Attachment C:

Compilation of All Public Comments Received as of June 11, 2026

June 10, 2026

Adria Brooks, PhD | adriabrooks@gmail.com

Dear COT Planning Staff and Commission,

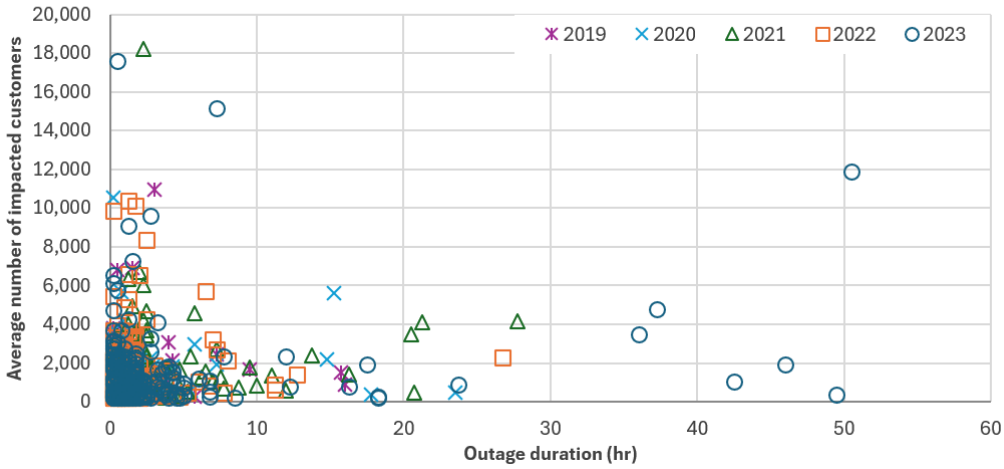
This letter is in response to a request I received from City staff on how to better define the backup generation requirements of the proposed data center land use code from the June 2026 Planning Commission meeting. I have also included some information on noise and heat island impacts due to data centers which can help quantify the setbacks requirements in the proposed code. I include this information as questions on these topics were raised in the recent Commission meeting and it seemed more information could help move the discussion forward.

Backup Generation Information

I suggested that a set duration of storage—battery or otherwise—backup should be required of potential data centers, either in addition to or in lieu of diesel generation (data centers' preferred backup power source). The proposed "storage-first" backup generation requirement will reduce the amount of time that diesel generators will need to be used, reducing local air pollution, noise pollution, and carbon emissions. I also suggested the code either allow for or require data centers to shift their load to backup generation at the request of TEP during times of peak load, grid stress, and emergency situations. This requirement will help improve reliability for the entire TEP footprint, as TEP can prioritize providing power to other grid users during generation capacity shortages. It will also help with affordability by reducing the number of new power plants TEP will need to invest in to serve the new load coming into the territory.

Severity of individual electric service outages in Pima County between 2019-2023

Data source: LBNL analysis of U.S. Department of Energy's Environment for the Analysis of Geo-Located Energy Information (EAGLE-I) | Adria Brooks, June 2026



June 10, 2026

Adria Brooks, PhD | adriabrooks@gmail.com

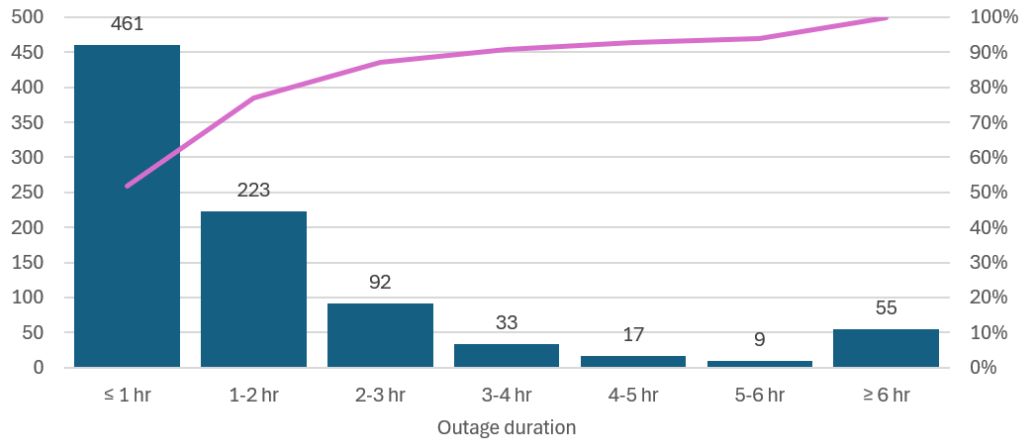
Given the aim of supporting grid reliability and affordability by load shifting, I examined five recent years of electric outage data for Pima County.[1] The figure below shows the severity of individual outages—both the duration of the outage and the average number of customers impacted during each event—which occurred between 2019-2023. The vast majority of outages last less than 4 hours.

Outage duration is not a perfect measure of the generation capacity shortage duration—outages can be and often are caused by downed power lines and not a lack of generation availability—but it is a good proxy measure to understand the County's reliability needs. A data center should shift their load to backup generation for the length of common service interruptions to alleviate stress on TEP to serve both the data centers and other customers currently without power.

While the requirement to shift load to backup generation could be done regardless of the generation resources used by the data centers, sizing the required batteries to match the length of common outages would be wise to limit the harmful impacts of diesel generation. The figure below shows the count of all outages by duration in Pima County between 2019 and 2023. Half lasted one hour or less, 75% lasted two hours or less, and 90% lasted four hours or less. These same trends followed for outages that occurred during the summer months, when TEP is most likely to experience capacity shortfall during peak demand conditions. A battery that is sized to support the typical load of the data center for two hours aligns with 75% of historic outages. A battery sized for four hours could help support TEP through nearly all their common outages without diesel generation use. I specify sizing for "typical" operation instead of "peak" operation because a data center, if requested, may be able to re-schedule high compute tasks—those that cause major spike in energy demand—for later hours after the outage or period of grid stress has resolved. This would limit the size of the battery needed.

Count of electric service outages in Pima County between 2019 -2023, organized by length of outage.

Data source: LBNL analysis of U.S. Department of Energy's Environment for the Analysis of Geo-Located Energy Information (EAGLE-I) | Adria Brooks, June 2026



[1]Outage data compiled by the U.S. Department of Energy is organized by county and not utility, so I cannot separate TEP's outages from TRICO's.

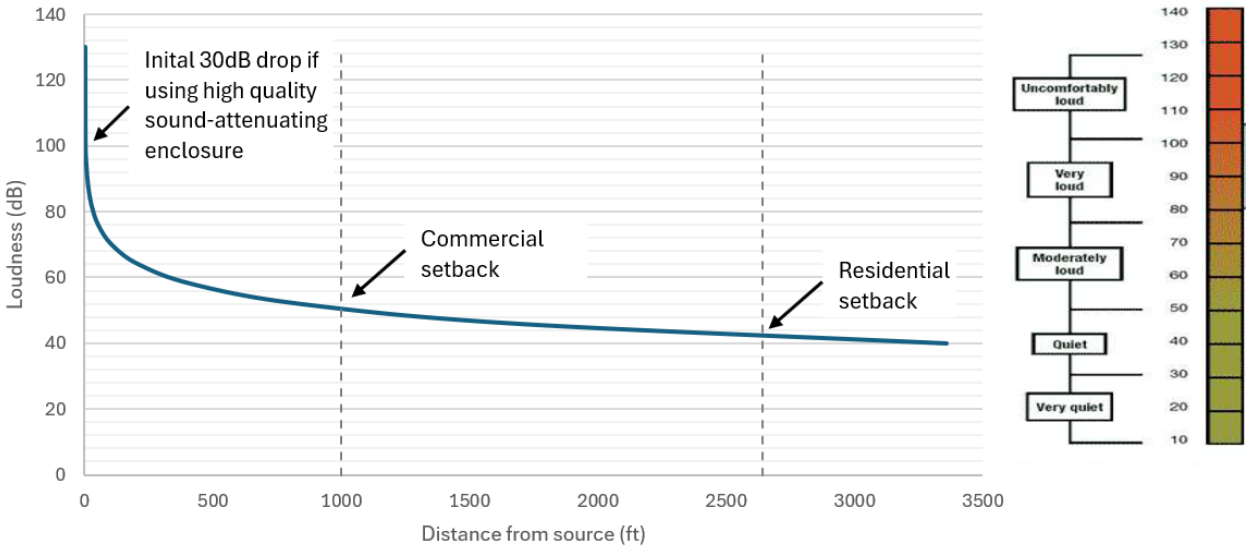
June 10, 2026
Adria Brooks, PhD | adriabrooks@gmail.com

Noise Impacts

Community members have express concerned about the noise caused by the data centers. Historically, industrial noise concerns have been related to the volume of operations. The loudest data center operation is during regular maintenance and backup use of their diesel generators. The figure below shows the volume (sound pressure, measured in dB) of a set of diesel generators based on the distance from the generators. A set of generators would likely be ~130 dB at the source. High-quality sound attenuating structures enclosing the backup generation room would reduce this by ~30 dB (dB Engineering. 2022). Given the 1,000 ft and 2,640 ft commercial and residential setback limits, respectively, proposed in the most recent code amendment draft, the noise of diesel generators housed in a high-quality sound enclosure should reach "quiet" levels between 40-50 dB.

Presumably, Tucson's codes already have requirements for the use of sound attenuating enclosures at the diesel generator source—though worth checking—so any other sound-attenuation measures would be in addition to that. Given the exponential nature of sound attenuation, additional setbacks would have marginal impact on reducing the volume of data center operations. But requirements for additional sound-attenuating vegetation or decorative barriers would continue to reduce noise volume, if desired.

Loudness of several diesel generators given distance from source across an open area
Source: dB Engineering "Generator Set Noise Solutions" (2022) | Adria Brooks, June 2026

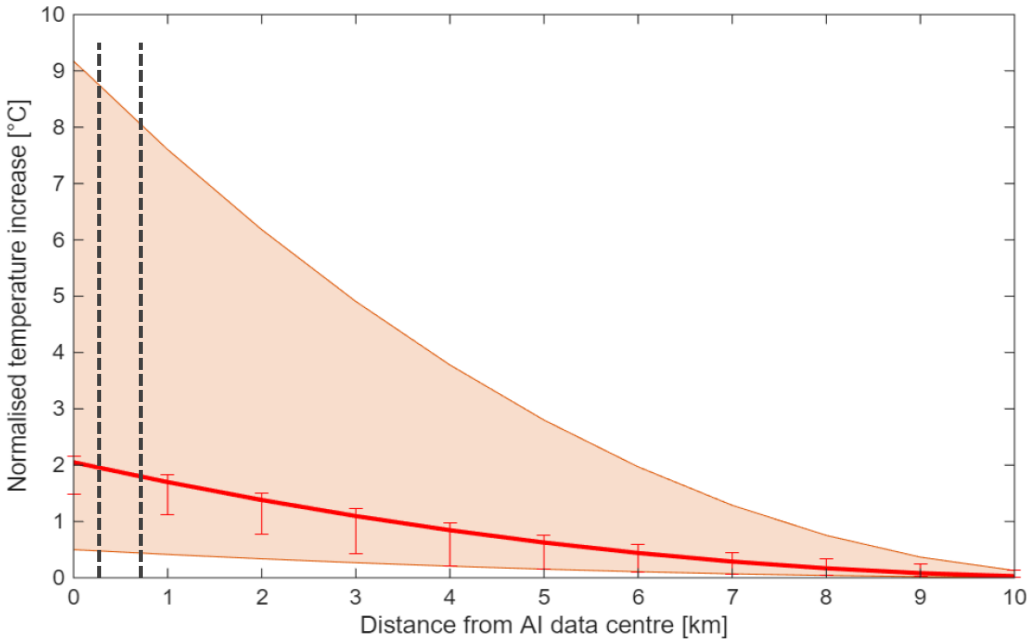


There is also emerging concern about low-frequency hum of electronic noise produced by data centers during all operations, not just during diesel generation use. This is most definitely not my area of expertise. I did pull a recent literature review from academia (Alves, J.A., et al. 2020) on the human health impacts of low-frequency noise—though computing noise was notably absent from the papers reviewed—to aid the discussion. It is attached. From my quick read of the paper, it seems that low-frequency noise has unique impacts on human health separate from hearing loss, but those impacts are still related to the volume of the low-frequency noise. Most of the reviewed papers note health impacts at a volume of at least 40dB, but a few noted impacts at lower volumes. Hopefully, the setback

requirements in the proposed regulations should help limit the impacts of this low-frequency hum on nearby community members by attenuating the volume of the noise.

Heat Island Impacts

Heat island has a huge impact on desert communities and is well studied for urban and energy development sites. Information is emerging about the heat island impacts of data centers, and they are non-trivial. One recent study which considered the heat impacts of data centers in suburban and remote parts of the world found that large data centers result in an average increase of local temperature by 2.0˚C (3.6˚F). These temperatures do not dissipate until 10km (6.2mi) away from the source. The figure showing the heat impact as a function of distance from Marinoni, A., et al. (2026) is shown below with the addition of hatched lines representing the City's proposed 1000ft and 2640ft setback limits.



A series of recent studies conducted on hyperscalers in the greater Phoenix area (Sailor, D., et al 2026) confirm these results. In those studies, field temperature measurements were taken in neighborhoods both down and upwind of several hyperscalers. An increase of 1.0˚C (1.8˚F) was found in the communities upwind of the data centers as far as 500m (0.3 mi, 1640 ft) away from the center, all due to waste heat from data center operations.

These are very real concerns for desert communities and can produce a feedback loop where additional air conditioning use is required to combat the increased heat, in turn creating more heat due to increased energy consumption (Sailor, 2026). Unlike with noise attenuation, additional setback requirements would help limit the impacts of heat on surrounding communities. Additional heat attenuation measures include requirements for native and naturally cooling landscaping, enhanced landscape borders, and low lot coverage percentages. I do not know what a good measure for these three characteristics are, but a heat island expert or planner would. Additionally, a heat impact study could be required of all data center applications with requirements to mitigate waste heat to acceptable levels.

applied sciences

MDPI

Review

Low-Frequency Noise and Its Main Effects on Human Health—A Review of the Literature between 2016 and 2019

Juliana Araújo Alves [1,*], Filipa Neto Paiva [2], Lígia Torres Silva [2] and Paula Remoaldo [1]

[1] Lab2PT–Landscape, Heritage and Territory Laboratory, University of Minho, 4710-057 Braga, Portugal; premoaldo@geografia.uminho.pt

[2] CTAC–Centre for Territory, Environment and Construction, University of Minho, 4800-058 Guimarães, Portugal; filipa_paiva@sapo.pt (F.N.P.); lsilva@civil.uminho.pt (L.T.S.)

* Correspondence: jalves.geografia@gmail.com

Received: 5 July 2020; Accepted: 27 July 2020; Published: 28 July 2020

Abstract: This paper summarizes the presently available knowledge about the association between low-frequency noise and its effects on health. A database was constructed with a total of 142 articles published between 2016 and 2019 regarding low-frequency noise exposure and its effects on health. A total of 39 articles were analysed in depth. The articles were divided into categories according to the effects on human health addressed. Regarding the emitting source, there was a greater number of articles addressing issues related to sources of environmental noise and noise from wind turbines. As for the effects generated on human health, there was a greater number of articles referring to the effects on sleep disorders, discomfort, sensitivity to and irritability from noise, annoyance, hearing loss, and cardiovascular diseases, and these effects are analysed in more detail in the present article.

Keywords: low-frequency noise; human health; impacts; environment; literature review

1. Introduction

At the worldwide level, there is a large number of studies on health impacts due to occupational and environmental exposure to noise. However, there are still few studies focusing exclusively on health impacts and discomfort due to low-frequency noise (Figure 1). One of the main reasons for this is the low sensitivity of the human auditory system to low frequencies. On the other hand, this type of noise has very particular characteristics and causes much more discomfort and long-term, non-auditory effects [1–3].

In the 1920s, research on the subject focused on occupational exposure and generally reported physiological changes such as pain in the hands, swelling, and increased vascular tone [4–6]. Until the 1930s, it was believed that the effects of noise on health were restricted only to hearing loss. In a study published in the Journal of the Acoustical Society of America, Jüichi Obata et al. [7] concluded that the effects of noise on human health went beyond hearing loss.

After the low contribution to the improvement of this scientific field in the 1960s, the 1970s were marked by the emergence of a series of studies addressing annoyance caused by environmental noise [1].

Consequently, during the 1970s and 1980s, studies started focusing on the impacts due to exposure to environmental noise [8,9]. The 1990s were marked by research aimed at more specific impacts on human health and reported discomfort due to noise [9–11]. Furthermore, these studies correlated exposure to noise with the onset of cardiovascular diseases [12,13].

In the 1990s, the World Health Organization (WHO) published documents on the subject, such as the Guidelines for Community Noise, in 1999. Regarding the studies published during the 2000s,

the most important are those directed at specific environments, such as schools and residential areas [14,15]. These studies used a comparison of the noise level measured by using reference curves with the aim of assessing noise discomfort and reinforced the fact that the A-weighting filter is not ideal to evaluate the non-auditory effects of low-frequency noise (LFN) [1–3]. From 2005, the studies that stand out are oriented to the impacts of low-frequency noise on the quality of sleep [16–18].

In general, these studies were carried out with voluminous samples involving patient reports, the application of questionnaires, the adoption of cross-sectional studies based on databases, and the comparison of environmental noise levels measured using criteria curves.

In fact, these studies reinforced the fact that low-frequency noise is a powerful stressor. The most cited effects on human health refer to emotional changes such as annoyance [19,20], agitation, and distraction [2,21,22], in addition to the association of low-frequency noise with cognitive alterations [23], the development of cardiovascular diseases [24,25], sleep disorders [26], and high blood pressure [27], and, more recently, the effects of industrial low-frequency noise on dental wear [28,29].

In the field of occupational medicine, there is a large number of studies that claim that low-frequency noise is an agent that interferes with the performance of work tasks [22,30]. In addition to these changes, noise can be an agent that affects mental and physical health.

In this sense, the effects of noise pollution comprise "auditory effects", which directly affect the human auditory system, and "non-auditory effects", i.e., the impact of noise on physiological functions. As regards "non-hearing effects", discomfort has been reported as the most frequent effect caused by exposure to low-frequency noise in humans [1,31,32].

In addition, the discomfort may vary from individual to individual and depends not only on the recorded noise pressure levels but also on the exposure time as well as the low-frequency components present in the measured sound levels. Thus, noise that contains low-frequency components tends to be more annoying than noise without them [1,33–35].

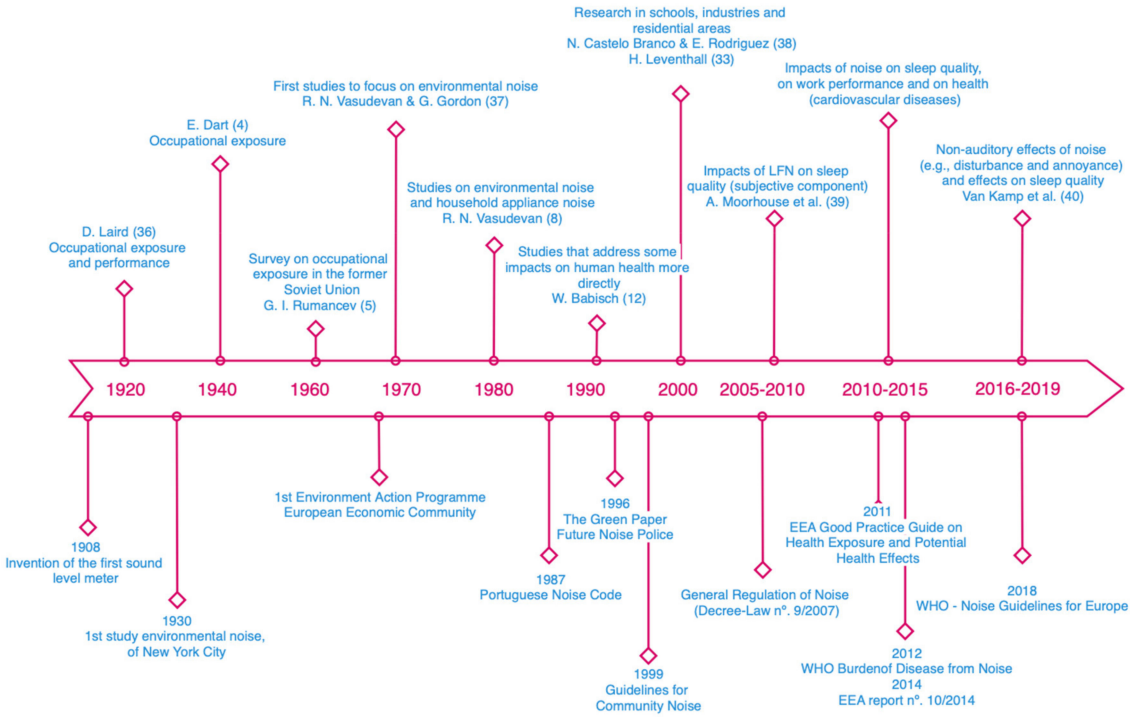


Figure 1. A summary regarding health effects due to low-frequency noise exposure. Source: own elaboration based on several authors [4,5,8,12,36–40].

Since 2000, the WHO has recognized low-frequency noise as an environmental problem. In addition, the health impacts of low-frequency components on noise are estimated to be more severe [1,33–35].

The WHO published its most recent noise pollution guidelines for Europe in 2018. This publication states that further research into the health impacts from wind turbine noise is needed, namely, the low-frequency component [35].

In fact, a systematic review of the up-to-date, peer-reviewed, epidemiological literature has been performed on the association between low-frequency noise and its effects on human health. The present paper aims to fill this gap in the literature.

The paper is structured into four sections. After the introduction, the methodology is outlined. A systematic review regarding scientific articles about low-frequency noise and its impacts on human health is presented in Section 3. The article concludes by highlighting the main conclusions of an in-depth analysis of 39 articles published between 2016 and 2019, some limitations of the research, and recommendations for further studies.

2. Materials and Methods

Database Collection

The original papers were identified by a literature search between October and December 2019 of all of the principal accessible journals and databases (PubMed, Web of Science, and Scopus) concerning the theme and using the following keywords: "low-frequency noise"; "low-frequency noise and its effects on health"; "noise pollution and health". A database was constructed with some variables, e.g., sample results and main noise sources. A total of 142 articles published between 2016 and 2019 was found (Supplementary Materials). Only studies were included in which it was mentioned in the title or abstract that the association between the low-frequency noise and effects concerning health or well-being was studied.

The 142 papers selected for the period from January 2016 to December 2019 were grouped into 9 categories: reviews; health effects due to noise and noise pollution; low-frequency sound/infrasound; health LFN case studies (small population); health LFN case studies (large population); LFN case studies (animals); laboratories studies, simulation studies, and computational case studies; and not relevant. A total of 39 articles published between 2016 and 2019 and grouped in the categories "health LFN case studies (small population)", "health LFN case studies (large population)", and, finally, "LFN case studies (animals)" were selected for in-depth evaluation. The evaluation carried out focused on the impacts on health, highlighting the incidence of studies aimed at human health and others aimed at carrying out tests on animals that may lead to a future study on humans. Additionally, the 39 articles evaluated used similar techniques (e.g., questionnaires; data previously collected in other studies; cognitive, physiological, and psychological tests based on medical and auditory equipment; noise measurements and audiometric assessments; and experimental tests based on noise exposure). The 39 articles evaluated were carried out mostly in Asian and European countries and were based on small samples.

3. Results and Discussion

This section presents the main results obtained from the analysis of articles published on low-frequency noise and its impacts on human health between 2016 and 2019. The results and discussion are structured in five sections on the main effects of low-frequency noise exposure on human health. Each section begins with a description of the methodologies used, followed by the main results achieved in the studies analysed.

3.1. Low-Frequency Noise Exposure and Its Main Health Effects

Table 1 presents a synthesis of the 39 articles based on three of the categories listed in the methodology section. These categories were as follows: cases of low-frequency noise studies in a small population, in a large population, and in a population of animals.

Of the 39 articles that were included in the evaluation of this article, it was observed that the main effects on human health are more prevalent in aspects such as sleep disorders (11.7%), discomfort, sensitivity and irritability to noise (10%), annoyance (13.3%), stress (6.7%), hearing loss (8.3%), reduced performance/fatigue (5%), heart rate/cardiovascular diseases (10%), tension and blood pressure (6.7%), anxiety (1.7%), depression (3.3%), imbalance (3.3%), and mental performance (6.7%).

There were also other effects on human health but with an incidence in very specific aspects (13.3%), such as the frequency of chromosomal aberrations in bone marrow cells, excess bilirubin, peptic ulcers (gastric and duodenal), effects on the cerebral blood barrier, haemodynamic events, irreversible imbalance with structural damage to the otoconial membrane, tinnitus and sound reconversion therapy, and vocal disorders and effort.

Only the effects on human health related to sleep disturbance, noise discomfort, annoyance, hearing loss, and cardiovascular disease were analysed, as these were the themes where a greater number of articles were observed, thus allowing a better comparison and evaluation between the various articles.

3.2. Sleep Disturbance

Sleep disturbance is one of the effects on human health that is due to exposure to noise, in particular, low-frequency noise. Long-term exposure to low-frequency noise from wind energy is a major factor in sleep disturbances in residents who live near wind farms. Abbasi et al. [41], Morsing et al. [42], Ishitake [43], Pohl, Gabriel, and Hübner [44], and Poulsen et al. [45] evaluated exposure to low-frequency noise due to proximity to wind turbines. The methodology adopted included the measurement of sound levels and, after the exposure of participants to wind turbine noise, an assessment of sleep disturbances.

The studies [41–43] applied questionnaires to participants to assess the disturbances they felt after exposure to noise. In the study by Abbasi et al. [41], in addition to the questionnaire, Pearson's correlation, analysis of variance, and multiple regression tests were applied for data analysis using software. Morsing et al. [42] evaluated the impact of noise on sleep as measured by polysomnography, after participants were exposed to wind turbine noise for three consecutive nights. Finally, Ishitake [43] assessed sleep disorders using the Athens Insomnia Scale method, based on the responses of participants when exposed to noise.

In the study designed by Pohl, Gabriel, and Hübner [44], the methodology of stress psychology with noise measurement was adopted, ascertaining the physical and psychological symptoms referenced by residents that participated in the study (general mental indisposition, performance and reduced work capacity, lack of concentration, fatigue, tension, nervousness, negative mood, dizziness, irritability, indisposition, reduced sleep quality, and annoyance) caused by exposure to noise from wind turbines. Moreover, Poulsen et al. [45] evaluated the evolution of medical prescriptions related to anxiolytics and antidepressants ingested by the populations living near the wind turbines, in an analysis that lasted two years (2012 to 2014).

Sleep disturbances may also be due to exposure to noise from oil and gas operations, namely in the construction and drilling of wells in residential areas [46]. Blair et al. [46] evaluated the impacts of these operations on human health, including sleep disorders. Sleep disturbances can also be linked to exposure to railway noise, as studied by Smith et al. [47]. They [47] evaluated the effects on physiological sleep resulting from the exposure of participants to railway noise for five consecutive nights, using polysomnography and questionnaires.

As for the results, Abbasi et al. [41] evaluated the effects of noise from wind turbines on the health of employees, divided into three groups (maintenance, safety, and administration). The group with the greatest exposure to noise was the maintenance team, who were considered as a reference group. Maintenance workers were subject to a higher sound level because they are in the vicinity of wind turbines, and higher GHQ (The General Health Questionnaire) scores were also recorded (the health assessment tool for individuals used in the study). Therefore, compared to those on management and safety staff, the harmful health effects of wind turbine noise are stronger on maintenance workers.

The questionnaire was divided into four sections, including somatic symptoms, anxiety and insomnia, social dysfunction, and depression. Based on the results obtained in this study, only the equivalent sound level had a significant effect on the general state of health and in some of its sections. The negative impact of noise exposure of 60 and 66 dBA on general health was approximately six and four times less than that of 83 dBA, respectively. The adverse effect of 60 dBA noise exposure in the anxiety and insomnia section was 1.6 times less than that in the 83 dBA exposure group. The effect of the experiment in the anxiety and insomnia section was 0.2 times greater than that of the 83 dBA noise exposure. This result indicates that the worst health status is due to working conditions and chronic exposure to occupational risk factors, such as noise. The results show that the effect of exposure to noise of 66 dBA in the social dysfunction section was 2.3 times less than that of 83 dBA noise. It was concluded that exposure to noise is significantly correlated with all subsections of general health, except depression. As a general evaluation of the article, the low-frequency noise from the turbines can cause harmful effects on the health of workers who are very close to the turbine, due to the reception of very intense noise [41]. By convention, a frequency A-weighting filter is used in low-frequency noise evaluation [3]. As a matter of fact, the A-weighting filter is not suitable for assessing the effects of low-frequency noise because this filter drastically reduces the low-frequency levels measured [3].

The results obtained by Morsing et al. [42] are due to the measurement of the effects of night noise from wind turbines on sleep measured physiologically in the laboratory. During nights with noise from the turbines, there was some incidence of participants with frequent awakening, less deep sleep, reduced continuous sleep, an increase in sleep disorders self-reported by the participants, and morning tiredness after the nights of noise exposure compared to nights without exposure to noise. Some evidence was observed in the study in which amplitude modulation and rotational frequency were varied; deeper sleep was negatively affected due to higher frequency and strong amplitude modulation while light sleep increased with high frequency and acoustic beat [42].

Blair et al. [46] monitored continuous levels of audible and low-frequency noise during the construction and drilling of oil and gas wells in a residential area. The equivalent monthly levels of continuous noise varied between minimum values of 51.5 and 73.1 dBC, and maximum values of 60.2 to 80.0 dBC. On the one hand, Blair et al. [46] found that continuous weighted noise levels above 50 dBA can have effects on health, such as increasing the risk of cardiovascular disease and hypertension. On the other hand, they found that low-frequency noise levels that exceeded the recommended level of 60 dBC caused nausea and headaches. In a general analysis of the article, the average noise levels in an oil and gas well during construction and drilling exceeded the levels associated with annoyance, sleep disturbances, and cardiovascular health effects; that is, they were higher than 50 dBA or 60 dBC [46].

Ishitake [43] conducted an epidemiological study that suggests that the noise generated by wind power generation facilities may be a risk factor for effects on human health, especially sleep disturbances. In this study regarding sleep disturbances caused by infrasound, it was found that the noise level of the wind turbine measured in the lower frequency range is below the human sensory threshold. As mentioned by Ishitake, 63% reported having sleep disturbance; the effect was reduced with increased distance between the source and the receiver [43].

Pohl, Gabriel, and Hübner [44] carried out a study that combined the methodology of stress psychology with noise measurement. They conducted interviews with residents who lived close to a wind farm and assessed their perception of noise from the wind farm and road traffic at two different points in time, first in 2012 and later in 2014. Residents complained of physical and psychological symptoms due to traffic noise (16%) and noise from wind turbines (10% and 7% in 2012 and 2014, respectively). In the study, 12 symptoms caused by exposure to noise were evaluated. It was found that the participants reported more symptoms in 2012 than in 2014 and the most strongly irritated participants considered their overall health in 2014 to be improved. The sleep disorders assessed decreased from 2012 to 2014. Distraction also decreased slightly from 2012 to 2014 for the most irritated residents, while remaining relatively low and/or unchanged in the other groups. However, only a few participants showed evidence of noise from low-frequency wind turbines: in 2012, 8.5% reported

feelings of pressure related to wind farms and 6.1% reported having felt vibrations in the body; in 2014, these feelings decreased to 6.8% and 3.8%, respectively. The annoyance experienced was very low, and symptoms of dizziness were not observed in this study. Regarding the effects of wind noise stress compared to road traffic noise, there were more reports of symptoms due to traffic (15.8%) than to noise from wind turbines. In 2014, it was observed that about a third (34.9%) of the participants were slightly irritated by traffic noise and 21.2%, by noise from the wind farm [44].

Poulsen et al. [45] determined the numbers of prescriptions for anxiolytics and antidepressants for residents due to prolonged exposure to noise from wind turbines. During the survey carried out between 1996 and 2013, 68,696 adults had recourse to sleeping pills and 82,373 used antidepressants, out of a population of 583,968 and 584,891, respectively. In this study, it was observed that people over the age of 65 years were more affected by the noise of wind turbines, with an HR (hazard ratio) of 1.68 for measuring sleep and 1.23 for antidepressants being found for the group with the greatest exposure. Regarding low-frequency noise due to wind turbines in indoor environments, the risk rate among people aged 65 and over when exposed to noise equal to or higher than 15 dB was 1.37 for anxiolytics and 1.34 for antidepressants. Thus, Poulsen et al. [45] concluded that the combination of high noise levels from wind turbines and the use of anxiolytics and antidepressants can induce sleep disturbance and, in turn, affect the mental health of the elderly [45].

Finally, Smith et al. [47] demonstrated that sleep was significantly affected, both in terms of physiological measures and by self-report, during nights with exposure to 45 dB noise, although the number and size of the effects were modest. Most self-reported sleep measures were adversely affected by terrestrial railway noise. In this study, no significant differences were found in the general sleep structure or disorders and in the subjective quality of sleep between the reference tests and the 35 dB night tests. The results obtained support the value of the Swedish guidelines proposed for the maximum noise level of 35 dB for indoor environments and may be suitable for protection against adverse sleep problems due to terrestrial railway noise [47].

3.3. Discomfort from, Sensitivity to, and Irritability from Noise

Discomfort, sensitivity to noise, and irritability are other effects on human health due to exposure to low-frequency noise.

Huang, Pan, Liu, Hou, and Yang [48] analysed acoustic comfort and developed a noise analysis model for a skyscraper by measuring exterior noise, mainly from road traffic.

Suzuki, Suzuki, Onishi, and Penido [49] performed audiometric assessments on patients with persistent tinnitus, through their perception of sounds of nature and everyday life and their comparison with a pure tone or noise (white noise, narrow-band low frequency and narrow-band high frequency). The assessments considered in the patients were otorhinolaryngological, audiological, Pitch Matching and Loudness, Visual Analogue Scale, Tinnitus Handicap Inventory, and Minimum Masking Level [49].

Lee et al. [50] determined the effects of exposure to transport noise and established a relationship with the blood pressure of residents of residential buildings. They determined noise exposure levels (Lden, Lday, and Lnight) through adjusted linear regression analysis and established the relationship with blood pressure [50]. They also conducted a questionnaire related to the annoyance caused by internal noise, noise sensitivity, and sociodemographic variables [50].

Tao, Wang, Zou, Li, and Luo [51] assessed the irritation from noise in a metro depot and the influence of noise in adjacent residential buildings. They carried out a questionnaire with people working at the metro station and took field measurements, both at the metro station and in the adjacent residential buildings [51].

Moradi et al. [52] studied the effects of noise on the selective attention of university students. They conducted questionnaires to determine students' personality traits; that is, they assessed whether they were extroverted or introverted and analysed their stability or instability [52]. In addition, they also assessed the level of sensitivity to noise using the Weinstein sensitivity scale and the level of selective attention using the DUAF test from the Vienna Test System [52].

Alves, Silva, and Remoaldo [53] analysed the effects of exposure to low-frequency noise pollution emitted by poles and power lines on the well-being of the population, based on a study carried out on "exposed" and "unexposed" populations in two residential areas. Additionally, adapted audiometric tests were carried out to complement the analysis and determine the audibility thresholds of "exposed" and "unexposed" volunteers. To develop the research, Alves, Silva, and Remoaldo [53] used sound level measurements and sound recordings (recordings made at a distance of 5 m from the source), as well as the adapted audiometric performance test [53].

Regarding the results, [48] observed that, due to the effect of the ground, the effect of medium propagation, and the different frequency components, the comfort of the sound does not increase with distance from the ground, that is, on the highest floors. They concluded that low-frequency noise has great potential for the annoyance and discomfort of the residents of the building.

Suzuki et al. [49] identified 181 tinnitus complaints in which pure-tone-type tinnitus was observed in 93 (51%) of the responses (4 low pitch and 89 high pitch) and from noise in 88 (49%) responses (15 low frequency and 73 high frequency). Regarding tinnitus with a low-frequency sensation, 19 responses were determined, while for that with a high-frequency sensation, 162 responses were found. They determined a Visual Analogue Scale average of 5.47 for tinnitus similar to pure tone and 6.66 for that similar to noise, with a higher value for noise. The average loudness of tinnitus similar to pure tone was 12.31 dBNS, and that similar to noise was 10.54 dBNS. For the Tinnitus Handicap Inventory and the Minimum Masking Level, the patients considered in the study were separated into three groups with tinnitus, pure tone, noise, and multiple, with the mean of the largest Tinnitus Handicap Inventory in the group with multiple tinnitus being 61.38. For the Minimum Masking Level, masked noises of the type white noise and narrow band [49] were used.

Lee et al. [50] concluded that general noise (road and rail traffic) and road traffic showed higher associations with systolic blood pressure (SBP) than with diastolic blood pressure (DBP), while rail noise had similar associations with SBP and DBP. They also observed that the closest associations between exposure to noise and blood pressure were estimated for participants who reported higher classifications of annoyance, irritation, and sensitivity to noise. This indicates that the annoyance of internal noise and sensitivity to noise develop regardless of the level of exposure to external noise. They also found that people who were sensitive to noise and participants who were most irritated due to internal noise had significantly higher SBP and DBP than the rest. In addition, the regression coefficients between noise exposure and blood pressure increased slightly in a subgroup that excluded participants exposed to high railway noise [50]. The results established by Lee et al. [50] support the hypothesis that long-term exposure to transport noise is associated with higher blood pressure in adults living in multi-storey residential buildings.

Tao et al. [51] concluded that 96% of respondents feel disturbed by noise and 31% of them feel that the impact of noise is serious. They noted that closing doors in buildings may be a solution, but only a reduction in noise from the low-frequency structure in the range 63 to 125 Hz occurs. They found that there is a problem of annoyance from low-frequency noise. They evaluated that the noise level caused by the fans decreases with the height of the floors. Ventilation noise is one of the dominant noise sources for adjacent buildings, and, therefore, they found that the shorter the distance between the building's fans and ventilation, the more severe the impact of the noise. They also concluded that the noise attenuation rate increases with an increase in the distance to the noise source [51].

Moradi et al. [52] concluded that there were no significant differences in the average time spent on correct answers before and after exposure to noise between extroverted and introverted participants; however, there was a significant difference among extroverts in the average time spent on correct answers before and after exposure to noise. The results showed that introverted participants are more sensitive to noise than extroverts. The most noise-sensitive participants showed greater stimulation during exposure to noise, which led to increases in incorrect responses and a decrease in mental performance. Moradi et al. [52] found that the participants' personal traits are related to their annoyance

due to noise. Moradi et al. [52] concluded that stress due to noise improves selective attention in extroverted individuals.

Finally, Alves et al. [53] concluded that the "exposed" area has higher sound levels and, consequently, more problems with well-being and health than the "unexposed" population. Audiometric tests also revealed that the "exposed" population seems to be less sensitive to low-frequencies than the "unexposed" population; that is, the "exposed" group needs a higher sound intensity to perceive noise, especially at lower frequencies. The "exposed" group has a larger number of respondents with health problems (e.g., cardiovascular disease, insomnia, and depression), which can be caused by exposure to low-frequency noise emitted by power poles and lines. On the other hand, the "unexposed" group tends to perceive noise with a slightly lower sound intensity, due to the fact that this residential area is far from the emission source [53].

3.4. Annoyance

Annoyance is another effect on human health due to exposure to low-frequency noise.

Boyle et al. [54] assessed how the A-weighted exposure levels differed indoors and outdoors in homes in the vicinity of a natural gas compressor station, where low-frequency noise was found. They performed measurements of the noise levels defined in the A-weighted scale to filter most of the low-frequency noise and in the C-weighted scale to identify the impulse noise (noise measured in less than one second with peak levels 15 dB higher than the background noise) [54].

Van Kamp, Breugelmans, Van Poll, Baliatsas and Van Kempen [40], and Lee et al. [50] presented questionnaires to assess issues related to annoyance due to noise. Van Kamp et al. [40] surveyed complaints due to low-frequency noise using existing data and by means of a questionnaire determining participants' annoyance due to noise from road, rail, and air traffic sources, low-frequency noise, construction noise, and noise sensitivity; the residential satisfaction index; and a survey of measures applied in the residence to avoid noise. As for the study by Lee et al. [50], the methodologies adopted are referenced in Section 3.3.

The methodologies adopted by Blair et al. [46] and Pohl, Gabriel, and Hübner [44] are referenced in Section 3.2 However, according to [46], noise levels above 50 or 60 dBA can cause annoyance.

Ishitake [43] assessed the level of annoyance regarding the source of low-frequency noise generated by wind energy and road traffic noise, by conducting a questionnaire to obtain these perceptions.

According to Hansen et al. [55], the presence of amplitude modulation in wind farm noise results in increased annoyance and possible sleep disruptions. The developed study investigated the prevalence of this characteristic in homes close to the wind farm [55]. In the article by Hansen et al., several important variables were considered, namely, the receiver-source distance, meteorological conditions, and proximity to reflective surfaces, among others.

Moradi et al. [52] assessed the level of selective attention through the DUAF test (test of selective attention, performance capacity, and general performance) and the level of annoyance based on the ISO15666 (International Organization for Standardization, 2003), based on the study sample referenced in Section 3.3.

As for the results, Boyle et al. [54] found that houses located close to a compressor station have higher average noise levels, both indoors and outdoors, than houses located at a distance greater than 300 m. The authors also found that noise levels during the day were higher than those recorded at night and that the residents of residences located less than 300 m from the station were exposed to low-frequency noise. In this study, they established the relationship of the results with the daytime and nighttime noise levels recommended for the prevention of hearing loss and annoyance, established by the WHO [56,57], and found that the average noise levels determined exceeded these guidelines [54].

Table 1. Studies selected and health effects related to low-frequency noise.

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2016	Zeitooni, Mäki-Torkko and Stenfelt [66]	27	Binaural hearing capacity	Evaluation of binaural auditory capacity in adults with normal hearing when bone conduction stimulation is applied bilaterally in the bone conduction hearing aid implant position, as well as in the audiometric position in the mastoid.	Exposure to low-frequency noise (400 to 600 Hz) and high-frequency noise (3000 to 5000 Hz).	The results confirmed that the binaural auditory processing with bilateral bone conduction stimulation in the mastoid position is also present in the bone conduction hearing aid (BCHA) implant position. This indicates the capacity for binaural hearing in patients with good cochlear function when using bilateral BCHAs.
2016	Walker, Brammer, Cherniack, Laden and Cavallari [63]	10 (male)	Heart rate variability and stress	The authors conducted a sound monitoring campaign between February 2015 and February 2016 across the city of Boston, MA. Boston occupies an area of 124 square kilometres with an estimated population of close to 700,000 individuals. To identify potential monitoring sites, the authors divided the city of Boston into 500 × 500 m grid cells using ArcGIS. They constructed a list of all accessible potential sites (n = 525), and 400 site locations were randomly selected for monitoring by time of day. Convenience sampling was also conducted in certain areas of the city to ensure adequate coverage of varied land use and urban activity. The participants underwent an outpatient electrocardiogram. Blood pressure measurements and saliva samples were collected before, during, and after exposure to noise.	Low-frequency noise (31.5 to 125 Hz at 75 dB (A)); high-frequency noise (500 to 2 kHz at 75 dB (A)); 50 dB (A) "noise-free" exposure.	During exposure to noise, reductions in heart rate variability of 19% (−35; −3.5) with low-frequency power and 9.1% (−17; −1.1) were observed according to the quadratic difference average between adjacent normal heartbeat intervals. During exposure to low-frequency noise, reductions in heart rate variability of 32% (- 57; −6.2) with high-frequency power, 34% (−52; −15) with low-frequency power and 16% (−26; - 6.1) according to the standard deviation of the adjacent normal heartbeat intervals. During exposure to high-frequency noise, reductions in heart rate variability of 21% (−39; −2.3) with low-frequency power compared to that with exposure to noise.
2016	Liu, Young, Yu, Bao and Chang [67]	1002	Hypertension and blood pressure	Personal noise measurements and environmental analysis of octave bands were carried out to divide workers into similar exposure groups based on the similarity and frequency of the tasks they performed in the company, thus creating a high exposure group (≥80 dBA), another of medium exposure (75–79 dBA), and another of low exposure (<75 dBA).	Noise at frequencies of 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, and 8 kHz during the working period.	Participants exposed to ≥80 dBA for 8 years had a higher relative risk of hypertension (relative risk = 1.38, 95% confidence interval: 1.02, 1.85) than those exposed to <75 dBA. Significant exposure–response patterns were observed between incident hypertension and the stratum of exposure to noise at frequencies of 250 Hz, 1 kHz, 2 kHz, 4 kHz, and 8 kHz. The strongest effect was found at the frequency of 4 kHz, and a 20 dBA increase in noise exposure at 4 kHz was found to be associated with a 34% higher risk of hypertension (relative risk = 1.34, confidence interval of 95%: 1.01, 1.77).
2016	Selander et al. [58]	1,422,333	Hearing dysfunction in children due to noise during pregnancy	Occupational noise exposure during pregnancy, according to the prospective cohort study, FENIX (foetal noise exposure), based on births between 1986 and 2008.	Low-frequency noise (<75 dBA); high-frequency noise (≥85 dBA); medium-frequency noise (75–84 dBA).	In the sample, in a mixture of part-time and full-time workers during pregnancy, HR adjusted for hearing impairment associated with exposure to maternal occupational noise ≥85 vs. <75 dB LAeq, 8 h was 1.27 (95% CI: 0.99 1.64; 60 exposed cases). When restricted to children whose mothers worked full time and had less than 20 days of absence during pregnancy, the HR was 1.82 (95% CI: 1.08, 3.08; 14 exposed cases).

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2016	Abbasi et al. [41]	53	General health; somatic symptoms; anxiety; insomnia; social dysfunction; depression	Study of the effect of wind turbine noise on the general health of employees at a wind farm, with workers divided into three groups: maintenance, security, and office workers. Equivalent sound levels were measured for each group. The individuals' health data were assessed using a 28-item questionnaire. Pearson's correlation, analysis of variance, and multiple regression tests were performed for data analysis using software.	In the maintenance team, an LAeq of 83 dBA was considered, an LAeq of 66 dBA was considered in the security team, and an LAeq of 60 dBA, in the administration team.	Exposure to noise is significantly correlated with all subscales of general health, except depression. The low-frequency noise from the turbines can cause harmful effects on the health of workers who are very close to the turbine and receive very intense noise.
2016	Wang et al. [59]	2700	Cardiovascular diseases; hearing loss.	The authors carried out the study in the metropolitan area of Taichung, Taiwan and set up 50 monitoring stations to collect related information on noise measurements, traffic flow rates, speed limits, and meteorological data. The 50 monitoring stations included 4 agricultural areas, 6 green-land areas (e.g., parks, forests, and mountains), 2 conservation areas, 8 culture-educational areas (i.e., schools, temples, and churches), 11 residential areas, 4 industrial areas, 1 stream-channel area (e.g., harbours), 7 commercial areas, 6 governmental areas (i.e., governmental agencies and institutes), and 1 recreational area. Determination of exposure to traffic noise by measuring the average equivalent noise levels A (LAeq, 24 h) in 50 monitoring stations (25 road traffic stations and 25 non-commercial ones) covering 10 different types of land use.	Equivalent continuous sound levels (Leq, 24 h) in the range of 30–130 dBA; noise levels with the time-weighted average (TWA) at frequencies of 31.5, 63, 125, 250, 500, 1000, 2000, 4000, and 8000 Hz.	The Leq annual average, 24 h in Taichung was 66.4 ± 4.7 dBA, exceeding the threshold for cardiovascular disease prevention. The mean annual Leq, 24 h in the flow and commercial channel areas was 71.2 ± 1.0 and 70.0 ± 2.6 dBA, respectively, revealing a potential risk of hearing loss among residents. The noise levels at 125 Hz had the highest correlation with total traffic and the highest forecast in multiple linear regression.
2017	Vasilyeva, Bespalov, Semenov, Baranenkoand Zinkin [68]	96 rats	Frequency of chromosomal aberrations in bone marrow cells; levels of low molecular weight DNA (lmwDNA) in blood plasma.	Exposure to single or multiple LFN from male Wistar rats and their comparison with those in the control group. The control group rats were not subjected to any impact. Measurement of the frequency of chromosomal aberrations in bone marrow cells and the levels of lmwDNA in blood plasma.	Frequency below 250 Hz; simple LFN with sound pressure levels (SPL) of 120 dB; multiple LFN with 150 dB SPL.	Blood plasma lmwDNA levels measured the following day after a single exposure to LFN were significantly higher (7.7 and 7.6 times, respectively) than in the control group (11.0 ± 5.4 ng/mL), and these levels were higher (4.8 and 2.1 times, respectively) in the week after a single exposure of LFN to the SPL of 120 and 150 dB, respectively, than in the control group (18.8 ± 1.6 ng/mL). Similar results were obtained in the group with multiple exposures to LFN (36.4 and 22.4 times, respectively) compared to the control group (17.7 ± 1.7 ng/mL) and suggest an increase in cell apoptosis as a result of impact of the LFN.
2017	Boyle et al. [54]	11	Noise disturbance from natural gas compression stations.	Assessment of how A-weighted exposure levels differ indoors and outdoors in homes near the natural gas compressor station, where low-frequency noise was found. Measurement of noise levels defined in the A-weighted scale to filter out most of the low-frequency noise and in the C-weighted scale to identify the impulse noise.	-	Houses located close to a compressor station have higher average noise levels, both indoors and outdoors, than houses located more than 300 m away. Noise levels during the day were higher than at night. Residents of residences located less than 300 m from the station were exposed to low-frequency noise. The daytime and nighttime noise levels recommended for preventing hearing loss and annoyance were exceeded.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2017	Van Kamp, Breugelmans, Van Poll, Baliatsas and Van Kempen [40]	3972	Annoyance due to low-frequency noise	Survey of complaints due to low-frequency noise, based on analysis of existing data. Conducting a questionnaire with participants addressing aspects such as annoyance and sensitivity to noise, sources of emission, and residential satisfaction, among others.	-	The level of background noise, sensitivity to noise, and dissatisfaction with the residential situation were strongly associated with higher levels of annoyance. The lower the background noise levels, the greater the annoyance due to tinnitus. Low-frequency noise is particularly a problem in places with low levels of background noise.
2017	Ohgami, Oshino, Ninomiya, Li and Kato [60]	Rats	Hearing loss; imbalance	Conducting an experimental study in which wild type rats were exposed to similar low-frequency noise and the assessment of noise-induced hearing loss and determination of the rats' imbalance.	Low-frequency noise (70 dB, 100 Hz)	The authors observed that a sound stimulation at 375 Hz at a frequency lower than the audible range of the rats causes a hearing reduction in wild type rats, and in rats with an abnormal otolytic morphology, this hearing loss was not observed.
2017	Venet et al. [61]	117 rats	Effects on hearing	Evaluation of exposure to the combination of low-frequency noise and carbon disulfide.	Low-frequency noise, ranging from 0.5 to 2 kHz at an intensity of 106 dB SPL.	Exposure to CS_2 (250 ppm or more) and noise increased the extent of the damaged frequency window, as a significant hearing deficit was measured at 9.6 kHz in these conditions; in addition, the significance at 9.6 kHz increased with solvent concentrations. Histological data showed that neither hair cells nor ganglion cells were damaged by CS_2.
2017	Alimohammadi and Ebrahimi [69]	89	Mental performance	All participants underwent the Stroop and Cognitrone tests in silent conditions, after 30 min of exposure to LFN and HFN. The Cognitrone test assesses concentration and attention, and the Stroop interference test is a sensorimotor speed test that records the performance of reading speed.	Low-frequency and high-frequency noise at 50 and 70 dBA.	Both noises emitted (LFN and HFN) not only caused precision in scaling the response but also reduced the duration of the test run. It was concluded that, disregarding the distribution of energy frequencies, noise improved the task performance of participants. The results illustrated that individuals under LFN performed the Cognitrone test more quickly than individuals under HFN.
2017	Huang, Pan, Liu, Hou and Yang [48]	-	Noise disturbance	Analysis of acoustic comfort and development of a noise analysis model for a skyscraper, through the measurement of exterior noise, mainly road traffic noise. The selection of measuring points was made on the horizontal and vertical planes and strictly follows the guidelines (Chinese standard JTG B03–206 and HJ 2.4-2009). The noise measurement instruments were an AWA6270+B noise analyser, AWA6228 frequency analyser, and TES1350A sound level meter.	-	A higher capacity to respond to high-frequency than low-frequency mining noise (LF) was observed, which probably reflects the audibility of the two frequency spectra.
2017	Mancera, Lisle, Allavena and Phillips [70]	57 rats	Effects on behaviour (stress), organ morphology, and faecal corticosterone.	Evaluation of the effects of noise from mining machines on the behaviour and physiological parameters (organ morphology and faecal corticosterone) of wild rats, when subjected to high- and low-frequency ranges, and comparison with a reference treatment without auditory stimuli.	High-frequency noise (>2 kHz); low-frequency noise (≤2 kHz).	The frequencies below and above 2 kHz had differential effects on male and female wild rats that can have important consequences for their well-being and survival.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2018	Morsing et al. [42]	12	Sleep effects	Evaluation of sleep effects, through polysomnography measurement and questionnaires, in 2 pilot studies, due to noise exposure from wind turbines. Six participants spent five consecutive nights in an ambient sound laboratory and, for three nights, were exposed to the noise of the wind turbine with the variation of some parameters.	High-frequency (>125 Hz) and low-frequency noise (125 Hz). Similar to a ventilation noise, a low background noise (18 dB LAeq) was used.	During nights with noise from the wind turbine, there were sleep disturbances compared to during control nights. Deeper sleep was negatively affected by higher rotational frequency and amplitude modulation, but light sleep increased with high rotational frequency and acoustic beat.
2018	Blair, Brindley, Dinkeloo, McKenzie and Adgate [46]	4 (residences)	Annoyance, sleep disorders, and cardiovascular effects	Determination of noise levels in a well block of oil and gas operations of several wells during construction and drilling in a residential area in Colorado and the verification of impacts on human health. A (dBA) and C (dBC) weighted noise measurements were collected at four residences located between 320 (1049.9 ft) and 550 m (1804.5 ft) from the site during development over a three-month period (February to April 2017).	A and C weighted noise levels of 60.2 dBA and 80 dBC, respectively.	Proportionally, 41.1% of continuous daytime equivalent daytime measurements and 23.6% of 1 min dBA exceeded 50 dBA, and 97.5% of daytime and 98.3% of nighttime measurements exceeded 60 dBC. Average noise levels in an oil and gas well during construction and drilling exceed levels associated with annoyances, sleep disturbances, and cardiovascular health effects (greater than 50 dBA or 60 dBC) in studies involving noise sources such as traffic, airports, wind turbines, and rail-related noise pollution.
2018	A.M. Abbasi, Motamedzade, Aliabadi, Golmohammadi andTapak [71]	35	Physiological effects and mental health (fatigue)	Participants were exposed to low-frequency noise and were ultimately asked to determine their level of mental fatigue. A cognitive test was performed to assess working memory (low, medium, or high workload). Software was used to assess mental fatigue, visual fatigue analogue scale, and psychophysiological indexes.	Low-frequency noise levels of 55, 65, 70, and 74 dBA.	The results showed that mental fatigue significantly affected heart rate, low- to high-frequency rates, and electroencephalogram rates. The results confirmed that the mental fatigue caused by low-frequency noise significantly impacted the participants' psychophysiological and working memory with exposure to noise levels of 65 to 75 dBA.
2018	Ninomiya et al. [72]	44 rats	Stress	A comparison of auditory levels and levels of expression of the Hsp70 protein in the cochlea was performed between rats exposed and not exposed to LFN.	Low-frequency noise (100 Hz to 95 dB).	The results showed that the inner ear may be one of the organs negatively affected by the stress caused by the inaudible exposure to LFN. Exposure to LFN increases the level of Hsp70 expression via Cebpb in the inner ear. The levels of Hsp70 and Cebpb may be candidates for biomarkers of responses to exposure to LFN.
2018	Rossi, Prato, Lesina and Schiavi [65]	25 (19 to 29 years)	Physiological effects (response time and heart rate)	The experiment involved 25 Italian volunteers (12 female and 13 male volunteers), aged 19–29 years. Before starting the test, each subject filled in a general questionnaire specifying age, occupation, musical experience, eyesight and hearing problems, and the presence of noise in their daily life. Measurement of changes in cognitive and physiological parameters in a sample of volunteers exposed to three types of noise in a hemi-anechoic room. Participants were involved in a cognitive task (Stroop effect) for 10 min in four different conditions: silence, multi-tonal broadband (BBN) stochastic noise, low and low-frequency stochastic noise (LFN1), and low-frequency stationary noise with regular amplitude modulation (LFN2).	Sounds reproduced with a sound pressure level equivalent to 93 dB; BBN noise based on frequencies between 315 and 2000 Hz; LFN1 with frequencies between 30 and 60 Hz; LFN2 with frequencies between 30 and 200 Hz.	In noise conditions, participants reduced their response times, that is, there was evidence of increasing stress. Dividing the participants into extroverts and introverts, it was demonstrated that LFN1 and LFN2 produced higher stress effects than BBN noise on cognitive performance and a physiological stress comparable to that produced by BBN noise.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2018	Zhou and Fu [62]	1404	Sensorineural hearing loss (SNHL); excess bilirubin (causes problems in the liver, spleen, kidneys, gallbladder).	Measurements of total serum bilirubin, tympanometry, and determination of the mean threshold of pure tones at low frequencies or high frequencies for a subset of adolescents, to assess levels of total serious bilirubin associated with different subtypes of sensorineural hearing loss.	Low-frequency noise (LPTA: 500, 1000, 2000 Hz); high-frequency noise (HPTA: 3000, 4000, 6000, and 8000 Hz).	Total serum bilirubin levels were associated with any high-frequency SNHL (HPTA > 15 dB in at least one ear) in adolescents in the USA; high-frequency SNHL with HPTA > 15 dB in both ears (bilateral) or with HPTA ≥ 25 dB in at least one ear had a stronger association with total serum bilirubin levels than HPTA > 15 dB in only one ear (unilateral) or HPTA = 15–25 dB in at least one ear.
2018	Ishitake [43]	9000 (≥20 years)	Annoyance; sleep disorders	Conducting an environmental epidemiological study and assessing the effects on sleep disturbance due to low-frequency noise generated by wind power installations, based on residents living in areas close to the source. Assessment of sleep disorders using the Athens Insomnia Scale. Assessment of environmental noise in residential areas (50 community centres) close to the noise source by measuring infrared and low-frequency sound exposure levels.	Infrared, low-frequency (20 Hz) and infrasound (<20 Hz).	As for sleep disturbances caused by infrasound (20 Hz or less), the noise level of the wind turbine measured in the ultra-low-frequency range is below the human sensory threshold. Of the participants, 63% heard the noise when the distance was less than 1000 m. However, the hearing rate decreased significantly when the distance was increased to 5000 m, when only 2% of the participants heard the noise. Based on the Athens Insomnia Scale, 40% of participants had sleep disorders when the distance was less than 1000 m. However, the frequency of sleep disorders decreased to 22% with an increase in distance. Amplitude-modulated sounds and pure tones contained in the noise generated by wind power generation facilities tend to increase annoyance.
2018	Chalansonnet et al. [73]	133 rats	Balance effects	Study of how exposure to low-frequency noise combined with 250 ppm CS_2 affects rat balance. Vestibular function was tested based on post-rotational nystagmus recorded by a video-oculography system. These measurements were completed by behavioural tests and cerebellar analysis to measure levels of gene expression associated with neurotoxicity.	Low-frequency noise, ranging from 0.5 to 2 kHz at an intensity of 106 dB SPL.	Coexposure to CS-250 ppm and low-frequency noise reduced the number and duration of the withdrawals by 33% and 34%, respectively. It was observed that the effects of CS_2 were due to reversible neurochemical disorders of the efferent pathways that manage post-rotational nystagmus. Since the nervous structures that involve vestibular function seem particularly sensitive to CS_2, post-rotational nystagmus can be used as an early non-invasive measure to diagnose CS_2 poisoning as part of an occupational conservation programme.
2018	Min and Min [74]	466,822 (217,308 with gastric ulcer + 249,514 with duodenal ulcer)	Peptic ulcer (gastric and duodenal)	Investigation of the incidence of peptic ulcers in adults due to long-term exposure to environmental noise. The diagnosis of gastric and duodenal ulcers was made during an 8-year follow-up (2006–2013). Environmental noise data were obtained from the National Noise Information System, a national noise monitoring system.	The interquartile range (IQR) for nighttime noise exposure was 2.37 dB for gastric ulcers and 2.41 dB for duodenal ulcers.	Gastric ulcers occurred in 32.1% of individuals, and duodenal ulcers, in 10.7% of individuals. The diagnostic rate for gastric and duodenal ulcers increased with increasing cumulative mean levels of nighttime ambient noise. With increases in the IQR of nighttime noise, the risk rate increased significantly by 12% for gastric ulcers and 17% for duodenal ulcers, based on the fully adjusted model.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2018	Pohl, Gabriel and Hübner [44]	212 (1st phase) and 133 (2nd phase)	General mental indisposition; reduced performance and work capacity; lack of concentration; fatigue; voltage; nervousness; dizziness; irritability; indisposition; reduced sleep quality; annoyance	A total of 212 persons participated in the first survey; nearly two-thirds (133 persons) remained in the second. Accordingly, a third dropped out ("dropouts"; 79 participants). Indeed, dropouts differed statistically from the other participants only in terms of education level and household size. The remaining participants had higher education levels and slightly larger households compared to the dropouts (small effect size for each). These socio-demographic variables had no significant influence on the central stress and attitude indicators; significant differences in the central attitude and annoyance assessments were not apparent. Longitudinal study, based on the methodology of stress psychology with noise measurements, in which residents of a wind farm in Lower Saxony were interviewed on two occasions (2012, 2014), using audio equipment to record irritating noises. Several residents complained of physical and psychological symptoms due to traffic noise (16%) and wind turbine noise (10%; two years later, 7%), which allowed the assessment of some symptoms caused by noise exposure.	Noise from low-frequency wind turbines (<100 Hz).	Participants reported more symptoms in 2012 than in 2014. From 2012 to 2014, sleep disorders decreased and symptoms of impaired performance were not repeated. Only a few participants showed evidence of low-frequency (<100 Hz) wind turbine (WT) noise effects: in 2012, 8.5% reported feelings of pressure related to wind farms and 6.1% experienced vibrations in the body. The annoyance experienced induced by feelings of pressure or vibrations was slightly greater in 2012. Symptoms of dizziness were not observed. The participants had more symptoms and greater irritation due to traffic noise than to wind noise.
2018	X. Wang, Lai, Zhang and Zhao [75]	6 (3 exposed, 3 unexposed) Bama pigs	Effects on the blood–brain barrier (BBB)	Investigation of the effect of noise exposure on the blood–brain barrier (BBB). Healthy male Bama pigs were randomly divided into a noise exposure group and a control group (no noise) for 30 min. After exposure, brain imaging was performed using computed tomography and fluorescent images.	Low-frequency noise (50, 70, 100, and 120 Hz at 140 dB).	The BBB permeability test showed that 50, 70, and 100 Hz noise exposure at 140 dB increased the BBB permeability, and the BBB opening at 70 Hz was more severe and reversible. Tomographic images demonstrated that noise-induced opening of the BBB did not cause intracerebral haemorrhage.
2018	Suzuki, Suzuki, Onishi and Penido [49]	110	Tinnitus and LFN discomfort	Classification of persistent tinnitus and its comparison with pure tone or noise, high or low pitch, presented to the patient by the sounds of the audiometer. Participants were subject to inclusion and exclusion criteria. The following evaluations were performed on patients: otorhinolaryngological, audiological, Pitch Matching and Loudness, Visual Analogue Scale, Tinnitus Handicap Inventory, and Minimum Masking Level.	Three types of noise: white noise (WN), narrow band low frequency (LFNB) at 500 Hz, and narrow band high frequency (HFNB) at 6000 Hz.	A total of 181 tinnitus complaints were identified, in which the presence of pure tone type tinnitus was observed in 93 (51%) of the responses (4 from low pitch and 89 from high pitch) and from noise in 88 (49%) of the responses (15 low frequency and 73 high). For tinnitus with low-frequency sensation, 19 responses were determined, while for high-frequency sensation, 162 responses were determined. Visual Analogue Scale average of 5.47 for tinnitus similar to pure tone, and 6.66 for that similar to noise. Average Loudness for tinnitus similar to the pure tone of 12.31 dBNS, and for that similar to the noise of 10.54 dBNS.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2018	Paunović, Jakovljević and Stojanov [76]	112 (82 women and 30 men, aged 19 to 32).	Blood pressure; haemodynamic events	Study divided into three 10-min phases: resting in quiet conditions before noise, exposure to traffic noise, and resting in quiet conditions after noise. Measurement of blood pressure, heart rate, and haemodynamic parameters (cardiac index and total peripheral resistance) with a chest bioimpedance device. Use of four statistical models to answer the study questions.	Exposure to noise: resting in quiet conditions before noise (Leq = 40 dBA); exposure to noise registered in traffic (Leq = 89 dBA); resting in quiet conditions after noise (Leq = 40 dBA).	Blood pressure decreased during the quiet phase before noise, increased in the first minute of exposure to noise, then gradually decreased at the end of exposure to noise, and continued to decrease to baseline values after exposure to noise. The cardiac index showed a gradual decrease throughout the experiment, while the total vascular resistance increased steadily during and after exposure to noise.
2019	Negishi-Oshino et al. [77]	Rats	Irreversible imbalance with structural damage to the otoconial membrane	Assessment of rats' imbalance due to acute exposure to LFN. The exposed rats also showed decreased cervical vestibular evoked myogenic potential (cVEMP) with impaired vestibular hair cell activity.	LFN with a frequency of 100 Hz at 85, 90, or 95 dB.	The results of this study demonstrate that acute exposure to LFN at 100 Hz at 95 dB for just 1 h caused irreversible imbalance in rats with structural damage to the otoconial membrane, as the target region for the LFN-mediated imbalance, which could be rescued by Hsp70.
2019	Lee, Park, Jeong, Choung and Kim [50]	400	Discomfort and sensitivity to noise; blood pressure; annoyance due to noise	The study recruited healthy residents aged between 20 and 60 years. Effects of exposure to transport noise on blood pressure in adult residents of multi-storey residential buildings, modification of the effects of discomfort from and sensitivity to internal noise, and self-assessed associations between transport noise and blood pressure. Measurement of noise levels at the top of buildings for 24 h, forecasting the levels of each unit in the house for different sources and periods using noise maps. Conducting adjusted linear regression analyses to estimate associations between noise exposure levels and systolic blood pressure (SBP) and diastolic blood pressure (DBP). Conducting a questionnaire with questions about annoyance from and sensitivity to noise and sociodemographic variables.	Exposure to noise (Lden, LDay, and LNight).	General noise (road traffic and rail noise) and road traffic showed stronger associations with SBP than with DBP, while rail noise had similar associations with SBP and DBP. Stronger associations were estimated for participants who reported higher ratings of annoyance by internal noise. The results support the hypothesis that long-term exposure to transport noise is associated with higher blood pressure in adults living in multi-storey residential buildings.
2019	Scherer and Formby [78]	151	Tinnitus retraining therapy (TRT); sound therapy (ST); tinnitus-specific educational counselling (TC)	Comparison of the effectiveness of TRT and its components, ST and CT, with the standards of care (SoC) in reducing the negative effect of tinnitus on quality of life. Study carried out in 6 military hospitals, in the office and in a data coordination centre, among active, retired, and dependent military personnel with functionally adequate hearing sensitivity and moderate to severe subjective tinnitus, with the objective of treating the military.	LFN (tinnitus).	There were few differences between treatment groups. About half of the participants showed clinically significant reductions in the effect of tinnitus.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2019	Poulsen et al. [45]	Residences between 20 and 40 inhabitants	Annoyance; sleep disorders; depression	Evaluation of the evolution of medical prescriptions related to anxiolytics and antidepressants ingested by the populations that lived near the wind turbines, in an analysis that lasted two years (2012 to 2014). A total of 7256 wind turnines (WT) was considered in noise modelling. The authors collected information on model, type, height, and operational settings. Each WT was classified into to one of 99 noise spectra classes, with detailed information on the noise spectrum from 10–10,000 Hz in thirds of octaves for wind speeds of 4–25 m/s.	Exposure to outdoor wind turbine noise (WTN) at night (<24, 24 to <30, 30 to <36, 36 to <42, and ≥42 dB) and nighttime low frequency indoor WTN (<5, 5 to <10.10 and <15, and ≥15 dB).	High levels of outdoors WTN associated with use of anxiolytics and antidepressants among the elderly, suggesting that WTN may be potentially associated with sleep and mental health.
2019	Tao, Wang, Zou, Li and Luo [51]	100	Irritation and sensitivity to noise	Assessment of noise irritation in the metro deposit and the influence of noise in adjacent residential buildings. Conducting a questionnaire with people who worked at the metro station and made field measurements, both at the metro station and in the adjacent residential buildings.	LFN and HFN (31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000, and 16,000 Hz)	Of respondents, 96% are disturbed by the noise and 31% of them feel that the impact of the noise is serious. They found that there is a problem of annoyance due to low-frequency noise. The authors evaluated that the noise level caused by the fans decreases with the height of the floors and that the shorter the distance between the building's fans and ventilation, the more severe the impact of the noise. They concluded that, with the increase in the distance to the noise source, the noise attenuation rate increases.
2019	Poulsen et al. [64]	717.453	Myocardial infarction (MI), stroke	The authors used the Danish Civil Registration System to identify the study cohort, defined as all adults (aged 25–84 years) who lived in one of these inclusion dwellings any time between five years before the erection of the first neighbouring WT and the end of 2013. Assessment of the impact of MI and stroke risk when there is long-term exposure to noise from wind turbines. Based on hospital and mortality records, an analysis was made of the number of cases of myocardial infarction and stroke that existed in homes located around wind turbines.	Exposure to wind turbine noise (WTN) at night outdoors (≥24 dB) and nighttime low frequency indoor WTN (≥5 dB; 10–160 Hz)	High long-term exposure to noise from wind turbines is associated with an increase in myocardial infarction and strokes.
2019	Hansen, Nguyen, Zajamšek, Catcheside and Hansen [55]	9 (residences) A total of 8716 and 8972 10 min samples of outdoor and indoor data	Annoyance	The outdoor measurements carried out at 9 different residences located between 1 and 9 km from the nearest wind turbine of a South Australian wind farm (37 operational turbines), each with a rated power of 3 MW. The wind farm is positioned along the top of a ridge, and the wind turbine hub height relative to the residences varies between 85 and 240 m. At all residences, the indoor measurements were taken in a room that faced as closely as possible towards the wind farm and the windows were closed. The presence of amplitude modulation in the noise of wind farms results in increased annoyance and possible interruptions in sleep. The study investigated the prevalence of this characteristic present in homes close to the wind farm.	-	During the night, audible amplitude modulation occurred in homes located 3.5 km from the wind farm up to 22% of the time. This had important implications for possible sleep disruptions and annoyance due to the wind farm by audible amplitude modelling, particularly as ambient noise levels in rural South Australia can be as low as 15 and 5 dBA, outdoors and in closed areas, respectively.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2019	Phadke, Abo-Hasseba, Švec and Geneid [79]	140 (between 21 and 56 years)	Voice disorders: dysphonia; neck pain; vocal effort	This study aimed to identify possible correlations between the vocal symptoms of teachers and their perception of noise, the locations of schools, as well as the locations and conditions of their classrooms. They carried out a questionnaire, whose answers were analysed statistically, with questions about the severity and frequency of their voice symptoms, noise perception, and the locations and conditions of their schools and classrooms.	-	Teachers experienced severe dysphonia, neck pain, and increased vocal effort with weekly or daily recurrence. Among the teachers who participated in the study, 24.2% felt that they were always in a noisy environment, with 51.4% of the total participants reporting having to raise their voices. The most common sources of noise were student activities and conversations in the teachers' own classrooms (61.4%), noise from adjacent classrooms (52.9%), and road traffic (40.7%).
2019	Smith, Ögren, Ageborg Morsing and Persson Waye [47]	23	Disorders in physiological sleep; heart rate	The study volunteers slept for five nights in a sound environment laboratory, which was furnished like a typical apartment. The participants were instructed to start trying to fall asleep at 23:00 each evening and were woken with an alarm call at 07:00 each morning. Sleeping at times outside of this 8 h period was not permitted. Participants could follow their normal daytime routine but arrived at the laboratory by 20:00 each evening to allow time for relaxation and the setup of the sleep-measuring equipment. Caffeine was prohibited after 15:00 each day, and alcohol was prohibited at all times. Evaluation of the effects on physiological sleep resulting from the exposure of participants to railway noise for five consecutive nights, using polysomnography and questionnaires. Heart rate was measured by electrocardiography.	Frequencies of 35, 40, and 45 dB.	No significant differences were found in the overall structure of sleep disorders between the reference tests and the 35 dB night tests. Regarding cardiovascular diseases, they observed that the noise spectrum with amplitude frequencies greater than 100 Hz led to increases in heart rate for noise levels equal to or greater than 35 dB.
2019	Zare et al. [80]	75	Serum cortisol concentration	The study aimed to examine the effect of sound pressure level (SPL) on the serum concentration of cortisol at three different times during the night shift, in an industrial and mining company. Participants were divided into three groups (one control and two groups of cases, with 25 each). Dosimetry was adopted to evaluate SPL equivalents using a TES-1345 dosimeter. The serum cortisol concentration was measured using a radioimmunoassay (RIA) test in the laboratory.	Exposure levels of 67, 80, and 92 dB.	The results indicated a downward trend in the serum cortisol concentration of the three groups during the night shift. SPL and exposure time significantly affected cortisol concentration. Age and body mass index had no significant influence on the concentration of cortisol. It was concluded that an increase in SPL leads to an increase in serum cortisol concentration.

Table 1. *Cont.*

Year	Studies	Studies Evaluated				
		Number of Participants/Sample	Main Human Health Effects	Methodology	Exposure	Outcomes
2019	Moradi et al. [52]	28 (14 females and 14 males)	Stress; noise sensitivity; annoyance	The study was conducted on students at different levels of educational programmes in an acoustic room in the School of Public Health, Iran University of Medical Sciences, in 2016. The study subjects were comprised of 14 female and 14 male university students who met the following entrance criteria: normal sense of hearing (hearing loss less than 20 dB) and no sensitivity to noise. Study of the effects of noise on selective attention of university students. They carried out questionnaires to determine students' personality traits (extroverted or introverted) and analyse their stability or instability. Evaluation of the level of sensitivity to noise, using the Weinstein sensitivity scale, and the level of selective attention, using the DUAF test.	80 dBA noise at 4000 Hz frequency	Introverted participants are more sensitive to noise than extroverts. The most noise-sensitive participants showed greater stimulation during exposure to noise, which led to increases in incorrect responses and a decrease in mental performance. The participants' personal traits are related to their annoyance due to noise. Stress due to noise improves selective attention in outgoing individuals.
2019	Alves, Silva and Remoaldo [53]	200 questionnaires + 62 measurements of noise levels + 14 adapted audiometric tests	Annoyance from LFN; audibility threshold	Analysis of the effects of exposure to low-frequency noise pollution, emitted by poles and power lines, on the well-being of the population, based on a study of "exposed" and "unexposed" individuals in two areas. Conducting audiometric tests adapted to complement the analysis and determine the audibility threshold of the volunteers. Sound level measurement and sound recording (at a distance of 5 m from the source), as well as the adapted audiometric performance test.	Frequency range between 10 and 160 Hz	The "exposed" area has higher sound levels and, consequently, more welfare and health problems than the "unexposed" population. Audiometric tests also revealed that the "exposed" population appears to be less sensitive to low frequencies than the "unexposed" population.

Van Kamp et al. [40] explored the determinants of annoyance due to tinnitus, that is, low-frequency noise. This article explored the relationship between contextual, situational, and personal characteristics with the level of annoyance due to low-frequency noise, based on secondary analysis of existing data. The results obtained showed significant differences between cities and neighbourhoods, a significant association between background noise levels during the day, and an inverse effect at night. The level of background noise, sensitivity to noise, and dissatisfaction with the residential situation were strongly associated with higher levels of annoyance. Based on the association with nighttime background levels, it was found that the lower the levels, the greater the annoyance due to tinnitus [40].

The main results of the studies by Blair et al. [46] and Pohl, Gabriel, and Hübner [44] have already been described in Section 3.2. Blair et al. (2018) found that the average noise levels during the construction and drilling of an oil and gas well exceeded the levels associated with health annoyance; that is, they were above 50 dBA or 60 dBC [46]. Pohl, Gabriel, and Hübner [44] found that the annoyance experienced was very low and that symptoms of dizziness were not observed in this study.

Ishitake [43] carried out a study regarding annoyance due to wind energy, with a questionnaire carried out for the analysis. In this survey, it was observed that 81% answered that they did not feel annoyed due to the generation of wind energy, while 8% answered that they felt very or a little annoyed [43].

The results related to noise annoyance determined by Moradi et al. [52] and Lee et al. [50] have already been covered in Section 3.3. However, in addition to what was mentioned earlier, Lee et al. [50] concluded that the closest associations between noise exposure and blood pressure were estimated for participants who reported higher classifications of annoyance, irritation, and sensitivity to noise. This indicates that the annoyance from internal noise and sensitivity to noise develop regardless of the level of exposure to external noise. The authors also found that people who were sensitive to noise and participants most irritated due to internal noise had significantly higher SBP and DBP than others [50].

Finally, Hansen et al. [55] determined an audible internal low-frequency tone modulated in amplitude in the frequency of the passage of the blade for 20% of the time up to a distance of 2.4 km. The audible amplitude modelling took place for a similar percentage of time between the wind farm's percentage power capacities of 40% and 85%. The modelling of the audible amplitude in the interior still occurred for 16% of the time at a distance of 3.5 km. At distances of 7.6 and 8.8 km, audible amplitude modelling was only detected on one occasion. During the night, audible amplitude modulation occurred in homes located 3.5 km from the wind farm up to 22% of the time. This had important implications for possible sleep disruptions and annoyance due to the wind farm by audible amplitude modelling, particularly as ambient noise levels in rural South Australia can be as low as 15 and 5 dBA, outdoors and in closed environments, respectively [55]. Although the geometric dimension of the room was not considered in the study by Hansen et al. [55], it is an important variable for this type of study.

3.5. Hearing Loss

Although hearing loss is reported as an effect on human health due to exposure to noise, the studies analysed were not totally conclusive regarding hearing loss due to low-frequency noise.

Selander et al. [58] assessed the impairment of children's hearing when occupational noise exposure occurred during pregnancy. They carried out a prospective cut study and determined cases of hearing impairment in children based on medical records and interviews conducted with prenatal unit teams, in a sample of births between 1986 and 2008 [58]. With the information collected, they established risk models to estimate data related to the impairment of children's hearing when exposed to noise with a strong low-frequency component during pregnancy [58].

Wang et al. [59] evaluated the exposure to noise from traffic and established a comparison regarding the potential risk of hearing loss for residents.

Ohgami, Oshino, Ninomiya, Li, and Kato [60] and Venet et al. [61] addressed experimental studies in rats and the assessment of hearing loss when they are exposed to low-frequency noise.

Ohgami et al. [60] carried out a survey of experimental studies carried out on rats when exposed to low-frequency noise and made an assessment of associated hearing loss. In this review, the imbalance in rats when exposed to noise was also assessed [60]. However, Venet et al. [61] effectively performed experimental tests on rats, testing the hearing of the rats with equipment (cubic DPOAEs – Distortion product otoacoustic emissions) when the animals were exposed to low-frequency noise combined with carbon disulfide (CS_2). The rats' hearing was tested before, during, and after exposure to noise, and blood samples were taken to assess the exposure to CS_2 [61].

Zhou and Fu [62] performed measurements to assess levels of total serum bilirubin, performed tympanometry, and examined pure tone thresholds at low or high frequencies associated with adolescents with different subtypes of sensorineural hearing loss (SNHL), using binary or multinomial logistic regression models.

Regarding the results, Selander et al. [58] divided the sample into three parts: (i) mothers who worked full time, (ii) mothers who worked part-time, and (iii) mothers absent from work during pregnancy. They observed an increased risk of hearing impairment in children after exposure to occupational noise during pregnancy. In the sample considered in the study, they determined adjusted risk rates for 75–84 dBA and ≥85 dBA, compared to <75 dBA, of 1.05 and 1.27, respectively. They observed 60, 42, and 14 highly exposed cases for all hearing disorders, sensorineural hearing loss, and tinnitus, respectively. They also determined that the adjusted risk rate for exposure to occupational noise ≥ 85 dBA compared to <75 dBA was 1.82, based on 14 exposed cases and 2222 cases with low exposure. However, the corresponding relative risks (HR) were 1.25 for high exposure among mothers classified as part-time and 0.74 for women who had more than 153 days of absence from work during pregnancy or who were not working at the time of the interview. Finally, [58] found that, among mothers working full-time, high exposure to occupational noise was associated with an increased risk of hearing impairment. The authors also observed an increase in the risk of hearing impairment of the foetus for the case of mothers who worked part-time. On the other hand, [58] did not find an increased risk of hearing impairment in children whose mothers reported exposure to occupational noise in early pregnancy but were absent from work during pregnancy. Thus, the fact that the mother's risk increases with presence at work proves that occupational noise during pregnancy is associated with an increased risk of hearing impairment in children [58].

Wang et al. [59] observed that the mean annual Leq over 24 h in the flow and commercial channel areas was 71.2 ± 1.0 and 70.0 ± 2.6 dBA, respectively, revealing a potential risk of hearing loss among residents [59].

Ohgami et al. [60] determined that a sound stimulus of 375 Hz, a frequency below the audible range of rats, causes a hearing reduction in wild type rats, while in rats with an abnormal otolytic morphology, no hearing loss was observed.

Venet et al. [61] observed that, after the period of contact with noise, exposure due to noise alone caused a hearing reduction in an area of frequency that varied between 3.6 and 6 kHz. The damaged area was approximately one octave (6 kHz) above the highest frequency of the exposure noise (2.8 kHz). Since the maximum auditory sensitivity is located at around 8 kHz in rats, exposure to low-frequency noise can affect the cochlear regions that detect mid-range frequencies. Exposure to CS_2 (250 ppm or more) and noise increased the extent of the damaged frequency window, as a significant reduction in hearing was measured at 9.6 kHz in these conditions, with an increase in CS_2 concentrations [61].

Finally, Zhou and Fu [62] determined that total serum bilirubin levels were associated with any subtype of high-frequency sensorineural hearing loss (SNHL). However, they observed that total serum bilirubin levels were not significantly associated with any low-frequency SNHL (bilateral or unilateral; LPTA greater or lesser) [62].

3.6. Cardiovascular Disease/Heart Rate

Cardiovascular diseases (variations in heart rate) are another effect on human health due to exposure to low-frequency noise.

Walker et al. [63] and Smith et al. [47] used electrocardiograms to measure participants' heart rates when they were exposed to low-frequency noise. In the case of [63], participants were also subjected to blood pressure measurements and saliva samples were collected before, during, and after exposure to noise. Based on linear regression models, the differences between the results obtained before, during, and after the noise were examined [63]. In the case studied by Smith et al. [47], the authors measured participants' heart rates when they were exposed to railway noise.

Poulsen et al. [64] assessed the impact of the risk of myocardial infarction and stroke when there is long-term exposure to noise from wind turbines. Based on hospital and mortality records, they analysed the number of cases of myocardial infarction and stroke in homes located around wind turbines [64].

Wang et al. [59] evaluated the exposure to noise from traffic and established a comparison in relation to the prevention threshold established for cardiovascular diseases.

The methodology adopted by Blair et al. [46] has already been referenced in Section 3.2 According to [46], noise levels above 50 or 60 dBA can cause cardiovascular effects.

Rossi et al. [65] measured the changes in cognitive and physiological parameters—in particular, the response time and heart rate—of participants when exposed to tonal noise (silence or multi-band stochastic noise), low-frequency and low-frequency stochastic noise, and low-frequency stationary noise with regular amplitude modulation.

As for the results, Walker et al. [63] concluded that during exposure to noise, the reductions in heart rate variation (HRV) were 19% with low-frequency power and 9.1% according to the mean square difference between the intervals of adjacent normal heartbeats (RMSSD). On the other hand, during exposure to low-frequency noise, the reductions in HRV were 32% with high-frequency power, 34% with low-frequency power, and 16% according to the standard deviation of the adjacent normal heartbeat intervals (SDNN). Finally, during exposure to low-frequency noise, the reductions in HRV were 21% with low-frequency power, compared to that with exposure to noise. As a general conclusion, [63] determined that exposure to noise—and, in particular, low-frequency noise—negatively affects heart rate variation, which affects health in terms of cardiovascular diseases [63].

Part of the results observed by [47] and [46] have already been described in Section 3.2. Regarding cardiovascular diseases, [47] also observed that the noise spectrum with amplitude frequencies greater than 100 Hz led to increases in heart rate for noise levels equal to or greater than 35 dB and increasing the probability of excitation at a noise level of 45 dB. Meanwhile, [46] concluded that continuous weighted noise above the 50 dBA threshold can cause health effects, such as an increased risk of cardiovascular disease and hypertension [46].

Wang et al. [59] concluded that the average annual equivalent noise levels (Leq, 24 h) were 66.4 ± 4.7 dBA, which exceeded the threshold established for the prevention of cardiovascular diseases.

Rossi et al. [65] concluded that, on average, participants decreased their response times in noise conditions compared to silence conditions; that is, there was evidence of increasing stress, according to the excitation theory. In this study, they observed that participant exposure to low-frequency noise 1 and 2 (LFN1 and LFN2, respectively) produced cognitive stress comparable to stochastic multi-tonal broadband noise (BBN). Subdividing the participants into extroverts and introverts, they demonstrated that LFN1 and LFN2 produced higher stress effects in introverted participants than BBN noise on cognitive performance, but had no effect on extroverts. In addition, heart rates increased significantly in the introverts during the tests, compared to those in a condition of silence before the start of the Stroop effect, while the extroverts showed no changes [65].

Finally, [64] concluded that, for external nighttime noise from long-term-operated wind turbines greater than 42 dBA and low-frequency noise from internal wind turbines greater than 15 dBA, the risks were slightly higher for myocardial infarction than those from exposures less than 24 and 5 dBA, respectively, but the number of cases was low in the groups with the highest exposure. As for strokes, all low-frequency noise levels from internal wind turbines were associated with adjusted incidence rates close to 1.0, while for noise from external wind turbines, the adjusted incidence rates were greater

than 1.0 for the groups of intermediate exposure, and lower than the unit for the groups with greater exposure. High long-term exposure to wind turbine noise was associated with slightly elevated point estimates for myocardial infarction, for both exposure to outdoor wind turbine noise and exposure to potentially more biologically relevant indoor wind turbine noise [64].

4. Conclusions

In the present research, 39 articles addressing exposure to low-frequency noise and its impacts on human health were analysed in depth. The articles were divided into categories according to the emitting source of the noise, and the effects on human health were addressed. Regarding the emitting source, there was a greater number of articles addressing issues related to environmental noise and wind turbine sources.

As for the effects generated on human health, there was a greater number of articles referring to effects on sleep disorders, discomfort, sensitivity to and irritability from noise, annoyance, hearing loss, and cardiovascular diseases, and these effects were analysed in more detail in this article.

In the case of impacts on sleep disturbance, a dependence on the distance to the source of noise was observed; that is, the greater the proximity to the source, the greater the effects on sleep, as established by [41,43]. With long-term noise exposure, noise sensitivity is lower, which reduces the effects on sleep disturbance, as determined by [44]. Exposure to noise at night disturbs sleep and causes more frequent awakenings, less deep and non-continuous sleep, and morning tiredness in the participants, as discussed by [42,47].

With increasing age, especially for people over the age of 65, exposure to noise causes sleep disturbances, which adds to the demand for sleeping pills and antidepressants, as determined by [45].

According to [46], the average noise levels exceeded the levels for sleep disturbances established for human health.

Discomfort, irritability, and sensitivity to noise were among the effects analysed. Discomfort due to noise depends on the proximity of people to the emitting source, making their sensitivity to noise different. Tao et al. [51] proved that with increased distance from the noise source, the noise attenuation rate increases, due to the fact that they feel uncomfortable and disturbed by the low-frequency noise. Alves et al. [53] observed that constant exposure to noise makes people less sensitive to the perception of noise compared to people who are more distant from the emitting source, necessitating greater sound intensity for the perception of low-frequency noise. This sensitivity of people to noise leads to a decrease in their mental performance, as ascertained by [52], and an increase in blood pressure, especially when people are more irritated, as noted by [50]. Huang et al. [48] observed that the convenience of sound does not increase with distance from the ground for buildings of great height, such as skyscrapers, and that exposure to this noise has an impact on the annoyance and discomfort of its residents. However, Suzuki et al. [49] noted that there was a low percentage of people who were uncomfortable with the presence of low-frequency noise compared to the presence of high-frequency noise.

Background noise levels and sensitivity to noise are associated with higher levels of annoyance; that is, they exceed the thresholds established for this health effect, as indicated by [40,46,54]. Moradi et al. [52] also confirms that the level of annoyance when exposed to noise varies with people's personal traits, with greater sensitivity and annoyance in introverts than in extroverts. Exposure to noise from rail transport is associated with the blood pressure of exposed people, which indicates that people with greater sensitivity to noise, greater annoyance, and more irritability have higher blood pressure values than those who do not have these symptoms, as studied by Lee et al. [50]. Thus, the annoyance increases with exposure to noise, especially when people experience unconventional noise. As described by [81], a greater disturbance is observed due to railway noise in people who are not normally exposed to this noise source. Hansen et al. [55] noted that noise levels had implications for annoyance due to exposure to the wind farm. However, both Pohl et al. [44] and Ishitake [43] determined that people do not feel annoyed due to exposure to wind energy noise. New

methodologies for the evaluation of noise emitted by wind turbines could be used to provide new findings in this field [82].

Exposure to noise causes a potential risk of hearing loss in people subjected to it, as studied by Wang et al. [59] and Venet et al. [61]. Venet et al. [61] also determined that exposure to carbon disulfide (CS_2) and noise caused a reduction in the auditory level when an increase in CS_2 concentrations was observed. Exposure to occupational noise during pregnancy was also a topic studied by Selander et al. [58] who proved that exposure to this type of noise is associated with the risk of increased hearing impairment in children, with greater relevance in mothers who worked full-time and part-time during pregnancy. Through experiments on rats, Ohgami et al. [60] observed a hearing reduction in wild type rats, in contrast to in rats with an abnormal autolytic morphology in which this hearing loss was not observed. However, studies were observed in which no effects associated with hearing loss were found with exposure to low-frequency noise, as ascertained by Zhou and Fu [62]. All studies analysed in this domain regarded low and high frequencies, revealing hearing loss in the samples exposed to high frequencies. Hearing loss due to low-frequency noise was not totally observed.

Finally, it was observed that exposure to noise—in particular, low-frequency noise—negatively affects the variation in heart rate, which harms health in terms of cardiovascular diseases, as it exceeds the levels established for the prevention of these diseases, as discussed by Walker et al. [63], Wang et al. [59], and Blair et al. [46]. According to Rossi et al. [65], heart rate increases significantly in introverts compared to in a situation of silence, while extroverts show no change in their heart rate. Smith et al. [47] realized that the heart rate in people increased with greater exposure to noise. High long-term exposure to noise from wind turbines is associated with an increase in myocardial infarction and stroke, as studied by Poulsen et al. [64].

The literature review carried out constitutes a novelty in Portugal, whether in the social sciences or the more exact ones, such as environmental acoustics. It is expected that in future studies, this type of evaluation can be explored for a longer period and more sources of low-frequency noise emission. This may provide important data on low-frequency exposure and its effects on human health, as well as important information on the definition of limits for installing wind farms and other sources of low-frequency noise. While some type of impacts on health have not yet been analysed and continue to be an understudied field, the impacts studied can provide good advice for the planning field. Thus, these studies can point out good ways of minimising the influence on human beings and can constitute a good tool for the preventive dimension of planning.

Supplementary Materials: The following are available online at http://www.mdpi.com/2076-3417/10/15/5205/s1. A list of 142 references.

Author Contributions: Conceptualization, J.A.A., F.N.P., L.T.S. and P.R.; methodology, J.A.A., F.N.P., L.T.S. and P.R.; results and discussion J.A.A. and F.N.P.; writing and revision of the manuscript, J.A.A., F.N.P., L.T.S. and P.R. All authors have read and agreed to the published version of the manuscript.

Funding: The authors gratefully acknowledge CAPES/Brazil (Process: BEX1684-13/2) for the financial support granted though a doctorate scholarship, the Project Lab2PT—Landscape, Heritage and Territory Laboratory—AUR/04509 and FCT through national funds and, when applicable, the FEDER co-financing, under the new partnership agreement PT2020 and COMPETE2020—POCI 01 0145 FEDER 007528.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Berglund, B.; Hassmén, P.; Job, R.F. Sources and effects of low-frequency noise. *J. Acoust. Soc. Am.* **1996**, *99*, 2985–3002. [CrossRef]
2. Pawlaczyk-Łuszczyńska, M.; Dudarewicz, A.; Szymczak, W.; Sliwinska-Kowalska, M. Evaluation of annoyance from low frequency noise under laboratory conditions. *Noise Health* **2010**, *12*, 166–181. [CrossRef]
3. Alves, J.A.; Silva, L.T.; Remoaldo, P.C. Impacts of low frequency noise exposure on well-being: A case-study from portugal. *Noise Health* **2018**, *20*, 131–145.

4. Dart, E.E. Effects of high speed vibrating tools on operators engaged in airplane industry. *Occup. Med.* **1946**, *1*, 515–550.
5. Rumancev, G.I. Investigations concerning the hygienic evaluation of vibration in factories producing reinforced concrete. *Gig. Tr. Prof. Zabol* **1961**, *5*, 6–12.
6. Cohen, A. The influence of a company hearing conservation program on extra-auditory problems in workers. *J. Saf. Res.* **1976**, *8*, 146–162.
7. Obata, J.; Morita, S.; Hirose, K.I.; Matsumoto, H. The effects of noise upon human efficiency. *J. Acoust. Soc. Am.* **1934**, *5*, 255–261. [CrossRef]
8. Vasudevan, R.; Leventhall, H.G. Annoyance due to environmental low frequency noise and source location—A case study. *J. Low Freq. Noise Vib.* **1989**, *8*, 30–39. [CrossRef]
9. Davis, A.C.; Lovell, E.A.; Smith, P.A.; Ferguson, M.A. The contribution of social noise to tinnitus in young people - a preliminary report. *Noise Health* **1998**, *1*, 40–46.
10. Mirowska, M. An Investigation and Assessment of Annoyance of Low Frequency Noise in Dwellings. *J. Low Freq. Noise Vib.* **1998**, *17*, 119–126. [CrossRef]
11. Rushforth, I.; Moorhouse, A.; Styles, P. A case study of low frequency noise assessed using DIN 45680 Criteria. *J. Low Freq. Noise, Vib. Act. Control* **2002**, *21*, 181–198. [CrossRef]
12. Babisch, W.; Ising, H.; Gallacher, J.E.J.; Elwood, P.C. Traffic noise and cardiovascular risk: The Caerphilly study, first phase. Outdoor noise levels and risk factors. *Arch. Environ. Health* **1988**, *43*, 407–414. [CrossRef] [PubMed]
13. Bluhm, G.; Eriksson, C. Cardiovascular effects of environmental noise: Research in Sweden. *Noise Health* **2011**, *13*, 212–216. [CrossRef] [PubMed]
14. Lundquist, P.; Holmberg, K.; Landstrom, U. Annoyance and effects on work from environmental noise at school. *Noise Health* **2000**, *2*, 9–46.
15. Mirowska, M. Evaluation of low frequency noise in dwellings. New Polish recommendations. *J. Ofl Low Freq. Noise Vib.* **2001**, *20*, 67–74. [CrossRef]
16. Griefahn, B. Sleep disturbances related to environmental noise. *Noise Health* **2002**, *4*, 57–60.
17. Rios, A.L.; Silva, G.A. Sleep quality in noise exposed Brazilian workers. *Noise Health* **2005**, *7*, 1–6.
18. Murphy, E.; King, E.A. Scenario analysis and noise action planning: Modelling the impact of mitigation measures on population exposure. *Appl. Acoust.* **2011**, *72*, 487–494. [CrossRef]
19. Schultz, T.J. Synthesis of social surveys on noise annoyance. *J. Acoust. Soc. Am.* **1978**, *64*, 377–405. [CrossRef]
20. Paulsen, R.; Kastka, J. Effects of combined noise and vibration on annoynce. *J. Sound Vib.* **1995**, *181*, 295–314. [CrossRef]
21. Karpova, N.I.; Alekseev, S.V.; Erokhin, V.N.; Kadyskina, E.N.; Reutov, O.V. Early response of the organism to low-frequency acoustical oscillations. *Noise Vib. Bull.* **1970**, *11*, 100–103.
22. Silva, L.T.; Mendes, B.; Rodrigues, D.S.; Ribeiro, P.J.G.; Mendes, J.F.G. A Mobile Environmental Monitoring Station For Sustainable Cities. *Int. J. Sustain. Dev. Plan.* **2016**, *11*, 949–958. [CrossRef]
23. Miedema, H.M.E.; Vos, H. Exposure-response relationships for transportation noise. *J. Acoust. Soc. Am.* **1998**, *104*, 3432–3445. [CrossRef]
24. Babisch, W. Traffic noise and cardiovascular disease: Epidemiological review and synthesis. *Noise Health* **2000**, *2*, 9–32. [PubMed]
25. Passchier-Vermeer, W.; Passchier, W.F. Noise Exposure and Public Health. *Environ. Health Perspect.* **2000**, *108*, 123–131. [PubMed]
26. Ising, H.; Kruppa, B. Health effects caused by noise: Evidence in the literature from the past 25 years. *Noise Health* **2004**, *6*, 5–13.
27. Bluhm, G.; Berglind, N.; Nordling, E.; Rosenlund, M. Road traffic noise and hypertension. *Occup. Environ. Med.* **2007**, *64*, 122–126. [CrossRef] [PubMed]
28. Cavacas, M.A.; Tavares, V.; Oliveira, M.J.; Oliveira, P.; Sezinando, A.; Santos, J.M. Effects of industrial noise on circumpulpar dentin—A field emission scanning electron microscopy and energy dispersive spectroscopy analysis. *Int. J. Clin. Exp. Pathol.* **2013**, *6*, 2697–2702.
29. Cavacas, M.A.; Tavares, V.; Borrecho, G.; Oliveira, M.J.; Oliveira, P.; Águas, A.; Santos, J.M. Industrial Noise and Tooth Wear – Experimental Study. *Int. J. Med. Sci.* **2015**, *12*, 3–8. [CrossRef]
30. Waye, K.P.; Bengtsson, J.; Kjellberg, A.; Benton, S. Low frequency noise "pollution" interferes with performance. *Noise Health* **2001**, *4*, 33–49.

31. Waye, K.P. On the Effects of Environmental Low Frequency Noise. Ph.D. Thesis, Goteborgs University, Gothenburg, Sweden, 1995.
32. Pawlaczyk-Luszczyńska, M.; Szymczak, W.; Dudarewicz, A.; Sliwińska-Kowalska, M. Proposed criteria for assessing low frequency noise annoyance in occupational settings. *Int. J. Occup. Med. Environ. Health* **2006**, *19*, 185–197. [CrossRef]
33. Leventhall, H.G. Low frequency noise and annoyance. *Noise Health* **2004**, *6*, 59–72.
34. Alves, J.A.; Silva, L.T.; Remoaldo, P.C. The influence of Low-frequency noise pollution on the quality of life and place in sustainable cities: A case study from Northern Portugal. *Sustainability* **2015**, *7*, 13920–13946. [CrossRef]
35. World Health Organization. *Environmental Noise Guidelines for the European Region*; WHO Regional Office for Europe: Copenhagen, Denmark, 2018.
36. Laird, D.A. Experiments on the physiological cost of noise. *J. Natl. Inst. Ind. Psychol.* **1928**, *4*, 251–258.
37. Vasudevan, R.N.; Gordon, C.G. Experimental study of annoyance due to low frequency environmental noise. *Appl. Acoust.* **1977**, *10*, 57–69. [CrossRef]
38. Castelo Branco, N.A.A. A unique case of vibroacoustic disease. A tribute to an extraordinary patient. *Aviat Space Env. Med.* **1999**, *70*, A27–A31.
39. Moorhouse, A.; Waddington, D.; Adams, M. *Proposed Criteria for the Assessment of Low Frequency Noise Disturbance*; DEFRA: University of Salford: Salford, UK, 2005.
40. Van Kamp, I.; Breugelmans, O.; Van Poll, R.; Baliatsas, C.; Van Kempen, E. Determinants of annoyance from humming sound as indicator of low frequency noise. In Proceedings of ACOUSTICS 2017 Perth: Sound, Science and Society—2017 Annual Conference of the Australian Acoustical Society AAS, Perth, Australia, 19–22 November 2017; pp. 1–7.
41. Abbasi, M.; Monazzam, M.R.; Zakerian, S.A.; Ebrahimi, M.H.; Dehghan, S.F.; Akbarzadeh, A. Assessment of noise effects of wind turbine on the general health of staff at wind farm of Manjil, Iran. *J. Low Freq. Noise Vib. Act. Control.* **2016**, *35*, 91–98. [CrossRef]
42. Morsing, J.A.; Smith, M.G.; Ögren, M.; Thorsson, P.; Pedersen, E.; Forssén, J.; Waye, K.P. Wind turbine noise and sleep: Pilot studies on the influence of noise characteristics. *Int. J. Environ. Res. Public Health* **2018**, 15.
43. Ishitake, T. Wind Turbine Noise and Health Effects. *Nihon Eiseigaku Zasshi* **2018**, *73*, 298–304. [CrossRef]
44. Pohl, J.; Gabriel, J.; Hübner, G. Understanding stress effects of wind turbine noise—The integrated approach. *Energy Policy* **2018**, *112*, 119–128. [CrossRef]
45. Poulsen, A.H.; Raaschou-Nielsen, O.; Peña, A.; Hahmann, A.N.; Nordsborg, R.B.; Ketzel, M.; Brandt, J.; Sørensen, M. Impact of Long-Term Exposure to Wind Turbine Noise on Redemption of Sleep Medication and Antidepressants: A Nationwide Cohort Study. *Environ. Heal. Perspect.* **2019**, *127*, 37005. [CrossRef] [PubMed]
46. Blair, B.D.; Brindley, S.; Dinkeloo, E.; McKenzie, L.M.; Adgate, J.L. Residential noise from nearby oil and gas well construction and drilling. *J. Expo. Sci. Environ. Epidemiol.* **2018**, *28*, 538–547. [CrossRef]
47. Smith, M.G.; Ögren, M.; Ageborg Morsing, J.; Persson Waye, K. Effects of ground-borne noise from railway tunnels on sleep: A polysomnographic study. *Build. Environ.* **2019**, *149*, 288–296. [CrossRef]
48. Huang, B.; Pan, Z.; Liu, Z.; Hou, G.; Yang, H. Acoustic amenity analysis for high-rise building along urban expressway: Modeling traffic noise vertical propagation using neural networks. *Transp. Res. Part. D Transp. Environ.* **2017**, *53*, 63–77. [CrossRef]
49. Suzuki, F.A.B.; Suzuki, F.A.; Onishi, E.T.; Penido, N.O. Psychoacoustic classification of persistent tinnitus. *Braz. J. Otorhinolaryngol.* **2018**, *84*, 583–590. [CrossRef]
50. Lee, P.J.; Park, S.H.; Jeong, J.H.; Choung, T.; Kim, K.Y. Association between transportation noise and blood pressure in adults living in multi-storey residential buildings. *Environ. Int.* **2019**, *132*, 105101. [CrossRef] [PubMed]
51. Tao, Z.; Wang, Y.; Zou, C.; Li, Q.; Luo, Y. Assessment of ventilation noise impact from metro depot with over-track platform structure on workers and nearby inhabitants. *Environ. Sci. Pollut. Res.* **2019**, *26*, 9203–9218. [CrossRef]
52. Moradi, G.; Omidi, L.; Vosoughi, S.; Ebrahimi, H.; Alizadeh, A.; Alimohammadi, I. Effects of noise on selective attention: The role of introversion and extraversion. *Appl. Acoust.* **2019**, *146*, 213–217. [CrossRef]
53. Alves, J.; Silva, L.T.; Remoaldo, P. How Can Low-Frequency Noise Exposure Interact with the Well-Being of a Population? Some Results from a Portuguese Municipality. *Appl. Sci.* **2019**, *9*, 5566. [CrossRef]

54. Boyle, M.D.; Soneja, S.I.; Quirós-Alcalá, L.; Dalemarre, L.; Sapkota, A.R.; Sangaramoorthy, T.; Wilson, S.; Milton, D.; Sapkota, A. A pilot study to assess residential noise exposure near natural gas compressor stations. *PLoS ONE* **2017**, *12*, e0174310. [CrossRef]
55. Hansen, K.L.; Nguyen, P.; Zajamšek, B.; Catcheside, P.; Hansen, C.H. Prevalence of wind farm amplitude modulation at long-range residential locations. *J. Sound Vib.* **2019**, *455*, 136–149. [CrossRef]
56. Berglund, B.; Lindvall, T.; Schwela, D.H. *Guidelines for Community Noise*; World Health Organization: Geneva, Switzerland, 1999.
57. Hurtley, C. (Ed.) *Night Noise Guidelines for Europe*; WHO Regional Office Europe: Copenhagen, Denmark, 2009.
58. Selander, J.; Albin, M.; Rosenhall, U.; Rylander, L.; Lewné, M.; Gustavsson, P. Maternal occupational exposure to noise during pregnancy and hearing dysfunction in children: A nationwide prospective cohort study in Sweden. *Environ. Health Perspect.* **2016**, *124*, 855–860. [CrossRef]
59. Wang, V.-S.; Lo, E.-W.; Liang, C.-H.; Chao, K.-P.; Bao, B.-Y.; Chang, T.-Y. Temporal and spatial variations in road traffic noise for different frequency components in metropolitan Taichung, Taiwan. *Environ. Pollut.* **2016**, *219*, 174–181. [CrossRef] [PubMed]
60. Ohgami, N.; Oshino, R.; Ninomiya, H.; Li, X.; Kato, M. Impairments of Inner Ears Caused by Physical Environmental Stresses. *Nihon Eiseigaku Zasshi. Jpn. J. Hyg.* **2017**, *72*, 38–42. [CrossRef] [PubMed]
61. Venet, T.; Carreres-Pons, M.; Chalansonnet, M.; Thomas, A.; Merlen, L.; Nunge, H.; Bonfanti, E.; Cosnier, F.; Llorens, J.; Campo, P. Continuous exposure to low-frequency noise and carbon disulfide: Combined effects on hearing. *NeuroToxicology* **2017**, *62*, 151–161. [CrossRef] [PubMed]
62. Zhou, G.; Fu, W. Total serum bilirubin levels and sensorineural hearing loss in the US adolescents: NHANES 2007–2010. *Int. J. Pediatric Otorhinolaryngol.* **2018**, *105*, 20–26. [CrossRef] [PubMed]
63. Walker, E.D.; Brammer, A.; Cherniack, M.G.; Laden, F.; Cavallari, J.M. Cardiovascular and stress responses to short-term noise exposures—A panel study in healthy males. *Environ. Res.* **2016**, *150*, 391–397. [CrossRef] [PubMed]
64. Poulsen, A.H.; Raaschou-Nielsen, O.; Peña, A.; Hahmann, A.N.; Nordsborg, R.B.; Ketzel, M.; Brandt, J.; Sørensen, M. Long-Term Exposure to Wind Turbine Noise and Risk for Myocardial Infarction and Stroke: A Nationwide Cohort Study. *Environ. Heal. Perspect.* **2019**, *2019*, 37004. [CrossRef]
65. Rossi, L.; Prato, A.; Lesina, L.; Schiavi, A. Effects of low-frequency noise on human cognitive performances in laboratory. *Build. Acoust.* **2018**, *25*, 17–33. [CrossRef]
66. Zeitooni, M.; Mäki-Torkko, E.; Stenfelt, S. Binaural Hearing Ability with Bilateral Bone Conduction Stimulation in Subjects with Normal Hearing: Implications for Bone Conduction Hearing Aids. *Ear Hear.* **2016**, *37*, 690–702. [CrossRef]
67. Liu, C.S.; Young, L.H.; Yu, T.Y.; Bao, B.Y.; Chang, T.Y. Occupational noise frequencies and the incidence of hypertension in a retrospective cohort study. *Am. J. Epidemiol.* **2016**, *184*, 120–128. [CrossRef] [PubMed]
68. Vasilyeva, I.N.; Bespalov, V.G.; Semenov, A.L.; Baranenko, D.A.; Zinkin, V.N. The Effects of Low-Frequency Noise on Rats: Evidence of Chromosomal Aberrations in the Bone Marrow Cells and the Release of Low-Molecular-Weight DNA in the Blood Plasma. *Noise Health* **2017**, *19*, 79–83. [PubMed]
69. Alimohammadi, I.; Ebrahimi, H. Comparison between effects of low and high frequency noise on mental performance. *Appl. Acoust.* **2017**, *126*, 131–135. [CrossRef]
70. Mancera, K.F.; Lisle, A.; Allavena, R.; Phillips, C.J.C. The effects of mining machinery noise of different frequencies on the behaviour, faecal corticosterone and tissue morphology of wild mice (Mus musculus). *Appl. Anim. Behav. Sci.* **2017**, *197*, 81–89. [CrossRef]
71. Abbasi, A.M.; Motamedzade, M.; Aliabadi, M.; Golmohammadi, R.; Tapak, L. Study of the physiological and mental health effects caused by exposure to low-frequency noise in a simulated control room. *Build. Acoust.* **2018**, *25*, 233–248. [CrossRef]
72. Ninomiya, H.; Ohgami, N.; Oshino, R.; Kato, M.; Ohgami, K.; Li, X.; Kato, M. Increased expression level of Hsp70 in the inner ears of mice by exposure to low frequency noise. *Hear. Res.* **2018**, *363*, 49–54. [CrossRef]
73. Chalansonnet, M.; Carreres-Pons, M.; Venet, T.; Thomas, A.; Merlen, L.; Seidel, C.; Cosnier, F.; Nunge, H.; Pouyatos, B.; Llorens, J.; et al. Combined exposure to carbon disulfide and low-frequency noise reversibly affects vestibular function. *NeuroToxicology* **2018**, *67*, 270–278. [CrossRef]
74. Min, J.Y.; Min, K. Cumulative exposure to nighttime environmental noise and the incidence of peptic ulcer. *Environ. Int.* **2018**, *121*, 1172–1178. [CrossRef]

75. Wang, X.; Lai, Y.; Zhang, X.; Zhao, J. Effect of low-frequency but high-intensity noise exposure on swine brain blood barrier permeability and its mechanism of injury. *Neuroscience Letters* **2018**, *662*, 122–128. [CrossRef]
76. Paunović, K.; Jakovljević, B.; Stojanov, V. The timeline of blood pressure changes and hemodynamic responses during an experimental noise exposure. *Environ. Res.* **2018**, *163*, 249–262. [CrossRef]
77. Negishi-Oshino, R.; Ohgami, N.; He, T.; Li, X.; Kato, M.; Kobayashi, M.; Gu, Y.; Komuro, K.; Angelidis, C.E.; Kato, M. Heat shock protein 70 is a key molecule to rescue imbalance caused by low-frequency noise. *Arch. Toxicol.* **2019**, *93*, 3219–3228. [CrossRef] [PubMed]
78. Scherer, R.W.; Formby, C. Effect of Tinnitus Retraining Therapy vs Standard of Care on Tinnitus-Related Quality of Life: A Randomized Clinical Trial. *Jama Otolaryngol. Head Neck Surg.* **2019**, *145*, 597–608. [PubMed]
79. Phadke, K.V.; Abo-Hasseba, A.; Švec, J.G.; Geneid, A. Influence of Noise Resulting From the Location and Conditions of Classrooms and Schools in Upper Egypt on Teachers' Voices. *J. Voice* **2019**, *33*, 802.e1–802.e9. [CrossRef] [PubMed]
80. Zare, S.; Baneshi, M.R.; Hemmatjo, R.; Ahmadi, S.; Omidvar, M.; Dehaghi, B.F. The Effect of Occupational Noise Exposure on Serum Cortisol Concentration of Night-shift Industrial Workers: A Field Study. *Saf. Health Work* **2019**, *10*, 109–113. [CrossRef] [PubMed]
81. Licitra, G.; Fredianelli, L.; Petri, D.; Vigotti, M.A. Annoyance evaluation due to overall railway noise and vibration in Pisa urban areas. *Sci. Total Environ.* **2016**, *568*, 1315–1325. [CrossRef] [PubMed]
82. Iannace, G.; Ciaburro, G.; Trematerra, A. Wind Turbine Noise Prediction Using Random Forest Regression. *Machines* **2019**, *7*, 69. [CrossRef]

Generator Set Noise Solutions

How do I make my generator quiet?

Controlling unwanted noise from on-site power systems

By Dennis Aaberg, Senior Acoustics Specialist, Cummins Power Generation Inc.

With the growth of standby, prime and peaking power installations in highly populated areas, design engineers have focused their attention on understanding how generator set noise is propagated and controlled. The high cost of retrofitting a site for noise reduction makes it imperative to assess noise performance requirements early in the on-site power system design stage. By applying the principles outlined in this paper, power system designers and end users alike will be able to more easily control unwanted noise from their on-site power system.

Like many types of rotating machinery, reciprocating engine-powered generator sets produce noise and vibration. Whether these generator sets run continuously in prime power applications or only occasionally in standby applications, their operating sound levels often must be reduced to comply with local, state or federal ordinances. In North America, maximum permitted overall noise levels range from 45 dB(A) to 72 dB(A), depending on location and zoning. In fact, recently, some states and communities have begun to specify property noise restrictions using octave band frequencies to reduce the amount of frequency noise that reaches community neighborhoods. Since untreated

Quiet Equates Quality

Leo L Beranek, 1914-2016
The Father of Modern Acoustics

We Help Our Customers Measure and Manage Noise

generator set noise levels can approach 100 dB(A) or more, both the location of the generator set and noise mitigation take on great importance.

in Their Products

In general, two forms of regulations affect the volume of noise to which individuals or the public may be exposed: state or municipal noise ordinances and Occupational Safety and Health Administration (OSHA) federal safety regulations. The former regulations address noise that may migrate beyond property lines and disturb the public but that is seldom sufficiently loud to constitute a safety hazard. The latter addresses standards for noise exposure in the workplace to protect the health of workers. OSHA regulations normally only apply to workers who may be exposed to generator set noise that is above 80 dB(A) for any appreciable time. Workers can limit exposure by wearing proper hearing protection when working around operating generator sets. Europe and Japan, as well as numerous other countries, have also set standards to control noise in the workplace and in the environment at large.

Defining noise

Sound is what the human ear hears; noise is simply unwanted sound. Sound is produced by vibrating objects and reaches the listener's ear as pressure waves in the air or other media. Sound is technically a variation in pressure in the region adjacent to the ear. When the amount of sound becomes uncomfortable or annoying, it means that the variations in air pressure near the ear have reached too high an amplitude.

The human ear has such a wide dynamic range that the decibel (dB) scale was devised to express sound levels. The dB scale is logarithmic because the ratio between the softest sound the ear can detect and the loudest sound it can experience without damage is roughly a million to one or 1:106. By using a base-10 logarithmic scale, the whole range of human hearing can be described by a more convenient number that ranges from 0 dB (threshold of normal hearing) to 140 dB (the threshold of pain).

There are two dB scales: A and L.

- The dB(L) unit is a linear scale that treats all audible frequencies as having equal value. However, the human ear does not experience all sound frequencies as equally loud. The ear is particularly sensitive to frequencies in the range of 1,000 to 4,000 Hertz (cycles per second), and not as sensitive to sounds in the lower or higher frequencies.
- Therefore, the "A-weighting filter," which is an approximation of loudness, is used to correct the sound pressure levels to more accurately reflect what the human ear perceives. This frequency-weighting results in the dB(A) scale, which was adopted by OSHA in 1972 as the official regulated sound level descriptor.

Figure 1 shows typical noise levels associated with various surroundings and sources.

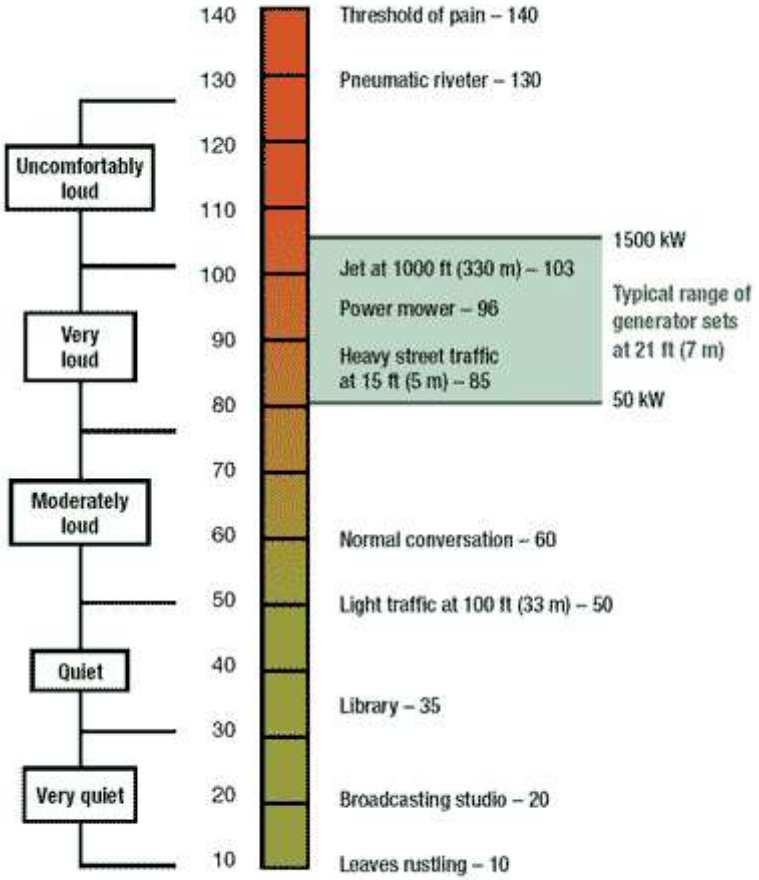


Figure 1: Typical noise levels

Sources of generator set noise

Generator set noise is produced by six major sources (see Figure 2):

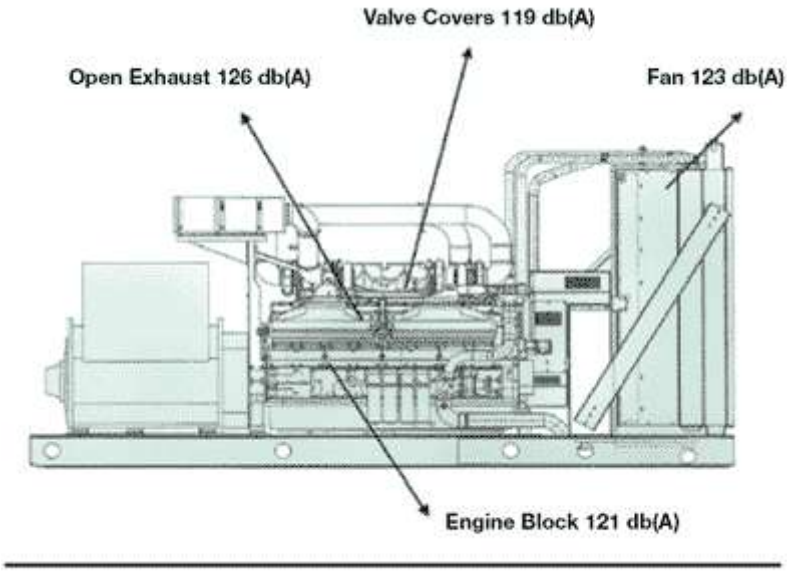


Figure 2: 2000 DQKC noise sources (estimated sound power levels)

- Engine noise – This is mainly caused by mechanical and combustion forces and typically ranges from 100 dB(A) to 121 dB(A), measured at one meter, depending on the size of the engine.

- Cooling fan noise – This results from the sound of air being moved at high speed across the engine and through the radiator. Its level ranges from 100 dB(A) to 105 (A) dB at one meter.
- Alternator noise – This is caused by cooling air and brush friction and ranges from approximately 80 dB(A) to 90 dB(A) at one meter.
- Induction noise – This is caused by fluctuations in current in the alternator windings that give rise to mechanical noise that ranges from 80 dB(A) to 90 dB(A) at one meter.
- Engine exhaust – Without an exhaust silencer, this ranges from 120 dB(A) to 130 dB(A) or more and is usually reduced by a minimum of 15 dB(A) with a standard silencer.
- Structural/mechanical noise – This is caused by mechanical vibration of various structural parts and components that is radiated as sound.

Measuring noise

Before you can begin to determine what mitigation might be required, you have to collect accurate sound measurements of both the existing ambient noise and the noise contributed by the generator set. Accurate and meaningful generator set sound-level data should be measured in a "free field environment." A free field, as distinguished from a "reverberant field," is a sound field in which there are negligible effects from sound being reflected from obstacles or boundaries. Noise measurements should be made using a sound level meter and an octave band filter set, at a minimum, to allow for more detailed analysis by acoustical consultants.

When measuring sound levels from a distance of 7 meters, microphones are placed in a circular array with measurement locations at 45-degree increments around the generator set. The measurement array is 7 meters from an imaginary parallelepiped that just encloses the generator set, which is usually defined by the footprint dimensions of the skid base or chassis.

When measuring sound power levels for European applications, a parallelepiped microphone array is typically used, as defined in International Standards Organization standard ISO 3744.

Sound performance data for generator sets from Cummins Power Generation Inc. are available on the company's design software CD (called "Power Suite"). Sound performance data is also available in the Power Suite Library on the company's Web site:www.cummins.com.

Initial noise measurements are usually made in eight octave bands from 63 Hertz to 8000 Hertz, although the highest sound power generated is typically in the range of 1,000 Hertz to 4,000 Hertz – the range of sound to which the human ear is most sensitive. While measurements are taken across a spectrum of frequencies, the logarithmic sum of all the frequencies is the most important [illegible]ding. However, when the overall sound level exceeds the allowable level for [illegible]ject, frequency band data is used to determine what design changes are necessary to lower the overall sound level to comply with requirements.

Totaling all the sources of noise

The total noise level from a generator set is the sum of all the individual sources, regardless of frequency. However, because the dB(A) scale is logarithmic, the individual dB(A) readings cannot be added or subtracted in the usual arithmetic way. For example, if one noise source produces 90 dB(A) and a second noise source also produces 90 dB(A), the total amount of noise produced is 93 dB(A) – not 180 dB(A). An increase of 3 dB(A) represents a doubling of the sound power; yet, this increase is barely perceptible to the human ear.

How to add decibels

When the numerical difference in dB(A) between two noise levels is:	Add this dB(A) amount to the higher of the two noise levels for a total:
0	3
0.1-0.9	2.5
1.0-2.4	2
2.4-4.0	1.5
4.1-6.0	1
6.1-10	0.5
10	0

Figure 3: How to add decibels based on the numerical dB(A) difference between two sources.

Figure 3 illustrates how to add decibels based on the numerical difference between two noise levels. As in the example above, if there is no difference between noise source 1 and noise source 2, their combined dB(A) measurement would only increase by 3 dB(A) – from 90 dB(A) to 93 dB(A). If source 1 was 100 dB(A) and source 2 was 95 dB(A), their combined dB(A) measurement would be 101 dB(A).

Noise laws and regulations

Representative outdoor noise level regulations

In North America, state and local codes establish maximum noise levels that are permitted at the property line. Figure 4 shows some representative outdoor noise level regulations. Compliance with these noise regulations requires an understanding of the existing ambient noise level at the property line without

the generator set running and what the resultant noise level will ultimately be with the generator set running at full load.

In Europe, regulation of generator noise is governed by the 2000/14/EC (Stage II) legislation that has been in place since 2006. For generators with a prime power rating less than 400 kW, the maximum sound power level permitted is calculated using the formula:

95 + Log Pel = dB(A)

(where Pel is the generator's prime power rating)

Generators of 400 kW prime rating and above are only required to be labeled with the LWA figure (European measurement of "acoustic power level") calculated from the manufacturer's developmental test results. For the European market, most generators from 11 kVA to 550 kVA are packaged in standard enclosures that make the units compliant with most legislation. Standard enclosures typically reduce radiated noise by a minimum of 10 dB(A).

Strategies for reducing generator set noise

Regardless of the type of generator set that needs sound attenuation, there are basically seven strategies for reducing generator set noise: 1) reduce the sound level of the source; 2) acoustic barriers; 3) acoustic insulation; 4) isolation mounts; 5) cooling air attenuation; 6) exhaust silencers; and 7) efforts to maximize the distance between the generator set and the property line (or people). When locating generator sets outdoors, the use of enclosures – particularly sound-attenuating enclosures – combines all of these strategies into a convenient package that provides weather protection as well as sound attenuation. These strategies are summarized in Figure 5.

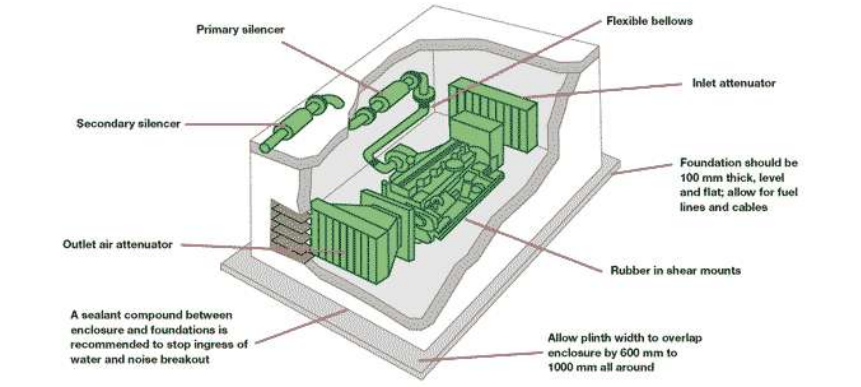


Figure 5: Typical genset installation showing noise control measures

1. **Acoustic barriers –** Rigid materials with significant mass and stiffness reduce the transmission of sound. Examples include sheet steel typical of enclosures, and concrete- or sand-filled block walls or solid concrete walls typical of indoor generator room installations. It is also important to eliminate sound paths through cracks in doors or walls, or through access points for exhaust, fuel or electrical wiring.

2. **Acoustic insulation –** Sound-absorbing materials are available for lining air ducts and covering walls and ceilings. Directing noise at a wall covered in sound absorbing material can be very effective. Select materials that are resistant to oil and other engine contaminants. Fiberglass or foam may be suitable, based on factors such as cost, availability, density, flame retardance, resistance to abrasion, aesthetics and cleanability.
3. **Isolation mounts –** Vibrating equipment creates sound pressure waves (noise) in the surrounding air. Anything that is physically connected to a generator set can cause vibrations to be transmitted to the building structure. These connection points include skid anchors, radiator discharge air ducts, exhaust piping, coolant piping, fuel lines and wiring conduit. Fitting these connections with flexible joints effectively reduces noise transmission. Mounting a generator set on springtype vibration isolators effectively reduces the vibration and noise that are transmitted through the floor.

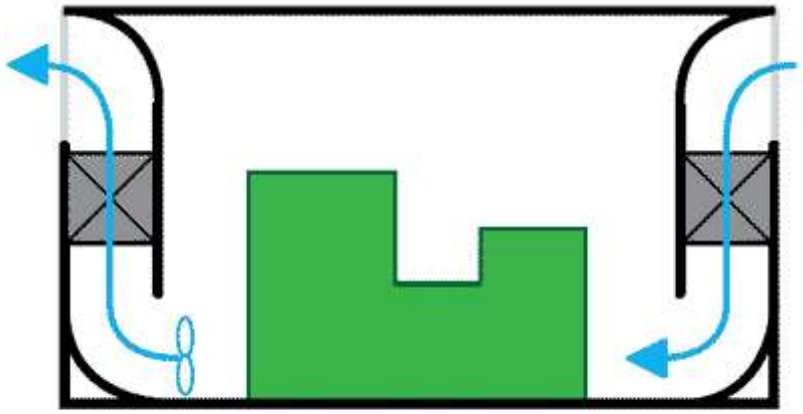


Figure 6: Reducing high-frequency noise by making the generator set cooling air turn 90 degrees several times as it enters or leaves a room or enclosure

4. **Cooling air attenuation** – Inlet and outlet air attenuation baffles can help reduce the noise produced by the cooling air as it moves across the engine and through the radiator. Noise from the movement of cooling air is significant because of the volume required – about 20 cubic meters per second for a generator set with a 50-liter diesel engine. Alternatively, the radiator can be remotely located to a roof, for example, to eliminate this noise source or direct it up and away from people or the property line. Also, making air travel through a 90-degree bend in a duct reduces high-frequency noise. See Figure 6.
5. **Maximizing distance –** When there are no reflecting walls to magnify the noise produced by the generator set, the noise level will decrease by approximately 6 dB(A) every time the distance is doubled (see Figure 7). If the property line is within the near field of a generator set, however, the noise level may not be predictable. A near-field environment is any location within twice the largest dimension of the noise source (generator set).
6. **Exhaust silencers –** Generator sets are almost always equipped with an exhaust silencer (muffler) to limit exhaust noise from the machine. Exhaust silencers come in a wide variety of types, physical arrangements

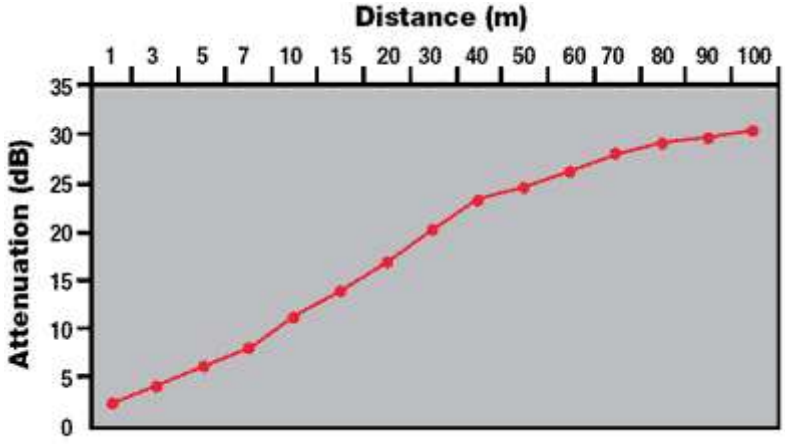


Figure 7: Reduction of sound over distance

and materials. Silencers are generally grouped into either chamber-type silencers or spiral type devices. The chamber-type devices tend to be more effective, but the spiral-type devices are more compact and may provide sufficient attenuation for many applications. Silencers can be made of coldrolled steel or stainless steel. Stainless steel is the preferred material for use outdoors when corrosion is a concern. Silencers are available in several different noise-attenuation "grades," commonly referred to as "industrial," "residential" and "critical." Industrial silencers reduce noise from 12 to 18 dB(A); residential silencers reduce noise from 18 to 25 dB(A); critical silencers reduce noise from 25 to 35 dB(A). In general, the more effective a silencer is at reducing exhaust noise, the greater the level of restriction on the engine exhaust. For long exhaust systems, the piping itself will provide some level of attenuation.

Sound-attenuating enclosures

Steel and aluminum enclosures of all kinds provide at least 10 dB(A) of attenuation for generator sets that must be located outdoors. In many cases, when combined with an effective exhaust silencer, this amount of attenuation may be sufficient to meet many local ordinances in North America and throughout Europe. Standard enclosures are available from most generator set manufacturers and from a variety of third-party providers.

When a greater amount of attenuation is needed to meet local noise ordinances or reduce impact on employees or neighbors, special sound-attenuating enclosures must be employed. In general, the cost of the enclosure is directly related to the level of sound attenuation required. In critical cases, it is not uncommon for the cost of the sound-attenuated enclosure to equal the cost of the generator set. Some enclosures also may negatively impact generator set performance by limiting proper ventilation and load-carrying capacity. Careful design from the outset is important to attain noise-control goals while maintaining generator set performance.

Special sound-attenuating enclosures combine both barrier and absorption noise control strategies to contain generator set noise. While both steel and inum sound-attenuating enclosures are available, steel – because of its ater mass and stiffness – provides about 2-3 dB(A) better attenuation.

Aluminum enclosures are usually only specified in coastal regions where their corrosion resistance is important in the salt air.

Conclusion

With maximum noise levels permitted at a property line that range from 52 dB(A) to 72 dB(A), depending on location and zoning, and untreated generator set noise levels that approach 100 dB(A) or more, it is clear that generator set noise mitigation is a subject of great importance. Furthermore, the high cost of retrofitting a site for noise reduction makes it imperative to assess noise performance requirements early in the on-site power system design stage. Working closely with local regulators, the generator set manufacturer, consulting engineer or acoustic specialist will allow you to achieve your project's sound-attenuation goals.

For additional technical support, please contact your local Cummins Power Generation distributor. To locate your distributor, visit www.cumminspower.com.

About the author

Dennis Aaberg, senior acoustics specialist, has degrees in Electro- Mechanical Technology and Industrial Drafting and Technology from Alexandria Technical College. He has worked in the field of sound and vibration engineering for Cummins Power Generation for the past 29 years. In that time, he has supported engineering and marketing departments with sound and vibration measurements and analysis, as well as design direction for all product lines produced at Cummins Power Generation in Fridley, Minnesota.

The Data Heat Island Effect: Quantifying the Impact of AI Data Centers in a Warming World

Andrea Marinoni[1,2*], Erik Cambria[3], Weisi Lin[3], Mauro Dalla Mura[5], Jocelyn Chanussot[6], Edoardo Ragusa[7], Chi Yan Tso[8], Yihao Zhu[9], Benjamin Horton[8]

[1*]Department of Computer Science and Technology, University of Cambridge, 15 JJ Thomson Avenue, Cambridge, CB3 0FD, UK.
[2]Glitch Analytics Ltd., The Old School House, Church Lane, Oving, HP22 4HL, UK.
[3]College of Computing and Data Science, Nanyang Technological University, 50 Nanyang Avenue, 639798, Singapore.
[4]Asian School of Environment, Nanyang Technological University, 50 Nanyang Avenue, 639798, Singapore.
[5]GIPSA-lab, Grenoble-INP UGA, 11 rue des Mathématiques, Grenoble Campus BP46, Saint-Martin-d'Hères Cedex, 38402, France.
[6]INRIA, 655 Avenue de l'Europe, CS 90051, Montbonnot Cedex, 38334, France.
[7]Dipartimento di Ingegneria Navale, Elettrica, Elettronica e delle Telecomunicazioni - DITEN, University of Genoa, via alla Opera Pia 11a, Genoa, 16145, Italy.
[8]School of Energy and Environment, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong.
[9]Department of Management, College of Business, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong.

*Corresponding author(s). E-mail(s): am2920@cam.ac.uk;
Contributing authors: cambria@ntu.edu.sg; wslin@ntu.edu.sg; mauro.dalla-mura@gipsa-lab.grenoble-inp.fr; jocelyn.chanussot@grenoble-inp.fr; edoardo.ragusa@unige.it; chiytso@cityu.edu.hk; yihaozhu2@cityu.edu.hk; bphorton@cityu.edu.hk;

Abstract

The strong and continuous increase of AI-based services leads to the steady proliferation of AI data centres worldwide with the unavoidable escalation of their power consumption. It is unknown how this energy demand for computational purposes will impact the surrounding environment. Here, we focus our attention on the heat dissipation of AI hyperscalers. Taking advantage of land surface temperature measurements acquired by remote sensing platforms over the last decades, we are able to obtain a robust assessment of the temperature increase recorded in the areas surrounding AI data centres globally. We estimate that the land surface temperature increases by 2°C on average after the start of operations of an AI data centre, inducing local microclimate zones, which we call the *data heat island effect*. We assess the impact on the communities, quantifying that more than 340 million people could be affected by this temperature increase. Our results show that the data heat island effect could have a remarkable influence on communities and regional welfare in the future, hence becoming part of the conversation around environmentally sustainable AI worldwide.

Keywords: Artificial intelligence sustainability, data centres, power consumption, heat dissipation, land surface temperature.

1 Introduction

When considering the impact of anthropogenic activities on climate change and global warming in the last few decades, the urban heat island (UHI) effect plays a key role. UHI results from the concentration of industrial activities and heavy use of synthetic construction material, as well as solid increase in energy consumption in densely populated urban areas [1–6]. When discussing UHI effects, it is paramount to consider the impact they have on local communities and regional welfare. In this respect, it has been studied and demonstrated how UHI would affect healthcare, energy consumption, air quality, and water quality. It is therefore crucial to understand their causes [7].

Specifically, the main drivers for UHI are classified in terms of geometry of the anthropogenic spaces (e.g., urban canyons dictate the concentration of particulates); lack of vegetation and water bodies; generation of air pollutants and water vapour; heat retention and low albedo building [1, 3, 6, 8, 9]. On top of these categories, the type of human activities established and operating dramatically influence the impact of UHI on environment and communities. These anthropogenic activities are characterized by their spatial concentration, functional type (e.g., residential, industrial), cooling requirements, fuel sources, and thermal efficiency [1, 7, 8].

With global data volumes growing rapidly [10], data centres are expected to be one of the most power-hungry activity in the next decade [11–14]. In fact, it has been estimated that in 3 to 5 years the power consumption for data processing will exceed the amount budgeted for manufacturing [15–17]. As such, it is possible to expect that the impact of data centres and AI hyperscalers activities on climate might not be negligible [18–20], indeed being further exacerbated by the use of AI in the next decades [15, 16, 21].

In fact, AI data centres are in vast majority relying on fossil fuel use [15, 19–22]. Therefore, the steep growth of AI training and use for various applications would directly translate into high net impact on emissions. Also, the inefficiencies and nonidealities of AI hyperscalers operations would cause their emissions to rise even more under the expected projections of AI model scaling [19].

However, studying in detail the actual impact of AI hyperscalers environmental footprint would entail several uncertainties and unknowns [19]. Indeed, there are no credible indicators that can help determine and quantify the impact of existing AI applications. Moreover, predicting the characteristics of future AI applications, particularly their energy consumption and computing requirements, remains challenging. The fluctuations on forecast scenarios that could be drawn are further amplified by a lack of both consistency in methodologies and comprehensive data, even in historic estimates of environmental footprint from the ICT sector [19, 20, 23, 24]. In this paper, we aim to provide a novel perspective on the impact of AI hyperscalers on environment and sustainability under various climate scenarios for the next decades. By a multiscale multimodal analysis of records collected from various sources of information and sensors, we quantify the contribution of AI hyperscalers worldwide on land surface temperature increase (see Figure 1). Specifically, we integrate land surface temperature data from remote sensing platforms with the locations of AI hyperscalers that have been established in the last twenty years in order to assess the change in atmospheric heat induced by the data centres. To make our study less prone to uncertainties, we harmonise, arrange and filter the data from seasonality effects, influence from various nonidealities (e.g., missing data), and influence from factors (e.g., other types of anthropogenic activities in the surrounding of AI hyperscalers) which might contaminate our study. In this way, we are able to identify the impact of AI hyperscalers on environment as a consistent gradient in temperature between the area of data centres and their surrounding regions, so much so that could form a "*data heat island effect*". Our analysis moves in order to address three main objectives:

- Quantification of the land surface temperature increase connected to the establishment of an AI hyperscalers;
- Assessment of the region of influence of this increase;
- Estimation of the population affected by the temperature increase.

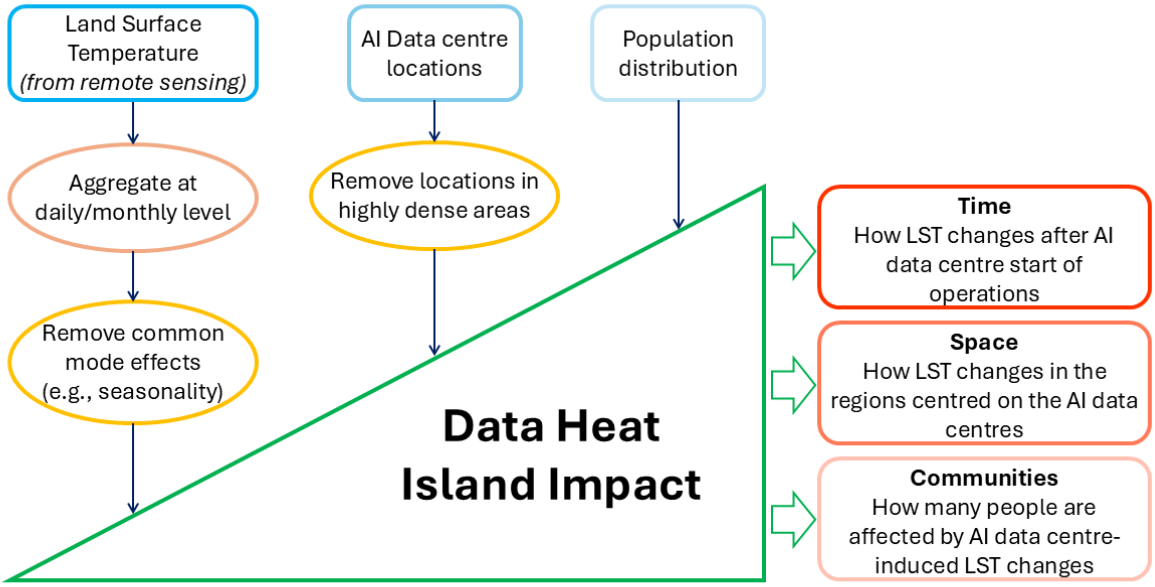


Fig. 1 Graphical abstract of this work: the proposed multiscale multimodal architecture for data analysis integrates records of land surface temperature trends from year 2004 to 2024, gridded population maps, and AI data centres locations worldwide, to achieve a thorough understanding of the impact of *data heat islands* in time, space and over communities.

The paper is organised as follows. Section 2 introduces the datasets and the methodology used to extract information on the land surface temperature increase induced by the AI data centres in twenty years worldwide. Section 3 reports the results we achieved with respect to the aforementioned indicators. Section 4 provides a few best practice guidelines for software and hardware solutions that could help to reduce the impact of the data heat island effect. Finally, Section 5 draws the final remarks and conclusions.

2 Data and methods

Our analysis of the environmental footprint of AI hyperscalers relies primarily on land surface temperature (LST) measurements (see Figure 1). We used a reconstructed MODIS LST dataset (produced by NASA) acquired worldwide from 2004 to 2024 over an enhanced 500m resolution grid [25]. To address data limitations (e.g., missing acquisitions, cloud cover), we aggregated the results at daily and then monthly scale, and removed seasonality effects, as well as outliers. Then, we focused our attention on the locations of the main AI hyperscalers that have been built in the same time interval, collecting information from resources such as [26]. This database contains more than 11000 locations worldwide, of which 8472 have been detected to dwell outside of highly dense urban areas. We thus used the latter locations to quantify the effect of the establishment of data centres on the environment in terms of the LST gradient that could be measured on the areas surrounding each data centre. In fact, LST profiles in urban and densely built-up areas can be affected by various activities, e.g., manufacturing, house heating, road networks. Considering only the AI data centres located outside of highly dense regions allows us to provide a solid connection between the LST trends that we can measure and the presence of AI data centres in the area. In particular, we assess mean LST trends over time within circular regions centered on each AI hyperscaler. In practice, our analysis counts

over 6733 data points, when considering LST trends cleared out of problematic data points and outliers for AI data centres located outside of highly dense urban areas. Finally, to assess the impact of LST change on population, we downscale the 100m x 100m demographic maps from Worldpop Global Project [27] over the considered to 1km resolution, so to enable a robust statistical analysis of the population affected the temperature increase induced by AI data centres.

This study relies on the assumption that AI hyperscalers might have an impact on the LST of their locations because of the heat that they would release as a result of the high power demanding applications that they would be used for [28]. To assess this, we first quantify the normalised temperature increase that could be observed in the months right after the start of operations of the AI hyperscalers we considered. To assess this impact we draw inspiration from the quantification approach used to estimate the urban heat island effect [6, 8, 9]. Specifically, we compute the monthly average LST of the area centred on each AI hyperscaler, and we calculate the difference between the mean monthly LST and average LST that is recorded across a period of k months on that region. In other terms, let us define T_i^r as the mean LST for month i at a distance of r km from a given data centre. Then, for every AI data centre location, we can write the normalised temporal temperature increase centred over the data centre location as $\Delta_i^{r=0}(k) = \Delta_i^0(k)$, which is defined follows:

$$\Delta_i^0(k) = T_i^0 - \frac{1}{k}\sum_{j=1}^{k} T_{i-j}^0, \tag{1}$$

where T_i^0 identifies the mean LST for month i for each AI data centre location. For completeness, this quantity is typically computed over 10 years, which translates into setting $k = 120$ in (1).

To focus our attention on the impact of AI data centres on LST increase, we centre the origin of the i-axis on the date of start of operations of each data centre under exam. Therefore, $\Delta_0(k)$ identifies the average LST increase that is measured over each AI data centre with respect to the mean of the LST that was recorded over the k months before their start of operations.

With this in mind, we assess the spatial influence of AI data centres on LST increase by focusing our attention on the LST distribution at r km from the given data centres over the k months prior to the start of operation of each data centre, that is:

$$\Delta_0^r(k) = \overline{T}_0^r - \frac{1}{k}\sum_{j=1}^{k} \overline{T}_{0-j}^r, \tag{2}$$

where $\overline{T}_0^r$ and $\overline{T}_{-j}^r$ identify the average of the LST of all the points at r km from the given AI data centre on the month of start of operation and at j months prior, respectively. In other terms, assuming that R points are at r km from the given data centre, and that $T_u^r|_l$ identifies the LST that we estimate for the l-th point at r km from the given data centre and u months from the start of operations, we can write $\overline{T}_u^r = \sum_{l=1}^{R} T_u^r|_l \,/R$.

As mentioned, we compute the quantities in (1) and (2) for each data centre under exam. The following Section reports the results we achieved building up on these metrics.

3 Results and discussion

The results we obtained conducting the analysis described Section 2 across all AI hyperscalers analysed during the 2004-2024 period are aggregated and displayed in Figure 2. Specifically, we focus our attention on the LST increase induced over the AI data centres under exam with respect to the average LST recorded over those regions for the 5 years prior to each AI data centre start of operations. For sake of visualisation, we concentrate 10 months before the start of operations of each date centre, and the 10 months after it. In other words, we compute $\Delta_i^0(k)$ as in (1) with $k = 5 \times 12 = 60$,

and for $i \in \{-10, -9, ..., -1, 0, 1, ...9, 10\}$. In particular, we align the temporal analysis results over the x-axis, where the trends are centred over the time of start of operations of each data centre. The aggregate average of the LST difference is shown in red solid line. The shaded areas show the interval between the maximum and minimum value of LST increase that has been recorded across the considered AI hyperscalers. Finally, the bar across the average line identifies the limit of the 95th percentile of the distribution we compute. Figure 2 shows a clear increase of LST coinciding with the start of

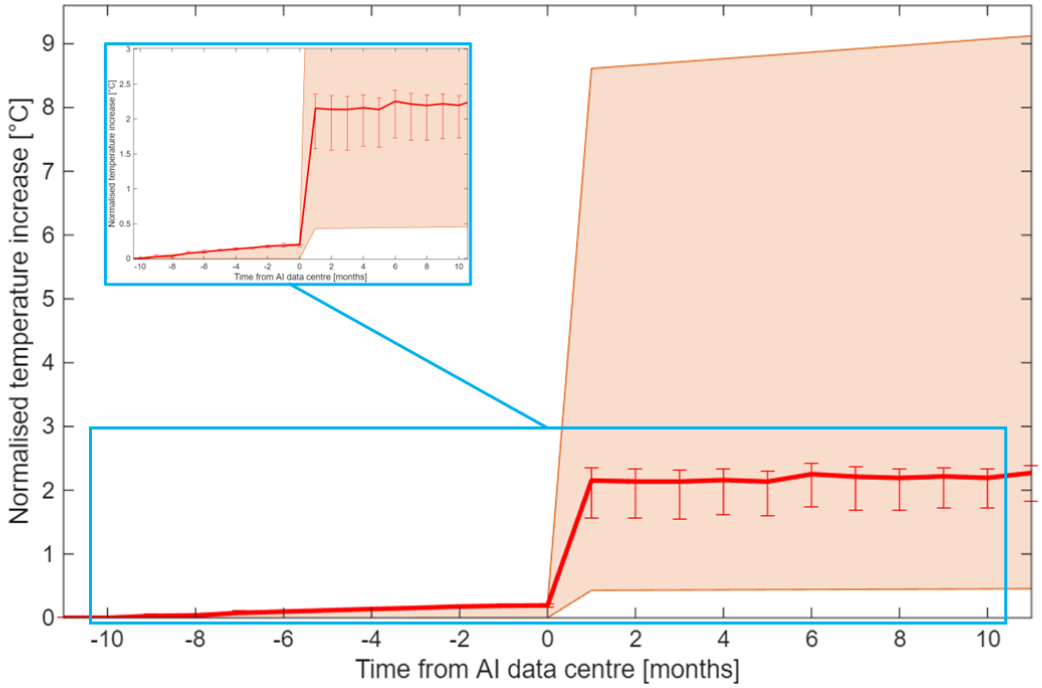


Fig. 2 Temperature increase through time over the AI hyperscalers locations centred around the time of start of operations ($i = 0$), according to the procedure described in Section 3 - equation (1). The aggregate average of the LST difference is shown in red solid line. The shaded areas show the interval between the maximum and minimum value of LST increase that has been recorded across the considered AI hyperscalers. The bar across the average line identifies the limit of the 95th percentile of the distribution we compute.

operations of the AI hyperscalers that have been monitored in this study. Indeed, the average LST increase across the data centres is 2.07°C, whilst its minimum and maximum can be found at 0.3 °C and 9.1 °C, respectively. The 95th percentile of the LST increase after the AI data centres start of operations is concentrated between 1.5°C and 2.4°C. These results are dramatically impressive, especially considering that the typical LST increase caused by the quintessential example of compound of anthropogenic activities – the urban heat island effect – has been estimated in the 4 and 6 °C interval [1, 6, 8]. This apparent step function emphasize the clear effect of AI hyperscalers on their surrounding areas, so much that it can match the impact of "islands" of higher temperatures: therefore, we call this the *data heat island* effect. This terminology is further supported when computing monthly LST differences as in Equation (1) over various time intervals (12 months to 10 years). Table 1 reports these results: across all the intervals that have been considered, the LST increase over the AI hyperscaler regions over the start of operations of the data centre seems consistent. The influence of AI hyperscalers apparently is not limited to the immediate proximity of their locations. In fact, we computed the temperature increase over wider regions circularly arranged around the data centres, following the same procedure that we previously described. Figure 3 displays the results of this analysis. Taking a look to these results, it is evident that the impact of LST increase reaches up to 10 km

Table 1 Temperature increase (in °C) as defined in Equation (1) at AI hyperscalers start of operation (i=0) as a function of k.

$\Delta_0(k)$	**k=12**	**k=24**	**k=36**	**k=120**
average	2.03	2.05	2.06	2.12
minimum	0.30	0.31	0.32	0.37
maximum	9.02	9.09	9.14	9.24

distance from the AI hyperscalers. The data heat island effect seems to reduce its intensity to 30% within 7 km around the data centres. In particular, an average monthly LST increase of 1 °C can be measured up to 4.5 km from the AI hyperscalers. This spatial extent is comparable to that observed in urban heat island effects [1, 6, 8]. The LST increase that is recorded in the area surrounding AI

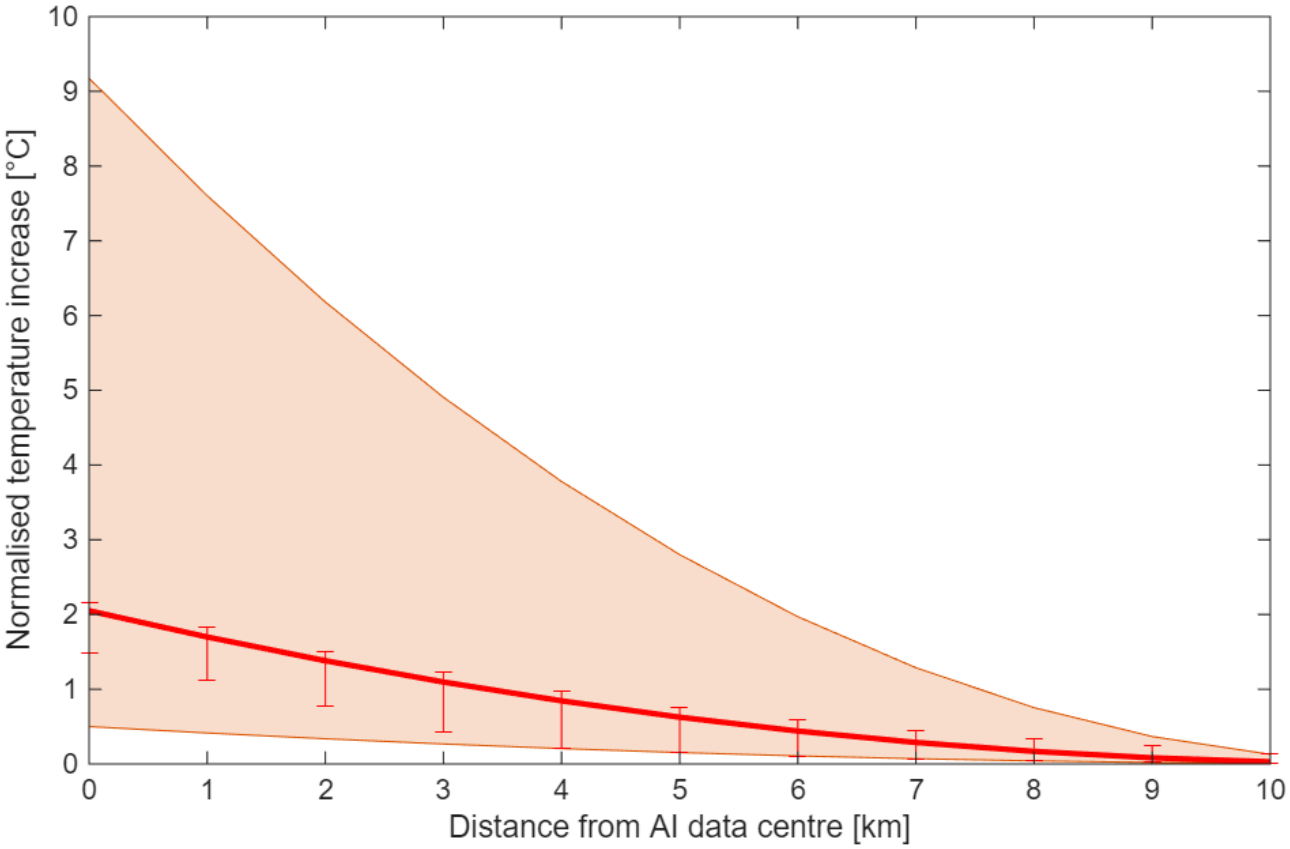


Fig. 3 Temperature increase through space as a function of the distance from the AI hyperscalers locations, according to the procedure described in Section 2 - equation (2). The same color policy as in Figure 2 applies here.

data centres seem consistent across various regions of the world, even if under diverse climatic conditions. As an example, we mention three situations that show the consistency of our study. In fact, in the following case studies, our LST increase assessment fit some anomalous trends of LST increase that have been recorded in the last decades, so that our approach could eventually be used to explain these non-typical temporal LST profiles:

- *Bajio region, Mexico*: the Bajio region in Mexico records a very high density of data centres managed by various providers that started operations approximately twenty years ago. The stable climate,

low seismic activity, and proximity to North American markets made the Bajío region a great hub for AI data centres. Nevertheless, it has been recorded a serious LST increase trend (in the order of 2°C) in the last twenty years in the region, which was not identified in proximal areas [29];

- *Aragon province, Spain*: Aragón has emerged as a major European hub for hyperscale AI data centres. The region is becoming a critical node for AI, cloud computing, and, increasingly, specialized server manufacturing. At the same time, the region has recorded an anomalous increase of approximately 2°C, which stands out with respect to the trends of the neighboring provinces of Spain, as well as to the global temperature increase that has been monitored in Europe [30];
- *Ceara' and Piauí states, Brazil*: The north east region of Brazil identifies one of the areas in the country (together with the greater urban areas of Rio de Janeiro and Sao Paulo) with a very high concentration of data centres. The surroundings of the city of Teresina, Piauí, are in particular dedicated for AI service hub. At the same time, the states of Ceara' and Piauí have shown a peculiar LST increase trend centred in Teresina in the range of 2.8°C, projected to reach more than 3.5°C in the next five years, that is quite unusual with respect to other areas in the north Brazil and equatorial Brazil [31].

These results become more significant when considering the population exposed to data heat island effects. We report in Figure 4 the amount of people that were resident within 10 km radius from the AI hyperscalers with respect to the LST increase that they would have experienced after the start of operations of each data centre. Figure 4 displays the result of this analysis. Although the object of the analysis has been focused on data centres outside of densely populated areas (as mentioned in Section 2), it is possible to appreciate how many people (up to 343 millions in total for a LST increase up to 9°C) could be affected by the data heat island effects worldwide. This makes the data heat island effect a phenomenon that is very hard to consider negligible, as it may lead (like the urban heat island effect) to dramatic impact on welfare, healthcare and energy systems [2, 6, 19, 24, 32].

Given these findings, mitigation measures for data heat island effects warrant urgent consideration: a set of strategies that can be implemented in this respect are introduced in the next Section.

4 A way forward

Although the impact of data heat islands can be intense (as it has been previously discussed), advances in technology in the semiconductor and energy material industries, as well as methodological developments in computer science and electrical engineering, can be used to mitigate their effects. We categorise these possible strategies in two main classes, software- and hardware-based. We report in the following examples of realistic approaches that can be employed to alleviate the data heat island effect (although in most cases these strategies have not been designed to address LST increase in the context of climate transformation). Beyond technological interventions, addressing the environmental impact of AI hyperscalers also highlights the need for a new theory of intelligence that explicitly incorporates energy, information, and physical constraints. Traditional AI theories often treat intelligence as abstract computation or symbolic manipulation, ignoring the thermodynamic costs of information processing. The Matryoshka model of intelligence [33], for instance, proposes a hierarchical, physically grounded framework in which cognitive, sensory, and motor processes are coupled with energy and material constraints across nested levels of complexity. By recognizing intelligence as a thermodynamically instantiated phenomenon, this framework not only provides deeper insight into natural and artificial cognition but also offers a principled foundation for designing more energy-efficient and sustainable AI systems, which could substantially reduce the heat and carbon footprint of large-scale data centers. Integrating such theory-driven principles into AI architecture and operations could complement hardware and software strategies, offering a holistic approach to mitigating the data heat island effect.

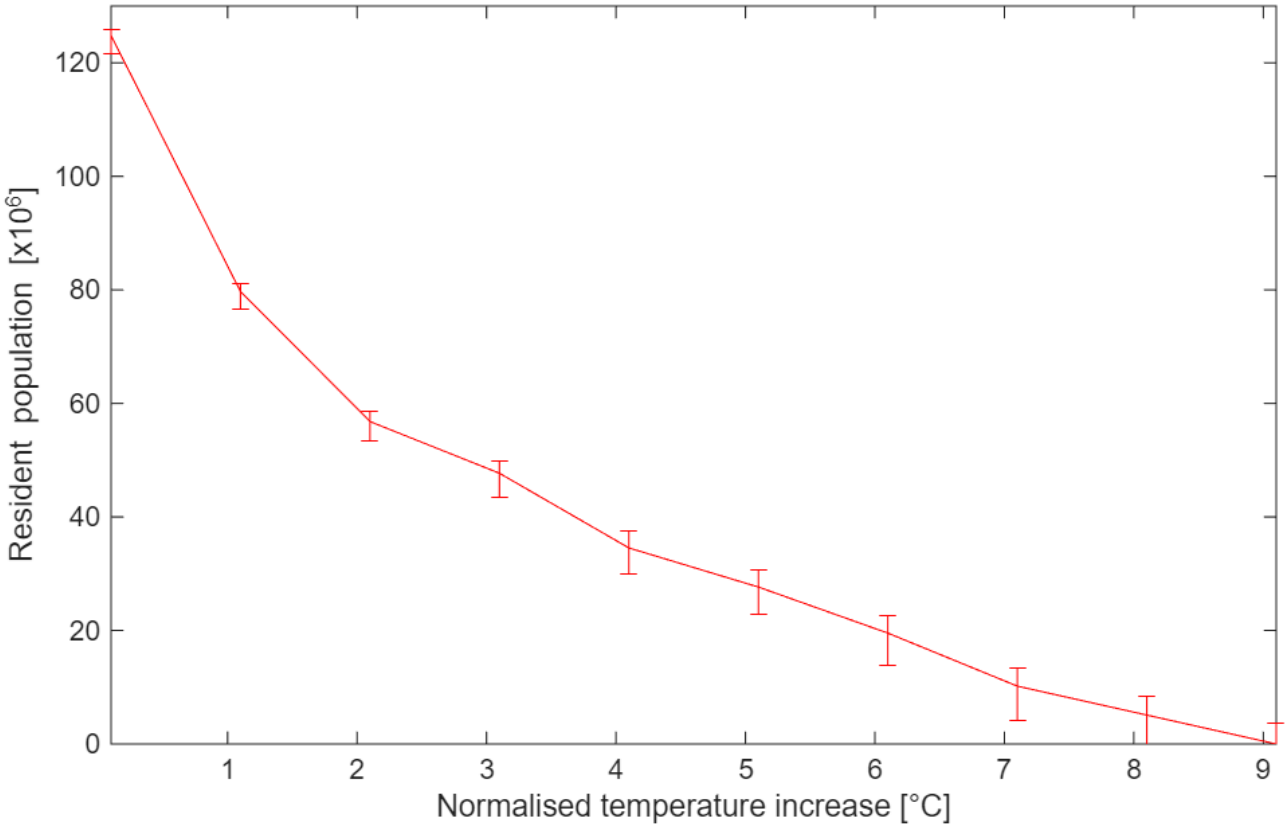


Fig. 4 Distribution of population as a function of the LST increase they are affected by within $r = 10$ km radius from the AI hyperscalers considered in this study with respect to the LST trend of the 5 years prior to the start of operations of the data centres, i.e., $\Delta_0^{10}(60)$ in (2) in Section 2.

4.1 Software-based solutions

The strategies in this category pertain to the design, development and implementation of computational methods that would make the data processing in AI hyperscalers more efficient, hence reducing their inherent power consumption. In order to provide a complete overview of the directions that could be explored for limiting the impact of data heat island effect in this respect, we divide the strategies in this category according to the main phases for data data analysis, i.e., preprocessing, processing, and usage for decision making:

- *how data are arranged*: the preprocessing operations in data analysis frameworks must not be underestimated. In the vast majority of operational scenarios, data analysis has to be performed onto records that show several nonidealities (e.g., missing, corrupted, unbalanced data, high variability in the records, low informativity of the data samples). This affects the quality of data analysis, as classic AI models would aim to reduce this uncertainty by implementing transformations (e.g., interpolation, smoothing) on the data, which could lead to artificial bias and hallucinations [24]. In this respect, considering the records as realizations of propagation and advection forces that can be used to model the properties of the data samples in the feature space can help [34]. In fact, this choice enables the identification of the actual relevance of the data samples and features, hence supporting efficient computational procedure by removing the negligible connections across samples and focusing the algorithms' attention on the significant and informative components of the datasets only. Core datasets can be selected from their original datasets to improve training efficiency in deep learning, without loss of performance accuracy [35].

- *how data are processed*: one of the greatest challenges of classic AI algorithms is convergence to unacceptably inferior local minima during the loss minimization or training process [23, 24, 36–38]. This leads to extreme difficulties for AI algorithms to guarantee any level of predictive accuracy without allowing AI models to use a large amount of energy, e.g., to identify all the possible solutions across the feature space [16, 18, 39, 40]. Seminal concepts such as the universality of deep, feed-forward neural networks and empirically encouraging results, although the degree of improvement in terms of power efficiency is most of the times very limited. Also, hierarchical learning based on functional learning (e.g., isogeometrical networks [41]) can be used to mitigate training and convergence issues, and can increase the accuracy of the classic AI strategies whilst guaranteeing a sustainable use of the computing resources. Also, pruning and compression of deep learning based models [42, 43] can benefit the definition and development of solution for hardware-aware AI models.
- *how data are used*: as other anthropogenic activities, data centeres emissions can be quantified in terms of carbon footprint, i.e., the the amount of greenhouse gas emissions (gCO2) generated [1, 2, 7, 9]. In this respect, novel strategies for innovative carbon-aware generative language model inference framework have been designed to reduce carbon footprint: the primary method for this relies on the strategic use of token generation directives while maintaining high-quality outputs [20, 23, 44, 45]. To achieve these goals architectures proposed in technical literature employ numerical programming for system-level optimization, balancing carbon savings with generation quality.

4.2 Hardware-based solutions

In this category, we summarise some viable options to improve data centres efficiency (hence their heat release in the atmosphere) by enhancing their operational framework. As for the previous case, we list these novel approaches according to the stage of functional deployment in the AI hyperscalers, i.e., at signal processing, power management, and infrastructure level.

- *how data are translated into signals*: recent progresses in integrated circuitry have enabled the development of technologies able to reduce the power consumption of AI accelerators and indeed recover the energy used for computing [23, 24, 46]. Adiabatic circuitry plays a key role in this respect [47]. This class of low-power integrated circuits rely on reversible logic and energy recovery, so that reduction of energy loss during computation can be achieved. This directly leads to reduction in heat dissipation, therefore potentially reducing the data heat island effect. Indeed, in adiabatic circuitry, power is recycled mainly through transistor switching. Although very promising, this technology show consistent limits for speed and scaling to AI models, hence requiring very complex systems (e.g., sinusoidal/trapezoidal clocks) to be implemented.
- *how signals are translated into power*: AI workloads are characterized by high computational intensity over long timeframes; high degree of variability, unpredictability, and nonlinear scalability of computational power usage; sensitivity to algorithmic design and implementation [11–13, 15, 16, 18]. This leads to major problems for demand and supply of AI hyperscalers within the energy grids that they are embedded in, e.g., affecting the grid stability and the accuracy of the AI models that are run onto their structures. These issues are a direct byproduct of the inability of AI hyperscalers power infrastructures to track the high variability of AI models usage. However, when power resources are set up to provide dynamic power response [48] (e.g., by intelligent battery energy support systems paired with power-load-temperature optimisation systems for resource and job allocation), the efficiency of data centres could dramatically improve, e.g., showing solid reduction of data centre downtime; protection of the infrastructure by power fluctuations, drops and spikes; and higher resilience towards irregular and unstructured AI platform usage.
- *how power is managed in infrastructure* The electronic components in AI hyperscalers are characterised by extremely high-power densities, often reaching magnitudes on the order of 107 W/m^2 [49]. These extreme thermal loads, exacerbated by non-uniform workload distributions and the emergence of localized hotspots across chips, demand sophisticated thermal management strategies

[50]. One key approach involves multiscale coordinated cooling schemes that combine localised liquid cooling at the chip level with system-wide air cooling across the facility. This hybrid method targeted heat extraction from critical hotspots while maintaining overall thermal balance throughout the infrastructure [51]. In addition to active cooling methods, passive cooling technologies offer complementary benefits by alleviating structural thermal load without increasing operational energy demand. Among these, passive radiative cooling has garnered particular interest. This technique engineers the optical properties of outdoor-exposed surfaces, such as building envelopes, by incorporating high solar reflectivity to suppress solar heat gain and strong thermal emissivity in long-wave infrared spectrum to enable radiative heat dissipation, thereby reducing the overall thermal load on infrastructure [52–54]. Recent advancements have translated this passive cooling technology into practical applications. In particular, passive radiative cooling coating based on polymer–nanoparticle composite has been applied across various real-world scenarios, including residential structures, urban infrastructure, and agricultural storage facilities [55]. Reported results indicate cooling load reductions ranging from 10% to 40% after applying the coating, contingent on site-specific factors such as surface albedo, orientation, and geographic climate conditions. In the context of AI hyperscalers, where thermal loads are not only intense, but spatially heterogeneous, such passive approaches can play a structural role in limiting the baseline thermal burden imposed on active cooling systems.

5 Conclusions

The increasing demand for AI-based services, processes and operations led to the proliferation of data centres worldwide that are extremely power hungry. In this paper, we provide the first assessment of the environmental impact of AI hyperscalers. We focus our attention on the heat dissipation of data centres, which is directly connected to the energy consumption required for the operations of the AI hyperscalers. We investigate, by means of a multimodal multiscale architecture, the land surface temperature change occurred as a consequence of the start of operations of the data centres. Our analysis spans over the last decades (from 2004 to 2024), taking advantage of the plethora of remotely sensed temperature measurements acquired by satellites worldwide. Our study shows a non negligible and rather remarkable impact of the AI data centres on their local regions, which is consistent across the data centres worldwide and extends for several kilometers around the AI hyperscalers. The consistency, scale and extent of these effects lead to think that the creation of local climate zones induced by data centres - that we call the *data heat island effect* - is real and significant, especially in the context of global warming and climate transformation.

Consequently, the data heat island effect could affect the welfare, healthcare, energy, and demographic systems. Since the trends of data centre energy consumption are expected to show a steep growth in the foreseeable future, the data heat island effect could solidly become an additional factor for environmental and industrial sustainability in the changing climate, hence having a robust impact on communities at local, regional, and international level, thus demanding to be studied in complex multi-hazard systems. To this aim, in this paper we provide an overview of potential solutions to alleviate the data heat island effect, which could be further expanded into mitigation policies for future climate and socioeconomic scenarios.

References

[1] Filonchyk, M., *et al.*: Greenhouse gases emissions and global climate change: Examining the influence of co2, ch4, and n2o. Science of The Total Environment **935**, 173359 (2024)

[2] UNEP: Emissions Gap Report 2025: Off Target. Available at https://www.unep.org/resources/emissions-gap-report-2025 (2025)

[3] Gunawardena, K.R., M.J.Wells, Kershawa, T.: Utilising green and bluespace to mitigate urban heat island intensity. Science of The Total Environment **584-585**, 1040–1055 (2017)

[4] Tan, J., *et al.*: The urban heat island mitigation potential of vegetation depends on local surface type and shade. Urban Forestry and Urban Greening **62**, 127128 (2021)

[5] Yuan, Y., et al.: Surface urban heat island effects intensify more rapidly in lower income countries. npj Urban Sustainability **5**(11) (2025)

[6] ECMWF: Urban heat islands and heat mortality. Available at https://stories.ecmwf.int/urban-heat-islands-and-heat-mortality (2025)

[7] UN: World Urbanization Prospects 2025. Available at https://www.un.org/development/desa/pd/world-urbanization-prospects-2025 (2025)

[8] EPA: What Are Heat Islands? Available at https://www.epa.gov/heatislands/what-are-heat-islands (2025)

[9] Nastrana, M., Kobala, M., Elerb, K.: Urban heat islands in relation to green land use in european cities. Urban Forestry and Urban Greening **37**, 33–41 (2019)

[10] Cambria, E., Chattopadhyay, A., Linn, E., Mandal, B., White, B.: Storages are not forever. Cognitive Computation **9**, 646–658 (2017)

[11] Li, Y., Mughees, M., Chen, Y., Li, Y.R.: The Unseen AI Disruptions for Power Grids: LLM-Induced Transients. Preprint at https://arxiv.org/abs/2409.11416 (2024)

[12] Chen, M., *et al.*: Power for ai and ai for power: The infinite entanglement between artificial intelligence and power electronics systems. IEEE Power Electronics Magazine **12**(1), 37–43 (2025)

[13] Luccioni, A.S., Jernite, Y., Strubell, E.: Power hungry processing: Watts driving the cost of ai deployment? In: ACM (ed.) Proceedings of Conference on Fairness, Accountability, and Transparency (2024)

[14] Choukse, E., et al.: Power Stabilization for AI Training Datacenters. Preprint at https://arxiv.org/abs/2508.14318 (2025)

[15] McKinsey: How data centers and the energy sector can sate AI's hunger for power. Available at https://www.mckinsey.com/industries/private-capital/our-insights/how-data-centers-and-the-energy-sector-can-sate-ais-hunger-for-power (2024)

[16] McKinsey: Scaling bigger, faster, cheaper data centers with smarter designs. Available at https://www.mckinsey.com/industries/private-capital/our-insights/scaling-bigger-faster-cheaper-data-centers-with-smarter-designs (2025)

[17] Masanet, E., Shehabi, A., Koomey, J.G.: Characteristics of low-carbon data centres. Nature Clim Change **3**(7), 627–630 (2013)

[18] Desislavov, R., Martínez-Plumed, F., Hernández-Orallo, J.: Trends in ai inference energy consumption: Beyond the performance-vs-parameter laws of deep learning. Sustainable Computing: Informatics and Systems **38**, 100857 (2023)

[19] IEA: Energy and AI. Available at https://www.iea.org/reports/energy-and-ai (2025)

[20] Masanet, E., *et al.*: Recalibrating global data center energy-use estimates. Science **367**(6481), 984–986 (2020)

[21] Nicoletti, L., Malik, N., Tartar, A.: AI needs so much power, it's making yours worse. Available at https://www.bloomberg.com/graphics/2024-ai-power-home-appliances/ (2024)

[22] Steele, K.: Global data center demand surges despite supply and power constraints. Available at https://www.jll.com/en-us/newsroom/global-data-center-demand-surges-despite-supply-and-power-constraints (2025)

[23] Wu, C.-J., *et al.*: Sustainable ai: Environmental implications, challenges and opportunities. In: Proceedings of Machine Learning and Systems (2022)

[24] Engineering, R.A.: Engineering responsible AI: foundations for environmentally sustainable AI. Available at https://nepc.raeng.org.uk/policy-work/engineering-responsible-ai-foundations-for-environmentally-sustainable-ai/ (2025)

[25] Metz, M., Rocchini, D., Neteler, M.: Surface temperatures at the continental scale: Tracking changes with remote sensing at unprecedented detail. Remote sensing **6**(5), 3822–3840 (2014)

[26] DataCenterMap: (2025). https://www.datacentermap.com/

[27] Catalog, E.E.D.: WorldPop Global Project Population Data: Estimated Residential Population per 100x100m Grid Square. Available at https://developers.google.com/earth-engine/datasets/catalog/WorldPop_GP_100m_pop (2025)

[28] Verne: Harnessing Data Center Waste Heat. Available at https://www.verneglobal.com/blog/data-center-waste-heat (2024)

[29] Rettie, F., *et al.*: Historical trends reveal significant increase in hot-dry extremes in mexico's bajío region. Environ. Monit. Assess. **198**(3), 228 (2026)

[30] Tejedor, E., *et al.*: Recent heatwaves as a prelude to climate extremes in the western mediterranean region. npj Clim Atmos Sci **7**, 218 (2024)

[31] Souza, A., et al.: Analyzing maximum temperature trends and extremes in brazil: A study of climate variability and anthropogenic influences from 1960 to 2020. Aerosol Sci Eng (2025)

[32] Council, U.G.B.: Climate resilience roadmap. Available at https://ukgbc.org/our-work/topics/resilience-roadmap/ (2024)

[33] Chen, M., Cambria, E., Laschi, C., Mengaldo, G.: Intelligence is physical: Energy, information, and a thermodynamically grounded theory of minds and machines. https://philsci-archive.pitt.edu/27741 (2025)

[34] Marinoni, A., Liò, P., Barp, A., Girolami, M.: Improving embedding of graphs with missing data by soft manifolds. IEEE Transactions on Pattern Analysis and Machine Intelligence **48**(3), 2221–2235 (2026)

[35] Nema, A., Zhu, H., Lin, W.: Holistic coreset selection for data efficient image quality assessment. In: Proceedings IEEE International Conference on Impage Processing (2025)

[36] Amodei, D., et al.: AI and compute. Available at https://openai.com/index/ai-and-compute/ (2025)

[37] Pandelea, V., Ragusa, E., Young, T., Gastaldo, P., Cambria, E.: Toward hardware-aware deep-learning-based dialogue systems. Neural Computing and Applications **34**, 10397–10408 (2022)

[38] Pandelea, V., Ragusa, E., Gastaldo, P., Cambria, E.: Selecting Language Models Features Via Software-Hardware Co-Design. In: Proceedings of IEEE ICASSP (2023)

[39] Schneider, I., et al.: Life-Cycle Emissions of AI Hardware: A Cradle-To-Grave Approach and Generational Trends. Preprint at https://arxiv.org/abs/2502.01671 (2025)

[40] Patel, P., *et al.*: Characterizing power management opportunities for llms in the cloud. In: ACM (ed.) Proceedings of 29th ACM International Conference on Architectural Support for Programming Languages

and Operating Systems (2024)

[41] Gasick, J., Qian, X.: Isogeometric neural networks: A new deep learning approach for solving parameterized partial differential equations. Computer Methods in Applied Mechanics and Engineering **405**, 115839 (2023)

[42] Wu, K., *et al.*: Efficient distortion-minimized layerwise pruning. IEEE Transactions on Pattern Analysis and Machine Intelligence **47**(10), 9298–9315 (2025)

[43] Zhang, X.: Learning grouped lattice vector quantizers for low-bit llm compression. In: Proceedings of NeurIPS (2025)

[44] d'Orgeval, A., *et al.*: Generative ai impact assessment through a life cycle analysis of multiple data center typologies. Applied Energy **406**, 127288 (2026)

[45] Mytton, D.: Data centre water consumption. npj Clean Water **4**(1) (2021)

[46] Butt, M.A., Janaszek, B., Piramidowicz, R.: Lighting the way forward: The bright future of photonic integrated circuits. Sensors International **6**, 100326 (2025)

[47] Pal, A.: Adiabatic Logic Circuits, pp. 303–321. Springer, New Delhi (2015)

[48] Marinoni, A., Shivareddy, S., Lio', P., Lin, W., Cambria, E., Grey, C.: Improving AI Efficiency in Data Centres by Power Dynamic Response. Preprint at https://arxiv.org/abs/2510.11119 (2025)

[49] Du, Y.H., *et al.*: Dynamic thermal environment management technologies for data center: A review. Renewable and Sustainable Energy Reviews **187**, 113761 (2023)

[50] He, Z.Q., *et al.*: Thermal management and temperature uniformity enhancement of electronic devices by micro heat sinks: A review. Energy **216**, 119223 (2021)

[51] Cao, K., *et al.*: Comprehensive review and future prospects of multi-level fan control strategies in data centers for joint optimization of thermal management systems. Journal of Building Engineering **94**, 110021 (2024)

[52] Raman, A.P., *et al.*: Passive radiative cooling below ambient air temperature under direct sunlight. Nature **515**(7528), 540–544 (2014)

[53] Fan, S., Li, W.: Photonics and thermodynamics concepts in radiative cooling. Nature Photonics **16**(3), 182–190 (2022)

[54] Lin, K., *et al.*: Hierarchically structured passive radiative cooling ceramic with high solar reflectivity. Science **382**(6671), 691–697 (2023)

[55] i2Cool: i2Cool Powers Green Event Management at Hong Kong Coliseum with Electricity-free Cooling Technology. Available at https://www.prnewswire.com/apac/news-releases/i2cool-powers-green-event-management-at-hong-kong-coliseum-with-electricity-free-cooling-technology-302342933.html (2025)

ASME Journal of Engineering for Sustainable Buildings and Cities
Online journal at:
https://asmedigitalcollection.asme.org/sustainablebuildings

Data Center Waste Heat as an Emerging Urban Thermal Hazard: First Field Measurements of Neighborhood-Scale Air Temperature Impacts

David J. Sailor[1]
School of Geographical Sciences and Urban Planning,
Arizona State University,
Tempe, AZ 85287
e-mail: David.Sailor@asu.edu

Soroush Samareh Abolhassani
School of Geographical Sciences and Urban Planning,
Arizona State University,
Tempe, AZ 85287
e-mail: ssamare1@asu.edu

Eli P. Martin
School of Geographical Sciences and Urban Planning,
Arizona State University,
Tempe, AZ 85287
e-mail: emart333@asu.edu

Data centers are among the fastest-growing sources of concentrated anthropogenic heat in urban environments. Despite heat flux densities that exceed peak solar irradiance by a factor of 2–6, their thermal impacts on adjacent communities have never been directly measured or reported in the peer-reviewed literature. This short communication addresses that gap by presenting the first vehicle-based traverse measurements of air temperature in residential neighborhoods downwind of operational data centers. Five traverses at four facilities in the Phoenix, Arizona metropolitan area, ranging from a 36 MW single-building data center in Mesa to a 169 MW colocation campus in Chandler, reveal downwind air temperature warming as high as 2.2 °C, with average downwind air temperatures 0.7–0.9 °C warmer than corresponding upwind areas. Thermal signatures were detectable at distances up to 500 m from facility perimeters. The 36 MW Mesa facility rejects waste heat equivalent to the electricity consumption of approximately 40,000 households, while the 169 MW Chandler campus is equivalent to over 180,000 households, both concentrated into footprints smaller than a single residential subdivision. With U.S. data center capacity projected to more than double by 2030, these findings establish data center anthropogenic waste heat as a previously undocumented urban thermal hazard demanding attention from the data center and urban planning communities. [DOI: 10.1115/1.4071922]

Keywords: data centers, anthropogenic heat, urban heat island, vehicle traverse, thermal plume, Phoenix, building energy, cooling, environment, heat transfer, measurement

1 Introduction

Anthropogenic heat (Q_f) is the thermal energy released into the environment by human activities—principally fuel combustion, industrial processes, and building heating and cooling systems [1]. In cities, Q_f compounds the urban heat island effect, with city-wide fluxes in major United States metropolitan areas typically ranging from 10 to 75 W/m^2 [2–5]. The existing literature documents temperature elevations of 0.5–3.0 °C associated with urban anthropogenic heat fluxes, with an estimated air temperature sensitivity of approximately 1 °C for each 100 W/m^2 [6] at the neighborhood scale. However, data centers generate heat fluxes of thousands of W/m^2, far exceeding any previously studied urban source.

The data center industry is expanding at an unprecedented rate. Global electricity consumption by data centers reached approximately 415 TW h in 2024, about 1.5% of worldwide electricity demand, and is projected to double to 945 TW h by 2030 [7]. The United States data center infrastructure consumed 183 TW h in 2024, over 4% of national electricity, with more than 5000 facilities nationwide [8,9]. The Phoenix, Arizona metropolitan area, is among the fastest-growing hyperscale markets, hosting facilities by NTT, CyrusOne, EdgeCore, Iron Mountain, Stream, and Apple, with hundreds of megawatts of operational capacity and thousands more proposed [10].

For example, the NTT PH1 facility measured in this study has a 36 MW critical IT load housed within 11,700 m^2 of floor space in a two-story building [11]. Because newer data centers in Phoenix generally rely on sensible air-based cooling, virtually all electrical energy consumed by Information Technology (IT) equipment is ultimately converted to sensible heat; this yields a heat rejection density of approximately 3100 W/m^2, exceeding peak solar irradiance (~1000 W/m^2) by a factor of three, concentrated near the ground level. For context, the average U.S. household consumes ~10,500 kW h/year, an average draw of ~1.2 kW (electricity only) [12]. A single 36 MW data center with a power usage effectiveness (PUE) of ~1.3 [13], drawing ~47 MW in total, therefore rejects heat equivalent to that emitted by approximately 40,000 households. The CyrusOne colocation campus in Chandler (PHX1–PHX8), another site measured in this study, comprises eight facilities totaling 186,000 m^2 with 169 MW of critical IT capacity [14]; at the same industry-average PUE, the campus draws approximately 220 MW in total, rejecting heat equivalent to over 180,000 households from a single 34-ha site.

Despite this extraordinary thermal footprint, the localized air temperature impacts of data center waste heat on surrounding communities have never been directly measured or reported in the peer-reviewed literature. This gap is significant because many facilities are sited adjacent to residential neighborhoods (Fig. 1), and their air-cooled condenser arrays discharge air at temperatures 8–14 °C above ambient—often exceeding 50 °C during Phoenix summers—with air velocities of 2–4 m/s [15,16], creating thermal plumes that are advected downwind over inhabited areas. For example, the Iron Mountain Data Center (Fig. 1(*c*)) has

[1]Corresponding author.

Manuscript received April 6, 2026; final manuscript received May 6, 2026; published online May 18, 2026. Tech. Editor: Jorge Gonzalez-Cruz.

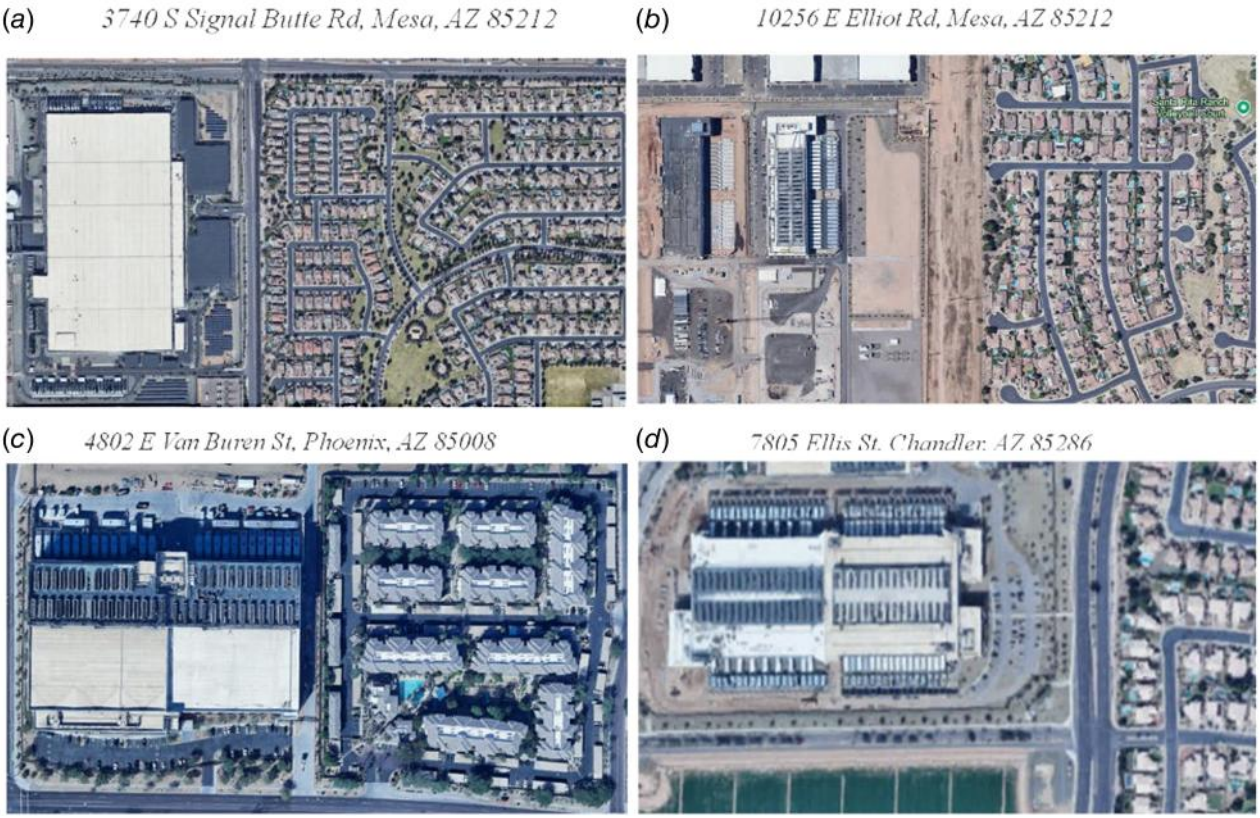


Fig. 1 Aerial imagery of four data center sites in the Phoenix metropolitan area, each situated adjacent to residential neighborhoods: (*a*) Apple Data Center, Mesa; (*b*) NTT PH1 Datacenter, Mesa; (c) Iron Mountain Data Centers (AZP-2), Phoenix; and (*d*) CyrusOne Price Road Tech Corridor (PHX1–PHX8), Chandler. The proximity of rooftop cooling infrastructure to surrounding communities illustrates the potential for thermal plume dispersion into residential areas

cooling equipment located less than 50 m from the nearest three-story apartment building.

The specific contributions of this short communication are (1) we present the first field measurements of air temperature elevations in residential neighborhoods attributed to data center waste heat rejection; (2) we quantify the magnitude (as much as 2.2 °C, with averages of 0.7–0.9 °C) and spatial extent (>250 m) of these thermal impacts at four facilities; and (3) we contextualize data center heat flux relative to other urban anthropogenic heat sources, establishing it as a previously unrecognized dimension of the urban heat challenge that is relevant to building energy, thermal comfort, and public health.

2 Methods

Vehicle-based traverses using established instrumentation and techniques [17–19] were conducted at four data center sites in the Phoenix metropolitan area. The first is the CyrusOne colocation complex (PHX1–PHX8) along the Price Road Technology Corridor in Chandler, Arizona, featuring dense rooftop condenser fan arrays located 130–150 m from the nearest residential neighborhood. The second and third sites, Aligned and Digital Realty, are also located along the Price Road Technology Corridor in Chandler, each situated adjacent to residential neighborhoods. The fourth is the NTT PH1 data center in Mesa (10256 Elliot Rd.), with 36 MW critical IT load across 11,706 m^2 of floor space, using air-cooled chillers with airside economizers [11]. NTT PH1 sits immediately south of the Santa Rita Ranch residential neighborhood, separated by 200 m of undeveloped land. These four data centers are highly representative of modern, hyperscale data center infrastructure. Together, they reflect the industry's shift toward massive multibuilding campuses with primarily air-based cooling systems.

Air temperature was measured using vehicle-mounted, aspirated, and shielded precision 4-wire Resistance Temperature Detectors (RTD with accuracy of 0.1 °C; time constant <3 s) sensors at 1.6–2.2 m height and a data logginging Global Position System (GPS) recorder (~2.5 m circular error probability), both logging at 2-s intervals. These instruments were mounted on multiple vehicles, which simultaneously drove on public roadways adjacent to data centers and throughout nearby neighborhoods. Measurements were obtained using established mobile urban temperature sensing protocols [18,20,21]. Thermal assessments upwind and downwind of data centers relied on averages of large areas (in each case representing >10 datum points) such that locational uncertainty and sensor time lags were not consequential. Wind speed and direction data were obtained from the Chandler Municipal Airport (KCHD) NWS station for the June 18 CyrusOne and October 25 Digital Realty traverses, from a portable weather station positioned near the facility perimeters for the August 8 CyrusOne and Aligned traverses, and from the Phoenix–Mesa Gateway Airport (KIWA) NWS station for the NTT PH1 traverse. Multiple traverses were conducted across different dates, times of day, and conditions from June 18 to October 25, 2025.

3 Results

Vehicle-based traverse measurements were conducted at four data center sites across three dates in the Phoenix metropolitan area (Fig. 2). All traverses captured clear thermal gradients that appear to be associated with data center waste heat rejection. The

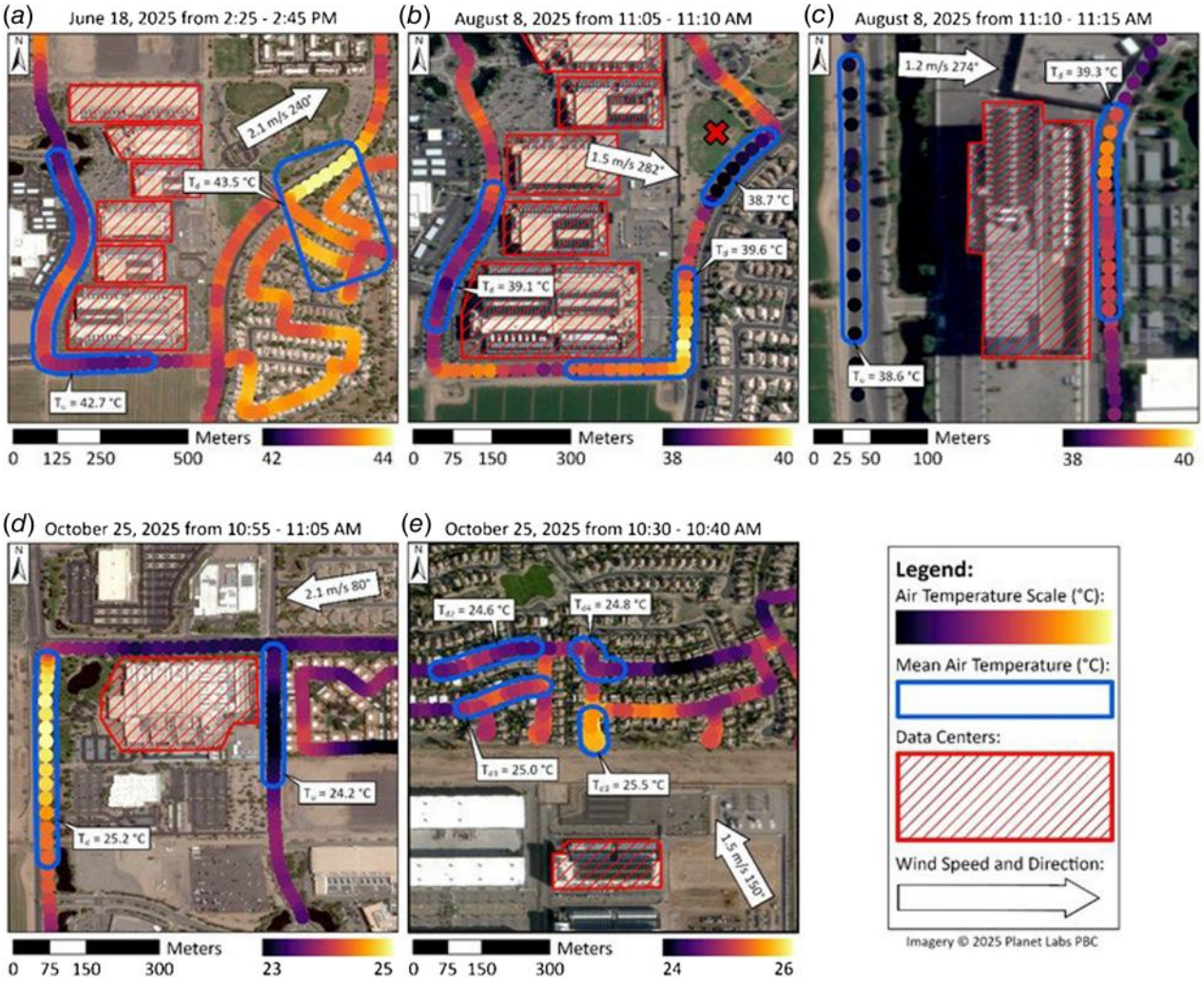


Fig. 2 Vehicle-based air temperature traverse results at four data center sites in the Phoenix metropolitan area: (*a*) CyrusOne, Chandler, June 18, 2025 (2:25–2:45 p.m.); (*b*) CyrusOne, Chandler, August 8, 2025 (11:05–11:10 a.m.); (*c*) Aligned, Chandler, August 8, 2025 (11:10–11:15 a.m.); (*d*) Digital Realty, Chandler, October 25, 2025 (10:55–11:05 a.m.); (*e*) NTT, Mesa, October 25, 2025 (10:30–10:40 a.m.). Small filled circles represent 1.6 m air temperature collected every 2 s. Outlined polygons denote the averaging areas for mean air temperature. Hatch-filled polygons indicate data center facilities. Wind speed and direction are shown for each traverse. Basemap imagery: PlanetScope, © Planet Labs PBC [22]

magnitude and spatial extent of warming vary by facility size, cooling system configuration, and meteorological conditions.

3.1 Cyrusone, Chandler. The CyrusOne colocation campus was measured on two dates. The first traverse (Fig. 2(*a*)), conducted on June 18, 2025 (2:25–2:45 p.m.), captured afternoon conditions with winds from 240 deg (WSW) at 2.1 m/s, advecting the thermal plume toward the residential neighborhoods east and northeast of the campus.

The mean air temperature on the upwind side of the facility was approximately 42.7 °C, increasing to 43.5 °C in the neighborhood near the eastern boundary of the data center campus on the downwind side. The observed ΔT of approximately 0.8 °C extended roughly 500 m downwind.

A second traverse at CyrusOne (Fig. 2(*b*)) on August 8, 2025 (11:05–11:10 a.m.), under winds from 282 deg (WNW) at 1.5 m/s, confirmed the thermal signature under different meteorological conditions. Mean air temperatures of 39.1 °C on the upwind side of the data center increased to 39.6 °C in the downwind residential area to the southeast, yielding a ΔT of 0.5 °C. This traverse also revealed an apparent downwind cooling signal near the northeast boundary of the figure. Upon further investigation, this region of apparent cooling is immediately adjacent to a water detention basin in Chuparosa Park (marked with an X on the figure), situated between the data center and the street upon which downwind measurements were made. Chuparosa Park uses a combination of sprinkler irrigation of sports fields and flood irrigation around treed areas of the park. As a result, it is not surprising that the measurements downwind of the park during summer reveal an apparent cooling relative to the areas upwind of the data center, suggesting a possible mitigation strategy to address the effects of data center waste heat.

3.2 Aligned, Chandler. On the same morning as the second CyrusOne traverse, measurements were conducted at the Aligned data center in Chandler (Fig. 2(*c*); August 8, 2025, 11:10–11:15 a.m.) under westerly winds (274 deg) at 1.2 m/s. The traverse recorded a mean air temperature of 39.3 °C near the eastern border of the facility, where condenser exhaust is discharged, compared with 38.6 °C in the upwind area to the west, yielding a ΔT of approximately 0.7 °C.

3.3 Digital Realty, Chandler. A traverse at the Digital Realty facility in Chandler (Fig. 2(*d*); October 25, 2025, 10:55–11:05

Table 1 Ranges and averages of air temperatures (°C) measured in the upwind (T_u) and downwind (T_d) boxes depicted in Fig. 2

	(a)		(b)		(c)		(d)		(e)			
	T_u	T_d	T_u	T_d	T_u	T_d	T_u	T_d	T_{d1}	T_{d2}	T_{d3}	T_{d4}
Min	42.1	42.8	38.8	39.4	38.5	39.2	24	25	24.8	24.4	25.4	24.5
Max	43.4	44.3	39.5	40	38.6	39.5	24.4	25.4	25.3	25	25.8	25.1
Mean	42.7	43.5	39.1	39.6	38.6	39.3	24.2	25.2	25	24.6	25.5	24.8

a.m.) was conducted under winds from 80 deg (ENE) at 2.1 m/s. The traverse revealed elevated mean air temperatures downwind, reaching 25.2 °C, compared with 24.2 °C in the upwind (east) area of the facility. The resulting mean and maximum temperature differences between the upwind and downwind areas were 1.0 °C and ~2 °C, respectively.

3.4 NTT, Mesa. A traverse at the NTT PH1 facility in Mesa (Fig. 2(*e*); October 25, 2025, 10:30–10:40 a.m.) was conducted under winds from 150 deg (SSE) at 1.5 m/s, placing the Santa Rita Ranch residential neighborhood directly downwind. Mean air temperatures of 25.5 °C and 25.0 °C were recorded near the data center boundary, decreasing to 24.8 °C and 24.6 °C with increasing distance northward (80–100 m) into the neighborhood. The resulting air temperature signal ($\Delta T \approx 0.9$ °C) 300–500 m downwind from the data center is consistent with plume dilution and vertical mixing downwind of the condenser arrays.

Across the four data centers observed in this study, the apparent downwind air temperature warming effect was as large as 2.2 °C, with average downwind air temperatures being 0.7–0.9 °C warmer than the corresponding upwind temperatures (Table 1). Temperature elevations were detectable at distances of 100–500 m from the facility perimeter, depending on facility size, wind conditions, and campus layout.

4 Discussion

The measurements presented here are, to our knowledge, the first field evidence that operational data centers produce measurable increases in air temperature in adjacent residential neighborhoods. While it should be emphasized that these are initial observations, the measured elevation of air temperature by as much as 2.2 °C at 100–500 m downwind is physically consistent with the extraordinary heat flux densities involved. The attribution of this warming to data center waste heat is supported by the consistent alignment of the temperature signal with the prevailing wind direction across multiple sites, dates, and meteorological conditions. While the sensitivity relationship of ~1 °C per 100 W/m^2 from Ref. [6] would suggest much larger warming, data center heat is emitted as a buoyant plume that partially disperses before reaching pedestrian level in downwind neighborhoods. Nevertheless, the measured air temperature elevations represent a nontrivial warming effect, especially in a region where extreme heat already poses serious public health risks. It is important to note that these measurements represent a relatively small sample of initial observations from only four data centers and a few measurement periods. A more exhaustive field campaign is being planned to collect data for a much wider range of times and weather conditions. These data will then support the development of a validated microscale atmospheric model that can be used to explore design alternatives to lessen the downwind thermal impacts of data centers. Nevertheless, these initial data are consistent with expectations from decades of research on anthropogenic heat and support the hypothesis that data centers may result in substantial warming of proximate downwind neighborhoods.

The magnitude of data center heat rejection is remarkable relative to other urban sources [23]. City-wide Q_f in Phoenix averages ~13 W/m^2 in summer, with peaks of ~50 W/m^2 in commercial areas [4]. Tokyo's central business district has peak Q_f emissions of ~1600 W/m^2 [24], but these emissions are distributed vertically across high-rise buildings exceeding 100 m. A single 36 MW data center rejects 2800–6200 W/m^2 at ground or rooftop level from one building footprint—far exceeding emissions from dense urban areas. With hundreds of megawatts of data center capacity currently operational in Phoenix and thousands more proposed [10], the aggregate thermal impact on the urban atmosphere could be substantial, leading to many pockets of data center heat islands, and potentially having wider-scale implications for the urban climate system.

These findings have implications for many aspects of urban operations, including increases in air conditioning energy demand for neighborhoods warmed by nearby data centers [25]. Prior modeling for Phoenix has shown that waste heat from residential air conditioning alone increases summertime nighttime temperatures by more than 1 °C [26]. In Phoenix, where cooling exceeds 50% of household electricity use, even 1–2 °C of additional ambient warming can meaningfully increase peak cooling demand and annual energy consumption in downwind homes, creating a feedback loop where data center operations raise the energy burden on surrounding neighborhoods, precisely during the extended summer cooling season when temperatures already routinely exceed 43 °C.

There are many factors that influence the downwind thermal impacts from data centers. Some, such as background weather conditions, are mostly out of our control. However, the design and configuration of cooling equipment used in data centers may offer some control over these impacts. Exhaust height, velocity, discharge angle, equipment density, and parapet walls all influence plume buoyancy and dispersion. Strategic design informed by high-resolution microclimate modeling now feasible at 1–2 m resolution [27] could substantially reduce the thermal footprints of data center impacts without compromising cooling performance. Such considerations should be integrated into siting and permitting processes, particularly in hot climates.

5 Conclusions

This communication presents the first field evidence that operational data centers produce measurable warming in adjacent residential neighborhoods, with the downwind warming effect as large as 2.2 °C and average downwind air temperatures 0.7–0.9 °C warmer than upwind temperatures, extending more than 250 m downwind. These impacts arise from heat flux densities of 2000–6000 W/m^2, magnitudes 2–6 times peak solar irradiance, equivalent to the heat emitted by thousands of residential buildings concentrated on a single site. As global data center capacity is projected to double by 2030, we establish data center anthropogenic heat as a previously unrecognized urban thermal hazard with implications for residential building energy, outdoor thermal comfort, and public health. With facilities increasingly sited in hot-climate markets across the American Southwest, the Middle East, and Southeast Asia, and a growing reliance on sensible air-based cooling systems, the thermal externality documented here is poised to become a recurring feature of 21st-century urbanization.

Future research should include systematic observational campaigns that integrate additional traverse observations with

temporary fixed weather stations and remote-sensed land surface temperature data. These studies should characterize the sensitivity of the observed warming to wind speed, atmospheric stability, and time of day, connect the warming to impacts on residential energy and water use, and translate the resulting temperature elevations into outdoor thermal comfort metrics. The resulting empirical datasets will be important for informing more systematic statistical analyses of the downwind thermal effects of data centers. They will also be essential for developing and validating microscale models, which can then be used to evaluate design interventions aimed at mitigating the downwind thermal impacts of data centers.

Acknowledgment

This material is based upon work supported in part by the U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research's Urban Integrated Field Laboratories research activity, under Award Number DE-SC0023520.

Conflict of Interest

There are no conflicts of interest.

Data Availability Statement

The datasets generated and supporting the findings of this article are obtainable from the corresponding author upon reasonable request.

References

[1] Oke, T. R., Mills, G., Christen, A., and Voogt, J. A., 2017, *Urban Climates*, Cambridge University Press, Cambridge.
[2] Sailor, D. J., and Lu, H., 2004, "A Top-Down Methodology for Developing Diurnal and Seasonal Anthropogenic Heating Profiles for Urban Areas," Atmos. Environ., **38**(17), pp. 2737–2748.
[3] Sailor, D. J., Georgescu, M., Milne, J. M., and Hart, M. A., 2015, "Development of a National Anthropogenic Heating Database With an Extrapolation for International Cities," Atmos. Environ., **118**, pp. 7–18.
[4] Chow, W.T.L., Salamanca, F., Georgescu, M., Mahalov, A., Milne, J. M., and Ruddell, B. L., 2014, "A Multi-method and Multi-scale Approach for Estimating City-Wide Anthropogenic Heat Fluxes," Atmos. Environ., **99**, pp. 64–76.
[5] Smith, C., Lindley, S., and Levermore, G., 2009, "Estimating Spatial and Temporal Patterns of Urban Anthropogenic Heat Fluxes for UK Cities," Theor. Appl. Climatol., **98**(1–2), pp. 19–35.
[6] Wang, L., Sun, T., Zhou, W., Liu, M., and Li, D., 2023, "Deciphering the Sensitivity of Urban Canopy Air Temperature to Anthropogenic Heat Flux With a Forcing-Feedback Framework," Environ. Res. Lett., **18**(9), p. 094005.
[7] International Energy Agency (IEA), 2025, "Energy and AI: Special Report," IEA, Paris.
[8] Pew Research Center, 2025, "What We Know About Energy Use at US Data Centers Amid the AI Boom," https://www.pewresearch.org/short-reads/2025/10/24/what-we-know-about-energy-use-at-us-data-centers-amid-the-ai-boom/, Accessed March 27, 2026.
[9] Data Center Map, 2025, "Number of Data Centers Worldwide," https://www.datacentermap.com/datacenters/, Accessed November 2025.
[10] CBRE, 2025, "North America Data Center Trends H2 2024," CBRE Research.
[11] NTT Global Data Centers, 2013, "Phoenix PH1 Data Center Fact Sheet," NTT DATA Inc., Mesa, AZ.
[12] U.S. Energy Information Administration, 2024, "Energy Use in Homes," https://www.eia.gov/energyexplained/use-of-energy/electricity-use-in-homes.php, Accessed March 27, 2026.
[13] Shehabi, A., Newkirk, A., Smith, S. J., Hubbard, A., Lei, N., Siddik, M. A. B., Holecek, B., Koomey, J., Masanet, E., and Sartor, D., 2024, "2024 United States Data Center Energy Usage Report," Lawrence Berkeley National Laboratory, LBNL-2001637, https://eta.lbl.gov/publications/2024-lbnl-data-center-energy-usage-report
[14] CyrusOne, 2026, "Chandler, AZ: PHX1-PHX8," https://www.cyrusone.com/data-centers/north-america/chandler-arizona, Accessed March 27, 2026.
[15] Kennedy, H., and ASHRAE, 2024, *ASHRAE Handbook—HVAC Systems and Equipment*, H. E. Kennedy, ed., SI ed., American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA, Ch. 39, pp. 741–760.
[16] ASHRAE, 2025, "Climatic Design Information," *ASHRAE Handbook—Fundamentals*, H. E. Kennedy, ed., SI ed., American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA, Ch. 14, pp. 14.1–14.18.
[17] Hart, M., and Sailor, D. J., 2008, "Quantifying the Influence of Land-Use and Surface Characteristics on Spatial Variability in the Urban Heat Island," Theor. Appl. Climatol., **95**(3–4), pp. 397–406.
[18] Molla, A., Sailor, D. J., and Flores, A. B., 2025, "Exploring Air Temperature Variability and Socio-demographic Inequalities in Heat Exposure Through Machine Learning: A Case Study of Maricopa County, Arizona," Urban Clim., **59**, p. 102276.
[19] Molla, A., Lamer, K., and Sailor, D. J., 2026, "Citizen Science Coupled With Machine Learning to Quantify Green-Blue Infrastructure Cooling Potential in Maricopa County, Arizona," Sustain. Cities Soc., **139**, p. 107211.
[20] Rajkovich, N. B., and Larsen, T. T., 2016, "A Bicycle-Based Field Measurement System for the Study of Thermal Exposure," Int. J. Environ. Res. Public Health, **13**(2), p. 159.
[21] Schneider, F. A., Ortiz, J. C., Vanos, J. K., Sailor, D. J., and Middel, A., 2023, "Evidence-Based Guidance on Reflective Pavement for Urban Heat Mitigation in Arizona," Nat. Commun., **14**(1), p. 1467.
[22] Planet Labs PBC, 2026, "PlanetScope Imagery Documentation," https://docs.planet.com/data/imagery/planetscope/, Accessed March 31, 2026.
[23] Sailor, D. J., 2011, "A Review of Methods for Estimating Anthropogenic Heat and Moisture Emissions in the Urban Environment," Int. J. Climatol., **31**(2), pp. 189–199.
[24] Ichinose, T., Shimodozono, K., and Hanaki, K., 1999, "Impact of Anthropogenic Heat on Urban Climate in Tokyo," Atmos. Environ., **33**(24–25), pp. 3897–3909.
[25] Santamouris, M., Cartalis, C., Synnefa, A., and Kolokotsa, D., 2015, "On the Impact of Urban Heat Island and Global Warming on the Power Demand and Electricity Consumption of Buildings—A Review," Energy Build., **98**, pp. 119–124.
[26] Salamanca, F., Georgescu, M., Mahalov, A., Moustaoui, M., and Wang, M., 2014, "Anthropogenic Heating of the Urban Environment Due to Air Conditioning," J. Geophys. Res. Atmos., **119**(10), pp. 5949–5965.
[27] Mortezazadeh, M., Wang, L. L., Albettar, M., and Yang, S., 2022, "CityFFD—City Fast Fluid Dynamics for Urban Microclimate Simulations on Graphics Processing Units," Urban Clim., **41**, p. 101063.

From:
Sent: Friday, June 5, 2026 11:37:57 AM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Subject: Suggestion for Data Center Code Amendment

I am writing to suggest that The Planning Commission consider including requirements to the PROPOSED OPERATIONAL MITIGATIONS that the they utilize the most efficient electronic devices available for Data Memory and Computing, in particular Photonic Technologies that use far less electricity, generate far less thermal emissions, operate at typical ambient temperatures.

This technology is similar to the transition from using coaxial cable to fiberoptics for communications.

These requirements would reduce significantly the amount of electricity and water required to support Data Center Operations, address Public reliability concerns, and simultaneously reduce Data Center Operational Costs, generate and incite mutual diverse benefits, collaboration.

Leading manufacturers include Intel's silicon photonics division, Broadcom, Lumentum, and Cisco, alongside specialized companies and PIC manufacturers across different platform technologies. This rapidly growing industry spans multiple regions, with distinct strengths in North America, Europe, and Asia driving global integrated photonics development.

Please advise if you can include some form of this

Mr. Terry Finefrock, CPIM

Retired Corporate Director
Retired Pima County Chief Contracts/Procurement Manager; Established first Megawatt Scale Solar in SoAZ
Solar-BESS Advocate
Tucson Area resident since 1956
520-444-9225

From:
To:
Subject:
Date:

From: Bruce Kelly
Sent: Thursday, June 4, 2026 8:50:03 AM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Subject: Data Centers

> You don't often get email from brucekelly777@gmail.com. Learn why this is important

Dear Planning Commissioners,
My name is Bruce Kelly and I am a property owner on the far east side of Tucson and also have rental properties in and around Tucson.
It has been brought to my attention this past week that there are Data Centers that are being planned for around the Tucson area. This is a terrible idea given the fact that we don't even have enough information about this new technology other than the fact that they use up unbelievable amounts of water for cooling and we are in a dry desert that already is known to have a very limited amount of water. We would be naive to believe that this isn't going to have a horrific impact on our already overtaxed water situation. This is the reason for the CAP water program years ago.
We live across the street from the Saguaro National Forest and have a well that services four other properties along with ours that is already 500 feet in the ground. Our well has been very adequate over the past 30 years but I am highly concerned that we may suffer greatly if these Data Centers come in and draw our water table down.
Another great concern is the noise pollution and light pollution and heat that they will create.
I am very interested in knowing why I am just finding out about these Data Centers, by chance, on facebook when I am a property owner who pays my taxes and actually quite a lot of property taxes. I should have been properly notified months ago as I am now finding out that this is not a new issue.
I have to say I have a hard time believing when these people pushing for these data centers try to make us think it's going to be ok when they absolutely know that these centers will create so many issues.
Dear council members, please do the right thing and stand up against this now before it's too late. What is the hurry to rush into approving this very new technology? Please don't let them convince you with money or empty promises as you can't put a price tag on water, solitude and good health. When it's gone, it's gone!

Thank you for your time in this matter,

Bruce Kelly

From:
To:
Subject:
Date:

From: Tracy Aleksic
Sent: Thursday, June 4, 2026 8:02:19 AM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Subject: We must stop data centers

> You don't often get email from sattvatracy@gmail.com. Learn why this is important

Data centers are not good for our communities, environment, or economy.
Please tell me how we can stop their construction in and around Tucson?

Warm regards,
Tracy Aleksic

From: Melinda Matson Spina
To: Carver Struve
Subject: Planning meeting 6/3
Date: Wednesday, June 3, 2026 8:05:32 PM

Hi Carver,
I'm the constituent who missed getting a couple questions into the public comment period -

I'd like to ask if the Commission has set any land use threshold that accounts for the cumulative impacts to civilian areas from buildouts on local military land?

Meaning, can the impact of data centers being built on Davis Monthan surpass thresholds, to prevent an increase in the impact of commercial data centers being built locally on civilian property?

And a second question, because the Red Cross and the UN have declared hyper scale data centers near civilian areas likely violate the Geneva Conventions, are you creating local planning regulations that mirror international conventions in restricting the development of legitimate military targets in civilian areas?

I look forward to hearing back.
Thank you!

Melinda

From: PlanningCommission
To: Daniel Bursuck; Ian Wan; Carver Struve; Christina Anaya; Nicholas Martell
Subject: FW: Regulate Desert Data Centers NOW
Date: Saturday, June 6, 2026 7:09:17 PM

From: Amber Weinstock <> **Sent:** Saturday, June 6, 2026 7:08:55 PM (UTC-07:00) Arizona **To:** PlanningCommission <PlanningCommission@tucsonaz.gov> **Subject:** Regulate Desert Data Centers NOW

> You don't often get email from amberweinstock12@gmail.com. Learn why this is important

To whom it may concern:

My name is Amber Weinstock and I am currently a Vail resident of 9 years and previously Tucson resident of 25 years. I work as a substitute teacher for the Vail School District for the past 3 years.

Once in business, it's predicted that 31 million gallons of clean, drinking water will be consumed by Project Blue's data center. Gone unchecked this could rise into the hundreds of millions. Also, considering these data centers use ten to hundreds of megawatts of energy usage. Risking destabilization of our power grids and partial or complete power outages through Southern AZ.

Residents of Southern AZ will see a drastic rise in utility costs if these data centers aren't regulated for water and energy usage. If not, their construction halted indefinitely. My plea and that of my fellow Southern AZ residents is that if construction continues that water and energy closely managed regulations be placed on these desert data centers. We the People implore the City of Tucson, Tucson Water, and TEP to ACT NOW!!

I've heard from neighbors and other residents of this area about how they were led to believe these data centers will only be using water for business purposes within the AI centers (i.e. plumbing for bathrooms and kitchen uses). That data center water consumption will be a closed loop system and AI data storage components will largely be cooled by air conditioning units. Either way high utility usages are going to drive up costs for those of us throughout Pima County. It is an unfair price for us to pay when many of us don't want these desert data centers here to begin with.

In efforts to push Project Blue through, deceitful Beale Infrastructure are liars and cons without any concern for our drought-ridden Tucson, Vail and surrounding residents, along with desert fauna and wildlife that are going to suffer with the development of their data center in SE Tucson.

Beale's recent history of going behind the City of Tucson's back to hijack 650,000 gallons of water for, quote unquote, “dust control” during desert land demolition only proves to show this community they'll do whatever it takes to further their profits.

These water guzzling, energy sucking, heat generating AI data centers have and will continue to effectively DESTROY and KILL any and all of Arizona's desert life in the vicinity. When they can guarantee, as a result of these data centers, residents won't see rises in utilities or disruptions in our water table, construction needs to be halted or stopped completely.

There needs to be more transparency with our communities in the details of development plans of these AI data centers. Right now people are being told half-truths or being outright lied to about the projected measures carried out behind closed doors.

Thank you for your time in reviewing this matter.

Signed: Amber Weinstock

From: Kate Hotten
Sent: Wednesday, June 3, 2026 12:01:35 PM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>

Dear team,

Please kindly distribute the attached letter to Chair Kinney and the Commissioners in advance of this evening's meeting of the Planning Commission.

We wish to support agenda item 3. on Regulations for Large-Scale Data Centers, but respectfully request that the main conditions outlined in our letter are first addressed.

Sincerely,
Kate

--
Kate Hotten (she/her)
Co-Executive Director
Coalition for Sonoran Desert Protection
738 N. 5th Ave., Suite 205, Tucson, AZ 85705

(520) 388-9925 office | (520) 365-5187 mobile | www.sonorandesert.org

Grateful to be living and working on ancestral lands stolen from the O'odham, Tohono O'odham and Pascua Yaqui

Coalition for
Sonoran Desert
Protection

738 N. 5th Ave., Suite 205 Tucson, Arizona 85705
520.388.9925 | sonorandesert.org

June 3, 2026

City of Tucson Planning Commission
City Hall
255 W. Alameda
Tucson, AZ 85701

RE: Agenda item 3. Regulations for Large-Scale Data Centers

Dear Chair Kinney and Commissioners,

The Coalition for Sonoran Desert Protection represents 30 national and regional organizations across Southern Arizona, including organizations and residents based in the City of Tucson. We participated in the Technical Advisory Committee (TAC) and represented environmental interests.

We strongly support this proposed code amendment, and want to thank staff, the Planning Commission, and the Mayor and Council for their work over the past several months in preparing this draft.

To best protect our natural resources, important revisions are still needed. The Coalition has three main recommendations:

1. **Explicitly include open space in Section 1.b**. This was discussed by the TAC and is detailed in the committee's minutes from January 12, 2026. ("Ensure that natural open space and riparian areas are considered in "other noise sensitive uses".) By referring to "open space", we incorporate natural, undisturbed open space, riparian areas, and other types of open space.

   We recommend the following wording, with the new language highlighted:

   > "2,640 feet (one-half mile) from educational, residential, **and other sensitive uses,** including nursing homes, residential care facilities, **open space**, or other uses as determined by the Zoning Administrator."

2. **Remove the arbitrary lot coverage percentage in Section 7** and adopt a flexible approach guided by existing conservation tools and the stated Environmental Resource Report process. **We were surprised to see this addition in May's study session materials** — it was not discussed by the TAC at the meetings we attended.

   We recommend that Section 7 be either removed or updated to read:

"Allowable lot coverage, including the coverage percentage, appropriate development area, and/or specific acreage to be conserved as natural open space, will be determined by staff and approved by the Mayor and Council. Undeveloped land area shall be dedicated as natural open space and conserved in perpetuity."

The remaining two sentences on revegetation and plant salvage can remain as-is.

Without this update, the City of Tucson may inadvertently limit industrial development on parcels where it makes most sense. This risks increasing development pressures on the region's highest priority natural resources while inadvertently limiting much-needed infill.

With this update, the City of Tucson reserves the right to determine allowable lot coverage. Per *Plan Tucson 2025*, the City of Tucson already has a tool — the Conservation Lands System — that can help inform any Environmental Resource Report and identify which parcels contain high biological value land. The Conservation Lands System also automatically recommends the maximum coverage area based on a parcel's biological value — reducing coverage from around 40% in some areas to as low as 5% in "important riparian areas". These are flexible guidelines that the Mayor and Council can use to inform a final decision.

3. **These Regulations do not specify any decommissioning plan requirements**. We note that the Town of Marana, in January of this year, had to add a decommissioning plan as a condition of approval for the recent rezoning for a 600-acre data center project — because its own ordinance does not require one.

   Where the City of Tucson deems it appropriate to add such a requirement, we **recommend including a requirement to remediate any environmental contamination and to restore or revegetate disturbed areas** as necessary following the cessation of data center activities on a parcel.

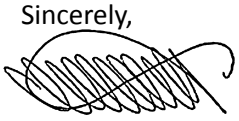
The following minor recommendations may improve clarity in the Regulations:

4. In Section 1, **consider using the term "setback"** to align with Unified Development Code (UCD) language and clearly distinguish distance requirements from landscape borders in Section 6.

5. In Section 6, **refer to the UDC section on landscape borders** (5-01.4.0 LANDSCAPE BORDERS).

Thank you for the opportunity to participate in this process, and please let us know if you have any questions.

Sincerely,



Kate Hotten, Co-Executive Director

From: Adria E. Brooks
Sent: Wednesday, June 3, 2026 4:52:36 PM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Subject: Comments on data center regulations

Hello,

Please find my comments attached on the proposed data center regulations to be discussed at tonight's meeting. I apologize that they are arriving so late in the hour.

Best,
Adria

--
Adria Brooks, Ph.D. (she/her)
adriabrooks.github.io
www.linkedin.com/in/adriabrooks/

June 3, 2026

Dear Planning Commission –

I am a Tucson resident and I served as a transmission planning expert on the City's Technical Advisory Committee (TAC) developing data center land use and regulations for the Unified Development Code (UDC).[1]

I enjoyed participating in the TAC and listening to public feedback and Commission deliberations on this matter. First and foremost, I would like to thank the City staff and facilitators who have been shepherding this process and several others related to data centers; this is not an easy topic to be in the middle of as a public servant.

I am writing today in regards to the May 27, 2026 Planning Commission Memorandum on the proposed UDC for data centers.[2] I want to address three stipulations that arise in the third sentence of the "Noise and Generators" section (pages 5-6) of the memo that believe would be damaging for the City to include in the final regulations. Below I present the memo language, my concerns, high-level technical background that may be needed to understand my concerns, and proposed edits to the memo language. I recognize that the characterization of these topics as summarized in the memo may not fully capture the language in the regulations, and therefore my proposed changes to the memo language will need to be edited for the final regulations.

1. *"For generators, only Tier IV or natural gas/dual-fuel generators would be permitted…"*

   I am concerned that this will require fossil fuel generation to be used as backup generation and prohibit any low-emitting generation or storage to be used as an alternative.

   This sentence refers to the backup generation which all data centers keep onsite to run their facility in the event of grid disturbance or failure. The intent of this stipulation reflects the general TAC desire that only the highest quality (i.e., most efficient and lowest polluting) fossil fuel generators be used. This is important to reduce local air and

[1] www.tucsonaz.gov/Departments/Planning-Development-Services/Planning-Initiatives/Data-Centers-Unified-Development-Code-Amendment

[2] www.tucsonaz.gov/files/sharedassets/public/v/1/pdsd/documents/boards-committees-commissions/planning-commission/6.3.26/pc-memo-data-center-code-update-6-3-26.pdf

noise pollution. However, the sentence phrasing is such that these high-efficient fossil fuel generators are the only backup source permitted, rather than saying that if fossil fuel generators are to be used, they must be of this caliber.

Most data centers do use fossil fuel (diesel gensets, specifically) generators as backup power. However, many data centers are considering low emissions technologies—long duration storage, geothermal, advanced modular nuclear—in the long term,[3] and several utilities have recently signed power purchase agreements with low-emitting generation providers to service data centers in the coming years.[4] The recent power purchase agreements show these technologies will become commercially viable in the next 3-5 years, which is likely the earliest that any data center which falls under this City zoning regulation would be energized. The backup generation source chosen by a data center will depend greatly on the size of the land available to it—where diesel gensets are more energy dense than alternative sources, making them a preferred candidate when land is limited—but good regulations could require data centers to choose alternative backup generators in lieu of or in conjunction with fossil fuel options.

Instead of using prohibitive language that would preclude any non-fossil backup generators, I suggest opening this language to at least include the option for low-emitting resources. Below is proposed language that would permit the use of both low- and high-emitting backup generation, though the City could strengthen this language to limit the use of high-emitting generation in line with their Climate Action and Adaptation Plan.[5] As "low-emitting" needs to be quantified in regulations, I suggest using the European Union Taxonomy's threshold of less than or equal to 100kg of carbon dioxide equivalent greenhouse gasses per kWh of electricity produced,[6] though another threshold could be used instead.

Proposed changes (changes in red, additions in **bold**, and deletions in ~~strikethrough~~):
"*For **backup** generators, **low-emitting (less than or equal to 100kg CO_2e/kW) generation is preferred and where high-emitting generation is used,** only Tier IV or natural gas/dual-fuel generators would be permitted…*"

---

[3] https://www.energy.gov/hgeo/geothermal/geothermal-and-data-centers; https://rhg.com/research/geothermal-data-center-electricity-demand/
[4] https://www.utilitydive.com/news/worlds-largest-grid-battery-part-of-google-xcel-energy-agreement/813793/; https://www.canarymedia.com/articles/batteries/gigantic-form-energy-battery-google-minnesota; https://fervoenergy.com/fervo-energy-announces-320-mw-power-purchase-agreements-with-southern-california-edison/
[5] https://climateaction.tucsonaz.gov/pages/caap
[6] https://ecostandard.org/wp-content/uploads/2021/12/EUTaxonomy_100g_7points.pdf

2. *"… with requirements for 'battery-first' backup systems,…"*

I am concerned that "battery-first" without any associated duration or energy requirement will not result in a change to usual data center operations.

All data centers have batteries that they use to transition to backup generation in the event of a grid disturbance. These batteries are sized to only last the time it takes to bring backup generation only, often no more than 10 minutes in the case of diesel gensets. By definition, data centers inherently have "battery-first" backup systems so this language on its own is meaningless. It would be more useful to stipulate how long a data center must run on storage before switching to another form of backup energy.

The intent of this statement may be to have data centers use alternative backup options for a length of time prior to fossil-fuel generators, the negative attributes are discussed above. Long-duration energy storage is an emerging solution (*see* prior links), but even short-duration chemical batteries can be used at utility-scale for several hours at a time. In fact, Arizona is one of the leading states for use of utility-scale battery storage and our utilities are very familiar with utilizing storage as a grid asset.[7]

I suggest amending this language to include the duration of time that the data center must first use storage backup. I also suggest changing "battery" to the more generic "storage," to allow for storage technologies other than traditional chemical batteries, such as compressed air storage. Finally, if the intent of this stipulation is to limit the air and noise pollution of fossil-fuel backup generators, then the requirement would be mute if the data center used less polluting backup generation technology. In my text I suggest 2-hours of storage backup, but any duration between 1/2 and 4 hours is technologically feasible today, with longer duration storage technologies becoming widely commercially available in the next few years.

Proposed changes (changes in red, additions in **bold**, and deletions in ~~strikethrough~~):
"… *with requirements for* ***2-hours of storage*** *~~'battery-first'~~ backup systems* ***to be used prior to the use of high-emitting backup generators****,…"*

3. "… limits on hours of maintenance testing, and prohibition of 'load shifting'."

My concern here is the affordability issues that will arise with prohibiting load shifting. A lack of load shifting is the reason why data centers could increase other ratepayers'

[7] https://cleanview.co/power-projects/operating/battery-storage-projects/arizona; https://www.azcc.gov/Rene-Lopez/news/2025/10/03/arizona-now-among-the-top-three-states-with-largest-capacity-of-utility-scale-battery-storage-systems

bills instead of decreasing them. Instead, a choice to require load shifting could help keep other TEP customers' bills from inflating due to data center growth.

I note that "load shifting" would need to be defined in the regulation. My concern is specific to a definition of "load shifting" as the ability of the data center to switch to backup generation even in absence of a grid disturbance or outage. Other definitions of "load shifting" could obviate my concern.

Utilities are required to plan for enough generation capacity to meet the "peak demand"—highest electricity usage—hour of each year, plus some extra headroom just in case. This means that TEP must have enough generators to meet the hottest summer afternoon when the entire footprint is using their air conditioners, running their washing machines, charging their cars, refrigerating large warehouses, manufacturing equipment, and sharing AI-generated cat videos. Those generators could be (and likely are) sitting idle or at partial capacity the rest of the year; all that matters is that TEP has enough power to meet those several hours of peak demand each year. Data centers intend to run at near-full tilt all hours of the year, adding just as much new electricity to that peak demand hour as the other 8,759 hours of the year. Any extra electricity demand at peak hour is why TEP must build new generation facilities, costs that they socialize across all customers via rate-basing. By requiring data centers to shift their load to backup generation during those peak demand hour(s) each year, TEP's need for new generation facilities will decrease.

Several entities have modified their regulations or laws to require data centers to switch to backup generation during these peak demand hours, or whenever it is that the servicing utility needs electricity usage to be lowered for reliability reasons. The most notable entity is the State of Texas, which passed a law in 2025 requiring data centers to be disconnected from the grid at the utilities' request to prevent wider reliability concerns.[8] The nation's electric reliability coordinator found that this preemptive "load shifting" of data center electricity usage enabled the Texas grid to avoid elevated risk for the coming summer.[9]

Rather than prohibit load shifting of data centers, it should be both allowed and encouraged. By requiring longer storage-first and/or low-emitting generation backup systems as previously discussed, the prohibition on load-shifting for air and noise pollution should be obviated.

---

[8] https://www.utilitydive.com/news/texas-law-gives-grid-operator-power-to-disconnect-data-centers-during-crisi/751587/

[9] https://www.nerc.com/globalassets/our-work/assessments/nerc_sra_2026.pdf

My proposed amendments below change the language from a prohibition to actively requiring the ability to load shift. If the City wishes, it could consider the legality of requiring data centers to shift their load during high demand hours. If it does so, I would recommend looking at limits to the number of hours and events that the servicing utility could call for this service. I would be happy to help with that research if needed.

Proposed changes (changes in red, additions in **bold**, and deletions in ~~strikethrough~~):
"… limits on hours of maintenance testing, and ~~*prohibition of 'load shifting'*~~ ***mandating the ability to disconnect load from the grid at the request of the servicing electric utility****."*

Thank you for your consideration,

Adria Brooks

_____
From: Heidi Hoscheidt
Sent: Wednesday, June 3, 2026 4:44:08 PM (UTC-07:00) Arizona
To: PlanningCommission
Subject: Data Centers-Environmental-human Impact

[You don't often get email from hhoscheidt@gmail.com. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification]

Hello Planning Commission,

As a third generation Tucsonan, working citizen of this city, who loves and appreciates the desert flora and fauna, I strongly oppose any Data Center in and around Tucson, AND southern Arizona because of the profound detrimental events demonstrated thus far with other Data Centers across the country. High energy rates, black-brown (tainted) water coming out of pipes, loss of water flow, drained water systems, toxic air quality, noise and light pollution, etc.

Project Blue, has prompted multiple sleepless nights, community conversations, and strong support against this proposed structure.

I AM VERY supportive of the current plan being discussed concerning regulations. It is critical to formulate a rubric involving accountability, and environmental assessment. This plan is highly beneficial and I appreciate any attempt to take power back, and work towards taking care of our desert resources responsibly and wisely for the next generation. However, I believe, like other cities, at this point, the next steps should be proposing a Data Center moratorium, indefinitely, until more research (long term health-environmental impact) can be obtained.

Again, thank you for creating such a well considered plan to make our community more safe under the currents circumstances.

With gratitude,

~Heidi A Hoscheidt-Sandman BFA
Educator, Community volunteer, artist, desert conservationist
And Mental Health Counseling/Art Therapy Graduate Student

From: wadsworth-seibel
Sent: Tuesday, June 2, 2026 3:25:05 PM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Cc: Scott Seibel <scott@seibelstudio.com>; wadsworth-seibel@cox.net <wadsworth-seibel@cox.net>
Subject: Data Centers: Please say NO

Data centers are a burdensome land use that impose disproportionate infrastructure, environmental, and community costs relative to their local benefit — and because of that, they should be restricted to areas specifically designed to absorb those impacts. Here in the desert, there are few-to-no areas designed for this type of impact.

1. Massive grid impact, low local return. A single hyperscale data center can pull as much power as tens of thousands of homes.
That means new substations, transmission upgrades, real grid strain. And what do you get in return? Very few long-term jobs and limited local economic activity.

The city/county takes on infrastructure risk without proportional community benefit.

2. Water consumption and cooling strain: A lot of these facilities rely on evaporative cooling — we're talking millions of gallons of water per year. Even with a "closed loop" system, we in the desert cannot spare that kind of water.

In a state that deals with drought cycles, that matters. You're allocating scarce water resources to a low-employment industrial use instead of housing or diversified economic growth.

3. Noise and constant industrial presence. This isn't occasional activity. It's a 24/7 baseline hum — cooling systems, generator testing, constant operation and constant heat production. This is effectively heavy industrial use, and it's not compatible with residential or mixed-use environments.

4. Land use inefficiency (zoning)
These are massive, windowless buildings. No foot traffic. No street-level activity. No community integration.Compare that to housing, retail, offices.

They sterilize valuable land that could support housing and economic diversity, and consume too much water and energy.

Arizona (and especially Pima County) does not have these resources to spare!

Respectfully,

Monica Wadsworth-Seibel
Tucson, Az

From: tlfinefrock@comcast.net
Sent: Saturday, May 9, 2026 7:45:25 AM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Subject: Public Comment: Data Center Regulations

Ms. Elisa Hamblin,

Pleases provide the following suggestions to the Commission Members.

Please consider requiring large electricity Consumers to use the most efficient electronics devices available.

New Photonic Memory and Computing Chips/Board assemblies use about 10% of the electricity than traditional chips and operate/cool at ambient temperatures.

Less electricity use reduces thermal generation, cooling, and water loss by TEP AC Turbines.

New Solar photocells are also 2x more efficient, require ½ the area for large scale solar systems

Thanks
Mr. Terry Finefrock, CPIM
Tucson area resident since 1956
Retired Corporate Director
Solar-Energy Storage Advocate
Established first 1MW Scale PV SAT Solar system in Southern AZ for Pima County

From: Liz McDonald
Sent: Sunday, May 31, 2026 8:29:47 AM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Subject: Regulations for large scale data centers

My name is Liz McDonald and I am resident of Tucson. I am dismayed, bitter and now distrustful of our BOS after they ignored our clear opposition to Project Blue.

Given that we cannot rely on them to enact the will of the people I believe that strict regulations must be enacted to protect us from the depredations of the technocrats.

I would like to see regulations that would ban data centers in Arizona but failing that we need regulations to sequester and protect our water; if a data center does get built, it should provide its own power.TEP must be prevented from using the eye-popping demands of the data centers as an excuse to raise our rates Data centers, if not banned, must be constructed far enough away from residential areas in order to protect the quality of life and the property values of the residents.

There must be clear and enforceable protocols in place for industrial accidents. Wildlife, sacred, and indigenous places must be protected. Decibel levels emanating from the plant should be monitored for the sake of residents.

Last but not least, the will of the people, when it comes to something as existentially threatening as Project Blue, must be made ironclad. Clearly the republican members plus one democrat on our BOS are not interested in protecting us and are pursuing a self serving agenda.

Thank you for your consideration.

Liz McDonald

From: Yvonne Navarro **Sent:** Monday, June 1, 2026 1:50:59 PM (UTC-07:00) Arizona **To:** PlanningCommission <PlanningCommission@tucsonaz.gov> **Subject:** Regulations for Large-Scale Data Centers

These large-scale data centers are NOT appropriate in a drought-ridden, scarce water desert environment. 30% of the water must be reclaimed? Seriously? Go look at Fort Huachuca down in Sierra Vista, where they use ONE HUNDRED PERCENT reclaimed water for anything other than drinking water. These data centers are a direct and serious danger to the water needed by humans and animals to survive. We get a "Water Wise" newsletter, but do you think huge corporations put people first and profits second? Of course not. And natural gas for power? I'll use (and this is not an exaggeration) perhaps $4.00 a month in natural gas in the summer, and my bill will be close to $35.00 after all the additional fees, taxes, and service charges. This planet's, and this area's, resources are NOT infinite. If the data centers need power, why can't they use solar? If they need water, why can't they do 100% reclamation? While the average homeowner looks for ways to conserve energy, these for-profit, energy- and water-sucking facilities just want to consume, consume, consume. When is our government going to put the planet and its people FIRST?

From: Sally Reeves
Sent: Monday, June 1, 2026 7:51:52 PM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Subject: Hearing date 6-3-26 Regulations for Large Scale Data Centers

I am extremely concerned about the environmental impact of data centers, especially in the desert. There is not one single human that needs AI to survive, but every living creature needs clean air and fresh water. Arizona does not need a data center that will pollute our desert.

Sally Reeves

From: Natalie Shepp
Sent: Monday, June 1, 2026 12:28:46 PM (UTC-07:00) Arizona
To: PlanningCommission <PlanningCommission@tucsonaz.gov>
Cc: Raye Winch <Raye.Winch@tucsonaz.gov>; Kylie Walzak <Kylie.Walzak@tucsonaz.gov>
Subject: Climate Mayors Data Center Report

Dear Planning Commission,

I am sending along a resource that I believe could be extremely helpful in ensuring that potential public health, environmental, and economic impacts are considered for current and future policymaking related to data centers. This document was created by the Climate Mayors and includes important details of existing recommendations and strategies being put to use in other cities. As you move forward with your data center ordinance, please utilize this resource as a guide. Please also pay careful attention to the information on page 20 that discusses utility Integrated Resource Planning as TEP's process is happening now and must be finalized by August. Thank you.

Natalie Shepp, MPH
Ward 6 Resident and CCES Commissioner

DATA CENTERS AND THE CLIMATE LANDSCAPE:
AN ACTIONABLE RESOURCE FOR US MAYORS

CLIMATE MAYORS

DATA CENTERS AND THE CLIMATE LANDSCAPE:
AN ACTIONABLE RESOURCE FOR US MAYORS

January 2026

ACKNOWLEDGEMENTS

This report was developed in partnership with **Bloomberg Associates** (Flavio Coppola, Sheetal Shah and Adam Freed). Climate Mayors would also like to extend its appreciation to the following individuals and organizations for their expert review and valuable contributions to the development of this resource:

- Kate Johnson, Cassie Sutherland, Claudia Huerta, Iyad Kheirbek, and Zoë Chafe, **C40 Cities**
- Office of Mayor Kate Gallego: Willa Altman-Kaough, **City of Phoenix**
- Katherine Gajewski, **KG Collaborative**
- Paola Ferreira Miani, Jacqueline Adams, Ruby Wincele, and Kristen Soares, **Climate XChange**
- Louisa Eberle, **Regulatory Assistance Project**
- Noah Goldmann, Alex Lopez, Zach Pierce, and Augusta Gillespie, **Rewiring America**
- Jasmine Chiu and Steve Abbott, **RMI**
- Dr. Margaret Cook, **HARC**
- Amy Turner and Daniel J. Metzger, **Sabin Center for Climate Change Law at Columbia University**
- Tremaine Phillips, **Third Coast Strategies**

ABOUT CLIMATE MAYORS

Climate Mayors is a bipartisan network of over 300 mayors, demonstrating climate leadership through meaningful actions in their communities since 2014. Representing 46 states and over 55 million Americans, Climate Mayors reflect U.S. cities' commitment to climate progress.

Cover photo: Nathan Howard, Getty Images

EXECUTIVE SUMMARY

Data center development is accelerating rapidly across the United States, driven by the growth of cloud computing and artificial intelligence. These projects bring large capital investments but also create outsized demands on local electricity systems, water resources, and land use. For mayors, data centers highlight the broader challenge of managing growth while meeting climate and sustainability goals. **Climate Mayors' objective is to ensure mayors have the resources to shape data center development to reinforce - rather than undermine - local climate, energy and community priorities.** Grounded in needs communicated by mayors, the following information is intended to catalyze peer learning between hundreds of Climate Mayors across the nation, support regional cooperation, and advance strategies that support community sustainability and affordability. This resource focuses on how cities can influence data center development outcomes, even when authority is limited or shared with states, utilities, or regional bodies.

First, cities play a critical role in **shaping where and how data centers are built**. Through zoning, permitting, site plan review, and conditional approvals, cities can guide siting decisions, require design and mitigation measures, and ensure projects align with housing plans, industrial strategies, and long-term land use goals.

Second, while electricity rates and utility planning are largely determined at the state level, **cities can influence whether data center growth raises costs for residents or jeopardizes grid reliability.** Cities can require evidence that new projects will not shift infrastructure costs to other ratepayers, encourage more storage and demand response, and coordinate with utilities and regulators around infrastructure planning.

Third, **cities can set clear expectations around water use, air quality, and noise**, particularly in communities already facing environmental burdens. Data centers can be major water users and rely on backup generation and cooling equipment that affect local air quality and sound levels. Cities can regulate water use where feasible, mandate monitoring and reporting, and adopt enforceable standards to limit cumulative impacts and protect public health.

Fourth, **cities influence whether data center development delivers real local economic value**. Cities can use tools such as performance-based incentives, community benefits agreements, and workforce requirements to strengthen local employment, infrastructure resilience, and accountability over time. By aligning with state and regional economic development agencies, cities can also ensure that incentives, tax policies, and infrastructure investments are justified by public benefit.

This resource equips mayors and senior staff to move beyond reactive decision-making. It offers a practical framework for setting clear standards, engaging communities, coordinating with state and regional partners, and ensuring that data center development supports climate goals, infrastructure affordability, and long-term community priorities.

TABLE OF CONTENTS

INTRODUCTION

As data centers continue to expand across the United States, their individual and cumulative local impacts have become more pronounced. Mayors are increasingly on the front lines of this fast-evolving landscape. Through listening sessions with mayors across the Climate Mayors network, it became clear that mayors need balanced, practical information to help answer key questions about the climate and sustainability impacts of data center development, as well as the policy levers, emerging case studies, and tools available to them. **This resource responds to that need by equipping mayors with actionable guidance to align data center development with local climate and sustainability goals, helping ensure continued progress as this sector grows.**

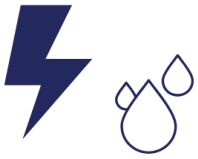
The intense competition to build data centers – many of which need to operate in or near cities – creates a window for mayors to shape outcomes, both within their communities and across broader industry practices. **This resource focuses on how cities can influence data center development through regulation**, **negotiation**, **coalition-building**, **and strategic leadership**, even when construction and operations fall partly outside of direct municipal control. It highlights five key policy areas, illustrated with case studies: **land use planning**, **electricity rates**, **water use**, **air and noise pollution, and economic development**. The outcomes and actions described are not prescriptive, nor are they needed or feasible in every context; cities may choose to focus on a subset of them to align with their local climate and sustainability agenda.

I. WHAT ARE DATA CENTERS AND WHY DO THEY MATTER?

What do data centers mean for cities' climate agendas?

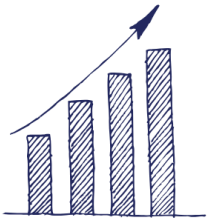
Data centers are the behind-the-scenes infrastructure that keeps digital services running—from cloud tools and artificial intelligence (AI) applications to financial systems, logistics, and government platforms. The computing infrastructure in these data centers operates around the clock and must meet high reliability standards,[1] which drives the demand for very large amounts of energy. Subsequently, this infrastructure generates a lot of heat and thereby requires large cooling systems that can use significant amounts of water and energy. This creates real implications for local utilities and long-term resource planning.

DATA CENTER IMPACTS



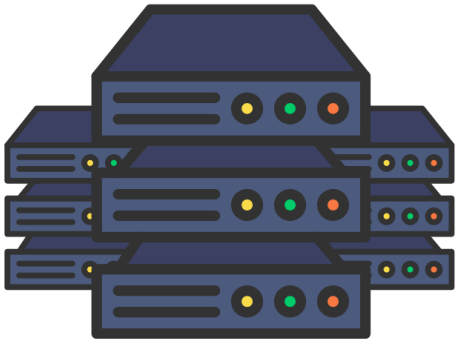
Energy and Water: Data centers have unusually high infrastructure demands. They require large, immediate electricity loads (with hyperscale centers using between 20-100 MW, equivalent to the electricity needed to serve between 16,000 and 82,000 households) and millions of gallons of water per day.

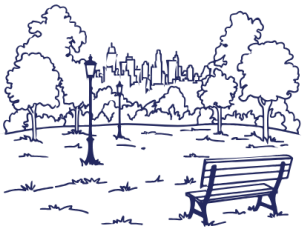
Noise: Equipment at data centers can cause noise levels which contribute to short- and long-term health impacts, including sleep disturbance, cardiovascular effects, and hearing impairment.



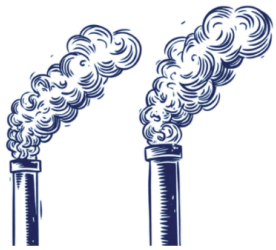
Tax Revenue: Data centers can generate significant property, sales, and income tax revenue.

Jobs: Data centers generate short-term construction jobs, and a limited number of permanent jobs in operations.





Community Investment: Through community benefits agreements and other negotiations, data centers can bring additional discretionary investments for community priorities such as local jobs, energy and water infrastructure, residential energy upgrades, and schools.



Air Quality: Data centers need backup power to cover outages on the grid. Most data centers use fossil fuel generators for backup power, which are usually diesel-powered and emit PM2.5, NOx, and ultrafine particles.

Land Use: Data centers have large footprints (some up to 200-500 acres) with no street activation. These facilities are typically large, windowless industrial buildings or multi-building campuses surrounded by security fencing, electrical substations, and cooling equipment.

As with all development projects, data centers can create positive and adverse effects for localities, residents, and local ecosystems. The image above outlines the impact areas for mayors to be aware of. A more detailed description of each of these impact areas are included in Appendix A.

While it is critical to understand the impacts of individual data centers, it is equally important to understand the **cumulative impact** of data center development where multiple facilities are sited together. This is of particular importance, as recent research shows that data centers are following historic industrialization trends and are clustered in areas with already high levels of pollution and environmental stress (additional information also detailed in Appendix A).[2]

Will data center growth impact our greenhouse gas emissions reduction goals?

Data center development and operations can impact city greenhouse gas (GHG) emission goals and energy systems in several ways:

- **Fossil fuel plant life extension:** Rapid load growth can cause utilities to delay retiring gas or coal plants,[3] derailing short and long term climate reduction goals.
- **New fossil fuel plants**: If new load is met with additional fossil generation, citywide emissions inventories may rise even if a city is otherwise decarbonizing or becoming more efficient.
- **On-site generation from fossil fuel sources:** In regions with limited available grid capacity, some data centers are choosing to rely on on-site generation (typically gas turbines) as a primary power source while awaiting grid connections, in addition to extensive diesel backup systems.

Conversely, the **large amount of energy required by data centers represents an opportunity for companies to bring new clean energy on the grid**, as companies like Google and Microsoft have done.[4]

Will data centers raise electricity bills for my residents?

In the U.S., electricity costs have been rising in recent years due to several factors, including extreme weather, aging grid infrastructure, grid hardening, and growing demand from electrification and new large industrial loads. The recent surge in data center development is amplifying some of these trends by adding large, concentrated new demand to an already stressed system. Data center load growth was the primary driver of recent capacity price increases in the PJM energy market (the wholesale electricity market for 13 states and Washington, D.C.), increasing capacity prices by an estimated 110%.[5] While data center development does not necessarily mean higher electricity rates for residents, without guardrails, it can contribute to rate increases for several reasons, including but not limited to:

- **Grid upgrades and cost-sharing**: New data centers typically require new generation, substations, transformers, and transmission upgrades. Depending on approaches set by utilities and their state regulators, and particular agreements negotiated with developers, these costs could be paid by the data center or passed on to all customers through rate increases.

- **Extension of aging electricity generation sources**: Given the significant increase in electricity demand driven by data center growth, some utilities are proposing to keep outdated fossil fuel power plants operating beyond their planned retirement dates.[6] This is occurring despite the fact that these plants are often uneconomical, more polluting, and require costly upgrades to remain operational; making them more expensive electricity generation resources for utility customers compared to newer, cleaner alternatives like renewable energy and energy storage.
- **Utility rate and tariff structures**: Commercial and industrial rate structures or discounted "economic development" rates can shift costs to households and small businesses if not carefully regulated.
    - When utilities invest in new infrastructure to serve large loads and that load later declines or disappears, the utility may be unable to recover its costs through electricity sales to the original customer. In such cases, those unrecovered costs can be shifted to other ratepayers. Contractual protections, such as minimum payment obligations from data centers embedded in large-load tariffs, can help mitigate this risk.
- **Data center flexibility requirements**: Like other large energy users, data centers can drive up overall system costs when they require electricity during times of already-high demand. However, some data centers could choose or be required to pursue strategies to flexibly adjust their energy intensity and participate in utility "demand response" programs that smooth out total electricity usage over time and avoid costly spikes.[7]

If paired with the right measures, data center development can put downward pressure on electricity rates by spreading fixed utility costs (the costs to maintain the generation, distribution, and transmission infrastructure that makes up the grid) across a larger volume of electricity sales. This outcome depends on ensuring that data centers pay the full cost of serving their load and do not receive discounted rates that shift costs onto other customers.

Will data center growth affect grid reliability?

Large, concentrated data center loads can strain local and regional power systems, particularly where multiple facilities cluster in the same area. Data centers can saturate transmission and distribution infrastructure, reducing available capacity for other users and creating reliability risks during periods of extreme weather. For instance, both data center cooling load and residential air conditioning demand peaks during a heatwave. There have also been occasions where large clusters of data centers have disconnected from the grid simultaneously during voltage disturbances; an abrupt loss of concentrated load can strain stability and increase the risk of wider outages.[8]

In addition to capacity constraints, rapid data center growth can affect the quality of electricity delivered to homes. Irregular spikes in electricity demand from data centers can cause

fluctuations in voltage, known as surges and sags, which, if left unaddressed, may damage sensitive equipment, create sparks, or even lead to electrical fires in homes.[9]

Will data centers impact our water systems and availability?

Data centers consume water directly (onsite, primarily for cooling) and indirectly (offsite, through power generation). Indirect water consumption accounted for about 70% of the total water footprint of U.S. data centers in 2023 but varies significantly by region and energy source.[10]

Though direct water consumption accounts for a smaller percentage of a data center's total water footprint, it can have a compounding effect on existing water risks. Since 2022, about two-thirds of data centers built in the U.S. were located in water stressed areas.[11] Furthermore, over 97% of data center operators purchase water from municipal systems, which can create added pressures in areas with already strained water resources and infrastructure.[12]

Direct water use and consumption varies based on data center size and design, as well as geographic and environmental factors like outdoor temperatures. For example, hyperscalers (large technology companies such as Google, Microsoft, or Amazon, building and operating very large data centers) can use between 500,000 to 5 million gallons per day (GPD), equivalent to the water use of 10,000 to 50,000 people, while smaller data centers can consume less than 100,000 GPD.

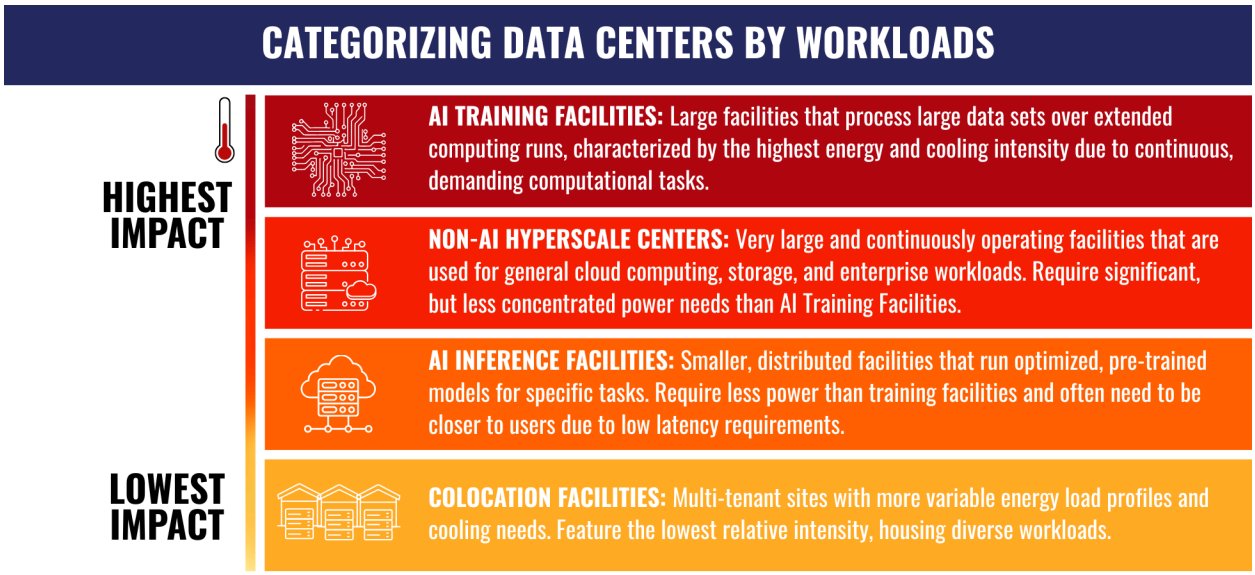
A key driver of on-site water use is cooling, since data centers generate intense heat and must be cooled to protect equipment and maintain operations. Appendix B outlines the different types of cooling systems currently used for data centers and their implications for water and energy consumption. In addition, data centers'cooling effluent can contain elevated concentrations of minerals that need to be treated and discharged, which can overwhelm aging infrastructure. Without water efficiency and reuse methods, these cooling systems can deplete aquifers, exacerbate water stress, affect local water quality, and result in higher water bills for residents. Outside of day-to-day operations, the construction of data centers can sometimes require the removal of groundwater at the site, which can impact local well water supplies.

Why are data centers and their energy use growing so rapidly?

Rapid growth in AI and cloud computing is driving a major expansion of data centers and energy use nationwide, with some regions experiencing more accelerated growth than others (see *FracTracker Alliance's* map of data center development across the US). U.S. data center power demand is projected to rise from about 40 GW today to 106 GW by 2035.[13] This is occurring for two primary reasons. First, the energy needs of individual facilities are growing: while most existing data centers use under 50 MW, many new projects exceed 100 MW, with some proposed at over 1 GW (enough to power 826,000 homes[14]). Second, facilities are getting physically larger: while typical data center sites historically averaged around 40 acres, AI-focused data centers now often require 200–500 acres.[15,16]

Are data centers all the same?

Bloomberg New Energy Finance (BNEF) categorizes data centers into four segments based on their workloads, outlined below. Each has distinct implications for electricity demand, cooling requirements, and siting.



While nearly all data centers developed before 2020 were non-AI hyperscale and colocation facilities, the number of new AI inference[17] and training facilities has been growing rapidly and these data centers are expected to represent over one-third of total data center power demand by 2035.[18]

Much of the planned AI-driven capacity is being built for prospective use and revenues, rather than existing customers and income streams. Competition amongst developers and speculative developments are leading to five to ten times more interconnection requests than the number of actual data centers being constructed.[19] If the anticipated need for data centers is not realized, a future market correction could significantly slow the pace of data center development and potentially create stranded asset infrastructure.

Does data center ownership matter?

Data centers are being developed by different actors, which can impact the levers available to cities to shape their development.

- **Enterprise Data Centers**: Built by companies for their own internal use (e.g., a bank's private facility).
- **Colocation Data Centers**: Built by providers that rent portions of the facility to multiple businesses. These projects may be speculative or have core tenants associated with them.

- **Cloud & Hyperscale Data Centers**: Built by large tech companies (e.g. Amazon Web Services, Microsoft, Google) or developers building for them. These projects may have more certainty associated with uses and sponsoring companies will remain engaged through operations.

Cities tend to have greater influence in cases involving enterprise and hyperscale data centers, because the end users are visible, long-term actors with broader interests in the region. These companies often operate across multiple sites, rely on public infrastructure and regulatory certainty, and have reputational exposure if projects generate community opposition or environmental concerns. As a result, they are generally more willing to engage with cities on sustainability commitments, infrastructure investments, and community benefits, giving cities greater ability to shape outcomes. By contrast, cities typically have less influence over colocation data centers, where end users may be unknown or change over time.

Are there fire risks associated with data centers?

Data centers can present unique risks for firefighters given their concentration of IT equipment, which can contain large lithium-ion batteries. Fires in data centers can produce dense, corrosive smoke that contains known carcinogens and heavy metal particles. Overheated batteries can also burn so hot that sprinkler systems prevent them from spreading but cannot extinguish them. The International Association of Fire Fighters states that the growing concentration of data centers requires specialized training, planning, and close cooperation between local fire safety personnel and on-site security and engineering teams.[20]

II. How Mayors Can Safeguard Community & Climate Priorities in Data Center Decisions

The current wave of data center expansion has heightened competition among developers and increased their reliance on local political support, infrastructure coordination, and community acceptance. This creates a window for mayors to safeguard climate and community priorities through negotiation, coalition-building, and strategic leadership.

Why this moment creates an opportunity for mayors

- **Data center developers seek certainty and speed**. Proactive engagement on the city side can materially reduce development risk and project delays.
- **Large technology companies face heightened public scrutiny around data center development**. Some technology firms that build and/or use hyperscale data centers are eager to structure deals that demonstrate they are constructive, long-term partners to communities, making mayoral support an important source of legitimacy.
- **Data centers are facing increased public opposition**. Mayors can play a key role in engaging and educating residents, setting clear expectations, and channeling community

concerns into enforceable protections and benefits, strengthening the City's negotiating position with developers and reducing the risk of outright project rejection.

- **Intense competition for computing power has altered the negotiating context for cities**. The race among technology companies to secure additional computing capacity is driving aggressive siting timelines and unprecedented capital deployment, with firms willing to absorb significant near-term losses to maintain a competitive position. This dynamic strengthens cities' negotiating position: where expectations are clearly articulated, standardized across jurisdictions, and predictable, cities are often well-positioned to ask for more, without materially deterring investment.
- **Timing matters**. Cities have the greatest influence over data center projects before key approvals are granted (such as zoning changes, conditional use permits, and interconnection agreements). Once these milestones are secured, cities retain enforcement authority but have far less ability to shape core project outcomes.

Negotiating with Intent

- **Lead with clear requirements and feasible pathways**. Cities should enter negotiations with a well-defined set of expectations (covering where data centers should and should not locate, how they can be designed, and what performance standards apply) with a framing of what is possible and needed within the local context, not solely what is prohibited. Clarity reduces friction, shortens negotiations, and strengthens the City's position.
- **Engage residents early and transparently.** Cities should proactively communicate with affected communities about potential impacts, tradeoffs, and mitigation measures, and use public input to inform clear requirements and community benefits agreements. Early, structured engagement can surface concerns before positions harden and help channel resident feedback into concrete outcomes that strengthen the City's negotiating position, reduce uncertainty for developers, and deliver tangible benefits for residents.
- **Think holistically about engagement**. Companies that develop or lease data center space often have multiple touchpoints with cities and the region beyond a specific project. Negotiations should account for the full range of interactions between the City and the company, including land use approvals, interventions in proceedings at the electric utility regulator level, infrastructure coordination, economic development incentives, cloud or procurement relationships, workforce presence, and public relations. These touchpoints collectively shape engagement and mirror the way that companies, in particular large technology companies, think in their negotiations with cities.
- **Differentiate by developer and user type**. Negotiation strategies should reflect who is building and who will ultimately use the facility:
    - Hyperscale self-builds have a higher public profile.

    - Third-party developers are more sensitive to cost structure, tenant requirements, and standardized approval processes

- **Adjust expectations based on project characteristics**. Cities should calibrate asks based on factors such as facility scale, power and water intensity, proximity to sensitive uses, local environmental conditions, and reliance on public infrastructure. Larger, more impactful projects can reasonably be held to higher standards.

Coordinate Beyond City Boundaries

Data center developers commonly pursue parallel siting discussions across municipalities within the same region, comparing sites, approval timelines, and requirements. Without coordination, this dynamic can trigger a race to the bottom, shifting costs and negative externalities across jurisdictions. Even if data centers are not proposed in your city, negative impacts (in terms of air quality, water, electricity rates) can be experienced regionally. A data center with on-site generation from gas turbines will affect air quality across the region, not just in the municipality where it is located. Coordinated action helps cities align expectations, protect shared infrastructure, and strengthen their negotiating position.

- **Coordinate with peer municipalities.** Sharing information and coordinating on minimum standards, incentives, conditions, and negotiated outcomes can help cities align expectations and avoid undercutting one another.
- **Engage regional and metropolitan partners.** Data center impacts extend beyond city boundaries, particularly for electricity, water, and air quality; regional coordination–such as through air quality districts–can strengthen the case for shared standards and positions.
- **Amplify collective positions at the state level.** Where state policy constrains local authority, coordinated mayoral advocacy can influence public utility commissions, legislatures, or governors' offices. This is particularly crucial as the most important factor for data center developers is speed of access to electricity, which mayors typically do not influence directly (except in the case of a municipal utility).

III. City Policy Levers to Impact Data Center Development

Mayors have access to different policy tools depending on their city's governance structure, delegated powers, local priorities, and the characteristics of individual data center projects. This section outlines the primary levers available to cities across five areas: **land use planning and design, electricity rates, water use, air and noise pollution, and economic development & community investment**. For each area, we identify outcomes that cities may seek to achieve to support sustainable and community-aligned data center development as well as specific policies or actions ("tools") that could be used to achieve these outcomes. These outcomes and actions are not prescriptive, nor feasible in every context; rather, they are intended to serve as a guiding framework and a practical menu of options that cities can draw from based on their unique

authority and circumstances. A spreadsheet of all the case studies by policy lever provided in this section can be found here.

Land Use Planning and Design

Site and Design Data Centers to Support Broader City Goals

Before approving a data center project, cities should seek the following land use outcomes:

- **Compatibility with surrounding land uses**. Data centers should not displace housing, constrain industrial growth, or conflict with neighborhood objectives.
- **Efficient use of scarce land**. Facilities should minimize footprint through compact, multi-story design where feasible, particularly in urban and near-urban areas.
- **Reduced environmental and community impacts**. Siting and design should aim to limit noise, heat, water consumption, air pollution, and impacts on sensitive or residential uses.
- **Alignment with infrastructure capacity**. Strive for projects to be located in areas with adequate grid, water, and water treatment capacity.
- **Support for decarbonization and circularity goals**. New construction should strive to minimize GHG emissions, prioritize reuse or adaptive redevelopment where feasible, and be designed for district energy integration or future heat reuse.
- **Development transparency and accountability over time**. Engaging with the public, sharing information at the planning stage and seeking feedback from residents on new development enhances transparency and accountability and can help proactively address public concern. Non-disclosure agreements between data center developers and city officials prevent meaningful dialogue and limit transparency and access to critical information. Once developed, a data center's operational performance should be tracked through benchmarking and reporting, where feasible, without compromising critical infrastructure security.

Tools to Achieve These Outcomes

Land use authority varies by jurisdiction, but it is often one of the strongest tools cities have to shape data center development. Cities can use a combination of zoning, permitting, and conditional approvals to translate these outcomes into enforceable requirements:

LAND USE PLANNING AND DESIGN	EXAMPLES AND RESOURCES
Define data centers as their own class within zoning codes or as "large-load customers" or "high impact facilities", enabling cities to craft tailored rules for these uses.[21]	***Chandler, AZ,*** *defined data centers in their zoning code as "A facility or portion of a facility housing networked computer systems and telecommunications equipment used for remote storage, processing, and distribution of data."*

LAND USE PLANNING AND DESIGN	EXAMPLES AND RESOURCES
Create zoning and overlay districts to designate appropriate areas for data centers, or to restrict them in locations where they would conflict with housing, employment, or neighborhood plans.	***Atlanta, GA,*** *prohibits data centers within its Beltline Overlay district, which is a major transportation route with protected green spaces and trails that run throughout the city, and within ½ a mile of transit stations.* ***Prince William County, VA,*** *created Data Center Opportunity Zone Overlay Districts (DCOZOD) to "promote the development of data centers within areas of the County where there is existing infrastructure that could adequately support the proposed use."*
Establish clear siting criteria within permitting processes, including requirements related to grid capacity, water use and discharges, flood risk, and proximity to sensitive uses.	***Fairfax County, VA,*** *amended their zoning ordinance to prohibit new data centers from being built within one mile from a Metro station and 200 feet from residential property lines.* ***Yorktown, VA,*** *requires that data centers have a "letter from the electric utility purveyor indicating sufficient proximity and availability to a substation and transmission lines to serve the proposed data center [to] be submitted to the Department of Planning and Development Services." This is meant to ensure availability of grid capacity to serve the data center.*
Adopt design standards addressing building height, footprint, enclosure of equipment, perimeter landscaping, and noise mitigation to reduce land use and community impacts.	***Phoenix, AZ,*** *requires a 30-foot-wide perimeter landscape setback around data centers, architectural components for buildings exceeding 100 feet, and landscaping that provides 75% shading on sidewalks.* ***Tempe, AZ,*** *requires data centers to be set back 500 feet from residential/sensitive uses.* ***York County, VA,*** *requires data centers and their ancillary equipment to be set back 200 feet from all property lines and 500 feet from any residential dwelling.* ***Prince William County, VA,*** *prohibits the use of chain-link or barbed wire fences, among other design requirements around data centers.*
Require conditional-use permits (CUPs) in designated locations that incorporate	***Loudon County, VA,*** *amended their Zoning Ordinance and Comprehensive Plan to eliminate*

LAND USE PLANNING AND DESIGN	EXAMPLES AND RESOURCES
performance-based requirements and other measures, including: heat-reuse readiness or co-location with district energy systems, benchmarking and reporting of energy and water use (subject to security considerations), embodied-carbon limits and reuse/deconstruction requirements for new construction, noise and air quality mitigation, a decommissioning bond to ensure the site can be safely dismantled at the end of its useful life, and/or community benefit commitments aligned with local priorities (e.g., energy efficiency, weatherization, or other affordability and clean energy projects).	*data centers as a by-right use within the county. This elimination means that proposals are reviewed by staff and sent to the public planning commission for a public hearing, providing an opportunity for community input.* ***Dublin, OH,*** *reclassified data centers from a permitted use to a conditional use in specified innovation/research-oriented districts, which requires additional public review.* ***Phoenix, AZ,*** *adopted a zoning text amendment that requires data centers to provide estimated annual "Power Consumption (MW)" and "Water Consumption (gallons)", and includes a requirement to demonstrate utility service/capacity for the project as part of the special-permit framework.* ***Atlanta, GA,*** *requires special-use permits for data centers, which require the disclosure of water and energy usage, tree removal during construction, and new powerline development.*
Enact temporary moratoria, where needed, to pause approvals while cities update outdated zoning or permitting standards in response to rapid market change.	***Prince George's County, MD,*** *enacted a six-month moratorium on new data center development in September 2025.* ***Aurora, IL,*** *enacted a 180-day moratorium in September 2025 on new data center and warehouse developments to give City staff time to "research best practices and safeguards implemented through zoning ordinances and building codes; study the environmental, stormwater, and utility impacts of data centers; assess fiscal impacts, including long-term service and infrastructure costs; develop potential zoning or performance standards; and report findings and recommendations to [Council] within three months."* ***The Southern Nevada Water Authority*** *enacted a moratorium on commercial and industrial projects using evaporative cooling systems.*

Electricity Rates

Protect Residents from Electricity Rate Increases

Unless data centers are located within the service territory of a municipal utility, cities do not typically directly control cost allocation or recovery, rate design, or interconnection standards. However, they can still play an important role in shaping how the infrastructure needed to serve large new electricity users, such as data centers, is evaluated and approved, and can influence state-level proceedings and other processes that impact electricity rates. When evaluating a data center project, cities should aim for the following outcomes:

- **No cost-shifting onto residents or small businesses**. Data centers should pay for the infrastructure required to serve them (including new generation, substations, feeders, and transmission upgrades) so that these costs are not passed on to ratepayers through rate increases. Cities should press their electric utilities, project owners and developers, and state energy regulators to demonstrate that their projects will not increase residential or small-business electricity bills.[22] As an example, Microsoft recently pledged to "pay our way as a company, to ensure that our data centers don't increase electricity prices."
- **Commitments to additional clean energy procurement.** Data centers should purchase or contract for *new* clean energy, on the same regional grid where consumption occurs,and with hourly matching of generation and consumption (24/7 carbon-free energy) if possible, rather than relying on Renewable Energy Certificates (RECs) from existing clean sources. This ensures that the additional power demand from data centers adds to local or state renewable energy energy capacity, helps retire outdated, costly and harmful fossil generation, and doesn't squeeze out other buyers from the RECs market.
- **Grid-supportive design**. Facilities should include on-site battery storage, participate in utility demand-response programs, and incorporate flexible and interruptible load capabilities into their operations to reduce strain on the grid during peak demand, extreme weather, and other contingency events.
- **Investment in community efficiency and renewables.** Rewiring America[23] estimates that developer investment in heat pumps, rooftop solar, and residential battery storage, energy efficiency, distributed generation and electrification solutions could reduce system-wide demand, ease grid constraints, reduce household energy costs, and meet the growing energy demand from data centers while supporting cities' climate objectives.
    - *While not a direct implementation of this approach, Minnesota's bill HF16 illustrates how policymakers are linking data center development with broader energy system investments: the bill would extend tax breaks for data centers while requiring them to pay $2 to $5 million into a weatherization fund for low-income Minnesotans.[24]*

- **High-efficiency operations**. Cities should require best-in-class efficiency standards, typically measured through Power Usage Effectiveness (PUE),[25] to minimize overall electricity consumption and reduce pressure on grid capacity and infrastructure.

Cities with a Municipal Utility

Cities with municipal utilities often have the strongest ability to influence electricity rates and system impacts.

MUNICIPAL UTILITY	EXAMPLES AND RESOURCES
Design special tariffs for data centers that require full cost recovery and prohibit cost-shifting. This ensures that each negotiated rate goes through an open proceeding to ensure that costs are not socialized by default and interventors can test potentially imprecise cost allocation claims.	***Oregon's*** *POWER Act created a separate rate utility class for data centers, so costs associated with their energy needs are not absorbed by residents.*
Scrutinize special contracts as these contracts are prone to cost shifting as they are confidential and allow utilities to exploit accounting subjectivity.	*A resource on special use contracts can be found here.*
Require 100% additional clean energy procurement for the facility's load, on the same regional grid where consumption occurs and with hourly matching.	*Microsoft signed long-term power purchase agreements with AES Corporation to procure approximately 475 MW of new utility-scale solar capacity across* ***Michigan***, ***Missouri***, *and* ***Illinois***. *The projects represent new-build renewable generation intended to supply clean electricity into the regional grids where Microsoft operates, contributing to the expansion of carbon-free power supply without reliance on existing assets or fossil fuels.* ***In Nevada***, *Google is pursuing a clean transition tariff with NV Energy that is currently under review by the Public Utilities Commission of Nevada. Under the proposal, Google would source electricity from a 115-MW geothermal facility, at a price modestly above NV Energy's standard cost. The tariff is structured to insulate other ratepayers from cost impacts while enabling Google to advance its goal of operating on 24/7 carbon-free energy by 2030.*
Design electricity rates so large data center customers are encouraged to reduce or shift	***In Washington***, *the Grant County Public Utility District does not offer an interruptible tariff or*

MUNICIPAL UTILITY	EXAMPLES AND RESOURCES
their power use during peak periods. Demand charges and peak pricing can reward data centers that adjust operations when the grid is under strain, helping lower system costs and improve grid reliability for other customers.	*tariff-based demand response program; instead, it negotiates such arrangements on a customer-by-customer basis.*
Require on-site storage or microgrid capabilities to support grid reliability.	***Aligned Data Center in the Pacific Northwest** will be deploying a battery system in early 2026, which will provide a 31-MW/62-MWh battery storage, enabling the data center to connect sooner to the grid, as it is used during peak demand. Note that this deployment was market-driven and not the result of negotiations with public authorities.*
Tie interconnection approval to developer-funded grid upgrades.	***The Cheyenne Light, Fuel and Power Company** as well as the **Idaho Power Company** have special contract or tariff provisions that require large load customers to cover new electric infrastructure, line extension, and upgrades for interconnection facilities to cover the costs of serving their new electricity demand.*
Mandate participation in demand-response or emergency load-shedding programs.	***The Michigan Public Services Commission** approved a data center in Washtenaw County with the condition that in an emergency situation, the utility will shut off the data center's power before interrupting other customers. Note that, due to data center's strict reliability requirements, curtailment of electricity for data centers may result in the use of backup generators, with negative air quality consequences if those are powered by fossil fuels.*
Require project co-benefits and explore shared infrastructure investments.	***Lansing, MI,** is working with a data center developed by Depp Green that will supply heat from the facility back to Lansing Board of Light and Water's hot water system, which is expected to bring $1.1 million in annual natural gas savings through reduced demand.*

Cities with State-Regulated Utilities

In investor-owned utility service territories, mayors can use land use tools to prevent new data centers from impacting electricity rates or system reliability. Mayors have indirect but meaningful leverage with utilities, data center developers, and state energy regulators and policymakers.

STATE-REGULATED UTILITIES	EXAMPLES AND RESOURCES
Negotiate community benefits agreements with data center developers that fund priority infrastructure, through land use approvals and development agreements. Cities can require developers to contribute to or fully finance grid upgrades that improve local reliability and support broader electrification goals, including solar PV and battery storage, heat pumps, home retrofits, and EV charging infrastructure, and participation in virtual power plants.	***In Arkansas,*** *Google announced a $25 million Energy Impact Fund to support energy affordability initiatives in Crittenden County and the surrounding region, with investments focused on home weatherization, advanced energy efficiency technologies, and workforce development in the local energy sector.*
Condition land use approval on: • Written confirmation from the serving utility or regulator that required grid upgrades will be funded by the project under cost-causation principles (customer pays for the cost they create on the system) and will not be recovered from other ratepayers; • An evaluation of the project's impact on peak load, local reliability, distribution constraints; • Developer-funded grid upgrades; • Additional renewable procurement; • Storage or flexible load; • Target Power Usage Effectiveness; and • Participation in utility grid-support programs, e.g., demand response programs.	*Examples of codes and standards that could be used include the* ***EU's Energy Efficiency Directive****, which requires energy audits, performance standards, and public reporting.*
Engage with state legislators, who set the underlying policies for how state regulators (often known as state public utility commissions, PUCs) oversee utilities. Several state legislatures are considering bills on approaches to data center interconnection, electricity rates, and demand response.	*Example forthcoming in future iterations.*
Engage with the state PUC,[26] **in order to:** **Participate in Integrated Resource Planning (IRP) proceedings** and ensure they incorporate reasonable projections for data center growth. IRP is a process required in 30+ states, by which utilities forecast future electricity needs (often over a 10-15 year window) and identify resource options to meet those needs and model projected load growth over time. Data center load growth needs	***The New York State Public Utilities Commission*** *directed Con Edison to only submit "non-emitting" solutions for data center energy needs. This includes "transmission, demand-side projects such as demand response (programs where customers get paid to reduce energy usage when demand is high) or energy efficiency, storage and renewable energy."*

STATE-REGULATED UTILITIES	EXAMPLES AND RESOURCES
can often be overestimated, so it is important for municipalities to be involved with the IRP process to ensure that projections are not overestimated and therefore a cause of utility rate increases. **Advocate for priorities specific to data center development**, including dedicated data center rate classes or tariffs; cost-causation principles; renewable procurement requirements; integrated planning that fully accounts for large new loads; transparency in regulated utility service negotiations with data centers; and fully contested proceedings on data center tariffs, as such proceedings allow for concerned stakeholders to bring forth evidence, fully review utility proposals, and help ensure state regulators have sufficient evidence to limit rate impacts on other customer classes.	***The Michigan Public Services Commission*** *recently approved a tariff for customers in excess of 100 MW. The rate structure requires these large customers to sign long-term power contracts with steep penalties for early exit, and for the utility to demonstrate that an individual large customer will shoulder all of the additional interconnection and transmission costs.* ***The Georgia Public Service Commission (PSC)*** *adopted a new rule requiring new Georgia Power customers whose peak load exceeds 100 MW to cover the upstream generation, transmission, and distribution costs incurred by the project. Additionally, any new contracts between Georgia Power and large-load customers must be submitted to the PSC for review.*
Use the renegotiation of franchise agreements with utilities[27] to set expectations on planning, transparency, and cost allocation, where the timing of the franchise cycle allows, recognizing that these agreements are long-term and may not be open for renegotiation when new data center projects are proposed.	*A resource on lessons learned from franchise agreements can be found here.*
Coordinate with peer cities to create joint positions on rate and infrastructure issues, including IRPs, increasing influence in state-level proceedings. Engage with other cities through intergovernmental agreements, in order to cooperate on common zoning and land use definitions for data centers, infrastructure planning and cost sharing, and requirements for on-site generation or demand response participation.	*Example forthcoming in future iterations.*

Water Usage

Enable Sustainable Water Use in Data Centers

Goals and priorities for sustainable water use will vary by geography, environment, and jurisdiction. Before approving a project, cities should aim for the following outcomes in relation to data centers' direct water use and cities' water resources and authority:

- **Prevent impacts to aquifers and local water supplies.** Data center developers and owners, in conjunction with cities and municipalities, should ensure site selection

considers local aquifer, groundwater, and ecological health, as well as any natural hazards. The construction process and day-to-day operations should integrate water efficiency measures and onsite wastewater recycling, as well as real-time monitoring to proactively identify and address any impacts to local water supplies.

- **Implement the best available technology.** Data centers should utilize the most water and energy efficient cooling systems available to them according to their load size and local environmental conditions, and, when possible, waterless cooling. For example, data centers in dry climates or water stressed regions should be mandated to install water recycling or direct liquid cooling with air cooled chillers, and use renewable sources for the increased energy demand.
- **Coordinate with water utilities.** Both public and private water utilities should engage in long-term coordination and planning with data center developers and operators. This includes integrating data center water use into asset management and master plans, requiring regular reporting on water use and consumption, and requiring data centers to pre-treat effluent before discharging.
- **Pursue infrastructure investments.** Modern and efficient water infrastructure is critical to long-term data center operations. Cities dealing with capacity constraints and funding gaps in municipal water and wastewater infrastructure have an opportunity to negotiate investments in upgrades and new construction from data center developers and owners.
- **Improve transparency and reporting.** Regular and accurate reporting from data centers on their water use is critical for both water management and community trust. Cities should refrain from entering into agreements that shield developers from disclosing estimated water and energy use or potential health impacts. Once data centers are operational, they should submit annual, publicly available consumption reports to water suppliers. Reports should be audited by third parties.

Tools to Achieve these Outcomes

These are several policy levers and resources cities can leverage to monitor water use and mitigate potential impacts.

GENERAL RECOMMENDATIONS	EXAMPLES AND RESOURCES
Conduct water availability assessments and environmental screens on the current state of, and potential impacts to, groundwater, aquifers, and ecosystems on or adjacent to the data center sites. These assessments should include existing sources of heavy water consumption (like agriculture or other industrial activity) and water system capacity constraints (like failing wastewater infrastructure) to better project cumulative impacts. Findings should be made publicly available and used to inform data center siting and permitting approvals.	*Cities can use holistic tools like the World Resources Institute Aqueduct Water Risk Atlas (which identifies multiple types of water risks) and Green Grid's Water Use Impact (WUI) calculator (a metric that combines water stress and onsite water consumption) to model current and future risks.*
Update building codes and design standards with requirements specific to water use in data center construction and operations, including closed loop systems, onsite water recycling, and, where possible, waterless technologies to cool data centers, as well as real time water and wastewater monitoring systems to track onsite Water Use Effectiveness (WUE).[28] Design standards should include rack designs that prioritize efficient heat capture.	***Tucson, AZ,** requires users expecting to use more than 7.4 million gallons/month to submit an application with a water conservation plan that includes a description of water use and projected annual/monthly/daily demand, efforts to reduce consumption and improve efficiency, and periodic updates.*
Engage in regional water resource coordination to develop and strengthen approaches to assessing water risks, negotiating infrastructure investments, and promoting environmental conservation and protection.	*The **Southern Nevada Water Authority** enacted a moratorium on commercial and industrial projects using evaporative cooling systems*
Require that data center owners submit audited reports on estimated water use and consumption to obtain a business license and periodic reports on actual water use and consumption during operation. In dry climates or water stressed areas, owners should include their estimated WUI in applications and include actual WUI scores in their subsequent reports.	***Detroit, MI,** has a water benchmarking ordinance that requires buildings of a certain size (including data centers) to report their annual water usage. Public disclosure is then meant to encourage efficiency improvements year to year.*
Where states manage groundwater rights, **collaborate with the state to set daily withdrawal limits** and require that developers apply for water withdrawal permits for any surface or groundwater withdrawals of potable or non-potable water above a specific threshold. State agencies should	*In **Virginia,** projects for surface water withdrawals that total more than 10,000 gallons per day from non-tidal waters require a Surface Water Withdrawal permit from the Department of Environmental Quality before withdrawing surface water or disturbing a wetland or stream by clearing, filling, excavating, draining or ditching.*

GENERAL RECOMMENDATIONS	EXAMPLES AND RESOURCES
conduct thorough environmental reviews as part of the permit approval process.	*In **New York,** a Department of Environmental Conservation permit is required for any type of non-agricultural water withdrawal system having the capacity to withdraw 100,000 gallons per day or more of surface or groundwater.*

Cities with a Municipal Water Utility

Cities with municipal utilities often have the strongest ability to influence water use and system impacts.

CITIES WITH MUNICIPAL WATER UTILITIES	EXAMPLES AND RESOURCES
Require that large quantity customers submit a conservation plan with their water application and provide regular reports on their WUE, set daily consumption limits, and/or prohibit municipal water departments from supplying potable water for cooling systems.	***Marana, AZ,** prohibits the provision of potable water for a data center principal/accessory uses.* ***Phoenix, AZ,** requires developments consuming more than 500,000 gallons of water a day to offset this by using at least 30% recycled or conserved water.*
Leverage and enforce the Clean Water Act's (CWA) pretreatment regulations for industrial users to set discharge limits and, if necessary, require pre-treatment of cooling effluent.	*Example forthcoming in future iterations.*
Integrate data center water use and consumption into master and asset management plans. These updates should be based on real-time monitoring and annual reporting from data center operators.	***Dublin, OH,** requires: "All new development must connect to the public water and sewer system operated by the City of Dublin (in coordination with the City of Columbus, which supplies the water). As part of any proposed development project, an applicant must demonstrate that adequate capacity is available to serve the proposed development and ensure the required infrastructure for water and sewer is designed to meet City of Dublin standards and Ohio EPA requirements. Additionally, any proposed new development has to meet the City of Dublin's Stormwater Management Design Manual requirements related to stormwater."*
Require that operators pay for upgrades to, or any new construction of, water and wastewater infrastructure needed to service their data center. These costs should not be passed on to ratepayers, and the municipality should retain ownership of new and upgraded infrastructure.	***Dalles, OR,** signed a $28.5 million agreement with Google to improve the city's water system, including two wells, two reservoirs, a pump station, and a sanitary sewer, and transferred full ownership of the new facilities to the city following construction. Google also financed an Aquifer Storage and*

CITIES WITH MUNICIPAL WATER UTILITIES	EXAMPLES AND RESOURCES
	Recovery System, which collects surplus surface water during rainy seasons for use in dry seasons and transferred ownership to the city.

Cities with a Private Water Utility

Cities with a private water utility can still influence water use and system impacts by coordinating with state agencies and regulators that oversee water rights, permitting, and utility operations.

CITIES WITH PRIVATE WATER UTILITIES
Work with the state to mandate and regulate asset planning and wastewater management between utilities and data centers.
Work with the state to regulate and enforce State Pollutant Discharge Elimination System (SPDES) programs (in those states authorized to implement CWA programs).[29]

Air Quality and Noise

Minimizing Noise and Air Pollution

Before approving a project, cities should seek the following outcomes:

- **No additional public health burden:** Data centers should not materially worsen local air quality or noise exposure, especially in communities already facing cumulative pollution and health risks.
- **Cumulative impacts explicitly addressed:** Air quality and noise impacts should be evaluated in the context of existing industrial activity and clustered data center development, not assessed project-by-project in isolation.
- **Best-available mitigation as the default:** Developers should utilize the cleanest feasible backup power technologies, advanced noise controls, and design strategies that minimize emissions and sound at the property boundary.
- **Predictable, transparent, enforceable performance standards:** Noise and air quality limits should be clearly defined, measurable, and enforceable over the life of the facility, not just at the time of approval. Monitoring data on air quality and noise should be regularly collected and made publicly available, with clear consequences for non-compliance.
- **Protection of nighttime conditions:** Special care should be taken to limit noise at night, recognizing that continuous low-frequency noise and intermittent generator testing can have outsized health and quality-of-life impacts.

Tools to Achieve these Outcomes

CITY LED ACTIONS FOR AIR QUALITY & NOISE	EXAMPLES AND RESOURCES
When evaluating permitting applications, conduct an independent environmental screen of existing sources and levels of noise and air pollution, including the cumulative impact of data centers. These assessments should be made available for public comment and review.	***New York City's*** *City Environmental Quality Review (CEQR) is a comprehensive framework for environmental decisionmaking by City agencies. Under CEQR:* • *An air quality assessment determines a proposed project's effects on ambient air quality, including NOx emissions and pollutants from increased vehicular traffic.* • *A noise assessment determines proposed project's potential effects on existing noise sensitive uses and/or locations.* • *Public comment periods are mandated by state and city rules at certain steps of the environmental review process.*
Prohibit on-site fossil fuel generation for primary or routine operations, through land use powers, building codes (when possible), or under a city's mandate to protect public health. Cities should ban or strictly limit the use of on-site fossil-fueled generation (including natural gas turbines or engines) as a primary or extended power source, allowing fossil fuel-based systems only for true emergency backup where no feasible alternative exists.	*Example forthcoming in future iterations.*
Restrict the use of diesel generators for backup power, and mandate alternative backup energy sources like battery storage, hydrogen fuel cells, or natural gas. If diesel generators are used, update backup generator permits to require the newest, Tier IV models.	***New York City*** *Local Law 38 of 2015 mandates that all new and registered stationary generators (excluding emergency generators) must meet Tier IV emissions standards in order to receive a renewed certificate of operation.*
Restrict generator operation to emergencies and tightly defined testing windows. Permits could explicitly prohibit non-emergency economic dispatch (such as for compensated demand-response operations) or routine grid-support operation of on-site generators, and limit testing to daytime hours with caps on annual run hours.	*Example forthcoming in future iterations.*

CITY LED ACTIONS FOR AIR QUALITY & NOISE	EXAMPLES AND RESOURCES
Where multiple facilities are located or significant fuel deliveries will be needed, require a traffic analysis and transportation plan for construction and fuel delivery trucks. Emissions from these trucks should be incorporated in environmental reviews and planning.	*Example forthcoming in future iterations.*
Update design codes and siting guidelines to mandate that exterior HVAC equipment, backup generators, and other industrial equipment are enclosed with acoustic barriers and a minimum buffer from residential or sensitive uses.	***Tempe, AZ,*** *requires that data center backup generators be located in an enclosed building with necessary ventilation.* ***Fairfax County, VA,*** *requires mandatory setbacks from residential areas (at least 200 feet), pre- and post-construction noise studies, and requirements for physical noise barriers for equipment.*
Establish strict noise limits through zoning or other ordinances, which could be tied to pre-operational ambient noise. Ordinances should address noise from individual developments and cumulative sources.	***Divide County, ND,*** *has the strictest noise limits for data centers at 50 dBA for daytime operations and 45 dBA at night.* ***Phoenix, AZ,*** *stipulates that noise levels cannot exceed 55 dBA during the day and 45 dBA from 10 pm to 7 am for data centers adjacent to residential areas.* ***Marana, AZ,*** *sets maximum decibel levels by type of property and time of day. For example, in residential areas, data centers cannot make noise greater than 55 dBA during the day or night.*
Set frequency-specific limits. Traditional noise regulations often use dBA (A-weighted) measurements, which may fail to capture the low-frequency humming characteristic of data center fans. Many ordinances are now adding dBC (C-weighted) standards to regulate these low-frequency "bass" sounds.	***Chicago, IL's,*** *Municipal Code (Article VII, Noise & Vibration Control) includes octave-band maximum sound pressure levels (tables by octave band center frequency) for manufacturing districts along residence/business-commercial district boundaries.*
Mandate independent noise impact studies both before construction (modeling) and within 60 days of occupancy to ensure actual operational noise meets limits.	***York County, VA,*** *requires a sound study be conducted to evaluate existing ambient noise prior to project development and modelling predicted noise generation after development, including generators and ancillary equipment. Upon construction, data centers cannot "produce any sound that exceeds the existing ambient noise captured in the sound study or 55 dBA, whichever*

CITY LED ACTIONS FOR AIR QUALITY & NOISE	EXAMPLES AND RESOURCES
	is greater, when measured from the boundary of the property on which it operates."
Ensure a robust public noise complaints and monitoring process and levy meaningful fines for operators that violate noise limits. If necessary, cities should update their zoning codes to increase maximum fines. Repeated violations should result in certificate of occupancy revocation.[30]	***Chandler, AZ,*** *requires early neighbor notification and meetings focused on project design and sound-mitigation for proposed data center projects.*

City-state coordination

Many cities will need to collaborate with the state to regulate the use of backup generators and mitigate impacts to air quality.

CITY-STATE COORDINATION ON AIR QUALITY	EXAMPLES AND RESOURCES
Work with the state to **mandate air quality permits** for industrial backup generators. Permitting requirements should include that NOx and PM emissions tests be conducted within 30 days of permit application or renewal with continued annual reporting, as well as annual generator tune ups.	*The* ***Washington State Department of Ecology*** *issues air quality permits to data centers to limit air pollution that comes from diesel-powered backup generators. Permit requirements include a health impact assessment and regular testing.*
Work with the state to **establish standards for NOx and PM emissions from distributed energy sources**.	*The* ***New York State Department of Environmental Conservation*** *adopted NYCRR Part 222, which requires that compression-ignition engines (which are used in diesel generators) with nameplate ratings greater than or equal to 750 horsepower must have an NOx emission rate less than 0.50 grams per brake horsepower-hour.*
Work with the state to **prohibit generator testing and maintenance on days with high air pollution forecasts.**	*The* ***New Jersey Department of Environmental Protection*** *requires that emergency generators shall not be used for normal testing and maintenance on days with forecasted "unhealthy" air quality as defined in the EPA's Air Quality Index.*
Work with the state to **set annual hourly limits on non-emergency use of diesel generators**, including maintenance, testing, and demand response.	*A 2025 EPA clarification allows backup generators to operate for up to 50 hours per year to prevent interruptions to local power supply, when the engine is dispatched by the local balancing authority or local transmission and distribution system operator.*

Economic Development & Community Investment

Maximizing Local Economic Value

Many state and regional economic development agencies are competing to attract data center projects through incentives and other forms of public support. While significant economic development incentives are often provided at the state-level, cities should coordinate closely with these entities to align expectations, avoid working at cross-purposes, and ensure that state or regional incentives reinforce local priorities. At the same time, before offering their own incentives or public support, cities should seek the following economic development outcomes:

- **Public value commensurate with public cost.** Incentives, tax abatements, or infrastructure investments should deliver clear benefits that justify foregone revenue and public expenditure.
- **High-quality, future-proof facilities.** Public support should favor "gold-standard" projects that exceed baseline requirements on energy efficiency, water stewardship, resilience, and community integration.
- **Local economic participation.** Data center development should support local employment (where possible), workforce development, and local supply chains, rather than delivering primarily capital-intensive benefits with limited local spillovers.
- **Alignment with citywide infrastructure and climate priorities.** Economic development tools should reinforce city goals related to decarbonization, water consumption, grid resilience, utility affordability, and heat recovery.
- **Accountability over time.** Incentives should be performance-based, with clear metrics, reporting requirements, and consequences for non-compliance.

Tools to Achieve These Outcomes

Cities can use economic development authorities and negotiated agreements to align data center projects with public priorities.

ECONOMIC DEVELOPMENT & COMMUNITY INVESTMENT	EXAMPLES AND RESOURCES
Require Community Benefits Agreements (CBAs) to secure enforceable commitments such as local hiring and purchases, workforce training, public infrastructure investments, or community-scale energy and resilience improvements. Cities can also develop a standardized CBA menu of pre-approved community benefits, co-designed with residents and businesses, giving developers clear expectations and reducing one-off negotiations while increasing certainty and	***The Lancaster, PA,*** *City Council approved a community benefits agreement associated with a data center development that includes a $20 million upfront financial commitment and a set of enforceable environmental and quality-of-life protections. The agreement is structured to secure funding during construction while placing clear operational conditions on noise, air quality, and commitments to procure clean energy.*

ECONOMIC DEVELOPMENT & COMMUNITY INVESTMENT	EXAMPLES AND RESOURCES
consistency across projects. Setting up a Community Advisory Group to oversee the establishment and implementation of the CBA ensures continued community engagement and accountability.	
Limit tax abatements, exemptions, or financial incentives to projects that meet clearly defined "gold-standard" criteria related to energy efficiency, on-site clean energy, water reuse, and heat-reuse readiness.	*Example forthcoming in future iterations.*
Tie eligibility for incentives to specific project features, including on-site clean energy generation or storage, non-potable water use, heat recovery, and measurable **local employment outcomes**	***Indianapolis, IN,*** *redesigned its incentive framework to center equity outcomes, restructuring tax abatements to better align with broader municipal policy goals. A similar approach could be applied to data center development by embedding eligibility criteria that tie public incentives to measurable sustainability performance and to commitments for local workforce participation.* *In* ***Michigan,*** *the state's tax incentive program for data centers requires developers to meet certain sustainability criteria such as using water from the municipal utility (rather than groundwater), procuring clean energy, and meeting energy performance targets.*
Include clawbacks or step-down mechanisms that allow cities to recapture incentives if developers fail to meet agreed performance or reporting requirements.	*Example forthcoming in future iterations.*
Condition public investments in roads, substations, water lines, or other enabling infrastructure on **developer contributions and alignment with broader city plans**.	*Example forthcoming in future iterations.*
Carefully design Tax Increment Financing (TIF) tools to **capture and allocate a portion of the additional property tax revenue generated by data centers for reinvestment in priority infrastructure or community benefits.** Note that TIF does not generate additional revenue: it earmarks tax revenue that would have gone to the general fund for a specific use, which can help	***Atlanta, GA,*** *uses Tax Allocation Districts (TADs) to capture the growth in property tax revenue and reinvest it back into the community. These funds support projects such as infrastructure improvements, park and street upgrades, and new housing. The City currently has eight TADs, each guided by its own redevelopment plan. Any data centers built within these districts would add to the*

ECONOMIC DEVELOPMENT & COMMUNITY INVESTMENT	EXAMPLES AND RESOURCES
build local support for the development as part of a broader negotiation effort.	*tax base and help generate additional revenue for reinvestment.*
Adjust tax structures to better capture the value created by data center development and redirect it toward local priorities.	***Henrico County, VA,*** *is implementing a 550% increase in taxes on equipment for data centers, which is being invested into a community housing fund for residents making 60% to 120% of the area median income.*

Conclusion

As data center development accelerates, the choices cities make today will shape not only local outcomes but the broader trajectory of this rapidly expanding sector. Mayors have a unique ability to ensure that growth aligns with community priorities—protecting resources, strengthening resilience, and advancing climate and energy goals. By engaging early and consistently in the policy, regulatory, and planning processes that influence data centers, cities can secure clearer benefits, mitigate risks, and set expectations that reflect the needs of their residents.

Just as importantly, mayors do not have to navigate this landscape alone. Continued collaboration across the Climate Mayors network will be essential for sharing emerging practices, coordinating approaches, and elevating a unified voice on issues that transcend any single jurisdiction. By learning from one another and working collectively, cities can help shape a data center ecosystem that supports innovation while upholding the values of sustainability, equity, and long-term community well-being.

APPENDIX A

DATA CENTER CONSIDERATIONS FOR CLIMATE AND ENERGY IMPACTS

Energy and water: Data centers have unusually high infrastructure demands. They require large, immediate electricity loads (with hyperscale centers using between 20-100 MW, equivalent to the electricity needed to serve between 16,000 and 82,000 households) and continuously operate,[31] which can create challenges for the electricity grid. In 2023, data centers consumed significant shares of electricity in Virginia (26%), North Dakota (15%), and Oregon (11%).[32] Data center cooling systems (which can utilize a combination of air, water, or liquid refrigerants) can be a significant driver of electricity consumption and, in many cases, require substantial water use. Cooling systems that use less or no water often have higher energy demands.

Air quality: To meet reliability standards, data centers need backup power to cover outages on the grid. Most data centers use fossil fuel generators for backup power, which are usually diesel-powered and emit PM2.5, NOx, and ultrafine particles (in California, 90% of back-up generators are powered by diesel).[33] Increased particulate exposure contributes to asthma, ER visits, cardiovascular disease, and premature mortality, especially in already overburdened areas. In Virginia alone, backup generators from data centers are estimated to cause 14,000 asthma cases per year.[34]

Noise: Noise exposure can cause a number of short- and long-term health impacts, including sleep disturbance, cardiovascular effects, and hearing impairment. The World Health Organization states that continuous exposure to sound levels above 70 dB(A) can cause hearing impairment.[35] The noise generated by data centers can vary based on the type of cooling system and equipment they utilize.[36] Data centers can produce continuous noise from cooling equipment and intermittent high-level noise from backup generators, with outdoor HVAC systems often measuring 55-100 dB(A) and diesel generators reaching 85-100+ dB(A) during testing or operation.[37] For comparison, normal conversations can rate 60-70 dB(A), lawnmowers 80 to 100 dB(A), sports events 94 to 110 dB(A), and sirens from emergency vehicles 110 to 129 dB(A).[38]

Land use: Data centers have large footprints with no street activation: these facilities are typically large, windowless industrial buildings or multi-building campuses surrounded by security fencing, electrical substations, and cooling equipment. Given their large size, data center campuses can crowd out housing, industrial, or mixed-use redevelopment. These factors make it essential for cities to evaluate proposals early and ensure they align with local climate goals, infrastructure plans, master plans, and long-term land use objectives.

Tax revenue: As large capital investments with economic activity on-site, data centers can generate significant property, sales, and income tax revenue. Data centers typically pay two primary types of property taxes: real property tax, which applies to the land on which they are

built and the permanent structures that sit upon it; and personal property tax, which is assessed on non-permanent assets such as the servers inside data centers. The latter can be quite substantial given the high value of equipment. Loudoun County, VA, which hosts the world's largest concentration of data centers, projects $1.37 billion in computer equipment tax revenues in 2026.[39] In some cases, tax revenues are foregone or offset as incentives to attract developers; while tax incentives can be established at the state level, they can affect municipalities due to loss in tax revenue from the state.

Jobs: Data centers generate short-term construction jobs, and a limited number of permanent jobs in operations. Unless developer agreements or regulations specifically require local hiring, many of the construction jobs can go to transient workers who specialize in data center construction, not local workers.

Investment: Through community benefits agreements and other negotiations, data centers can bring additional discretionary investments for community priorities such as local jobs, energy and water infrastructure, residential energy upgrades, and schools.

***Frontline communities*:** In California, the median pollution burden score for locations of all existing and planned data centers is 7 out of 10 (with 10 representing the highest pollution burden).[40] Across the U.S., communities within one mile of data centers deal with higher levels of PM2.5, NO_2, and diesel particulate matter, and are disproportionately communities of color.[41]

APPENDIX B

DATA CENTER WATER COOLING SYSTEMS

Cooling systems consist of a loop of cooling fluid that pulls heat from the computing equipment, and heat rejection equipment that pulls heat from the cooling fluid. The different types of cooling fluid and heat rejection equipment vary in their water and energy efficiency. While cooling technology is rapidly evolving to reduce water and energy use, a system's total water consumption depends on which heat rejection system and cooling fluid are paired:

Low water / High energy

- **Cooling fluid: Closed loop and water recycling systems**, which reuse chilled water as the cooling fluid, reduce water consumption by 50%-75% compared to evaporative cooling (if paired with water efficient heat rejection equipment) but increase energy demands and costs.[42]
- **Heat rejection: Air-cooled chillers**, which use ambient air and mechanical fans to remove heat from cooling fluid, are more energy intensive and generally used in data centers with lower density racks.[43]

High water / Low energy

- **Cooling fluid: Evaporative cooling systems**, which cool hot air by passing it over water-soaked pads that are continuously moistened. These systems are less energy-intensive but can consume millions of gallons of water per day.
- **Heat rejection: Water cooled chillers** use water from a cooling tower to remove heat from cooling fluid. They are more energy efficient than air cooled chillers for higher density racks.

Low water / Low energy

- **Cooling fluid:** Some hyperscale data centers, particularly in Europe, use **Direct Liquid Cooling (DLC)**, which pipes liquid coolant (not water) directly onto servers or chips and is especially effective for high density racks to absorb heat in a closed loop system. DLC systems are both water and energy efficient, but costly, and must still be paired with heat rejection equipment. According to a 2024 survey of data center operators, 22% of respondents in the U.S. were using DLC, although nearly half of those used it on fewer than 10% of their racks.[44]

Water and wastewater monitoring are also key considerations, as this data is critical to understanding and mitigating potential impacts. In 2021, only 10% of data center operators tracked water use across their facilities.[45] Of those that did not track water use, 63% said there was no business justification for doing so, suggesting that water costs are relatively low compared to other operating costs.

CITATIONS

[1]Reliability standards describe how continuously a data center must operate from a business standpoint (typically allowing little to no downtime) and are achieved through redundant power supplies, backup generators, multiple network connections, and continuous cooling so services remain available even during grid outages or equipment failures. Hyperscale data centers typically aim for “seven 9s” uptime (99.99999%).

[2]https://kaporfoundation.org/datacenters-envt-health/

[3]https://www.utilitydive.com/news/load-growth-plant-retirements-blackouts-doe/752408/

[4]See, for example, Google’s geothermal project in Nevada: https://www.utilitydive.com/news/google-fervo-nv-energy-nevada-puc-clean-energy-tariff/719472/

Microsoft commits to procuring 10.5GW of new clean energy from Brookfield: https://bep.brookfield.com/press-releases/bep/brookfield-and-microsoft-collaborating-deliver-over-105-gw-new-renewable-power

[5]https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2025/2025q3-som-pjm.pdf

[6]https://www.utilitydive.com/news/a-fraction-of-proposed-data-centers-will-get-built-utilities-are-wising-up/748214/

[7]Utility regulator directs Con Ed to address reliability concerns

[8]https://www.reuters.com/technology/big-techs-data-center-boom-poses-new-risk-us-grid-operators-2025-03-19/

[9]https://www.bloomberg.com/graphics/2024-ai-power-home-appliances/

[10] https://www.eesi.org/articles/view/data-centers-and-water-consumption

[11]https://www.bloomberg.com/graphics/2025-ai-impacts-data-centers-water-data/

[12]https://www.wateronline.com/doc/u-s-water-related-expenditures-data-centers-exceed-us-b-through-0001

[13]]BloombergNEF. US Data Center Outlook 2H 2025: The Boom Gets Bigger. December 1, 2025.

[14]Average U.S. household electricity consumption is about 10,566 kWh per year, or roughly 28–30 kWh per day, which corresponds to an average continuous power draw of approximately 1.2 kW. https://www.eia.gov/consumption/residential/data/2020/c%26e/pdf/CE8.5.M.2020.AverageSiteElectricityConsumption.pdf

[15]http://www.techtarget.com/searchdatacenter/feature/The-increasing-concern-of-data-center-land-acquisition

[16]https://cushwake.cld.bz/Data-Center-Development-Cost-Guide-2025

[17]AI inference refers to customers using trained models to generate predictions or responses in real time.

[18]BloombergNEF. US Data Center Outlook 2H 2025: The Boom Gets Bigger. December 1, 2025.

[19]https://www.utilitydive.com/news/a-fraction-of-proposed-data-centers-will-get-built-utilities-are-wising-up/748214/

[20]City of Phoenix Planning and Development Department, “Health and Safety Impacts: Data Centers.” City of Phoenix, Phoenix, AZ, 2025.

[21]Large load customer is a term used by the Federal government.

[22]https://rmi.org/large-energy-users-want-power-heres-how-to-protect-other-ratepayers-from-the-costs/

[23] https://www.rewiringamerica.org/newsroom/press-releases/peak-demand-report-2025

[24]https://www.mprnews.org/story/2025/06/18/data-centers-face-new-regulations-in-minnesota

[25]PUE is defined as the ratio of total facility energy use to energy used by IT equipment. A PUE of 1 indicates perfect efficiency, meaning all electricity is used directly by computing equipment, not for cooling or other uses. Note that discussions on the best metric for data center energy efficiency are evolving, as PUE doesn’t account for efficiencies in the energy use of the compute load itself.

[26]https://pubs.naruc.org/pub/41BBF1F5-ED6E-79C8-CC25-14E9721A6E8B

[27]An electricity franchise agreement is a negotiated contract between a municipality and an electric service provider. In 30 states, municipalities have authority to negotiate their franchise agreements; this makes it an important tool to advance their objectives. https://www.sciencedirect.com/science/article/abs/pii/S0301421520303554

[28]WUE is defined as total water used by a facility divided by IT equipment energy use, expressed in L/kWh. Lower WUE values indicate more water-efficient operations, but the metric does not capture local water scarcity or the source of water. Source: www.thegreengrid.org/system/files/store/WUE_v1.pdf

[29]The EPA manages National Pollutant Discharge Elimination System programs in Massachusetts, New Hampshire, Idaho, and New Mexico. Other states have their own SPDES program

[30]https://docs.google.com/document/d/1x8KsCVOhJS97rxzdd_bWW4Me1Errpj6ggyU5dAdNKUM/edit?pli=1&tab=t.0

[31] While all data centers operate continuously, their energy demand profiles vary according to the categories described in the previous section. AI training facilities have significant spikes in their load demand when the training models are being run; while these spikes have more acute impacts on the grid, it makes this category well-suited to demand-response programs. Non-AI hyperscale centers have “flatter” load profiles, which are more predictable but potentially less flexible and less suited to demand-response programs. AI inference facilities have load shapes that match user activity (for example, there is more ChatGPT inference-driven demand during the workday than at night). Co-location facilities’ load profiles are harder to predict due to the variety of their tenants.

[32]https://www.pewresearch.org/short-reads/2025/10/24/what-we-know-about-energy-use-at-us-data-centers-amid-the-ai-boom/

[33]https://www.businesswire.com/news/home/20211006005088/en/New-Study-Shows-a-Rapid-Increase-of-Diesel-Fueled-Backup-Generators-Across-California

[34]https://arxiv.org/abs/2412.06288

[35]https://www.who.int/publications/i/item/a68672

[36]https://ketchumandwalton.com/5-sources-of-noise-in-data-centers-how-to-control-it/

[37]https://www.techtarget.com/searchdatacenter/tip/Understanding-the-impact-of-data-center-noise-pollution

[38] https://www.nidcd.nih.gov/news/2020/do-you-know-how-loud-too-loud

[39] https://www.bizjournals.com/washington/news/2020/10/19/loudoun-data-center-revenue-growth.html

[40] https://www.techpolicy.press/data-center-boom-risks-health-of-already-vulnerable-communities/

[41] Communities Close to EPA-Regulated Data Centers Face Heightened Air Pollution – Environmental Data and Governance Initiative

[42] https://www.grundfos.com/media/latest-news/whitepaper--water-circularity-can-reduce-water-stress-and-boost-

[43] Rack density refers to the amount of electrical power and computing equipment packed into a single server rack.

[44] https://intelligence.uptimeinstitute.com/sites/default/files/2024-05/Uptime%20Institute%20Cooling%20Systems%20Survey%202024_0.pdf

[45] https://uptimeinstitute.com/uptime_assets/4d10650a2a92c06a10e2c70e320498710fed2ef3b402aa82fe7946fae3887055-2021-data-center-industry-survey.pdf

Carver Struve

Subject: FW: Proposed amendments re data centers ignore biggest threat to our water

---

From: Lee Stanfield <onesimplee@gmail.com>
Sent: Monday, May 11, 2026 3:36 PM
To: MayorRomero <Mayor.Romero@tucsonaz.gov>; Ward1 <Ward1@tucsonaz.gov>; Ward2 <Ward2@tucsonaz.gov>; ward3 <ward3@tucsonaz.gov>; Ward4 <Ward4@tucsonaz.gov>; Ward5 <Ward5@tucsonaz.gov>; Ward6 <Ward6@tucsonaz.gov>; cityclerk <cityclerk@tucsonaz.gov>; CityManager <CityManager@tucsonaz.gov>
Subject: Proposed amendments re data centers ignore biggest threat to our water

The City's proposed amendments regarding requirements for data centers completely ignore the following facts. They are not even mentioned:

* Roughly **86 percent** of TEP's local generation of electricity comes from **generators that burn fossil fuels and fracked gas**.

* These generators require an **enormous amount of water just to cool them. TEP already reports using 4.7 BILLION gallons of water per year (before any data centers).**

* TEP gets this water directly from our aquifer... **not through Tucson Water**, but through its own wells, so it pays nothing to Tucson or Pima County for its consumption of our water, **and Tucson Water has no say in how much water TEP draws from our aquifer.**

* The amount of electricity required to air condition a large data center is massive! **The additional electricity TEP will need to generate for the data center's air conditioning will require TEP to use even more water (just to cool its generators) than the water the data center would have used if it had gone with onsite evaporative cooling. That is a humongous amount of water!**

* TEP's longstanding refusal to take significant timely steps to convert from its water-intensive burning of fossil fuel and gas, to solar and wind energy sources (which use zero water), makes it clear that **any major increase in the need for electricity anywhere in Pima County will massively increase TEP's drain on our aquifer. It will also massively increase TEP's drain on our bank accounts.**

So, the City of Tucson should be proposing amendments that address this issue directly. After all, water is our most precious and most endangered resource. The following requirements are a minimum of what must be enacted... just to protect our water supply:

1. Data centers and any industry, business, or development that will likely require a significantly large increase in either direct or indirect use of water, are prohibited from using water for purposes of cooling on or off site.

2. Data centers and any industry, business or development that will likely require a significantly large increase in either direct or indirect use of water, must supply all of its own energy exclusively via solar + batteries, and must do so exclusively and entirely onsite.

These two amendments will keep data centers and any other industry, business, or development from being able to directly or indirectly dry up our aquifer.

Note that if we replace TEP with a publicly owned electric utility "Public Power" we could shave years off the switch to solar and wind.

---

https://www.tucsonaz.gov/files/sharedassets/public/v/2/pdsd/documents/data-centers/large-scale-data-centers-code-amendment-fact-sheet_04.16.26.pdf

https://tucson.com/news/local/business/article_289e2c5a-4dd8-11ef-8024-7bdc8c686cd2.html

https://docs.tep.com/wp-content/uploads/TEP-EEI-ESG-2025.pdf

https://www.youtube.com/watch?v=HfRw-nV6b8M

-Lee Stanfield
520-322-5355
onesimplee@gmail.com

Sustained peace requires two things: recognition that all life is interdependent, and an extended form of democracy where all living beings are recognized as equal in value and are given equal voice in how the system works.

Carver Struve

Subject: FW: Regs for large scale data centers

From: Romero-Cardenas, Krista Regina - (kristarc)
Sent: Monday, April 27, 2026 9:41 AM
To: fatima.luna@tucsonaz.gov <fatima.luna@tucsonaz.gov>
Subject: Krista / Tucson Summit / Regs for large scale data centers

Hola buenos dias, Fatima!

It was serendipitous that I was able to run into you last week at the Summit! There are some things I cannot write through email but I mentioned in person- these matters have high level sensitivity and have direct impacts on residents that choose to speak in public recording meeting spaces.

Before I continue I would like to share that I am not against technology and am aware of the financial backing small cities are under. However, I believe in the words of Mayor Romero and strategically placing "guardrails". That is where I am coming from sharing this perspective as a PhD student in Science, Technology and Society.

Below are some recommendations for the proposed code amendment on large scale data centers.
1.) We may want to modify the language "Large-scale data center" to include industry umbrella terms - using more blanket, safe, defensible language allows the amendment to include the complex "computing, storage and networking capacity" but I believe we want to do is to regulate impacts to water and energy and we should stay energy-focused.

Additional language to include :
Large-load energy users
High-density electrical load facilities
Bulk power consumers
Energy-intensive digital infrastructure
Industrial-scale cooling-dependent infrastructure
Resource-intensive computing facilities

Broad policy-safe phrasing
“Facilities supporting digital services or cloud-based operations”
“Infrastructure required for data processing and storage services”
“High-capacity computing or network operations facilities”
“Facilities with significant electrical demand associated with digital operations”
“Digitally enabled high-load infrastructure”
“Unclassified high-demand utility users (digital sector)”

2.) Amendments to definition of Large-Scale Data Centers
We should begin the threshold at 10MW and gross floor area greater than 50,000 sq ft.

Using ≥1 MW threshold = defensible for datasets + policy
Using ≥10 MW threshold = captures high-impact infrastructure

FYSA:

- Average data center globally: **~4 MW**
- Typical "enterprise" facility: **5–20 MW**
- Hyperscale (Google, AWS): **20–100+ MW**
- Large campuses: **100–300 MW typical; up to 1 GW+ emerging**

This graph will continue to grow but we the people should be protected and voices heard given our current society and future generations will be heavily impacted. Graph source:

3.)
Modify current language: “Applicant must disclose the proposed amount of energy and energy mix, including renewables, in application materials” to: "Applicants must disclose projected energy demand, energy mix (including renewables), and water use, with annual estimates for the first 3–5 years. Reporting must distinguish between construction and operational phases. This information will be used to guide incentive eligibility, prioritizing projects that minimize energy and water impacts."

- Require applicants to provide a detailed projection of anticipated energy demand and energy portfolio, including the proportion of renewable versus non-renewable sources, as part of the application materials.

- To improve accuracy and accountability, require year-by-year estimates for at least the first 3–5 years of operation, including both electricity consumption and water use. This should explicitly distinguish between:

- construction-phase resource use, and
- operational (post-buildout) resource demand,

  (because...these phases have substantially different resource profiles.)

This information will enable the City of Tucson (COT) to:

- evaluate cumulative infrastructure and resource impacts, and
- structure incentive programs that prioritize facilities demonstrating lower energy intensity and reduced water demand.

- In this framework, incentives are not guaranteed, but are contingent upon demonstrated efficiency and responsible resource use.

Thank you and don't hesitate to let me know if you have any follow up questions. I am interested if your legal team can point me to the ARS that does not allow citifies to enact more stringent policy than state law.

Muchas gracias,

Krista Romero-Cardenas
NSF CAMBIUM Fellow | PhD Student
Natural Resource Studies | University of Arizona

“We live in an age of information, but not one of ideas. We need to learn to think big.” *– Dr. Joel Olson*

Compilation of All Public Comments (4_27_2026)

Date	Name	Organization (if applicable)	Source	Comment
2/24/2026	Daniel Dempsey		Email	For definition, the energy or water required seems like a better metric for determining a data center than ft2. Or maybe a combination of metrics. Something like >50,000ft2 or >20MW electric service or >X ccf of water. We also want to be careful of the language “with the same controlling ownership interest” since that is so easy to play games with. What if different parts have different controlling ownership? Does control require ownership? What if they hide control through NDAs? That’s actually a good additional disclosure requirement: who has an ownership or controlling interest in the layers of shell companies? Also, I don’t know what M&C goals are but here’s a recent example of other munis attempting to kill infrastructure they don’t like using large setbacks. I think something similar was done for dispensaries. https://www.themesatribune.com/news/utilities-rap-mesa-s-ok-of-battery-facility-setbacks/article_3cb04d1f-6620-4793-b923-96f9510372dc.html
2/24/2026	Carissa Sipp and Dan Hunt		Email	We attended the disappointing zoning meeting last Thursday. We have reviewed the advisory committee notes, the board for advisory and the 'proposed' zone requirements. Quite honestly we feel like deja-vu. This process, the panel and the proposed recommendations are out of step with everything that it should be and the 'experts' from the data centers perspective are widely out of touch salesmen not bases in the reality of the technology, power use or algorithms. We honestly don't know where start - so much needs to be corrected, fix and set up to protect Tucson. When pressed about what the committee would do with our feedback, the panel would not commit to hearing us or even truly listening. Why then have these meetings? The Y/N is a joke and the fact the recommendations were released just before the meeting- come on. The fact Tucson thinks 400ft may be 'ok enough' for a 50000 sq ft data center is just the start of what is so wrong with these recommendations. This alone shows so much is not well thought out or even understood by the zoning committee and how they are unwilling to even really try to do the right thing. Basic breakdown of just power needs for a rack in a data center (est with only 10 servers): 10 AI servers x 2.2kW (assume Gen12A) 5 HS Switches x 750W 1 KVM + swtich x100W 3 PDU x 6W Firewall 720W 2x Memory (1PB, min need) x 3160W Therefore one rack is maybe 231kW and assuming a 10000 st ft facility - this could be as many as 5000 servers. So, you are running 115MW easy just from the computing equipment easy. Then the 30deg delta from bottom to top server with the ambient need for 25C for the 'uP' means you have the cooling in the lab blowing (possibly) at 50F IN THE DESERT. We believe you as leaders need to address this immediately and discuss this fiasco again with the town manager.
2/23/2026	Daniel Dempsey		Breakout Room Feedback	We need disclosures on what infrastructure is required by the utilities to service the data center, who is paying for it, and how they are paying for it. It turned out that a lot of the public presentation by Project Blue was false. They were not paying the whole cost. Ratepayers were paying the cost and so long as Project Blue paid rates, it was paying the whole cost. The problem lies in when Project Blue does not use enough resources to cover the cost of developing those resources. That becomes a subsidy. Or, if it abandons the project at year ten when the infrastructure takes 30 years to pay off through rates. The $40m in security was but a fraction of the $1b in new generation and transmission infrastructure needed. These sorts of deceptions are hard to see without disclosures. And none of it is proprietary.
2/23/2026	Natalie Shepp		Breakout Room Feedback	The energy demands of data centers are not compatible with the City or County Climate Action Plans because new energy generation will be needed, likely with some new natural gas which is not conducive to net zero by 2050 goals. In addition, a large number of generators needed for back-up will likely contribute to ozone and particulate matter air quality impacts. Research at ASU shows that temperatures near data centers can be 3-5 degrees hotter. Therefore, hyper scale data centers are inappropriate for the City of Tucson.
2/25/2026			Email	Hello and good morning I attended Monday night's virtual meeting, and during my breakout group I feel what I said was misrepresented based on a another community member who spoke after me. What I was addressing is not, under any circumstance, related to the no-evidence-based, anti-renewable-energy conspiracy known as "turbine sickness." This was a misinformed person who implied that my information on the effects of infrasound measured around data centers is an equivalent to a debunked conspiracy theory. I was not discussing "vibrations" or radiation. There was also a woman who is in the industry with many good points that she addressed about "regulating" data centers, but we must acknowledge the financial insentive this person has to the continued expansion of data centers. I think as a whole the city pushback has failed to address that we have awareness that data centers are necessary, and the purpose of AI tools in some capacity in general. The mass expansion for generative AI is not equivalent to cloud centers used for social platforms and streaming services. Even AI technology that benefits the world through science, math, and medicine does not need to be to this scale. Especially not the desert. 2 miles from a residential area is not enough distance, and too close under any circumstance. When I discussed infrasound these tones are notable near large data centers as well as oil and natural gas pipelines. Not cell towers or wind turbines. The main things I wanted to discuss were outside of scope, which I will be bringing up at future public hearings. Those being a) the AI bubble b) costs passed to consumers for electricity is undeniable and universal. If you are curious about some infrasound information I have attached a few video essays as studies are limited. I know how that sounds, but I ask for these not to be disregarded as being without merit without giving them all a watch. They are well researched, tested clearly, and with plenty of easily verifiable information. I have also included a video of them hacking flock cameras which is also important for council to be aware of. I know that is not zoning either, but please pass this information to relevant parties if possible once you have determined legitimacy from your perspective of their research and testing capabilities.Infrasound:-https://youtu.be/zy_ctHNLan8?si=qalHIYboQA8iWS76-https://youtu.be/UTvr8L5v8u8?si=SIvII-_8xg7TfnO2-https://youtu.be/_bP80DEAbuo?si=qA9UueFeQ8jEb0QtMass Surveillance:-https://youtu.be/uB0gr7Fh6lY?si=xnLzq3IeAOyROEf6

Attachment F

Feedback Received on Large Scale Datacenters (3_12_2026)

2/24/2026	Vivek Bharathan	Email	I'm wondering if you can send us info about the data centers currently operating in Tucson and their energy and water use?
2/19/2026		Survey 2.19 Q1	What are some comparable examples? How big in sq ft are current Tucson data centers?
2/19/2026		Survey 2.19 Q1	Appears due deligencr has been done
2/19/2026		Survey 2.19 Q1	I reject the assumption that a data center is inevitable here in Tucson.
2/19/2026		Survey 2.19 Q1	Size threshold should be lower than 50,000 sq. ft.
2/19/2026		Survey 2.19 Q1	I understand all the processes put in place, but I do not think there should be any data centers ever.
2/19/2026		Survey 2.19 Q1	Zoning have to address changes of new technology.
2/19/2026		Survey 2.19 Q1	More restrictions of the zoning review process. Run them like planned parenthood, hallway size requirements, bathrooms, ceiling height
2/19/2026		Survey 2.19 Q1	Technology changes, it should be based more on power consumption and environmental impact. Review process with no public health input or participation on TAC is bad
2/19/2026		Survey 2.19 Q1	Where are the current data centers in Tucson? How big is the biggest?
2/19/2026		Survey 2.19 Q1	Comment: too small a notice radius due to AQI and data center should be greater than 10000 NOT 50000
2/19/2026		Survey 2.19 Q1	You need to include energy usage as well the size requirement. Community should b all of Tucson
2/19/2026		Survey 2.19 Q1	Review process: notice bubble should be broadened- 10 miles at least. Those notified should include all residents and business including renters, not just owners. The definition should be broader and include land use by multiple owners and users not just one interest. The last sentence should read "or" not "and" processing
2/19/2026		Survey 2.19 Q1	I appreciate the definition, however I would like the definition should cover more the active requests and processing. As well as some of the requirements for data. And expected data requests. I like the review process. The one issue would have been a clearer understanding of the I2 zone and impact on human, wildlife, and general ecological impact. And a research plan to examine and communicate it. That said, I like the definition.
2/19/2026		Survey 2.19 Q1	The zoning and review process should include a public vote by those effected by associated power and water price increases.
2/19/2026		Survey 2.19 Q1	Data centers are incompatible with climate and environmental sustainability, including land use, water use, and energy use. There is no way to manufacture water out of thin air nor is there any way to mitigate excessive and unsustainable water use. There is no way to offset carbon from such an intensive use.
2/19/2026		Survey 2.19 Q1	Please protect us from data centers
2/19/2026		Survey 2.19 Q1	Glad you are asking residents and property owners for their feedback.
2/19/2026		Survey 2.19 Q1	Your lack of direct QA casts in doubt your commitment to communal consultation.
2/19/2026		Survey 2.19 Q1	Moratorium on all hyper-scale Data Centers!
2/19/2026	Emma Nichols	Survey 2.19 Q1	Bigger Notification Zone (5 miles)
2/19/2026		Survey 2.19 Q1	definition should remove the term "remote" - due to the outsized impact on a community, notices and meetings arent enough, the project should require a vote from the residents (look what happened with project blue)
2/19/2026	Admir Quraishy	Survey 2.19 Q1	when it comes to data centers, it should cover data-usage, memory, processing, and traffic management. Regading zoning review, I'd like to have seen more discussions on ecological impact, and how those would be measured. The definition should cover ecological, and human/ property disruption
2/19/2026	Diane Marzonie	Survey 2.19 Q1	2 miles is not enough spare
2/19/2026	Hanna Egan	Survey 2.19 Q1	more restrictions, 5x5 dimension max, only wind/solar energy
2/19/2026	William Wilkening	Survey 2.19 Q1	Definition should include power & water (total cooling and power generation method) numbers (you may not do anything differnt but at least you would make developer to document numbers to get around state limits)

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026		Survey 2.19 Q1	this is nothing but manufactured consent we made it clear how tucson feels about data centers a poject blue. You're trying to educate us . we know. where is the size maximum? Proposal- No data center zoning?
2/19/2026	Carol Price	Survey 2.19 Q1	Is there a referendum process if the public disagrees w/ the mayor + council decision? want to make sure a data center doesnt sneak in parts by building it in smaller sections that dont meeting the efinition therefore sneak in under the wire; the notification area seems woefully small. what is the usual way council agendas ae shared? Do we have to work hard to hear about agenda items or are they widely disseminated?
2/19/2026		Survey 2.19 Q1	power matters, not just size/ 1.5 oz 2 miles is not sufficently large of a notification area
2/19/2026		Survey 2.19 Q1	The definition should have a lower threshold- much lower; the process should have more public review + engagemetn (including this info session); The proposed notification area for neighborhood meetings + public hearing is way too small. Same for associations. Theres no info about how/when neighbors + the public would be informed
2/19/2026		Survey 2.19 Q1	glad you are having neighborhood meetings and public meetings
2/19/2026	Saul Ramirez	Survey 2.19 Q1	please have meetings like this in Spanish too. A large population of Tucson, residents are spanish speking residents
2/19/2026	TF Johnson	Survey 2.19 Q1	Dont lie, this is about Project Blude, and if if it wasnt prepartion implies construction, we say no. If you wanna bitch about NMBYS, bitch about whoevers preventing hihg-speed rail. when the bubble pops this will fuck us. the process is way too fast
2/19/2026	85719	Survey 2.19 Q1	contigous site & ownership questions; a good stat (expanded notice good but the limit for PHs is NOT ADDRESSED); 1) Seems like the provisions for "contigous" site & Controlling ownership will allow companies to make work arounds to avoid regulation 2) Currently our high paid mayor 7 council limit public hearings to 1 hour that is totally inadequate for issues as impactful as water & energy guzzling industries it is insulting to their consituents to limt the time for public hearings.
2/19/2026		Survey 2.19 Q1	notice and add 3 more meetings; incurese notice to the whole city bc data centers are gong to use water from all of the watershed I do like is not right to build
2/19/2026	Dominik Soto	Survey 2.19 Q1	I believe that as much of the surrounding area should be notified and should have a chance to understand how they may be affected; The Public should have the final say. and if the public follows our best interest. Data Center will not be built. Definition notes: I agree with exausted definitions to limit explotiation.
2/19/2026	Jessica Ramirez	Survey 2.19 Q1	Will the people have an ability to actually speak? Will our voices be heard? If the public does not want this, will that be considered? Is there a possibility these centers arent built?
2/19/2026		Survey 2.19 Q1	Any Guarantee decision-maker listen to the public? What are sensitive areas? How will noise & scale & other impacts be defined? Tucson's values are no data centers, that should be the core of all regs. Community impact evaluted in "proposed zones" How does neighborhood meeting influence process? Can they say no? Will neighborhood meetings be accessible?
2/19/2026		Survey 2.19 Q1	A proposed data center should be put up for a vote. Power & water users effected by associated price increases & outages should be allowed a say on whether the data center is allowed.
2/19/2026	Adrian Fernandez	Survey 2.19 Q1	2, 40,000 sq ft centers or smaller would no be under these regulations? Can you give examples of current data centers in our city, county, state? (was addressed by speaker)
2/19/2026		Survey 2.19 Q1	there may be much larger data centers wiht associated infrastructure support facilities and "gigafactories" That may be adjacent to the data center. maybe need a "meage" data center designation. For anything over say 1,000,000 sf in total buildings(s) footprint.
2/19/2026		Survey 2.19 Q1	the tac was flowed from the beginning. why are TEP and others who will profit off data cents included? Having feedback only in writing is not democratic and transparent. People want to hear others comments and questions. Appreciate the language to prevent segmentation.
2/19/2026		Survey 2.19 Q1	Its not the size that counts its the energy it consumes. we want this to be more prohibitive.
2/19/2026		Survey 2.19 Q1	50k is enormous, it should be 1/2 or a 1/4 that size
2/19/2026		Survey 2.19 Q1	yes except size threshold should be 50K sq ft- maybe 35 sq ft
2/23/2026	William Craig	2_23 Registration Comments	What role does a Data Center hold in a desert community where water is a major issue and energy is already being priced beyond the reasonable access of this poor community? to keep it running are minimal
2/23/2026	William Craig	2_23 Registration Comments	After it has been built the number of jobs needed to keep it running are minimal
2/23/2026	Carissa Sipp	2_23 Registration Comments	NG is not a ‘green’ energy. There is no reason to not demand backup via solar and battery storage.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Carissa Sipp	2_23 Registration Comments	there should be demand for solar infrastructure on the roof I have more comments
2/23/2026	Carissa Sipp	2_23 Registration Comments	corrections to the note in from the committee
2/23/2026	Stella smith	2_23 Registration Comments	I am interested in all areas not only one area of concern re data centers.
2/23/2026	Coral	2_23 Registration Comments	Arizona may have the very short end of the stick for CAP water, especially Tucson. ANY extra water demands are especially important to consider as we seek water solutions to keep up with the existing people, homes and businesses. Not NIMBY, just cautious!
2/23/2026	Priscilla Watts	2_23 Registration Comments	Limited energy useage and rate increase to residence
2/23/2026	Charles Spann	2_23 Registration Comments	Why is still on the table the citizens have already said no way to this p
2/23/2026	Mark Roxburgh	2_23 Registration Comments	Are they going to supply there own energy and not make our electricity prices skyrocket??
2/23/2026	lee stanfield	2_23 Registration Comments	We cannot afford to allow data centers access to any of our water, either directly OR INDIRECTLY via TEP!!!. We are already in the midst of an unprecedented drought that is predicted to continue to worsen for decades!
2/23/2026	Hollis Toal	2_23 Registration Comments	There is probably no way a large data center can operate in Tucson without depriving the surrounding community of absolutely critical water and energy requirements, and raising utility rates for everyone.
2/23/2026	Jeff Lynch	2_23 Registration Comments	I find all of you in contempt of not responding to the negative views of the public that have already been voiced on this subject. My feeling is that all of you should be recalled! This matter isn't rocket science!
2/23/2026	Carol Huggins	2_23 Registration Comments	What safeguards are there regarding energy costs and water usage?
2/23/2026	Megan Lucin	2_23 Registration Comments	Thank you for the opportunity to be a part of this conversation.
2/23/2026	Amber Hall	2_23 Registration Comments	Why are you building a data center in the desert when the future of our water and energy resources is already so uncertain? This is a cruel and unnecessary use of those resources and you know it.
2/23/2026	Laura Anderson	2_23 Registration Comments	I'd like no data centers in Tucson, but if that ship has sailed, we need to make sure we don't end up like the other cities without reliable running water. Don't let Pima County become the new Newton County, GA!! https://youtu.be/DGjj7wDYaiI
2/23/2026	Kathleen Wilber	2_23 Registration Comments	Why should our quiet beautiful area be sacrificed to increase profits for the top four data center investors: Amazon Web Services, Microsoft Azure, Meta Platforms and Google Services. There will be environmental damage, noise pollution, increased traffic.
2/23/2026	Sheila McBride	2_23 Registration Comments	Plan to not pass on extraordinary Energy demand on to residents and businesses. Plan to refuse data centers in the desert. Plans to prevent contamination of environment if coolant is proposed instead of water.
2/23/2026	Nic Adams	2_23 Registration Comments	Against Data Center. Not enough jobs, too much strain on local ecology. We literally don't have the water to sustain this nor do citizens want to carry the burden of increased utilities to give IT companies tax breaks. NO. Absolutely NO.
2/23/2026	Adena Bank	2_23 Registration Comments	Having data centers in this area is absolutely insane. Our water is in peril. We have no business doing anything to risk any more water and energy uses. Say absolutely no to this.
2/23/2026	Christopher Kloeppinger-Todd	2_23 Registration Comments	Based on historical data, what major realistic, proven long-term benefits can a large-scale data center provide outside of short-term contracts for large construction outfits and low-pay facility jobs, that could justify the risk and expense to the region

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	kristin eberhardt	2_23 Registration Comments	Convince me this won't affect Tucson's infrastructure - water, electricity, etc.
2/23/2026	john divjak	2_23 Registration Comments	What will this Data Center benefit the people of this area, in ways that will make this a better place to live? A large percentage of citizens moved to this area for retirement, pollution free air, and a peaceful, noise-free environment.
2/19/2026	Dan Hunt	2_19 Registration Comments	Statements in the meetings are misguided. Working tangential to data centers world wide there should be adoption from China and the EU for better data center zoning and environmental impact. There is no note on construction our requirements on energy efficiency (PDU) or e-waste. Energy loading (specifically to AI) should be of note and TEP should not be at the table but community experts.
2/19/2026	Carissa Sipp	2_19 Registration Comments	Many statements in the meeting notes from the 'experts' on the 'committee' seem to be misguided and there is a misunderstanding in AI/ML and the HW/infrastructure as well as power loading, jobs provided. Natural gas is not a green generator. There is new battery technology in EVs in China that has thermal stability- these are cheaper (Na+ battery technology). There are papers from MIT and this battery technology is production ready. These zoning requirements should require this technology and there is no reason to not contain or stop generators from running with a proper establishment of backup - true renewable. The team making decision should look to China's build out requirements (truly pushing for energy efficiency and environmental protection). The EU is also releasing standards and policies the team should review- to be released Q1 2026. The efficiency of any power to these centers in such heat is ridiculous. The thermals of the GPUs, TPUs, ASICs and CPUs (varies by customers) creates a tremendous burden on power and water. There is no reason to have a data center in Tucson of hyper scale capacity and there should be a 1 yr moratorium on anything until voters can decide on regulations. A panel of corporation reps and a few community members who may not understand systems we need to constrain is not adequate.
2/19/2026	Lanie Herrera Lally	2_19 Registration Comments	I am worried about water usage while we are in a water shortage in the desert.
2/19/2026	Donald Ries	2_19 Registration Comments	I have questions: Are these large facilities being required to generate a significant portion or all of the electricity they use? Where will the water they use come from? How will their water use affect our ground water and CAP water?
2/19/2026	April	2_19 Registration Comments	There should be an area of interest for just banning large scale data centers outright, you'd probably get a lot of signups
2/19/2026	Jon Ralston	2_19 Registration Comments	The Colorado River is in decline and there is no agreement among states that use the Colorado River. NASA satellites show Arizona aquifers are in decline. Why are we wasting water on cooling and power generation for data centers?
2/19/2026	Reed Spurling	2_19 Registration Comments	I am worried that this public input process is intended to manufacture consent for something that many in Tucson do not want at all. For example, my primary area of interest here—banning large data centers in the city—is not listed on this form. Banning large data centers entirely through zoning might be necessary to adequately protect our water and our electric grid given the circumstances, but this deserves more discussion.
2/19/2026		2_19 Registration Comments	Though I am unhappy with being siloed, I selected "Energy and Water Use" because I want to see enforceable limits on how much water and energy data centers in Tucson are allowed to use. Please take a look at this year's Colorado River snowpack data [https://graphs.water-data.com/ucsnowpack/], then decide for yourself whether you think our city will need to use more water or less water over time. We cannot support large data centers without sacrificing other more useful things.
2/19/2026		2_19 Registration Comments	Please continue to listen to as many Tucsonans as possible and continue to reform your processes so that the field is no longer tilted in favor of wealthy developers. I am paying attention to Mayor and Council and City Management's entanglements with corporations and I am ready to call them out as necessary.
2/19/2026	Betsy Wilkening	2_19 Registration Comments	Will the public have time to speak? Why was No Desert Data Center Coalition not provided a place for speaking?
2/19/2026	Kathryn Anderson	2_19 Registration Comments	Yes, I have questions. No accommodations
2/19/2026	Leonna Sierra	2_19 Registration Comments	Will there be a ASL interpreter?
2/19/2026	Reyes	2_19 Registration Comments	Data centers have no place in a Desert during a water crisis. Why are we exploiting our finite resources for limited monetary gain. We will not be able to afford desalination/decontaminated water costs when we run out of fresh water.
2/19/2026	Hanna Egan	2_19 Registration Comments	No water for data centers

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Julia Guglielmo, SW Decision Resources	2_23 Zoom Poll	Need more information about what setbacks are standard and comparisons with existing plans and projects
2/23/2026	lee stanfield	2_23 Zoom Poll	We need to do everything possible to stop all big data centers from locating here.
2/23/2026	Vivek	2_23 Zoom Poll	Setbacks don't matter. We need a minimum distance a data center can be from zoned residential. Like 20 miles
2/23/2026	Kya	2_23 Zoom Poll	On the proposed setback? Increase the distance.
2/23/2026	Nicole Hagedorn	2_23 Zoom Poll	This is far too small of a setback for both residential and commercial buildings given the pollutants given off by data centers and corresponding health concerns.
2/23/2026	Stella smith	2_23 Zoom Poll	We are being sold out to consider having data centers at all. We DO NOT have the wter resources that most comunities have and should NOT be selling out those resources to DATA Centers that can go ANYWHERE ELSE in the US.
2/23/2026	Beth Lehr	2_23 Zoom Poll	These proposed centers would be HUGE. There needs to be a distance measured more than hundreds of meters.
2/23/2026	Miriam Robles	2_23 Zoom Poll	we dont want data centers
2/23/2026	Heather Pruzan	2_23 Zoom Poll	Not set back far enough
2/23/2026	Daniel Dempsey	2_23 Zoom Poll	I think Chandler or Mesa just implemented a 1,000ft setback for new battery systems.
2/23/2026	Susan Tiss	2_23 Zoom Poll	Residential setbacks should be 800 to 1000 feet or more. But really we just shouldn't have them in any residential area at all.
2/23/2026	Bev Paul	2_23 Zoom Poll	What if they are not allowed within 25 miles away w/private wells
2/23/2026	Megan Martin	2_23 Zoom Poll	We can't even be considering putting something like this near schools or homes. It's shown these centers do damage to public health. Look up what is happening in Virginia (data center ally) we cannot do this, it is no where near appropriate.
2/23/2026	Eric Klingberg	2_23 Zoom Poll	Noise pollution from data centers have been shown to reach 2.5 miles+ away. This seems WAY too close.
2/23/2026	Megan Milton	2_23 Zoom Poll	The citizens of Tucson do not want any data centers.
2/23/2026	Priscilla Watts	2_23 Zoom Poll	what about lights, signage, etc?
2/23/2026	Erin Harris	2_23 Zoom Poll	What is the setback from industrial zoning or uses?
2/23/2026	Patricia Piasecki	2_23 Zoom Poll	i think it should be at least a mile
2/23/2026	Wil Schuiteman, AIA	2_23 Zoom Poll	400-ft is NOT FAR ENOUGH!!!!!!!!!!
2/23/2026	Jon Ralston	2_23 Zoom Poll	Ban hyperscale data centers
2/23/2026	Vivek	2_23 Zoom Poll	The definition needs to be based on energy use not area
2/23/2026	Kya	2_23 Zoom Poll	There needs to be more focus on energy use
2/23/2026	S. Vandergriff	2_23 Zoom Poll	how was the sq feet of 50,000 determined?
2/23/2026	Stella smith	2_23 Zoom Poll	the moe public review the better. one public meeting is not enough. should have 3 or 4
2/23/2026	Paul Stapleton-	2_23 Zoom Poll	Here is the question that I posted in my registration links: "Will we define and commit to requiring a Community Benefits Agreement, with succession clauses and enforcement mechanisms with all development entities? Thank you for this public meeting opportunity."

Feedback Received on Large Scale Datacenters (3_12_2026)

	Smith, Arizona CD6		
2/23/2026	Raye Winch	2_23 Zoom Poll	I do not see anything here that looks at the amount of water and electricity used and takes into context how that would impact city residents (both human and beyond human)
2/23/2026	Miriam Robles	2_23 Zoom Poll	We don't want data centers
2/23/2026	Heather Pruzan	2_23 Zoom Poll	More notice to all neighbors not just hoa
2/23/2026	Daniel Dempsey	2_23 Zoom Poll	“Same controlling ownership” could be manipulated, no?
2/23/2026	Susan Tiss	2_23 Zoom Poll	Large scale is 10,000 square ft or more
2/23/2026	Kathleen Dreier	2_23 Zoom Poll	Just look at the questions in chat to see
2/23/2026	Carissa Sipp	2_23 Zoom Poll	The largest size shows a misunderstanding from both the advisory council and the town on AI, data center architecture. This is ridiculous
2/23/2026	Dan Hunt	2_23 Zoom Poll	Definition is way too large. Should be 5000 sq ft
2/23/2026	Reed Spurling	2_23 Zoom Poll	The notification area should be 20 miles in radius
2/23/2026	Megan Martin	2_23 Zoom Poll	The questions surrounding water and energy are not being answered clearly enough to feel confident in zoning proposal. Not to mention the consistency of not listening to the public. There should not be a data center here.
2/23/2026	Eric Klingberg	2_23 Zoom Poll	Noise pollution from data centers can extend beyond two miles. I recommend sending mail further than that radius.
2/23/2026	Erin Harris	2_23 Zoom Poll	If a data center proposal is located in I-2 and meets ALL regulatory requirements re: zoning, setbacks, water use, electricity, everything... why is it still discretionary?
2/23/2026	Victoria Sammons	2_23 Zoom Poll	There is so much damage being done by these centers in other states and no one is looking into the long term impacts. What are you doing to prevent data centers from taking on a "we will fix it later" mentality?
2/23/2026	Rachel Cook	2_23 Zoom Poll	My family and I do not feel satisfied that a defining the data center in this way will protect us from environmental/health issues as a result of their building them in our area
2/23/2026	Patricia Piasecki	2_23 Zoom Poll	there should be greater distance of notification
2/23/2026	Wil Schuiteman, AIA	2_23 Zoom Poll	Notice should be a 1 mile radius
2/23/2026	Jon Ralston	2_23 Zoom Poll	Ban hyperscale data centers
2/23/2026	lee stanfield	2_23 Zoom Poll	No one has yet answeredmy question about TEP’s water usage directly from the aquifer?
2/23/2026	April	2_23 Zoom Poll	You are not taking into account current customers and how they will be affected, i.e., rates, current action plans, and health outcomes.
2/23/2026	S. Vandergriff	2_23 Zoom Poll	How would violations of the regulations be addressed/handled?
2/23/2026	Nicole Hagedorn	2_23 Zoom Poll	WE DO NOT WANT DATA CENTERS AT ALL IN TUCSON. WE WANT THE CITY TO BACK UP RESIDENTS AND REJECT ALL PROPOSALS. THE PROPOSED REGULATIONS SHOULD REFLECT THAT.
2/23/2026	Stella smith	2_23 Zoom Poll	should be more restrictive. why do we need to have ANY data centers??? Evidently mayor and council made their own personal decisions about this without sufficient public input on whether toallow these things AT ALL
2/23/2026	Raye Winch	2_23 Zoom Poll	I believe both should take into account the impact that the amount of water and energy use would have on human and beyond human life. Not just to evaluate how much conservation is incorporated into the plans, but how will this energy and water use affect life and the long term viability of life in the region

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Mark Estes	2_23 Zoom Poll	Please include the resolutions offered by Beal Infrastructure to the town of Marana so that Tucson residents can be informed about how Beal Infrastructure intends of easing the communities concerns
2/23/2026	Miriam Robles	2_23 Zoom Poll	Absolutely Not, we need detail how the power will be generated, who will pay for that infraestructure, we need renewable energy.
2/23/2026		2_23 Zoom Poll	In terms of water usage, none, not one drop of our valuable water.
2/23/2026	Daniel Dempsey	2_23 Zoom Poll	Need more disclosure around what new infrastructure is required. Who is paying for it. How they are paying for it.
2/23/2026	Susan Tiss	2_23 Zoom Poll	We should not have large-scale and hyper-scale data centers here. They don't fit in this environment. We don't have the resources to support them and also support the population. Why won't you listen to us when we tell you we don't want this?
2/23/2026	Kathleen Dreier	2_23 Zoom Poll	Review chat comments
2/23/2026	Bev Paul	2_23 Zoom Poll	NO data centers. Period.
2/23/2026	Megan Martin	2_23 Zoom Poll	A data center here just does not make sense. We don't have the water resources, period. We also can't get clear answers about how this will effect energy use AND water use with TEP. This isn't going to just do nothing, it's a large center that requires tons of resources and we cannot provide it.
2/23/2026	Megan Milton	2_23 Zoom Poll	No resources for data centers. We do not want it.
2/23/2026	Rachel Cook	2_23 Zoom Poll	they are wholly insufficient and should have been set before the beale data center was even proposed!!!!!!
2/23/2026	Wil Schuiteman, AIA	2_23 Zoom Poll	More data needs to be collected, analyzed first.
2/23/2026	Jon Ralston	2_23 Zoom Poll	No water for hyperscale data centers directly or indirectly (i.e. via TEP)
2/23/2026	Julia Guglielmo, SW Decision Resources	2_23 Zoom Poll	Need more info about amount of noise centers are expected to make, as well as other anticipated impacts
2/23/2026	Vivek	2_23 Zoom Poll	https://www.youtube.com/watch?v=_bP80DEAbuo please watch this!!!
2/23/2026	Kya	2_23 Zoom Poll	What is the maximum allowable level being considered? What about high pitched sounds and vibrations?
2/23/2026	S. Vandergriff	2_23 Zoom Poll	How will offences be enforced? How will any of this be enforced?
2/23/2026	Stella smith	2_23 Zoom Poll	The City has SO MANY environmental regulations currently that they don't enforce because they don't hire people to check or to enforce ocmplaints. The enforcement regulations here may be passed but totally mean absolutely noTHInG. TO CITIZENS.
2/23/2026	Natalie Shepp	2_23 Zoom Poll	There should be limits on the number of generators
2/23/2026	Julie Dittmer	2_23 Zoom Poll	Would the City consider requiring a developer-funded public health impact assessment for large-scale data centers, similar to required traffic or acoustic studies, to evaluate heat, air quality from generators, noise-related health impacts, and emergency service impacts?
2/23/2026	Raye Winch	2_23 Zoom Poll	Can you share more context on noise, such as a public health analysis of noise impact and an environmental impact on noise on wildlife? I don't think I have enough information from this presentation to make a determination
2/23/2026	Beth Lehr	2_23 Zoom Poll	The noise level isn't specified.
2/23/2026	Divinity Caldwell	2_23 Zoom Poll	Not specific enough, not adequate protections l. Still to vague, how would users define an emergency? Stricter language should be used
2/23/2026	Miriam Robles	2_23 Zoom Poll	Bloom Energy is the latest battery backups, causes zero noise.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Andi Faulkner-Harrison	2_23 Zoom Poll	does not address infrasound
2/23/2026	Daniel Dempsey	2_23 Zoom Poll	What are setbacks on generators?
2/23/2026	Susan Tiss	2_23 Zoom Poll	These regulations don't go far enough, don't call out actual standards for level and type of noise, and they do include no info about what the penalties would be.
2/23/2026	Reed Spurling	2_23 Zoom Poll	Require all applicants to supply 1) noise modeling assumptions, 2) an expected decibel contour plot, referenced to a specific sound pressure, 3) an expected frequency spectrum, and 4) an expected heat map of frequency vs power
2/23/2026	Sarah Rotenberger	2_23 Zoom Poll	what constitutes allowed emergency use? how is "emergency" defined and by whom?
2/23/2026	Megan Martin	2_23 Zoom Poll	https://youtu.be/t-8TDOFqkQA?si=o6QPXcNNjvDm90Dh
2/23/2026	Megan Milton	2_23 Zoom Poll	There is no information regarding the level of noise that we're talking about?
2/23/2026	Victoria Sammons	2_23 Zoom Poll	This is not adequate or appropriate for the areas. How will this be enforced? Which 400ft away neighborhood are you willing to watch get destroyed? I can have one drone ruin a whole hiking experience and those are not very loud.
2/23/2026	Rachel Cook	2_23 Zoom Poll	are current data from large and hyper scale data centers around the country being included in the research for this regulation? does topography specific to the desert affect this compared to other areas where data centers are located?
2/23/2026	Wil Schuiteman, AIA	2_23 Zoom Poll	Require ALL Data Ctrs. to have roof-mtd. PV systems to store energy rather than using any type of fossil fuels.
2/23/2026	Jon Ralston	2_23 Zoom Poll	Ban hyperscale data centers
2/23/2026	April	2_23 Zoom Poll	You're allowing acres of impervious pavement that run-off
2/23/2026	Kya	2_23 Zoom Poll	20ft is so little.
2/23/2026	Nicole Hagedorn	2_23 Zoom Poll	As someone mentioned in the comments, heat generated from data centers is not being taken into account here.
2/23/2026	Stella smith	2_23 Zoom Poll	nOT RESTRICITEVE ENOUGH. no GUARANTEE OF ANY ENFORCEMENT EVEN IF ESTABLISHED. THE CITY IS VERY POOR ON KEEPING MANY OF ITS PRIOR COMMITMENTS RE ENFORCEMENT
2/23/2026	Julie Dittmer	2_23 Zoom Poll	I need time to analyze each standard and look at other standards to compare - is there a way to have meeting materials and then give feedback?
2/23/2026	Raye Winch	2_23 Zoom Poll	I believe any landscaping and buffering standards must include a thorough analysis on potential health impacts and should include a required public health analysis
2/23/2026	Beth Lehr	2_23 Zoom Poll	20 feet of landscaping does not take the place of an acre worth of an ecosystem.
2/23/2026	Susan Tiss	2_23 Zoom Poll	No data centers of these sizes are appropriate and no amount of landscaping will make them appropriate.
2/23/2026	Reed Spurling	2_23 Zoom Poll	Require continuous tree cover over 100% of each lot, seriously
2/23/2026	Sarah Rotenberger	2_23 Zoom Poll	would like to see required landscaping as a percent of total land usage
2/23/2026	Eric Klingberg	2_23 Zoom Poll	I like the inclusion of rain capturing, but a 50,000+ acre huge building with 20ft around it in landscaping seems disproportionate.
2/23/2026	Megan Milton	2_23 Zoom Poll	Slapping native plant landscaping on this public safety and health hazard is a joke. Why not plant some palm trees while we're at it?
2/23/2026	Victoria Sammons	2_23 Zoom Poll	I don't even know how to process this comment as it is just so terrible for the environment and trying to make these regulations is like paving over the Desert Museum for more parking lot.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Wil Schuiteman, AIA	2_23 Zoom Poll	Data Ctrs. need to be held at a higher standard than ANY Commercial project. 20-ft buffer is a joke! Stormwater use should be set @ 80%.
2/23/2026	Jon Ralston	2_23 Zoom Poll	Ban hyperscale data centers
2/19/2026		Survey 2.19 Q2	We should not have data centers in a place that can barely support what it already has there.
2/19/2026		Survey 2.19 Q2	What is your stance on co-locations and Power Coupling?
2/19/2026		Survey 2.19 Q2	Both open and protects - good job
2/19/2026		Survey 2.19 Q2	A little concern data centers will find a way to not report real water usage
2/19/2026		Survey 2.19 Q2	Make the rules as restrictive as possible
2/19/2026		Survey 2.19 Q2	The premise of this meeting that we want data centers and that they are acceptable/inevitable in our community is infuriating to me.
2/19/2026		Survey 2.19 Q2	As to both, demonstrated access should be not just time of application, but e.g. for 20-50 years minimum
2/19/2026		Survey 2.19 Q2	Must have ability to shut off water of violation of limits. Fines are not enough.
2/19/2026		Survey 2.19 Q2	On water, is the "no potable water" requirement only applicable to data centers that don't meet the threshold of large water user?
2/19/2026		Survey 2.19 Q2	What's to stop them from changing their intended energy use mix later? These regulations are weak
2/19/2026		Survey 2.19 Q2	We aren't even asking the right questions to get honest estimates on resource use. Even if we were, data centers aren't honest in their answers. Don't let data centers poison water with chemicals like PFAS. Tucson has already poisoned our communities water in the past and we can't even address current issues with PFAS. Tucson Water doesn't even know what pipes have lead in them. There needs to be punishment and accountability for violated agreements as well, they can't project usage and then overdraw later
2/19/2026		Survey 2.19 Q2	Where do I start. Water is used in energy thus there should be a plus in the regulation. Monitoring should be part of this as well. Need to add more comments but will provide be via email
2/19/2026		Survey 2.19 Q2	Even with regulations, we don't have the means or resources to let them be expendable for such a long period of time.
2/19/2026		Survey 2.19 Q2	No large data centers. Period.
2/19/2026		Survey 2.19 Q2	There is no accountability in here. As we have seen with Beale they will say anything to get what they want. They told ACC that nuclear is renewable. There is no big picture or accountability about the amount of water needed to produce energy. You should define renewables and make them provide energy locally through 100% renewable. Don't let them get by with just credits
2/19/2026		Survey 2.19 Q2	Don't use water that the desert doesn't even have
2/19/2026		Survey 2.19 Q2	don't steal water from a desert, a literal desert!!
2/19/2026		Survey 2.19 Q2	It seems to be a good start. I'm not sure what other standards might be needed
2/19/2026	Emma Nichols	Survey 2.19 Q2	they need to reuse water, use rain water, ground water, they will not use drinkable water. Solar power should be considered. no using our power grid
2/19/2026		Survey 2.19 Q2	Energy: should require protections for utility rate payers should require a percentage of energy from renewable sources & limit fossil fuels. should address nuclear (small scale) EMFs on-site and offsite should be addressed why no solar requirements? Water: need commtment to reduce use parallelll to reduced avalability
2/19/2026	Adamir Quraishy	Survey 2.19 Q2	Mainly Id like to see more regarding tucson offset cost, i.e. how to ensure a decrease in water prices and an effort to ensure that there is a limitation of impact on the average Tucson resident water cost. How will that responsiblity be borne by the data center
2/19/2026	hanna egan	Survey 2.19 Q2	no river ground water, no clean water, no generators no batteries no gas
2/19/2026	william wilkening	Survey 2.19 Q2	does large quanity use ordinance apply to private well user? how to hold developer to what they say they are going to use; again need to consider water use of power generator ; need to sue state to change to local control
2/19/2026		Survey 2.19 Q2	do you have any idea how much waver they use
2/19/2026	carol price	Survey 2.19 Q2	the requirement of adequate water supply is the main sticking point. In Arizona there is no such thing it will simply get less and less adequate as time goes on. Not sure how the large water user ordinacne can allow such high water usage w/o endangering the rest of the community

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026	lynn price	Survey 2.19 Q2	"proposed" and "adequate" are subjective and not enforceable
2/19/2026		Survey 2.19 Q2	ENFORCE this or it is meaningless
2/19/2026	Dravea	Survey 2.19 Q2	for data centers would not have access to potable water to cool off equipment energy use for them solar (aka no use of our power grid)
2/19/2026		Survey 2.19 Q2	what does applicant certifying access to adequate water supply "even mean when our city is located in a region experiencing extreme drought rising temperature and CAP limitation as the Colorado river dries up? where will the huge amounts of water that these centers will use actually come from? Our watershed and or other communities! Access to energy supply our shared grid and or energy generation that will use our water and pollute our environment (especially if not required to be 100% renewable without credits)
2/19/2026		Survey 2.19 Q2	afraid data centers will be violating water usage limits and just pay fines to get away with using more water.
2/19/2026	TF Johnson	Survey 2.19 Q2	If you want them to use energy have them use 100% rewnewable they gotta work for it. if you cant regulate energy mix they should income the water use on the sitc does not match up with the level of water scarcity and has too many loopholes
2/19/2026	85719	Survey 2.19 Q2	1) require solar or all rooftop of data center bed 2) Nothing pricing of energy and water use= as residential uses we are charged on a sliding scale where by more use equals higher prices large scale users must pay more or a scale that is comparable to residential users w/ regard to amount used. 3) huge scale users should absorb all cost associated w/ their impact on electrical and water infrastructure imposters needed for their use.
2/19/2026		Survey 2.19 Q2	I think they should be able to prove they can access an extra 75% I do like the prohibiting use of potable water
2/19/2026	Dominik Soto	Survey 2.19 Q2	Even with restrictions and regulations we do not have the resources to sustain a long running data center. We do not get our water back!
2/19/2026	Jessica Ramirez	Survey 2.19 Q2	7,480,000 gallons (or more) monthly average. we dont have the resources to consider this. what are the consequences to regulation being violated? Big tech companies can easily pay off fines so fines dont stop them.
2/19/2026		Survey 2.19 Q2	How will businesses be accountable to their conservation plans? Who defines respectufl water use? How are adequate enrgy & water supplies defined? Impact to citizens considered?
2/19/2026		Survey 2.19 Q2	energy: generator use is problematic
2/19/2026	Adrian Fernandez	Survey 2.19 Q2	The energy used and generated should be a public utility. If these centers are only going to grow (I mean they will want to build data centers in 5, 10, 20 years) what are is the cush? waiting and seeing how (the good and bad) of how other projects play out may be wise
2/19/2026		Survey 2.19 Q2	If you cant regulate energy use, source are cast the City should ban large scale data centers.
2/19/2026		Survey 2.19 Q2	Why cant demad mix from providers? Not one drop for data
2/19/2026		Survey 2.19 Q2	you want to require they show access to power/water but not the impact it would have on the resource or if the use would affect anyone else ie power goes up water deplited. Require nuterz or better resource usage is solar reclaimed water/ use
2/19/2026		Survey 2.19 Q2	should rquire demonstreated access to energy not only @ time application but for determined period of time, e.g ensuit. ditto re water but for much longer period e.g 50 years
2/19/2026		Survey 2.19 Q3	Not nearly enough for generator air pollution, noise, and heat produced
2/19/2026		Survey 2.19 Q3	No data centers in Tucson
2/19/2026		Survey 2.19 Q3	That’s not nearly enough. That is laughable and complete buffoonery. No data centers.
2/19/2026		Survey 2.19 Q3	To be honest, I wasnt listening. I was thinking of my QA questions
2/19/2026		Survey 2.19 Q3	Not large enough to address noise and other impacts.
2/19/2026		Survey 2.19 Q3	Will send email with feedback
2/19/2026		Survey 2.19 Q3	Good distance
2/19/2026		Survey 2.19 Q3	Make the setback the length of the property
2/19/2026		Survey 2.19 Q3	Not sure how long 200 or 400 feet is.
2/19/2026		Survey 2.19 Q3	Setbacks footage should be larger.
2/19/2026		Survey 2.19 Q3	Need more info on noxious range
2/19/2026		Survey 2.19 Q3	These large scale data centers shouldn't exist. If they do, the setbacks are not enough. Make the setbacks big enough to make sure the can't get built

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026		Survey 2.19 Q3	Ngl, this section was not clearly displayed. So I am unsure what was being communicated.
2/19/2026		Survey 2.19 Q3	Need to take into account the infrastructure like parking and any extra generators
2/19/2026		Survey 2.19 Q3	Details of noise generation and dampening from generators is unclear.
2/19/2026	Emma Nichols	Survey 2.19 Q3	increase setback
2/19/2026		Survey 2.19 Q3	no use of our power grid. please look into cleaner or greener power alternatives.
2/19/2026		Survey 2.19 Q3	these need huge setbacks - 400 ft & 200 ft are woefully inadequate
2/19/2026		Survey 2.19 Q3	Noise: who pays for testing to verify levels are being maintained? How often is testing done? hwat hapens if levels are exceeded?
2/19/2026		Survey 2.19 Q3	Generators: Priority should be to use large- format battery (energy) storage such as vanadium flow batteries, etc paired with solar wind
2/19/2026	Aamir Quraisz	Survey 2.19 Q3	straight up dont know what is going on
2/19/2026		Survey 2.19 Q3	I'd like to see more requirements into reducing noise research. I.e. a tax related to funding. Data center and similar noise reduction requirements
2/19/2026	Diane Marzonie	Survey 2.19 Q3	400 ft is not enough. They should pick a space thats farther away from homes and businesses
2/19/2026		Survey 2.19 Q3	who chooses the members at the independent noise study. Variety of folks outside of the government/state/ adj employees
2/19/2026	Hanna Egan	Survey 2.19 Q3	More standards more rules we dont want this the whole project should be set back
2/19/2026		Survey 2.19 Q3	too loud youre letting them ruin our lives
2/19/2026	William wilkening	Survey 2.19 Q3	what about auxilary structures: parking, back up generation, fuel storage; pollution numbers at property line?
2/19/2026		Survey 2.19 Q3	Need to have correct D6 levles for creiteria
2/19/2026	Carol Price	Survey 2.19 Q3	Every design standard related to data center zoning should be the strictest & the highest standards to provide the most protection to our community our environment and our people over giving concessions to the corporations
2/19/2026		Survey 2.19 Q3	Again, the highest standards should be in place to protect humans + wildlife + the environment - low frequency noise can be very problematic
2/19/2026	Lynn Price	Survey 2.19 Q3	too small
2/19/2026		Survey 2.19 Q3	I dont personally know enough about decibles but looks convincing
2/19/2026		Survey 2.19 Q3	make the steback the length of each property, seriously
2/19/2026		Survey 2.19 Q3	you need a much better understanding of low-frequency noise generation
2/19/2026		Survey 2.19 Q3	ban all fossil fuel generators- we are in a climate crisis
2/19/2026	Dravea	Survey 2.19 Q3	600 ft for residential 400ft for office/commercial
2/19/2026		Survey 2.19 Q3	no use of the powergrid unless absolutely necessary
2/19/2026		Survey 2.19 Q3	The setbacks arent nearly enough- these centers dont belong anywhere in Tucson. I-2 zones are mostly on the southside + will impact the health of our communities because of the noise + pollution
2/19/2026		Survey 2.19 Q3	who's conducting the noise study? Do decibel limits at the property line refer to dba or abc? These centers produce a flat hum or low-frequency noise thats more often felt than heard over a wider area with signficant health impacts.
2/19/2026		Survey 2.19 Q3	The generators will use diesel gas - this will harm neighborhs and our climate. There should be no data centers using fosil fuels esp in the desert
2/19/2026		Survey 2.19 Q3	200 and 400 ft setback do not seem enough
2/19/2026		Survey 2.19 Q3	If parking area is smaller that means not enough people would get employed. noise travel different quiet times which would make noises at data centers more detectable
2/19/2026	TF Johnson	Survey 2.19 Q3	I dont trust like that
2/19/2026		Survey 2.19 Q3	natural gas generators are what makes it so bad in other locales. Thorium reactors or nothing, I can think of several engineers willing to agree.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026	85719	Survey 2.19 Q3	really depends on location & nearby zoning & build out 1) I live nearby a wash--> noise from outdoor events travels the wash and impacts residents adversely it is affected by air temperature and other factors--> consult w/ sound engineers as well City & County noise ordinances are not adequate today w/o data centers in the mix. 2) what about wording that deals w/ code violations= penalties; timing of court cases; ability to halt business if pattern of violations
2/19/2026		Survey 2.19 Q3	currently noise violations are pretty much ignored by the City & County. Just measuring decibles is not sufficient - ambient noise from traffic and other everyday sounds is totally different from noise from things like amplified music or generators or heat pumps etc. We are told essentially to pump up w/ adverse noise because it is not a health issue.
2/19/2026		Survey 2.19 Q3	it should be bigger perhaps + 70% back from property line
2/19/2026		Survey 2.19 Q3	I want noise limit to be 0 D at property line I'm not joking
2/19/2026		Survey 2.19 Q3	I want only battery! If they run out they should have planned better
2/19/2026	Dominik Soto	Survey 2.19 Q3	The pollution will still be there just farther away. It is still going to affect our community
2/19/2026		Survey 2.19 Q3	The noise pollution is a good concern but our concerns lie where the resources are being used. the ones being used to create the noise
2/19/2026	Jessica Ramirez	Survey 2.19 Q3	Do these setbacks protect us from air pollution? 400 feet is not nearly enough .1 mile =5280 400 feet=.0076 miles only about a minute or two of distance at a normal walking pace. unnacceptable
2/19/2026		Survey 2.19 Q3	who conducts independent noise study? How are measurements of proposals done? What if proposal isnt accurate? What is an emergency ? How does a data center have an emergency?
2/19/2026		Survey 2.19 Q3	My concern is that set back may not be adequate to dampen noise produced by generators
2/19/2026		Survey 2.19 Q3	generator proposal for natural gas & no load switching seem acceptable
2/19/2026	Adrian Fernandez	Survey 2.19 Q3	once again no need to be first learn from others
2/19/2026		Survey 2.19 Q3	more perfect union, a journalist project has done various interview and research on above questions.
2/19/2026		Survey 2.19 Q3	would need to be updated if a higher level or larger 1M sf center were to be allowed.
2/19/2026		Survey 2.19 Q3	How much heat will large scale data center generate? Set back should be the length of the property
2/19/2026		Survey 2.19 Q3	"natural" aka fracked gas is not clean. Renewable energy and battery backup only.
2/19/2026		Survey 2.19 Q3	Need more info about how far from nearest residence >10 miles
2/19/2026		Survey 2.19 Q3	Define emergency/ no diesel/ cant determine noise regs w/o knowing min. distance from residences
2/19/2026		Survey 2.19 Q3	still to loud no teeth to proposal
2/19/2026		Survey 2.19 Q3	I doubt the setbacks (400 ft) are sufficient to amilirate noise/glare radiant heat etc.
2/19/2026		Survey 2.19 Q3	I lack enough info to understand how noise studies could be done meaningful prior to construction + occupancy/use
2/19/2026		Survey 2.19 Q4	Not One Drop for Data!
2/19/2026		Survey 2.19 Q4	Habitat destruction cannot be overstated.
2/19/2026		Survey 2.19 Q4	This is laughable
2/19/2026		Survey 2.19 Q4	Will email
2/19/2026		Survey 2.19 Q4	No amount of buffering is going to mitigate the impact on contaminated water supplies and heat spillover
2/19/2026		Survey 2.19 Q4	Is landscaping and setback requirements redundant?
2/19/2026		Survey 2.19 Q4	In the words of Dr Evil, “how about No!” to the idea of data centers in Tucson.
2/19/2026		Survey 2.19 Q4	Parking lots must have solar coverings and designed to void heat island effect.
2/19/2026		Survey 2.19 Q4	No
2/19/2026		Survey 2.19 Q4	The desert should be left alone. No data centers. If these regulations exist they should be more strict. Low Parking maximums. MAXimums. Native plants. But yeah... These large scale dcs shouldn't exist and we should prohibit hem altogether through land use code

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026	Emma Nichols	Survey 2.19 Q4	make sure the plants and landscapping is local and non invasive
2/19/2026	Diane Marzonie	Survey 2.19 Q4	1/2 the distance of the setback?
2/19/2026	Hanna Egan	Survey 2.19 Q4	no native land (which is all land)
2/19/2026		Survey 2.19 Q4	lol
2/19/2026	Carol Price	Survey 2.19 Q4	better not let them plant anything that needs irrigation
2/19/2026		Survey 2.19 Q4	make requirements more strict
2/19/2026	Draea	Survey 2.19 Q4	make sure here plants are invasive, and are native
2/19/2026		Survey 2.19 Q4	these standards are putting lipstck on a pig; the presentation made clear that theres litle parking because these centers dont have much staffiing- the opposite of what we were told by the city and developers of proejct blue last summer. So you all lied. were being presented regulations for a giant warehouse of servers, not for jobs but for what?
2/19/2026		Survey 2.19 Q4	dont trust these standards
2/19/2026	TF Johnson	Survey 2.19 Q4	They should no be allowed in any ERZs they ignor potential damage from other sources like the gas generators
2/19/2026	85719	Survey 2.19 Q4	sounds walls plus enhanced native landscaping should be increased or at least an option to impose depending or adjacent built environment & zoning
2/19/2026		Survey 2.19 Q4	with my increase setback there should be live ISO plants I would like lots of parking for all the jobs
2/19/2026	Dominik Soto	Survey 2.19 Q4	appropriate sure but its hard to advocate for an establishment that doesnt have the peoples best interest in mind, polluting hurting the people and our land, without even doing the least, which is creating more jobs for people to be unhappy at
2/19/2026	Jessica Ramirez	Survey 2.19 Q4	not much parking = not many workers= not many jobs. these centers will drain us of resources and will not give back to the community . Feels like a lose lose
2/19/2026		Survey 2.19 Q4	Landscaping is greenwashing. Dont destroy the larel #larelback
2/19/2026		Survey 2.19 Q4	were about to lose 300 acres of beautiful desert to project blue, come on
2/19/2026		Survey 2.19 Q4	feels like it needs more
2/19/2026		Survey 2.19 Q5	What are the parameters that constitute an "emergency"?
2/19/2026		Survey 2.19 Q5	Get rid of data centers. As if a company is gonna adhere to any regulations.
2/19/2026		Survey 2.19 Q5	Ban all fossil fuel generators
2/19/2026		Survey 2.19 Q5	100s of MWs of diesel power is not acceptable in any application
2/19/2026		Survey 2.19 Q5	NOT ONE DROP FOR DATA!!!
2/19/2026		Survey 2.19 Q5	neighboring communities in phoenix have been forced to sleep in their basements due to noise pollution.
2/19/2026		Survey 2.19 Q5	Noise: no way or method to monitor stated Generator: so bad- will email
2/19/2026		Survey 2.19 Q5	How can noise study be meaningful prior to construction?
2/19/2026		Survey 2.19 Q5	Don't believe this covered low frequency beyond an audible range,/effects on wildlife
2/19/2026		Survey 2.19 Q5	The setting up of a check box process to provide cya criteria for the city to allow data centers is not acceptable.
2/19/2026		Survey 2.19 Q5	No large data centers at all. No generators ever. If they do exist, all regulations should be more strict on noise and generator use should be more limited
2/19/2026		Survey 2.19 Q5	On generators: the affirmative answer is only for natural gas generators or no load switching proposals.
2/19/2026		Survey 2.19 Q5	Any amount of noise is harmful to health. Generators are noisy, and create lots of emissions that are hazardous to health.
2/19/2026		Survey 2.19 Q5	Noise pollution is definitely a concern but it’s about the resources that are used to produce the noise. This case is a waste of resources.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026		Survey 2.19 Q5	My main issue is I'd like to have a requirement of revenue/profit to be funded into research grants to support public funding into R&D into generator muting.
2/19/2026		Survey 2.19 Q5	In general there is a lack of proof how a large scale data center would benefit Tucson, Pima County, or really any community. I dont know anyone who wants these here where we are already vulnerable to drought & heat. Bottom line is we dont want these here
2/19/2026	Admir Quarishy	Survey 2.19 Q5	I would like to see discussion regarding hiring practices. To support local hiring requirements
2/19/2026	Diane Marzonie	Survey 2.19 Q5	any data centers at all!
2/19/2026		Survey 2.19 Q5	Oregon required utilities to create new building classes/ reate structures for data centers so the costs arent shared by households businesses Data Centers doent bring jobs they bring pollution + aide fascism. Arizona doesnt have water to spare for data centers. Limit ground water + river water use. Batteries + Generatros contribute to climate change. Solar energy should be utilized. Noise will affect quality of life
2/19/2026	William Wilkening	Survey 2.19 Q5	rezoning for next use of facility; accountability for energy mix by developers + energy mix, water replacement projects; disposal process for data center equipment.
2/19/2026	Carol Price	Survey 2.19 Q5	E-waste andling is an issue; abandoned projects+ buildings is a possiblity + a big potential problem; the process should always be transparent open to the public no NDAs; the process should depend upon public imput- preferably a public vote on referendum, every time. we cant trust elected officials to protect us from corporate greed as weve learned recently, sadly; would it just be simpler cleaner and less expresive to simply write an ordinence prohibiting data centers in Tucson period?
2/19/2026	Lynn Price	Survey 2.19 Q5	Electronic waste disposal? Data Center will need nw regulations: so much larger amount of E-waste; Those standards need to be developed. what are state & federal regs currently?
2/19/2026		Survey 2.19 Q5	NOT ONE DROP FOR DATA!!!
2/19/2026		Survey 2.19 Q5	This Process wasn't designed to maximize community participation and engagement. The proposal should have been shared in advance. It would have been informed by a technical advisory committee that included a wider set of experts not just mostly including indigenous tribes, southwest southside, southeast tucson residents who will be impacted; standards regulations and processes are not neutral. you're designing them what will enable these projects or will stop them. No hyperscale data centers in the desert or anywhere
2/19/2026		Survey 2.19 Q5	having this codes for large scale data centers supports having these data centers. standards should be set higher to avoid centers to be build here in tucson. we need higher standards 200-400 ft standards are no enough
2/19/2026	TF Johnson	Survey 2.19 Q5	The lack of a Q&A section until we griped + the mainpulation of presented infor shows bad faith. Tell the Mayor and Council to fuck off I Know yall are pleasant bureacrats way over your heads but you got to have a spine. No data centers
2/19/2026	85719	Survey 2.19 Q5	1) large scale users must have their water & energy use priced on a sliding scale & cost them based on their use exceeding what is "acceptable" why should residents considere if industry does not 2) currently large scale data centers are needed for AI and cryptocurrency they do not serve the community nor are they needed for internet well phones or other every day uses seems like these large scale data centers are a billionares wet dream
2/19/2026		Survey 2.19 Q5	I think we should just outlaw large data centers or have limits that make it impractical
2/19/2026	Dominik Soto	Survey 2.19 Q5	reserach and TAC imput being only 13 people who have an unknown bias? that couldve been a team of public citizens, there shouldve been more community outreach since the start. Schools are an untapped goldmaine full of community members that are in the field everyday Talking to young adults tracking them down if you have to Plan a city of tucson outreach day at high schools because a lot of the you just doesnt know better
2/19/2026	Jessica Ramirez	Survey 2.19 Q5	We dont want regulations. we dont want these data centers
2/19/2026		Survey 2.19 Q5	a large data center involves costs associated with power adn water. the purpose of these data centers is obstensibly to replace human workers through automation. Is there an upside to Tucsonans to allow a data center?
2/19/2026	Adrian Fernandez	Survey 2.19 Q5	what are the pros and cons to data centers? what are the pros and cons to the working class of AI? may be able to grow revenue and community support by having limts on AI uses. I would rather live ina city where the goal is to help people grow not just AI or corporate interest. What is going on with all the solar energy we generate what= how is it used who profits from it?
2/19/2026		Survey 2.19 Q5	great start! thanks for the opportunity to comment!
2/19/2026		Survey 2.19 Q5	Its absurd that TEP was on the TAC when their owners, for tis, told investors they plan to make money off building 1.5-2 billion dollars for additional generation for data centers. where is consultation of native nations? would all data centers be limited to the southside under these regulations?

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026	Survey 2.19 Q5	come back with a draft like you were directed to write an ordinance prohibiting large scale data centers from our city of Tucson
2/19/2026	Survey 2.19 Q5	I was told there was going to be Free hot dogs! can we address current business water/power waste small and large? can we adress city building/school water conservation?
2/19/2026	Survey 2.19 Q5	Thank you for the presentation it is unfortanate zoning cannot address water+ power usage which of course are the most significant/ large-scale concerns
2/23/2026	Poster - Anthing we missed?	Sticker - Big tech gets a paycheck We get the electric bill No data center, Graphic representation of various desert species being impacted by technology and data center
2/23/2026	Poster - Anthing we missed?	No large hyperscale data centers. Attract low resource usage water/energy companies that create local jobs (permanet)
2/23/2026	Poster - Anthing we missed?	Sticker - Protect our desert, Graphic representation of desert with various species and sign with red cross over data center
2/23/2026	Poster - Anthing we missed?	Sticker - Bird saying "NO" , graphic representaion of bird yelling no
2/23/2026	Poster - Anthing we missed?	Water & energy guzzling data centers do not belong in our drying desert. These centers have no practical use for ordinary citizens.
2/23/2026	Poster - Anthing we missed?	Yes, we don't want any large scale data centers under any circumstances. This is a farce.
2/23/2026	Poster - Anthing we missed?	PROPOSED REVIEW PROCESS: Notice bubble shoule be larger - 10 miles. Notive should go to renters & businesses as well.
2/23/2026	Poster - Anthing we missed?	50,000 sf is to big...size should be brought down to largest exisiting Tucson data center square footage.
2/23/2026	Poster - Anthing we missed?	What's to keep the applicant from changing the energy mix after their zoning is approved? or water use
2/23/2026	Poster - Anthing we missed?	The setbacks aren't big enough! They should be tripled or quadrupled at least.
2/23/2026	Poster - Anthing we missed?	Who will be responsible for cleaning up the data center e-waster & building
2/23/2026	Poster - Anthing we missed?	NO large data centers
2/23/2026	Poster - Anthing we missed?	As water use for power generation cannot be addressed via zoning code, how will this key concern be addressed?
2/23/2026	Poster - Definition & Process	Moratorium on hyperscale data centers
2/23/2026	Poster - Definition & Process	Have a large public notification zone
2/23/2026	Poster - Definition & Process	Tucson already has a long history of big organizations poluting our land, I'm not ready for the health complications or the upscale in our electricity bill, especially when the notified area is so small!
2/23/2026	Poster - Definition & Process	Moratorium on all hypre-scale data centers!
2/23/2026	Poster - Definition & Process	E-waste disposal standards? Codes? Legal?

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Poster - Definition & Process	No data centers!
2/23/2026	Poster - Definition & Process	The definition + process: NO HYPERSCALE DATA CENTERS! Moratorium now.
2/23/2026	Poster - Definition & Process	*Unreadable* scale data centers should be: No, you don't get to build one.
2/23/2026	Poster - Definition & Process	Sticker - Not one drop for data, Graphical representation of rain over various desert related items
2/23/2026	Poster - Definition & Process	Leave South Tucson alone!
2/23/2026	Poster - Definition & Process	The highway already cut through South Tucson/Mexican American communities.
2/23/2026	Poster - Definition & Process	What hazards would we be exposed to in southern Tucson.
2/23/2026	Poster - Definition & Process	Problem w/your definition at written "The same controlling ownershup interest" -> or multiple ownership interests. "Storage, processing, and distribution" -> OR distribution
2/23/2026	Poster - Definition & Process	These are all in the Southside or along waterways. That is environmental racism of ecological dustruction. ICE comes to mind.
2/23/2026	Poster - Definition & Process	Way too small of a notification area
2/23/2026	Poster - Definition & Process	Sticker - No data center in our desert, graphical representation of rattlesnake wrapped around drop of water
2/23/2026	Poster - Definition & Process	We're already in a desert. We don't have enough water as is.
2/23/2026	Poster - Energy & Water Use	E-waste! toxic, no longer can be exported from U.S.
2/23/2026	Poster - Energy & Water Use	With AZ taking a hit on future CAP water there should be NO water guzzling industries whatsoever allowed to build in the desert. Data centers should absorb all costs assoc w. increased
2/23/2026	Poster - Energy & Water Use	NO
2/23/2026	Poster - Energy & Water Use	100% renewable energy only locally not credits + not nuclear like Beale said
2/23/2026	Poster - Energy & Water Use	Adequate water supply - What's the defintion of that? Seems that there is no such thing unless the aquifer is recharging
2/23/2026	Poster - Energy & Water Use	Sticker - Public Power, A brighter future for Tucson Graphic representation of tortoise with solar panel on back
2/23/2026	Poster - Energy & Water Use	Zero water or energy use allowed for largescale data centers
2/23/2026	Poster - Energy & Water Use	Water used to generate energy with fossil fuels MUST be considered throughout the CO River watershed

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Poster - Energy & Water Use	Make sure TEP energy use is getting checked! (Public power!)
2/23/2026	Poster - Energy & Water Use	No energy or water for data centers
2/23/2026	Poster - Energy & Water Use	Sticker - Big tech gets a paycheck We get the electric bill No data center, Graphic representation of various desert species being impacted by technology and data center
2/23/2026	Poster - Energy & Water Use	We already do not have "adequate water supply"
2/23/2026	Poster - Energy & Water Use	Full moratorium on all hyperscale data centers
2/23/2026	Poster - Energy & Water Use	Need protections around energy bills. No fossil fuel power. Better definition of adequate.
2/23/2026	Poster - Energy & Water Use	Sticker - Not one drop for data, Graphical representation of rain over various desert related items
2/23/2026	Poster - Energy & Water Use	Where will these centers get water form? The future of our water is uncertain, esp w/ what's happening with the Colorado River! Water should be for life, not data centers! These centers use way too much water.
2/23/2026	Poster - Energy & Water Use	We don't have enough water for ourselves, let alone a data center. :(
2/23/2026	Poster - Energy & Water Use	Will residents have to pay higher water & energy bills?
2/23/2026	Poster - Energy & Water Use	Energy projections should be for summer months, not a winter day
2/23/2026	Poster - Energy & Water Use	Sticker - Water for the people Not for Billionaires, No data CenterS
2/23/2026	Poster - Noise	Set to sound uses allowed within the public library & no louder
2/23/2026	Poster - Noise	We dont want data centers!
2/23/2026	Poster - Noise	What similar sound levels from other uses?
2/23/2026	Poster - Noise	On site generation if not renewable needs to be last resort. Limit generation = limit noise
2/23/2026	Poster - Noise	Data centers out of South Tucson!
2/23/2026	Poster - Noise	The highway already has alot of noise pollution
2/23/2026	Poster - Noise	Will the noise study include only audible sounds?
2/23/2026	Poster - Open Space	Landscaping should require tree canopy coverage of the entire parcel at tree maturity.
2/23/2026	Poster - Open Space	Moratorium on all hypre-scale data centers!
2/23/2026	Poster - Open Space	What happens to 10 year old data centers? Require owners of data centers to dispose safely
2/23/2026	Poster - Open Space	E-waste from data centers! Disposal?
2/23/2026	Poster - Open Space	NO Desert Data Centers
2/23/2026	Poster - Open Space	Landscape borders need to be extensive & sound walls may be required depending on location. Better to require them to build underground
2/23/2026	Poster - Open Space	Define large-scale data centers as ≥1000 sq. ft.
2/23/2026	Poster - Open Space	Our lands can barely support what we currently have on them. We don't need to add more to habitat destruction =(

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Poster - Open Space	Don't get fooled when they say this will bring new jobs to Tucson. This will raise all our utility bills and harm our water.
2/23/2026	Poster - Open Space	Your community engagement processese need revision, reform + transformation so they enable actual community public opinion.
2/23/2026	Poster - Open Space	Permenant ban on ALL DATA centers
2/23/2026	Poster - Open Space	This community engagement didn't engage the community! Come up w/ + reform the process.
2/23/2026	Poster - Setbacks	[Protect our Desert photo]
2/23/2026	Poster - Setbacks	Setbacks half the size of the parcel from each perimeter of the parcel
2/23/2026	Poster - Setbacks	Need to update noise ordinance to address noise issues related to Data Centers. Current code is not adequate to address what other towns w/ Data Centers are experiencing.
2/23/2026	Poster - Setbacks	Err on the side of the strictest + highest standards possible
2/23/2026	Poster - Setbacks	A setback of 400 feet is not usually enough for a hyperscale data center in a residential zone - they generate noise + pollution that's bad for public health! No Data Centers in Tucson = anywhere! Look at what happened in other communities
2/23/2026	Poster - Setbacks	1-2 is mostly on the Southside + SW or SE - then will impact our families' health (noise + pollution!)
3/4/2026	Survey 3.4 Q1	Need lots more information
3/4/2026	Survey 3.4 Q1	If approved, then big expansion, is a new applcation, hearing, etc required?
3/4/2026	Survey 3.4 Q1	Is there an additional level of fact-checking when the applicant requests or answers your questions to make sure they are being truthful and transparent?
3/4/2026	Survey 3.4 Q1	At which point during the review process is the environmental aspect taken into consideration? (light pollution, water availability, impact, neighboring town impact, etc)
3/4/2026	Survey 3.4 Q1	feels too big
3/4/2026	Survey 3.4 Q1	I-2 zoning makes sense. Please consider the lands under the DMAFB Departure Corridor where any land use for dense population is prevented-no homes, apartments, dense employment uses. Also suggest that 50,000 sf is considered to be a medium data center. Suggest 100K sf
3/4/2026	Survey 3.4 Q1	At first, I was thinking that since the city does have within itz zoning laws the ability to reject buildings for purpose I thought you could just not approve data centers based on that but I appreciate the effort to have the review porcess dictate whether the business can meet the criteria to not impact the water and electric needs of the community so I support this proposal.
3/4/2026	Survey 3.4 Q1	What Kinds of accessory uses likely go along with a data center, and do the accessory structures related to a data center need some considerations? for example onsite water treatment for water recycling vs putting it into the main system what are the impacts to wastewater infrastructure? Is there a process for expanding the data center on an established site? If an established site wants to add additional data processing, is that also a mayor and council approval? Do they repeat all these steps and submit the same materials (energy declaration etc)? Is there a maximum amount of sf allowed other than via lot coverage?
3/4/2026	Survey 3.4 Q2	We are running out of water. For existing HUMANS living here. Too many unknowns.
3/4/2026	Survey 3.4 Q2	Unclear if or what penalties for not following plan?? I didn’t see any requirements for using rainwater harvesting, white or “green” roofs, non potable water for appropriate uses, etc
3/4/2026	Survey 3.4 Q2	Again double-checking to make sure that the applicants answers are truthful and transparent. How are you going to do that?
3/4/2026	Survey 3.4 Q2	Showing that they can provide the resources doesn't mean that they are appropriate methods. Using other counties to provide power isn't ethical.
3/4/2026	Survey 3.4 Q2	Need analysis of how usage affects tep capacity and pricing for others long term
3/4/2026	Survey 3.4 Q2	Sourcing of energy needs to be broader as new energy sources are developed - example - Small Nuclear
3/4/2026	Survey 3.4 Q2	If energy is sufficient or can be generated, but costs will increase due to transmission or other infrastructure needs, applicant should cover those expenses to prevent cost increase to existing customers. Water should default to closed loop. If using once through or open loop (even with recycled water) we should seek to condense and recapture through passive systems and reuse or put into surrounding plant areas proposed at borders. Wastewater is also a concern- must show we can properly process blowdown given scale and potential impact to our grey water systems. Any expenses to enhance water processing should be borne by company.
3/4/2026	Survey 3.4 Q2	I'm not sure exactly how businesses would meet the standards but they are exactly what is needed. What I wasn't clear on is what happens to a business when it violates those standards? It should result in something painful to the business or they could just pay the fine and continue making water/electricity an issue for residence.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/4/2026		Survey 3.4 Q2	Thank you for covering gaps not covered by the LWUO. What goes into the energy declaration? How can we ensure the declaration is clear and thorough enough to hold them accountable? What does enforcement of energy demand/sources look like?
3/4/2026		Survey 3.4 Q3	Increase setbacks. This should not negatively impact residential areas.
3/4/2026		Survey 3.4 Q3	IF the centers are required to stay within industrial zones, then the setbacks are OK.
3/4/2026		Survey 3.4 Q3	Setbacks should be 1000’ or more from residential areas.
3/4/2026		Survey 3.4 Q3	400 ft is .075 miles -- that seems very close given the noise and air pollution. I live precisely 10x that distance (just measured it) from a heavy industrial user. I can hear and smell it even at that distance, and there are many people who are even closer than I am. Physical issues, such as vibrations, are also important to consider: my house sometimes shakes due to industrial activity. Given this, a minimum quarter-mile setback from urban residential and office/commercial would be more appropriate. However, I would like to know what the setbacks are for other heavy industrial uses to compare. They are probably all quite low.
3/4/2026		Survey 3.4 Q3	Good on load shifting; good on batteries first; weak on allowing TEP to draw power from batteries if needed; weak on allowing any natural gas, especially if the install noisy RICE generators, etc
3/4/2026		Survey 3.4 Q3	na
3/4/2026		Survey 3.4 Q3	Require independent noise studies and clear limits for all sites, including those not in purely industrial zones.
3/4/2026		Survey 3.4 Q3	There are many famous cases of commercial sites noise bouncing and landing somewhere far away. Are there provisions to address situations like this not forseen? Generators if environmentally equivalent to tep or other providers emissions should absolutely be allowed for load shedding especially if the city needs the relief. I would agree with them having additional noise restrictions. But we don't want large commercial sites killing us like happened in texas.
3/4/2026		Survey 3.4 Q3	Generators need to be tested periodically to ensure reliability. Battery storage adds expense and is seldom useful for any medium or long term outage - good for short only. Both Batteries and generators plus forcing Tier IV level becomes potentially deal breakers due to cost impact.
3/4/2026		Survey 3.4 Q3	Should clarify minimal battery backup time, such as ability to be on battery at least 15 min (possibly up to 30)
3/4/2026		Survey 3.4 Q3	Not sure
3/4/2026		Survey 3.4 Q4	Require permeable paving for parking lots; good to require 50% rainwater ;
3/4/2026		Survey 3.4 Q4	Na
3/4/2026		Survey 3.4 Q4	Agree on parking. Landscaping is an esthetic issue. Why different than any large warehouse?
3/4/2026		Survey 3.4 Q4	Expect significant heat and evaporation from these centers; propose trees with large canopies. I also expect fencing will be established so presume that would have to be within the interior of the landscaping. Given that and concerns for security I’d propose an additional 10’ beyond the 20’ for landscaping and enough underbrush to encourage rabbits, mice, coyotes, javelina and other urban animals to forage in the area.
3/4/2026		Survey 3.4 Q4	desert landscaping, while beautiful, is sparse vegetation compared to other environments. Is a 20 ft buffer of prickly pear going to be effective? Is that 20 ft distance based on best practices that were established where denser forest-type vegetation is in place? If so, we should consider a larger buffer or other rules about the density of the vegetation.
3/4/2026		Survey 3.4 Q5	Is it possible to build in likely additional staff costs for enforcement if needed into the permit, especially given City finances!!
3/4/2026		Survey 3.4 Q5	Triple your efforts to lessen impact on our environment, utilities and resources.
3/4/2026		Survey 3.4 Q5	This is a joke.
3/4/2026		Survey 3.4 Q5	What are the teeth of enforcement besides. Hand waving and strongly worded letters. Penalties need to make sure transgressions are not financially worth it.
3/4/2026		Survey 3.4 Q5	Thanks for doing this. Please develop a Code Amendment that is followed in practicality, not emotional, non-factual, loudest voice wins approach.
3/4/2026		Survey 3.4 Q5	If Tucson adopts such rigorous standards, we will be prepared to adequately vet large data centers. This was a good presentation, thank you.
3/4/2026		Survey 3.4 Q5	Thank you!
3/5/2026	Barbara Richard	3_5_RegistrationComments	I have mobility issues but assume the venue will be ADA Compliant. If not I will not be able to attend.
3/5/2026	Annika Reimers	3_5_RegistrationComments	Is the City of Tucson prepared to listen to its citizens and make the ethical decision for our community and environment to prohibit large-scale data centers? Or do they prefer to sell-out to corporations at the expense of all?

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026	James M Nelson	I'm known as the man behind the RealPage lawsuit	3_5_RegistrationComments	I have an important comment about what hasn't been asked about the data centers
3/5/2026	Deanne F.	Citizen for questions...	3_5_RegistrationComments	Must you live in that particular county/community to be heard?
3/5/2026	Elena Ortiz		3_5_RegistrationComments	What are approaches the City can use through the updated code to restrict hyper scale data center development so that these facilities are not developed within city limits?
3/5/2026	Eliseo		3_5_RegistrationComments	Make sure to have an extra microphone or two for audience Q&A. I'd be happy to volunteer as a runner to get microphones to the people in the audience.
3/5/2026	Lynn Price		3_5_RegistrationComments	What are guidelines for electronic waste from data centers?
3/4/2026	Linda Jenson		3_4_RegistrationComments	Am mostly interested in learning more to form an informed opinion at this point. This seems like an important topic moving forward, so I want first hand experience.
3/4/2026	guy smith	none	3_4_RegistrationComments	Where would the water and electricity come from?
3/4/2026	Kimberly Madison	Barrio San Antonio Neighborhood Association	3_4_RegistrationComments	I sincerely hope we're continuing to keep the interests of our Tucson ecosystem and its citizens, both human and nonhuman, in this decision-making process.
3/4/2026	Noah Gariepy	United Way of Tucson and Southern Arizona	3_4_RegistrationComments	I would like to know how we can specifically tax the data centers to uplift the Prosperity Initiative work in the community
3/4/2026	Carrie Newman		3_4_RegistrationComments	How would the building and functioning of data centers impact the availability and cost of energy and water for Tucson residents?
3/4/2026	Lisa Maher	Garden District Neighborhood Assn Board	3_4_RegistrationComments	I wish I could have checked more than one area of interest in your drop-down. VERY concerned about water and energy consumption.
3/4/2026	Suzie Garrett	community member	3_4_RegistrationComments	What else can this land/space be used for?was that ever considered and discussed? Is housing development being postponed because of the water and electricity that would be used by a data center? What % of the cost will DMAFB pay for ? Whose the new NDA?
3/4/2026	Margo Itule	No Desert Data Center	3_4_RegistrationComments	We need a revised, stronger Large Quantity Water User Ordinance that protects our precious groundwater, creeks, rivers, wetlands, rainwater, and recycled water. All applicants should have intentional review with opportunity for public input.
3/4/2026	Florence Johnson	Public Safety Task Force	3_4_RegistrationComments	Data Centers require excessive power and water that increases infrastructure needed, unaffordably raising residential users' rates, and enabling suveillance technologiesand AI analysis that violates residents' Constitutional rights
3/4/2026	Norma Itule	Citizen	3_4_RegistrationComments	Data centers are dangerous to the health of our community on all levels.
3/4/2026	Dan Stormont	Commission on Climate, Energy, and Sustainability	3_4_RegistrationComments	I was involved with the working group that proposed the code changes. I'm curious to see how the proposed changes go over with the public. Looking forward to the meeting!

Feedback Received on Large Scale Datacenters (3_12_2026)

3/4/2026	Mary Slachter	Live here	3_4_RegistrationComments	I want all of the above addressed
3/4/2026	Elizabeth Thompson	Private citizen	3_4_RegistrationComments	I want to hear how we can put in local regulations to prevent data centers bringing low quality, short term jobs to the area in exchange for using up our scarce water resources and straining our power grid.
3/4/2026	Carmen Vega-Cruz	Retired - live in LD17	3_4_RegistrationComments	Would appreciate as much detail as possible on regulations being established to cover natural resource usage and landscape effect, electricity, noise, air pollution and traffic flow considerations. Thank you.
3/4/2026	Johanna Martinez	Concerned Citizen	3_4_RegistrationComments	I stand in firm opposition to allowing large scale data centers in Tucson. We live in a desert water is not a resource we have to spare and no amount of economic consent of justifies gambling with the future of this community. Reject data centers!!!
3/4/2026	Roger Johnson	Retired concerned citizen	3_4_RegistrationComments	Water, electrical power, noise. Why Tucson?
3/4/2026	Pamela Tankersley	home owner and resident of pima county & Tucson	3_4_RegistrationComments	How will our water & energy be protected so that residents & future generations of Pima county won't get stuck paying for this.
3/4/2026	MaryLynn StOres	Citizen of Tucson	3_4_RegistrationComments	Why not build in land that gets more rain?
3/4/2026	Nancy Fahringer	Private homeowner	3_4_RegistrationComments	I vote for more stringent noise, water, and setback requirements for data centers.
3/4/2026	Patricia Stoll	Public	3_4_RegistrationComments	How will centers be powered and regulated to protect our water supply? What methods will be usd toutilize green energy in their power plans?
3/4/2026	Greg Veitch	University of Arizona faculty, architectural designer, Tucson resident and property owner	3_4_RegistrationComments	Net benefit to Tucson community: jobs #, aesthetic/cultural/urban benefit, energy and water use relative to other employment and commercial options, tax incentives to data center developers and operators, site locations relative to other urban uses?
3/4/2026	Miguel Ortiz	None	3_4_RegistrationComments	We don't want Data Centers!
3/4/2026	Scott Barker	Tucson Lifestyle Magazine	3_4_RegistrationComments	Just interested in gathering information for a story.
3/4/2026	Tereasa Moffett	none	3_4_RegistrationComments	Water isn't renewable, it's a luxury. Rural areas rely on wells, slowly taken over by companies. Datacenter construction wastes water for dust abatement, stealing water from residents. Const. should be outlawed bc environment can't sustain it AND ppl.
3/4/2026	Pati Norman	Self	3_4_RegistrationComments	I would like to listen to this meeting.
3/5/2026			Poster - Noise	way to prohibit on site generators like the methane turbines used in xAI in Memphis which ruins air quality
3/5/2026			Poster - Noise	Prohibit all diesel/XIG generators please
3/5/2026			Poster - Noise	Define emergency and non-emergency
3/5/2026			Poster - Noise	NO MORE DATA CENTERS AT ALL PLEASE. Full moratorium or prohibition.
3/5/2026			Poster - Noise	BAN ALL DATA CENTERS! They have NO value to us. We don't have the resources.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026	Poster - Noise	Data centers generate large decibles of noise that can cause chronic issues in humans and wildlife. We already have constant noise- we don't need more noise pollutants
3/5/2026	Poster - Open Space	Artificial coverage traps heat, need natural vegatative coverage
3/5/2026	Poster - Open Space	Enforced solar on parking spots
3/5/2026	Poster - Open Space	Require use of native plants, focus on food/pollinator plants for wildlife enjoyment
3/5/2026	Poster - Open Space	BAN ALL DATA CENTERS! They have NO value to us. We don't have the resources.
3/5/2026	Poster - Open Space	Could use this land to preserve the environment and wildlife that is here instead of making room for a data center?
3/5/2026	Poster - Setbacks	NO DATA CENTERS PLEASE
3/5/2026	Poster - Setbacks	Proposed zoning is too close to Tribal lands.
3/5/2026	Poster - Anything missed	Range of effect of low low frequency non audible
3/5/2026	Poster - Anything missed	Tucson does not need data centers, we need water, renewable energy, and a future for this city, Data centers are modern day mass polluntants that are detrimental to the communities they inhabit
3/5/2026	Poster - Anything missed	BAN ALL DATA CENTERS! THEY HAVE NO VALUE to us. We DON'T HAVE THE RESOURCES!
3/5/2026	Poster - Anything missed	NO HYPERSCALE DATA CENTERS LISTEN TO TUCSON RESIDENTS! We DON'T want these AT ALL - these centers will harm our communities and environment
3/5/2026	Poster - Anything missed	Sticker - Bird saying "NO" , graphic representaion of bird yelling no
3/5/2026	Poster - Definition & Process	Where is the 50,000 square ft. guidance coming from? What factors are going into that decision?
3/5/2026	Poster - Definition & Process	RE: I-2 Zones = marginalized communities = ENVIRONMENTAL RACISM
3/5/2026	Poster - Definition & Process	Need more open discussion not filtered through one way feedback Townhall!
3/5/2026	Poster - Definition & Process	<- THIS is environmental racism! (Making it easier to build these in I-2 zones)
3/5/2026	Poster - Definition & Process	If it's easier to build these centers in I-2 zones, the impacts will be on South+Southeast Tucson especially. Large-scale data centers have effects on health, through low-frequency noise, cooling systems, e-waste, etc.
3/5/2026	Poster - Definition & Process	The proposed locations of data centers disproprotimately negatively affect the health of the people who live near these facilities. It feels like environmental racism when you consider the demographic populations of I-2 zones
3/5/2026	Poster - Definition & Process	Definition should be based off energy demand.
3/5/2026	Poster - Definition & Process	BAN ALL DATA CENTERS! THEY HAVE NO VALUE to us. We DON'T HAVE THE RESOURCES!
3/5/2026	Poster - Definition & Process	Citizens need to be added to the TAC ASAP including No Desert Data Center
3/5/2026	Poster - Definition & Process	The I-2 locations where these things can get built cure too disproportionately nearby marginalized communities

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026		Poster - Definition & Process	If size based, the size should be over 39,000 sft. (Not 50,000 sqft)
3/5/2026		Poster - Energy & Water Use	Complinace & meaningful enforcement
3/5/2026		Poster - Energy & Water Use	Water for power generation
3/5/2026		Poster - Energy & Water Use	Sticker - Public Power, A brighter future for Tucson Graphic representation of tortoise with solar panel on back
3/5/2026		Poster - Energy & Water Use	I grew upnhere if younthink we have opare water - We do not.
3/5/2026		Poster - Energy & Water Use	We are entering a water shortage crisis - we don't have water to spare on data centers
3/5/2026		Poster - Energy & Water Use	Renewable practicality
3/5/2026		Poster - Energy & Water Use	Why is TEP on the TAC? They told their investors they plan to profit off of data centers! Public Power NOW!
3/5/2026		Poster - Energy & Water Use	How do we prohibit data centers, point blank.
3/5/2026		Poster - Energy & Water Use	Water limit must be enforced by shutoff threshold. Fines are not adequete deterant for billion dollar corporations
3/5/2026		Poster - Energy & Water Use	We as humans can relate to needing water for life to sustain life itself That comes before any machine
3/5/2026		Poster - Energy & Water Use	They use too much energy & water, we don't want them here. No data centers.
3/5/2026		Poster - Energy & Water Use	The notification scale to the public about data centers should absolutely seek wider range if transparency is a priority
3/5/2026		Poster - Energy & Water Use	Work w/ pima county + other nearby cities to implement cities to implement similar regulations. What's to stop a data center from building right outside city limits?
3/5/2026		Poster - Energy & Water Use	We should focus on renewable energy
3/5/2026		Poster - Energy & Water Use	BAN ALL DATA CENTERS! THEY HAVE NO VALUE to us. We DON'T HAVE THE RESOURCES!
3/5/2026		Poster - Energy & Water Use	There is no "adequate water supply" avaiable for these centers! The energy isn't avaliable - especially if 100% renewable with no offsets/credits + no nuclear! Who will cut them off if they violate? Need stronger regularations!
3/5/2026		Poster - Energy & Water Use	TEP shouldn't be TAC - they will profit from working with developers of these centers and don't care about renewable energy or develop customers with a stable grid!
3/5/2026	Hernan	In person survey written Q1	I want to learn how you "define" the proposed large-scale data cente and how you proposed to re-zone before I can comment on theis. May consider imposing an upper limit to the size of the building
3/5/2026		In person survey written Q1	1) the FAQ #1 does no answer its won question of whether we can prohbiti data centers outright! 2) when will it be determined when enhancement fo 400ft-> 2mi will be done?

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026	Ary	In person survey written Q1	definition should include smaller sq sootage. Can grandfatehr existing data centers. Also definition of large water use should be drastically reduced. Notification should be larger scale, rather than 2 miles should 10 miles. The entire city should be allowed input since we all share water and energy burden. renters should also be included
3/5/2026		In person survey written Q1	Needs max and minimum size in the definition. Notification should be regional and include all residents not just property owners. The entire county should be altered months in advance this is a regional concern no merely a 2 mile radius concern
3/5/2026		In person survey written Q1	a gross floor area of 50,000 sq ft is too big for a definition to regulate these in away that leads community voices saying no- the servers are getting powerful in less space! Define by energy use! Or make the threshold the median of current centers. The presenter said there are no communities near I-2 zones- thats not true! The notification area is too small for data center- it should be at least
3/5/2026		In person survey written Q1	The public notice should be extended to tenents. The notice zone should be larger. Upper limit on large-scale definition
3/5/2026	Larry Lemon	In person survey written Q1	wee need a data center like we need a hole in our head!
3/5/2026		In person survey written Q1	could the square footage be limited so larger project are no proposed? Clear definition of where current sq footage come; include renter's non property owners in the notice potentially expand the notification zone to include more impacted
3/5/2026		In person survey written Q1	where the water coming from?
3/5/2026		In person survey written Q1	Aside from dimensions and that it stores data, the definition is not ____ clear of the type of data and what its used for, this should be expanded upon. The review process could additionally be ___ longer or be given a large scale for public consideration as that is who will be affected
3/5/2026		In person survey written Q1	what loopholes may exist? Say allowing multiple entities to inhabit the same building? 50,000 sq ft is still too big. Communities should ask for a data center. Not wait to be notified if they're going to be thrown under the bus
3/5/2026		In person survey written Q1	they are too large. Our community cannt absorb a LSDC anywhere near 50,000 sq ft; The PA zones have very sparse population and will have limited turn out. Who will protect the sonoran desert. Residents need to be notified not just absentee landlords; A sonoran desert protection zone needs to be established. The proposed allowed zones would be destrcutive and detrimental to the sonoran desert
3/5/2026	Kay	In person survey written Q1	If we don’t allow data centers in Tucson then we don’t need definitions for data centers. The proposed zoning for these centers also disproportionaly affects south tucson its residents. The range needs to be larger gov alert, renters need to be informed and a max site needs to be added
3/5/2026	Roma Lanor	In person survey written Q1	why are we even considering any data center? Size is not a good way to regulate look at water usage and elctricity usage. Ban all data centers
3/5/2026	Hernan	In person survey written Q2	by law tucson water must stop water mining our aquifers. My understanding is that blending CAP water is not meeting present & future demands for H2O. How can you support such monstrocity? Can they guarentee 1000 years of sustainable use as you should demand from all developments
3/5/2026		In person survey written Q2	what happens later if an applicant has misrepresenteed its estimated water and energy usage? Will the penalities actuallly contribute to remediating any damage or will the damage be irrevocable? Steep is vauge
3/5/2026	Ary	In person survey written Q2	water use & energy use threshold should be significantly reduced. 7.5 million gallons of water per month is an outrageously high number. It should be below a million, and re-evaluated every 3-5 years based on environmental changes since we know under depletion continues to increase. there should be provisions requrired used for renewable energy. fines should increase exponentially once exceeded and a clause to shut off water/energy pull license w/ continued violations
3/5/2026		In person survey written Q2	finace are not enforciable crazy to think that’s going to competl compliance. Include energy usage in the definition of large scale; need lots and lots of publicity to be sure everyone is educated on the issue and have time to organize
3/5/2026		In person survey written Q2	Energy mix should be 100% renewable w/ no credits; nuclear=no!; Demonstrate access means what? Are there lmits on the amount of energy they dislose as proposed use? There should be. This is totally inequitable hasn’t consulted tribes at all willimpact their water access. Larger quantity water user ordinance isnt enough recycled water is still water should be 100% offsets of total which should be lower! The penalties arent steep enough- it shouldnt take years + mega corporations can pay! Cut them off as soon as they stop complying!

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026		In person survey written Q2	should be regulation on % renewable water standards should be stricter, non-potable water more stringent penalties
3/5/2026	Larry Lemon	In person survey written Q2	in a desert, a city I've lived in since 1953 and had water conservation preached to me all that time, we don't need this!
3/5/2026		In person survey written Q2	energy use should come from renewable sources, fossible fuels are not sustainable for our future. Proposed data centers should not exceed the entire city is usage. Water is not a resource that we can be willing to give up to billion dollar companies water is life, we cant lose it or we lose our way of life
3/5/2026		In person survey written Q2	where the water coming from?
3/5/2026		In person survey written Q2	TEP bought natural gas to provide data center energy. Don not give credit loopholes also don't give water until these buildings are 100% efficent or way more
3/5/2026		In person survey written Q2	The use of reclaimed water is a good start if any usage is necessary. If anything it should only use water that could not be otherwise put towarrds the city or the land. The current usage of several households worth is not sustainable, renewable energy sources are what should be strived for.
3/5/2026		In person survey written Q2	no business that uses millions of gallons of water monthly should be located anywhere in Arizona. Large businesses should be responsible for their own energy infrastructure. No data center in Tucson!
3/5/2026		In person survey written Q2	for waters do you distinguish between using water by returning it through the sewer system and using water by heating it into vapor and shooting it into the atmosphere? Energy- should be related to qty of people working for the facility
3/5/2026		In person survey written Q2	Applicant must create their own energy supply without creating new emissions net zero!; Fines do not solve the problem of water waste; only resident of tucson understand how precious each drop of water is. Water for life, not technology. We have no need for data center, we do hav a need to drink water, bathe, grow plants! There is no subsitute; There is no guarentee we will get water each year for the living.
3/5/2026	Kay	In person survey written Q2	TEP is already fear mongering and water is becoming a scarcity. Humans, wild life, and our environment need water ore than data centers, we also need to move towards more nvironmentally sustainable power, TEP and data centers would set that back we the peopl of tucson need to own TEP
3/5/2026	Roma Lanor	In person survey written Q2	Tucson doesn't have enough water for any data centers. TEP doesn't have the infrastructure for any data center. Ban all data centers
3/5/2026	Hernan	In person survey written Q3	tell me what you proposed to do and I'll tell you whether or not I agre with you setback standards
3/5/2026		In person survey written Q3	400 ft does not seem adequate
3/5/2026		In person survey written Q3	the setback should be out of the state
3/5/2026		In person survey written Q3	the setbacks are too small- the noise and pollution will impact nearby residents especially in the southside where I-2 zones are located and have an easier approval process
3/5/2026		In person survey written Q3	residential setback should be 1/2 mile at least what does right-sized mean?
3/5/2026		In person survey written Q3	the setbacks need to be greater, especially for residential and noise sensitive areas
3/5/2026		In person survey written Q3	where the water coming from
3/5/2026		In person survey written Q3	still a lot to learn a lot to review

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026		In person survey written Q3	rebewable energy sources must be a requirement
3/5/2026		In person survey written Q3	way too close a constant hum/buzz is unnatural and unhealthy. Protect your citzens! Require sound deadening/reduction from inside facility
3/5/2026		In person survey written Q3	who decides the arbitary setback? You can hear the droned of the 10 freeway all the way to bear canyon at night
3/5/2026	Kay	In person survey written Q3	If the data centers already have to be back 200-400 feet could we use that land for enviornmental preservation or (if its abandoned urban land) update that land to directly benefit the community (parks, shelters, anythign that builds/protects community/land) not golf courses
3/5/2026	Roma Lanor	In person survey written Q3	400 ft and 200 ft is not enough sound vibration travels much further than that. 24/7 sound and vibration will ause health issues ban all data centers
3/5/2026	Hernan	In person survey written Q4	no matter what you do there is no way you can generate no noise around your facility
3/5/2026		In person survey written Q4	how will avoidance of load shifting be enforced
3/5/2026	Ary	In person survey written Q4	there should be time limits. While 50 dbs seems low, should be reduced after 8pm-6am. Fines should be significantly increased as these data centers to account for the fact that billinares own these companies. Again a clause to cut off water/energy + pull contract for continued violations.
3/5/2026		In person survey written Q4	no data center noise. No data center. Full stop
3/5/2026		In person survey written Q4	noise limts "at the property line" is wholley inadequate when these centers produce a 24/7 low hum that travels far (as reported in other communities). Generator use- who will enforce (actually have capacity to enforce) when these companies violate the code??
3/5/2026		In person survey written Q4	constant noise at 55-65 decibles is harmful and disruptive. Who is monitoring load shifting? Who can stop them from breaking regulations and how?
3/5/2026		In person survey written Q4	I feel like presentation breezed through this unsure about it but having a noise study is needed
3/5/2026		In person survey written Q4	Where is the water coming from?
3/5/2026		In person survey written Q4	we need to make sure there is ways to stop on site generation solely to save money (not because its necessary ie outages)
3/5/2026		In person survey written Q4	These are issues that need to be full proof in their handling and monitoring but can only be tested through transprings that would not happen.
3/5/2026		In person survey written Q4	much much more research need be done before any people should be used as guinea pigs for these constant noise
3/5/2026		In person survey written Q4	These applicants do not care about our community or humanity for that matter. They want to mine our data, especially our childrens data to no benefit to society.
3/5/2026	Kay	In person survey written Q4	we should work to become leaders in sustainable quiet power such as solar power (we are a city where we have ample sunlight) or even energy produced through kinetic/walking/moving this is the future technology we should invest in, not data centers)
3/5/2026	Roma Lanor	In person survey written Q4	ban all data centers no amount of noise is acceptable
3/5/2026	Hernan	In person survey written Q5	I'm sure you'll be able to build a "plastic paradiso" around this building so as to hide this monstrocity.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026		In person survey written Q5	putting lipstick on a pig doesn't change the pig
3/5/2026		In person survey written Q5	you cant dress up these massive b__ structures with landscaping! Even on-site water harvesting is still using water that could use for projects that people actually want and need in this community!
3/5/2026		In person survey written Q5	if this is something zoning can help then it should
3/5/2026		In person survey written Q5	This is horrible + harms the planet. That's it.
3/5/2026		In person survey written Q5	we should be working with the given environment not against it, construction of a large scale warehouse strips the land and the community of what could otherwise be a space for them, we already have data centers we don't necessistate more or large one with a pretty lawn
3/5/2026		In person survey written Q5	These centers will pave over acres of beautiful desert if we let them build. Why is this worth it? A small landscaping buffer is no consolation.
3/5/2026		In person survey written Q5	need to be larger borders. Environmental compatability must harvest 100% of water demands
3/5/2026	Kay	In person survey written Q5	we should consider preserving what little natural land we have left not giving it up to data centers we have so many abandoned buildings in our city already- data centers only have a life span of about 10 years (unless the costly serves are replaced) Do we want buidling that massive to join out list of abandoned land that nature struggles to reclaim
3/5/2026	Roma Lanor	In person survey written Q5	no parking needed. No jobs. Ban all data centers!
3/5/2026	Hernan	In person survey written Q6	I thought we made it clear to the mayor & city council: we do not want a data center in Pima County
3/5/2026		In person survey written Q6	we need the strictest restrictions and regulations. We need to do everything we can to prhibit building of data centers we don't have enough water for this. For future community meetings, I think 20 + minutes at the beginning would be better moved to the end to give everyone who wants to speak a chance people made excellent points about enforcement and monitoring
3/5/2026	Ary	In person survey written Q6	the entire framing is problematic you should be
3/5/2026		In person survey written Q6	no data center in the desert. Full stop the standard and proposed standrads neeed to be "no data center larger then the six that exist in the city limits currently and no loopholes that would allow 2 or more smaller facilities side by side etc.
3/5/2026		In person survey written Q6	Why didn't the technical advisory committee recruit from a wider range of experts in our community? Why was it so stacked with people who think these are good for business development" with little/no concern for the impact on our water energy air quiet biodiversity and especially our health + futures here?! Why wasnt there a citizens advisory committee? How will you integrate community feedback + be accountable to what you say you'll do with this? A productive proposal to regulate large-scale data centers means listening to Tucsonans who said no (overwhelmingly) to project blue + designing a code that effectively stops these from being built here at all! We dont need or want these! these centers are being built to profit from the survalliance of people- immigrants, health care centers, educators, workplaces
3/5/2026		In person survey written Q6	prohibit data centers require a vote of the public
3/5/2026		In person survey written Q6	no data centers please! Data centers should not impose on people! The city has the power to be different
3/5/2026		In person survey written Q6	we don't want data centers! This is the Desert!

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026		In person survey written Q6	why are people who directly benefit ($$) from lesser regulation on the advisory committee (TEP USAF, data ceneter) why were they asked before citizens?
3/5/2026		In person survey written Q6	no data center in Tucson. No data center in tucson.....
3/5/2026		In person survey written Q6	consider nature. These regulations should aim to enhance the wonderful natural aspects of Tucson and our place within it. We must be good stewards of the land. This is simply slightly minimized exploitation. How above no exploiting the earth
3/5/2026	Kay	In person survey written Q6	we shouldn't be spedning time trying to find a way to let this city have large data centers we should not and cannot have data centers here. We need to prohibit data centers (transparancy requires company honesty- how many mass corporations have lied or left out key data in the past)
3/5/2026	Roma Lanor	In person survey written Q6	why are these being considered losing our resource for what? Add noise heat vibration, energy use, and water use. We don't have the resoruces to support this kind of industry. The companies are going to violate the policies. Ban all data center in tucson pima county & arizona
2/19/2026		Online Survey Q1	Define Large-Scale Data Centers How large are average data centers currently in Tucson in square footage? What is their comparative energy intake? Who do these current data centers service, and if they service the public how many do each service? Can this information be combined into a pamphlet with an illustration so people can see how much a proposed "large" data center would be in comparison? Eligible Locations and Review Process I don't think City of Tucson should allow co-location of data centers with existing power plants being used to meet electricity demand from existing customers. Replacing this existing generation with other sources of generation could increase emissions and costs for other customers. I think we should consider creating a new zone separate from I-2 for large-scale data centers. I would like more citizen visibility and widespread advertising when it comes to a large data center. Billboards, three-month long newspaper ads, regular reminders on all major local television networks, social media, pamphlet handouts with informed persons who can take questions, and roadside signs. It's important to first establish "why should I care?" If a zoning amendment is made, will that mean we the people do not get to decide on the establishment of a data center? How much power do we the people have now and how much will we have after the amendment? I'd like to increase the enhanced public notice mileage area (which you proposed as half a mile for property owners and 2 miles for HOAs) to 1 mile and 4 miles respectively.
2/20/2026	Colleen	Online Survey Q1	I am concerned about the placement of the Data Center. The impact the large scale data center will have on our current water supply and energy supply.
2/20/2026	Joyce T. Smith	Online Survey Q1	⛔❌⛔NO DATA CENTERS IN TUCSON OR PIMA COUNTY, AZ. PERIOD⬤
2/22/2026	Liam Donovan	Online Survey Q1	The definition is fine but large scale data centers per this definition should be entirely banned. They use up our electricity, land, and water while providing no benefit to rhe community or the world
2/23/2026		Online Survey Q1	Please rewrite the regulation definitions to make it impossible to build large-scale data centers here. We do not want them here, they add no benefit to our community and they will only cause us harm.
2/23/2026	Fiona	Online Survey Q1	I just think they shouldn't be a thing so if I picked the wrong answer know that I don't stand with data centers
2/23/2026	Moxy Smith	Online Survey Q1	I believe we need to halt data center construction in Tucson. data centers take more than they give- just the worst kind of "growth". It is antithetical to any kind of sustainability goals to ballon city power demands for projects that provide products unnecessary for human survival and happiness.
2/23/2026		Online Survey Q1	Large-Scale data centers are massive and complex entities, with substantial impacts not just at the locations themselves, but within the infrastructure they require. The process needs to regulate and create extreme clarity on sound, power generation, backup power facilities, heat generation and overall environmental impacts.
2/23/2026		Online Survey Q1	We are already in a scarce water situation. Places in texas and Georgia are already suffering greatly from these centers. Locals are struggling to get enough waters through their pipes due to the centers. Are we seriously considering letting huge data centers suck our water dry and kill the desert in the process? The Tucson community is strong and has and will be here forever, data centers do not need to be a part of our environment

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Sharyn Marie	Online Survey Q1	Tucson City Council should be responsive to constituent feedback & be using city resources to ban data centers within our community vs creating ways to fast track future approvals based size. Size of a data center is second to HOW MUCH WATER & ENERGY WILL A DATA CENTER CONSUME, HOW MUCH AIR-WATER-NOISE POLLUTION WILL IT EMIT. The city has already spoken loud and clear —TUCSON DOES NOT WANT DATA CENTERS
2/23/2026	Luke Felix-Rose	Online Survey Q1	In my capacity as a student, as a community organizer with Climate Action Campaign, and as Vice President of the West University Neighborhood Association, I stand firmly against the proposal of such extractive development. Not just in my backyard, but in any yard, it is heinous, unnecessary, and provides a product that will soon crash and leave our community decimated in the aftermath. Please stop this nonsense.
2/23/2026		Online Survey Q1	For any data center to be built in an area such as the desert which has extremely minimal groundwater and has to borrow the rest of it from out of state, is a horrible outcome for any long-term sustainability. Other ways of supplying power, such as using electricity, also requires water usage. Not to mention, the additional heat it brings to an area already over-temperature year after year. Any allowance of facilities like this is a major blow to the American Southwest.
2/23/2026	mary-gray mahoney	Online Survey Q1	We should not be allowing for ANY data centers in the desert, so we do not need to have zoning for them.
2/23/2026	Kielly Lewis	Online Survey Q1	Absolutely NO DATA CENTERS. We have said resoundingly and loudly as a community that we do not want these no matter what size they are. We cannot afford to deplete the little water we currently have and we are months to years away from losing our rights to the Colorado river water. Put a permanent ban on the agenda and follow the lead of so many other communities across our country to protect themselves against this extractive, harmful and FAILING industry.
2/23/2026		Online Survey Q1	NO to large scale data centers! NO to small scale data centers! NO to imperial backed data centers!!! NO to data centers on NATIVE NATIONS' LAND!!!
2/23/2026	Rae Lynn Reffruschinni	Online Survey Q1	We should prohibit all data centers from being built in the Tucson area. WE HAVE NO WATER! Our CAP amount is being cut. We are in a drought. We can not sustain any more growth. The business opportunities are small and short lived. In addition, the light, noise, air and water pollution is bad for everyone.
2/23/2026	Daniel Rodriguez	Online Survey Q1	We want NO data centers at all. There is no need to have data centers in a desert that lacks water. I don't care how many "solutions" are given we font want more large warehouses filled with computers that will bring no permanent jobs, fill expand our carbon footprint and contribute to acoustic and overall pollution
2/23/2026	Nicole	Online Survey Q1	Large scale data centers are wrong for our community. I ask that staff be redirected to these regulations to make them prohibitive of data center construction in Tucson and Pima County at large. The Tucson community has shown up to say that data centers are not only an unpopular but extremely unwanted resource within our community. The UN recently declared that we are entering an era of global water bankruptcy. Large scale data centers subtract from our water table in an environment that will become even more volatile in an world of growing water scarcity. Protect our environment and protect the needs of our community. Listen to us, please.
2/23/2026	Sarah Osborne	Online Survey Q1	The people of Tucson and Pima County have voiced concerns over the negative environmental and economic impact that a data center would have, and yet this issue is still being pushed through. Please listen to your constituents and stop all proceedings that would involve data centers being built in Tucson, Pima County or Arizona in general.
2/23/2026	BEV PAUL	Online Survey Q1	VERY concerned about the TRUTH of any info regarding any data center.
2/23/2026	Coral	Online Survey Q1	We the customers of TEP and Tucson Water will end up paying for the data centers. Already raising/wanting to raise our rates dramatically- and deal in CAP looks bad for Tucson. Putting the cart before the horse. While you are trying to be proactive, it could only end up meaning covering your "sss" when "the people" are upset - look at issues around country with mines - pollution, bankruptcy etc. Data centers the "new" mines.
2/23/2026	Carol Plotkin	Online Survey Q1	Redirect staff to write regulations so they make it impossible to build large scale data centers here.
2/23/2026	Emily Stulz	Online Survey Q1	We do not need any data centers here in Tucson and I ask that we rewrite this to make it very clear they are not allowed.
2/23/2026	Jon Ralston	Online Survey Q1	I understand the staff has been directed by the City Council and City Manager to go through this process, but I can't express how frustrating it is to have to continue to fight this as well as the City Council and City Manager with malice of forethought continuing to force this issue.
2/23/2026	Megan	Online Survey Q1	A large reason for the "need" for these data centers all across the country has to do with the mass surveillance state we are seeing grow today. Not only would a data center here take away necessary resources from us it would also allow for that state to grow. Data centers are not an inevitability and we cannot have one anywhere near here.
2/23/2026	Nicole R	Online Survey Q1	No data centers in Tucson. We already have so much art and technology in the city, so much beautiful wildlife and nature. These things make our city a great place to visit and live, and data centers will ruin all that with zero in exchange.
2/23/2026	D	Online Survey Q1	No data centers in Tucson!! No AI surveillance!! No more funding genocides!!

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026		Online Survey Q1	No. The regulations need to be so restrictive that Tucson is removed from the radar of these predatory corporations.
2/23/2026		Online Survey Q1	NO large-scale data center is appropriate, so the proposed zoning review process is inadequate as it falls short of simply prohibiting these data centers. It doesn't matter if data center corporations have to jump through a couple additional hoops; there will be objectively grave consequences on our local community and environment if these centers are constructed that far outweigh any perceived gains.
2/23/2026	Darcy Nagle-O'Brien	Online Survey Q1	The city of Tucson and Pima County are located in a desert. We live under constant threat of inadequate water to sustain our modern lifestyle. Potential major restrictions of CO River/Cap water are on the horizon. AI technology is speculative and NOT necessary. It undermines many job sectors and many of its applications are useless. For these reasons, it makes no sense to build data centers in Pima County. NONE. The companies that will profit from these data centers are notoriously unethical and profit-driven. To date, they have not provided any assurances/terms of accountability for the promises they make to recycle the vast amounts of water and electricity that would be required to run these massive computer banks. The jobs provided by the data centers are extremely limited and mostly consist of construction contracts to bulbs the data centers. It is imperative to understand that data centers are neither inevitable nor necessary. This idea is being pushed by those who stand to gain massive short-term profits. this is a speculative industry, pushing us to accept it and a cost that is too large. Furthermore, constructing them in a fragile desert environment is tantamount to erasing our way of life.
2/23/2026	Gillian	Online Survey Q1	The review process needs to seriously consider how dangerous, energy hungry, expensive, and unnecessary data centers are when defining them
2/24/2026		Online Survey Q1	We live in the desert. Why in THE WORLD would you put a data processing center anywhere, let alone in THE MIDDLE OF THE DESERT. We do NOT have enough water to spare. Adding another processing center on this earth is going to cut the amount of drinking water left in HALF IF NOT more. Please use your brains like we are. Please don't help kill the planet faster.
2/24/2026	Bekka	Online Survey Q1	Change the scale to include facilities 25,000 square feet and above. Require the use of clean, renewable energy for 100% of operations. This is 2026 and we're headed into water bankruptcy. Tucson faces increasing threat of fire. Every new regulation we pass needs to be more strict than the last. Tucson is on borrowed time. Make them plant 100,000 trees. You can really make them do anything if they want this facility badly enough. And if they don't want it, so much the better for us, the residents of Tucson.
2/24/2026	John LaValley	Online Survey Q1	No Desert Data Center!!! Tucsonans have already made it loud and clear! We don't want any data centers in or around our beautiful city. It's bad for the environment, bad for our health, and drains water that's already in short supply. Listen to us! No Data Centers!!!
2/24/2026		Online Survey Q1	No data centers they hurt the communities and resources there will be no value added to the area just damage
2/24/2026	Elizabeth F	Online Survey Q1	The people say No! No large-scale data centers in our desert.
2/24/2026		Online Survey Q1	You've already heard a clear NO from the citizens of Tucson. Not sure why you're continuing this process anyway. (I know, developer pressure.)
2/24/2026		Online Survey Q1	NO DATA CENTERS IN TUCSON OR PIMA COUNTY.
2/25/2026	Zion Alderette	Online Survey Q1	I do not feel having large scale data centers in our community is going to benefit Tucson residents in a meaningful manner. The various contradictions outweigh the benefits. Tucson residents pride ourselves in being innovative and forward thinking. The cost for water, electricity, the environmental hazards that having a large scale data center causes more harm to a population. Tucson has seen other larger communities agree to large data centers and seen the impacts it negatively had within those communities.. yes we want increased employment opportunities, we want corporations to want to move here to our beautiful community. However, We do not want corporations that will permanently harm our citizens.
2/26/2026	Landon S.	Online Survey Q1	I feel that there needs to be a requirement for more community feedback or community involvement in the planning process. The definition seems fine.
3/4/2026	Ellen	Online Survey Q1	Need lots more information.
3/4/2026	Bruce Plenk	Online Survey Q1	If approved, then big expansion, is a new application, hearing, etc required??
3/4/2026	TL Cross	Online Survey Q1	Is there an additional level of fact-checking when the applicant requests or answers your questions to make sure they are being truthful and transparent?
3/4/2026		Online Survey Q1	At which point during the review process is the environmental aspect taken into consideration? (light pollution, water availability, impact, neighboring town impact, etc).
3/4/2026		Online Survey Q1	Feels to big
3/4/2026	John Moffatt	Online Survey Q1	I-2 zoning makes sense. Please consider the lands under the DMAFB Departure Corridor where any land use for dense population is prevented - no homes, apartments, dense employment uses. Also suggest that 50,000 sf is considered to be a medium data center. Suggest 100K sf.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/4/2026		Online Survey Q1	At first I was thinking that since the city does have within it's zoning laws the ability to reject buildings for "purpose" I thought you could just not approve data centers based on that but I appreciate the effort to have the review process dictate whether the business can meet the criteria to not impact the water and electric needs of the community so I support this proposal.
3/4/2026		Online Survey Q1	What kinds of accessory uses likely go along with a data center, and do the accessory structures related to a data center need some considerations? for example onsite water treatment for water recycling vs putting it into the main system? what are the impacts to wastewater infrastructure? Is there a process for expanding the data center on an established site? If an established site wants to add additional data processing, is that also a mayor and council approval? Do they repeat all of these steps and submit the same materials (energy declaration, etc) is there a maximum amount of sf allowed, other than via lot coverage?
3/5/2026	Heather Kaylor-Mayhew	Online Survey Q1	Why does this keep coming up? The city council voted no in August and yet, here we are again.
3/5/2026		Online Survey Q1	We should not have any large-scale data centers in Tucson.
3/5/2026	Christian Garcia	Online Survey Q1	These data centers will set back our city, I'm glad we are taking action.
3/5/2026		Online Survey Q1	I believe these data centers need more supervison.
3/5/2026	Stephanie Perry	Online Survey Q1	I'm fully against the idea of having data centers in Arizona. The reason why I'm against it is because A/C cooling for houses that require electricity is already at an extreme high especially during the summer for the common folk. The average person already spends around 400 dollars possibly more during the summer just to avoid getting heat stroke. If the data centers were to get put in place it would take up way more electrical resources for average people causing their bills to go up. The data centers wouldn't be beneficial for the average people and it would just cause more pollution. According to Lincoln Institute of Land Policy AI in 2023 consumes enough energy to power 100,000 houses along with consuming 5 million gallons of water every day. Having these data centers in Tucson would be awful in the long run for normal people.
3/5/2026		Online Survey Q1	A project as massive and complex as a data center campus obviously relies on a wide range of safety codes and standards, including the National Electrical Code, NFPA 101, Life Safety Code, NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, and dozens of others. While there is no single standard that focuses exclusively on data centers, NFPA 75, Standard for the Fire Protection of Information Technology Equipment, comes the closest. The standard applies to information-technology equipment and the various places in a building where it is found, which is basically everywhere in a data center. However the city of Tucson only adopted the IFC code for 2024 and not any of the NFPA standards or guidelines that apply. Because the NFPA standards fall a few years behind, language in our ordinances stating that the latest versions be applied to these new projects and would be in the best interest of our citizens, our community and our brave fire fighters. Please consider adding NFPA adherence to these types of facilities with proposed adoptions.
3/5/2026	Megan	Online Survey Q1	Why are we hosting meetings about regulations on data centers when we already told you WE DONT WANT A DATA CENTER HERE. This is dystopian. Data centers are not inevitable and you have the ability to stop it. Wake up.
3/5/2026	Leo	Online Survey Q1	We dont need data center to monitor or tucsonans and use digital records against them.
3/5/2026		Online Survey Q1	I feel like mayor and council are still not listening
3/5/2026	Derrick Espadas	Online Survey Q1	Mimics the language and talking points of data center developers and voids the voice of citizens
3/5/2026		Online Survey Q1	Large scale data centers should be defined by how much energy they use. I appreciate the public input process, that no project is guaranteed approval and is not by-right, and that there is no allowance for segmentation. The locations where data center could be located are textbook environmental racism. All the locations are on the Southside, closest to communities that have already been harmed by industrial development. Renters should be notified too.
3/5/2026	Reyes	Online Survey Q1	To much unilateral presentation. Need a townhall

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026		Online Survey Q1	No larger than the current one of roughly 34000 square feet. Better yet no more data centers at all in Tucson
3/5/2026		Online Survey Q1	Given miniaturization and growth of computational density, size is the wrong metric to use for regulation. A MW rating (e.g. 50 MW) would be more applicable. Distance is also an issue. These facilities generate low frequency noise which in the Sonoran desert travels miles, so distance is very different than A weighted noise generators. See the research submitted for more references and details. Notification should be expanded to 10 miles because of the propagation distances of low frequency noise in the Sonoran Data.
3/5/2026		Online Survey Q1	You need to explain why such an entity would be of help to the citizens of Tucson. What about renters?
3/5/2026		Online Survey Q1	I dislike the 50,000 Sq ft minimum requirement, i think it should be lowered, and I believe there should be a maximum limit defined as well. Every citizen deserves a notification, regardless of whether they own property, or not.
3/5/2026	Nathan Laurel Shane	Online Survey Q1	Need to notify neighbors farther than 1/2 mile. Notifications should go to the property, not the landlord.
3/5/2026		Online Survey Q1	Definition should be more broad and inclusive, based on energy use or if it must be by square feet then smaller than 50K. Should not be same controlling ownership interest, should allow for multiple interests. Should Include more "and" language, less "or" language. The review process should be more inclusive of renters and other residents and businesses, individuals including students and workers, and the notice area should be expanded to 10 miles or more. There should be multiple required public meetings, at least 3. Also, the developer should be required to gain a supermajority of signatures of approval from all residents within a 20 mile radius in order to develop a large data center
3/5/2026		Online Survey Q1	These regulations do not grow nearly far enough. No data centers. Stop it.
3/5/2026		Online Survey Q1	Please do NOT allow data centers here. We do not want AI and we want to protect our fragile ecosystem above all.
3/5/2026		Online Survey Q1	Define large data center as 50,000 contiguous or non-contiguous in the same city. Review process doesn't allow time for public verbal comments.
3/5/2026	C Sipp	Online Survey Q1	Data center means a facility consisting of one or more buildings (whether constructed simultaneously or in separate phases) used primarily for the storage, management, processing, and transmission of digital data, which houses computer or network equipment, systems, servers, appliances, and other associated components related to digital data storage and operations. Data center includes commercial cryptocurrency mining operations and processing. Small-scale data center means a data center that has an electrical design capacity of 20 MW or less, and that uses less than 50 gallons per minute of water or less on an annualized basis. For the purposes of determining compliance with power and water usage thresholds in this ordinance, all data center buildings that are part of a phased or multi-building campus shall be evaluated in the aggregate, regardless of whether such buildings are constructed simultaneously or in separate phases. Large-scale data center and above means a data center that has an electrical design capacity greater than 20 MW or that uses more than 50 gallons per minute of water on an annualized basis. For the purposes of determining compliance with power and water usage thresholds in this ordinance, all data center buildings that are part of a phased or multi-building campus shall be evaluated in the aggregate, regardless of whether such buildings are constructed simultaneously or in separate phases. Purpose. The purpose of Large-Scale Data Center District is

			to provide a clear, comprehensive, and predictable regulatory framework for the siting and operation of large-scale data centers within Tucson. Large-scale data centers are characterized by substantial long-term demands on public infrastructure, including electrical power, water supply, transportation systems, and emergency services, as well as potential impacts on surrounding land uses and environmental resources. This district is intended to ensure that such facilities are evaluated, located, and developed in a manner consistent with the Comprehensive Plan (TBD); that their infrastructure and operational impacts are appropriately reviewed and mitigated; and that the City can fulfill its longterm fiscal, infrastructure, and community responsibilities associated with hosting generational infrastructure facilities. (b) Principal permitted use. (1) Large-scale Data Centers. (c) Accessory Uses. (1) Battery energy storage systems (BESS). (2) Solar arrays and other similar on-site renewable power generation systems. (3) On-site standby or backup power generation. (4) Electrical substations, switchyards, or power distribution equipment. (5) District energy or microgrid infrastructure. (6) Water treatment and recycling facilities. (7) Office, maintenance, and employee support facilities incidental to the data center. (d) Major site plan required. A major site plan shall be submitted and reviewed prior to the approval of a large-scale data center. A large-scale data center shall require rezoning to the zoning district, unless already located within such zoning district. (e) Additional information. (1) The following information shall be submitted on the major site plan, or in narrative form, supplied by the applicant with any application for rezoning to the zoning district: a. Legal description of all properties leased and/or owned, that are identified to be part of the project area; b. A description of the project including development timeline, location of buildings, parking, approximate number of employees; c. Water Study. A water study shall be submitted demonstrating that sufficient water resources are available to support the proposed use as described in See water comments d. Economic Development Agreement. The applicant shall enter into an Economic Development Agreement (“EDA”) with the city I have more but for some reason this format does not allow all the recommendations. That is not good or ideal.
3/5/2026	Karen MacDonald	Online Survey Q1	Why allow exceptions for a large-scale data center at all (in a PAD or PCD)?
3/6/2026		Online Survey Q1	We live in a desert, we should not have one of these.
3/6/2026	Toni Gosinski	Online Survey Q1	Need to make sure water can't be taken. Drought and a lack of CAP water will create dangerous conditions in arizona in the next 50 years. I know the large scale water ordinance is a guard rail let's just make sure we don't have too many small data centers that add up to the functional equivalent to a large one. Need a upper limit on total water usage across all data centers using Tucson water.
3/6/2026	Lynn Price	Online Survey Q1	Looking at the TAC report: I wonder how current codes are working for existing data centers.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/7/2026		Online Survey Q1	The review processes and definitions of large-scale data centers are nowhere near strict enough to protect the residents in Tucson. To put it bluntly: unless these companies seeking to build facilities in our desert--which will bring more costs than benefits (people will get sick and die from the pollution that data centers bring)--have revolutionary water treatment and reclamation methods, then they should not be allowed to build here at all. We are a desert with already scarce water supply and simply cannot afford a data center being built here.
3/8/2026		Online Survey Q1	I like that property owners within a half mile and neighborhood associations within 2 miles are included in the review process. I would like to see property owners within 2 miles notified because that is the distance the low hum can travel that far; this also seems more appropriate when a data center is being proposed for a PAD rather than I-2.
3/11/2026		Online Survey Q1	I want the mayor and council to more overtly declare that Tucson will NOT host data centers. They are a self-replicating blight on the land and they will only draw more. Oppose them entirely please.
3/11/2026		Online Survey Q1	The need is growing. We can no longer hide the need. People are afraid of change. Managed correctly and it will be fine.
3/11/2026	Anthony Young	Online Survey Q1	Placing a data center in a location without sufficient water resources is irresponsible. I can see no community benefit nor justification for doing so given the shortage of water in southern Arizona. In fact, continuing to move forward with this project over the objection of community members is a flagrant disregard of the wishes of the public and suggests corruption given this appears to be driven by certain business interests. Sad to see government leaders forcing a data center on the public.
3/11/2026		Online Survey Q1	I feel that the biggest factor to be considered in the review process should be the opinion of the homeowners and neighborhood associations. If the majority of them vote no, then we should not allow the data center to be built.
3/11/2026		Online Survey Q1	No water/ power data centers in Pima County
3/11/2026	Kerry Hales	Online Survey Q1	TEP and GOP want to overturn public input
3/11/2026		Online Survey Q1	In definition on website should read used for instead of use for
3/11/2026		Online Survey Q1	Throughout this entire saga, Tucson citizens have repeatedly rejected building a data center in southern Arizona. The fact that we're still fighting speaks to a failure on the part of local government and corporate commission. Once again, we reject any plans, current or future, to build data centers in Pima County.
3/11/2026	Novaray	Online Survey Q1	Not excited about massive power or water usage but glad to see a practical plan to move forward
3/11/2026	Annette Robertson	Online Survey Q1	Resident opinion should take priority - nothing happens if we are not living here or paying taxes. I moved away from Goodyear because the enormous desire to fill our empty spaces with buildings that bring NO value to the residents. We do not need to be the dumping ground for projects rejected in other more "beautiful" places. PLUS, we are in the Sonoran Desert - no place for an industry that pulls from our extremely valuable and diminishing resource of water. You lose all credibility when encouraging water conservation and then consider allowing data centers. It is laughable and totally incongruent with our desert, Tucson, and Pima County values. Thank you!
3/11/2026		Online Survey Q1	there is no way this is not going to cause more cost to the citizens of Tucson. It benefits the company and the company Board of directors and the CEO of the company pushing this program. Let alone a host of other issues that will be something that the Tucson citizens will have to face and will not be able to reverse.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/11/2026		Online Survey Q1	Applicants must define how they will process their electronic waste when components of their systems fail or become obsolete and need replaced. Their waste cannot go into public landfills. Smaller buildings can be hubbed together, and equipment can get smaller, so there needs to be smaller threshold than a 50,000 square foot facility-size. The definition of Data Center cannot be left open so that data-centers can be allowed to lease data services to third parties. Data centers frequently lease their "data services" and an "on-site" property owner could be a shell for an international company. All data centers, regardless of who is using the services, need to be strictly controlled and limited. Property buyers cannot be trusted to provide their own reports for proving adequate water supply. This is the desert, and there is not enough water for life. Notifications need to be sent to anyone living within a 10 mile radius of a proposed center. Noise and air pollution travel further than 2 miles. Energy providers (owned by Canada) must charge a higher electric rate to data-centers. Individual customers cannot be expected to pay to increase TEP's capacity and improve their electric grids because big data wants to give them money. Part D, second bullet point is incomplete in regard to limiting sound when in proximity to _____? "Enhanced" landscaping needs require that there be native plants and big pollinator gardens. Aesthetics won't save water and stop wasted electricity. We don't need AI. The desert ecosystem does not need data centers.
	Stephanie Duncan		
3/11/2026		Online Survey Q1	I am concerned regarding the massive water usage required for such a project anywhere in AZ. We are in a severe drought and have been for decades. This wont help the matter. As far as the massive energy usage, let the tech billionaires pay and provide for that themselves. They'll be making money off this. Let it be their investment for doing business with Tucson. Im sick of these guys literally getting away with murder with their unregulated destructive ideas; social media in particular along with AI.
3/11/2026		Online Survey Q1	***LARGE AND HYPER-SCALE DATA CENTERS ARE NOT INEVITABLE!*** ***Tucsonans do not need or want ANY large-scale data centers*** 3)Definition: -I agree that a clear definition is necessary to create restrictions. -IF City of Tucson is still considering allowing the building of large-scale data centers DESPITE DISAPROVAL of Constituents as well as endless negative energy, water, environmental and human implications, should there be an upper limitation that would ALWAYS be declined? Example: Large and hyper-scale defined as 50,000-100,000sq ft. The City of Tucson will reject any proposal >100,000sq ft. Without a clear report of rejecting over the upper limit, I feel that there will be opportunity for manipulation of the language that could result in attempts at even larger facilities 4)-Review Process: -Required neighborhood meeting invites should be expanded to include ALL humans living and working in the defined area. Specifically, renters (not just property owners), all schools and daycares (individual locations and district/administration level), as well as health clinics/doctor's offices/hospitals (individual locations and administration level). It is imperative to notify individual humans and locations as these are the humans effected, out of town property owners will not have the same buy in. -The Notification Radius should be larger than the proposed increase. If the intent is to build a huge, hot, loud, water sucking, undesirable and unnecessary shelter for computers in an area that has limited resources, and is already subjected to environmental racism, the people that will be affected should know. All humans that LIVE and WORK within 2miles should be notified of neighborhood meetings. There should be several neighborhood meetings at varying times with enhanced

			accessibility.
3/11/2026		Online Survey Q1	Needs more transparency
3/11/2026		Online Survey Q1	Data centers are required to maintain our global competitiveness.
3/11/2026		Online Survey Q1	Alternate cooling method
3/11/2026		Online Survey Q1	The public should have input on proposed large scale data projects. No NDA's should ever occur and should be outlawed. The taxpayer is the biggest stakeholder and should be notified immediately.
3/12/2026	optional	Online Survey Q1	Not enough unbiased review. MONEY ALWAYS talks.
3/12/2026	Gretl Krooksmer	Online Survey Q1	Data centers suck up water and natural resources while providing zero benefits to the communities in which they are placed. They provide no jobs in their 50,000 sq feet buildings. They are a blight. Please do not allow big tech to steal more of the desert's beauty
3/12/2026		Online Survey Q1	Why are we allowing energy hungry companies utilize our resources? Why are residents not protected from skyrocketing utility bills?
3/12/2026		Online Survey Q1	I think it's ridiculous to have an AI plant here- let alone ANYWHERE! It's terrible for the climate and it's sucking the creativity and life out of people. BOOOO AI
3/12/2026	Divinity Caldwell	Online Survey Q1	The parameters shared during this meeting are not strict enough to prevent exploitative and extractive companies from trying to weasel in a hyperscale data center that would use a lot of resources
3/12/2026		Online Survey Q1	I firmly believe that we need to add CoT taxing to the data centers. The funding from said taxes should then be used to further cover the costs of the Thrive Zones and the Prosperity Initiative.
3/12/2026	Lisa Stee	Online Survey Q1	Let them come. I don't believe a data center is wildly different from any other proposed industry and I don't think we need yet another set of codes and a new permitting process to deal with them. Complicating our business codes yet again only drives up the cost of doing business in Tucson and that is a serious long term problem.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026		Online Survey Q2	Energy Consumption and Sourcing What will be the conditions for utilities to serve data center customers? Can there be minimum revenue obligations, as well as prepayments, and required letters of credit for those costs? Is there a way for regulators to hold utilities accountable for developing new electricity supplies required by data centers, perhaps basing accountability on firm commitments with financial backing from data center customers? Utilities should also utilize rate-setting processes to track transmission costs caused by specific customers. Data center customers (and other large loads) must be required to pay the costs of direct transmission connection. Utility companies should recognize these costs in retail-cost-of-service studies so that costs can be allocated appropriately. Water Use and Sourcing I need more information. If large water users use more than 10,000 ccf, what do the current largest water users use? Can we get an example list? Can we get a comparison to a single Walmart? (Or something simple that can help people mentally measure how big this thing is) Can we get a comparison with the average neighborhood and a single household?
2/20/2026	Colleen	Online Survey Q2	I hear a lot about our water scarcity. How will this data center that uses a lot of water to cool the data center impact our current water supply? Tucson is growing with more people moving in. The south west has always had a problem with water. How is this going to impact our water supply going forward into the future?
2/20/2026	Joyce T. Smith	Online Survey Q2	⛔❌⛔NO DATA CENTERS IN TUCSON OR PIMA COUNTY, AZ. PERIOD⬤
2/22/2026	Liam Donovan	Online Survey Q2	We should not be giving any electricity or water to these data centers whatsoever
2/23/2026	Fiona	Online Survey Q2	I kinda don’t know what these fully mean and I don’t stand with data centers they may leave
2/23/2026	Moxy Smith	Online Survey Q2	no amount of water or power should be allocated to data centers.
2/23/2026		Online Survey Q2	Power generation and how it is handled need to be addressed on a regional basis, not just on a facility-by-facility or project-by-project basis but needs to be holistic. Methods, power generation and what happens to the area water with increased generation capabilities in place given the water restrictions in place and coming from the Colorado River.
2/23/2026		Online Survey Q2	No data centers. Not a drop of water
2/23/2026	Sharyn Marie	Online Survey Q2	Do your job & be responsive to the community - not the corporations.
2/23/2026	Luke Felix-Rose	Online Survey Q2	As a TEP ratepayer, I will be put one step closer to homelessness, a status that is criminalized by the City of Tucson. Projects like Hyperscale Data Centers will certainly increase the infrastructure needed by TEP, thus increasing my rates, lowering my quality of life, and making me less financially stable. If you push this through I will take it as a hostile stance against me personally.
2/23/2026		Online Survey Q2	For any data center to be built in an area such as the desert which has extremely minimal groundwater and has to borrow the rest of it from out of state, is a horrible outcome for any long-term sustainability. Other ways of supplying power, such as using electricity, also requires water usage. Not to mention, the additional heat it brings to an area already over-temperature year after year. Any allowance of facilities like this is a major blow to the American Southwest.
2/23/2026	mary-gray mahoney	Online Survey Q2	The only appropriate answer is NO DATA CENTERS.
2/23/2026	Kielly Lewis	Online Survey Q2	TEP is already out of control and we need a public option for our energy sources. It has been proven we can do this. In addition adding anything to the agenda or considering future projects that will deplete our water resources is foolish and dangerous to the area.
2/23/2026	Rae Lynn Reffruschinni	Online Survey Q2	We should prohibit all data centers from being built in the Tucson area. WE HAVE NO WATER! Our CAP amount is being cut. We are in a drought. We can not sustain any more growth. The business opportunities are small and short lived. In addition, the light, noise, air and water pollution is bad for everyone.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Daniel Rodriguez	Online Survey Q2	The appropriate standards are zero energy and zero water provided to these datacenters. As seen across the country, the neighboring communities end up with higher energy bills, subsidizing the data center for companies that just want to keep dividing us for their profit. This is not something that will benefit the community hence it should not be allowed within it
2/23/2026	Nicole	Online Survey Q2	Data centers are water negative. Any proposed compliance with large quantity water ordinances does not negate this fact. No data centers in Tucson or Pima county.
2/23/2026	Sarah Osborne	Online Survey Q2	There is so much evidence to support that data centers cause significant negative impacts on water sources and energy rates in the areas they are operating.
2/23/2026	Coral	Online Survey Q2	What You ask and they agree too is not necessarily what will happen in practice. Where are the fines and other legal repercussions .
2/23/2026	Carol Plotkin	Online Survey Q2	Redirect staff to write regulations so they make it impossible to build large scale data centers here.
2/23/2026		Online Survey Q2	Demonstrating an "adequate water supply" is likely impossible in reality given the state of the Colorado River. Please strengthen this requirement. Recycled water should not be considered less valuable or separate from potable water—we have One Water.
2/23/2026	Emily Stulz	Online Survey Q2	We have minimal water already and don’t need to be using it for data centers.
2/23/2026	Jon Ralston	Online Survey Q2	Ban hyper scale data centers
2/23/2026	Megan	Online Survey Q2	We haven't gotten any real transparency to our questions about data and water usage. The boards stance seems to be that it won't make any impact on us but looking around the country we see that is not true. Also we do not have the resources to provide a data center.
2/23/2026	D	Online Survey Q2	We live in a desert!! We CANNOT provide water for data centers!
2/23/2026		Online Survey Q2	The standard seems to consider whether the user has assured access to water and power, but does not appear to consider additional costs to the utility (and thus other users) to provide that water and power.
2/23/2026		Online Survey Q2	Needs to consider the Colorado River levels. We are a desert. The years are getting warmer. We do not have the surplus of resources or the desire to just these community-destroying entities.
2/23/2026		Online Survey Q2	NO large-scale data center is appropriate, and the proposed energy/water use and sourcing standards are inadequate. They are incredibly vague and provide no real guidelines. What does “access to adequate energy/water supply” even mean? It seems like this is purposefully left vague so that the data center corporations themselves can potentially decide what it means when submitting their application. Again, however, this falls short of simply prohibiting these data centers, which is the only correct and ethical decision the City of Tucson can make.
2/23/2026	Darcy Nagle-O’Brien	Online Survey Q2	We do not have the necessary water and the energy required would be prohibitively expensive as well as detrimental to the environment.
2/23/2026	Gillian	Online Survey Q2	These need to be incredibly strict, we are living in a water deficit, it is not understandable to give resources to an unwanted data center
2/23/2026		Online Survey Q2	Tucson doesn’t need harsher conditions
2/24/2026		Online Survey Q2	Please use your brains when deciding to NOT add a data center in the middle of the desert
2/24/2026	Bekka	Online Survey Q2	Restricting the use of potable water is a good start, but how does that get enforced? Regulatory agencies have been disbanded left and right over the past year. We don't know what the future holds. The best thing we can do is to restrict water use. Tucson does not have the water for data centers. Make them use clean, renewable energy for 100% of their operations. We don't want to breathe more smoke from TEP burning more oil, and we don't want our electricity costs rising either.
2/24/2026	Daisy Flowers	Online Survey Q2	Large scale data centers should not be allowed to be built here in Tucson at any capacity. We will not allow what has happened to other cities happen to ours. The environmental impact is irreversible and it is always at the expense of us civilians, both environmentally and economically when the energy cost is passed down to our bills.
2/24/2026	Elizabeth F	Online Survey Q2	Large-scale data centers are so extractive and devastating for the climate. Allocating resources to developing data centers is especially harmful to the nearby Indigenous communities that are already facing resource insecurity.
2/24/2026		Online Survey Q2	Too lax, not enough oversight. Inappropriate to have energy-guzzing and water-guzzing enterprises in the desert.
2/26/2026	Landon S.	Online Survey Q2	I feel that there needs to be something built in for water amount tier payment increase requirements and a required amount of renewable energy infrastructure as a percentage of energy use
3/4/2026	Ellen	Online Survey Q2	We are running out of water. For existing HUMANS living here. Too many unknowns.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/4/2026	Bruce Plenk	Online Survey Q2	Unclear if or what penalties for not following plan?? I didn’t see any requirements for using rainwater harvesting, white or “green” roofs, non potable water for appropriate uses, etc
3/4/2026	TL Cross	Online Survey Q2	Again double-checking to make sure that the applicants answers are truthful and transparent. How are you going to do that?
3/4/2026		Online Survey Q2	Showing that they can provide the resources doesn't mean that they are appropriate methods. Using other counties to provide power isn't ethical.
3/4/2026		Online Survey Q2	Need analysis of how usage affects tep capacity and pricing for others long term
3/4/2026	John Moffatt	Online Survey Q2	Sourcing of energy needs to be broader as new energy sources are developed - example - Small Nuclear
3/4/2026		Online Survey Q2	If energy is sufficient or can be generated, but costs will increase due to transmission or other infrastructure needs, applicant should cover those expenses to prevent cost increase to existing customers. Water should default to closed loop. If using once through or open loop (even with recycled water) we should seek to condense and recapture through passive systems and reuse or put into surrounding plant areas proposed at borders. Wastewater is also a concern- must show we can properly process blowdown given scale and potential impact to our grey water systems. Any expenses to enhance water processing should be borne by company.
3/4/2026		Online Survey Q2	I'm not sure exactly how businesses would meet the standards but they are exactly what is needed. What I wasn't clear on is what happens to a business when it violates those standards? It should result in something painful to the business or they could just pay the fine and continue making water/electricity an issue for residence.
3/4/2026		Online Survey Q2	Thank you for covering gaps not covered by the LWUO. What goes into the energy declaration? How can we ensure the declaration is clear and thorough enough to hold them accountable? What does enforcement of energy demand/sources look like?
3/5/2026	Heather Kaylor-Mayhew	Online Survey Q2	Study after study shows the detriment data centers cause to the environment and communities they are built in. Please do your research and vote no on text ring and continuing this discussion on data centers in Southern Arizona.
3/5/2026		Online Survey Q2	We should not be paying for billionaires who don't want to pay for their own data centers.
3/5/2026		Online Survey Q2	This can be extremely dangerous in the future, for all we know we can suddenly run out of water or electricity and energy, now what? Not only that, the demands go up, and so will the price and taxes. Nobody will want to live in a situation like this.
3/5/2026		Online Survey Q2	In other states the consumer ended up getting their electric rates increased. Mega users should pay and offset the costs, adopt a no water usage policy for data centers. They can use lubricants
3/5/2026	Megan	Online Survey Q2	Stop this garbage and fight against the data center, which you have the capacity to do by being in control of land use
3/5/2026	Leo	Online Survey Q2	Our water are for tucsonans use only
3/5/2026		Online Survey Q2	I feel like mayor and council didn’t listen to us the first time: Tucson cannot support large scale data centers
3/5/2026	Derrick Espadas	Online Survey Q2	No means no. Why do outside corporations get to violate us
3/5/2026		Online Survey Q2	Energy should be 100% renewable. And get rid of TEP. Public power for Tucson!
3/5/2026	Reyes	Online Survey Q2	Must be threshold where if they do not remain within use electricity or water is shutoff, not just fined!
3/5/2026		Online Survey Q2	There needs to be a much better cross agency approach to power supply, generation and delivery. These have massive impacts on resources and resident cost, which MUST be transparent. Bouncing who owns what between agencies is irresponsible and the government side MUST work together to regulate these rather than leaving residents to try to sort this out or hold the bag when no one pays attention. The issue in water is with respect to power generation, which is substantial and poorly regulated. Clarity on the SPECIFICS of where and how the energy is created and delivered and how much is thermal power based to drive water conservation. Water use directly in the facilities dwarfs power generation needs.
3/5/2026		Online Survey Q2	There should be REQUIREMENTS that companies use renewable energy and recycled water.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026	Nathan	Online Survey Q2	We don't have any water to spare, and our community cannot afford the hikes to our electric bill. Not one drop, don't build this.
3/5/2026	Laurel Shane	Online Survey Q2	This may be outside zoning abilities, but can you require a minimum percentage of renewable energy?
		Online Survey Q2	We do not want these here they should be prohibited. They should do more than "disclose" a "proposed" energy amount or mix. The accountability mechanisms are not strong enough there appears to be nothing to hold the developer to their original disclosure at time of mayor and council decision. Penalties are not strong or high enough for the Large Water User Ordinance.
3/5/2026			We don't want these things here. We do not want large scale data centers in Tucson or anywhere.
3/5/2026		Online Survey Q2	These regulations are far too weak.
3/5/2026		Online Survey Q2	No water or electricity for AI- we NEED those resources for the residents!
3/5/2026		Online Survey Q2	Very weak in energy standards and sourcing. All it says is applicant is required to “discuss” renewables? Require them to USE renewables. Only renewables.
		Online Survey Q2	Water Use Agreement. The applicant shall submit a water use agreement to govern ongoing coordination between the applicant and the County regarding water use during operation of the facility as described in Section 107-151 § (n)(2) below. Water Supply and Sustainability Review. Approval for large-scale data center projects shall be conditioned on the applicant demonstrating there is sufficient reliable water supply to meet all projected water demands without undue adverse impacts on existing users, aquifers, or watersheds. To demonstrate this, the applicant must comply with the following requirements: (1) As part of any application for rezoning, special use permit, or other discretionary land use approval for a data center, the applicant shall submit a Water Study. The purpose of this plan is to demonstrate, at a planning-level, that sufficient water resources are available to support the proposed use without causing undue adverse impacts to existing water users, groundwater resources, or surface water systems. The plan shall describe the proposed water source(s), anticipated ranges of water demand, assumptions regarding cooling technologies, efficiency measures, system reliability considerations, and general contingency approaches for water supply interruptions or emergencies. The plan shall be prepared by a qualified professional and shall contain sufficient information to allow the City reviewing bodies, and the public to understand and evaluate the potential water impacts of the proposed use. (2) Prior to issuance of any building permit for a data center, the applicant shall enter into a Water Use Agreement with City. The purpose of the Water Use Agreement is to govern ongoing coordination between the applicant and the City regarding water use during operation of the facility. The agreement shall address, at a minimum, water use monitoring, reporting frequency, data sharing protocols, and verification of compliance with applicable permits and approvals. The agreement may also include provisions addressing response procedures during periods of water supply constraint, drought, emergency conditions, or other circumstances in which water use reductions or operational adjustments may be necessary to protect public health, safety, or existing water users. The Water Use Agreement may include additional terms related to adaptive management, mitigation measures, and enforcement as determined appropriate by the City and Applicant. The Water Use
3/5/2026	C Sipp		

			Agreement shall also require the Applicant to demonstrate coordination with the Environmental quality regarding applicable water use permits, interference mitigation procedures, monitoring obligations, and compliance procedures. (3) The applicant shall prove the use of water source immediately for all phases of the construction and understand the tier system by Tucson Water and incur heavy use rates for any CAP and/or groundwater use. Basically, zero water use day 1 to day 10000000000000000.
3/5/2026	Karen MacDonald	Online Survey Q2	Energy usage must take into account the impact of a large data center's use of energy on community residents. Will a data center's energy usage strain the energy grid? Will residents' energy rates increase? Also, renewable energy sources should be a priority. For water use, we live in a desert in the midst of a 30-year drought. There is no adequate water supply for a large data center, period.
3/6/2026		Online Survey Q2	As they aim to reconfigure the water dividends from the Colorado River in a way that could wipe Arizona from the map from its general water use, it is EVIL to consider the allowance of a large scale data center to be built here. Anyone involved in the invitation to Project Blue's remnants or peers to construct such a monstrous and destructive entity in Tucson's limits does not have an Arizonan's best interests at heart and is failing as a public servant. NO DATA CENTERS!
3/6/2026	Toni Gosinski	Online Survey Q2	Generator usage needs to be tested to make sure it doesn't cause air quality issues during heat emergencies. In the future if it is 115 degrees and a power outage happens running generators of any kind could cause air quality issues. Can air quality tests be done when generators run?
3/6/2026	Lynn Price	Online Survey Q2	According to the purpose of city panners, codes don't regulate energy and water use. It is up to the other regulatory powers of the city. How well is that working for existing data centers.
3/7/2026		Online Survey Q2	I cannot reiterate enough how inappropriate the mere consideration of a data center being built in a desert is. They should not be allowed to build here at all. The "closed loop" systems are advertised to be more effective than they are in reality. Once our drinking water is polluted, it will not be clean. Even if the facility is careful about how much water they use (and even if they use "air-cooling", which is also highly burdensome on the community both health-wise and financially), it will pollute our groundwater permanently by leaking chemicals just by being there at all. Do not let any data center, large or small, be built in a desert period.
3/8/2026		Online Survey Q2	When an applicant discusses the energy source, are the obligated to stick to that mix for any set time? Can the energy mix be altered? I like that potable water cannot be used for cooling. Is groundwater pumping part of an "adequate source"?
3/11/2026		Online Survey Q2	See prior
3/11/2026	Anthony Young	Online Survey Q2	Arizona is on the verge of having its water allotment reduced by the Federal Government. TEP is seeking currently a rate increase, and the public can expect TEP will request additional increases particularly after this project is built.
3/11/2026		Online Survey Q2	My concern is that we need a way to "police" the water and energy use. Impose hefty fines if they go over their limits, or shut them down entirely.
3/11/2026	Kerry Hales	Online Survey Q2	These data centers are notorios for lying.
3/11/2026		Online Survey Q2	the proposed standards will likely only stand until all final contracts are approved and "new information" demands revisitation
3/11/2026		Online Survey Q2	Should be signed off on by an independent entity, not just the developer's or their client's claims. Also, has the city paid for the high-powered legal advice necessary to outwit these powerful companies? They're getting the best, specialized legal advice. We need the same. This is not an area for in-house counsel or the usual suspects of outside vendors.
3/11/2026		Online Survey Q2	Data centers notoriously do not keep energy or water conservation promises.
3/11/2026	Annette Robertson	Online Survey Q2	Science should lead all discussions. Crops should be low water needs crops. Not sure if gourd farmers are still supplemented, but our farming should be water smart choices and related to food supply - keeping as much local as possible. Manufacturing plants pulling from our aqueducts should not be allowed free reign to our water supply. I appreciate the efforts AZ is making and realize we are caught in a timeline that is fast approaching for a resolution.
3/11/2026		Online Survey Q2	how can anyone be positive of how sources of water sources of energy are going to be replaced and how much is going to be utilized and so forth you have to be kidding if you know the answers to that for the future of Tucson.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/11/2026	Stephanie Duncan	Online Survey Q2	Applicants must define how they will process their electronic waste when components of their systems fail or become obsolete and need replaced. Their waste cannot go into public landfills. Property buyers cannot be trusted to provide their own reports for proving adequate water supply. This is the desert, and there is not enough water for life. Notifications need to be sent to anyone living within a 10 mile radius of a proposed center. Noise and air pollution travel further than 2 miles. Energy providers (owned by Canada) must charge a higher electric rate to data-centers. Individual customers cannot be expected to pay to increase TEP's capacity and improve their electric grids because big data wants to give them money.
3/11/2026	Daniela Mendez	Online Survey Q2	I do not think a desert city is the appropriate location for a large scale data center, regardless of the resources usage.
3/11/2026		Online Survey Q2	See previous comment.
3/11/2026		Online Survey Q2	***LARGE AND HYPER-SCALE DATA CENTERS ARE NOT INEVITABLE!*** ***Tucsonans do not need or want ANY large-scale data centers*** 6) Energy use and sourcing standards: “Applicants must demonstrate access to adequate and secure energy supply at time of application” If these organizations have enough money to build a large-scale data center, then they have enough money to build a solar grid or other alternative renewable energy source to supply their own energy. There should be a restriction on their ability to access the current power grid. **Maybe there should even be a contractual requirement that these corporations build a renewable energy source that has enough to give back to the community instead of solely exploiting the people and land for the benefit of billionaire investors?** 7) Water use and sourcing standards: I appreciate that Water conservation is being reviewed as part of Data Center evaluation. I am concerned that the descriptions of restrictions do not go far enough. Under the Large Quantity Water Users Ordinance info listed in the FAQs. “This plan must demonstrate that at least 30% of proposed water use will come from reclaimed sources.” During the meetings it was described that this Ordinance is reserved mostly for golf course or parks. I would like to point out that as useful that an Ordinance like this is, large-scale data centers are NOT golf courses or parks. Golf courses and parks are usable locations where community members come together and enjoy their time and space. This use may change the land, but they do not decimate the land and environment in the same way that a large-scale data center does. IF the City of Tucson continues to consider the building of large and hyper-scale data centers, the Large Quantity Water Users Ordinance can be a starting point, However, A SHELTER FOR COMPUTERS DOES NOT DESERVE THE SAME WATER RIGHTS AS A LIVING USEFUL SPACE, LIKE A GOLF COURSE OR PARK. Aside from some kitchen/bathroom use at the facility, the need for potable water should be close to zero. Maybe this type of facility should have its own Ordinance rather than being grandfathered into something designed for community spaces?
3/11/2026		Online Survey Q2	City must first address water issues for the general public
3/11/2026		Online Survey Q2	Renewable requirements as long as reasonable are ok
3/11/2026		Online Survey Q2	No eco friendly be a city inside a city fighting each other for water and energy and the land keeps dieing
3/11/2026	DeeAnn Saber	Online Survey Q2	We already do not have enough water resources in Tucson nor Arizona. They need to build these massive energy suckers somewhere else that has lots of water.
3/11/2026		Online Survey Q2	How could mayor R. Romero be concerned about Lake Mead but fail to be concerned about water usage for data centers? That’s absurd.
3/12/2026	optional	Online Survey Q2	NO water and electrical power use is the ONLY choice.
3/12/2026	Gretl Krooksmer	Online Survey Q2	We need a desalination plant in Ajo to assure water for our community

Feedback Received on Large Scale Datacenters (3_12_2026)

3/12/2026		Online Survey Q2	The original proposal was to use a substantial amount of electricity and water. How do we guarantee that the resources are available? The large data center push it short-sided.
3/12/2026		Online Survey Q2	water and energy should be provided to the community members of Tucson, NOT AI GENERATORS
3/12/2026	Divinity Caldwell	Online Survey Q2	Not strict enough
3/12/2026		Online Survey Q2	I think we should outright decline all water use for data centers due to being in a desert with minimal water as it is. Water is not a right, it's a human essential and should be treated as such. Water for residents takes precedence over a data center.
3/12/2026	Lisa Stee	Online Survey Q2	See earlier comment. Project Blue came in with an interesting water source (reducing leakage in city water pipes). They were clearly willing to work with the city. Tucson equally clearly was not willing to work with them. I wonder if there would have been room to talk about electricity sourcing and think the city should have had that conversation particularly in light of the frustration with TEP. That is an opportunity missed and now probably an elimination of any future opportunities.
2/19/2026		Online Survey Q3	Setbacks from Residential and Other Non-Industrial Uses Regarding setbacks, I would like the public to know what the current zoning laws for setbacks are for our power plants. That needs to be factored into consideration so the people living around the plants can give their opinion if they would have appreciated a few hundred more feet. Ideally, I would love at least 1 mile from residential and commercial zones. Half a mile is tolerable. I think it would be great to implement a sort of jury standard. I'm a tax accountant and what I learned in school is that if a judge looks at a defendant's case, recognizes that the loopholes they're trying to jump through is to evade tax, he can call BS and shut it down. "If it walks like a duck, it's a duck" kind of thing. You already have something like that with the thing you made so people cant make tons of mini data centers under the same ownership control to fall under the 50,000 sq ft rule.
2/20/2026	Colleen	Online Survey Q3	I suppose this question really depends on where these data centers are planned to be placed? Are they going to be located in commercial locations?
2/20/2026	Joyce T. Smith	Online Survey Q3	⛔❌⛔NO DATA CENTERS IN TUCSON OR PIMA COUNTY, AZ. PERIOD⬤
2/23/2026	Fiona	Online Survey Q3	I feel like no DATA CENTERS
2/23/2026	Moxy Smith	Online Survey Q3	no data centers.
2/23/2026	Sharyn Marie	Online Survey Q3	How many times & how many ways do you need to be told the same thing - NO DATA CENTERS
2/23/2026	Luke Felix-Rose	Online Survey Q3	They are not enough. It's that plain.
2/23/2026		Online Survey Q3	For any data center to be built in an area such as the desert which has extremely minimal groundwater and has to borrow the rest of it from out of state, is a horrible outcome for any long-term sustainability. Other ways of supplying power, such as using electricity, also requires water usage. Not to mention, the additional heat it brings to an area already over-temperature year after year. Any allowance of facilities like this is a major blow to the American Southwest.
2/23/2026	Kielly Lewis	Online Survey Q3	Just don't, do not consider letting any ai data center of any size any where near here.
2/23/2026	Rae Lynn Reffruschinni	Online Survey Q3	No data center should be built near any humans.
2/23/2026	Daniel Rodriguez	Online Survey Q3	No data centers at all are the only appropriate standard. Just vote no or we will remember come election time
2/23/2026	Nicole	Online Survey Q3	No data centers in Tucson or Pima County. Respect your constituents, respect the environment, we dont need them here.
2/23/2026	Coral	Online Survey Q3	Too close to schools. Tucson Southside always treated as the dumping grounds for anything the rest if county doesn't want: airport, Air Base, munitions plant, landfill etc.
2/23/2026	Carol Plotkin	Online Survey Q3	Redirect staff to write regulations so they make it impossible to build large scale data centers here. They ARE NOT INEVITABLE. We don't need or want them. Save our city for our children and grandchildren.
2/23/2026		Online Survey Q3	Require a setback of all buildings by 1/2 the width of the parcel on all sides measured by the widest dimension

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Jon Ralston	Online Survey Q3	Ban hyperscale data centers
2/23/2026	Megan	Online Survey Q3	Having data centers near homes and schools is deadly. We don't know the long term effects but health issues in other areas of the country that have data centers shows this is not a healthy plan. 400 feet is nothing and not even close to acceptable.
2/23/2026		Online Survey Q3	They should not be allowed within walkable distance of any residences, offices/businesses, or nature hubs. Data centers are known to lower the quality of life in the communities that they unfortunately exist within.
2/23/2026		Online Survey Q3	NO large-scale data center is appropriate, and the proposed setback standards are absolutely inadequate! They don't even include all residential zones (SH and RH excluded). This fact displays gross negligence of the City's responsibility to protect ALL its citizens. But again, the only solution to truly protect everyone is to prohibit these data centers altogether.
2/24/2026	Bekka	Online Survey Q3	They need to be way farther than half a mile set back. Why do they need to be so close to our city? We live here and love the desert that surrounds our homes. Not only do they make a lot of noise, but they ruin the view, displace wildlife, and remove access to nature for our communities when they have over our natural environment.
2/24/2026	Daisy Flowers	Online Survey Q3	Large Scale Data Centers shall not be permitted AT ALL within Tucson or it's neighboring cities and counties.
2/24/2026		Online Survey Q3	Not rigorous or strict enough.
3/4/2026	TL Cross	Online Survey Q3	Increase setbacks. This should not negatively impact residential areas.
3/4/2026		Online Survey Q3	IF the centers are required to stay within industrial zones, then the setbacks are OK.
3/4/2026		Online Survey Q3	Setbacks should be 1000' or more from residential areas.
3/4/2026		Online Survey Q3	400 ft is .075 miles -- that seems very close given the noise and air pollution. I live precisely 10x that distance (just measured it) from a heavy industrial user. I can hear and smell it even at that distance, and there are many people who are even closer than I am. Physical issues, such as vibrations, are also important to consider: my house sometimes shakes due to industrial activity. Given this, a minimum quarter-mile setback from urban residential and office/commercial would be more appropriate. However, I would like to know what the setbacks are for other heavy industrial uses to compare. They are probably all quite low.
3/5/2026		Online Survey Q3	Go build data centers in space or underground, stop destroying our natural landscapes with these ugly-ass data centers
3/5/2026	Christian Garcia	Online Survey Q3	The setback standards need to be looked over, they are not far enough
3/5/2026	Megan	Online Survey Q3	No data centers here! ARE YOU LISTENING?!
3/5/2026		Online Survey Q3	A 400 foot setback is laughable. Talk to folks in Virginia. Probably you need a mile at least
3/5/2026	Derrick Espadas	Online Survey Q3	Where are the data points that these ordinances provide a positive outcome
3/5/2026		Online Survey Q3	No data centers within 2 miles of an environmental justice community
3/5/2026	Reyes	Online Survey Q3	400 feet is not far enough.
3/5/2026		Online Survey Q3	In all honesty it is useless relative to the noise and pollution output of these facilities. The sound travels MILES and through structures so unless you place the facility in a vacuum where it is on the property is largely irrelevant.
3/5/2026		Online Survey Q3	400 feet is nothing; what a joke
3/5/2026	Nathan	Online Survey Q3	Try 1 hundred million trillion feet away from anyone and anything.
3/5/2026	Laurel Shane	Online Survey Q3	Is this setback far enough to mitigate heat/noise/unsightliness impacts? Why are offices closer? Do people at work not feel the impact? Working all day next to a noisy data center would drive me insane
3/5/2026		Online Survey Q3	Setbacks should be more stringent and larger. The existing city code makes a lot of land uses actually unbuildable due to the ridiculous setback standards. Why not use this same tactic to make data centers unbuildabe in effect? I'm specifically thinking about how things like homeless shelters or rehabs are so restricted in code, it's basically impossible to build them. The city knows quite well how to prohibit land uses when they want to. Do it here for data centers, which nobody wants, instead of actually useful things (shelters) like you normally do.
3/5/2026		Online Survey Q3	A 400-foot setback is not nearly enough from a residential zone. It should be setback of 1 mile instead

Feedback Received on Large Scale Datacenters (3_12_2026)

3/5/2026	C Sipp	Online Survey Q3	Minimum of 1000ft from the edge of the property to the first wall of any side with all sides at least >1000ft inside the boundary and proposed alerting all residents within a 5mile radius before any sell of land is approved. No data center within 10miles from boundary to a school.
3/6/2026	Toni Gosinski	Online Survey Q3	400 feet is too close to a school. 1,300 feed is needed to prevent bad harmonics. Can you require 1,300 feet distance between data centers and schools to protect children?
3/6/2026	Pamela Harig	Online Survey Q3	As I have read, across the country where these large-scale centers are in use, the noise pollution is a huge concern. 400 feet is not enough of a setback. It shouldn't be within a mile of residences or schools. Air pollution is another huge concern where large data centers are already operating. The generators produce a lot. And in our hot summers, which are only going to get hotter, emergencies will happen, and they will run, contributing to the heat! The desert is not the right place for a data center.
3/7/2026		Online Survey Q3	Again, this proposal seems far too lenient. Four-hundred feet is a rather short distance for what is the noise equivalent of a constant police siren constantly blaring from the data center's cooling systems. They should not be within a mile of residential areas, urban or rural. And this isn't even accounting of the months/years of construction noises prior to the facilities being built.
3/11/2026		Online Survey Q3	See prior
3/11/2026	Anthony Young	Online Survey Q3	Evidence is mounting concerning the sound emanating from data centers and the negative environment impact on humans and wildlife.
3/11/2026		Online Survey Q3	400ft is not nearly far enough. It will still be an eyesore, disrupting the natural views that Tucson is so well-known for. It should be at least 1000ft.
3/11/2026		Online Survey Q3	Again - get the best legal advice $ can buy. They are.
3/11/2026	Annette Robertson	Online Survey Q3	I do not approve of Data Centers here, so no set back would be appropriate - still pulling from our water supply, using our electric grid.
3/11/2026	Stephanie Duncan	Online Survey Q3	Setbacks need to be larger. Part D, second bullet point is incomplete in regard to limiting sound when in proximity to _____? "Enhanced" landscaping needs require that there be native plants and big pollinator gardens.
3/11/2026	Daniela Mendez	Online Survey Q3	The proposed setbacks should be larger to accommodate for a neighboring community.
3/11/2026		Online Survey Q3	I dont know what they are.
3/11/2026		Online Survey Q3	-Setbacks should be greater than the proposed 400 feet from residential areas. Is it possible to increase these setbacks to 1000 feet from residential and 500 feet from commercial?
3/11/2026		Online Survey Q3	Rethinking is always a good thing time to consider dehydration and over hydrating droughts and fluids no matter how the water is used on a massive scale that causes these two things and super storms tornados hurricanes cool water going into warm water not good change to natural eco system setbacks can be forward thinking for generations of people to exist than be destroyed
3/11/2026		Online Survey Q3	Setback standards should be increased.
3/12/2026	optional	Online Survey Q3	NO data center is the real answer.
2/19/2026		Online Survey Q4	Noise & Generator Regulations It would be nice to have an established department where residents can complain or give feedback on noise levels. If a large amount give complaints, a new noise study has to be done. Please define "emergency situation". War, command from federal government, request of a % of Tucsonans, "because Microsoft says so", just give some guidelines on what that means.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/20/2026	Colleen	Online Survey Q4	I have not seen any type of plan showing where these proposed data centers are to be located. So the discussion of noise is hard to answer. If the development is located near communities I would prefer the developments are located a little further away from residential zones and placed into commercial zones that are designed for large scale commercial buildings and equipment.
2/20/2026	Joyce T. Smith	Online Survey Q4	⛔❌⛔NO DATA CENTERS IN TUCSON OR PIMA COUNTY, AZ. PERIOD⬤
2/22/2026	Liam Donovan	Online Survey Q4	The main problem is that none of these centers should be built!
2/23/2026	Fiona	Online Survey Q4	No data centers no matter what stop taking the water we already take without asking
2/23/2026	Moxy Smith	Online Survey Q4	data centers produce physicially harmful noise pollution - and generators produce physical pollution. no data centers. we don't need them.
2/23/2026		Online Survey Q4	These are massive topics and need to be thought through thoroughly. Noise should include A, C & G weighting as well as tonal penalties for frequencies generated by these facilities, specifically in the 31Hz, 63Hz, and 125Hz ranges, to avoid critical annoyance issues. Back-up power, clear definitions of when and how they can be used, testing requirements, technologies and environmental impacts need to be understood clearly, especially at large scale.
2/23/2026		Online Survey Q4	I don’t want to hear it, I don’t want to see it, I don’t want to feel it. No data centers
2/23/2026	Sharyn Marie	Online Survey Q4	Tucson does need data centers
2/23/2026	Luke Felix-Rose	Online Survey Q4	Noise pollution does not only affect the people living in the area, which seems to be the metric you are solely concerned with. It affects the local wildlife immensely, the human aspect you are playing down is amplified tenfold on the other living creatures around any proposed data center. This forces migration, disrupts ecosystems, and can be cataclysmic in its effects.
2/23/2026		Online Survey Q4	There is no need to add this additional pollution to our communities and devaluing of people's private property
2/23/2026	mary-gray mahoney	Online Survey Q4	NO DATA CENTERS AT ALL
2/23/2026	Kielly Lewis	Online Survey Q4	Again. These people are liars and do not care about any regulations the city puts forth. They will break every ordinance and standard and just pay the fines because they don’t care about our community or environment.
2/23/2026	Rae Lynn Reffruschinni	Online Survey Q4	Zero noise should be allowed. Generators cause pollution. No generators.
2/23/2026	Daniel Rodriguez	Online Survey Q4	As mentioned before. None of this is enough. We as a community do not want these
2/23/2026	Nicole	Online Survey Q4	No data centers in Tucson or Pima County, reconsider these regulations to be prohibitive
2/23/2026	Coral	Online Survey Q4	Boise pollution very damaging to all of us, but especially children. Davis Monthan air traffic brings instruxtion to a halt. SE Tucson will get built out with homes. Consider data centers in states with true water supplies and lots of open space! Many need the $
2/23/2026	Carol Plotkin	Online Survey Q4	Redirect staff to write regulations so they make it impossible to build large scale data centers here. Save our city from them. They are not inevitable.
2/23/2026	Jon Ralston	Online Survey Q4	Ban hyperscale data centers
2/23/2026	Megan	Online Survey Q4	The generators are only to be used in "emergency situations" but who is defining the state of emergency? Again we see across the country the misuse of these tools and how it impacts the environment. We do not want and cannot have a data center here!
2/23/2026		Online Survey Q4	The details of the noise being regulated is not well defined. Generators should not be allowed. Data centers do not provide a life-sustaining service. They can endure any power outages as most Tucson businesses and residents also do.
2/23/2026		Online Survey Q4	NO large-scale data center is appropriate, so the proposed noise and generator use regulations are inadequate. PROHIBIT THESE DATA CENTERS.
2/23/2026	Darcy Nagle-O’Brien	Online Survey Q4	None of the proposed regulations are adequate. Data centers are not sustainable, they are not affordable, they don’t produce good jobs, they don’t enhance our community. No amount of regulation can change these facts. There are many ways we can grow our community, our economy and increase the quality of life in Pima County. Data centers are not the way. The only benefactors

			are the corporations who come from outside our community and make huge profits at the expense of our water, cost of living and quality of life.
2/24/2026	Bekka	Online Survey Q4	Double it and give it to the next person
2/24/2026	Daisy Flowers	Online Survey Q4	Large Scale Data Centers shall not be permitted AT ALL within Tucson or it's neighboring cities and counties.
2/24/2026	Elizabeth F	Online Survey Q4	Any noise or generator use is too much. Because the people don't want this data center. We do not NEED this data center. We need clean water and preserved wild-lands.
2/24/2026		Online Survey Q4	Noise pollution can be heard for up to 2 miles.
2/24/2026		Online Survey Q4	Not strict enough.
3/4/2026	Bruce Plenk	Online Survey Q4	Good on load shifting; good on batteries first; weak on allowing TEP to draw power from batteries if needed; weak on allowing any natural gas, especially if the install noisy RICE generators, etc
3/4/2026	TL Cross	Online Survey Q4	Na
3/4/2026		Online Survey Q4	Require independent noise studies and clear limits for all sites, including those not in purely industrial zones.
3/4/2026		Online Survey Q4	There are many famous cases of commercial sites noise bouncing and landing somewhere far away. Are there provisions to address situations like this not forseen? Generators if environmentally equivalent to tep or other providers emissions should absolutely be allowed for load shedding especially if the city needs the relief. I would agree with them having additional noise restrictions. But we don't want large commercial sites killing us like happened in texas.
3/4/2026	John Moffatt	Online Survey Q4	Generators need to be tested periodically to ensure reliability. Battery storage adds expense and is seldom useful for any medium or long term outage - good for short only. Both Batteries and generators plus forcing Tier IV level becomes potentially deal breakers due to cost impact.
3/4/2026		Online Survey Q4	Should clarify minimal battery backup time, such as ability to be on battery at least 15 min (possibly up to 30)
3/4/2026		Online Survey Q4	Not sure
3/5/2026		Online Survey Q4	Generators fall under county regulations
3/5/2026	Megan	Online Survey Q4	You guys are wasting so much time on this project when instead you could be looking into zoning areas and creating homes for people who don't have them instead of building a data center for the ruling class billionaires
3/5/2026	Leo	Online Survey Q4	Generator gives off pollutants and nosey
3/5/2026		Online Survey Q4	Did Beale ever send you the noise data they said they would? No? Do you seriously think big data center companies can be trusted?
3/5/2026	Derrick Espadas	Online Survey Q4	Diesel generation is used in other areas and the fines are easily paid by the offenders
3/5/2026		Online Survey Q4	All forms of generation should be renewable. Fracked gas is not clean. Appreciate no load shifting.
3/5/2026	Reyes	Online Survey Q4	Need more information on no. Audible low frequency sound, and certain Gen brain, (Methane, coal) should be prohibited.
3/5/2026		Online Survey Q4	You fundamentally missed the sound these facility generate. Sound should be composed of C and G Weighted scales as well as octave band limits and tonal penalties for day and nights as well as sensitive noise areas like schools, cemeteries, etc. this noise travels miles and has significant health impacts based on significant WHO research.
3/5/2026		Online Survey Q4	Too limited for noise. What about duration of noise?
3/5/2026	Nathan	Online Survey Q4	I don't think we should be setting standards for neverending noise in our community. We should not have nonstop noise centers. Period.
3/5/2026	Laurel Shane	Online Survey Q4	50 db all day long would be very annoying. Maybe drop that number down.
3/5/2026		Online Survey Q4	It doesn't address the length of time the noise lasts. There shouldn't be noise allowed round the clock. There is no accountability for the generator use, who will report or notice of the data center doesn't do it's load shift properly?

3/5/2026	Online Survey Q4	No generators whatsoever. They should be required to use solar with battery storage if they need redundant power.
	Online Survey Q4	Noise Analysis. No operating data center equipment shall produce decibel levels exceeding any of the following limitations, with the exception of initial construction and routine maintenance. Adequate setbacks and effective sound mitigating equipment shall be used to comply with these limitations: (1) The average hourly noise level shall not exceed fifty-five (55) dBA or sixty-five (65) dBC as measured from the outer wall of any occupied structure within residentially zoned property adjacent to the proposed development. For property adjacent to the proposed development that is not residentially zoned, the average hourly noise level shall not exceed sixty-five (55) dBA or seventy-five (65) dBC as measured from the outer wall of any occupied structure. The average decibel limit is specific to source of the sound and does not count against cumulative ambient decibel levels as established in a baseline acoustic evaluation. (2) Equipment testing, maintenance activities, and construction activities that generate elevated noise, including generator testing, shall be limited to the hours of 8:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise approved by the Zoning Administrator. County approval for excessive noise generation shall not be unreasonably withheld. (3) A pre- and post-construction noise evaluation shall be completed by a certified professional by the Institute of Noise Control Engineering (INCE), or a licensed Professional Engineer (PE) to verify compliance with the County's standards. The post-construction nose evaluation shall be completed after completion of all planned data center buildings at the end of construction (as defined in section 107-151(l)(5). (4) Commencing on the fifth anniversary of the end of construction, as defined hereafter, and continuing every five years thereafter, for so long as the data center operates, a noise evaluation shall be completed at the operators expense by a certified professional by the Institute of Noise Control Engineering (INCE), or a licensed professional engineer (PE) to verify compliance with the city standards (tbd). Completion of all data center buildings, or end of construction, means the date on which all of the following have occurred: completion of construction of the data center or, in the case of a phased or multi-building campus, all buildings of the multi-building data center campus, and issuance of a certificate of occupancy for all related buildings; and the data center operator has communicated, in writing, to the Zoning Administrator that it has completed the data center campus; provided, that, if all construction has stopped on the property for more than six (6) consecutive calendar months, other than due to delays by the County in processing related permits or approvals, then "end of construction" as used herein shall be deemed to have occurred as of the last day of such calendar month. This six-month time frame may be extended by the Zoning Administrator. (5)vibration accumulation should be limited to that of 'normal' standards (ie: recorded prior to the construction and maintained within 10% after (6) A description of a backup power plan describing the fuel source and expected usage of any standby, backup, or temporary power generation systems. The plan shall identify the anticipated number and size of generators or other power units, anticipated testing frequency and duration, anticipated noise and emission control measures, and anticipated fuel storage or delivery methods. The plan shall demonstrate the data center will comply with all applicable local, state and
3/5/2026	C Sipp	

			federal permitting requirements. ONLY fixed generators allowed on site for power. All storage of fuels and pipelines monitored for leaks and safety hazards with reports and independent inspectors paid and the center's cost with the city witnessing the review. (7) BESS, Solar and wind can be used. SMRs need nuclear review and proper wasted maintenance (NRC) paid for by the datacenter.
3/6/2026	Toni Gosinski	Online Survey Q4	I'm not sure if the noise mitigation is enough. Might have to still do the 1,3000 set back plus the noise regulations. I still have concerns about air pollution during heat emergencies.
3/6/2026	Pamela Harig	Online Survey Q4	See my previous comment.
3/7/2026		Online Survey Q4	While the principle of using barriers both natural (like trees) and constructed (like thick walls) does seem practical in theory, it still is far too lenient for large companies who will have it in their best interest to short-cut any regulations to build faster and claim more land for their data centers.
3/8/2026		Online Survey Q4	I like the details to track sound and mitigate the impacts
3/11/2026		Online Survey Q4	See prior
3/11/2026		Online Survey Q4	I am concerned how we will prevent electricity premiums from increasing. Surely if a data center is eating up a large portion of the energy produced, TEP will increase their prices. It is basic supply/demand.
3/11/2026		Online Survey Q4	These things pollute the air and generate noise pollution. The noise doesn't stop, so it can be like living with tinnitus. Also, where's the independent study confirming what we must assume are their BS claims.
3/11/2026		Online Survey Q4	No data center ever!
3/11/2026	Annette Robertson	Online Survey Q4	Part of why I moved from Goodyear was the data centers and the other was the increasing lack of attention to the health of residents related to noise pollution. It is an irritant that is not highly recognized until you experience it. I am a mental health professional and advocate for clients, and oppressed/forgotten populations, and provide training and technical assistance to several states related to services for those with serious mental illness - and they often are living in places which do not allow a peaceful nights rest. How can they, or you and I recover, when we cannot get a peaceful nights sleep? https://magazine.hms.harvard.edu/articles/noise-and-health https://coeh.ucdavis.edu/research/how-noise-pollution-quietly-affects-your-health
3/11/2026		Online Survey Q4	Tucson will fit the bill in any action or source needed for this data center to operate for companies or a company that is wanting or needing this type of massive program.
3/11/2026	Stephanie Duncan	Online Survey Q4	Applicants must define how they will process their electronic waste when components of their systems fail or become obsolete and need replaced. Their waste cannot go into public landfills. Notifications need to be sent to anyone living within a 10 mile radius of a proposed center. Noise and air pollution travel further than 2 miles. Part D, second bullet point is incomplete in regard to limiting sound when in proximity to _____?
3/11/2026		Online Survey Q4	Noise and Generator Use regulations: -I have reservations about who and how these regulations will be monitored and reprimanded if violated. I do not believe fines will be a deterrent.
3/11/2026		Online Survey Q4	Better cooling method rethink generator only needed in emergency or not at all
3/11/2026		Online Survey Q4	Generators should emit no noise.
3/12/2026	optional	Online Survey Q4	no noise and no generator.
3/12/2026		Online Survey Q4	No to all of it!!! KEEP AI OUT OF ARIZONA
2/19/2026		Online Survey Q5	I want special care for the safe relocation of saguaros. Too many illegally knocked down things in my childhood. Prevention can be demanded now. There needs to be assurance that the saguaros continue to live for at least 1 year. No throwing saguaros in any bad dirt and calling it a day.
2/20/2026	Colleen	Online Survey Q5	I did not see either option. However, more desert vegetation is preferred.

2/20/2026	Joyce T. Smith	Online Survey Q5	F "LANDSCAPING STANDARDS" F DEMANDING AN ANSWER. NOT OK ❗ ⛔❌⛔NO DATA CENTERS IN TUCSON OR PIMA COUNTY, AZ. PERIOD⚫
2/23/2026	Fiona	Online Survey Q5	No data centers we keep our land you go back
2/23/2026	Moxy Smith	Online Survey Q5	no amount of trees or landscaping is going to offset the issues caused by data centers.
2/23/2026		Online Survey Q5	I couldn’t care less about their landscaping, they shouldn’t be building here
2/23/2026	Sharyn Marie	Online Survey Q5	Landscaping standards for a data center is like wrapping cancer cells in silk —still cancerous. Landscaping would not be needed if the center was not built.
2/23/2026	Luke Felix-Rose	Online Survey Q5	I'm assuming "Option 2" is no. I am holistically against the proposals, and you seem to be deeming it "Inevitable". While we cannot defy the inevitable, we can define the inevitable, and I assure you that broligarch AI Tech is not what will win, it is the people and community and environment of Tucson.
2/23/2026	mary-gray mahoney	Online Survey Q5	NO DATA CENTERS!
2/23/2026	Kielly Lewis	Online Survey Q5	This has to be a joke. Of all the standards we are going to hold ai data centers to we’re going to have them look pretty while they destroy neighborhoods, the environment, poison our water supplies and spew cancer causing chemicals into the air?
2/23/2026		Online Survey Q5	Option 1 or Option 2? My answer is NO
2/23/2026	Rae Lynn Reffruschinni	Online Survey Q5	If no data centers are built, this will not be needed.
2/23/2026	Daniel Rodriguez	Online Survey Q5	Completely irrelevant. No landscaping will matter. WE JUST SO NO WANT THE DATA CENTERS HERE
2/23/2026	Nicole	Online Survey Q5	No desert data centers
2/23/2026	Carol Plotkin	Online Survey Q5	There are no options that are appropriate. I am sure of that. Redirect staff to write regulations so they make it impossible to build large scale data centers here. Save our city from them. They are not inevitable.
2/23/2026	Jon Ralston	Online Survey Q5	Ban hyper scale data centers
2/23/2026	D	Online Survey Q5	The desert should remain intact!! The people of Tucson DO NOT want data centers here!
2/23/2026		Online Survey Q5	No, a mere 20ft of desert flora does not even begin to counter the destruction from creating or sustaining a large data center.
2/23/2026		Online Survey Q5	First of all — nice attention to detail leaving the response options as “Option 1” and “Option 2”…. But again, NO large-scale data center is appropriate, and the proposed landscaping standards are inadequate. This one especially feels like slapping a band-aide on what would be a gaping wound (only 20ft, really?). JUST PROHIBIT THE DATA CENTERS.
2/23/2026	Darcy Nagle-O’Brien	Online Survey Q5	As stated before these proposed standards are completely inadequate at addressing the real issue. The citizens of Tucson and greater Pima County have spoken loudly. A very strong majority of our citizens are 100% opposed to data centers.
2/23/2026		Online Survey Q5	No
2/24/2026		Online Survey Q5	WHY IS THERE NOT A YES OR NO ANSWER. YOU GUYS ARE SETTING US UP TO FAIL. NO NO NO NONE OF THIS IS APPROPRIATE
2/24/2026	Bekka	Online Survey Q5	Landscaping is better than concrete but worse than leaving the sonoran desert alone. If they're going to build anything, they should have to at least be required to install wildlife corridors with instruction from indigenous experts.
2/24/2026	Daisy Flowers	Online Survey Q5	Large Scale Data Centers shall not be permitted AT ALL within Tucson or it's neighboring cities and counties.
2/25/2026	Zion Alderette	Online Survey Q5	None of these options are acceptable.
2/26/2026	Landon S.	Online Survey Q5	I read thought the document link and I didn't see these options

Feedback Received on Large Scale Datacenters (3_12_2026)

3/4/2026	Bruce Plenk	Online Survey Q5	Require permeable paving for parking lots; good to require 50% rainwater ;
3/4/2026	TL Cross	Online Survey Q5	Na
3/4/2026	John Moffatt	Online Survey Q5	Agree on parking. Landscaping is an esthetic issue. Why different than any large warehouse?
3/4/2026		Online Survey Q5	Expect significant heat and evaporation from these centers; propose trees with large canopies. I also expect fencing will be established so presume that would have to be within the interior of the landscaping. Given that and concerns for security I'd propose an additional 10' beyond the 20' for landscaping and enough underbrush to encourage rabbits, mice, coyotes, javelina and other urban animals to forage in the area.
3/4/2026		Online Survey Q5	desert landscaping, while beautiful, is sparse vegetation compared to other environments. Is a 20 ft buffer of prickly pear going to be effective? Is that 20 ft distance based on best practices that were established where denser forest-type vegetation is in place? If so, we should consider a larger buffer or other rules about the density of the vegetation.
3/5/2026	Megan	Online Survey Q5	WE DONT HAVE THE WATER IN THE DESERT. WE DONT WANT TO PAY EXTRA FOR OUR ELECTRIC BILLS BC OF A DATA CENTER WE DO NOT WANT!
3/5/2026	Leo	Online Survey Q5	We don't want data center
3/5/2026		Online Survey Q5	Lol
3/5/2026		Online Survey Q5	Don't allow development of the desert.
3/5/2026	Reyes	Online Survey Q5	Why is natural vegetation not planned for shade covering for parking, or at the very least solar.
3/5/2026		Online Survey Q5	Not really all that important to me.
3/5/2026		Online Survey Q5	Because it's just a silly data point.
3/5/2026	Nathan	Online Survey Q5	You're complicit in killing the desert.
3/5/2026	Laurel Shane	Online Survey Q5	Require native plants with an emphasis on pollinator plants and food plants
3/5/2026		Online Survey Q5	A data center is not better than an undisturbed desert. The landscaping should require 90% of the parcel to have water retention basins with native flora.
3/5/2026	C Sipp	Online Survey Q5	drainage system, limited parking, heat abatement for the surrounding area are all lacking here in 'landscaping'
3/5/2026	Karen MacDonald	Online Survey Q5	Landscaping must use native, low-water use plants and trees and follow the City's Water Harvesting Guidance Manual.
3/7/2026		Online Survey Q5	It's reasonable to address the "anticipated low parking needs" for a supposed data center. Especially since they don't employ many people to be on-site or bring many jobs to our community at all besides a handful of engineers who could easily just work from home. But also, it doesn't really address the construction phase, which is another annoyance on the community as well.
3/8/2026		Online Survey Q5	Screening goes a long way.
3/11/2026		Online Survey Q5	See prior
3/11/2026		Online Survey Q5	We need to ensure as little impact to the natural environment as possible. I feel the restrictions should be much more strict. Once again, hefty fines for those not in compliance.
3/11/2026		Online Survey Q5	We do not want a data center to drain resources and mar the natural beauty of the desert. Again, they do not keep promises and cannot be trusted.
3/11/2026	Annette Robertson	Online Survey Q5	I oppose Data Centers
3/11/2026	Stephanie Duncan	Online Survey Q5	"Enhanced" landscaping needs require that there be native plants and big pollinator gardens. Aesthetics won't save water and stop wasted electricity. We don't need AI. The desert ecosystem does not need data centers.
3/11/2026	Daniela Mendez	Online Survey Q5	I like the idea of a small parking lot.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/11/2026		Online Survey Q5	14) Landscaping Standards: -Although I absolutely do not agree with the idea of building a large or hyper-scale data center in the desert, I would like to commend City of Tucson for their increased efforts over the years in improved landscaping and reducing heat island effect around town. I know that a lot of work has gone into these types of plans and projects, and I appreciate that this environmental protection exists! It is these types of environmental protections programs and plans that I want to see from my Tucson City Council. I know there are people on City Council that care about this precious desert we live in, that is why they are here to fight for it! I know that many, (maybe all?) Tucson City Council members would prefer to NOT see large-scale data centers come to fruition. Can we please continue this process to create definitions and codes, but rather than define how a data center can exist, use these to help protect us against large-scale data centers?
3/11/2026		Online Survey Q5	Concrete not landscape no water return to ground even naturally go underground landscape remains same or even better boost natural plants animals bugs natural desert eco system amenities
3/11/2026		Online Survey Q5	What does landscape matter if you're depleting resources?
3/12/2026		Online Survey Q5	No amount of landscaping will offset the energy and carbon use of a large-scale data center.
3/12/2026	Lisa Stee	Online Survey Q5	Time to get out of the weeds and eliminate regulations.
2/19/2026		Online Survey Q6	Design and Aesthetic Standards Can we require them to commission local artists for the creation and upkeep of a mural? If it's going to be taking up so much space, might as well stimulate the economy and make it not an eyesore. Please also see this resource for guidelines and studies: https://www.ucs.org/resources/data-center-power-play?read-online-content=1
2/20/2026	Joyce T. Smith	Online Survey Q6	⛔❌⛔NO DATA CENTERS IN TUCSON OR PIMA COUNTY, AZ. PERIOD⬤
2/22/2026	Liam Donovan	Online Survey Q6	Why are you guys so obsessed with helping large corporations build data centers that nobody wants??
2/23/2026	Fiona	Online Survey Q6	No data centers and please listen to us we are fighting
2/23/2026	Moxy Smith	Online Survey Q6	no data centers. take a stand.
2/23/2026	Sharyn Marie	Online Survey Q6	NO DATA CENTERS IN TUCSON
2/23/2026	Luke Felix-Rose	Online Survey Q6	This is one strike in a long list of failures I have witnessed since arriving in Tucson. From Prop 414, Project Blue, RTA Next, the criminalization of houseless folx, and the attempts to reverse positive steps in public transport... honestly Mayor Romero seems little better to me than a Republican. I feel a hostile energy emanating from the City of Tucson with every passing month, and it is exhausting. Thankfully, the love and support of my community here sustains me, and I know the communities I am in are in agreement with the sentiments I've shared here today.
2/23/2026	mary-gray mahoney	Online Survey Q6	DO NOT LET DATA CENTERS WIN
2/23/2026	Kielly Lewis	Online Survey Q6	NO DATA CENTERS OF ANY SIZE IN THE DESERT
2/23/2026	Rae Lynn Reffruschinni	Online Survey Q6	No data centers around or in Tucson! We do not need AI. We do not need the cloud. We can not afford the loss of water.
2/23/2026	Sarah Osborne	Online Survey Q6	A data center of any size would create negative impacts throughout our community. Even if the center is not "defined" as large scale the building or creation of a data center would cause public backlash and a loss of respect for the integrity of City of Tucson and Pima County officials. The people have spoken and we do not want a data center in our desert.
2/23/2026	BEV PAUL	Online Survey Q6	I think they should be located many miles from city limits. They could drill their own wells & use solar power for electricty.
2/23/2026	Carol Plotkin	Online Survey Q6	Redirect staff to write regulations so they make it impossible to build large scale data centers here. Save our city from them. They are not inevitable. We need you to do the right thing and not support these data centers in any way.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Jon Ralston	Online Survey Q6	Ban hyper scale data centers
2/23/2026	Megan	Online Survey Q6	These meetings should be less about the way we can change ordinances to accommodate a data center and more around how we can stop a data center from being built here at all. We do not have the resources and the public has already clearly stated we do not want it. Step up and represent the people you're supposed to represent.
2/23/2026	Nicole R	Online Survey Q6	I live on the SE side of town and was so glad when the proposed data center on Houghton was shot down. I want to make sure that all of Tucson is protected from the many problems data centers cause
2/23/2026	D	Online Survey Q6	NO DATA CENTERS IN TUCSON
2/23/2026		Online Survey Q6	What could the city do if the data center ignored the regulations once it was operational? Fines? Could they shut the building down? The city does not have a good track record of enforcing regulations or having the funds to enforce regulations. The health risks and environmental impacts need to also be studied and considered.
2/23/2026		Online Survey Q6	NO large-scale data center is appropriate. Regardless of the flaws with all the proposed regulations, any proposal will be inadequate as long as it falls short of simply prohibiting these data centers. It doesn't matter if data center corporations have to jump through a couple additional hoops; there will be objectively grave consequences on our local community and environment if these centers are constructed that far outweigh any perceived gains.
2/23/2026	Darcy Nagle-O'Brien	Online Survey Q6	AI is a speculative industry, not an inevitable one. We stand to lose far too much by allowing data centers to be constructed in our arid, drought-ridden beautiful desert home.
2/23/2026	Gillian	Online Survey Q6	Kill ANY data centers proposal, Tucson is not an energy desert for large data centers, it is a community and people will be hurt by any progress of a data center approval
2/24/2026	Bekka	Online Survey Q6	The best data center would be no data center. Tucson doesn't want any data centers. If your goal is to make sure that if a data center gets built, that Tucson is the least amount impacted negatively, please require much more from developers. You make the rules. You could make them do a lot more. You can require them to build a solar power plant to power their operations. You can limit their water use to be no more than residential use would be. It doesn't need to be reasonable for their operations. This is about Tucson and the watershed and the wildlife and the community. Let's have rules that would make it so that they have to contribute to making Tucson an ever better place for everyone if they want to come here!
2/24/2026	Daisy Flowers	Online Survey Q6	Large Scale Data Centers shall not be permitted AT ALL within Tucson or it's neighboring cities and counties.
2/24/2026	Elizabeth F	Online Survey Q6	No desert data center!!
2/24/2026		Online Survey Q6	No means no.
2/24/2026		Online Survey Q6	This community overwhelmingly decries data centers. We don't want them. The only legislation that is appropriate is legislation that prevents corporations from coming to Tucson/Pima county and using vast amounts of water and electricity. Data centers are a blight on our environment and do nothing to promote jobs or public social welfare. NO DATA CENTERS. LEGISLATE TO BLOCK THEM ENTIRELY.
2/25/2026	Zion Alderette	Online Survey Q6	Do not consider this proposal that causes harm to the community we have built together.
2/26/2026	Landon S.	Online Survey Q6	How do I find the landscaping options. Please think about 30 years into the future when we find ways to improve upon the industrial use of our desert where we have many limited resources.
3/4/2026	Bruce Plenk	Online Survey Q6	Is it possible to build in likely additional staff costs for enforcement if needed into the permit, especially given City finances!!
3/4/2026	TL Cross	Online Survey Q6	Triple your efforts to lessen impact on our environment, utilities and resources.
3/4/2026		Online Survey Q6	This is a joke.
3/4/2026		Online Survey Q6	What are the teeth of enforcement besides. Hand waving and strongly worded letters. Penalties need to make sure transgressions are not financially worth it.
3/4/2026	John Moffatt	Online Survey Q6	Thanks for doing this. Please develop a Code Amendment that is followed in practicality, not emotional, non-factual, loudest voice wins approach.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/4/2026		Online Survey Q6	If Tucson adopts such rigorous standards, we will be prepared to adequately vet large data centers. This was a good presentation, thank you.
3/4/2026		Online Survey Q6	Thank you!
3/5/2026		Online Survey Q6	Tell Jeffrey and Elon that they are not welcome in Tucson
3/5/2026		Online Survey Q6	Please consider language already developed in California, and consider the chemicals, and stored fuel package, and the danger of lithium batteries, when adding to the IFC 2024 adoption amendments, ask our state and local fire departments for help to protect life and property. Consider fire response. Use NFPA to guide you.
3/5/2026	Megan	Online Survey Q6	This needs to stop. We don't enjoy these meetings and I'm sure you don't either. Stand for something good instead of just going through the motions. A data center is a death sentence for our city, state, country. Stop it now.
3/5/2026		Online Survey Q6	So tired of this shit
3/5/2026	Derrick Espadas	Online Survey Q6	Did not appreciate the city officials silencing the public
3/5/2026		Online Survey Q6	Large scale data centers should be defined by how many megawatts of energy they will use and if the City is serious about protecting ratepayers from data center bill spikes we need a public power utility.
3/5/2026	Reyes	Online Survey Q6	This process is too unilateral too presentation and not community feedback and questions with live response.
3/5/2026		Online Survey Q6	We do not want any large scale data centers in our desert.
3/5/2026		Online Survey Q6	A moratorium should be put in place and significantly more work needs to be done here. There are substantive gaps and holes here which will compromise residents health and well being.
3/5/2026		Online Survey Q6	Very disappointing. The panel was all white people. Didn't really answer questions. Feels very much like a done deal.
3/5/2026	Nathan	Online Survey Q6	I hope the pay is worth it, cowards.
3/5/2026	Laurel Shane	Online Survey Q6	What's stopping data centers from building just outside city limits? Is Pima County working on regulations? Do OV, Vail, Marana care?
3/5/2026		Online Survey Q6	We don't want any of these. No data centers
3/5/2026		Online Survey Q6	Our community does not want nor need these data centers. The city and county already ran behind our back before. Don't do it again.
3/5/2026		Online Survey Q6	NO AI!!!!!

Feedback Received on Large Scale Datacenters (3_12_2026)

		Online Survey Q6	This form did not allow for all the entry 'space' I needed or want to provide feedback. This zoning requirement lacks teeth, definition and overall analysis to keep any data center in check. There is limited to no real balance and the understanding of what so many electronics pose from fire hazard, chemical waste, heat production and both grid and water consumption. there are counties outside of AZ doing so much better and you should seek their input (Georgia, Iowa). The following information shall be submitted prior to issuance of the first building permit for the data center: a. Planned location of underground or overhead electric lines, grid interconnection points, project entrances, staging areas, and access roads required during construction and post construction; b. Waste Management Plan. A Waste Management Plan detailing how construction waste will be handled during the construction period. The plan shall include: i. Estimated volumes and types of materials to be generated. ii. Identification of materials proposed for recycling, salvage, or reuse. iii. Designated recycling and disposals facilities. iv. Procedures for on-site material separation and storage. v. Documentation requirements demonstrating final disposal or diversion; . Written verification from their proposed power provider that the applicant has calculated the maximum planned electrical consumption of the proposed use and has verified the utility supply and related electrical infrastructure is sufficient to accommodate the applicant's proposed use; d. Lighting Plan. A lighting plan shall be submitted providing details of the light spread and intensity diagrams, fixture specifications and mounting height details. Any lighting used for outdoor illumination on the property shall be full-cutoff fixtures so that light does not shine upward nor adversely impact adjoining property. e. A description of a backup power plan describing the fuel source and expected usage of any standby, backup, or temporary power generation systems. The plan shall identify the anticipated number and size of generators or other power units, anticipated testing frequency and duration, anticipated noise and emission control measures, and anticipated fuel storage or delivery methods. The plan shall demonstrate the data center will comply with all applicable local, state and federal permitting requirements. there should be regulation for AQI PM2.5, PM10, TVOCs, Ozone levels such that in a case these rise >5ppm or reach unheathly levels (AQI, federal levels) near or around the data center - all operations should cease for the day, week or extended time until the air is safe. Monitoring is by the town/city with equipment approved by the town/city but purchased at the expense of the datacenter. Fire hazards of electrical equipment and chemicals that are used both in electronics and to fight fires need to be understood, hazmat plan for handling and all local water and water out of plant monitored for contamination with any contamination pulling all licenses and issuing financial penalties to the data center owner to clean up (mitigation and clean up plan should be developed with fine tiers)
3/5/2026	C Sipp		
3/5/2026	Karen MacDonald	Online Survey Q6	Regulations for large-scale data centers must be as stringent as possible. In the end, to my mind, data centers have no place in this beautiful, fragile desert.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/6/2026	Toni Gosinski	Online Survey Q6	Make sure we are protecting schools. Keep air quality high near schools. Keep noise and bad harmonious away from schools. Need to make sure Tucson doesn't get too many small data centers that create the functional equivalent of a large data center.
3/6/2026	Lynn Price	Online Survey Q6	Thank you to the planners who presented. The TAC minutes were helpful. How are current data centers, e.g. the 38,000 sq. ft. size, disposing of their electronic waste? lynnmpricept@gmail.com
3/6/2026	Pamela Harig	Online Survey Q6	Why can't they be banned? If not outright, then make the burden to comply with regulations so onerous that no one will want to try. Data centers poison the water, air and land. They use electricity that rate payers will have to pay a lot more for in order to build capacity. Rolling blackouts could become the norm. Cities and towns around the country are rejecting them. We should, too.
3/7/2026		Online Survey Q6	It's imperative to make these regulations as strict and rigid as possible. We cannot afford any large-scale data centers to be built here. Even if they were to bring supposed "economic benefits" they would be completely irrelevant in the face of a mass public health crisis that a data center would bring here to Tucson. Unless a company also happens to have a revolutionary water treatment and reclamation processes that could somehow reverse toxic chemical pollution in groundwater, or some means of being so self-sufficient that they don't even need to account for cooling methods and making private electrical power deals with companies like TEP, then they cannot build here. Make the regulations so steep that they will not want to build here. The people of Tucson should come first.
3/8/2026		Online Survey Q6	Thank you for your time and thoughtful attention to this
3/11/2026		Online Survey Q6	I do not like the idea of data centers in Tucson. We have already seen the problems they have caused, hence why we never continued with Project Blue. We seriously need to make these restrictions strict and actually enforce them.
3/11/2026		Online Survey Q6	I don't want
3/11/2026	Kerry Hales	Online Survey Q6	I oppose data centers
3/11/2026		Online Survey Q6	The 400+ jobs created does not justify the long term detrimental effects of implanting a data center close to populated areas. Energy and water guarantees cannot be met long term, but only long enough to solidify contracts and achieve voter approvals.
3/11/2026		Online Survey Q6	You are dealing with bad faith actors who know every possible way to screw the city over. Top legal talent knows how they will do this and can advise the city how to prevent it. Please cough up the $ to pay for this.
3/11/2026		Online Survey Q6	No data center ever!
3/11/2026	Annette Robertson	Online Survey Q6	Thank you for asking for community feedback.
3/11/2026	Daniela Mendez	Online Survey Q6	Thank you for being proactive and creating regulations for this fast growing industry. Please be wise when it comes to privacy, climate, and wildlife if such project is proposed.
3/11/2026		Online Survey Q6	*S-cuk Son-Inhabited for Millennia-Established 1775* Even if large-scale data centers are somehow inevitable in our future world, they really just DO NOT make any sense in the desert, they are too hot, demand too much energy and demand too much water. I am a second-generation Tucsonan in my 40s with two daughters I would like to raise here; I am witness to hotter summers, shorter winters, far less and inconsistent rain, I know the heat and drought have changed us and I see it getting worse. I am also witness to the lengths Tucson has gone to for respecting heritage, celebrating our communities and traditions, protecting wildlife, preventing worsening heat and honoring our desert existence! This is the Tucson I love and respect, please do not let data centers be the downfall of this mindset. We do not want large-scale data centers in Tucson or anywhere in the desert! El desierto es mi madre. Thank You.
3/11/2026		Online Survey Q6	Make eco friendly new prosess of cooling instraments less water more innovation of cooling recycle clean energy no moving parts cheaper maintenance making 100 percent less noise many possibilities only one fact eco friendly must be to surrounding inhabitants both prosper possible jobs
3/11/2026	DeeAnn Saber	Online Survey Q6	I already said it - no to data centers all together.

Feedback Received on Large Scale Datacenters (3_12_2026)

3/11/2026		Online Survey Q6	Stop contributing to global climate change you're making the earth hotter!
3/12/2026	Gretl Krooksmer	Online Survey Q6	Please send these tech bros back to the basements in which they belong
3/5/2026	Patricia Bauerle	Email	Attached is a copy of my March 2, 2026 letter emialed to Tucson City Council and a copy of my March 3, 2026 statement for the "call to the audience" for the Tucson City Council meeting that evening urging Tucson City Council to ban all data centers within and intersecting Tucson's jurisdiction. Statement of "Call to the Audience" urging ban of data centers From: Patricia Bauerle, a resident of Tucson, Arizona Date: March 3, 2026 Please ban any and all Data Centers within and intersecting with your jurisdiction, whether referred to as a "Data Center" or not for the following reasons: • Data Centers consume massive amounts of electricity, water, and fossil fuels and pollute the air and water and increase noise pollution. • Data Centers are a major threat to our environment and climate and exacerbate climate problems. • Data Centers increase the costs for community members, including working families and other residents, such as seniors and persons with disabilities. • Although one or more Data Centers may promise to offer a benefit of more reclaimed water in the future, there is no guarantee of such, and Pima County cannot afford to take any risk pertaining to our limited water. Even if Pima County has been using less water than allocated, situations could change at any time, including the amount of water allotted and/or available to Pima County. • Proposed Data Centers have been shrouded in secrecy , which raises so many suspicions that if more were known by the public, there would likely be much more public outcry against such. Also, secrecy often shrouds wrongdoing. • Democrats have urged "investigation of commerce secretary for boosting AI Data Centers that may enrich his entire family." • What are the other potential conflicts of interest, financial and/or otherwise, do proponents of the Data Centers have? • Data Centers may be subject to a potential AI bubble, from which they may likely be economic fallout and problems. • Data Centers have grossly overestimated the potential benefits and grossly underestimated the potential risks and/or harms. • Data Centers, including any Data Center for cloud computing or cloud backup, are often developed for the purpose of Artificial Intelligence, and there are so many problems and concerns with AI, such as its lack of conscience, lack of empathy, ability to implement cyberattacks for which defenses aren't ready, and accelerating at dangerous speeds. • AI Safety experts have departed from AI firms with dire warnings about catastrophic safety risks. • "[T]hermal drone footage shows Musk's AI power plant flouting clean air regulations." • AI tends to exacerbate human biases. • AI seems to "undermine medical education" and "medical doctors may never learn vital skills".

• Construction, Development, and/or hosting of Data Centers risk potential expensive lawsuits.

• Other locales within the USA have made significant progress towards banning data centers in their jurisdictions. , , , ,

For more information, please refer to my letters and emails dated July 27, 2025, December 14, 2025, and March 2, 2026, each with citations.

Please ban data centers!!!

Thank you for your attention to these matters.

Unfortunately, I cannot attend any of the currently scheduled public hearings pertaining to data centers.
I depend upon City of Tucson transit public transportation, and i experience too many technical difficulties for trying to participate in a virtual meeting.

Thank you for your attention to these matters.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Aamir Nasir Quraishy	Email	I thank you again for leading the efforts on these hearings, and looking for feedback on structure. One point we discussed was how to communicate intent and structure in a way that would be most beneficial for expectations and boundaries that support meeting conduct and provide avenues for constructive feedback. _____ Thank you for facilitating the recent meeting. I would like to offer constructive feedback regarding the structure and communication of the session. Several attendees expressed frustration about the format, particularly the perception that feedback was being requested but only accepted in written form during portions of the meeting. While I understand the need to manage time and maintain clarity when presenting technical or zoning-related information, it may be helpful to make the structure more explicit in advance to avoid misunderstandings. I recommend the following adjustments for future sessions: 1) Clear Division Between Informational and Public Comment Phases The meeting agenda should explicitly state that the initial portion is strictly informational. During this phase: • Comments would be accepted only in written form. • The purpose would be to present zoning definitions, policy language, and technical clarifications. • City staff would respond to written questions as appropriate. This framing helps set expectations and ensures that time is used efficiently for structured information delivery. 2) Scheduled Open Discussion Segment Following the informational portion, a clearly designated public comment period should be scheduled, with microphones available and equal opportunity for speakers. Making this second phase explicit in the agenda would ensure participants understand that vocal input is not being excluded, but sequenced. 3) Communication and Accessibility Enhancements To further improve transparency and reduce confusion: • Consider posting meeting slides and policy drafts in advance. • Create a mailing list or text alert system specifically for data center hearings. • Offer optional seating outside the primary meeting space for individuals who prefer to wait until the public-comment phase begins, with text notifications 5–10 minutes before speaking begins. These steps would help align expectations, reduce frustration, and ensure broader participation while preserving order and time management. The overall goal should be clarity of structure. When participants understand the purpose of each segment of the meeting, tensions tend to decrease and engagement becomes more productive.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/25/2026	Julie Dittmer	Email	My name is Julie Dittmer and I attended the 2/23/26 UDC information session. Carver Struve asked me to submit my questions from the breakout session in writing, and shared your contact information to discuss them further. I'm Chair of RADCAP (Responsible AI Data Center Advisory Panel). The questions below are based on our framework areas II (Public Health & Community Impact) and IV (Public Finance & Constitutional Protections). I've attached our evaluation framework for reference. 1) Public health impacts Public health as a zoning-relevant compatibility concern (proximity to homes/businesses, and whether any form of developer-funded public health impact assessment could be part of review/conditions). My understanding is that this hasn't been fully addressed yet (as of 2/23/26). Carver noted that suggestions, additional research, or precedents would be welcomed. Is that correct? 2) Applicant track record / compliance history In discretionary review, what applicant disclosure (if any) is required regarding prior compliance issues, enforcement actions, or settlement agreements in other jurisdictions? If the City can't directly penalize based on history, could disclosure still inform conditions of approval (e.g., monitoring, reporting, performance assurance/bonding where feasible)? Carver noted this is a question that would need to be run by an attorney. If it would be helpful, I'm also happy to schedule a call with you to discuss more. Thank you again for your time and for running a thoughtful public process. RADCAP Panel Evaluation Framework The Responsible AI Data Center Advisory Panel evaluates proposed data center developments across five core domains. This framework reflects the panel's shared priorities and serves as a baseline for assessing the public, infrastructural, legal, and technological implications of large-scale AI infrastructure projects. I. Resource Limits & Infrastructure Capacity The panel assesses whether proposed developments operate within sustainable and verifiable resource constraints. • Hard caps on water usage rather than fee-based mitigation mechanisms, recognizing that financial penalties alone may not deter high-capital operators • Disclosure of projected energy demand, infrastructure sourcing, and load profiles • Independent verification of grid capacity impacts, including cumulative effects on municipal and regional systems • Requirement for detailed infrastructure plans demonstrating long-term viability without disproportionate burden on public systems • Phased growth and cumulative-use re-trigger provisions • Anti-aggregation safeguards for related entities operating at shared sites • Phase-specific disclosure of water sourcing (potable, reclaimed, alternative) II. Public Health & Community Impact The panel evaluates the direct and indirect effects of data center operations on community health and household stability. • Ongoing health impact assessments for high-resource industrial users, consistent with municipal due diligence frameworks

	• Developer-funded municipal capacity to conduct public health monitoring and longitudinal impact analysis • Protections against household "energy insecurity" and other community-level risks arising from industrial demand on critical infrastructure • Integration of public health findings into permitting, enforcement, and ongoing oversight processes III. AI System Transparency & Governance The panel examines the governance and risk profile of AI systems deployed within data center environments, recognizing their potential impact on public infrastructure and safety. • Disclosure of AI training capacity, compute scale, and operational scope relevant to infrastructure and resource impacts • Risk-appropriate transparency regarding model architecture, system deployment practices, and security controls, subject to reasonable protections for proprietary intellectual property • Mandatory reporting of critical safety incidents affecting infrastructure, public systems, or users • Whistleblower protections for employees and contractors involved in AI system development and operations IV. Public Finance & Constitutional Protections The panel evaluates the legal and economic structure of public-private agreements associated with data center development. • Evaluation of tax incentives, subsidies, and development agreements under the Arizona Gift Clause and related constitutional standards • Assessment of economic proportionality between public cost and private benefit • Enforceable public-interest conditions in development agreements, including clawback provisions, performance benchmarks, and transparency requirements • Clear allocation of financial risk between developers and public entities V. Data Governance, Security & Public Accountability The panel assesses governance standards for data handling and operational security in large-scale AI infrastructure. • Standards for sensitive data handling, retention, and third-party access • Baseline cybersecurity and AI system security controls, with independent assessment or auditability where appropriate • Clear breach and incident notification requirements, including remediation timelines and public disclosure thresholds • Defined oversight and enforcement mechanisms, including accountability pathways for developers, operators, and public authorities • Requirement that public-facing commitments be time-bound and enforceable at the same stage as private benefit realization

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Aamir Nasir Quraishy	Email	Firstly, realized I kept forgetting the h in your name. My bad. My next concern I'd like for the record is regarding long-term resiliancy and sustainability that if the "AI-bubble" bursts. Tucson is not left "holding the bag" _____ I'd like to raise a long-term sustainability concern that I believe should be explicitly addressed in the City's data center policy framework. There is an ongoing public concern that we may currently be in an "AI bubble," and that rapid buildout could outpace long-term demand. If that happens, Tucson could be left with large-scale facilities that require continued upkeep, utility commitments, and land-use constraints—even if the original business model becomes nonviable. For that reason, I believe the City should require explicit long-term sustainability and transition planning as a condition of approval. I recommend the policy incorporate the following requirements: 1) Maintenance, Resiliency, and Pivot Planning Data center approvals should include a clearly defined budget and plan for: • ongoing maintenance and upkeep, • resiliency (operational continuity, safety, and secure shutdown capabilities), and • flexibility to pivot if the primary business model (e.g., AI training) declines. If a facility is proposed primarily for AI workloads, the agreement should require a documented pivot pathway—including identified alternative uses, transition timelines, and a dedicated contingency budget—so the site can be repurposed rather than abandoned or left in partial decay. 2) Performance Audits and Enforceable Off-Ramps The City should require an end-of-contract and noncompliance procedure that is explicit, enforceable, and transparent. This could include: • periodic audits (e.g., every 2–3 years) of key commitments and performance parameters, • public reporting (in a digestible form) so residents can evaluate compliance, • a structured escalation pathway: notice → corrective action plan → probation → termination, and • a clearly defined termination and transition plan that protects the City and the community. Put simply: the City should not rely on goodwill alone. The agreement should contain a functional off-ramp if commitments are not met, and it should ensure the site does not become a stranded asset with unresolved obligations. 3) Decommissioning and Site Reuse Planning There should be required planning (and ideally bonding/financial assurance) for: • decommissioning, • equipment removal and safe disposal/recycling, • remediation if needed, and • site reuse or re-tenanting. This is about ensuring that Tucson is not left with expensive, decaying infrastructure that cannot be retrofitted or transitioned into productive use. 4) Research Partnership for Sustainability and Scalability Finally, I recommend that the policy require or incentivize support for ongoing research partnerships with the University of Arizona (and relevant local academic and national research institutions) focused on: • data center sustainability practices, • ecological impact monitoring, • failure detection and risk modeling, • scalable operations, and • strategies for rapid repurposing or transition during market downturns. The goal is to ensure that economic and land-use decisions remain safe, adaptive, and congruent with long-term community well-being—even if market conditions shift sharply.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Aamir Nasir Quraishy	Email	My next suggestion is on ensuring the datacenters support local business/entrepreneurship support. _____ In addition to workforce development, I believe the City should consider mechanisms that ensure meaningful local technological and economic reinvestment, rather than allowing the benefits of large-scale data infrastructure to flow primarily to out-of-state corporate headquarters. To that end, I recommend exploring the following concepts: 1. Local Technology and Business Support Commission The City could establish or designate a commission tasked with ensuring that data center operations meaningfully support local businesses, startups, and technical professionals. This body could monitor compliance with local investment commitments and recommend strategies for strengthening Tucson's emerging technology ecosystem. 2. Preferential Access or Cost Structures for Local Use Where legally and contractually feasible, agreements could encourage reduced-cost data processing or infrastructure access for Tucson-based businesses, startups, and residents. This could include cloud credits, compute grants, or subsidized infrastructure programs designed to stimulate local entrepreneurship and digital innovation. 3. Local Priority for AI and Compute Resources If facilities are engaged in large-scale AI training or high-performance computing, the City could negotiate provisions encouraging priority pathways or reserved allocations that support Tucson-based AI startups, web development firms, or technology entrepreneurs. This would help ensure that local innovators are not priced out of infrastructure physically located within their own community. 4. Research Partnerships for Public Benefit The policy could include structured partnerships with the University of Arizona and other regional research institutions, prioritizing projects that advance medical research, public health, environmental science, or other socially beneficial domains. Allocating compute resources or grant funding toward research with demonstrable public impact would align infrastructure growth with community well-being. The overarching goal would be to ensure that Tucson retains a degree of technological sovereignty and economic participation in the value generated by infrastructure hosted within its jurisdiction. This is not about restricting corporate operation, but about designing agreements that ensure shared prosperity and long-term local resilience. _____

Feedback Received on Large Scale Datacenters (3_12_2026)

2/23/2026	Aamir Nasir Quraishy	Email	It's Aamir again, here is my second suggestion on supporting workforce stability in Tucson. _____ Thank you for the opportunity to provide feedback on the second policy area. In addition to ecological and infrastructure considerations, I believe it is important that the City of Tucson incorporate hiring and workforce development language that ensures meaningful reinvestment into local talent and the regional economy. Specifically, I recommend consideration of the following elements: 1. Local Hiring Commitments The policy could include a defined percentage target or quota for hiring Arizona residents, particularly those from the Tucson metro area. Ensuring that a substantial portion of jobs are filled by locally grown talent strengthens community buy-in and ensures that economic benefits remain within the region. 2. Inclusive Workforce Access The city may wish to encourage or require that a portion of roles be accessible to individuals without formal educational credentials (e.g., not requiring a high school diploma), including pathways for GED holders or high school dropouts. Many data center operations include roles in facilities management, physical infrastructure, logistics, and support that can provide stable employment and upward mobility when paired with structured training programs. 3. Spanish-Language Accessibility Given Tucson's strong Hispanic and bilingual population, it would be forward-thinking to support the creation of Spanish-accessible roles where English fluency is not strictly required, particularly in operational or technical-support environments where language flexibility is feasible. This would meaningfully expand access to opportunity within the local community. 4. Education and Workforce Development Investment The policy could require participating companies to allocate funding or partnership support toward institutions such as Pima Community College and local secondary education programs. This may include curriculum development, certification pipelines, technical training programs in data center management, and internship-to-hire pathways. As the industry evolves, aligning local educational infrastructure with emerging workforce demands ensures long-term sustainability. Above all, I believe the policy should aim not only to safeguard ecological impact, but also to ensure that employment pathways, job safety, and workforce resilience evolve alongside rapidly changing technological paradigms. A comprehensive framework would allow Tucson to benefit both environmentally and economically from this industry's growth. _____
2/23/2026	Aamir Nasir Quraishy	Email	This is Aamir, we spoke for a bit at the hearing last week about my views of considerations regarding data center policy. ---------- One concern I have, particularly from the perspective of someone with experience in data management, is that the definition does not appear to sufficiently account for the types of data being processed. Not all data centers operate in the same way, and the nature of the workloads they support can differ significantly. For example, AI training workloads, AI inference (real-time request handling), general cloud storage, video streaming, and online gaming each involve distinct data flows, storage architectures, latency requirements, and network request patterns. These differences affect infrastructure design, resource allocation, energy usage, cooling demands, and overall system behavior. I believe the definition would benefit from incorporating distinctions between these different levels and categories of data management. A more comprehensive framework that acknowledges variations such as AI training, AI inference, and high-throughput streaming or gaming workloads would result in a more accurate and research-informed definition of what a data center is and how it operates. Thank you again for your work on this, and I hope this perspective is helpful as the definition is refined. ---------- I will be sending several emails that cover different suggestions regarding considerations for Tucson Data Center Policy.

Feedback Received on Large Scale Datacenters (3_12_2026)

2/19/2026	Noelia Yucupicio	Email	Nice talking to you tonight. I wanted to share resources that may help you in making guidelines: https://www.ucs.org/resources/data-center-power-play?read-online-content=1 UCS really condenses a lot of good information and gives good sources for studies/research. I like them a lot and I think it could be useful for your work. I'd love to discuss with you the public education and and awareness of this topic (the zoning definition expansion regarding data centers) because I think that was a major mark missed tonight with the crowd. It's important to first establish "why should I (a random Tucsonan) care?" If a zoning amendment is made, will that mean we the people do not get to decide on the establishment of a data center? How much power do we the people have now and how much will we have after the amendment? What is something bad that might happen if this amendment is not made, can a data center be snuck in? Does our mayor intend on doing the same as the Marana town council and disregard our concerns? How can we know our Mayor and City of Tucson has our best interests at heart? Once there are clear consequences and assurances, I think it will make people see this as an important thing to define/consider and not just something they want to chase away with anger. I would like more citizen visibility and widespread advertising when it comes to a large data center. Billboards, three-month long newspaper ads, regular reminders on all major local television networks, social media, pamphlet handouts with informed persons who can take questions, and roadside signs. Do you think City of Tucson would be interested in setting aside a role/team and a budget for this?
2/6/2026	Lori Rickard	Email	I hope your day is going well. I received an email about the upcoming public meetings about the data center. I wish you much success. I was wondering if having the server rooms walls and floor covered in Himalayan Salt Bricks if that would help displace the heat along with the traditional cooling methods? Then when a section needs to be replaced one can do it a brick at a time. Himalayan Salt Bricks Link - https://saltbricks.us/products/salt-bricks?variant=46207641026790

00:01:33 Colleen Whitaker, SW Decision Resources: https://docs.google.com/document/d/1LxMJ-EvqPcYlQbAL84b3fAH5G9C_q6D2YMVX9P8ACts/edit?usp=sharing
00:06:01 Carver Struve, City of Tucson PDSD: https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
00:07:46 Colleen Whitaker, SW Decision Resources: Any PDSD folks have a short link for that full survey?
00:38:41 Ian Wan, City of Tucson PDSD: Participant Agenda: https://drive.google.com/file/d/1Dy-EEo6HBp0UWAinXSrDPYYK7JKat5Ke/view?usp=sharing
00:44:06 lee stanfield: When specifically will you be addressing the other topics such as water use, electrical use, pollution, etc.?
00:45:51 Ian Wan, City of Tucson PDSD: The presentation will address the topics with time for discussion after in the breakout rooms
00:46:32 Ian Wan, City of Tucson PDSD: Participant Agenda: https://drive.google.com/file/d/1Dy-EEo6HBp0UWAinXSrDPYYK7JKat5Ke/view?usp=sharing
00:52:07 lee stanfield: I believe we should require any data center proposed to locate here, to be completely self-sufficient via its own solar generated power for all its electrical needs (including all cooling systems), and zero water use for cooling. It should not be allowed to transfer its use of water onto TEP or any other IOU by using Air conditioning powered by electricity from TEP or any other IOU.
00:52:58 Rachel Cook: Will the proposed code be able to be applied to existing data centers and those that have been approved but have not yet been built (eg Project Blue) or would these only be subject to the old code?
00:52:59 Monika Browatzki: Reacted to "I believe we should ..." with 🌵
00:54:07 lee stanfield: Reacted to "Will the proposed co..." with 👍
00:54:31 Cesar Acosta, City of Tucson PDSD: Replying to "Will the proposed co..."

whatever proposed amendments we make to the UDC would apply to new builds in City Limits, so not the existing smaller data centers and not project blue which is outside COT city limits
00:55:06 Reed Spurling: How is the city identifying and addressing gaps between these draft zoning rules and the large water users ordinance etc? I ask because Project Blue slipped through previously unidentified regulatory gaps.
00:55:15 lee stanfield: Replying to "Will the proposed co..."

😵
00:55:26 Rachel Cook: Reacted to "How is the city id..." with 👍
00:56:23 Ian Wan, City of Tucson PDSD: Participant Agenda: https://drive.google.com/file/d/1Dy-EEo6HBp0UWAinXSrDPYYK7JKat5Ke/view?usp=sharing
00:57:13 Jon Ralston: What is the time for the meeting on March 18th?
00:57:35 Dan Bursuck, City of Tucson, PDSD: Replying to "What is the time for..."

Hi Jon - our Planning Commission meetings start at 6pm.
00:57:54 Rachel Cook: was part of the function of the NDA signed by mayor & council to keep "community meetings" such as the one we are having now from happening before project blue was pushed through?

00:58:00 Jon Ralston: Reacted to "Hi Jon - our Plannin..." with 👍
00:58:15 Mark Estes: I have attended meetings on this subject in both Marana and in Tucson, Beal Infrastructure has outlined how it plans to use sustainable, renewable energy. They have also addressed potable and reclaimed water usage. Outlining how they plan to use a closed cooling system that doesn't rely on our aqua fur. Furthermore, Beal Infrastructure has already addressed any noise and environmental impact concerns. I'm confused as to why the city of Tucson hasn't implemented the same regulations and oversight as Marana has mandated for Beal Infrastructure.
00:58:23 Susan Tiss: Reacted to "was part of the func…" with ➕
00:59:04 April: Reacted to "was part of the fu..." with ➕
00:59:08 Jon Ralston: Replying to "What is the time for..."

Thank you Dan! 😳
00:59:17 Dan Bursuck, City of Tucson, PDSD: Reacted to "Thank you Dan! 😳" with 👍
01:00:57 lee stanfield: Do any of these new ordinances apply to TEP, since they get their water directly from our aquifer without going through Tucson Water?
01:01:20 Rachel Cook: Reacted to "Do any of these ne..." with 👍
01:02:07 Jon Ralston: Reacted to "Do any of these new ..." with 👍
01:02:12 Vivek: Reacted to "Do any of these new ..." with ‼️
01:02:45 Mark Estes: Beal Infrastructure has already indicated that the only potable water usage would be only for things like drinking fountains, bathrooms and or staff uses. Which would have minimal impact on the water table.
01:02:56 Vivek: How will CAP changes affect these processes?
01:03:07 Rachel Cook: Will "paper water" or water credits fall under 'large quantity water users' in this ordinance?
01:03:35 Julie Dittmer: Just to make sure I understand correctly - the zoning ordinance can’t regulate utilities directly, but it can require applicants to demonstrate infrastructure capacity and compliance with other ordinances. Is that accurate?

Thank you for hosting this session to educate the public.
01:03:43 Susan Tiss: How do these plans change now that we have the news about planned reductions in Colorado River water for AZ ? Those reductions could change the equation for water in Tucson
01:03:54 Renee: Reacted to "How do these plans c…" with 💟
01:03:57 Miriam Robles: Reacted to "How do these plans c..." with 💟
01:03:59 Rachel Cook: Reacted to "How do these plans..." with 💟
01:04:44 Kathleen Dreier: Reacted to "How do these plans c..." with 👍
01:05:10 Sarah Rotenberger: Replying to "Do any of these new ..."

Bumping this question
01:05:11 Vivek: Replying to "Beal Infrastructure ..."

Beale Infrastructure wants 286 MW for phase 1 of Project Blue and up to 1.5 GW for Marana, which has YUUUUGE water implications since our energy utilities rely so much on fracked gas. Fracking takes millions of gallons from someone else’s community, and then more water to heat into steam at the actual power plants. It’s not about

the water consumed on site. We have to be stewards for everyone’s water. Is this a country or not? Is this a world or not?
01:05:16 Renee: So you won’t recalculate these given our much lower CAP amounts?
01:05:25 April: Will aquifer injection wells be allowed in the Tucson Basin that carry Data Center discharge
01:05:54 Miriam Robles: Reacted to "Beale Infrastructure..." with 💙
01:05:56 Susan Tiss: Reacted to "So you won’t recalcu…" with 💯
01:06:13 Rachel Cook: Reacted to "So you won’t reca..." with 👍
01:06:23 Julie Dittmer: Reacted to "Do any of these new …" with ‼️
01:06:31 lee stanfield: Replying to "Beal Infrastructure ..."

That’s because they will instead, transfer their water usage from direct to indirect via going with air conditioning that will require TEP to use massively more water to cool its generators in order to provide the data center with power for AC
01:06:35 Divinity Caldwell: Reacted to "So you won’t recalcu…" with 💙
01:06:48 Carissa Sipp: What is net water zero in the terms of the agreement?
01:07:32 Miriam Robles: Reacted to "What is net water ze..." with 👍
01:07:41 ct tracy: how is 'emergency' defined with regard to generator use?
01:07:51 Vivek: Reacted to "how is 'emergency' d..." with 💙
01:07:53 Miriam Robles: data centers are known for worsening water contamination crisis, alleging that the facility's operations are exacerbating nitrate levels in the local water supply, which are linked to cancer and miscarriages
01:08:03 Rachel Cook: Reacted to "data centers are k..." with 👍
01:08:04 Renee: Sorry, this water information is very unclear.
01:08:13 Rachel Cook: Reacted to "how is 'emergency'..." with 👍
01:08:16 Dan Bursuck, City of Tucson, PDSD: Replying to "how is 'emergency' d..."

Hi CT - we will discuss this a little further in the presentation.
01:08:19 Miriam Robles: Reacted to "Sorry, this water in..." with 👍
01:08:40 Susan Tiss: Reacted to "how is 'emergency' d…" with 💙
01:08:43 Susan Tiss: Reacted to "Sorry, this water in…" with 👍
01:08:45 Susan Tiss: Reacted to "Sorry, this water in…" with 💯
01:08:51 Megan Martin: Reacted to "Sorry, this water in..." with 💯
01:08:56 Rachel Cook: Reacted to "Sorry, this water ..." with 👍
01:09:04 Susan Tiss: Reacted to "data centers are kno…" with 👍
01:09:11 Kya: Reacted to Sorry, this water in... with "👍"
01:09:16 Dan Bursuck, City of Tucson, PDSD: Replying to "How is the city iden..."

Hi Reed - we will discuss this a bit when we get to the review process, and required disclosures for energy and water.
01:09:43 lee stanfield: Reacted to "So you won’t recalcu..." with 💯
01:09:46 Carissa Sipp: Who decided these were experts in data center? Most have no architecture experience and mostly cloud
01:09:52 Vivek: Reacted to "Sorry, this water in..." with 💯

01:10:17 Dan Bursuck, City of Tucson, PDSD: Replying to "Just to make sure I ..."

Hi Julie. Yes, there are limitations on what we can regulate, but will go into some detail on what we are proposing to require related to infrastructure capacity.
01:10:19 lee stanfield: Reacted to "What is net water ze..." with 👍
01:10:23 Carissa Sipp: Who is ‘we’?
01:10:24 Mark Estes: Replying to "Beal Infrastructure ..."

I have extensive experience working on data centers and that is NOT how they plan on using our potable water. They've made extensive concessions to the community's concerns pertaining to water. Everything from reclaimed water (the same as what municipal golf courses use) to closed cooling systems (much like the radiator in your car) which would NOT use potable water.
01:10:24 Rachel Cook: who are the members specifically and what are their credentials and interest in the health and safety of Tucsonans?
01:10:41 Miriam Robles: Reacted to "Who decided these we..." with 👍
01:10:43 April: Replying to "Sorry, this water ..."

How can we find details on the water plan that covers the aquifer protection under current law
01:10:58 Rachel Cook: Reacted to "I have extensive e..." with 👍
01:11:05 Divinity Caldwell: Reacted to "Sorry, this water in…" with 💯
01:11:07 Susan Tiss: Reacted to "Beale Infrastructure…" with 💙
01:11:21 Rachel Cook: Reacted to "Beale Infrastructu..." with 👍
01:11:24 Rachel Cook: Reacted to "That’s because th..." with 👍
01:11:26 lee stanfield: Reacted to "Sorry, this water in..." with 👍
01:11:31 Susan Tiss: Reacted to "That’s because they …" with 👍
01:12:05 April: Do you have water experts besides stakeholders on your TAC and/or the City Water department as you have no experience with data centers as customers?
01:12:10 Jon Ralston: Reacted to "Sorry, this water in..." with 💯
01:12:12 Cesar Acosta, City of Tucson PDSD: Replying to "who are the members ..."

Hey Rachel TAC members can be seen along with their area of expertise here https://www.tucsonaz.gov/Departments/Planning-Development-Services/Planning-Initiatives/Data-Centers-Unified-Development-Code-Amendment
01:12:20 Rachel Cook: Reacted to "Hey Rachel TAC mem..." with 👍
01:12:21 Miriam Robles: Reacted to "who are the members ..." with 👍
01:12:29 Miriam Robles: Reacted to "Do you have water ex..." with 💙
01:13:31 Dan Bursuck, City of Tucson, PDSD: Replying to "Sorry, this water in..."

Hi April - there was a Mayor and Council study session on the Large Quantity Water Users Ordinance last week. The materials and the presentation should be helpful.
01:13:33 lee stanfield: I do not think my question re whether TEP’s water usage (which comes directly from our aquifer and does NOT go through Tucson Water) was adequately answered at all.
01:14:18 Cesar Acosta, City of Tucson PDSD: Replying to "Do you have

water ex..."

members of the Citizen Water Advisory Committee and Watershed Management Group were part of the TAC were hoping more perspectives will give us feedback now
01:14:30 Daniel Dempsey: My biggest concerns—outside of the environmental—are stranded cost and cross-subsidy risk (externalized costs from the datacenter to ratepayers). I think we can address them through disclosure requirements. The first draft doesn't mention these issues at all.
01:14:35 Mark Estes: Why hasn't the city of Tucson adopted the same regulations and zoning issues as the town of Marana?
01:14:39 April: Reacted to "Who decided these ..." with 💟
01:14:40 Kathleen Dreier: Reacted to "Sorry, this water in..." with 👍
01:14:56 Tahnee Robertson, SDR: All questions in chat for now please
01:14:58 Carissa Sipp: You missed local people in architecture
01:15:11 Carissa Sipp: AI and ICs
01:16:02 Rachel Cook: why did this not occur prior to the vote on project blue?
01:16:36 Kathleen Dreier: Reacted to "AI and ICs" with 💯
01:16:47 Reed Spurling: Reacted to "why did this not occ..." with 💟
01:17:00 Kathleen Dreier: Reacted to "why did this not occ..." with 😢
01:17:09 Tahnee Robertson, SDR: You should be able to move the poll on your screen if it is blocking the screen behind
01:17:27 lee stanfield: I tried to get my question in the chat answered, but it was not adequately answered, so I have raised my hand.
01:17:32 Miriam Robles: We don't want any kind of Data Centers, big or small
01:17:41 Coral: If you dont have much say over water and energy who does?? Seems like THE big question/issue!
01:17:43 Jon Ralston: Reacted to "If you dont have muc..." with 💯
01:17:46 Mark Estes: How is Tucson more unique than Marana in respect to Hyper Data Centers?
01:18:00 Susan Tiss: Reacted to "We don't want any ki…" with 💯
01:18:02 Susan Tiss: Reacted to "We don't want any ki…" with 💟
01:18:04 Rachel Cook: Reacted to "We don't want any ..." with 👍
01:18:05 lee stanfield: Reacted to "why did this not occ..." with 💟
01:18:09 Megan Martin: Reacted to "We don't want any ki..." with 💯
01:18:13 Rachel Cook: if this code change will apply to all large scale water users why are we specifically discussing definitions only for large-scale data centers?
01:18:19 April: Why are you only looking at outdated Phoenix codes and not real-time issues happening in other parts of the country/world that have raised customer electricity rates, damaged aquifers, and degraded air quality. Our air quality is an F according to the American Lung Association
01:18:21 Reed Spurling: Replying to "Beal Infrastructure ..."

Mark, I think we are talking about two slightly different issues. TEP uses lots (billions of gallons) of water to generate power, whether or not potable water is used locally. Electricity itself costs water, and data centers use a lot of electricity, therefore a lot of water.

01:18:41 Miriam Robles: Reacted to "How is Tucson more u..." with 👍
01:18:41 Vivek: Reacted to "Mark, I think we are..." with 💯
01:18:47 Carissa Sipp: So this could draw 500MW or more and anything under - you truly think you have regulations
01:18:49 Colleen Whitaker, SW Decision Resources: Replying to "I tried to get my qu..."

Lee we will have more time for questions and feedback in the breakout rooms. Please feel free raise your unanswered questions again there.
01:19:04 Jon Ralston: Reacted to "Mark, I think we are..." with 💯
01:19:06 Susan Tiss: Reacted to "Why are you only loo…" with 💙
01:19:09 Susan Tiss: Reacted to "Why are you only loo…" with 💯
01:19:11 Susan Tiss: Reacted to "Why are you only loo…" with ➕
01:19:18 Vivek: Reacted to "Why are you only loo..." with 💯
01:19:28 Rachel Cook: Reacted to "Why are you only l..." with 💯
01:19:29 Susan Tiss: Reacted to "How is Tucson more u…" with 👍
01:19:36 Megan Milton: Reacted to "We don't want any ..." with 👍
01:19:55 Megan Milton: Reacted to "Why are you only l..." with 💯
01:20:02 Vivek: Weird, why aren’t there any suitable locations in the Foothills?
01:20:04 April: Setbacks won't help PM2.5 or nitric oxide particulate that travels hundreds of miles from data centers and affects all life in the area.
01:20:08 Rachel Cook: Reacted to "Weird, why aren’t..." with 👍
01:20:09 Renee: Why are PAD, PCD, not shown on the map? This is the loophole that is historically used to bypass zoning codes.
01:20:14 Susan Tiss: Reacted to "Weird, why aren’t th…" with 💙
01:20:17 Susan Tiss: Reacted to "Weird, why aren’t th…" with 😂
01:20:22 Kathleen Dreier: Reacted to "Weird, why aren’t th..." with 💯
01:20:23 Nicole Hagedorn: Reacted to "Setbacks won't hel..." with 👍
01:20:25 Megan Milton: Reacted to "Weird, why aren’t..." with 💯
01:20:26 Reed Spurling: Reacted to "Weird, why aren’t th..." with 💙
01:20:29 Susan Tiss: Reacted to "Setbacks won't help …" with 👍
01:20:31 Miriam Robles: Reacted to "Setbacks won't help ..." with 👍
01:20:35 Kathleen Dreier: Reacted to "Setbacks won't help ..." with 👍
01:20:38 Rachel Cook: Reacted to "Setbacks won't hel..." with 👍
01:20:44 Mark Estes: Replying to "Beal Infrastructure ..."

Again, I am a Union Electrician with over 2 decades of experience in the industry that includes working at TEP, Solar Fields and Data centers. Furthermore, I have attended meetings on this issue in both Marana and Tucson.
01:20:44 Kathleen Dreier: Reacted to "Why are PAD, etc, no..." with 💯
01:20:52 Nicholas Martell, City of Tucson: Replying to "if this code chang..."

Thank you for the question. One of the reasons Mayor and Council has directed staff to look at new zoning regulations for data centers is related to how quickly the technology and definitions have changed as opposed to other land uses. Other large

users, like Golf Courses have not seen the same technological changes.
01:21:13 Nicole Hagedorn: Reacted to "Why are you only l..." with 💯
01:21:19 Carissa Sipp: But only if >50000?
01:21:32 Kya: Reacted to Weird, why aren't th... with "👍"
01:21:40 Divinity Caldwell: Reacted to "Beale Infrastructure…" with 💯
01:21:48 Divinity Caldwell: Reacted to "That's because they …" with 💙
01:22:00 Rachel Cook: and yet feedback was requested from the public, council voted no after the fact and project blue will still be building... how are we to trust that public opinion will be taken into account????
01:22:07 Julie Dittmer: What policy objective is the City seeking to achieve through establishing this ordinance now. Regulatory clarity, anticipation of applications, or economic positioning?
01:22:17 Megan Martin: Reacted to "and yet feedback was..." with 💯
01:22:19 Megan Milton: Reacted to "and yet feedback w..." with 👍
01:22:19 April: Sorry, are you saying you will allow data centers within 1/2 mile of schools, businesses, and houses??
01:22:35 Susan Tiss: Reacted to "and yet feedback was…" with 💯
01:22:35 Kathleen Dreier: Reacted to "and yet feedback was..." with 👍
01:22:39 Susan Tiss: Reacted to "and yet feedback was…" with ➕
01:22:52 Miriam Robles: Council meeting in Marana was packed, yet council members ignored our voices, we don't want Big Tech just easily checking boxes, we need to block Data Centers in the first place.
01:22:53 Susan Tiss: Reacted to "Sorry, are you sayin…" with ➕
01:22:57 Vivek: Replying to "Beal Infrastructure ..."

I'm not questioning any of that, and I respect your experience! But TEP's energy mix is on their website: 50% fracked gas. The technology doesn't exist to spin up renewables as quickly as they need to meet 1.5 GW of demand over a few years, right? https://www.tep.com/our-energy-mix/
01:23:05 April: These standards you are proposing are proven to be deadly to citizens
01:23:06 lee stanfield: Data centers should only be allowed to be in areas where they can have sufficient land to use solar panels to be totally self-sufficient with regard to their total electricity needs including all air-conditioning needs. They should not be allowed to dump their water usage onto TEP by using AC cooling and thus requiring TEP to have to use huge amounts of water to cool their generators in order to supply the data centers with enough electricity to air condition them.
01:23:08 Susan Tiss: Reacted to "Council meeting in M…" with ➕
01:23:14 Miriam Robles: Reacted to "Council meeting in M..." with 💙
01:23:15 Nicole Hagedorn: Reacted to "and yet feedback w..." with 👍
01:23:29 Carissa Sipp: Reacted to "Data centers should …" with 👆
01:23:31 Nicole Hagedorn: Reacted to "Council meeting in..." with 👍
01:23:32 Rachel Cook: Reacted to "I'm not questioni..." with 👍
01:23:32 Susan Tiss: Reacted to "Data centers should …" with 💯
01:23:33 Jon Ralston: Reacted to "Data centers should ..." with 💯
01:23:37 Nicole Hagedorn: Reacted to "These standards yo..." with 💯
01:23:44 Susan Tiss: Reacted to "These standards you …" with 💯
01:23:45 Nicole Hagedorn: Reacted to "Data centers shoul..." with 👆

01:23:46 Nicole Hagedorn: Reacted to "Data centers shoul..." with 💯
01:23:47 Megan Martin: Reacted to "Data centers should ..." with 👆
01:23:53 Rachel Cook: Reacted to "Data centers shoul..." with 💯
01:24:00 Miriam Robles: Reacted to "These standards you ..." with 👍
01:24:04 John Kmiec: Replying to "I do not think my qu..."

TEP has their own water rights that they are regulated against by the state of Arizona.
01:24:04 Coral: Doesn't the south side of Tucson already have bigger impacts: noise from TIA and Davis Monthan, who keep trying to get F35s here; Hughes aircraft toxic ponds; PFAs from firefighting foam etc.in wells/water; more poverty and less activism there to protest or prevent negative impacts.
01:24:05 Carissa Sipp: Was any feedback from last week’s meeting taken into account?
01:24:12 Miriam Robles: Reacted to "Was any feedback fro..." with 👍
01:24:18 Miriam Robles: Reacted to "Doesn't the south si..." with 💙
01:24:20 Rachel Cook: Reacted to "Doesn't the south ..." with 💙
01:25:10 Megan Milton: Reacted to "Doesn't the south ..." with 💯
01:25:11 Tahnee Robertson, SDR: A reminder that City staff will respond to questions through a FAQ that will be posted.
01:25:31 Susan Tiss: Even Google defines “large-scale” data centers as anything over 10,000 sq feet. Not 50,000. 50,000 is hyperscale
01:25:32 Raye Winch: Can we have more context? Like how much energy and water a data center that size might use?
01:25:41 Dan Bursuck, City of Tucson, PDSD: Replying to "Was any feedback fro..."

Hi Carissa - this is the same presentation as Thursday. We are planning four meetings that will help to guide potential revisions as we move forwad.
01:25:46 Susan Tiss: Reacted to "Was any feedback fro…" with ➕
01:26:00 Vivek: What if we defined large-scale data centers not by area but by energy consumption?
01:26:01 Rachel Cook: no
01:26:09 Renee: One neighborhood meeting is NOT enough
01:26:10 Daniel Dempsey: Reacted to "What if we defined l..." with 💙
01:26:15 Miriam Robles: Reacted to "One neighborhood mee..." with 💙
01:26:24 Miriam Robles: Reacted to "no" with 👍
01:26:29 Susan Tiss: Reacted to "What if we defined l…" with 💙
01:26:32 lee stanfield: Where is the poll?
01:26:39 Kathleen Dreier: Reacted to "Even Google defines ..." with 👍
01:26:48 Dan Hunt: Lost the poll screen
01:26:51 April: Replying to "Was any feedback f..."

So is Carissa's question a no then?
01:27:02 Daniel Dempsey: Replying to "What if we defined l..."

Exactly. It’s the resource consumption that is the problem. AI data centers use far more resources than normal cloud data centers.
01:27:05 lee stanfield: It is not showing up on screen!

01:27:13 Kathleen Dreier: Please show us the results on the screen.
01:27:22 Vivek: Reacted to "Sorry, are you sayin..." with ‼
01:27:25 lee stanfield: Your poll is not showing up on the screen!!!
01:27:31 Miriam Robles: Reacted to "Please show us the r..." with 👍
01:27:36 Coral: Where us poll? On phone...
01:27:39 Kathleen Dreier: Thank you. See it now.
01:27:40 ct tracy: i never saw the poll
01:27:43 April: Reacted to "One neighborhood m..." with 💚
01:27:46 Vivek: Reacted to "Doesn't the south si..." with 💯
01:27:47 Megan Milton: I didn't get a chance to finish.
01:27:49 Raye Winch: Reacted to What if we defined l... with "💚"
01:28:10 April: Reacted to "Doesn't the south ..." with 💯
01:28:27 Colleen Whitaker, SW Decision Resources: https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
01:28:58 Susan Tiss: Power consumption…. Anything over 100 mw is “large.”
01:29:05 April: Reacted to "Power consumption..." with 💯
01:29:08 Colleen Whitaker, SW Decision Resources: That is a link you can use to answer the same questions as are being posed in the Zoom polls. And it will remain open so you can take your time.
01:29:14 Kathleen Dreier: Reacted to "Power consumption…. ..." with 👍
01:29:18 Susan Tiss: Reacted to "Can we have more con…" with ➕
01:29:24 Miriam Robles: Replying to "Power consumption…. ..."

They need to build Clean energy infrastructure first
01:29:30 lee stanfield: Reacted to "What if we defined l..." with 💚
01:29:36 Kathleen Dreier: Reacted to "They need to build C..." with 👍
01:29:44 lee stanfield: Reacted to "Was any feedback fro..." with 👍
01:29:56 Beth Lehr: Sorry...my phone kicked me off. Can you drop the link one more time, please?
01:30:01 Daniel Dempsey: Disclosure is a big tool.
01:30:10 Ian Wan, City of Tucson PDSD: https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
01:30:12 Colleen Whitaker, SW Decision Resources: Survey link: https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
01:30:25 Beth Lehr: Reacted to https://forms.office... with "👍"
01:30:34 lee stanfield: Reacted to "Power consumption…. ..." with 💯
01:30:39 Stella smith: Yes, we do not want any data centers.
01:30:40 Daniel Dempsey: Disclosure has to include who is paying for the new infrastructure required and how it is being paid for.
01:30:41 lee stanfield: Reacted to "They need to build C..." with 👍
01:30:46 Miriam Robles: Reacted to "Disclosure has to in..." with 💚
01:30:52 Miriam Robles: Reacted to "Yes, we do not want ..." with 💚
01:30:55 S. Vandergriff: Reacted to "Disclosure has to ..." with 👍
01:30:56 Rachel Cook: Reacted to "Yes, we do not wan..." with 💚
01:30:57 Rachel Cook: Reacted to "Disclosure has to ..." with 💚

01:31:06 April: Are you working with climateXchange or any other policy group that understands transmission challenges? If not, why? Because as you said, the grid is complicated and trying to make policy blindfolded is not wise.
01:31:11 lee stanfield: Reacted to "Yes, we do not want ..." with 💙
01:31:20 Rebecca Craft: It just isn't clear yet whether data centers can operate in an environmentally unimpactful and sustainable way, anywhere in the country (or planet). I'd like to see Tucson refuse all such development until we are more certain that it can be operated in a minimally damaging way. So far data centers seem to be operating in ways that have seriously negative impact on the people who live near them.
01:31:24 Susan Tiss: Reacted to "Disclosure has to in…" with 💯
01:31:26 Stella smith: One publich meeting is absurd should be at least 4 or 5 unless you intend to just NOT TAKE PUBLIC INPUT SERIOUSLY
01:31:27 lee stanfield: Reacted to "Disclosure has to in..." with 💙
01:31:32 Miriam Robles: Replying to "Disclosure has to in..."

It has to commit to 100% renewable energy
01:31:37 Vivek: Reacted to "It just isn't clear ..." with 💯
01:31:39 Susan Tiss: Reacted to "It just isn't clear …" with 💯
01:31:39 Daniel Dempsey: There’s a major difference between a user financing the infrastructure and it being recovered through rates. If recovered through rates, it needs to have security and long-term contracts.
01:31:41 Susan Tiss: Reacted to "It just isn't clear …" with ➕
01:31:55 Megan Milton: Reacted to "Disclosure has to ..." with 👍
01:32:06 Miriam Robles: Reacted to "It just isn't clear ..." with 💙
01:32:22 Miriam Robles: Reacted to "One publich meeting ..." with 💙
01:32:24 Kathleen Dreier: Reacted to "Disclosure has to in..." with 👍
01:32:27 Miriam Robles: Reacted to "There’s a major diff..." with 💙
01:32:30 Kathleen Dreier: Reacted to "It has to commit to ..." with 💯
01:32:31 Rachel Cook: how do recent changes to the EPA and federal government's stance on climate change and interest in regulation affect this and the enforcement of current and future code?
01:32:31 Stella smith: why do we have to have ANY data centers. This is very unclear but apparently a decision that has already been made by City Council without adequate public input.
01:32:33 Vivek: Reminder that Tucson Water WANTED to supply Project Blue until mayor and council said no
01:32:35 April: What are your mechanisms for "off-setting" water use?
01:32:38 Rachel Cook: Reacted to "why do we have to ..." with 👍
01:32:41 Kathleen Dreier: Reacted to "why do we have to ha..." with 💯
01:32:43 Rachel Cook: Reacted to "Reminder that Tucs..." with 👍
01:32:43 Julie Dittmer: Reacted to "It just isn't clear …" with 💙
01:32:43 Miriam Robles: Reacted to "why do we have to ha..." with 💙
01:32:48 Kathleen Dreier: Reacted to "Reminder that Tucson..." with 💯
01:32:49 Vivek: Reacted to "why do we have to ha..." with 💯
01:32:54 Vladimir: Reacted to why do we have to ha... with "💯"

01:32:55 Julie Dittmer: Reacted to "Disclosure has to in…" with 👍
01:33:05 Daniel Dempsey: TEP admitted before the ACC that Beale was not covering the cost of new generation and it was only a ten year contract. And that new generation has a life of 25+ years. So we get stuck with the bill under most scenarios. And the security amounts were nowhere near sufficient.
01:33:18 Vivek: Reacted to "TEP admitted before ..." with 💯
01:33:20 Rachel Cook: Reacted to "TEP admitted befor..." with 💯
01:33:20 Carissa Sipp: I feel like these are just words and there is no system to check
01:33:27 Rachel Cook: Reacted to "I feel like these ..." with 👍
01:33:39 Andi Faulkner-Harrison: Every data center has gone over initial energy disclosure. Every community has had their electricity bill increase. How can you say it will be different here if there is no evidence to prove otherwise?
01:33:54 Vivek: Can you please review slides while the poll is up?
01:34:08 Jon Ralston: the comment section bogs down with everyone trying to answer the poll at the same time
01:34:09 Tahnee Robertson, SDR: Reacted to "Can you please revie..." with 👍
01:34:11 Kathleen Dreier: Reacted to "Every data center ha..." with 💯
01:34:25 Vivek: Reacted to "the comment section ..." with 👍
01:34:26 Kathleen Dreier: Replying to "Can you please revie..."

Yes, please!
01:34:50 Colleen Whitaker, SW Decision Resources: Replying to "the comment section ..."

If anyone is having issues with the Zoom poll, please use this link. It has all the same questions:
https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
01:34:55 Vivek: Paper water is water stolen from somewhere else
01:35:00 Colleen Whitaker, SW Decision Resources: Replying to "the comment section ..."

And it will remain open after the meeting.
01:35:08 Rachel Cook: Reacted to "Paper water is wat..." with 👍
01:35:10 Susan Tiss: Reacted to "how do recent change…" with ➕
01:35:12 Divinity Caldwell: Reacted to "Paper water is water…" with 💯
01:35:19 Susan Tiss: Reacted to "why do we have to ha…" with 💯
01:35:23 Susan Tiss: Reacted to "Reminder that Tucson…" with 💯
01:35:27 Miriam Robles: Reacted to "I feel like these ar..." with 👍
01:35:31 Nicole Hagedorn: Reacted to "Reminder that Tucs..." with 💯
01:35:34 Carissa Sipp: Replying to "TEP admitted before …"
By ACC and AZ law the are compensated- I think the term is base rate- this allows them to seek rate increases for these things and Fortis dropped the infrastructure for Beale in its investment disclosure this year touting it as a good thing and more revenue.
01:35:35 Nicole Hagedorn: Reacted to "why do we have to ..." with 💯
01:35:36 Susan Tiss: Reacted to "TEP admitted before …" with 💯

01:35:37 Miriam Robles: Reacted to "Every data center ha..." with 💟
01:35:40 Susan Tiss: Reacted to "TEP admitted before …" with ➕
01:35:49 Miriam Robles: Reacted to "Paper water is water..." with 💟
01:35:55 Megan Milton: Have any of these plans been reassessed after the United Nations declared that we are in a state of global water bankruptcy (https://news.un.org/en/story/2026/01/1166800)? If so, how?
01:35:57 Carissa Sipp: I have no poll
01:36:22 Susan Tiss: Reacted to "Every data center ha…" with 💯
01:36:23 Susan Tiss: Reacted to "Every data center ha…" with 💟
01:36:25 Colleen Whitaker, SW Decision Resources: Replying to "I have no poll"

Please use this link Carissa: https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
01:36:33 Susan Tiss: Reacted to "Paper water is water…" with 💯
01:36:48 lee stanfield: But Tucson Water is NOT where TEP gets its water from….. TEP has its own wells and does NOT go through Tucson Water. So WOULD TEP'S WATER USE be be regulated by the new water standards???
01:36:50 Colleen Whitaker, SW Decision Resources: Replying to "I have no poll"

It has the same questions as the zoom poll and will remain open after the meeting.
01:36:57 Susan Tiss: Reacted to "Have any of these pl…" with ➕
01:36:59 Susan Tiss: Reacted to "Have any of these pl…" with 💯
01:37:23 Susan Tiss: Reacted to "But Tucson Water is …" with ➕
01:37:25 Miriam Robles: Reacted to "But Tucson Water is ..." with 💟
01:37:28 Susan Tiss: Reacted to "But Tucson Water is …" with 💯
01:37:36 Rachel Cook: Who deetermined the setback distances?
01:37:46 Miriam Robles: Reacted to "Who deetermined the ..." with 👍
01:38:12 Vivek: Is there a minimum distance a data center must be from the nearest zoned residential?
01:38:13 Daniel Dempsey: Replying to "TEP admitted before ..."

Yeah, TEP adds the cost to the base rate. It then hopes Beale pays enough to cover it in its bills. If Beale fails to do so, it's a cross-subsidy. We can address this through disclosures. Most of this information was redacted in TEP's agreement with Beale. Then TEP admitted Beale wasn't covering the cost.

M&C special exception needs to have this information to make a good decision.
01:38:15 Megan Milton: Reacted to "why do we have to ..." with 💯
01:38:15 Rachel Cook: Contractor weighing in on the setbacks--this is incredibly low considering the noise, etc\
01:38:20 Megan Milton: Reacted to "Reminder that Tucs..." with 💯
01:38:24 Mark Estes: If Hyper Data Centers are to have an impact on Pima County, why then isn't the city of Tucson including the proposed zoning and regulation issues addressed by Marana in these meetings? Why isn't the City of Tucson breaking down the concerns that Marana residents have expressed and offering those proposed resolutions offered by Beal Infrastructure so that the community of Tucson can be more informed?

01:38:27 Miriam Robles: Other communities are having health issues due to similar setbacks
01:38:37 Dan Hunt: Would you want this behemoth in YOUR backyard?
01:38:47 Miriam Robles: Reacted to "Would you want this ..." with 💟
01:39:15 lee stanfield: TEP’s water usage is crucial because if a data center uses Air Conditioning, it just transfers its direct water usage to an indirect usage via massively increasing TEP’s water usage to generate the HUGE additional power needed for the data center’s air conditioning.
01:39:21 Victoria Sammons: Do you consider data centers a public health threat?
01:39:36 Kathleen Dreier: The whole country has already shown us what happenes as it relates to data center development: It leads to extraction where the common person gets the fallout.
01:40:06 Miriam Robles: Reacted to "TEP’s water usage is..." with 💟
01:40:14 Miriam Robles: Reacted to "Do you consider data..." with 💟
01:40:14 Dan Bursuck, City of Tucson, PDSD: Reacted to "Contractor weighing ..." with 👍
01:40:21 Dan Hunt: If you are truly looking for public feedback: it’s not zoning regulations we need, it’s a moratorium on all data centers.
01:40:21 Miriam Robles: Reacted to "The whole country ha..." with 💟
01:40:22 April: Replying to "Contractor weighin..."

Yes, there are incidents of Havana type syndrome this close to data centers. Have you studied that?
01:40:32 Miriam Robles: Reacted to "If you are truly loo..." with 💟
01:40:34 Susan Tiss: Reacted to "Do you consider data…" with 💟
01:40:35 Eric Klingberg: Reacted to "If you are truly loo..." with 💟
01:40:36 Kathleen Dreier: Reacted to "If you are truly loo..." with 💯
01:40:41 Miriam Robles: Reacted to "Yes, there are incid..." with 💟
01:40:41 April: Reacted to "Contractor weighin..." with 💯
01:40:41 Susan Tiss: Reacted to "The whole country ha…" with 💟
01:40:45 Miriam Robles: Reacted to "Contractor weighing ..." with 💟
01:40:47 Rachel Cook: what is the maximum building heights in this example?
01:40:48 Susan Tiss: Reacted to "If you are truly loo…" with 💟
01:40:49 Susan Tiss: Reacted to "If you are truly loo…" with 💯
01:40:51 Dan Hunt: Reacted to "Contractor weighing …" with 👍
01:40:51 Susan Tiss: Reacted to "If you are truly loo…" with ➕
01:40:52 Rachel Cook: Reacted to "If you are truly l..." with 💟
01:40:54 Rachel Cook: Reacted to "If you are truly l..." with 💯
01:40:54 S. Vandergriff: Reacted to "If you are truly l..." with 👍
01:40:57 Megan Milton: Reacted to "If you are truly l..." with 👍
01:40:58 Rachel Cook: Reacted to "If you are truly l..." with ➕
01:40:59 Rachel Cook: Reacted to "If you are truly l..." with 👍
01:41:06 Carissa Sipp: When will our feedback be rolled into the work?
01:41:13 Rachel Cook: Reacted to "When will our feed..." with 👍
01:41:16 Eric Klingberg: Reacted to "Contractor weighing ..." with 👍
01:41:22 Megan Milton: Reacted to "When will our feed..." with 👍
01:41:23 Vivek: Is there a minimum distance a data center must be from the

nearest zoned residential?
01:41:24 Nicole Hagedorn: Reacted to "When will our feed..." with 👍
01:41:24 April: Replying to "Contractor weighin..."

This setback proposal is deadly and unrealistic according to studies from Cal Tech and others.
01:41:35 Susan Tiss: No data centers in residential areas. Period. No “setback” is enough.
01:41:42 Miriam Robles: Reacted to "No data centers in r..." with 💟
01:41:43 Divinity Caldwell: Reacted to "Contractor weighing …" with 💯
01:41:52 Kya: #3 on the poll for this one is a duplicate from the previous poll. #2 doesn't make sense
01:41:55 Dan Bursuck, City of Tucson, PDSD: Replying to "Is there a minimum d..."

As of now it is at 400 feet from residential.
01:42:01 April: Reacted to "If you are truly l..." with 💯
01:42:03 Divinity Caldwell: Reacted to "No data centers in r…" with 💟
01:42:04 Rachel Cook: Reacted to "No data centers in..." with 💟
01:42:08 Nicole Hagedorn: Reacted to "No data centers in..." with 💟
01:42:25 Jon Ralston: I’ve got a joke for everyone. A horse walks into a bar. The bar tender says, “why the long face?” The horse says, “because I’m a citizen of Tucson and I had thought we had defeated hyper scale data centers in our community, but the City of Tucson continues to push them.” I realize that joke is kind of sad, but then again so is this process. (whomp, whomp)
01:42:26 Megan Martin: Reacted to "As of now it is at 4..." with 👎
01:42:34 Reed Spurling: Replying to "If Hyper Data Center..."

Agreed, but Beale Infrastructure has lied to us multiple times about their projects’ requirements, so I think it would be difficult to apply their proposed “solutions” with much confidence.
01:42:36 Kathleen Dreier: Reacted to "No data centers in r..." with 💟
01:42:42 Susan Tiss: Reacted to "I’ve got a joke for …" with 😂
01:42:45 Megan Martin: Reacted to "I’ve got a joke for ..." with 😂
01:42:46 Susan Tiss: Reacted to "I’ve got a joke for …" with 💟
01:42:47 Rachel Cook: Reacted to "I’ve got a joke f..." with 👏
01:42:52 Divinity Caldwell: Reacted to "I’ve got a joke for …" with 💟
01:42:55 Tahnee Robertson, SDR: Replying to "#3 on the poll for t..."

We’ll fix that, thanks for noting
01:42:55 Rachel Cook: Reacted to "I’ve got a joke f..." with 💟
01:42:58 April: What decible of noise are you talking about, your slide does not say.
01:43:02 Dan Bursuck, City of Tucson, PDSD: Replying to "When will our feedba..."

Once we get through these public meetings, we will summaraize and post all the comments and provide revisions. Most likely that will be prior to the Planning Commission Study Session.

01:43:08 Carissa Sipp: Are we building hills in Tucson desert?
01:43:14 Susan Tiss: Reacted to "What decible of nois…" with ➕
01:43:17 Kathleen Dreier: Reacted to "Agreed, but Beale In..." with 💯
01:43:18 Susan Tiss: Reacted to "When will our feedba…" with 👍
01:43:20 Stella smith: Reacted to "Paper water is water..." with 👍
01:43:21 April: Reacted to "I've got a joke f..." with 👏
01:43:26 S. Vandergriff: Reacted to "No data centers in..." with 💟
01:43:45 Andi Faulkner-Harrison: Has anyone on council done their research on infrasound by data centers (it's bad btw)
01:43:45 Rachel Cook: except for project blue that has already been "passed" without consent from the public and without an amended code.....
01:43:51 Mark Estes: The server systems in data centers are set on a vibration dampening floor that mitigates any noise Produced by Data Centers. Marana has already set the standards for this and many other issues.
01:43:56 Carissa Sipp: What is the exact equipment you are using do measurement? What and who will do this? And where? With generators on/off?
01:44:03 Miriam Robles: Reacted to "The server systems i..." with 💟
01:44:05 April: "getting at that noise" won't be mitigated by a wall. Sorry.
01:44:10 Susan Tiss: Without specifics about the type of noise, this is not helpful info.
01:44:27 Susan Tiss: Reacted to "What is the exact eq…" with ➕
01:44:56 Vivek: Reacted to "Without specifics ab..." with 💯
01:45:02 Megan Milton: Reacted to "Without specifics ..." with 💯
01:45:06 Carissa Sipp: Times of required maintenance should not be 9-6 for air quality issues
01:45:22 Stella smith: Replying to "I have no poll"

The City DOES NOT enforce the noise level restrictions that we have now. There is certainly NO reason to be lieve they will enforce whatever noise regulations that they set up here. The City sets some of these regulations that sound good but then allocate NO staff to be concerned about enfor
01:45:27 Mark Estes: The generators are only used for emergency situations and for emergency testing situations
01:45:28 April: The generator segment is not clear. And saying that natural gas is cleaner is greenwashing and not helpful
01:45:51 Carissa Sipp: I understand noise but this misses the generator issue and checkout is monthly maintenance with regards to impact on air quality
01:45:55 Dan Hunt: Reacted to "Without specifics ab…" with 💯
01:45:59 Vivek: Replying to "Without specifics ab..."

https://www.youtube.com/watch?v=_bP80DEAbuo must watch about noise, data centers, and public health
01:46:23 Carissa Sipp: Replying to "The generators are o…"
No- they receive maintenance monthly
01:46:34 Carissa Sipp: They aren't just 'emergency'
01:46:36 Miriam Robles: Reacted to "https://www.youtube...." with 👍
01:46:38 April: Particulate from LNG stays in the atmosphere decades longer than diesal or coal - which does not make it a good comparison. Solar or wind is "cleaner"

01:47:03 Megan Martin: https://youtu.be/t-8TDOFqkQA?si=pMleg-oD0MJZol46
01:47:18 Divinity Caldwell: Reacted to "Without specifics ab…" with 💯
01:47:39 ct tracy: maintenance needs to be defined or general ops is maintenance
01:47:41 Susan Tiss: Other data centers around the country are using generators far more than they said they would. There are also no penalties mentioned here for non-compliance. This is wholly unacceptable.
01:47:57 Divinity Caldwell: Reacted to "Other data centers a…" with 💯
01:47:58 Susan Tiss: Reacted to "The generator segmen…" with ➕
01:47:59 Megan Martin: Reacted to "Other data centers a..." with 💯
01:48:01 Nicole Hagedorn: Reacted to "Other data centers..." with 💯
01:48:01 Jon Ralston: Reacted to "Other data centers a..." with 💯
01:48:05 April: Reacted to "Other data centers..." with 💯
01:48:23 Stella smith: Replying to "I have no poll"

aLL THE REGULATIONS are not RESTRICTIVE ENOUGH.
01:48:26 Megan Milton: Reacted to "Other data centers..." with 💯
01:48:30 Miriam Robles: Reacted to "aLL THE REGULATIONS ..." with 👍
01:48:34 Miriam Robles: Reacted to "The City DOES NOT en..." with 👍
01:48:51 Rachel Cook: Reacted to "Other data centers..." with 👍
01:48:59 Stella smith: Replying to "I have no poll"

none OF HE regulations will have any guarantee of nforcement
01:49:20 S. Vandergriff: Reacted to "I feel like these ..." with 👍
01:49:24 ct tracy: adding native veg to the border of a clear-cut acre is surreal
01:49:33 Carissa Sipp: Where is heat generated from the data center considered here?
01:49:36 April: What about stormwater runoff - any regulations there or does disaters soak into the soil and make it's way to the aquifer? What about fire protection requirements? Fire departments say they don't have resources to put out data center fires b/c of the heat and toxicity.
01:49:46 Miriam Robles: Define: Low water usage
01:49:46 Divinity Caldwell: Reacted to "Where is heat genera…" with 💯
01:49:49 Megan Milton: Reacted to "Where is heat gene..." with 💯
01:50:03 Nicole Hagedorn: Reacted to "What about stormwa..." with 👍
01:50:03 Divinity Caldwell: Reacted to "What about stormwate…" with 💯
01:50:06 Nicole Hagedorn: Reacted to "Where is heat gene..." with 💯
01:50:08 Eric Klingberg: Replying to "The generators are o..."

What would stop them from having an "emergency" every summer?
01:50:21 Stella smith: Replying to "I have no poll"

HOW MANY EMPLOYEES WILL BE GUARANTEED TO MANAGE ENFORCEMENT?
01:51:10 Carissa Sipp: Replying to "The generators are o…"
They will have daily emergencies and then more maintenance
01:51:11 Mark Estes: Parking, setback and environmental issues would be the equivalent or better as that of the Amazon building on Kolb and Irvington.
01:51:40 ct tracy: which is pretty depressing
01:51:41 Dan Hunt: I worry that this public feedback is just a “check

the box” exercise that will get permanently archived into the circular filing cabinet.
01:51:46 Megan Martin: Reacted to "What would stop them..." with ☝
01:51:51 Divinity Caldwell: Reacted to "I worry that this pu…" with 💯
01:51:53 Megan Martin: Reacted to "They will have daily..." with ☝
01:52:01 Megan Martin: Reacted to "which is pretty depr..." with 💯
01:52:02 Nicole Hagedorn: Reacted to "I worry that this ..." with 💯
01:52:10 Nicole Hagedorn: Reacted to "which is pretty de..." with 💯
01:52:17 Carissa Sipp: I am NO, NO and my links don’t work to add to the %
01:52:22 Mark Estes: Replying to "The generators are o..."

Your assessment is incorrect CS.
01:52:26 April: Reacted to "adding native veg ..." with 💯
01:52:33 Susan Tiss: Replying to "The generators are o…"
In other parts of the country and in other countries generators are used far too much and are causing pollution and soil/water contamination. We have absolutely no reason the believe that it would be any different here.
01:52:46 Jon Ralston: Reacted to "What would stop them..." with 💯
01:52:51 Susan Tiss: Reacted to "which is pretty depr…" with 💯
01:52:53 Carissa Sipp: No Mark- they are my assessment is correct
01:53:02 Susan Tiss: Reacted to "I worry that this pu…" with 💯
01:53:04 Susan Tiss: Reacted to "I worry that this pu…" with ➕
01:53:12 Carissa Sipp: I work in this field
01:53:14 Kathleen Dreier: Reacted to "https://www.youtube...." with 👍
01:53:16 Susan Tiss: Reacted to "No Mark- they are m…" with 💯
01:53:16 Daniel Dempsey: Replying to "I worry that this pu..."

While it is, M&C special exception process means M&C will always be involved.
01:53:21 Susan Tiss: Reacted to "No Mark- they are m…" with 💟
01:53:26 April: Reacted to "I worry that this ..." with 💯
01:53:55 Mark Estes: Replying to "The generators are o..."

That's not correct ST.
01:54:05 Carissa Sipp: Reacted to "The generators are o…" with 😂
01:54:13 Colleen Whitaker, SW Decision Resources: Survey link: https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
01:54:23 Colleen Whitaker, SW Decision Resources: we can share again in breakouts too.
01:54:41 Carissa Sipp: You are not an expert. You need to stay in the correct lane and read more
01:54:55 Vivek: Breakout comments aren’t being written down so we should put them where? Sorry missed that
01:55:00 April: The problem is there is NOT enough technical information, nor the data to back it up that data centers are viable in this environment
01:55:12 Susan Tiss: Replying to "The generators are o…"
It is correct, you can go read the citizen experiences and testimonials
02:25:42 Vivek: Thanks Carver and Ina!!
02:26:06 Vivek: If anyone wants to debrief with the No Desert Data Center

Coalition after the virtual meeting is done, everyone is welcome:

https://us02web.zoom.us/j/83418134176

Meeting ID: 834 1813 4176
02:26:10 Ina Ronquillo, City of Tucson: Reacted to "Thanks Carver and In..." with 👍
02:26:52 Jon Ralston: Not going to be able to debrief I have to go drink heavily.
02:26:59 Megan Milton: Reacted to "Not going to be ab..." with 💯
02:27:05 Kathleen Dreier: Reacted to "If anyone wants to d..." with 💯
02:27:10 Megan Milton: Reacted to "If anyone wants to..." with 💚
02:27:13 Vivek: Replying to "Not going to be able..."

I'll be having a beer but respect!
02:27:16 Andi Faulkner-Harrison: Reacted to Not going to be able... with "💯"
02:27:25 Reed Spurling: Reacted to "If anyone wants to d..." with 💚
02:27:27 Vivek: Reacted to "Not going to be able..." with 🍻
02:27:44 Colleen Whitaker, SW Decision Resources: City of Tucson webpage on this amendment process: https://www.tucsonaz.gov/Departments/Planning-Development-Services/Planning-Initiatives/Data-Centers-Unified-Development-Code-Amendment
02:28:38 Julie Dittmer: Thank you for hosting and keeping us so apprised of the processes!
02:28:45 Colleen Whitaker, SW Decision Resources: Replying to "City of Tucson webpa..."

And linked on that page is a document that summarizes the proposed regulations that were shared tonight: https://www.tucsonaz.gov/files/sharedassets/public/v/1/pdsd/documents/planning-initiatives/data-centers/draft-data-centers-udc-amendment-outline-2.19.26.pdf
02:28:52 Kathleen Dreier: Reacted to "Thank you for hostin..." with 💯
02:29:16 Reed Spurling: Reacted to "Thank you for hostin..." with 💯
02:29:22 Heather Pruzan: Thank you
02:29:26 Colleen Whitaker, SW Decision Resources: Replying to "City of Tucson webpa..."

And finally, the survey link should you want to respond later or share with friends: https://forms.office.com/pages/responsepage.aspx?id=7Fke0gjC60Oq8c8G2aGW4DGeZj0tRXRPjmeLR-c215NUMVNZV1NQSlUyT1FMTDYzNUoxVEVLWDJTOS4u&route=shorturl
02:29:27 Susan Tiss: Reacted to "If anyone wants to d…" with 💚

Large Scale Data Centers Code Amendment 3/4/2026 Virtual Meeting Chat

00:16:22 Colleen Whitaker: Participant Agenda
00:23:54 Colleen Whitaker, SW Decision Resources: Breakout notes
00:31:44 Cesar Acosta: hey yall can I be a host too?
00:32:51 Colleen Whitaker, SW Decision Resources: Full online survey
00:32:57 Colleen Whitaker, SW Decision Resources: Breakout Room Survey
00:33:25 Amanda Smith: Tahnee can you unmute me?
00:33:51 Colleen Whitaker, SW Decision Resources: Breakout notes
00:34:16 Colleen Whitaker, SW Decision Resources: Community Meetings - DETAILED Agendas (in-person and virtual).docx
00:35:16 Roxanne Johnston, City of Tucson PDSD: Same. I'll be happy to take notes. I will say the agenda won't let me open it - permissions issue
00:42:41 Tahnee Robertson, SW Decision Resources: Can you share your cell, Roxanne
00:43:04 Tahnee Robertson, SW Decision Resources: That way you can be in touch with me if needed (I'll be out of the rooms, and can also move participants if needeD)
00:43:09 Roxanne Johnston, City of Tucson PDSD: 07
00:43:52 Cesar Acosta City of Tucson PDSD: Community Feedback: Proposed Code Amendment for the Regulation of Large-Scale Data Centers
00:44:38 Roxanne Johnston, City of Tucson PDSD: 432-213-4507
00:45:23 Colleen Whitaker, SW Decision Resources: Elizabeth, here are the breakout notes: Breakout Notes
00:50:46 Amanda Smith, City of Tucson PDSD: 6088430244
00:53:21 Ian Wan, City of Tucson - PDSD: Agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
00:56:11 Ian Wan, City of Tucson - PDSD: Agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
00:57:32 Ian Wan, City of Tucson - PDSD: Agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
00:59:55 Ian Wan, City of Tucson - PDSD: Agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
01:03:25 Ian Wan, City of Tucson - PDSD: Agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
01:03:29 Cesar Acosta City of Tucson PDSD: (https://forms.office.com/g/dcwqZxHkfC)
01:04:07 Cesar Acosta City of Tucson PDSD: ^this is our Survey for questions throughout our presentation I'll be dropping it in the chat a few times throughout
01:04:24 Dan Stormont: Reacted to "^this is our Survey ..." with 👍
01:06:30 Ian Wan, City of Tucson - PDSD: Agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
01:09:12 Cesar Acosta City of Tucson PDSD: https://tucsonaz.gov/files/sharedassets/public/v/1/pdsd/documents/data-centers/data-centers-faq_030426.pdf
01:19:17 Colleen Whitaker, SW Decision Resources: ^ The above document is the FAQ to-date
01:20:22 Stella smith: What time tomorrow is the Rincon meeting?
01:20:31 Colleen Whitaker, SW Decision Resources: 6-8pm
01:20:42 Cesar Acosta City of Tucson PDSD: Replying to "What time tomorrow i..."

Hey Mae! it'll be from 6-8pm
01:21:02 Cesar Acosta City of Tucson PDSD: For folks who have just joined/ joined recently here is today's agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
01:21:31 Stella smith: Replying to "What time tomorrow i..."

in the auditorium i assume?
01:21:47 Cesar Acosta City of Tucson PDSD: Replying to "What time tomorrow i..."

yes maam!
01:23:01 Jason Makansi: He mentioned 8 something for the average water user - what was this figure?
01:23:19 Tereasa Moffett: By all accounts a data center would use way beyond 7.5M gallons a month.
01:23:23 Dan Stormont: Replying to "He mentioned 8 somet..."

8 ccf monthly
01:23:48 Dan Bursuck, City of Tucson, PDSD: Reacted to "By all accounts a da..." with 👍
01:23:55 Dan Bursuck, City of Tucson, PDSD: Reacted to "8 ccf monthly" with 👍
01:24:20 Tereasa Moffett: It can use that within less than a week
01:25:42 Dan Stormont: Replying to "By all accounts a da..."

That really depends on a lot of factors in the design of the data center. You also have to look at Scope 1 use (on-site) vs Scope 2 usage (off-site). And whether the water is consumed or used and recycled. It's complicated...
01:26:08 Tereasa Moffett: Replying to "By all accounts a da..."

True, but it's not recycled forever.
01:26:58 Dan Stormont: Replying to "By all accounts a da..."

That's why consumption is the most important metric. 🙄
01:27:31 Lisa Maher: Reacted to "That's why consumpti..." with 👍
01:27:53 Jason Makansi: Replying to "He mentioned 8 somet…"
Thx
01:28:25 Dan Stormont: Reacted to "Thx" with 👍
01:28:45 Cesar Acosta City of Tucson PDSD: Survey link (https://forms.office.com/g/dcwqZxHkfC)
01:28:54 Stella smith: Replying to "What time tomorrow i..."

Interesting that TAC did not have a lighting consideration
01:29:06 Tereasa Moffett: Reacted to "..." with 👍
01:29:32 Dan Stormont: Replying to "What time tomorrow i..."

We have looked at that as part of the zoning review.

01:29:44 Stella smith: Replying to "What time tomorrow i..."

super
01:30:36 Stella smith: Replying to "What time tomorrow i..."

Mae Smiith, ssmith@arizona.edu
01:31:05 Colleen Whitaker, SW Decision Resources: Survey
01:38:31 Ian Wan, City of Tucson - PDSD: Agenda (https://drive.google.com/file/d/1dFZqbIahLjoJBhkZlXHC4A0L2Bq6CJKT/view?usp=sharing)
01:38:40 Ian Wan, City of Tucson - PDSD: FAQ - https://tucsonaz.gov/files/sharedassets/public/v/1/pdsd/documents/data-centers/data-centers-faq_030426.pdf
01:39:29 Cesar Acosta City of Tucson PDSD: Survey link (https://forms.office.com/g/dcwqZxHkfC)
01:44:57 Monika Browatzki: We need the same transparency for the public showing the water use, as that is our key issue in this location.
01:45:26 Tereasa Moffett: was that supposed to cover electricity?
01:46:19 Tereasa Moffett: Thank you
01:46:19 Bruce Plenk: How do you avoid the failure of the “100 year water supply” law here??
01:46:56 Lisa Maher: On the water slide, was there a prohibition for non-potable use in the largest centers?
01:48:31 Cesar Acosta City of Tucson PDSD: Survey link (https://forms.office.com/g/dcwqZxHkfC)
01:49:01 Monika Browatzki: When answering the survey please provide the link to the slides so we can reference while we are answering.
01:51:26 Dan Bursuck, City of Tucson, PDSD: Reacted to "When answering the s..." with 👍
01:52:27 Colleen Whitaker, SW Decision Resources: Replying to "When answering the s..."

Link to slides: https://drive.google.com/file/d/1Shicwy_VIYlZIqYz687Cv9yiiSYogZt1/view?usp=sharing
01:52:37 Cesar Acosta City of Tucson PDSD: Survey link (https://forms.office.com/g/dcwqZxHkfC)
01:52:51 Colleen Whitaker, SW Decision Resources: Replying to "When answering the s..."

Remember you can fill out the survey after the meeting as well, if you want more time to think!
01:53:01 Monika Browatzki: Replying to "When answering the s…"
Thank you
01:57:15 Jason Makansi: The Generator maintenance restrictions to 9-5 M-F are likely too limiting.
01:57:22 Dan Bursuck, City of Tucson, PDSD: Reacted to "The Generator mainte..." with 👍
01:57:29 Bruce Plenk: What are option s 1 and 2??
01:57:34 Monika Browatzki: Is it possible to see a list of all surveys total?
01:57:43 Tereasa Moffett: I'm sorry, I can't get over the comment

"They don't need a lot of parking" bc there aren't many workers except maintenance. There goes the sales pitch for new jobs haha
01:58:44 Dan Bursuck, City of Tucson, PDSD: Hi Monika - it is just one survey with all of the questions.
01:58:54 Monika Browatzki: Reacted to "Hi Monika - it is ju…" with 👌
01:58:59 Jason Makansi: Replying to "The Generator mainte…"
What I mean is not allowing emergency generator maintenance on weekends probably isn't fair. I can explain sometime...
01:59:44 Nicholas Martell, City of Tucson PDSD: Reacted to "What I mean is not a..." with 👍
01:59:47 Amanda Smith, City of Tucson PDSD: Replying to "What are option s 1 ..."

I think it's supposed to be "yes" "no" or "unsure"
02:00:02 Colleen Whitaker, SW Decision Resources: PDSD Data Centers Webpage
02:00:18 Cesar Acosta City of Tucson PDSD: FAQ https://tucsonaz.gov/files/sharedassets/public/v/1/pdsd/documents/data-centers/data-centers-faq_030426.pdf
02:00:47 Deirdre Demers: Is light pollution addressed anywhere?
02:00:58 Bruce Plenk: Reacted to "Is light pollution a..." with 👍
02:01:15 Dan Bursuck, City of Tucson, PDSD: Replying to "I'm sorry, I can't g..."

Hi Tereasa - I think it is also related to requiring too many parking spots than needed, which could lead to more pavement than needed. Considering they are going to be setback significantly and have other standards, the impact of no parking requirements is pretty minimal.
02:01:23 Carmen Vega-Cruz: Sorry, didn't get ... is there a link for this presentation that I may share with neighbors?
02:01:30 Bruce Plenk: Are they required to comply with Dark Skies ordinance??
02:01:31 Colleen Whitaker, SW Decision Resources: Replying to "Is light pollution a..."

We are moving into Q&A shortly, and this can be addressed by staff.
02:02:04 Ian Wan, City of Tucson - PDSD: Yee, they would have to comply with the Outdoor Lighting Code
02:02:09 Dan Bursuck, City of Tucson, PDSD: here is a link to the presentation: https://drive.google.com/file/d/1Shicwy_VIYlZIqYz687Cv9yiiSYogZt1/view?usp=sharing
02:02:16 Ian Wan, City of Tucson - PDSD: **Yes
02:02:18 Monika Browatzki: Great meeting, thank you!
02:02:27 Colleen Whitaker, SW Decision Resources: Replying to "Sorry, didn't get ....."

Presentation slides: https://drive.google.com/file/d/1Shicwy_VIYlZIqYz687Cv9yiiSYogZt1/view?usp=sharing
02:02:49 TL Cross: Sorry, I have another meeting. I did complete the survey. Thank you.

02:03:04 Amanda Smith, City of Tucson PDSD: Replying to "Sorry, I have anothe..."

Thank you for attending!
02:03:07 Carmen Vega-Cruz: Replying to "Sorry, didn't get ....."

Thanks so much!
02:24:05 Roxanne Johnston, City of Tucson PDSD: Where do we store the notes?
02:28:10 Colleen Whitaker, SW Decision Resources: All information is on the PDSD website: PDSD Data Centers Webpage
02:28:27 Mark Holden: Thanks COT & SW
02:29:45 Cesar Acosta City of Tucson PDSD: survey link if you want it john (https://forms.office.com/g/dcwqZxHkfC)

Planning and Development Services Department

Planning and Development Services Code Enforcement Division

Tucson Development Center Online (TDC)

CITY OF TUCSON

From: Thayer Kuehne <tkuehne567@gmail.com>
Sent: Wednesday, April 22, 2026 10:24 AM
To: PDSDInquiries <PDSDInquiries@tucsonaz.gov>
Subject: Earth day action - Oppose Project Blue

> You don't often get email from tkuehne567@gmail.com. Learn why this is important

Good morning,

I am writing today to voice my opposition to the project blue data center that is set to be established on the outskirts of Tucson near the Pima County Fairgrounds.
If allowed to continue development it will cause irreparable harm to the environment and surrounding communities.
Here in the desert we are already struggling with water shortages and frequent droughts. A data center here in the southwest will only exasperated the current issues and lead to even further water shortages. Taking away from farmers, ranchers and the expanding housing developments in that area.

Not to mention then the electricity needed to run the data centers, time and time again we've seen the ramifications of these data centers on the communities. It's not the big companies that foot the bill for the power drawn from our shared grid it's been the locals, the community that have seen rising energy bills. In a time where more folks are struggling to pay their bills or put food on their tables the last thing we need is another economic and environmental stressor.

I implore you to contact who you can and use the power of your seat to help put a stop to

this data center.

Thank you,
Thayer Kuehne

From: Carver Struve
To: "dlho2468"
Subject: RE: Data Center
Date: Monday, April 27, 2026 8:10:00 AM

Hello, thank you for your feedback. Your comments will be passed on to both the Planning Commission and Mayor and Council.

From: dlho2468 <dlho2468@proton.me>
Sent: Friday, April 24, 2026 8:57 AM
To: Carver Struve <Carver.Struve@tucsonaz.gov>
Subject: Data Center

> You don't often get email from dlho2468@proton.me. Learn why this is important

I am home bound, twice wounded Vietnam vet living with cancer and cannot attend council meetings so you are going to hear my unequivocal opposition to data centers anywhere in the Tucson area here and now.

Have you people lost your minds for even considering approving a data center here? Are you going to pay my increased electricity bill or is Amazon going to pay for it? Perhaps you will personally. What about my water bill and the massive increase approving data centers here will cause.

With the current shortage of water, an extended drought actually, and given the outrageous amounts of water Amazon, who I despise for political reasons, will be using I think you people have to be taking bribes from that behemoth. I am a Democrat and I do not ever miss voting in elections. Check my voting record. If the council approves this boondoggle I will vote against every single one of them in the next election and will vote for other Democrats instead.

I only receive $1345 in SS and another $106 in a VA pension. Without HUD-VASH and Section 8, I would be in the street.. Approval of this albatross could very well put me right into the streets.

Feel free to copy this email and send it to the city council.

Very Sincerely,

Dennis L Hoban
1111 W. Saint Marys Rd, #205
Tucson, AZ 85745.
520-910-7955