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Data Centers in Michigan:

Evaluation of Policy Controversies Regarding Hyperscale Data Center Development

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Summary

In a Nutshell

- Data center development proposals should be evaluated on a case-by-case basis. While large 'hyperscale' facilities should be carefully scrutinized to mitigate potential negative impacts (power demand, water use, noise), many smaller more typical data centers are nearly indistinguishable from office buildings and provide valuable services to local businesses and other users of digital cloud services.
- The economic benefits of data center investments are modest. The primary economic activity created by data centers is during the construction phase. Attracting data centers is not an effective approach to long-term economic development. However, local host communities may substantially benefit from property tax revenue and/or community benefit agreements.
- The negative impacts of data centers are often overstated. While there is risk of unsustainable development, Michigan's water resources and power grid appear capable of accommodating substantial data center development under current policies. The most concerning negative impact of data centers is noise pollution. Protecting nearby residents from harmful impacts of data center noise is feasible but requires particular attention from local permitting agencies.

In December 2024, Michigan enacted a state law exempting large "enterprise" data centers from sales and use taxes to attract investments to Michigan. This law was passed just as tech companies accelerated global investment in hyperscale data centers, largely to support the development and deployment of new artificial intelligence (AI) tools. In 2025, multiple data center proposals in Michigan prompted resistance from many citizens and local governments, bringing data center development policy into focus.

Not All Data Centers are Created Equal

Large 'hyperscale' data centers demand immense amounts of electrical power, may consume millions of gallons of water for cooling, and can impose quality-of-life issues for nearby residents. Some hyperscale data centers have been blamed for noise pollution, air pollution, and increased electrical rates. If permitted without due diligence, hyperscale data centers can be disruptive to local communities.

Not all data centers have such disruptive potential. One public database lists

> Conversations about data centers are frequently conflated with broader concerns about artificial intelligence (AI). This report does not address the potential socioeconomic impacts of AI. The development and deployment of AI tools is a global phenomenon, largely unrelated to state and local policy. While state policymakers have some influence on how the use of AI may be regulated in Michigan, this is a separate discussion to occur at the federal level..

about 70 data centers already operating in Michigan. Many of these have operated for over a decade. This counts only commercial 'colocation' facilities (available to multiple clients to rent or lease data center infrastructure to locate their servers and/or networking hardware). Many more smaller 'enterprise' data centers are exclusively operated by a single client—including governments, universities, corporations, hospitals, and others. The full count of data centers currently operating in Michigan is unknown, but may number in the hundreds. Most data centers are indistinguishable from office buildings.

Data centers are well established as a critical component of the global economy. They allow the internet to operate and have become indispensable to society. The task for policymakers is to evaluate trade-offs to best capture the benefits of these tools while minimizing harm.

When evaluating a data center development, it is important to focus on the details of the project rather than reacting to the general *idea* of a data center. Adopting strict prohibitions or moratoriums on data centers that include smaller traditional facilities is unnecessary and could have detrimental impacts on local economies.

The Economic Benefits of Data Centers are Modest

Technology companies have announced plans to invest trillions of dollars globally in data centers over the next few years. Many public officials and economic development professionals have focused on attracting some of this investment to boost state and local economies.

Economic development often relies on a 'multiplier effect'—an assumption that investments in new developments promote additional economic activity. While data centers certainly do have *some* multiplier effects, the effects are likely far more limited, dollar-for-dollar, than most any other economic development strategies. For example, a large investment in a manufacturing facility may create hundreds of direct jobs and thousands of local indirect jobs through supply chain and service industry demands. An equivalent investment in a data center creates maybe a few dozen direct permanent jobs with minimal supply chain or services needed for operation.

The largest economic impact of data center development is during construction. Construction of a hyperscale data center may require over 1,000 workers on site during peak activity, including many skilled trades professionals. This is likely to support local jobs and attract workers from around the region, providing temporary but substantial benefit to the local economy in a variety of ways.

State policymakers should continue to evaluate if the economic benefits of data center development are equivalent or greater than the revenue lost to tax exemptions. Data centers provide state revenue primarily through personal income tax revenue, which is minimal following the construction phase. A less than full exemption of sales and use taxes may be sufficient to attract future investments and may discourage speculative proposals and associated risks.

Once a data center becomes operational, local jurisdictions may benefit substantially from additional property tax revenues. Additionally, many communities negotiate community benefit agreements as a condition of data center approval. This could include contributions to support public services such as emergency response, housing funds, land preservation, recreational facilities, and more.

Data Center Electricity Demand is Manageable, but Risks Remain

The largest hyperscale data centers can demand as much electricity as a small city. The recent acceleration of data center investments, coupled with increasing electricity rates and concerns about grid reliability, is driving public concerns that data center power demand could make electric power less reliable and further drive rate increases.

Grid Reliability

Many Michigan electric customers suffer frequent power outages. Some people are concerned that new data centers will cause utility companies to prioritize service to data centers and result in less reliable service to other customers. This concern is largely misplaced.

The North American power grid is a complex network of numerous individual circuits forming overlapping regional and local grids. Hyperscale data centers typically draw power directly from a *transmission* grid. Residential customers receive service from a *distribution* grid. In most cases, a power outage for a residential customer is due to a failure of the distribution grid and can be entirely unrelated to the transmission grid.

Data centers could theoretically impose reliability concerns on the transmission grid if new power demand is added to the grid faster than new generation capacity is added. However, the multiple regulatory agencies in place work to prevent this. A greater risk is that steps taken to ensure reliability in an era of increasing demand may increase electricity rates for other users.

Electricity Rates

The electricity rates paid by end users are the result of a combination of costs related to power generation, transmission, distribution, and regulatory compliance. Final rates are determined by myriad policies and formulas adopted by utility providers, state public utility commissions, regional transmission operators, and the Federal Energy Regulatory Commission. Each of these entities are obliged to work together to provide reliable electric service for the lowest reasonable costs allocated fairly among ratepayers.

For many years, this approach generally improved service reliability while keeping rate increases below the rate of inflation. However, this framework was established during an era of relatively stable electricity demand. In 2025, many areas of the country began experiencing rapid demand growth, primarily due to new large loads such as hyperscale data centers. Long-established policies to fairly allocate costs of operating the electric grid were not sufficient to function in an era of rapid load growth.

Some of the costs to provide electric services to new data centers were likely imposed on other ratepayers. That said, data centers have contributed only a fraction of recent increases in electric service rate. A confluence of factors has contributed to rising rates nationally, including rapid material cost inflation, more stringent reliability requirements, natural disasters, as well as state and federal regulatory compliance costs.

Policymakers and regulatory agencies are now aware of the potential for other ratepayers to subsidize new large loads and have adopted, or are in the process of adopting, policies to mitigate this. In fact, the Michigan Public Service Commission issued an order for utilities to prove that any large load customer will not increase rates for other customers. In fact, investments made by data centers could help *reduce* future cost increases for other Michigan ratepayers.

Renewable/Clean Energy Goals

In 2023, Michigan passed a state law requiring electric utilities to achieve renewable and 'clean' energy targets. The increasing electric power demand from data centers implies the need for more electric power generation. Many are concerned that this will increase the demand for fossil-fuel electricity generation, preventing Michigan from reaching its goals.

This is a risk. In other states, data center power demand has compelled investment in new methane power plants that emit carbon dioxide. However, this has largely occurred in states without renewable energy mandates like Michigan. Data center investments in Michigan are as likely to help to achieve renewable/clean energy goals as they are to stand in the way. So far, most data center proposals in Michigan have included investments in renewable power or battery storage. Success will hinge on sustained focus by utility companies and the Michigan Public Service Commission.

Data Centers Are Unlikely to Threaten Michigan's Water Resources

Some hyperscale data centers use a lot of water. Many are concerned that allowing hyperscale data centers will stress Michigan's water resources through consumption or pollution. This appears unlikely.

Data centers that use a lot of water do so by employing an evaporative cooling system. Evaporative cooling systems release cooling water to the atmosphere as water vapor. Water that is used and not returned to the watershed is considered 'consumed.' This may be a problem in a water-stressed region. Although a few groundwater aquifers in Michigan have been depleted, Michigan is not generally a water-stressed state and has policies in place to prevent unsustainable withdrawals of water. Furthermore, many data centers use closed-loop cooling, which does not require continuous water use and thus consumes a negligible amount.

A secondary source of water consumption is related to electricity generation. Thermoelectric power plants (e.g., coal, nuclear) typically use evaporative cooling and consume a lot of water. Data center development in Michigan may increase water consumption through increased power generation. This is not a pressing concern. Michigan's water-consuming power plants are located in areas with more than sufficient water availability. In fact, water consumption from power generation in Michigan is about half what it was in 2020 (largely due to declining coal power generation).

Data centers may contribute to water pollution by discharging water used to maintain the cooling equipment or fire suppression system. In this regard, a data center poses no more threat than any other industrial or commercial facility. Michigan has a sufficient regulatory framework to prevent water pollution assuming that existing laws are enforced.

Data Centers Impose a Novel Risk of Harmful Noise Pollution

The most frequent complaints from residents who live near data centers relate to the noise they create. Data centers emit the most noise when operating on backup power and running on-site generators. However, data centers rarely use backup power. Most noise complaints are from routine operations.

Hyperscale data centers use industrial-scale electrical and mechanical equipment. Historically, most industrial sites (e.g., factories, smelters, power plants) that emit such noise have been sited away from residential areas and/or reduce activity during nighttime hours. In contrast, many data centers are sited near residential areas and operate near full capacity 24 hours a day year round.

Furthermore, the *type* of noise emitted by data centers is unique. People living near data centers often describe it as a low-frequency continuous drone that is *felt* as much as heard. Data center noise often disturbs residents without exceeding standard thresholds that would require noise mitigation. Long-established noise pollution prevention standards were adopted before data center noise became so prevalent.

Unlike water pollution, no federal or state regulations govern noise pollution. Noise pollution is considered an annoyance, or a nuisance, to be managed at the local level through zoning codes or construction permits. However, this overlooks noise pollution as a real health issue.

Exposure to certain noises triggers the release of stress hormones. Continuous long-term exposure to noise pollution can produce chronic physiological stress. Chronic stress invites a myriad of health problems, including but not limited to depression/anxiety, diabetes, high blood pressure, high cholesterol, hypertension, arrhythmia, stroke, and heart failure.

Most local governments have adopted restrictions on noise pollution, but existing frameworks to establish limits and assess compliance did not anticipate the distinctive continuous noise emitted by large data centers. In the absence of clear appropriate guidance for data center noise pollution regulation, local permitting agencies should employ the precautionary principle. Noise assessment criteria should require the most stringent limitations on noise emissions that can be reasonably justified by reference to applicable ISO and ANSI standards and related recommendations.

Take-home Message

Data centers are not the economic development miracle often described by boosters. Nor are data centers the threat to everything residents hold dear as often described by opponents.

The topic of data centers has become such an emotional issue for many people that it is difficult to engage in rational discussion. Much of this response is related to enthusiasm or anxiety surrounding artificial intelligence. There are numerous possibilities and valid concerns regarding the development and deployment of AI tools—and likely a pressing need for relevant policy conversations. Those issues are entirely irrelevant to where a data center might be built. Conflating the impacts of AI with data center development policies prevents constructive conversations of both issues.

To evaluate policies related to data center development, it is useful to consider data centers simply as an investment in industrial land-use.

As far as large investments go, data centers have modest economic impact. The local economic impact of a data center is mostly related to the construction phase. Once placed into operation, data centers provide relatively few permanent jobs and do not require extensive supply chains or services that would support a local economy through an economic multiplier effect.

Data centers impose minimal risk to the reliability and cost of electric power in Michigan. There are sufficient policies in place to prevent data center development from imposing power shortages or increasing electricity costs.

Data centers pose no substantial threat to Michigan's water resources, assuming that existing environmental protection laws and policies are enforced.

The largest potential negative impact of data centers is from noise pollution and exposure to those living nearby. Many established standards that inform local restrictions are inadequate to prevent the potential nuisance and health impacts from data center noise. Local governments should make noise pollution a focus when evaluating data center proposals and require sufficient noise mitigation.

Michigan policymakers should continuously evaluate state-level tax incentives to assess that the revenue lost to such incentives is outweighed by benefits to the state. State regulatory agencies should be given sufficient resources to enforce existing environmental protection regulations.

Local governments responding to proposed data center developments should avoid reflexive emotional reactions. Local officials and permitting agencies should employ due diligence to ensure that valid concerns are sufficiently addressed. However, hosting data center developments could yield meaningful benefits for local communities through property tax revenue and community benefit agreements.

A Fact Tank Cannot Run on Fumes

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Data Centers in Michigan: Evaluation of Policy Controversies Regarding Hyperscale Data Center Development

1 Introduction and Background

Data centers have become a prevailing topic in public policy, politics, and public debate. A lot of money is at stake. It is expected that trillions of dollars will be invested in data centers globally between 2026 and 2030. Much of this investment is related to developing artificial intelligence (AI) models that may impose disruptive socioeconomic changes.

To some extent, the topic of data center development policy has been over-simplified into a conflict between opposing sides.

On one side are data center proponents. This includes the technology companies behind the investments, economic development professionals who would like to attract such investments, public officials seeking to benefit from tax revenue, and construction firms and labor unions who would benefit from development activities.

On the other side is a wide range of interests that generally share a concern that data center investments will impose more harm than good for a variety of societal, economic, and environmental reasons.

In reality, this is a nuanced topic on which reasonable people may disagree. Such nuance is often lost in public debates. The goal of this report is to evaluate contentious issues to the extent allowed through objective evaluation of research and evidence.

1.1 What are Data Centers?

As a basic concept, a data center is simply a physical location that contains information technology (IT) infrastructure to provide digital services. Data centers have existed for practically as long as computers have, but have evolved along with computers and the digital economy.

Initially, data centers were owned and operated by the same entities that produced and used the data, typically in the same location. This began to change around 30 years ago with the advent of 'cloud computing.' The storage and processing of digital information in 'the cloud' doesn't mean this data is literally floating around somewhere, it simply means that storage and processing is taking place somewhere else—remote from the user. That somewhere else is a data center.[1]

Data centers enable websites, social media networks, streaming services, GPS navigation, and just about any application to run on a smartphone, personal computer, or other digital device. More importantly, data centers support essentially every aspect of the modern economy. Financial transactions, transportation networks, hospitals, government agencies, and nearly every business you might think of is in some way dependent on data centers.[2]

Most existing data centers are visually unremarkable, resembling office buildings (usually with fewer windows and more cooling equipment). However, as society and the economy have increasingly come to rely on the internet, and the internet has increasingly relied on cloud services, data centers have evolved to meet new demands. Most notably, they've gotten bigger.[3]

Data centers may be categorized in multiple ways depending on factors like ownership, security, reliability, use, and scale.[4,5] Many of these aspects are primarily relevant to data center users. It is the *scale* aspect that has made data centers an increasing focus of public attention. The large warehouse-like facilities that have come to dominate data center investments and related discussions are known as 'hyperscale' data centers.

1.2 Hyperscale Data Centers

The *scale* of a data center is actually measuring is the peak electrical power that may be demanded by the data center, measured in watts (W). Most of the electricity used by a data center powers the computer equipment housed within, so data center scale reflects the computational power available.

There is no technical definition of a *hyperscale* data center. Generally, this just means it's bigger—potentially *much* bigger—than historically typical data centers. A common threshold to identify hyperscale data centers is 100 MW.

The typical operators of hyperscale data centers are large cloud service providers like Alphabet (the parent company of Google), Amazon Web Services (AWS), Microsoft, Apple, and Meta (the parent company of Facebook). Data center operators are notoriously secretive about site details, making it difficult to describe a typical hyperscale data center, or even identify the largest.

The first hyperscale cloud data centers were basically scaled-up versions of traditional smaller data centers, which support multiple uses if not multiple users. In the past few years, the increased push to develop

> Data centers are measured in watts (W) because, at the most basic level, they are giant machines that consume electricity and turn it into computing, storage, and networking. A watt is a measure of electric power—the rate at which electrons are flowing through a system.
>
> 1,000 W = 1 kilowatt (kW)
>
> 1,000 kW = 1 megawatt (MW)
>
> 1,000 MW = 1 gigawatt (GW)
>
> A typical home may use less than 2 kW of power on average but may increase to over 10 kW during peak periods, like when running an air conditioner or charging an electric vehicle.
>
> Thus, a 1 GW hyperscale data center has the peak power requirements of about 100,000 homes but uses as much energy over the course of a year as a half-million (or more) homes.

hyperscale data centers is to power specific artificial intelligence models. This is a different type of facility with different attributes than earlier hyperscale data centers.

Hyperscale *Artificial Intelligence* Data Centers

While 100 MW is still often used as a rule-of-thumb to classify hyperscale data centers, they can be much bigger. Proposals for 1,000 MW (1 GW) or larger facilities have become common. These large powerful data centers are typically designed to support artificial intelligence (AI). Current approaches to AI utilize high-performance graphics processing units (GPUs) that require much more power than the equipment installed in traditional data centers.[6]

The technology company Nvidia has coined the term '*AI factories*' to describe these hyperscale AI data centers.[7] This is an apt description. Unlike traditional data centers where thousands of servers support multiple users and tasks, an AI factory has thousands of GPUs manufacturing a specific AI product for global export.

Recent investments in AI and the sudden demand for these hyperscale AI data centers have made data centers the focus of policy discussions in Michigan and around the globe.

1.3 Why Scale Matters

Not all data centers are created equal. While many new data center investments are large hyperscale developments, not all are. Small unremarkable data centers are still sometimes proposed in response to local market demands. Until a year or two ago, these projects were usually approved and permitted with minimal scrutiny or public attention. Today, any proposal for anything labelled a 'data center' elicits similar backlash—as though the very concept of a data center is universally detrimental.

Ironically, many data centers are still approved with minimal attention, simply by not being called 'data centers.' Smaller *enterprise* (single user) data centers may be proposed as things like administrative offices, IT facilities, server facilities, network operations centers, or a variety of other labels. Such data centers may be developed by large corporations, hospitals, universities, government agencies, telecommunication providers, etc. Public notice and permitting requirements are all the same, but apparently a data center by any other name is much more acceptable.

Not all data center developers can use this trick. Specifically, *colocation* data centers (available to multiple users to lease space and locate equipment within a multi-tenant facility) are pretty much stuck with the label. The reflexive public response to data center proposals is often applied to unremarkable small colocation centers as vehemently as a hyperscale AI factory.

Policymakers and public officials should resist reflexive emotional reactions to data center proposals. Many proposals deserve critical scrutiny, especially hyperscale investments. However, communities that resist any data center proposal may be needlessly resisting beneficial development. Data center proposals should be evaluated on a case-by-case basis on their individual merits.

1.4 Existing Data Centers in Michigan

There is no comprehensive count of data centers in Michigan. By one estimation, Michigan has about 70 data centers in operation.[8] However, this count is provided by a market research service working to link *colocation* data centers with potential clients. This source does not count typical *enterprise* (single user) data centers operated by corporations, government agencies, hospitals, universities, laboratories, and so on. As noted in the previous section, many such developments were proposed and permitted without explicitly being labelled a 'data center.' With such facilities included, the true count of data centers currently operating in Michigan may number in the hundreds. Most data centers are housed in nondescript buildings that are nearly indistinguishable from surrounding uses like office buildings and may even be incorporated into mixed-use buildings.

This section provides a brief description of a sample of Michigan's existing data centers. While not comprehensive, this provides an idea of the range of the kind of developments that fall under the 'data center' label.

Switch Pyramid Center, Grand Rapids

Michigan's largest currently operational (as of 2026) data center is located in and around the former Steelcase Corporate Development Center in Gaines Township south of Grand Rapids. The iconic pyramid building itself opened as a mid-sized ten MW colocation center in 2017. Switch has since constructed two additional buildings on the campus providing over 300 MW capacity at the site, making this Michigan's first hyperscale facility.[9]

Figure 1
Switch 'The Pyramid' campus near Grand Rapids

Image Source: MLive.[10]

123 Net DC1, Southfield

Southeast Michigan's largest operational data center is located in a mixed-use area near Ten Mile and Evergreen in Southfield. Operated by 123Net, the seven MW facility sits near offices, churches, and single-family homes.

The 123Net Data Center 1 is a colocation facility that leases server space to customers such as automakers, hospitals, and social media companies. In addition to storage and processing, the data center offers direct connection to the high-capacity fiber network making up the 'backbone' of the internet, providing low latency communication to internet service providers like AT&T and Xfinity.[11]

123Net operates two more colocation centers in Southfield and one in Grand Rapids.[12]

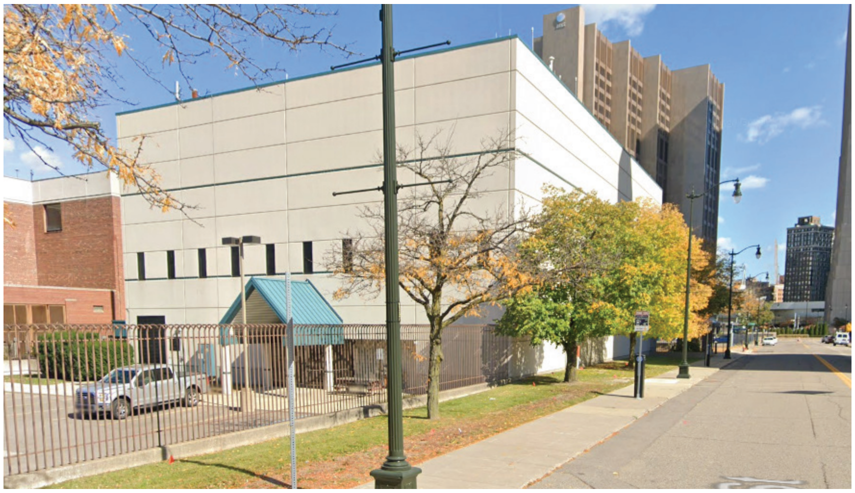
Figure 2
123Net Data Center 1 in Southfield

Source: Google Maps

Cogent Data Center, Detroit

Detroit hosts only a few small colocation data centers. The largest appears to be operated by the internet service provider Cogent Communications.

Figure 3
Cogent Data Center in Detroit



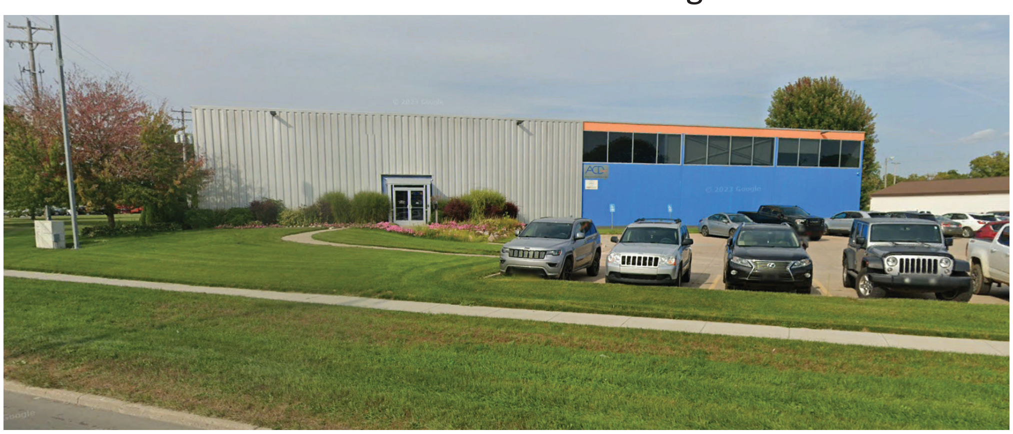
Source: Google Maps

Located in Detroit's central business district at the corner of 3rd & Abbott, Cogent's Detroit data center is listed at 4.5 MW.[13] Cogent also operates data centers in Troy, Ann Arbor, and Grand Rapids.

ACD.net MetroIIX, Lansing

Possibly the largest colocation data center currently operating in Lansing, ACD.net's facility on Grand River Avenue opened in 2006. Electric power demand specifications are not available for this 40,000-square foot facility.[14]

Figure 4
ACD.net MetroIX Data Center in North Lansing



Source: Google Earth

1010 Technology Center, Inc., Alpena

1010 Technology Center Inc. is an independent technology services provider and hosts a small colocation data center in a converted bank building on a 1-acre lot on US-23.[15] Incorporated in 2013, 1010 Technology Center Inc. was started by an Alpena-based wood products manufacturer looking to serve its own IT needs. The data center now supports computing needs of local businesses, schools, and government agencies.[16]

Figure 5
1010 Technology Center, Inc. in Alpena

Source: Google Earth

Oracle/OpenAI Stargate Hyperscale AI Data Center, Saline Township (Under Construction as of 2026)

Until recently, Michigan data centers have been proposed, approved, and placed into operation with minimal attention. This changed in 2025 as hyperscale developers began proposing projects. Perhaps the most notable proposal was a massive 1.4 GW AI factory proposed in Saline Township south of Ann Arbor. This is the type of facility that has prompted public backlash to data center projects.

Figure 6
Oracle/OpenAI Stargate Saline Conceptual Rendering

Source: Oracle

The Saline Stargate center has been approved and is under construction during 2026. This process has been controversial.[18] In July 2025, developers applied for conditional rezoning of the site, which was previously zoned for agricultural use. There was a strong public response in opposition, and the Saline Township board rejected the application, prompting the developers to file a lawsuit. Considering potential consequences of continuing to fight the development, Saline Township decided to pursue a settlement, and the project was approved under a consent judgment.[19,20]

Construction began in late 2025 to develop the nearly 600-acre parcel with nearly two million square feet of building area (though about a third of the parcel will be preserved as natural area or open space). The data center will include on-site water sourcing and wastewater treatment, a dedicated electrical substation, and 15 diesel backup generators.[21] The controversy and potential impacts of this hyperscale site have contributed to public backlash against further data center developments in Michigan.

Policy Implications

Data centers are the physical foundation of the digital economy. Michigan already hosts dozens of data centers that provide essential computing services to local businesses, public institutions, and residents. However, the evolution of the digital economy has given rise to very large 'hyperscale' and AI-focused facilities with unique infrastructure needs, economic impacts, and quality-of-life issues. The growing public backlash toward any project labeled a 'data center' risks deterring beneficial development, making it essential for governments to adopt case-by-case evaluation frameworks rather than blanket opposition. The scale and secrecy of hyperscale operators impose policy issues that require deliberate public oversight.

1.5 Public Policy Issues

The recent emergence of hyperscale data center proposals in Michigan has precipitated public opposition and valid policy concerns. This report offers an evidence-based overview of the policy implications of data center development.

This analysis is framed around the following topics:

Economic Impacts (Chapter 2)

The key policy argument for encouraging data center development is economic development. Data center developers have suggested that several trillion dollars may be invested globally in the next few years, prompting efforts by governments and economic developers to attract some of this investment. Data centers can benefit states and local governments by expanding the tax bases, driving major construction activity, and supporting related sectors such as electrical trades, engineering, and fiber and power infrastructure. They create substantial short-term construction jobs and local contractor demand, then provide a modest number of permanent jobs.

Impacts on the Electric Grid (Chapter 3)

Data center development can create challenges for electric utilities and regulators. New facilities may require transmission upgrades, substations, and generation capacity, raising questions about who pays and when costs are recovered. The potential new electricity demand from data centers may require new generation to be brought online, imposing concerns about fossil fuel use. An additional public concern is that data center power demand may outrun supply, leading to reliability issues.

Impacts on Water Resources (Chapter 4)

Data center development can impose water resource management issues because water use may occur both on-site (for cooling) and indirectly through electricity generation needed to serve large power loads. Public concerns include water consumption (water not returned to the watershed) as well as water pollution for water that is returned to the watershed.

Noise Pollution (Chapter 5)

Noise from data center operations can come from the use of backup generators, as well as noise produced by electrical and mechanical equipment. It is mainly the mechanical equipment used for cooling that prompts noise complaints from nearby residents. Hyperscale data centers emit low-frequency noise that can annoy residents and may even contribute to chronic health issues.

Other Potential Negative Externalities (Chapter 6)

The majority of data center concerns and policy discussions emphasize electricity use, water use, and noise pollution. However, additional concerns are often inserted into policy debates. This can include potential air pollution from on-site generators, light pollution, heat island effects, disruptions from construction, loss of agricultural land, and more.

2 Economic Impacts

Some estimates project more than $6 trillion may be invested in data centers globally from 2026 to 2030.[22] This remarkable investment development potential has influenced tax policy in many states with governments offering various incentives to attract some of this investment. A 2024 survey identified 36 states with data center development incentives, with sales tax exemptions being the most common approach.[23] (A few states do not levy sales or use taxes.)

In December 2024, Governor Whitmer signed bills exempting data centers from state sales and use taxes, assuming certain requirements are met.[24] This made Michigan more attractive to large hyperscale data center developments. Considering that Michigan's hyperscale data center tax exemption is relatively new, it is difficult to confidently compare costs and benefits of this policy. This chapter assesses the potential benefits and costs to Michigan to the extent feasible.

Sales Tax: Michigan levies a six percent Sales Tax on the purchase price of goods at the point of purchase and remitted by the vendor.

Use Tax: Use Tax is a companion tax to sales tax. Use Tax of six percent must be paid to the State of Michigan on the total price of all taxable items brought into Michigan or purchases through the internet, by mail, or by phone from out-of-state retailers that do not collect the Sales Tax from their customers. Credit is given for tax paid to another state. Use tax is also applied to certain services such as telecommunications and hotel/motel accommodations.

2.1 Business Attraction

The general goal of the use of tax exemptions is to attract job creators, investment, and development that have public benefits that exceed the amount of foregone tax revenue.[25] One way this could happen is if a data center development attracts other businesses and jobs. Indeed, most economic impact studies assign data centers a high economic 'multiplier'—where economic activities—e.g., wages, purchases, and supplies—ripple through the economy, generating tertiary economic impacts beyond the initial activities. It is often assumed that data centers attract additional commercial or industrial investments nearby, catalyzing local economic development. For example, the Detroit Regional Chamber states, "Data centers create long-term economic strength by attracting nearby tech growth."[26] This idea deserves scrutiny.

Colocation Data Centers

Until recently, most data centers were relatively small colocation facilities that host servers for multiple users. Dozens of colocation data centers are currently operating in Michigan—many of these were constructed many years ago. Colocation data centers are typically located close to perceived need. Most colocation data centers are owned by Real Estate Investment Trusts (REITs), who specialize in identifying locations of unmet and anticipated local demand. The REITs own the facilities and lease rack space for local users to install their servers and/or networking equipment. In this case, data centers are attracted to local economic activity, not the other way around.[27]

Hyperscale Cloud Data Centers

In recent years, data center investment has increasingly concentrated among hyperscale cloud service providers such as Amazon Web Services, Microsoft, and Alphabet (Google). These firms now account for a majority of global cloud infrastructure spending, and their expansion is a primary driver of new data center development.[28] In the public cloud model, providers operate the underlying facilities, hardware, and networking infrastructure. Unlike colocation data centers, enterprise cloud customers do not own the servers and thus do not require physical access.[29]

> Most businesses do not need to be very near cloud data centers to be adequately served by them. For example, Microsoft currently does not have any data centers operating in Michigan and yet countless Michigan businesses utilize Microsoft cloud services (though Microsoft likely leases space from local colocation centers).

Investment in high-capacity fiber optic cables have made physical proximity between cloud providers and clients decreasingly important. Digital communication occurs at nearly the speed of light.[30] As a result, cloud providers organize their infrastructure into *regional* networks designed to balance latency, reliability, costs, and regulatory requirements, rather than locating facilities in every individual city or state they serve. As with colocation data centers, cloud infrastructure investment tends to follow concentrations of economic activity and demand, rather than causing businesses to relocate in order to be physically near data centers. In this sense, hyperscale cloud data centers are more attracted to regional economic activity than they are drivers of it.[31]

Hyperscale AI Data Centers

Hyperscale AI data centers ('AI factories'), such as the Saline Township Stargate facility, are even less reliant on latency factors (and thus physical proximity). They are located with an emphasis on 'speed to power'—getting electric service to GPU processors as soon as is practicable.[32] These facilities are primarily used to train next-generation AI models. For training, latency is a non-issue.

They also may be used to operate the models (e.g., OpenAI's ChatGPT, Anthropic's Claud, xAI's Grok, Microsoft CoPilot, etc.). In this case, latency may be a consideration in some applications. But again, data now travels at nearly the speed of light. The processing time to perform most AI tasks is long enough that latency is relatively a negligible concern for most users and regional proximity is generally sufficient. It is unlikely that any businesses that utilize AI inference would locate to Michigan to be near a hyperscale AI data center.

> Modern internet infrastructure has greatly reduced the advantage for data users to be located near data centers. Data travels through fiber optic cable at roughly 125,000 miles/second. For example, digital communication latency between Detroit and Columbus, Ohio is about 0.002 seconds.

Overall, attracting data center investments is not likely an effective strategy to catalyze broader economic development.

Data Centers Tend to Cluster

Data centers do attract some other businesses. The primary business type is other data centers. Occasionally this happens so that data centers can be networked together. But again, data now travels at nearly the speed of light and *regional* clustering is likely sufficient in most cases.[33]

At a local/state level, data centers attract other data centers indirectly. Data centers tend to locate in areas where there is sufficient power capacity, regulatory structures that facilitate development, and local agencies that have learned how to efficiently process permitting.[34] In this case, it is not that a data center itself encourages further development. Clustering occurs as a result of policies amenable to data center construction.

If an area becomes a data center hub, construction firms, specialty subcontractors, and related suppliers may expand or invest locally to meet construction demand.[35] Data center projects have become a leading source of nonresidential construction growth, and in at least some hub markets they are already driving expansions by firms that supply data center and utility infrastructure—though many projects still rely on contractors brought in from outside the region.[36]

Restricting Data Center Development May Constrain Economic Growth

Generally, the idea that data center investment will catalyze a local high-tech ecosystem or broadly attract new investment is flawed. However, there is some nuance. With the recent public backlash towards data centers and adoption of restrictive policies (e.g., moratoriums), this relationship may change. Historically, businesses have had little reason to locate or relocate based on proximity to data centers because colocation providers and cloud service providers have sited facilities to meet existing and anticipated local and regional needs.[37]

If colocation data center development is discouraged or delayed, it could limit the ability of businesses to expand locally and prevent future investment that would otherwise occur. It is difficult to predict the full effects of restrictive data center policies, as such conditions have little precedent. Historically, policies towards colocation data centers have been neutral if not encouraging. Dozens of such facilities currently operate in Michigan.

As reliance on data centers continues to grow, businesses in regions with constrained colocation data center development may increasingly rely on regional cloud service providers. Alternatively, if businesses want to own and manage their servers (i.e., in a colocation center), they may shift investment to other states. In this way, a lack of local data center capacity could potentially discourage local economic development.

In summary, while permissive data center development policy is not likely to drive economic growth, restrictive policies could very well discourage it.

Novel Approaches *Could* Support Economic Development

A recent report by the Brookings Institution acknowledges that, "the standard model of data center development has produced … relatively little long-term, high-value tech activity or large-scale employment."[38] However, Brookings argues that there are opportunities to leverage the data center boom to support long-term local economic prosperity.

The recent surge in data center investment, coupled with local resistance, gives communities more leverage to negotiate for broader local benefits instead of accepting traditional real estate deals.

As an example of how this might work, Brookings highlights the approach taken by Microsoft in Wisconsin. Microsoft's data center investments in Wisconsin have been accompanied by secondary investments and partnerships to promote a high-technology sector. Microsoft has partnered with the University of Wisconsin - Milwaukee to open an "AI Co-Innovation Lab" focused on innovation in manufacturing.[39] In addition, Microsoft is partnering with Gateway Technical College to launch Wisconsin's first Datacenter Academy to train more than 1,000 students in five years for high-demand data center roles. Further, Microsoft has expanded high-speed broadband internet access to 1,200 rural homes and businesses.[40]

Policy Implications

Data center development incentives can attract investment but rarely catalyze a broader tech ecosystem. Policymakers should work to ensure that tax exemptions or other incentives produce public benefits that exceed foregone revenue. The current data center construction boom provides negotiating leverage to secure long-term local benefits. Incentives to attract data centers should be transparent and targeted, with enforceable conditions to achieve benefits and protect against negative impacts. Policymakers should avoid over-subsidizing data center developments with automatic concessions, but also refrain from reflexive opposition—especially when considering colocation facilities that support local users.

2.2 Job Creation

Like most economic development efforts, Michigan's exemption of sales and use taxes on data centers emphasizes job creation. The Senate Fiscal Agency noted that, "According to testimony before the Senate … constructing more data centers in Michigan would benefit local and State economies because of jobs involved in their construction and operation."[41] It is worth addressing these two phases separately.

Jobs Related to Construction

The primary economic benefit of data centers comes from the initial construction. Roughly 20 to 25 percent of typical data center capital investment is related to construction (though for AI hyperscale data centers, so much is invested in GPUs that the construction spend percentage is usually much less). Construction of an individual data center facility usually takes about 12 to 24 months. For large facilities, over 1,000 workers may be on site during peak activity.[42] This includes many skilled trades workers and union jobs.

Most construction spending remains in the state economy because much of it goes to Michigan-based businesses performing key construction services such as clearing and grading sites, erecting steel frames, installing high-voltage electrical equipment, installing industrial-scale cooling systems, and running miles of cable, conduit, and piping. Additionally, materials used in construction may often be sourced from Michigan businesses. In fact, Michigan's industrial manufacturing base benefits from data centers constructed throughout the region.[43]

The broad consensus is that the recent surge in data center investment and construction is a substantial benefit to construction firms, skilled trades workers, and labor unions. This is particularly true with hyperscale AI data centers. The firms investing in these developments are in a race to get them operating as quickly as possible and thus providing high-margin contracts to the firms capable of meeting accelerated timelines.[44] This filters down to individual workers, who may see up to 30 percent wage premiums.[45]

It should be noted that these benefits are not without potential negative consequences. Michigan currently has a shortage of some types of skilled trades workers, such as electricians and industrial mechanics. As data centers pull skilled labor towards these projects because they often pay wage premiums to get the facilities operational as quickly as possible, this can delay timelines and increase costs for construction of many different projects such as apartment buildings, factories, and hospitals.[46] The demand for both labor and materials for AI data centers has been identified as a contributor to construction cost inflation in recent years.[47] That said, both construction labor and material markets are often regional or national, if not global. It is not clear that states and regions that are seeing substantial data center investment are seeing significantly more construction cost inflation than other regions.

Overall, states and regions that are experiencing data center development are likely to experience meaningful, albeit temporary, positive net economic benefits from data center construction activities.[48]

Jobs Related to Operation

It is sometimes assumed that data centers will employ people who design next-generation AI systems. This is a fallacy. AI development rarely requires physical proximity to data centers. These positions are typically associated with corporate headquarters or technology campuses—and are often fully remote.

> Highly compensated technology developers rarely work within data center campuses. There is little reason for the people who design software and hardware to be near data centers.

Data center developers often promise to create hundreds of permanent jobs when advocating for tax

Michigan's largest currently operational data center, the Switch Pyramid center near Grand Rapids, self-reported in 2023 as having created 26 jobs with an average annual compensation of $58,000.[52,53] Notably, this number was provided before the recent expansion of the Switch Pyramid campus from ten MW to over 300 MW. Also notable, data center jobs tend not to scale linearly with capacity (i.e., larger facilities achieve more efficient returns to scale).

breaks or other incentives. It is now well established that most of these jobs have not materialized in prior projects.[49] Small to medium-sized data centers typically provide 10 to 50 on-site jobs. Employment does not scale with size, and even the largest data centers typically provide fewer than 100 permanent jobs, including contracted labor (i.e., security).[50]

It is difficult to estimate typical compensation for data center employees. Managerial positions may receive salaries of over $100,000 annually—but these positions are rare. The average data center worker, consisting largely of technician and security roles, is non-salary and earns $50,000 to $80,000 per year. Additionally, data center jobs frequently include inconvenient schedules; shifts can vary between day and night, between eight and 12 hours, and are subject to change.[51]

Multiplier Effect

As with all large capital investments, data center investments result in indirect investments and indirect jobs created or supported. This is known as a multiplier effect.[54] A typical industrial investment such as an auto factory creates jobs through supply chain demands, transportation, logistics, and more.[55] Data centers are different.

Once a data center is fully built and operational, there is minimal continual supply demand or need for local services. These sites do not provide enough employment to expect new incomes to benefit local businesses like restaurants and retail. Anecdotally, even when a huge data center is sited in a small town, economic impacts are minimal once the construction workers have left.[56]

Estimates of the employment multiplier for data centers vary greatly.[57] Some estimate that for every job directly created at a data center, ten jobs are created elsewhere.[58] This is likely an extreme overestimate. Most data centers would not exist but for the clients and services that they support. In other words, data centers are the *result* of an economic multiplier, not driving economic activity themselves.[59] It should also be considered that to the extent that data center operations do require an operational supply chain (e.g., upgrade and replacement of processors), the jobs related to manufacturing that equipment are likely located overseas (e.g., Taiwan).[60]

Policy Implications

Available evidence suggests that data centers provide relatively few permanent local jobs—either directly or indirectly. The jobs that are created tend to provide above-average compensation, but not uniquely so. Any economic development strategy relying on data center development to drive permanent job creation is flawed. That said, the benefit to the construction industry and construction workers should not be dismissed.

2.3 Costs of Michigan Sales/Use Tax Exemption

Michigan exempted data centers from the state sales and use tax with enactment of Public Act (PA) 181 of 2024. Since 2016, traditional colocation data centers could qualify for sales/use tax exemptions,[61] but most hyperscale enterprise data centers (such as those dedicated to AI development) could not. Michigan's first operational hyperscale data center (the Switch facility near Grand Rapids) was a special case; it was exempted from sales/use taxes by benefit of being declared a Renaissance Zone under other policies.[62]

PA 181 now exempts qualified *enterprise* (single user) data centers from sales and use taxes related to the core data center functions. Exempted purchases include: "Computers, servers, routers, switches, peripheral computer devices, racks, shelving, cabling, wiring, storage batteries, back-up generators, uninterrupted power supply units, environmental control equipment, other redundant power supply equipment, and … computer software. … Data center equipment also includes any *construction materials* used or assembled for the construction or modification of an enterprise data center … including, but not limited to, building materials [e.g., concrete and steel], infrastructure, machinery, wiring, cabling, devices, tools, and equipment that would otherwise be considered a fixture or related equipment."[63]

Among other requirements, to qualify for the sales/use tax exemption, data centers must create at least 30 "qualified new jobs…at the facility." Additionally, new jobs will only qualify if they pay 150 percent or more of the regional median wage. The regional median wage varies by region, but on average would equate to roughly $37/hour in 2026 (about $75,000/year assuming a 40-hour work week).[64] Thirty jobs may not seem like a lot; but in the data center world, it is. Data center operations require minimal labor. Only hyperscale data centers can be expected to provide more than a handful of permanent well-compensated jobs.

Determining how much sales/use tax revenue will be lost to the exemption is difficult. As noted by the House Fiscal Agency, "If [a data center] investment would not have occurred but for the provisions of the bill, that would be a mitigating factor on the revenue loss. That said, whether the exemptions were a necessary condition of the investment in any given case is indeterminable."[65] In other words, if a data center investment would not have occurred but for the tax break, then there is no lost revenue.

Evidence suggests that without the sales/use tax exemption for large enterprise data centers, these investments would not be proposed in Michigan. In January 2025, Steve DelBianco, President and CEO of NetChoice (an internet trade association[66]) testified that "no hyperscale data center has located in states that impose sales tax on data center equipment."[67]

That said, with hyperscale data center investments increasing, it is becoming more difficult for developers to identify locations with sufficient land, water, and power availability. For example, Maine levies a 5.5 percent sales/use tax and does not provide exemptions for data centers but has attracted enough attention from data center developers that lawmakers passed a statewide 18-month moratorium on data centers larger than 20 MW.[68] This bill was subsequently vetoed by Maine Governor Janet Mills, who stated that she would have signed it if it included an exemption for an 82 MW project now underway.[69]

To be clear, Maine has not seen proposals on the scale that Michigan has seen. The largest Maine proposal is for a "100 to 300 MW data center," with a fuel cell power plant in an industrial and technical campus.[70] It is likely that Michigan would still see some data center proposals without the sales/use tax exemption, but it is unlikely that it would be a target for hyperscale AI data centers such as the 1.4 GW Stargate facility now under construction in Saline Township.

The Stargate data center is estimated to require nearly $5 billion in real (land and structures affixed to it) and personal property investments (furniture, machinery, equipment, etc.).[71]

The cost of the high-performance chips to be installed in the facility has not been reported, but a similar 1.2 GW Stargate data center in Texas was reported in May 2025 to require $40 billion in GPUs.[72] Compute (GPU) costs have increased, and the Saline Stargate facility is about 15 percent larger than the one in Texas. The cost of the chips filling the Saline data center could easily exceed $50 billion, making the Stargate facility roughly a $55 billion capital investment.

If this $55 billion investment were subject to Michigan's six percent sales/use tax, it would provide $3.3 billion in state revenue. For context, Michigan anticipates collecting about $13 billion in total sales/use tax revenue in Fiscal Year (FY)2026.[73]

Furthermore, data center processors do not have long shelf-lives. The IRS advises that "computers and peripheral equipment" are fully depreciated after five years.[74] Similarly, Amazon considers the "useful life" of its servers to be five to six years.[75] For AI data centers such as the Stargate facility, the shelf life of the chips may be even shorter—on the order of three years.[76]

Considering current costs and expected service life of AI chips, it is reasonable to expect that after the first few years, the long-term operation of a hyperscale AI data center like the Saline Stargate facility will require about a $10 billion average annual investment in high-powered processors. If subject to Michigan's sales/use tax, this would cost the data center operator an additional $600 million per year.

With the substantial and ongoing cost of keeping processors up to date, it is reasonable to expect that hyperscale AI data center developers like Oracle/OpenAI would *not* have located in Michigan without the sales and use tax exemption. But not all hyperscale data centers are built specifically for AI; the economics and location decision factors may be much different for cloud service providers. Unfortunately, the technology companies are generally very secretive about site selection processes, preventing informed analysis of the impact of the sales/use tax exemption.

Policy Implications

It is impossible to estimate how much revenue will be foregone because of the Michigan sales and use tax exemption. If the exemption is utilized only by developments that would not have occurred in the absence of PA 181, then the cost is zero. It is virtually certain that at least some of the proposals would not have occurred without the tax break (including the Oracle/OpenAI data center in Saline Township). If some hyperscale investments would have occurred regardless of the law, then the exemption may result in hundreds of millions of dollars per year in foregone revenue.

If state policymakers wish to continue working to attract hyperscale data center investment, a full repeal of the sales/use tax exemption is not optimal. But tax incentives do not need to be an all-or-nothing policy. Policymakers may consider providing a partial percentage exemption, or capping the amount exempted. For instance, local property tax abatements (discussed below) typically provide relief for half of the amounts that would be due. Additional policies could dedicate state revenue provided by data centers to support inspection and enforcement of environmental protection laws, which would help to alleviate environmental risks related to data center developments (as discussed in subsequent chapters).

2.4 State Revenues

Although Michigan has exempted qualifying data centers from sales and use taxes, data centers will provide revenue to the state through other means.

Individual Income Tax

Michigan's individual income tax rate is 4.25 percent. This will be applied to income generated during both the construction and operations phases of the data centers.

Construction Phase

Most of the labor-intensive economic activity related to data centers occurs during the construction phase. The wages provided during the construction phase for a hyperscale data center may approach $1 billion.[77] However, construction capacity is limited. If contractors and trades workers were not employed on data center construction, they may have been employed elsewhere within the state. On the other hand, large data center projects may pull workers in from out of state and tend to provide higher wages than other projects.

Adopting an assumption that a hyperscale data center project generates $600 million in new construction wages that would not otherwise have been subject to income taxes, taxed at 4.25 percent, this renders over $25 million in new income tax revenue. This would provide a short-lived but meaningful revenue increase for the state.

Operations

The state law that exempts enterprise data centers from sales and use taxes requires that the data center provide at least 30 full-time jobs paying 150 percent or more of the regional median wage (about $75,000 per year in 2026).[78]

Individual income tax revenue that may be provided by a hyperscale data center can be estimated by adopting reasonable assumptions. Assuming that a data center will employ 30 workers at an average of $80,000 per year, plus an additional 30 jobs at $40,000 per year, this adds up to $3.6 million per year of gross income. If fully taxed at 4.25 percent, this would provide $153,000 per year in state revenue, increasing annual revenue provided by the Individual Income Tax less than 1/100th of a percent.

Corporate Income Tax

Michigan applies a six percent Corporate Income Tax (CIT) on C-corporations with positive taxable income apportioned to Michigan.[79,80] If profitable C-corporations (e.g., Microsoft, Alphabet, Amazon) directly own Michigan data centers, they would be required to remit CIT taxes to the state.

However, it is common for data centers to have corporate structures that would prevent Michigan's CIT from applying. Many, possibly most, data centers are owned and operated by Real Estate Investment Trusts (REITs) or other special purpose vehicles (SPVs) designed to shield the parent company from financial liability.[81]

It is possible that Michigan data centers may provide some corporate income tax revenue. For example, a proposal in Gaines Charter Township was filed directly by Microsoft.[83] If Microsoft continues to own and operate this site, the portion of Microsoft corporate income apportioned to Michigan would be subject to the CIT. However, Microsoft may subsequently transfer ownership to a SPV. Generally, it does not appear that Michigan data centers are likely to provide significant CIT revenue.

While the SPV's income will be subject to the Individual Income Tax, data centers themselves may not report any income. Any revenue is likely to be offset by debt-financing and paper losses due to billions of dollars of annual depreciation of the AI processors.[84]

> Michigan's first hyperscale AI data center, the Stargate facility in Saline Township, is owned by an SPV called "RD Michigan Property Owner I LLC," which was incorporated in Delaware in July 2025 concurrent with the request for rezoning. This appears to be a wholly owned subsidiary of Related Digital LLC, which is a subsidiary of Related Companies Inc., a private real estate investment firm.[82] The technology corporation Oracle will be the sole client of this data center. Oracle will install GPUs under a lease agreement with RD Michigan Property Owner I LLC and provide computing services under contract with OpenAI, maker of ChatGPT.

State Education Tax on Taxable Property

Michigan's State Education Tax (SET) applies a six mill ($6 per $1,000 of assessed value) tax on the taxable value of all property subject to taxation. While much of the value of data centers is in personal property, which has largely been exempted from state and local property taxes, real property value (land and structures) may exceed $1 billion for large hyperscale facilities. If not otherwise exempted or reduced, the SET applied to $1 billion of real property would provide $6 million annually to the School Aid Fund. For reference, in 2026, the SET contributed about $3 billion to Michigan's $22 billion School Aid Fund.

Policy Implications

In assessing the benefits of the Michigan sales and use tax exemption, policymakers should consider that both the state General Fund and School Aid Fund will receive revenues through other means—primarily the individual income tax and State Education Tax. It is difficult to provide an average or general estimate of state revenues that would be obtained through a specific development as real and personal property values may vary substantially and projects may receive different tax breaks. Initial analysis suggests that under current tax frameworks, data centers will typically have relatively little long-term impact of the state budget.

2.5 Local Property Tax Revenue

Data centers can provide substantial property tax revenue for the local governments that host them. For example, in Louden County, Virginia (locus of 'Data Center Alley,' the largest concentration of data centers globally), data centers provide nearly half of the tax revenue to this county of over 440,000 residents.[85]

It is difficult to estimate local property tax revenue in a general way. The amounts of investments are substantial enough that they can ease tax pressures on existing taxpayers where data centers are located. Different local governments have different tax rates and data centers may be eligible for various incentives.

Every property is subject to taxation from a number of taxing jurisdictions. For example, taxes on the Stargate facility in Saline Township will be levied by

- Saline Township (1.8782 mills in 2025)
- Saline Area Schools (26.3310 mills for operations, the sinking fund, recreation, and debt)
- Saline District Library (1.4858 mills)
- Washtenaw County (7.3157 mills for operating and extra-voted millages)
- Washtenaw Community College (3.3429 mills)
- Washtenaw Intermediate School District (5.3800 mills)
- Huron Clinton Metropolitan Authority (0.2050 mills)
- State Education Tax (discussed above).[86]

Assuming tax rates remain the same even with the expanded tax base, the Stargate data center is estimated to provide an average of $1.6 million per year to Saline Township through 2039.[87] This could be transformative for the township, which collected $754,000 in property taxes in 2025.[88] Additionally, the Stargate center is estimated to provide about $8 million per year in school funding, largely distributed to the state School Aid Fund.[89]

Through 2039, the Stargate center will receive a partial exemption on local property taxes through Michigan's Industrial Facilities Tax (IFT) exemption.[90,91] This exemption will expire in 2040, increasing the annual property tax revenue for the township in future years (assuming tax breaks are not extended).

Property tax abatements (such as the IFT) generally work by exempting properties being developed or rehabilitated from the general ad valorem property taxation and levying a specific tax in its place. They authorize cities, villages, or townships to reduce the cumulative tax burden created by all jurisdictions serving the property(s). For the IFT, the specific tax levied in lieu of the property tax is generally: a) levied at half of the total tax rate that the property owner would pay or b) freezes the value of rehabilitated buildings at their pre-rehabilitation values. While cities, villages, and townships decide whether to grant tax abatements, the abatements reduce the tax yield for all levels of government levying taxes upon that property(s) (with the State Education Tax often treated differently).

Data centers are considered light industry and thus are eligible for property tax abatements under the Plant Rehabilitation and Industrial Development Districts Act. It provides industrial facilities tax abatements (IFT) for property tax reductions of qualified (1) new developments, (2) expansions, or (3) rehabilitation efforts for industrial and high-technology purposes.[92] Qualified new projects may apply for property tax liability limited to one half of the rate of all (improved real and personal) property taxes, except the State Education Tax (six mills), for a term of up to 12 years, as determined by the local unit. For restoration of, renovation of, or addition to an existing facility within a district, taxable value (or real and personal property) of the facility may be frozen at the pre-restoration, pre-renovation or pre-addition level for a term of up to 12 years, as determined by the local unit.

Property tax abatement programs are designed to encourage economic development by providing an incentive to locate a business facility in a particular jurisdiction. The tax reduction incentive aims to induce economic development that would not occur in that location absent the incentive. Most commonly utilized in Michigan cities, city officials generally attempt to use tax abatements to "make the math work" so that all of the cost of locating in the place is not at a detriment to the business. The flexibility in the act allows the governments to adjust the amount and the duration of the abatement to meet this goal.

For the governments, the goals in providing the abatements are associated with the ancillary benefits of the business attraction or retention. In cities with a local income tax, the abatements allow the city to forego property tax revenues but benefit from the corporate and individual income taxes levied on the business and workers in the building. It is hoped that the workers will live nearby, so the governments will benefit from the property taxes paid on their homes. The workers will eat at nearby restaurants, shop at nearby stores, fill up at nearby gas stations, and spend their earnings in other ways in or near the abated facility.

Personal Property Tax Exemptions

The taxation of personal property was an issue for many years with advocates for reform arguing that including it in the tax base dissuades businesses from investing in the means of production in Michigan. Personal property is generally considered to be things that are movable. It includes tangible property (other than real property), intangible property, and inventory. Beginning in 2016, state law exempts most personal property from taxation.

Specifically, the AI GPUs and related technologies being installed in data centers will be considered Eligible Manufacturing Personal Property (EMPP), which is statutorily defined as all personal property located on land zoned for industrial use if that personal property is predominantly used in industrial processing or direct integrated support. Data centers are light industry and their personal property would seem to qualify for the EMPP exemption.

Notably, the property tax revenue estimates for the Saline Stargate data center assume that only *real* property will be taxed. As noted in section 2.3, the cost of the high-performance AI GPUs filling the Saline data center could easily exceed $50 billion. Every mill applied to $50 billion in personal property would render $50 million in revenue—far more than the estimates.

Typically, facilities that receive the EMPP exemption are subject to an alternative Essential Services Assessment (ESA).[93] For personal property at a facility that has been granted an IFT exemption, the ESA on eligible manufacturing personal property is 1.2 mills (technically 2.4 mills on half the reported taxable value). The ESA is collected by the state to be redistributed back to local governments. However, the Michigan Strategic Fund (MSF) Board may adopt resolutions to fully exempt a data center facilities from the ESA for up to 15 years.[94] Considering that the annual tax benefits from the Saline Stargate facility are estimated at only around $10 million annually, it appears that it is anticipated that the MSF Board will grant a full ESA exemption on personal property.

In summary, although the majority of data center property value may be partially or fully exempted, property taxes may still provide substantial revenue to local governments and school districts.

Utility Property Tax Revenues

Utility companies and transmission infrastructure owners are subject to Michigan property taxes, and also eligible for various exemptions. Investments in the transmission grid and other power infrastructure may provide additional revenue to local governments and schools. A more complete assessment is outside the scope of this report. It should be noted that personal property tax relief for utilities is being considered by the legislature as this report is being drafted.

Policy Implications

The primary benefit provided by hyperscale data center development is property tax revenue. This is likely to remain true even if granted tax break incentives such as the Industrial Facilities Tax exemption.

Michigan's IFT exemption must be approved by the local government with jurisdiction over the development. Local governments should be cautious when considering IFT exemptions and approve exemptions only when anticipated benefits of development exceed the foregone revenue. Awarding the IFT to a hyperscale data center is a somewhat unusual application. Hyperscale data center developers are well-funded and could easily afford to pay a full tax rate. What they value most in choosing locations is a sufficiently large plot of land and access to high-voltage power transmission lines. Local governments that can offer land and power grid access are likely to attract proposals without the need to offer local incentives.

That said, an IFT exemption can be an appropriate and beneficial arrangement with developers.

For one thing, hyperscale data centers are huge investments and are likely to become a local government's largest taxpayer—even if an IFT exemption is offered. If hyperscale developments were to pay full rates, this could result in a scenario where the tax base is overwhelmingly reliant on a single property owner. This could impose long-term risks to fiscal planning and sustainability.

Furthermore, an IFT exemption could be valuable as leverage to negotiate for project conditions that serve the public interest. For example, the exemption could be conditional on the data center maintaining compliance with noise or environmental regulations. Governments could also provide an IFT exemption in exchange for near-term benefits such as immediate contributions to a community investment fund. Such 'community benefit agreements' are a common feature of data center development projects.

2.6 Community Benefit Agreements

In addition to property tax revenue, local governments that host a data center often negotiate community benefit agreements. Community benefit agreements are legally enforceable project conditions through which local governments seek benefits in exchange for good-faith cooperation in project approval and permitting. Benefits may include cash contributions, infrastructure funding, environmental safeguards, workforce commitments, and more.

Local governments must be careful in negotiating community benefit agreements, as an overly aggressive approach may cross the line into illegal 'taking.'[95] However, considering the public backlash to data center development, many developers may willingly negotiate generous conditions in exchange for reasonable approval and permitting processes.[96]

Michigan's first approved hyperscale AI data center (the Oracle/OpenAI Stargate facility in Saline Township) rendered multiple conditions and community benefits. In this case, the benefits were negotiated through settlement of a lawsuit brought by the developer and ordered by consent judgement.[97] Ideally, conditions of approval can be negotiated without legal action. As a condition of Saline Township agreeing to approve the Stargate data center, the developer agreed to the following:

- Developer will contribute $2 million to establish a Township Farmland Preservation Trust Fund.
- Developer will contribute $2 million to establish a Township Community Investment Fund.
- Developer will contribute $8 million to local Fire Departments.
- Developer will construct turn-lanes on Michigan avenue to access the project from either direction.
- Developer will not sell or lease the site to a tax-exempt organization (which would eliminate future property tax revenue).
- Approximately 200 acres of the site will be preserved as open space. Agricultural activities may occur on this space with the exception of 50 acres of conservation easements identified for wetland and natural area preservation.
- If the data center is vacated, the developer will maintain the property. If the site remains vacant for over five years, the developer will restore the site to a natural area. The developer will provide the Township with a decommissioning surety bond of up to $10 million with potential increases every two years at the discretion of the Township engineer relative to estimated demolition costs.

In addition to these direct financial and land-use contributions, the Stargate consent judgement included several provisions to protect the community from potential negative impacts:

- The data center will not construct or operate a power generating facility with the exception of generators used in emergency situations.
- No activities otherwise permitted on land zones as industrial will be permitted except for data center operations (e.g., solar power generation).
- The data center will not be expanded in the future beyond the approved initial site plan.
- On-site water and wastewater facilities will be constructed to serve only the site and not be expanded to serve other uses. Developer will install monitoring wells and assume financial liability of impacts to the groundwater table that affect nearby users.
- The data center will not use evaporative cooling. Water use is limited to non-consumptive uses such as restrooms, fire suppression, and maintenance.
- Buildings and parking lots must be set back at least 75 feet from adjacent properties and the frontage road (Michigan Avenue).

- Developer shall construct landscaped earthen berms along Michigan Avenue to provide visual screening of the site.
- Developer will not impact local traffic during construction and will meet regularly with the township engineer to address construction issues.
- On-site generators will operate only during emergency situations and for maintenance/testing. Maintenance operations shall occur no more than once per week and must occur during daylight hours.
- The noise emitted from the data center operations “shall at all times not exceed 55db” as measured from all property boundaries, including during emergency generator operation. (While unclear, this is likely to be assessed as 55 dBA—see Chapter 5, Noise Pollution.)

For these concessions and additional provisions (e.g., compliance with state regulations), Saline Township agreed to approve a necessary rezoning and “not unreasonably” hinder or delay any permits or approvals necessary to bring the data center into operation, and to submit an IFT exemption to the state.

Policy Implications

Community benefit agreements are a common feature of data center development projects. Local governments have meaningful negotiating power and can further leverage tax incentives such as an IFT exemp`tion. Agreements can provide an explicit legally enforceable approach to precluding potential negative environmental and quality-of-life impacts from data centers. Further, such negotiations represent an opportunity to obtain community benefits beyond those anticipated from property tax revenues.

For local governments that have not yet experienced a hyperscale data center proposal but may in the future, local policymakers should prepare by assessing community priorities and needs. Drafting a preliminary community benefits agreement could accelerate productive negotiations and increase the likely of successful and beneficial project approval.

3 Impacts on the Electric Grid

Some of the most pressing public concerns regarding data center development relate to their demand for electric power. Electric power demand in the United States was relatively flat between 2004 and 2023. In 2024, U.S. electric power demand reached a new peak and is forecasted to continue increasing for the foreseeable future.[98] Multiple factors contribute to increasing power demand, including climate change factors (increased A/C use), ongoing electrification of vehicles and appliances, and re-shoring of manufacturing capacity. However, "the driving factor behind this surge is increasing demand from large computing centers" (i.e., data centers).[99]

Data centers consumed 4.4 percent of electric power in the United States in 2024.[100] As of 2026, data centers consume about seven percent of electricity produced in the U.S. This figure may exceed 10 percent by 2030, largely driven by investments in generative AI and the subsequent construction of hyperscale AI data centers.[101]

This unprecedented forecasted load growth, as well as the unique power requirements of hyperscale data centers, imposes challenges on the power industry and raises new policy issues.[102]

3.1 Electric Grid Reliability

A popular argument against data center development is the idea that these power-hungry facilities will stress the electric grid, creating blackouts for other power users. This concern is fueled by general distrust and dissatisfaction with local electric utilities.[103]

Public concerns regarding power availability are frequently over-stated or based on a lack of understanding of electric grid planning and management. While the risk of data centers creating power shortages is not zero, it is practically negligible. Multiple layers of oversight are intended to ensure that sufficient electric power is available to serve all users (loads) at all times. If a data center were to impose a potential power shortage, that data center would almost certainly not be permitted to connect to the grid until an acceptable solution is determined to remedy any identified concerns.

The idea that data centers could precipitate a grid failure and subsequent 'blackout' has some merit; but it is for an unusual reason not directly related to increased electricity demand. It's because, occasionally, data centers suddenly *stop* drawing power from the grid.

Transmission grid operators have been more frequently confronting sudden demand drops due to multiple large data centers unexpectedly disconnecting from the grid. This happens when there is a voltage surge in the main transmission lines. Such transient voltage surges are historically common and usually not problematic.

Regional Transmission Organizations

Regional transmission organizations (RTOs), coordinate the movement of electricity across large multi-state high-voltage transmission grids: they run wholesale power markets, manage transmission planning, and help maintain reliability by balancing supply and demand across broad regional systems. Over 97 percent of Michigan electric customers receive power from utilities connected to the Midcontinent Independent System Operator (MISO) transmission grid.

About 130,000 electric customers in the southwest corner of the state receive power from the PJM transmission grid. (PJM was originally an abbreviation for Pennsylvania-Jersey-Maryland. The PJM RTO has expanded across several more states but has retained the historical organization name.) The PJM region has become a focus in recent years due to perceived electric generation capacity shortages related to new data center demand. PJM's territory includes "Data Center Alley" in northern Virginia, an established data center hub in the Chicago region, as well as emerging hubs in Ohio and Indiana.

Figure 7
Northeastern U.S. Regional Transmission Organizations and Independent System Operators

Source: Federal Energy Regulatory Commission[104]

This becomes a problem because data centers—full of critical and sensitive IT equipment—require consistent uninterrupted 'clean' power. When a voltage fluctuation is detected in the power supplied from the grid, data centers automatically disconnect from the grid and switch to backup power. While the voltage fluctuation in the transmission line may last only microseconds, the data centers remain on backup power for at least a few minutes. This sudden loss of power demand must be balanced by immediately shutting off generation of an equivalent amount of power.[105] This has caused 'near miss' incidents where grid operators had to take emergency action to prevent cascading regional power failures.[106]

While sudden large-load loss is a challenge for grid operators, these incidents have been successfully managed so far. No such incidents are known to have resulted in a power failure. In fact, the North American power grid has become increasingly reliable and resilient in recent decades, largely from policies implemented following the 2003 regional blackout that spanned from New York to Michigan.[108]

Transmission vs. Distribution Grids

Hyperscale data centers are not connected to the electric grid in the same manner as residential customers. When residential (and most commercial) electricity users lose power, it typically is due to a failure of a local (low voltage) *distribution* grid. Hyperscale data centers are provided power from the (high voltage) *transmission* grid through dedicated distribution facilities.[107] While both residential customers and hyperscale data centers ultimately receive power through the transmission grid, transmission grid failures are very rare. No known transmission grid failure has resulted from data center load.

As data centers proliferate, sudden load loss is likely to remain a risk, but is unlikely to become a problem. This risk has been adequately identified by the state regulators including the Michigan Public Service Commission (MPSC), the Federal Energy Regulatory Commission (FERC),[109] the North American Electric Reliability Corporation (NERC),[110,111] as well as the independent system operators and RTOs.[112] These organizations are collectively tasked with ensuring the reliability of the regional transmission grids.

Many potential technical strategies and operation policies can reduce the risk of sudden demand loss.[113] Data centers may even improve grid reliability by agreeing to curtail power use during periods of high demand.[114] This may not be an option for many facilities that support critical cloud services, but it is possible for some AI hyperscale facilities. In fact, the MPSC approval of the 1.4 GW hyperscale AI data center in Saline Township requires that if DTE is directed by MISO to reduce load on the transmission grid, the load will be reduced from the data center before affecting any other DTE customers.[115]

Policy Implications

There is negligible risk that data centers will create power outages or otherwise reduce reliability.

From the perspective of local governments responding to development proposals, the local electric power utility should be engaged in the process as soon as possible. However, the local utility will often be aware of potential developments before they are officially proposed. Sufficient electric power availability is a primary consideration in hyperscale data center siting and developers will likely consult with local utilities as a preliminary step. Policies are in place to ensure that data centers are not allowed to draw more power from the grid than is available.

That said, one approach to grid reliability management is through market price mechanisms. There is some potential for data center power demand to increase electricity rates, if the identified mitigation steps ares not utilized, as discussed in the following section.

3.2 Electric Rates and Consumer Costs

The electricity rates paid by end users are the result of a combination of costs related to power generation, transmission, distribution, and regulatory compliance. Final rates are determined by myriad policies and formulas adopted by utility providers, state public utility regulators, regional transmission operators, the Federal Energy Regulatory Commission, and the U.S Department of Energy.[116]

There is widespread concern that the increasing power demand imposed by data centers will increase costs of electricity.

Data Center Power Demand can Increase Capacity Costs

The impact of data centers on electricity rates has become an acute concern in the PJM region,[117] which services multiple data center hubs including "Data Center Alley" in northern Virginia.[118] Many recent press articles and anecdotes about data centers increasing electricity rates are based on recent clearing prices set in PJM's forward-looking capacity market auctions. PJM's most recent capacity auction set record prices for peak power delivery, with a diminishing reserve.[119]

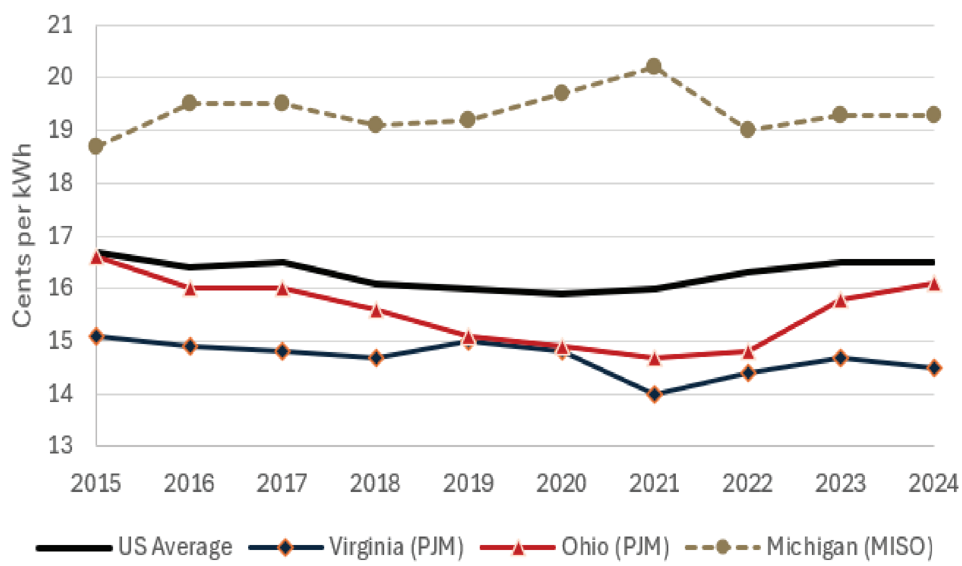
> **Electric Power Capacity Markets**
>
> Regional Transmission Operators (RTOs) such as PJM and MISO work to ensure grid reliability by managing *capacity markets*. While details vary, RTOs basically forecast peak electric power demand during extreme conditions and hold a market auction for electric power generators to provide electricity during those conditions. Electric power generators bid, and are paid, based on their ability to contribute power to the grid during peak demand. The resulting prices reflect the cost of providing reserve capacity during peak demand, rather than the direct cost of power generation. These costs are passed on to ratepayers.

The prices cleared in capacity market auctions are passed through the RTO (in this case PJM) to utility providers, and then to ratepayers. Thus, these rising capacity auction prices are likely to impact electricity rates in the PJM region.[120] The concentration and continual construction of data centers in the region is driving this,[121] along with constrained power generation supply growth.[122]

PJM's most recent auction cleared $16.4 billion in capacity price, covering the June 2027 to May 2028 delivery year. This is over a 700 percent increase from the 2024/25 delivery year (only three years prior), which cleared $2.2 billion. However, six years prior to that, PJM's 2018/19 auction cleared $10.9 billion.[123] The variability in capacity market clearing prices over a period of relatively stable demand suggests that load growth is not the only factor contributing to capacity market clearing prices.

Additionally, capacity prices are a minor component of electric utility rates in the PJM region. This is seen in the average retail electricity prices in a couple of states served by PJM. Chart 1 provides the average residential electricity rates from 2015 to 2024 in Virginia (home of "Data Center Alley") and Ohio (an emerging data center hub). As previously noted, PJM capacity costs were highly variable over this time. Furthermore, 2015 has been identified as an inflection point when data center investments and related electricity demand began increasing.[124]

Chart 1
State Average Residential Electric Power Rate, Inflation-adjusted ($2024)



Source: U.S. Energy Information Agency data as analyzed by Lawrence Berkeley National Laboratory.[125]

Despite drastically variable capacity auction clearing prices in the PJM region, inflation-adjusted residential electricity rates in Virginia and Ohio have been relatively flat. Ohio rates range from 16.6 ₵/kWh in 2015, to a low of 14.7 ₵/kWh in 2021, before rebounding to 16.1 ₵/kWh in 2024. Virginia's highest rate was also in 2015 at 15.1 ₵/kWh, declining to 14.0 ₵/kWh in 2021, and rebounding to 14.5 ₵/kWh in 2024.

In inflation-adjusted terms, both Ohio and Virginia had lower rates in 2024 than in 2015—as did the U.S. national average.

Chart 1 also provides Michigan's average residential electricity rates for comparison. While also relatively flat over the decade, Michigan's rates have been consistently higher than the data center clusters of Ohio and Virginia, as well as the national average. As of 2024, Michigan residential ratepayers were subject to a 4.8 ₵/kWh (33 percent) higher rate than Virginia, which has more data center power draw than anywhere else in the world.

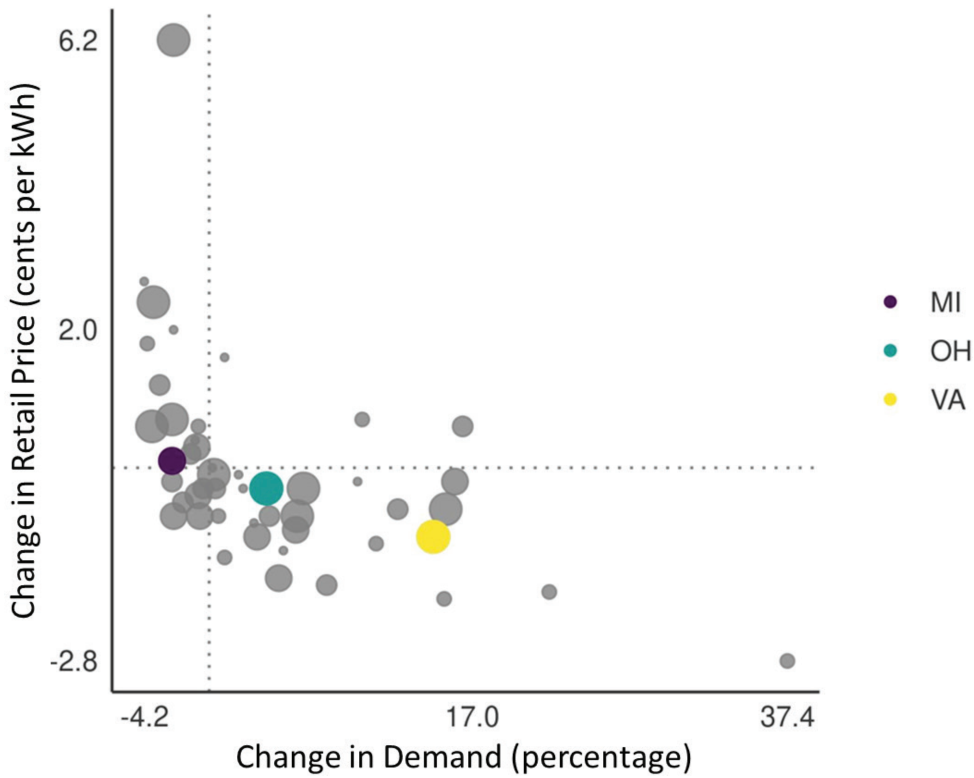
This demonstrates that electricity markets, and resulting rates, are too complicated to fully adhere to simple supply/demand economics. In fact, increased power demand may tend to reduce electricity rates, as discussed below.

Load Growth Has Historically Tended to Reduce Overall Electricity Costs

A recent study by the Lawrence Berkeley National Laboratory found that "rising state-level load in recent years (through 2024) has generally been associated with overall price reductions."[126] Chart 2 shows the relationship between the change in retail electricity prices (all sectors – residential, commercial, and industrial) to the change in statewide electric power demand from 2019 to 2024 in the 48 contiguous states. There is a strong correlation between load growth and decreasing rates. Michigan, Ohio, and Virginia are highlighted in this chart.

Chart 2

U.S. State Change in Retail Electricity Prices vs. Change in Electric Power Demand 2019 to 2024, Inflation-adjusted ($2024)



Source: Berkeley Lab. Drivers of Electricity Pricing Trends & History (DEPTH) Tool[127]

Notes: Bubble size corresponds to state electricity sales. Dashed lines represent the 0-axis (no change).

As shown in Chart 2, of the states that increased electricity consumption from 2019 to 2024, only three (Rhode Island, Nevada, and Oregon) saw increased rates (relative to inflation). Michigan's electricity use dropped by 2.4 percent while electric power costs increased marginally by 0.1 ₵/kWh. Virginia experienced a 14.5 percent surge in power demand, yet rates decreased by 1.0 ₵/kWh (about 8.5 percent).

Residential Rates May Increase Despite Overall Decreasing Rates

As shown in Chart 2, from 2019 to 2024, Ohio's electricity use increased by 3.7 percent while the state saw an overall 0.3 ₵/kWh decline in power. Here's where things get interesting: The retail electricity prices provided in Chart 2 include *all* end-users—representing the average cost of a kilowatt hour across residential, commercial, and industrial electric utility customers. While by this metric overall Ohio electricity rates decreased, Chart 1 (page 31) shows that *residential* ratepayers in Ohio experienced a 1.0 ₵/kWh (6.7 percent) *increase*. During this same period, the average rate paid by Ohio *commercial* users declined 17 percent—from 13.0 to 10.8 ₵/kWh.[128] This correlates to a period of hyperscale data center investment in Ohio.[129]

Multiple factors likely contribute to Ohio's residential rates increasing while commercial rates declined. However, residential electricity consumers in Ohio may have valid reasons to suspect that the electricity rate increases they have seen since 2022 are related to the development of hyperscale data centers and special lower rates applied by utilities to these large load industrial end-users. That said, as of 2024, Ohio residential electricity rates remained below the national average and significantly lower than Michigan, which has not experienced a similar wave of data center investment.

Thus far, the focus has been on capacity market price increases as a potential mechanism to explain how data centers may increase power costs. An additional potential mechanism is the cost of transmission infrastructure investment required to serve new large loads such as data centers.

Data Centers May Increase Electricity Rates Through Transmission Infrastructure Costs

At a very basic level, an electricity grid is composed of high-voltage transmission lines that move power around a region, and low-voltage distribution lines that supply power to local end users. The transmission grid is largely governed by regional transmission organizations (RTOs) like MISO and PJM. Local distribution grids are typically owned by utilities operating under the authority of state public service commissions. Nearly all electricity end-users receive power through the local, utility-owned, distribution grid.[130]

Most typical (colocation) data centers have a power demand of less than 10 MW (occasionally ranging up to 50 MW). These are connected to the grid just like other users—through low-voltage retail service on existing transmission lines. When power demand for a customer is much higher, meeting that demand may require a direct connection to the regional transmission line through a dedicated step-down transformer and dedicated distribution facilities. In the last couple of years, the development of data centers with over a 100 MW power demand has become common. Increasingly, hyperscale AI data centers are being developed with over 1,000 MW (1 GW) of demand. These large loads must be connected directly to transmission lines and dedicated distribution facilities.[131]

Historically, the cost of transmission grid infrastructure has been distributed

Transmission Cost Allocation: Not Just a Data Center Issue

Until recently, allocating transmission costs was relatively simple. Transmission infrastructure investments were pursued to improve grid reliability, and it was easy to understand which users would benefit from reliability improvements.[136] This began changing with the transition to renewable energy. While renewable energy is inexpensive to generate, connecting it to the grid while ensuring reliability is costly and complicated. Fairly allocating transmission costs to efficiently bring renewable energy onto the grid precipitated a contentious regulatory proceeding, culminating in FERC Order No. 1920-A in 2024.[137,138]

among all the electricity end-users that benefit from the upgrade through well-established rules adopted by the Federal Energy Regulatory Commission (FERC), RTOs, and state utility regulators. Until recently, direct transmission customers were very rare. The framework established by these organizations presumes that transmission infrastructure investments are for wholesale market purposes benefiting electricity ratepayers across a region.[132] But transmission grid investments are increasingly benefiting data center customers that are more directly supported by the transmission grid through dedicated distribution facilities.[133]

There is some potential that the costs of transmission infrastructure built to serve data centers is being allocated to other users.[134] A recent FERC order suggests that PJM may be shifting operation costs of serving data centers to other users in some cases (including but not limited to transmission costs).[135] While this is an evolving issue and some transmission cost allocation outcomes may be inequitable, grid planners and regulators at multiple levels are working to adopt frameworks to fairly allocate transmission investment costs.

Having Data Centers On the Grid Does Not Necessarily Impose Higher Rates

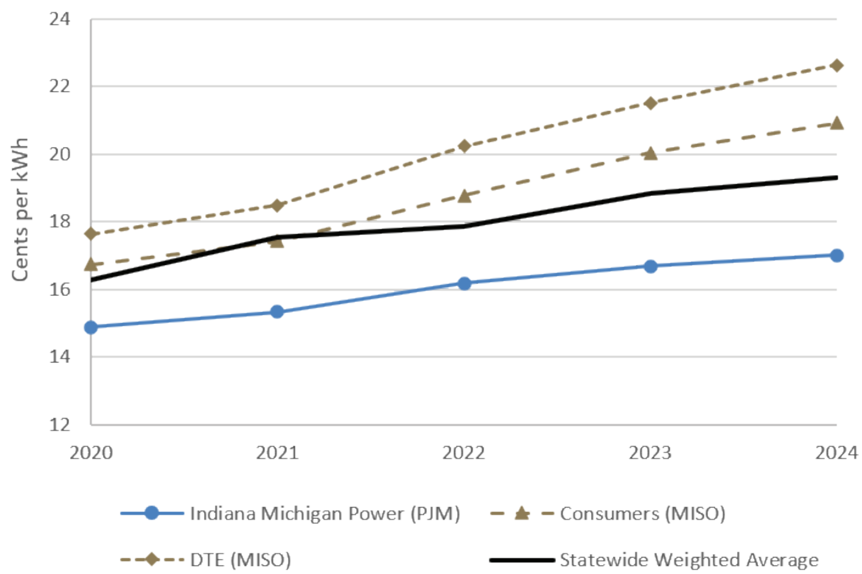
While over 97 percent of Michigan electric users receive service through utilities connected to the *MISO* transmission grid, about 130,000 customers in the southwest corner of the state receive service from Indiana Michigan Power (IMP). IMP's service territory crosses the Michigan-Indiana border and is connected to the *PJM* transmission grid.

As previously described, PJM is currently challenged with record high capacity costs from numerous and increasing large data center loads. Furthermore, at least two hyperscale AI data centers are under construction in IMP's Indiana service area.[139,140]

This provides an opportunity for a 'natural experiment.' IMP's Michigan customers are subject to the same legislative and regulatory requirements as other Michigan electric utilities but are uniquely subject to impacts of data centers.

One might assume that Michigan customers of IMP would be subject to uniquely high rates as a result of receiving power from the PJM grid, which must serve these local and regional data centers. However, the latest available data does not show this (see Chart 3).

Chart 3
Average Annual Residential Electricity Rates for Michigan's Three Largest Investor-owned Utilities and State Average, 2020 to 2024
(Not Inflation Adjusted)



Source: U.S. Energy Information Administration Electric Power Annual Reports[141]

From 2020 to 2024, IMP residential customers in Michigan enjoyed electricity rates between eight and 13 percent lower than the statewide average. By comparison, Michigan's two largest electric utilities charged rates up to eight percent (Consumers Energy) and 17 percent (DTE Energy) higher than the state average. Additionally, IMP customers have been subject to lesser rate increases. From 2020 to 2024, IMP rates increased 14 percent—compared to 25 percent for Consumers Energy, 28 percent for DTE, and 19 percent statewide.

It is not clear how IMP has accomplished providing residential service at lower rates than the Michigan state average. IMP is not a non-profit cooperative; it is an investor-owned utility with a guaranteed rate of return. IMP's Michigan service is subject to the same state legislative and regulatory requirements as other investor-owned utilities in Michigan. IMP has provided more reliable service (fewer power outages) in most recent years than the state average or other investor-owned utilities.[142] Furthermore, it does not appear that the rest of Michigan being on the MISO transmission grid is a factor—Michigan has the highest average electric rates of all MISO states.[143]

Understanding how IMP has moderated electricity rates without sacrificing reliability is beyond the scope of this report. Numerous factors are likely involved. However, looking at IMP allows the opportunity to evaluate residential electricity rates for Michigan consumers who receive power from a grid that serves a substantial and growing data center load. IMP ratepayers enjoy below-average rates and above-average reliability, despite sharing a grid with data centers. While not conclusive, this evaluation provides evidence that data center electricity demand *can* be accommodated without harming other customers.

2025 May Be An Inflection Point

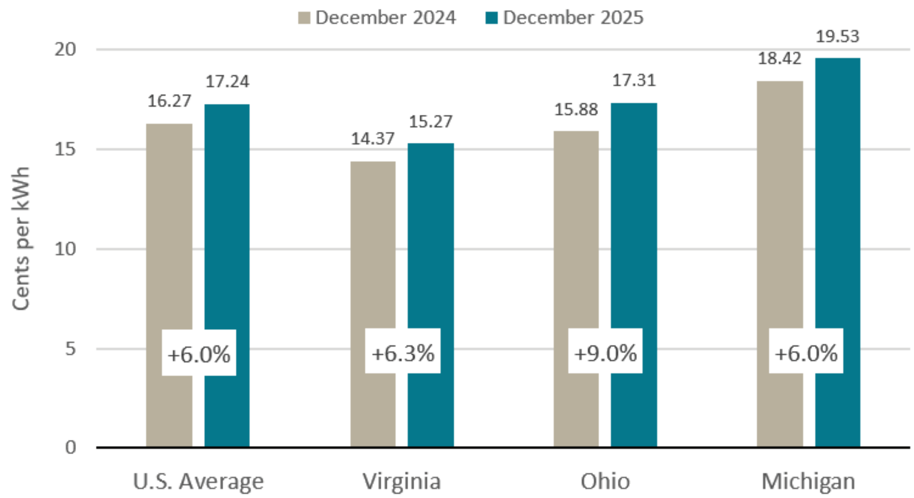
So far, the analysis of electricity rates has covered up to 2024.

- Chart 1 (page 31) shows that residential electricity rates in the United States have been flat relative to inflation from 2015 to 2024. Furthermore, the data center hub states of Virgina and Ohio have maintained rates below the national average and had lower rates in 2024 than in 2015.
- Chart 2 (page 33) shows that from 2019 to 2024, states that experienced increased electricity demand tended to see decreasing overall electricity costs.
- Chart 3 (page 36) shows that from 2019 to 2024, Michigan's residential electricity customers served by IMP benefited from lower rates and lesser rate increases compared to the statewide average. This is despite being connected to the PJM transmission grid, which serves a substantial and increasing number of hyperscale data centers.

At the time that research was conducted for this report, analogous 2025 data was not yet released. However, data center investments notably accelerated in 2025 with an increased emphasis on hyperscale data centers. The relationship between new data center developments and electric rates may have started to change.

Recent data suggests that rates have recently started rising significantly faster than inflation. Chart 4 shows state monthly average residential electric rates for December 2024 and December 2025. Year-over-year, the average residential electricity rate in the U.S. increased by 6.0 percent—twice the inflation rate.

Chart 4
State Average Residential Electric Power Rate, December 2024 and December 2025



Source: U.S. Energy Information Administration, Electric Power Monthly, February 2026, Table 5.6.A[144]

Residential customers in Virginia saw a 6.3 percent rate increase from December 2024 to December 2025, slightly higher than the U.S. average. Notably, the average rate for commercial customers (which includes data centers) increased 15 percent, from 8.86 to 10.21 ₵/kWh.[145] This increase was largely due to pass-through of increased methane fuel costs rather than new demand. However, many of Virginia's electric customers saw an additional rate increase beginning January 2026 due to a scheduled rate increase by Dominion Energy, which sells about two-thirds of all electricity in the state. This increase is due, in part, to PJM capacity market clearing prices, which are up largely due to new loads, including data centers.[146,147]

Ohio's average residential electricity rates increased 9.0 percent from December 2024 to December 2025—three times the rate of inflation. The average rate for commercial customers (including data centers) increased 15 percent from 10.62 to 12.25 ₵/kWh.[148] For the month of December 2025, Ohio residential electricity rates were higher than the U.S. average for the first time in over a decade.

It is not clear to what extent the growth of data centers in Ohio (and the PJM region more broadly) is contributing to these rate increases.[149] The Ohio Public Utilities Commission documented increasing costs since 2020 due to several unrelated factors.[150] On the other hand, one of Ohio's electric utilities stated, "many AEP Ohio customers saw the generation portion of their bills increase $27 a month in the summer of 2025 because of an imbalance between the supply of electricity being generated and demand for it."[151] This appears to be related to the 2025/26 PJM capacity auction clearing price increases.

It is also important to note that energy prices across the country are impacted by how energy is regulated within a state/jurisdiction. Not all areas are the same. Michigan is a regulated energy market meaning that utility companies are governed by the Michigan Public Service Commission (MPSC) to set and approve electric rates. The MPSC's role is to ensure rates are fair and are in the public interest. Rates follow a cost-of-service model meaning customers that cause the cost pay for those costs and are reflected in Michigan's different rate codes (residential, commercial, and industrial). Oppositely, in deregulated markets energy prices are set by energy commodity markets with no control over costs. Pennsylvania, New Jersey, and Ohio are a few examples. In these markets, energy prices follow supply and demand principles; as demand increases, supply becomes constrained and energy prices goes up and vice versa. This creates price volatility. Price spikes have not occurred in Michigan because the ability to set rates is determined via the regulated process.

The relationships between energy and AI continue to evolve. While AI investment continues to increase, some proposed projects are being cancelled, and material shortages are delaying construction for others. Additionally, AI is becoming more efficient and current projections of power demand may be overestimated. It is difficult to project how AI data centers will impact the energy grid in future years.[152]

Interpreting PJM Capacity Market Clearing Prices

Many recent press articles and anecdotes about data centers increasing electricity rates are based on recent clearing prices set in PJM's forward-looking capacity market auctions. The PJM region serves multiple data center hubs, including 'Data Center Alley' in northern Virginia. PJM's most recent capacity market auctions cleared record high prices for the 2024/25 power delivery year, and have increased every year since, including the most recent auction covering the 2027/28 delivery year.

These capacity market price increases have been attributed, in part, to the growing concentration of data centers in the PJM region. This has driven a broader narrative that data center developments drastically and inevitably increase electricity costs.

Importantly, the PJM capacity auction clearing price spike for the 2024/25 delivery year was only marginally related to demand growth (i.e., from data centers). PJM projected a 3,243 MW load growth, which is significant. But this new demand was dwarfed by a reduction in available generation capacity. Over 13,000 MW of supply was removed from the market, largely due to retiring fossil fuel power plants. Compounding this supply/demand issue, beginning with the 2024/25 delivery year, PJM imposed a stricter accreditation methodology (which determines the capacity value of a resource). The new rules resulted in some resources receiving less capacity credit than previously, further tightening supply and driving up clearing prices.[153]

Additional factors drive up PJM capacity clearing prices. For the capacity auction covering the 2025/26 delivery year, PJM adjusted the structure of the capacity market in multiple ways. PJM's independent market monitor has determined that these changes created confusion and resulted in clearing prices twice as high as what would have been set in a well-functioning market.[154]

For the 2026/27 delivery year, PJM's capacity auction clearing price increased 9.5 percent to $16.1 billion.[155] Because this is a market-based auction subject to multiple factors and human judgement, it is impossible to determine exactly what factors are driving price increases.[156] Some observers conclude that future load demand has been greatly overestimated, driving capacity price increases.[157,158] PJM's independent market monitor maintains that the capacity auction is poorly designed, but attributes the marginal 2026/27 increase almost entirely to new demand imposed by large load data centers.[159,160,161]

The most recent auction (for the 2027/28 delivery year) cleared $16.4 billion, a smaller increase than the previous two years. However, this auction was influenced by the institution of a price cap.[162] PJM estimates that without an artificial price cap, the 2027/28 auction would have cleared $17.2 billion.[163] Instead, PJM fell short of its target reliability margin by 6.6 GW. PJM plans to hold an incremental capacity auction in February 2027 to procure additional reserve capacity resources.[164]

While the huge jump in the 2025/26 PJM region capacity costs appear to have been driven by a combination of increased demand, decreased supply, and inefficient market structure, the additional increases for the 2026/27 and 2027/28 power years appear to be driven almost entirely by new power demand from data centers. In this already supply-constrained market, PJM forecasted demand growth of nearly 11 GW over these two years, "largely due to additional Large Loads."[165] Many electricity customers within the PJM region will begin seeing additional rate increases in 2026 related to data center power demand.[166]

Data centers are certainly contributing to increasing capacity auction market clearing prices in the PJM region, but it is unclear how much of this is a direct result of data center demand, and how much is due to a market structure that is not set-up to efficiently accommodate this demand. Furthermore, as previously discussed, capacity market clearing prices are a minor contribution to the final rates paid by utility customers.

PJM market dynamics demonstrate that data centers can potentially increase electric powers costs and have done so. However, it would be a mistake to conclude that rate increases are substantial or inevitable.

Data Centers Have Not Impacted Electricity Rates in the MISO Region but Risks are Emerging

This report focuses on PJM because this is the RTO most challenged to manage data center load growth and supply constraints. While PJM has a small presence in Michigan, over 97 percent of Michigan electric customers are served by utilities connected to the MISO transmission grid. Until very recently, construction of hyperscale data centers was relatively rare in the MISO region.

The 2024 State of the Market Report from MISO's independent market monitor (published June 2025) mentioned data centers only briefly in the context of "future market needs." MISO has not typically been subject to supply/demand constraints. Power demand in the MISO region had generally been flat or declining from 2011 to 2024.[167]

Things change quickly.[168] Over 17 GW of new large load additions have been approved in the MISO territory since 2022 (though not necessarily brought online).[169] A Transmission Expansion Plan report published in November 2025 stated that at least 3,100 MW of additional capacity beyond currently committed capacity would be needed to meet the projected planning reserve margin forecast for 2026.[170]

In response to increasing requests for new large loads (including data centers), MISO has implemented an Expedited Project Review (EPR) process. Multiple new large loads (e.g., data centers) have been approved for connection to the grid in the past year. In late 2025, MISO conducted a Long-Term Load Forecast survey of member utilities and found that at least 21 GW of new demand was expected to come online by 2030.

Relatedly, MISO has initiated an Expedited Resource Addition Study (ERAS) process designed to accelerate the process of bringing new generation capacity onto the grid.[171] MISO is currently fast-tracking five Michigan projects, including 780 MW of battery storage and 400 MW of solar generation.[172] Resources approved through this process will begin coming online in 2028.[173]

As with PJM, MISO's capacity auction clearing prices increased substantially between the 2024/25 and 2025/26 power delivery years. This cost is passed on to ratepayers in the MISO region through state-approved charges, often labelled on electricity bills as "power supply cost recovery" or something similar. This is typically less than about two percent of the total electricity bill.

While these charges increased in Michigan and the MISO region in 2025, this does not appear related to data center construction. MISO does not identify load growth as a contributing factor to constrained supply for 2025/26. The primary drivers are retirement of fossil fuel power plants and redesign of the market structure (i.e., accreditation factors).[174]

MISO 2026/27 Power Deliver Year

In the MISO region, capacity prices are determined one year in advance through MISO's *Planning Resource Auction* (PRA). The latest PRA auction results, released in April 2026, suggest that data center development in the MISO region in the last year has not resulted in a supply shortage or price increases.[175]

The 2026 PRA capacity prices will apply from June 2026 to May 2027. In MISO's North/Central zone (which includes Michigan), summer capacity prices decreased 33 percent from the previous power year. This price decrease is primarily due to increased generation capacity—largely from solar generation.[176]

While this trend suggests that MISO is adequately managing power supply and demand, this will remain a challenge. MISO states, "while our market reforms have helped hold the line amidst tighter reserve margin compared to the prior decade, resource adequacy remains at risk, especially as demand for large load additions accelerate."[177]

Policies to Protect Electricity Customers from Data Center Costs

The potential for data centers to increase electricity rates for other customers has become a point of focus for policymakers and regulatory agencies. New rules and frameworks have been adopted to address this issue, and more are under consideration.

The Federal Energy Regulatory Commission (FERC) is now considering new regulations to encourage that transmission grid investments that primarily serve data centers to protect other electricity customers through more appropriate cost allocation methods.[178] In a separate filing, FERC has coordinated with PJM to adopt new rules to more directly link the costs of new transmission lines to the large loads that are served by them.[179] MISO, has not yet adopted new policies but has convened a working group to further study the issue.[180]

Critically, many details of such arrangements are under the jurisdiction of states.[181] It is becoming increasingly common for state public utility commissions to require special conditions for connections of new large loads like data centers that prevent imposing costs on other users.[182]

In July 2025, Ohio's Public Utilities Commission specifically required AEP Ohio to insulate electricity customers from cost increases related to data centers.[183,184] The Virginia State Corporation Commission adopted a similar approach in November 2025.[185,186] Pennsylvania's Public Utility Commission reached an agreement for a large load rate class in March 2026.[187]

In Michigan, the Michigan Public Service Commission's approval of the 1.4 GW hyperscale AI data center in Saline Township came with similar conditions for DTE.[188,189] It also approved Consumers Energy's application to amend its general primary demand rate (GPD) to add new terms for data centers and other very large customers.[190] At the regional level, MISO also has ongoing initiatives to ensure reliability while controlling costs.[191]

It remains to be seen how well these approaches will work. Success will require continual attention, transparency, and accountability. Citizens and ratepayers should be attentive, but not panicked.

Policy Implications

This section, *Electric Rates and Consumer Costs*, is the most extensive section in this report. The reason for such a thorough discussion is that the potential for data center developments to increase costs for other electricity customers has been identified as one of the most emphasized public concerns. Furthermore, this is a concern that can be evaluated by reference to available, reliable data. The data suggests that concerns are valid, but often exaggerated and misunderstood. Appropriate evaluation requires acknowledging the complexity of power grid operations and nuance of power markets.

Data centers have been around for a long time, but their number and scale have been increasing. The adoption of cloud computing around 2015 marks one inflection point when data center investment and related power demand notably increased. There is no reason to believe that such data center developments imposed increased electricity costs anywhere in the U.S. before 2025.

Developments in 2025 mark another inflection point. The continual adoption of cloud services plus new demand for hyperscale AI data centers further accelerated investments and new power demands. Recent data (most notably PJM capacity market auction clearing prices) suggests that data center power demand has begun to outrun power supply, resulting in increased costs passed on to other ratepayers in the PJM region. As this is an evolving situation, available data is somewhat open to interpretation.

It can be concluded that data center load growth has increased electricity costs for ratepayers in the PJM region. However, it is uncertain to what extent capacity price increases are the result of increased demand from data centers in the context of other factors, such as retiring fossil fuel generation and suboptimal market structures. Further, it is unclear to what extent the final rates paid by other electricity customers are related to capacity price increases and other cost factors imposed by data centers.

Additionally, policy approaches can protect other ratepayers from cost increases attributed to data centers. The rapid investment push in 2025 caught utilities, grid managers, and regulatory agencies somewhat off-guard. Policy and procedure is now catching up to this new dynamic. The trend observed in the PJM region may be limited and temporary.

The link between data centers and rising electricity costs will remain a subject of controversy for years to come. It is likely that electric power rates will increase above the rate of inflation for the next several years. It is also likely that data center investments will proliferate for the next several years. There will inevitably be a tendency for the public to blame electricity cost increases on data centers. Policymakers must be on guard to understand and mitigate the mechanisms by which data centers could potentially increase electricity costs to other users while keeping in mind that correlation does not necessarily imply causation.

In a Michigan context, there is reason to believe that state regulators and MISO (with guidance from FERC and NERC) are actively working with utilities to mitigate risks that data center developments could increase costs to other electricity consumers. The risks imposed by data centers to the power grid are real, but are manageable, and are being managed. Citizens should remain aware of this dynamic and demand appropriate transparency and accountability. However, with appropriate policy, Michigan's grid can accommodate data center development without increasing costs to other electricity users.

Critically, the policymakers with influence over these processes are those within utilities and regulatory agencies. There is no apparent need for additional state legislation to guide this process. Local governments should confer with utilities during assessment of development proposals, but there is no apparent need for any targeted local laws or ordinances. In most cases, bringing a new hyperscale data center onto the grid is likely to reduce future rate increases (keep rates low) for all customers served by the utility.

3.3 Michigan's Renewable and Clean Energy Goals

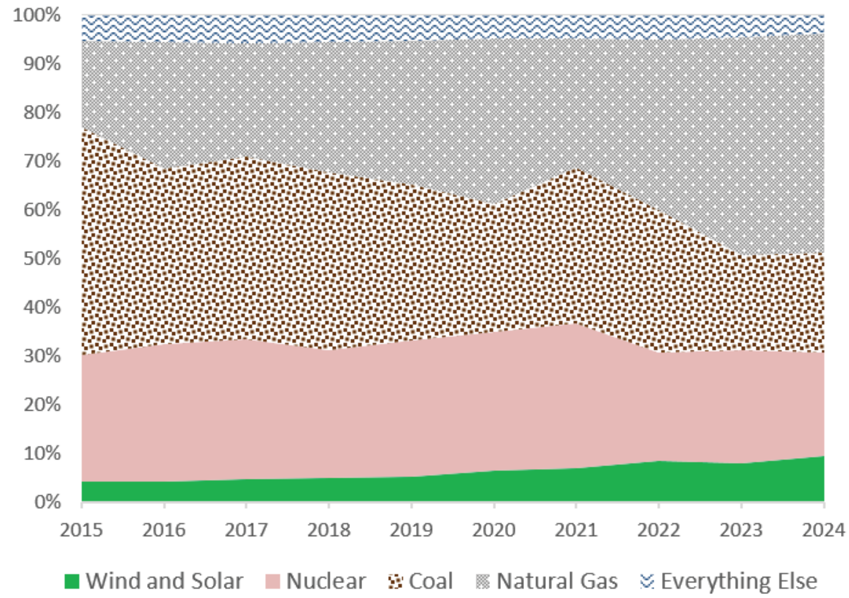
In November 2023, Governor Gretchen Whitmer signed into law Public Act (PA) 235 of 2023 requiring Michigan electric utilities to achieve a renewable energy portfolio of 50 percent by 2030, and 60 percent by 2035. The law includes additional goals for "clean energy," a category that includes nuclear power and methane gas generation with carbon capture.[192]

Michigan's goals for clean and renewable electricity are ambitious. In 2024, wind and solar accounted for less than 10 percent of the electricity generated in the state. Nuclear (a non-renewable but "clean" power source) accounted for another 21 percent. About 70 percent of electricity generation in Michigan is by fossil fuels and this has been consistent since 2015 (see Chart 5).

Chart 5 can provide only a vague idea of Michigan's progress towards meeting the 2030 target of 50 percent renewable energy. Assessing compliance is far more complicated. While Chart 5 shows the state *generation* mix, the law applies to electricity *sold* in-state as assessed through a system of renewable energy credits, where one mega-watt hour of renewable energy equals one renewable energy credit. Currently, all of Michigan's utilities are meeting a 15 percent renewable portfolio standard requirement.[193]

Renewable energy credits generated can be banked and utilized for up to five years. Thus, meeting the 50 percent renewable target for 2030 does not imply that 50 percent of Michigan's electricity generation will have to be from renewable energy generated in that year. However, it is apparent that meeting the 2030 renewables target (and subsequent more stringent targets) will require unprecedented investments in renewable generation, battery storage, and transmission system investments.

Chart 5
Michigan Electric Generation by Fuel Source



Source: U.S. Energy Information Administration[194]

The Michigan Public Service Commission (MPSC) is tasked with regulating utilities as to achieve the state's renewable energy goals.[195] Both state law and MPSC rules allow for utilities to delay compliance with Michigan's renewable portfolio standard, for example, if achieving compliance would reduce reliability or excessively increase rates.[196] The emerging concern is that the new demand created by data centers could lead to delays in meeting Michigan's renewable and clean energy goals.[197]

The theory is that the increased electricity demand from data centers will force the delay of the retirement of coal generation plants, as well as create new demand for methane gas generation. This may slow the transition to renewables even as more renewable generation is brought online. There is some data to support this.

Preliminary estimates indicate that in 2025, electricity demand in the U.S. increased by 2.4 percent, driven primarily by data center development in Texas, the Mid-Atlantic (Virginia) and Ohio Valley. Although solar generation increased substantially, coal generation also increased and the rate of coal plant retirements fell (partly due to U.S. Department of Energy orders). That said, the increase in coal generation was largely due to high methane gas prices. The share of fossil fuel generation fell one percentage point nationally from 2024 to 2025.[198]

However, as previously noted, 2025 appears to mark an inflection point. There is reason to be concerned that in 2026 and beyond, data center power demand may drive up fossil fuel generation. Particularly in the western U.S., hyperscale data centers have developed off-grid generation with methane gas turbines.[199] Some are even using diesel generators.[200] Notably, in most cases, these off-grid fossil fuel power plants are "bridge solutions" to provide data center power until they can be connected to the grid.[201,202]

There is also reason to believe that data center investments can *speed* the transition to renewable energy. While solar and wind have become the least expensive forms of energy generation, they require significant up-front costs. The largest costs are related to transmission infrastructure and the addition of battery storage to sites in an effort to optimize the energy produced from these intermittent resources. Data center developers have the capital to fund renewable energy infrastructure and are doing so more frequently.[203]

For example, Google has signed several power purchase agreements that funded grid-connected utility scale solar farms, including a 188 MW solar farm in Indiana,[204] and one in Ohio.[205] Google has also funded grid-scale battery storage—such storage capacity is necessary to transition to renewables while maintaining grid reliability.[206] Perhaps most impactful long-term, Google has also funded development of small nuclear reactors and expects to have a plant in Tennessee operational by 2030.[207] Meta (Facebook) is funding an 80 MW solar farm in Pennsylvania.[208] Amazon Web Services has a long history of supporting solar energy in Virginia,[209] and has continued such practices as it builds new data centers in places like Indiana.[210]

Michigan's largest currently operational data center, the Switch Pyramid facility near Grand Rapids, has a 100 percent renewable power purchase agreement with Consumers Energy that helped fund the expansion of wind power in Michigan.[211] The recently approved 1.38 GW Oracle Stargate data center in Saline Township will fund grid battery storage capable of providing an equivalent 1.38 GW for up to four hours.[212]

Policy Implications

The construction of data centers in Michigan could either delay or accelerate Michigan meeting renewable/clean energy targets. This will depend largely on power purchase agreements between utilities and large loads, and MPSC approval of those agreements. Moreover, Michigan's clean/renewable energy policy was adopted at a time when electricity demand growth was not anticipated. There are scenarios where Michigan could meet its (percentage-based) goals but increase overall greenhouse gas (GHG) emissions.[213,214]

Many data center operators have long positioned themselves as sustainability leaders. For example, Microsoft has contracted 34 gigawatts of renewable energy assets across 24 countries and has set a goal to be water positive by 2030. Similarly, Google has set an ambition to reach net-zero emissions across its operations and value chain by 2030. However, the accelerating pace and scale of AI-driven data center buildouts have made these commitments much harder to hit and operators are not intrinsically concerned with emissions from power generation sources.[215] While data centers funding grid scale renewables is common, it is becoming increasingly common for them to fund methane gas power plants.[216]

Michigan's sales and use tax exemption requires qualifying data centers to procure at least 90 percent of their electric power from "clean" energy. This would imply that data center developments would tend to support Michigan's renewable and clean energy goals. However, the requirement is not self-enforcing. Policymakers and regulatory agencies will have to be deliberate and consistent to ensure that data center developments do not increase fossil fuel generation and GHG emissions.[217]

It is also worth noting that Michigan policymakers can only influence the GHG emissions of data centers that are constructed in the state. Policies that push development to other states with less ambitious renewable energy standards will not further the broader objective of reducing global GHG emissions.

3.4 Electric Grid Planning an AI Bubble

It is widely believed that artificial intelligence (AI) is currently in a speculative "bubble." There is a potential that many of the AI projects driving hyperscale data center developments will fail to generate any revenue. (See Appendix A.)

The possibility of an AI "bubble" is pertinent the impacts of data centers on the electric grid and consumer rates in several ways. First, there is some risk that when the AI bubble bursts, data centers will be vacated, perhaps by bankrupted companies, and unable to pay the rates anticipated to finance any new transmission or generation infrastructure built to support that data center.[218] This concern has been mitigated by Michigan's largest utilities, Consumers Energy and DTE, through upfront collateral requirements and exit fees included in their rate tariff and special contracts ensuring costs are recovered and not shifted to other customers.

A bigger issue is that many of the projections of future generation and transmission capacity are based on proposed data centers as measured by grid interconnection requests. Considering the strategy of AI companies to win the race to AI that will allow them to survive the bubble burst, data center developers are emphasizing "speed to power."[219] In other words, hyperscale AI data centers are being built wherever available land and power availability allows them to get operational as quickly as possible.

Getting a new large load connected to the grid often requires years of delay. First, a developer must acquire development rights to a site and reach a electric service agreement with the local utility. Then, that agreement must be approved by a state public utility commission. Then, the approved proposed load enters the RTO interconnection queue. RTO interconnection queue requests are often backlogged for years. Only when the interconnection request is approved can construction begin on transmission infrastructure electric service, which requires additional time.[220]

Since data center developers cannot be certain of any one proposal moving as fast as they want, they often propose developments at multiple sites. It is now universally accepted that there are far more data center requests than will ever be constructed. These have been given the name "phantom data centers."[221]

This matters because the large load interconnection queues, especially from speculative hyperscale data centers, have vastly inflated electricity demand projections.[222] Grid planners are aware of this, but no one is sure how inflated the projected load growth actually is.[223,224]

Utilities and RTOs are obligated to serve requested loads and thus are inclined to plan around the higher end of demand growth projections.[225] This has become an acute point of contention in the PJM region, where rapid data center growth—and *projected* growth—have contributed to increased clearing prices in future-oriented capacity and transmission market auctions.[226]

In the MISO region, hyperscale data center interconnection requests were relatively rare until 2025. By 2025, utilities and state utility regulators were already aware of the 'phantom data center' phenomenon and the risks of an AI bubble. Recent hyperscale data center power purchase agreements approved by state utility regulators have generally been structured to insulate the utility and other ratepayers from the costs of generation and transmission investments required to serve the data centers. For example, Michigan's first approved hyperscale AI data center (the OpenAI/Oracle Stargate facility in

Saline Township) included credit and collateral requirements.[227]

This also has near-term implications for renewable and clean energy, even in the MISO region. Projected demand growth may spur investments in methane gas generation and keep coal power plants online past their planned retirement date.[228,229] In the longer term, the inflated estimates from data center demand could lead to overbuilding of generation and transmission infrastructure.[230] Despite front-loaded power purchase agreements, other ratepayers may ultimately be burdened with some of these infrastructure costs if forecasted demand does not materialize.[231]

Policy Implications

For policymakers and regulatory agencies, it will be critical in the near-term to continue to account for risks and uncertainty related to this AI bubble. In addition to other attributes of proposed developments, approval of projects should consider the track record and reliability of the developer. For example, if the developer is a subsidiary of a larger corporation created specifically to insulate that corporation from financial risks (i.e., a special purpose vehicle), utilities and regulators should take additional steps to manage the risks from that investment.[232]

For the general public, it may be reassuring to understand that power grid doomsday scenarios that often drive public debate are greatly exaggerated.[233] Many of the data centers currently proposed are ‘phantom’ data centers and will never be built.

These phantom data centers do complicate matters for RTOs, state policymakers, public utility commissions, and utilities. But there are multiple organizations and countless individuals responsible for assuring that electric power service remains reliable and available at rates that reflect the cost of service to residential ratepayers. As with other challenges involved with bringing data centers onto the electric grid, the phantom data center issue is manageable and being managed.

4 Impacts on Water Resources

Michigan's water has been a critical economic and cultural resource since before recorded history. The state name, "Michigan," was given to the land by the native peoples, meaning "great water." Michigan's water resources supported the state's early economic growth and establishment as an industrial center and continues to benefit the state in a variety of ways.[234] Michigan's waters can support growth and prosperity into the future, including by supporting data center operation. But it is imperative that Michigan's water resources be respected and protected.

As data center development has become a topic of public debate, one focus is on the potential impact on Michigan's water resources.[235] This discussion can be divided into two potential impacts: 1) water consumption, and 2) water pollution.[236]

4.1 Water Consumption

Water *consumption* is measured by the amount of water withdrawn and not returned to the watershed. This is harder to measure than water use. Water use can be measured through a meter. For most water users, most of the water used is returned to the watershed. Typically, this happens when water goes down the drain, into the sanitary sewer, and is treated and discharged by the local wastewater treatment plant (or perhaps a septic system).

Water is only considered *consumed* when it is removed from the watershed.[237] Occasionally, this may occur through export, as in the case of water bottling plants or food production. This can also happen through irrigation; some percentage of irrigation water will return to the aquifer (ground water) by percolating through the soil, but the rest will be consumed by evaporation or evapotranspiration. Irrigation is the largest water consumption activity in Michigan.[238]

In the context of data centers, water consumption happens primarily through evaporative cooling towers. Water is used to cool equipment and then emitted as water vapor that enters the atmosphere and is carried by wind outside of the watershed before eventually precipitating back into liquid water.

Data center water consumption can occur either on-site at the facility (used to cool computing equipment), or at the power plant that provides electricity to the data center (if that power plant uses evaporative cooling).

On-site Water Consumption

Data centers create a lot of heat. The processor chips must be continually cooled down. If a large data center uses an evaporative cooling system, it can consume a lot of water. About 80 to 85 percent of water used in an evaporative cooling system is *consumed*—or *lost*—to evaporation. The rest is discharged, sometimes directly but usually through the sanitary sewer system to the local wastewater treatment plant.[239]

It is not easy to verify how much water real-world data centers use or consume. One estimate that has been repeated in several Michigan press outlets is that "hyperscale data centers can use between one and five million gallons of water per day when evaporative cooling [is used]."[240] Adopting the high end of that figure, and assuming that 80 percent (four million gallons per day) is *consumed*, that's about 1.5 billion gallons per year. This is equivalent to about 2,250 Olympic-sized swimming pools, or a small lake.

Statewide, Michigan water users *consumed* about 165 billion gallons in 2024 (about six percent of *use*). In 2020 water consumption was 25 percent higher—the reduction being largely due to the retirement of legacy power plants and associated evaporative cooling.[243]

As for specific data centers with somewhat reliable reporting on water consumption, the thirstiest appears to be xAI's Colossus facility near Memphis, Tennessee which uses three million gallons per day for evaporative cooling, or about a billion gallons per year (likely consuming about 80 percent of that).[241] Another notable water user is Google's 'The Dalles' data center in Oregon, which uses about 500 million gallons per year (consuming an unknown lesser amount lost to evaporation).[242]

Assuming that a hyperscale AI data center using evaporative cooling may consume one billion gallons of water per year—is that a lot? Maybe.

If a data center were to withdraw this volume of groundwater from a watershed that has already been depleted due to agricultural withdrawals, consuming an additional billion gallons per year could certainly be a problem. But in most locations in Michigan, there is probably enough available water to sustainably meet this demand.

Michigan's Water Withdrawal Assessment Tool

Michigan law prohibits water withdrawals from causing excessive depletion of stream and river flows, called an Adverse Resource Impact (ARI). Landowners planning a new or increased withdrawal using one or more pumps capable of at least 70 gallons per minute (100,000 gallons per day or 36.5 million gallons per year if running continuously) must obtain approval from the state government prior to operation.[244]

Any on-site water withdrawals would have to be permitted through the Department of Environment, Great Lakes, and Energy (EGLE). The Department would also control permits for any expansion of municipal water plants, and would reject proposals that would result in reduced reliability.[245] Notably, Michigan's sales and use tax exemption requires qualifying data centers to procure water from a municipal water authority. This does not preclude the use of on-site wells to serve the data center, but implies that the local water utility will own and operate the service infrastructure. Development agreements should ensure that any costs are imposed on the data center.

It is becoming increasingly common for data centers to use 'closed loop' cooling systems.[246] With closed loop systems, on-site water consumption is essentially zero. But there is a trade-off: while closed loop systems use less water, they use more electricity. Some sources of

Michigan's first hyperscale AI data center, the Oracle/OpenAI 'Stargate' facility in Saline Township, will draw water from onsite wells. As the Stargate center is using a closed-loop system (not using evaporative cooling), water demand will be limited to occasional maintenance, fire suppression, and typical facility uses (e.g., bathrooms). The site will include monitoring stations for groundwater levels, and the developer is financially liable for impacts on groundwater availability for nearby properties.[248]

It is worth mentioning that Michigan's sales and use tax exemption requires qualifying data centers to "use municipal water sourced from a municipal water system." This has led to a quirky stipulation in the consent agreement: "If required by the State of Michigan in order for the Developer and/or the Tenant to qualify for Sales and Use Tax exemption, the on-site water system will be dedicated to and accepted by the Township as a municipal water system with the commitment that all costs to construct, operate, repair, and maintain the water system will be the responsibility of the Developer or its successor in interest."

electric power generation use evaporative cooling. This secondary impact accounts for the majority of water consumption associated with data centers.[247]

Secondary Data Center Water Consumption from Electricity Generation

Data centers are considered substantial water consumers largely because they are substantial electricity consumers. But water consumption from electric power generation is not unique to data centers. Producing electricity consumes water regardless of the end use of the power. Thus, secondary water consumption by Michigan data centers can be estimated by dividing total consumptive water use from electric generation in the most recently reported year (22.265 billion gallons[249]) by total electricity generation in the state (124,200,090 MWh[250]). This renders about 180 gallons of water consumed per MWh in 2024.

For a one GW (1,000 MW) data center operating continually, this works out to roughly 1.6 billion gallons of water consumed each year (4.4 million gallons per day). This would increase Michigan's overall water consumption by about six percent. Imagining a scenario where Michigan becomes home to 10 GW of new data center capacity, increasing electricity water consumption by about 60 percent: Would this stress water availability? Probably not.

As recently as 2020, water consumption from electric power was about twice as high as it was in 2024.[251] The drastic decline in electricity water consumption is due largely to coal thermoelectric power plants being replaced by more water-efficient methane turbine plants and renewable energy resources (see Chart 5). This trend of retiring coal plants is expected to continue (though perhaps not as quickly as once hoped).

It should be noted that real world impact of a data center on electricity generation water consumption may be higher or lower, depending on the details of a project. Different utilities in Michigan have different generation sources, and a data center in some locations may have higher water consumption than the state average. Alternatively, many data centers are financing and purchasing renewable energy, which has much lower water consumption than the state average.

It is also relevant that Michigan's biggest water-consuming electric power plants draw water directly from Great Lakes surface waters.[252] Michigan's entire statewide annual water consumption from electric generation is about 0.0001 percent of the volume of Lake Michigan, alone. This resource should not be thought of as infinite, but electricity water consumption is not a threat to Great Lakes water levels or supply.[253]

Policy Implications

Water demand should be assessed during the proposal phase with the local water utility consulted as early as possible. If a data center intends to use evaporative cooling, water demand could be significant. Serving the demand may require infrastructure upgrades. Any necessary infrastructure costs should be borne by the developer. Generally, large water consumers like a data center with evaporative cooling are likely to provide substantial revenue to a water utility, allowing the utility to contain rate increases for other customers.

Data centers generally do not pose a threat to Michigan's water resources from consumptive use, either on-site or through secondary consumption related to electricity generation. Enforcement of existing laws and regulations will prevent unsustainable use. No new policies or laws are needed.

4.2 Water Pollution

Both data centers and power generation *use* much more water than is *consumed*. The percentage of water use that is not lost to evaporation is discharged back into the watershed, imposing concerns of water pollution.

Many of the water pollution concerns regarding data centers relate to the processes used to manufacture chips, or end-of-life processing and disposal of electronic waste.[254] This report focuses only on the water pollution risk from data centers through on-site usage and secondarily through electricity demand.

Concerns regarding water pollution are centered more around what is unknown than what is known. Data centers add various chemical additives to cooling water to inhibit corrosion and bacterial growth. Data centers often do not disclose the specific chemicals added to water or plans for disposal or discharge. While data centers are not generally known to be substantial water polluters, the unknowns invite public skepticism and criticism.

Contaminated Wastewater Discharge

When data centers use water for evaporative cooling, a fraction of that water is not evaporated and is discharged. Non-evaporative 'closed loop' cooling systems generally do not discharge water, but disposal may occasionally occur for maintenance. In this case, the wastewater may be disposed of as hazardous waste (e.g., if it contains glycol) and exported off-site. But in some cases, cooling water may not contain regulated hazardous waste and may be discharged.[255] Known cooling system wastewater contaminants may include sanitizing chemicals like chlorine or bromine, corrosion inhibitors, and heavy metals.[256] It is possible that such contaminants may not be sufficiently removed before being returned to the watershed; however there are laws in place to prevent this.

Any facility discharging wastewater must obtain a permit though the National Discharge Elimination System (NPDES) under the federal Clean

Nitrates are one potential source of pollution. Nitrates are ubiquitous in the environment—but they are poisonous in high concentrations.[261] Data centers may add nitrates to cooling water for corrosion inhibition—typically in closed-loop systems that do not, or rarely, discharge.

One in-depth article regarding data center water pollution focused on nitrate-contaminated groundwater in rural Morrow County, Oregon. In this county, agricultural and food processing wastewater is treated at the Port of Morrow WWTP. Nitrogen-rich water is applied to cropland as fertilizer, but excessive land application has contaminated groundwater. The article conjectures that "Amazon [data centers] supercharged this process." Amazon has stated that it does not add nitrates to its cooling water. The proposed mechanism for data centers contributing to this problem is that Amazon is drawing well water that has already been contaminated by nitrates from excessive agricultural wastewater land application, concentrating it, and discharging it to the WWTP. This means there is more water and nitrogen for the Port of Morrow to discharge.[262]

The article does not estimate what fraction of nitrate (or water) discharge from the Port of Morrow is due to Amazon's data center. Regardless, the core problem is unsustainable agricultural practices and continual violations of the Clean Water Act, for which the Port of Morrow WWPT has been repeatedly cited.[263]

If a data center were to use a private well to withdraw groundwater from a nitrate-contaminated watershed, the wastewater may impose nitrate pollution risks if not sufficiently treated. However, NPDES permitting would require appropriate treatment and removal of nitrates. Furthermore, the data center would not have created this pollution, it would just be moving it around. Efforts to identify and manage nitrate pollution in Michigan groundwater would prevent this and would have broader environmental and human health benefits.[264]

Water Act.[257] Michigan's Natural Resources and Environmental Protection Act (NREPA) imposes additional requirements.[258] Wastewater discharges in Michigan must be permitted by the Department of Environment, Great Lakes, and Energy (EGLE), who would work to assure compliance with all applicable laws and regulations.

In most cases, data centers will not discharge wastewater directly to surface waters, but to a municipal wastewater treatment plant (WWTP). It will be critical to ensure that EGLE continues to work with all NPDES permittees to remain compliant with environmental laws. This may require data centers to have on-site pre-treatment filters before discharging to the WWTP, as is common at industrial facilities. Contaminants like dissolved solids and chloride are often not targeted in municipal wastewater treatment and may require on-site pre-treatment.[259,260]

The Morrow County, Oregon case study provided in the side box is representative of reporting on data center water pollution. There are similar cases where data centers have been blamed for impacting water quality, but further analysis reveals a complicated situation where a data center has become a part of a pollution concern, but did not cause it. Other reporting may accuse a data center of pollution without evidence. It is certainly possible that data centers could contribute water pollution, but illicit or harmful discharges appear to be exceedingly rare.

Thermal Pollution

Some evaporative cooling towers—specifically 'once-through' systems—discharge water that may be several degrees warmer than the surrounding water environment.[265] Discharging water that is much warmer than the surrounding environment can impact aquatic ecosystems.[266]

It is very unlikely that any new data centers will use 'once-through' evaporative cooling. Closed-loop systems are becoming standard, and modern evaporative systems recycle cooling water multiple times, greatly reducing both consumption and the temperature before discharge. Additionally, wastewater is typically sent to a WWTP for further treatment and cooled to an appropriate temperature before discharge to the environment.

If data centers receive power from a large thermoelectric power plant (coal or nuclear), this could potentially impact thermal pollution. However, thermal water pollution is not currently considered a problem. Thermal pollution is covered by the Clean Water Act and subject to NPDES requirements.[267] Michigan's Natural Resources and Environmental Protection Act (NREPA) has additional protections.[268] A review of recently reported thermal water pollution issues in Michigan generally focuses on river impoundments (dams), which artificially heat water by slowing it down to allow it to absorb heat from the sun.[269,270]

Policy Implications

Despite water use and pollution being frequently highlighted in public opposition to data centers, documented negative impacts are rare. Data centers generally do not pose a threat to Michigan's water resources from polluted discharges. Appropriate enforcement of existing regulations is fully adequate to protect Michigan's water resources from any negative impact of data center development. No new policies or laws are needed.

State policymakers should confirm that the state environmental regulator, EGLE, is appropriately staffed and funded to adequately monitor and enforce Michigan's environmental regulations. State tax policy as applied to data centers could be modified to obtain sufficient revenue to ensure environmental protection.

5 Noise Pollution

Noise pollution should not be dismissed as merely an annoyance or even a nuisance; it is a substantial epidemiological human health problem.[271] In fact, noise pollution is detrimental to human health regardless of whether or not the person reports being consciously bothered by the noise.[272] Exposure to certain noises, even at relatively low volume, triggers cortical activation and release of stress hormones. Continual long-term noise exposure often imposes chronic physiological stress.[273]

The human stress response evolved to respond to temporary acute threats (e.g., supporting 'fight or flight' behavior). Humans also evolved in very quiet environments, so the central nervous system interprets many noises as a threat and initiates a stress response. The human body functions differently under stress, which is fine (even healthy) in moderation. But under long-term chronic stress, the body begins breaking down at the molecular level.[274] This potentially manifests as a range of health issues including, but not limited to, depression/anxiety, diabetes, high blood pressure, high cholesterol, hypertension, arrythmias, stroke, and heart failure.[275]

Measuring Sound

As a physical phenomenon, sound is a form of mechanical energy produced by vibrating objects. These vibrations create waves of pressure that are transmitted through any physical medium—solid, liquid, or gas. Humans most often experience sound as it travels through air. In this case, sound is created by some object that is physically moving (vibrating) and transferring the energy of those vibrations into waves of oscillating air pressure.[276] When these pressure waves reach our ear drums, the energy induces vibrations in a set of three tiny bones in our ear, which our brain interprets as sound.[277]

Note: 'Sound' and 'noise' are physically the same phenomenon. The difference is in perception. Sound is generally considered noise when it is undesirable.

The loudness of a sound is related to the amount of energy being transferred to the ears by pressure wave (its 'intensity'). As a physical phenomenon, the intensity of sound can be measured in terms of power applied to an area (e.g., watts per square meter). But human perception of sound is not a purely physical phenomenon—human bodies and brains are involved.

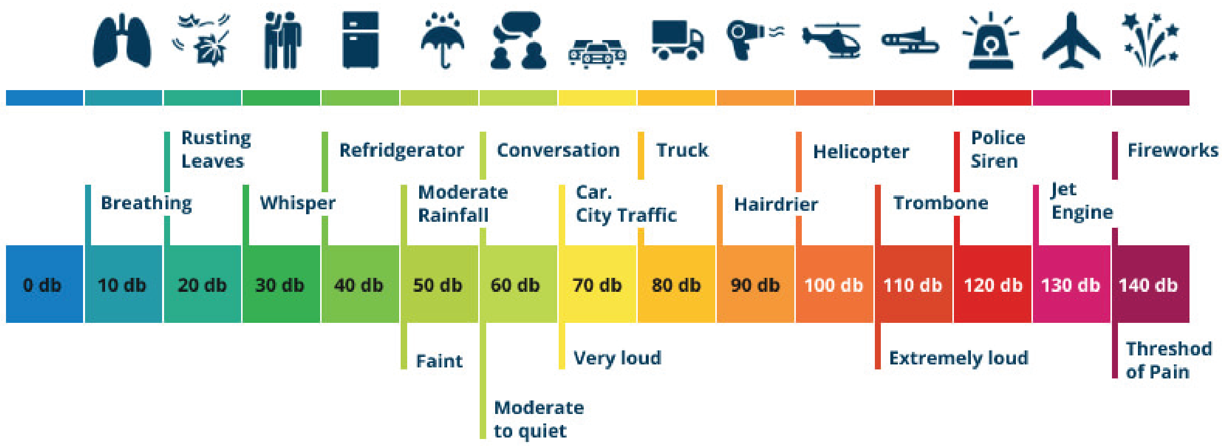
The ear mechanism responds to sounds non-linearly. Specifically, it responds much more efficiently to lower intensity sounds. To measure sound in a way that is more relevant to human hearing, a unit of measurement called a *decibel* (dB) is used.

The decibel scale begins at zero. 0 dB is considered complete silence, but that does not imply an absence of sound. A sound wave at 0 dB transmits energy at 10^{-12} watts per square meter and may be perceived by many animals—just not humans. Below this threshold, the decibel scale can still be used, but becomes negative.[278]

Decibels measure sound intensity on a logarithmic scale with a base of ten. A sound wave at 10 decibels carries ten times the energy as 0 dB. Twenty decibels is ten times more intense than 10 decibels, and so on. A reasonably quiet room might be about 50 dB. The energy carried by sound at 50 dB is 100,000 (10^5) times greater than 0 dB.

Put another way, every increase of three dB reflects roughly a doubling of sound energy.[279] But because of how human ears and brains work together, sounds that are twice as intense are *not* interpreted as twice as loud. To some extent, loudness is subjective. But as a general 'rule of thumb,' an increase of 10 dB is perceived as doubling in volume.[280]

Figure 8
Examples of Sound Intensity in Decibels



Source: PrimeBuy.com[281]

Figure 8 provides some examples of how loud typical noises may be when measured in decibels. This is provided for context, but should not be interpreted too literally. Different sources may be louder or quieter, and sound level depends much on distance from the source, as well as factors like weather and the physical environment.

It is also important to recognize that noise is contextual. For example, nature sounds such as wind, water, and chirping birds may approach 70 dB, but may effect humans differently than artificial noise at 70 dB, such as from traffic or data centers. Additionally, when decibels are measured for sound studies, a noise filtering method is typically adopted that provides a different metric than raw decibels. This is known as 'A-weighting,' and provides a measure of A-weighted decibels (dBA), a metric introduced in 1933.[282] Unweighted decibels are sometimes noted as dBZ.

An A-weighted noise assessment emphasizes the frequency range that human ears are most sensitive to, and thus a proximate measure of 'loudness.' As human ears are most sensitive to this frequency range, it is also the most likely range to cause hearing damage at loud volumes. Additionally, this is the range most likely to be perceived as noise pollution because it drowns out the things people want to hear (e.g., other human voices).

In many cases, the distinction between dBZ and dBA is not important, but in other cases it may be.

Generally, the science of measuring sound and assessing noise is more complicated than might be assumed. Some of this complexity is relevant to consider when assessing potential noise pollution from data centers, as is discussed in this Chapter.

Traditional, small (colocation) data centers have not typically been a concern for noise pollution. However, the proliferation of large hyperscale centers has generated numerous complaints and policy issues.[283]

5.1 Backup Generator Noise

Large industrial generators can be deafening if people are standing next to them. Sound levels vary, but one sound study noted that three MW diesel generator used at one data center outputs 85 A-weighted decibels (dBA) at a 23-foot distance.[284] (85 dBA is considered the threshold at which prolonged exposure can cause permanent hearing damage.[285]) Hyperscale data centers may have dozens of industrial generators.

The xAI Colossus data center in Mississippi provides a worst-case scenario.[286] Eighteen (18) temporary methane turbine generators cumulatively outputting about 400 MW were installed and operating for 'bridge' power until an offsite power plant could be connected to the grid. The droning of these generators sparked noise complaints from a half mile away.[287]

Stories like this have promoted public fears that on-site data center generators will be running constantly and impose significant noise pollution. But xAI is a particularly egregious example. State and local regulators *chose* to allow xAI to continually operate these temporary generators without required permitting.

For most data centers, on-site generators are installed only for backup emergency power. Data centers will typically run backup generators at full capacity only in the rare event of a power outage. The U.S. Environmental Protection Agency (EPA) also allows backup generators to operate up to 50 hours per year for demand response programs (i.e., in the event of anticipated grid power capacity constraints). During these times, noise pollution may be significant.

Generators *do* need to be periodically 'exercised'—running for up to an hour each month. Such maintenance operation is performed one generator at a time. The noise emitted from a single generator at a hyperscale site is likely to be barely noticeable outside the fenceline.

While generator noise is a frequent concern expressed in public meetings regarding proposals, once data centers are constructed, most noise complaints are in response to noise emitted during routine operation.

Michigan's first hyperscale data center, the Oracle/OpenAI Stargate facility in Saline Township, is not installing backup power sufficient to maintain full operations in the event of a power loss. Construction permits show that the Stargate facility will have 15 diesel generators with a maximum power output of about 40 MW. While substantial, this is a fraction of the data center's full 1,300 MW power demand.[288] The Stargate data center is obligated (by consent judgement) to maintain reasonable noise emissions (55 dB) at the property line even when emergency generators are operating.[289]

5.2 Operational Noise

A study conducted in Virginia, home of 'Data Center Alley,' noted: "Data centers emit low-frequency noise that is not loud enough to damage nearby residents' hearing and rarely loud enough to violate noise ordinances. However, some nearby residents report that the constant noise generated by some data centers affects their well-being."[290]

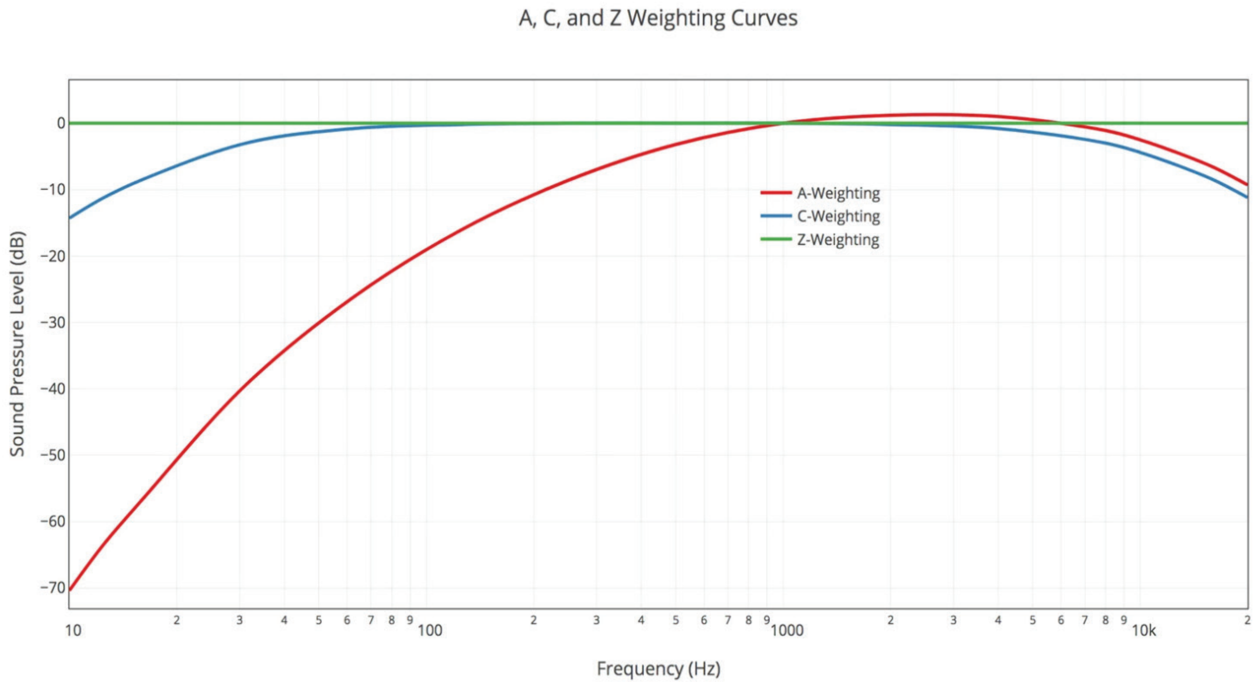
Data center noise pollution can be more detrimental than typical noise assessments would suggest. When noise studies are conducted to determine the impact on humans, they typically use *A-weighted* decibels (dBA) The A-weighted sound level is filtered to emphasize frequencies (pitch) between 1,000 Hertz (Hz) and 5,000 Hz.[291,292]

Humans can hear sounds well beyond this range, potentially from about 20 Hz to 20,000 Hz, depending on the individual. On the low-end, it is even possible to hear sound down to about 10 Hz, though only at exceedingly high decibels.[293] Generally, frequencies below 20 Hz are considered inaudible 'infrasound.' However, just because one does not hear a sound does not mean it is not perceived by the brain.[294] What humans perceive as sound is the brain's interpretation of energy transferred by waves of oscillating air pressure. People may not *hear* low frequency sound very well, but their bodies and brain may nevertheless be *sensing* it and responding (e.g., through a physiological stress response).[295] There is compelling evidence that exposure to infrasound has detrimental health impacts, and some individuals are much more sensitive than others.[296]

When noise studies specifically evaluate the frequency spectrum generated by data center equipment, the most noise energy (unweighted decibels or dBZ) is identified at about 65 dBZ.[297] One study found that backup generators output the most sound energy (140 dBZ at the source) at 31.5 Hz, which was the lowest frequency evaluated.[298] Data centers certainly produce noise energy at even lower frequencies and these low frequencies are heavily discounted in typical noise studies.

Most noise studies emphasize A-weighted decibels.[299] A dBA-based noise assessment is based on the idea that noise pollution is an annoyance issue (or a 'nuisance' if adopted into code). At 30 Hz, the dBA level is discounted by 40 decibels (see Chart 6). This reflects the reduced sensitivity of human hearing to lower frequency noise.

Chart 6
Sound Pressure, A, C, and Z Weighting Curves



Source: Echo Barrier[300]

A common reference point to evaluate environmental noise is 55 dBA. This is roughly the volume of conversation-level human voice from about three feet away. Many noise pollution regulations use 55 dBA as the upper limit for what is permitted when measured from a 'noise sensitive location.' Noise that is under the 55 dBA limit would generally be considered acceptable, *regardless of the energy carried by the unweighted noise level* (dBZ).

As shown in Chart 6, for noise at exactly 1,000 Hz, dBA is equivalent to dBZ. For example, a 1,000 Hz 60 dBZ tone would be reported as 60 dBA—exceeding most regulatory thresholds. However, a lower pitch 30 Hz tone at 60 dBZ would be reported as 20 dBA—not even close to the 55 dBA threshold. Each of these tones carries the same amount of sound pressure and imparts the same amount of energy to human ears and bodies. It is only because the 1,000 Hz tone is more readily perceived by human brains as audible noise, and thus an *annoyance*, that the noise would be in violation of typical noise thresholds.

Lower frequency tones *are* sometimes considered in noise assessments, but in a weird way. As shown in Chart 6, there is a "C-weighted" curve that can be used to measure noise. C-weighted noise (dBC) does not filter out low frequency tones nearly as much as dBA. Some noise assessments use dBC, but not directly.

Research has shown that evenly balanced noise (e.g., 'white noise') is less annoying to people than noises that emphasize specific tones (frequencies).

People can become particularly annoyed when a noise is dominated by low-frequency tones. To screen for noise pollution related to noise that meets dBA thresholds but may still be *annoying*, some noise assessments calculate the difference between dBC and dBA (dBC-dBA). If dBC-dBA is greater than 10, this could be considered an unbalanced spectrum with the potential to cause annoyance.[301] If dBC-dBA is greater than 20, this can impose not only annoyance, but acute physiological responses such as headaches, anxiety, and vertigo.[302]

Michigan requires that tonal prominence be considered and mitigated in the evaluation of grid-scale solar power generation, wind turbines, and battery storage facilities. Public Act (PA) 233 of 2023 enabled state preemption for siting of such facilities, and specified that they shall not "generate a maximum sound in excess of 55 average hourly decibels (dBA) as modeled at the nearest outer wall of the nearest dwelling."[305] PA 233 further allowed the Michigan Public Service Commission (MPSC) to adopt more stringent requirements.

Fortunately, the MPSC *did* adopt more stringent sound pollution requirements, as 55 dBA measured at a dwelling (e.g., a house) would be annoying to almost everybody. (The 55 dBA limit is more typically applied as measured from *the property line*.) Recognizing that electrical equipment often exhibits tonal prominence, the MPSC applied a +5 dBA "tonal penalty" in most (but not all) cases. Further, the MPSC applied a +6 dBA factor for "façade pressure doubling"—basically, sound bounces of the wall of a building and is interpreted as twice as loud.[306]

Low frequency noise is also occasionally included in noise assessments by evaluation of *tonal prominence*. People are more likely to find noise annoying when it is dominated by a particular frequency (tone) rather than being balanced. Mechanical and electrical equipment noise often exhibits tonal prominence.[303] Some noise pollution regulations evaluate this and set a lower dBA threshold when tonal prominence is identified.[304]

Essentially all noise pollution regulations are designed to minimize the risk of *annoyance*. But annoyance is a subjective term.[307] All people do not respond in the same way to noise in the way anticipated by A-weighting. Some people seem to be unusually sensitive to low frequency sound—even infrasound.[308]

Further, policymakers should consider the consistency of data center noise. A helicopter flying overhead may emit around 100 dB, including low frequencies and infrasound. But the helicopter noise is temporary. For people living near data centers, while the noise may be barely at the level of perception, it is unrelenting. A study of data centers in Virginia noted that, "rather than the [A-weighted] *volume* of the noise, it's data centers' *constant* noise that some residents consider problematic. Data center noise is described as a constant 'drone' or 'hum,' similar to house air conditioning systems but magnified to an industrial scale. The noise can sometimes be heard both in and outside of nearby residences."[309]

5.3 Insufficiency of Standard Noise Assessments as Applied to Data Centers

Hyperscale data centers pose a unique challenge for noise pollution regulations due to the immense amounts of low frequency sound they produce. Typical noise assessment methods (based on established industry standards) were adopted before it was considered possible that such facilities could be cited near residential neighborhoods or other noise sensitive locations.

If a data center is compliant with the standard applied, it is assumed that they are not creating noise pollution. Residents who complain are told that their annoyance is not justified.[310] The difference between what standard noise assessments *assume* is noise pollution, and what real people consider a disturbance, has the potential to create detrimental quality-of-life issues for those living near data centers.[311,312]

Most local noise ordinances were adopted to protect from typical neighborhood noises like barking dogs and loud parties, and so a 55 dBA limit was considered reasonable to prevent annoyance. Even noise ordinances adopted with industrial facilities in mind may not sufficiently address the unique characteristics of data center noise. Regulations that impose a tonal penalty are more protective, but do not fully consider the immense energy that may be carried by low frequency tones emitted by large data centers. Adopting a dBC-dBA threshold also reduces risk of annoyance, but discounts the potential for high-pressure infrasound to be produced by data center equipment.

Another weakness of typical noise assessments is that they only assess outdoor noise. It is assumed that if the noise outside of a home is below the limits that would prevent annoyance, the noise *inside* a home is not an issue. This assumption is problematic with low frequency noise. The lower the frequency, the more difficult it is to attenuate (block). Low frequency noise can penetrate solid walls, and annoying acoustic effects may become amplified.[313]

More critically, neither noise assessment methods nor the industry standards that they adopt have been updated to acknowledge emerging epidemiological evidence linking long-term exposure to low frequency noise and infrasound to chronic stress and a host of associated health impacts.[314] Notably, such links remain inconclusive—partially due to the difficulty of acquiring reliable data through controlled studies.[315]

Typical long-term exposure to infrasound and low frequency noise is related to proximity to highways and airports.[316] In this case, it is difficult to discern health impacts specifically from infrasound and low frequency noise as the noise pollution is typically broad spectrum and balanced (not tonal) and is confounded with air pollution issues. Nevertheless, the World Health Organization has found that typical regulatory thresholds of 55 dBA increase the incidence of hypertension and other negative health outcomes for exposed populations.[317]

Wind turbine noise is high in infrasound and low-frequency noise.[318] It has become common to adopt extra-stringent noise control for wind farms, primarily to reduce annoyance. However, the low frequency noise emitted by data centers is of a much different nature than wind turbines. The noise emitted by hyperscale data centers is more like that experienced in industrial settings.

Occupational noise exposure is conclusively linked to health impacts such as hypertension, heart disease, and stroke.[319] It is unclear how directly the health impacts of industrial noise may relate to data center noise pollution, as the noise level at nearby residences and other noise sensitive locations is far less than within an industrial setting. On the other hand, most people do not routinely sleep in factories.

Hyperscale data centers impose a relatively new type of noise pollution that is not yet well understood. There is reason to believe that adverse impacts of data center noise—both in terms of annoyance and human health—are not sufficiently addressed by existing noise assessment methods.[320] A growing number of acoustic researchers, epidemiologists, and health professionals have advocated for updates to noise pollution regulations and related technical standards, especially to protect from negative impacts of infrasound and low frequency noise.[321,322] The proliferation of hyperscale data centers emphasizes the need for such updates.

Data center noise pollution is likely to be an ongoing policy issue. In future years, research and guidance from standards organizations may become available.

Meanwhile, in the absence of clear appropriate guidance for data center noise pollution regulation, regulators should employ the precautionary principle.[323] Noise assessment criteria should require the most stringent limitations on noise emissions that can be reasonably justified by reference to applicable ISO and ANSI standards and related recommendations.

Policy Implications

Standing local noise ordinances are likely insufficient to protect against data center noise pollution and quality-of-life impacts. Local governments should require a full-spectrum sound study during the design phase. Site approval should be contingent on the most stringent limitations justified by applicable standards and known state of the science. Operational monitoring should be required at sound-sensitive locations near the project site.

6 Other Potential Negative Externalities

This report has identified the primary potential negative impacts of data centers as focused on electricity demand (Chapter 3), water resources (Chapter 4), and noise pollution (Chapter 5). However, a review of recent press articles and public meetings reveals several additional concerns.

6.1 Air Pollution

Data centers primarily contribute to air pollution through the generation of electricity required to power the facilities. In most cases, a data center's electric power will be generated off-site, connected to the same grid from which other customers receive electric service. In some cases, power is generated on-site, which imposes unique concerns for air pollution and related human health hazards.[324]

Grid Power Demand (Off-site)

The power demand from data centers may delay the transition to renewable energy by requiring the construction of methane power plants or delaying the retirement of coal plants. The potential impact on greenhouse gas emissions is discussed in Section 3.3. These fossil fuel burning power plants also emit pollutants that are harmful to human health, including particulate matter (PM), nitrogen oxides (NOx), and sulfur oxides (SOx).

Legacy coal-fired power plants are the biggest polluters. There is some potential that electricity demand of data centers will keep coal plants online past their date of planned retirement. This has occurred, to some extent, due to a December 2025 "emergency order" from the U.S. Department of Energy.[325] However, the coal plants that are being forcibly kept online are generally inefficient and are rarely being utilized to generate power. Utilities and grid operators are expected to proceed with retirement plans as soon as they are allowed.[326,327]

Another concern is the potential for data center electricity demand to prompt the construction of new natural gas (methane) power plants. This may be a relevant concern for GHG emissions that impact climate change, but much less so for localized environmental and human health impacts. Methane turbines produce zero PM and SOx, and negligible NOx.[328,329] Some data centers may install methane fuel cells, which emit less CO_2 than combustion turbines and zero pollutants like NOx and SOx.[330]

The U.S. EPA has recently updated emissions requirements for new methane turbines that reflect recent advancements in technology.[331] Unfortunately the new EPA emissions requirements for NOx are not as stringent as could be achievable.[332] State environmental regulators could impose more stringent requirements, if needed, to meet ambient air quality standards under the Clean Air Act. This may not be necessary in Michigan, which has been fully compliant with nitrogen dioxide (NO_2) air pollution requirements since 1978.[333] (NO_2 is used as a primary indicator to evaluate NOx pollutants.)

However, some areas in Michigan are non-compliant or borderline compliant with ozone pollution limits.[334] In certain conditions, NOx/NO_2 breaks down into surface-level ozone.[335] Michigan environmental regulators should be conscious of this dynamic if approving any new methane turbine power plants.

Temporary 'Bridge' Power (On-site)

As hyperscale AI data centers are being constructed with an emphasis on 'speed to power,' some have installed temporary on-site fossil power plants to become operational before they are connected to the grid.[336] Such temporary electricity generation is regulated by the Clean Air Act but is subject to less-stringent emission standards.[337]

This issue has received the most attention due to the artificial intelligence company, xAI, which began operating data centers in Tennessee and Mississippi with non-permitted temporary methane generators.[338] xAI's has utilized regulatory loopholes as well as potentially inadequate state and federal regulatory enforcement.[339] xAI's approach is not common and is uniquely concerning.

Another source of controversy centers on a data center in a populated area of Louden County, Virginia, that has been permitted to operate eight methane combustion turbines as bridge power until permitted to connect to the grid. The Piedmont Environmental Council commissioned a report concluding that the air pollution emitted from this data center alone will impose $53 to $99 million per year in adverse impacts.[340] While the Virginia Department of Environmental Quality has conducted a study disputing this finding and Virginia is in compliance with Clean Air Act requirements, it is undeniable that combustion turbines unavoidably emit some air pollution.[341]

In Michigan, regulators should probably prohibit or discourage such temporary on-site power generation, particularly near populated areas. Any temporary generators should be permitted and compliant with applicable regulations. So far, no operating, planned, or proposed data centers in Michigan would utilize such a 'bridge power' strategy.

Backup Power (On-site)

Most data centers require practically 100 percent up-time reliability.[342] There are some exceptions, such as data centers fully devoted to training next-generation AI models. But in most cases, if a data center were to lose power, critical services would stop functioning. This includes: emergency (911) services, financial transactions, GPS navigation routing, weather reporting, telephone communication (including landlines), email, and more. Losing power is not an option.

> Data centers are not the only facilities equipped with backup power. Critical facilities such as hospitals and surgical centers, long-term care centers, and government buildings are often mandated to procure and maintain backup generators. Even many less critical facilities like office buildings and large retail outlets are so equipped.[343]

Most data centers are equipped with on-site backup generators to enable continued operation through a worst-case-scenario power outage. Occasionally, the on-site backup generators are methane powered. More often, they run on diesel fuel.[344] Diesel generators are covered by Clean Air Act emissions regulations[345] but are relatively polluting, emitting NOx, SOx, PM, and carbon monoxide.[346]

If the backup diesel generators at a data center facility were to run for an extended period, this could create substantial local air pollution issues. However, data centers prefer not to use this backup power and rarely do so. Backup generators are used for power only when grid power is out or experiencing voltage spikes, which is rare.

However, ensuring backup generator reliability requires routine maintenance checks, including 'exercising' (periodically running) the generators. This is necessary to prevent corrosion. Clean Air Act regulations allow backup generators to run up to 100 hours per year under non-emergency conditions.[347] However, most new generators require minimal exercise. This will typically be about 30-60 minutes every month, but may be as little as a few minutes every six months.

Policy Implications

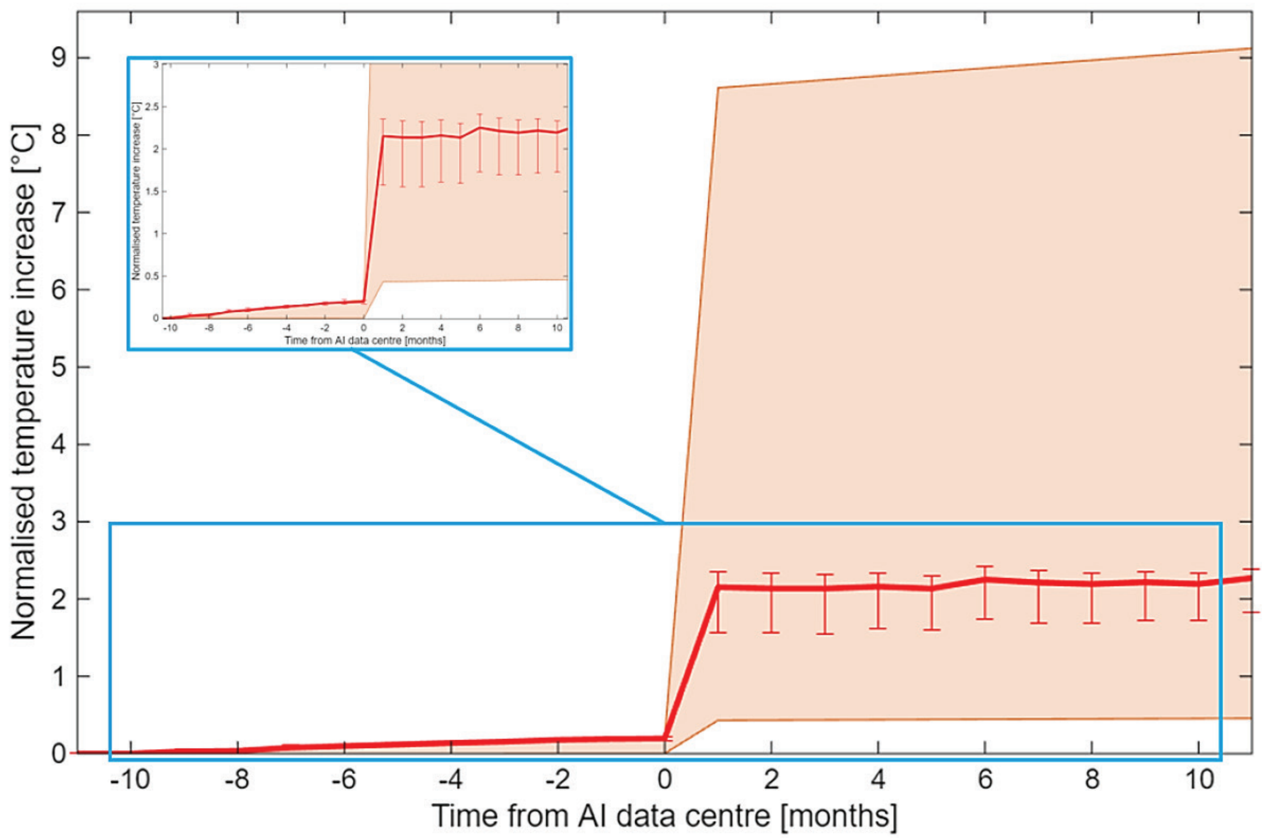
Data centers do not pose a novel or notably high risk to air pollution in Michigan. Some air pollution issues in other states are real, but easily avoidable. Potential issues can be mitigated through enforcement of existing laws and regulations.

6.2 Heat Island Effect

Areas with lots of buildings and pavement and minimal trees and green space create microclimate effects known as *heat islands*. All development that converts green space into developed land may contribute to a heat island effect. This is primarily due to the way sunlight that hits buildings and pavement is reflected and re-emitted as heat.[348] However, the heat island effect from hyperscale data centers is amplified by the immense amount of heat that the facilities produce and emit in the process of cooling the chips inside.

A resent research effort has documented significant increases in ground surface temperatures resulting from hyperscale data center operations in rural areas (see Chart 7). The construction of a data center increases ground surface temperatures in the vicinity by about 0.25 °C (~0.50 °F). Once the data center becomes operational, the surrounding temperature increases by an average of over 2 °C (~3.75 °F). Some data centers have been found to increase ground surface temperatures by over 15 °F.[349] The authors of this research have labelled this a "data heat island effect."

Chart 7
Land Surface Temperature Increase Due to Hyperscale Data Centers



Source: Marinoni et al.[350]

This *data heat island effect* can extend for miles around the hyperscale data center. Even a mile away from a hyperscale data center, land surface temperatures increase by over 2.5 °F on average, and potentially more than 10 °F. Any area within six miles of a hyperscale data center may be subject to measurable increases in surface temperature.[351]

The real-world implications of this research are not yet clear. As shown in Chart 7, the heat island impact ranges from 0.5 °C (1 °F) to over 8 °C (15 °F). This is a large variation, and the study does not evaluate why there is such a range. However, a couple of factors can be reasonably deduced.

The study evaluated rural hyperscale data centers, defined as having minimum 100 MW capacity. Hyperscale data centers can be much larger. A 1 GW (1,000 MW) facility uses ten times the power of a 100 MW facility, and thus creates roughly ten times the amount of heat. The differences in the power demand (and related heat emissions) of data centers likely accounts for the variance of data heat island impact observed.

An additional factor is the type of cooling system used by data centers. Some use evaporative cooling. An evaporative cooling system would not emit any more heat than a closed-loop system, but it would emit water vapor.

Water vapor is a greenhouse gas and acts as a thermal blanket. Some of the thermal energy radiated from the ground is absorbed by water vapor and redirected back towards the ground.[352] The largest data heat island impacts are likely from large hyperscale facilities using evaporative cooling, which emit large amounts of water vapor.

A similar study using higher-resolution satellite data and a robust statistical analysis found that a 12 MW data center in Uruguay increased temperatures in the immediate area by about 2 °F, with about 0.5 °F attributable to the waste heat alone.[353]

Another study directly measured ground-level air temperature around four data centers near Phoenix, Arizona. One of the data centers was identified as having a power demand capacity of 47 MW, another 220 MW, while the other two were not listed. Each of the four used a closed-loop cooling system. The researchers compared ambient air temperature both upwind and downwind of the data center, finding that temperatures downwind were about 1.5 °F higher on average, and as much as 4 °F.[354]

The heat island impact of hyperscale data centers has not yet become one of the major concerns, but could be one of the most notable local impacts. A data center could potentially turn an 80-degree summer day into an 85-90 degree day for those living nearby. Local emissions of water vapor may also reduce nighttime cooling, further amplifying the impact of heatwaves.[355] This potential impact of hyperscale data center development should not be overlooked.

Policy Implications

The heat island impact of data centers should be considered in zoning and siting considerations. A large hyperscale facility using evaporative cooling could significantly increase temperatures in the vicinity. This impact could be amplified if the data center is in a developed area where a more typical heat island effect is already increasing surface temperatures. Planners and permitting agencies should consider this, especially when considering developments in urban and suburban areas.

Unfortunately, as this is an emerging issue, there are no established metrics or methods to assess the risk of a data heat island effect or protect against it. It is known that large trees provide a substantial cooling effect.[356] Local governments may consider requiring greenbelt areas and/or funding of a public forestry program as a condition of hyperscale data center development.

6.3 Light Pollution

Similar to noise pollution, light pollution is often dismissed as a nuisance issue. Light pollution may be one of the most underrated detriments to ecosystems. Artificial night lighting imparts physiological stress on humans as well as a plethora of plants and animals.[357]

Unlike noise pollution, data centers do not impose unique challenges for light pollution. A typical suburban parking lot is more likely to be a source of light pollution than a data center. That said, lighting from data centers located in rural areas may create annoyance for residents who are not desensitized to light pollution.

As an initial step, local governments should adopt light pollution ordinances into zoning and/or building codes; this issue remains overlooked in many jurisdictions.[358] Compliance with light pollution reduction does not require keeping sites dark during the night. It simply requires lighting strategies that output no more than the amount of light needed, directed to the areas where it is needed.[359]

Policy Implications

Local governments should adopt and enforce light pollution ordinances. Restrictions should include not only light 'trespass,' but also 'glare' and 'skyglow'.

6.4 Construction Phase Disruptions

The most disruptive impact of data centers is often from the initial construction phase. While temporary, intense construction activities may last for a year or more. The impacts of data center construction are similar to other large construction projects.

Noise pollution from construction is the most frequent complaint. Large construction sites may have dozens of large diesel-powered earth-moving machines, excavators, generators, and so on. Some sites may even install temporary concrete batch plants.

This work also imposes air pollution concerns. On-site diesel equipment emits a variety of pollutants. More impactful, construction sites can generate a lot of dust. Construction dust is largely bare earth picked up by wind. Gravel and concrete dust may also contribute.

Contributing to noise and air pollution concerns, large construction sites generate substantial heavy truck traffic. Large diesel trucks such as gravel haulers and concrete trucks contribute additional noise, diesel emissions, and may contribute to airborne dust.

Exposing bare earth may also create water pollution issues due to soil erosion and sedimentation. Additional water and soil pollution concerns emerge from various chemicals (e.g., diesel fuel) used on a construction site, which may be handled improperly or spilled.

Construction permits typically include provisions to limit these impacts.

Noise pollution may be mitigated by restricting noisy activities to daytime hours.[360] Temporary noise barriers are also available and may reduce annoyance.[361] Another option to mitigate noise may be earthen berms—these are often included in site plans and could help to reduce construction noise if installed early in the project.

Air pollution from diesel emissions can be mitigated with properly functioning emissions-compliant equipment. Dust can be managed by watering active traffic areas and employing appropriate soil erosion and sedimentation control best management practices, which also mitigate water pollution.[362]

It is inevitable that construction projects impose some disruption for nearby residents and businesses. These disruptions can be minimized through appropriate permit requirements. That said, construction permit compliance varies. Regulatory and enforcement agencies should inspect permit compliance frequently, be responsive to complaints, and work with the developer and contractors to quickly remediate any issues that arise.

Policy Implications

Construction of data centers is likely to be disruptive for nearby residents, even with proper management and precautions. Local governments may consider monetary contributions to nearby residents to compensate for the inconvenience. Such arrangements can be included in a community benefits package.

6.5 Rural Land Use (Loss of Farmland, Community Identity)

Most traditional (colocation) data centers are nearly indistinguishable from commercial office buildings and are sited in mixed-use areas. However, hyperscale data centers appear more like massive warehouses, including over a million square feet of building space on a property that may be hundreds of acres. If sited in a rural setting, such a project is often jarring to residents. Complaints often center on loss of farmland or local rural character.

While data centers are huge in terms of typical development sites, they are not big or numerous enough to significantly impact availability of farmland. There are nearly 10 million acres of active farmland in Michigan.[363] There is no reason to believe that data centers threaten Michigan's agricultural economy in a way that would be noticeable in statistical data.

Concerns about loss of farmland are more often related to community character or identity.[364] A typical Michigan township is 36 square miles, or 23,000 acres. A 250-acre data center site would require over one percent of the area of the township. Moreover, a large data center is likely to become a small communities largest corporate citizen and taxpayer, changing the nature of local identity, politics, and public engagement.

Even if a data center provides substantial benefits and has adopted conditions to protect against negative impacts, residents may suffer emotional distress. The psychological cost of data center development in a small rural community cannot be quantified.

Local governments cannot fully prohibit data center development. The Michigan Zoning Enabling Act states that local zoning ordinances "shall not have the effect of totally prohibiting the establishment of a land use."[365] This is not merely a matter of state preemption. Numerous court decisions have established that property owners have certain rights, including the right to develop their property. This right is not universal, but restrictions must have a substantial relation to the protection of public health, safety, and the general welfare of residents.[366]

Policy Implications

It would be prudent for local governments to review local zoning codes to promote development that is as sensitive to local concerns about community character as is practicable.[367] Adopting a careful and deliberate approach to evaluating proposed developments may help to dissuade interest from developers—many developers are seeking 'streamlined' approval and may avoid locations that evaluate project details.[368] But local governments must be careful not to be so unreasonably restrictive as to invite a legal battle.[369]

Additionally, local governments should earnestly consider the potential benefits of proposed developments rather than reflexively working to oppose them. Working with, rather than against, data center developers can achieve substantial tax revenue and community benefits.[370] (See section 2.6, Community Benefit Agreements.)

6.6 Global Resource Use Footprint

Concerns about water use, power use, and pollution emitted by data centers often include the entire life-cycle footprint of a data center. Semiconductor manufacturing facilities are immense users of water and energy, as are electronic waste recycling facilities. The manufacturing of data center facility material and equipment such as steel, concrete, and industrial electrical and mechanical equipment also is resource intensive.

In most cases, these activities will occur outside of Michigan. Concrete production and some equipment manufacturing may occur in-state. Such second-order impacts are outside the scope of this report, other than to acknowledge that they exist.

6.7 Socioeconomic Impacts of Artificial Intelligence

Observation of public meetings regarding data center development reveals that many objections to data centers are less about the facilities themselves, and more about what they represent. New AI hyperscale data centers are specially configured for AI training or operation of trained models. Many people expect the next generation of AI models to impose social and economic changes akin to the industrial revolution.[371] Some have even suggested that the development of artificial *general* intelligence (AGI) is an existential threat.[372]

While doomsday scenarios attract attention, there is very little reason to believe that data centers themselves will lead to some kind of "AI apocalypse."[373] That said, AI technology has already infiltrated many aspects of daily life—often in ways that people do not like. Many of the corporations deploying AI tools are among the wealthiest and most powerful organizations in human history. Interactions with the world are increasingly mediated by some app continuously collecting people's data and trying to sell them something. It's now almost impossible to use a consumer electronic device without some algorithm insisting on being your personal assistant.

Some impacts of AI are broadly viewed as detrimental. For example, AI products have been used for misinformation, manipulation, and pornographic 'deep fakes.' AI tools have been used to justify denials of insurance claims and increased spot-prices for goods and services based on a perceived 'willingness to pay.' AI is being used in warfare and government surveillance. AI tools have resulted in loss of income, loss of privacy, and even loss of life. It is entirely reasonable to distrust emerging AI tools and the corporations and people that are pushing them.[374]

None of that has anything to do with permitting data center development in Michigan.

If Michigan were to adopt policies to effectively prohibit data centers, they would go to the next state. If every state in the U.S. somehow prohibited data centers, they would go overseas. AI development would continue with new tools immediately imported and applied to our economy and society. It doesn't matter where the data center is located.

There is a pressing need to regulate the deployment and use of AI tools to minimize disruption and harm. Responsibly adopting new AI tools may require new privacy laws, financial regulations, intellectual property rights, and so on.[375] But those are entirely unrelated policy topics.

Opposition to data center construction based on socioeconomic concerns is a distraction from—not a solution to—such issues.

7 Summary Discussion

The proliferation of hyperscale data centers does impose some unique policy issues. However, the public focus on data centers is largely emotional. It is difficult to separate the policy issues of data centers from what they have come to represent.

The recent surge in investment in data centers is largely related to the adoption of advanced AI systems. These AI systems are being developed by some of the wealthiest, most powerful corporations in human history. They are collectively investing trillions of dollars with no clear path to see a return on those investments beyond vague promises to remake society and the economy. It is entirely reasonable to be suspicious and anxious about the socioeconomic impacts of AI.

Myriad policy issues can and should be addressed to limit the influence that giant monopolistic technology companies have over society and the economy. These are difficult and complicated topics and beyond the scope of this report.

In recent months, there has been a tendency to bypass these difficult topics by simply objecting to data centers. This is not practical.

For one thing, not all data centers are used to develop next-generation AI. Data centers provide essential digital services to business and citizens and have become a cornerstone of the modern economy. To the extent that hyperscale AI data centers are used in training next generation AI systems, prohibiting the construction of a data center in Michigan would only lead to development elsewhere and do nothing to protect Michigan citizens from any impacts of the AI tools that are developed.

With an understanding that data center development policy itself does is unrelated to potential socioeconomic impacts of AI or further integration of monopolistic technology companies into society and the economy, this report provides an assessment of potential impacts of data center development. Separated from underlying implications of AI, data centers are simply a unique light-industrial land use. From this perspective, this report provides the following key findings.

Data Centers Come in Different Sizes and are Used for Different Purposes

Looking around the country, a few data centers have had truly negative impacts on the local community, imposing noise pollution, air pollution, and potentially unsustainable water use. These tend to be hyperscale AI data centers that were developed in coordination with state and local governments that chose not to employ regulatory restrictions that would protect local communities from harm.

Even the largest data centers can be developed sustainably under appropriate governance frameworks. Moreover, it would be a mistake to react to any data center proposal as though it is a hyperscale AI facility. Many data centers (i.e., colocation data center) are small, visually unremarkable, have modest power and water use requirements, and can be integrated into mixed-use districts with no negative impacts. Furthermore, many data centers provide essential local and regional digital services.

Any policy that imposes blanket provisions on *all* data centers would be inappropriate. Data center proposals should be evaluated on a case-by-case basis. Reflexive emotional reactions to the concept of a 'data center' should be avoided to the extent feasible.

Data Centers are not an Effective Economic Development Strategy

The trillions of dollars anticipated to be invested in data centers has prompted many states, including Michigan, to provide tax incentives in an effort to lure investments. Economic development strategies are often based on a theory that large investments will have a 'multiplier effect,' pulling additional investments to the region. With data centers, this multiplier effect is likely very modest.

The primary economic benefit of data centers occurs during construction. Once operational, data centers provide minimal employment, require no local supply chains and minimal local services. Unless data center development is accompanied by additional investments in local institutions, data centers are not typically a significant direct benefit to local economies.

Data Centers can Provide Substantial Tax Revenue and Community Benefits

A hyperscale data center is likely to become the largest taxpayer in a community, even if awarded incentives such as the Industrial Facilities Tax exemption. While data centers should not be expected to stimulate secondary economic activity, the revenue provided by data centers could allow local governments to make investments in public infrastructure, public services, or otherwise reduce taxes such that the local economy benefits. It would be negligent for local governments to adopt a fully oppositional response to proposed or potential data center developments.

Data Center Electric Power Demand can be Accommodated without Negative Consequences

Hyperscale data centers use a lot of power. If data center development is managed poorly, there is potential for data center power demand to impose reliability issues, increase rates, and contribute to greenhouse gas emissions. These issues have emerged in some areas of the country.

In Michigan, policies are in place to prevent data centers from imposing such negative impacts. In fact, if managed effectively, data center growth could improve service, decrease rates, and help Michigan to meet renewable energy goals.

Data Centers are Not Likely to Impact Michigan's Water Resources

Some hyperscale data centers use immense amounts of water. This does not necessarily imply that water is being used unsustainably. There has been much attention given to overconsumption and pollution in press articles and elsewhere. It is possible that data center water use could deplete resources or contribute pollution. However, the evidence that this has occurred anywhere is inconclusive.

In Michigan, environmental protection laws are in place to prevent both unsustainable water use and pollution from data centers. It is possible that regulatory agencies are insufficiently supported in their ability to monitor water resources and enforce existing laws, but this is a separate issue. Data centers themselves do not pose a unique threat to Michigan's waters.

Data Centers Impose Some Unique Considerations in Zoning and Permitting

As previously noted, data centers use a lot of power, and may potentially use a lot of water. State, regional, and federal policies are in place to ensure that a data center will not be developed in such a way as to stress power grids or water resources. However, data centers impose some unique issues that are atypical of light-industrial land uses and are delegated to local governments to manage.

The primary consideration is noise pollution. Some local jurisdictions may not have any standing noise ordinances. Others may have noise ordinances that are insufficient to protect local residents and businesses from adverse impacts of data center noise. Data centers emit significant levels of low frequency noise and infrasound that standard sound studies and noise ordinance de-emphasize. It is becoming increasingly common for data centers to comply with noise ordinances and yet generate complaints.

This is an emerging and evolving issue. As of yet, there is no generally accepted approach to regulating data center noise. In the absence of clear standards, local governments should employ the precautionary principle. Comprehensive sound studies should be utilized in pre-construction site design with particular attention given to lower frequencies. The most stringent noise limits that can be reasonably interpreted from applicable ISO and ANSI standards should be adopted. Post-construction operational monitoring may also be appropriate.

Another emerging issue is the concept of 'data heat islands.' It is well-known that *any* development can produce a general 'heat island' effect—concrete and asphalt absorb the sun's energy and re-emit it as heat, increasing ground and air temperatures. Hyperscale data centers may amplify heat island effects due to the immense amounts of electric power used, generating immense amounts of heat that is discharged into the air.

Analysis of satellite data suggests that some hyperscale data centers may increase ground temperatures in the surrounding area by over 10 °F. The mechanisms leading to such an increase (and impacts on humans and the local environment) are unclear. This is likely to be a research focus in coming years. In the meantime, local governments evaluating data center development proposals should be aware of this issue and be cautious approving data centers near populated areas.

Take-home Message

Data centers, as a general concept, are neither good nor bad. In the context of the modern economy, some data centers are quite necessary and beneficial. The economy now depends on the internet, and the internet depends on data centers.

Data center development policy has recently become politically contentious because of a surge in investment of very large hyperscale data centers designed specifically to develop and run next-generation artificial intelligence programs. There are many valid concerns about the continual adoption of AI into society and the economy. However, policymakers should take care to distinguish AI regulation from development policy.

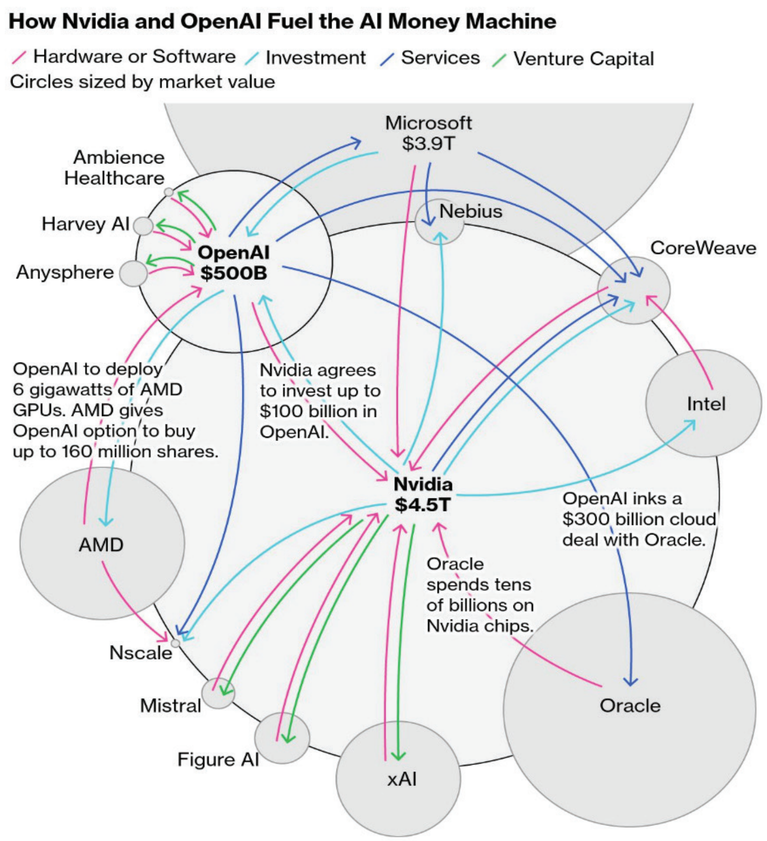
As a development policy, data centers are best considered as a unique light-industrial land use. Compared to other light-industrial investments, data centers themselves are not very effective in stimulating sustained economic activity or development. Aggressive tax breaks and other incentives may not be justified. They also create unique risks—especially as related to noise pollution. That said, data centers development is a boon to the construction industry and can provide significant benefits to hosting communities through property tax revenue and community benefit agreements.

In the near-term, data center development policy will be difficult to consider from a purely rational policy-based perspective. Data centers have captured the public's attention—inviting misinformation, misunderstandings, and emotion-laden perspectives. Policymakers are faced with the difficult task of adopting reasonable development policies that are also politically acceptable.

Appendix A: Risk of an AI Bubble

It is widely believed that AI is in a speculative "bubble." In October 2025, Bloomberg reported, "Never before has so much money been spent so rapidly on a technology that, for all its potential, remains largely unproven as an avenue for profit-making."[376] Further, Bloomberg documented a set of circular relationships with companies investing in each other to inflate growth, particularly Nvidia and OpenAI. Subsequent reporting in March 2026 documented further financial interdependencies and suggested, "The risk with these circular deals is that they can create skewed incentives that may lead to bad decision making and magnify losses if demand for AI fails to match today's lofty expectations."[377]

Figure 9
Nvidia/OpenAI Investment Ecosystem (Bloomberg 2025)



Source: Bloomberg News reporting

There are dozens of companies in the AI ecosystem heavily investing without a clear path to achieving returns on those investments.[378] The four largest tech companies (Alphabet, Microsoft, Amazon, and Meta) expect to invest $630 billion in AI in 2026, alone.[379] These are well established companies that remain profitable, but have taken on increasing debt to fund AI infrastructure.[380] OpenAI (maker of ChatGPT) has projected investments of $600 billion by 2030 despite generating only $13.1 billion in revenue in 2025.[381]

Most economists and investors agree that AI is currently in a bubble.[382] But it's not just a bubble, it's also a *race*. There is also wide agreement that AI will continue to play a larger role in the economy and eventually drive profits, even after the bubble bursts (or deflates).[383,384]

Here is what is now happening: AI companies are in competition to create the best, most functional next generation of AI programs and tools. They anticipate that when the AI bubble bursts, the companies with the best AI will survive and become profitable. Current investments in hyperscale AI data centers are most often focused on training these models. AI training requires immense computational power and energy demands. The desire to create a tool that eventually captures one or more AI market segments is driving AI companies to build out hyperscale AI training data centers as quickly as possible.[385] Once AI models are trained, they must be run on a slightly different type of architecture optimized for inference. There is also investment in these inference-oriented data centers, and this will increase over time. Both the training and inference tasks are performed most efficiently in massive hyperscale facilities.[386] While investments in these data centers are now largely speculative, the perceived potential for profit is currently outweighing the risks of loss.[387]

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