



Lightening the Load

Scaling Clean Solutions for
Data Centers and Communities



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Authors and Acknowledgments

Authors

Steve Abbott
Jasmine Chiu
Nour Elgoweili

Authors are listed alphabetically. All authors are from RMI unless otherwise noted.

Contributors

RMI

Jesse Cohen
Erifili Draklellis
Mark Dyson
Jonny Kocher
Lauren Shwisberg
Jingyi Tang

Wise County Industrial Development Authority

Brian Falin

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Executive Summary

As the rapid expansion of artificial intelligence drives a need for more, ever-larger data centers, they present a range of opportunities and risks to communities. Although data centers can provide economic benefits, particularly local tax revenue, their physical size and resource-intensive operations can strain infrastructure and spark opposition. Increased demand for electricity, which is one of the primary inputs to data centers, poses several risks for communities, including higher utility bills for households and businesses, the potential for overinvesting in new electrical infrastructure, and negative impacts to grid reliability and power quality. If left unchecked, these issues could exacerbate existing challenges in communities and further erode public acceptance of data centers.

Fortunately, communities, utilities, and data centers have an array of ways to meet data center energy needs through investments at the data center facility (i.e., behind the meter), across the community, and at utility scale. This report outlines several strategies and then provides insights into their collective potential via two case studies. First, by applying desktop research, RMI illustrates how a combination of solar, battery storage, demand response, and virtual power plant technologies could offset nearly 65% of peak load for an anticipated 560 megawatts (MW) for new data center facilities in Memphis, Tennessee. Second, efforts in Wise County, Virginia, to support a data center by building a co-located solar plant on an abandoned mine underscore the potential for creative solutions when communities, companies, and utilities collaborate effectively. Finally, this report details how local governments and communities can take advantage of these strategies and best practices:

- **Develop an engagement plan and identify collective priorities:** Local leaders should engage community members to understand their priorities related to data center development and formulate a plan.
- **Enact beneficial local policies and programs:** City and county officials can facilitate and accelerate the deployment of local clean energy resources by implementing a range of supportive policies and programs to meet the data center's additional demand.
- **Collaborate with the data center company:** Communities should engage with data center companies early in the development process to share priorities and establish key areas of alignment.
- **Engage local utilities, utility regulators, and legislators:** In some cases, local leaders may also wish to engage with their utility, regulators, or legislators to unlock additional opportunities and establish common rules and procedures for data center development and regional large-load users more broadly.

Introduction

Communities across the United States are increasingly faced with difficult, high-stakes decisions about hosting data centers in a relative information vacuum. Local officials are in a particularly challenging position as they seek to balance financial opportunity, local infrastructure and resource strains, community opposition, and national interest considerations.

Although data centers have traditionally been concentrated in a few key locations, recent proliferation into new areas is forcing more communities to face these complex decisions. At the national level, the excitement around artificial intelligence (AI), along with a growing perception that the United States must win the AI race, has fueled an explosive increase in forecasted demand for computational resources and electricity. According to a study by Lawrence Berkeley National Laboratory, data centers represented 4.4% of total US electricity consumption as of 2023, yet their share of demand is forecast to grow to between 6.7% and 12% by 2028.¹

As traditional markets such as Northern Virginia have become saturated and unable to meet data center electricity demand, data center owners have begun expanding to other markets. Recent hot spots for data center activity include Arizona, California, Georgia, Illinois, New Jersey, New York, Ohio, Oregon, Texas, and Virginia.²

Data centers offer a complex set of potential opportunities and challenges for communities that host them. When designed to minimize harms and deliver benefits in partnership with local communities, the scale of tax revenue they generate can be truly transformative. For example, Loudoun County, Virginia, the self-proclaimed “data center alley,” has attracted many data centers and, in doing so, increased its real property portfolio by \$16 billion. These financial benefits far exceed costs; data centers account for almost half of the county’s property taxes (reducing tax pressure on homeowners), and the county receives \$26 in tax revenue for every \$1 spent on services for data centers.³

However, these facilities can also have significant negative local impacts that should be managed. For one, data centers use a lot of electricity to execute computations, which can strain the local grid and, in turn, raise electricity costs and degrade power reliability for residents. This intensive computation requires significant cooling, which in some cases can put a strain on local water supplies. Data centers can also take up green space and generate significant noise and — when backup generators are used — pollution. These issues have become more significant as data centers have grown larger, contributing to local resistance. A recent study found that Americans were almost equally divided between supporting and opposing data centers in their community.⁴

This report aims to provide local governments and communities with insights on how to address the electricity demand for data centers in ways that not only mitigate potential negative impacts but also directly and tangibly improve the quality of life for residents. To do so, the report will discuss possible risks related to electricity load growth, outline potential technical means of addressing load growth, illustrate these solutions with case studies, and outline steps for implementing these approaches.

Three Potential Load Growth Challenges for Communities

This report will explore three potential challenges resulting from sudden increases in local electrical demand from data center projects that communities should seek to manage: increases in utility costs; financial exposure from overbuilding; and degraded grid reliability.

Increases in Utility Costs

Data center construction, and the ensuing sharp increases in electricity demand, can compel electrical utilities and grid operators to deploy additional generation capacity and grid infrastructure to meet the higher demand. If the costs for these increases are not allocated appropriately to the data center company, it will likely result in higher bills for all utility customers. Communities across the United States are already struggling with increasing utility rates. US residential electricity prices rose by almost 10% from January to August 2025,⁵ and the trend may continue as lengthy interconnection queues, tariffs, and uncertainty over federal policy impede deployment of new generation assets.⁶

In this current power-constrained environment, a related risk is that data center power needs may crowd out other types of facilities (such as large-scale manufacturing plants) that could bring other benefits (e.g., a greater number of high-paying, stable jobs).



Financial Exposure from Overbuilding

A related but distinct risk is that utility companies may overestimate future electricity demand, build infrastructure to meet that demand, and then be left with costly stranded assets for decades. There are good reasons to take this scenario seriously. As RMI has previously documented, utilities have a systemic tendency to overestimate future load, in part because they are traditionally incentivized to spend money on infrastructure.⁷ Demand forecasts may be further exaggerated due to data center developers submitting many speculative interconnection requests as they shop around for prime locations.⁸ If a data center is not actually built, if demand for AI services does not meet expectations, or if other factors limit the actual electricity usage, the local utility and the community might be exposed to the costs of paying for these large-scale, long-lived, underutilized assets.⁹

Degraded Grid Reliability

Although it can be difficult to tie a single facility directly to grid reliability issues, anecdotal and correlational data are emerging that large clusters of data centers can weaken regional grid performance and reliability. In July 2024, 60 data centers in Northern Virginia dropped off the grid almost simultaneously in response to a surge protector failure, prompting power providers to quickly reduce generation to bring supply and demand back in sync.¹⁰ This “near miss” has similarities to a December 2022 incident in West Texas where a small equipment malfunction caused 1.7 gigawatts (GW) of load to suddenly go offline. These cases highlight how data centers’ need for continuous, high-quality power can cause them to simultaneously disconnect from the grid, an issue that gets more serious as more data center load comes online. Meanwhile, a Bloomberg analysis found strong correlations between data centers and degraded power quality, which, in extreme cases, can damage home appliances or even spark fires.¹¹

Opportunities for Localized Clean Energy Investments

Data center companies, utilities, and communities across the United States have a range of ways to address this load growth, with varying deployment speeds, opportunities to manage risks, cost and benefit distributions, and emissions reduction potentials. This section will categorize some of these strategies into approaches that can be deployed “behind the meter” (i.e., at the data center), across a community, and at utility scale. The *Actionable Steps* section of this report will outline ways that communities can support the deployment of these solutions.

An important consideration across these strategies is their impact on energy versus power usage; the difference between these concepts can be illustrated through an analogy to water in a bathtub. Energy is a measure of how much electricity a facility uses over time — in our analogy, this might be equivalent to the water added to a tub. Meanwhile, power reflects the rate at which facilities use energy, which is comparable to the rate of water entering the tub. As data centers can have large energy and power needs, communities should consider the impact of the following strategies on each. Reducing overall energy usage will limit the need for generation and likely reduce emissions. Meanwhile, limiting power requirements — particularly at times when the grid is strained — can mitigate the need to build new grid infrastructure.

Behind-the-Meter (BTM) Opportunities

BTM measures are some of the fastest ways to address load growth while also conveying the least risk to ratepayers.¹²

- **Energy efficiency:** Employing efficient software, advanced cooling, more efficient chips, or shifting to less energy-intensive, smaller language models can significantly reduce data center electricity demand. Efficiency measures also reduce peak power needs. *Example: a draft agreement in Bozrah, Connecticut, requires potential data center developers to meet efficiency standards within 180 days of commercial operation.*¹³
- **Flexibility:** Data centers can reduce peak power usage through flexibility measures, such as postponing computation or shifting operations to other data center facilities when the local grid is overtaxed. *Example: in Memphis, Tennessee, xAI has signed an agreement with the municipal utility to not use grid power at one of its facilities during emergencies or when the grid is strained, thereby providing 150–300 MW of flexibility to the system.*¹⁴
- **On-site generation and storage:** Data centers’ need for power and energy from the grid can also be reduced by colocating energy generation and storage at the site. Clean forms of generation, such as solar, wind, and geothermal, can provide ongoing benefits without harming local air quality. Where necessary, clean generation can also be supplemented by emergency fossil fuel generation stations to ensure reliable power in the event of a grid failure, but if such generators are routinely required, data center companies may wish to invest in cleaner options, such as fuel cells. A related RMI report focuses on opportunities to jointly develop data centers and new clean energy resources, so-called “power couples,” near existing generation.¹⁵ *Example: a data center being developed in Washington state is planning 160 MW of solar to meet the requirements of the local Bring Your Own Power policy.*¹⁶

Provided that these investments are paid for by the data center companies, these BTM approaches limit the financial and reliability risks to local community members by reducing new stress on the grid. Their usage, however, may be constrained by factors such as available land around the data center facility, the cost-effectiveness of certain technologies, and the data center company's willingness to invest in these opportunities.

Community-Based Strategies

There are several ways data centers can invest in energy solutions within communities to reduce peak usage and reduce strain on the local grid. These approaches are by definition more distributed, which introduces several benefits and drawbacks. On the benefits side, the smaller, more modular nature of these projects means they can be installed rapidly — typically in days or weeks instead of years.¹⁷ By installing and leveraging infrastructure in communities, these smaller projects can also maximize local benefits, such as cost savings to hosts and reliable clean electricity even during grid outages. Importantly, these local benefits will persist regardless of the data center's electricity usage. On the negative side, smaller-scale projects are sometimes (but not always) more expensive per unit of energy and require more collaboration and organization to effectively deploy.

- **Virtual power plants (VPPs) and demand response (DR) programs:** VPPs and DR programs reduce strain on the grid by incentivizing utility customers to reduce or flex their electricity demand during peak hours. To achieve this, VPP and DR programs leverage technologies that adjust the behavior of existing infrastructure such as thermostats, building automation systems, rooftop photovoltaics (PV), water heaters, and distributed batteries. Such programs can be deployed rapidly and support households by lowering energy costs.¹⁸ A Brattle Group study found that VPPs can provide the same resource adequacy as a natural gas plant at a 40% lower cost.¹⁹ *Example: National Grid's ConnectedSolutions open access multitechnology VPP program in Massachusetts boasts 227 MW enrolled from nearly 96,000 participants attracted by the performance-based payments. It has inspired all six New England states to adopt similar programs with its standardized design, which helps mitigate operational and customer acquisition costs.*²⁰
- **Solarize-style programs:** These centrally organized programs accelerate the local adoption of clean technologies by combining competitive provider selection, community outreach, and a limited sign-up window. This approach can be leveraged to support a variety of distributed clean energy investments such as distributed solar, energy efficiency, and in some cases electrification, which can reduce both peak power needs and net demand for energy within communities. Local governments can take advantage of extensive how-to resources (e.g., for Solarize and Electrify programs) as well as partnerships with experienced organizations to maximize the potential of these programs.²¹ *Example: the City of Asheville and Buncombe County in North Carolina worked with RMI and other partners to deploy ~1.5 MW of rooftop solar across local commercial and residential properties.*²²
- **Microgrids and resilience hubs:** Local governments, utilities, and data center companies can also directly bolster community resilience by supporting local clean microgrids. By combining clean generation with energy storage, these systems can provide clean, reliable power during blackouts as well as ongoing grid benefits in the form of reduced peak power demand, local generation, and ancillary services. Microgrids can keep the lights on at critical infrastructure (e.g., fire stations), but they can also be installed in community centers to create “resilience hubs” that shelter residents and provide critical services during emergencies. *Example: The organization Together New Orleans is working to stand up a network of installations such that residents across the city are within a 15-minute walk of a hub.*²³



Although these types of community-based strategies may not fully meet the needs of increasingly large data centers, they offer opportunities to nimbly reduce peak power and net energy demand while providing tangible benefits to local constituents.

Utility-Scale Efforts

In many cases, utility-scale projects may be required to fully address the electricity needs of large data centers. Although utilities may default to building new, large-scale generation facilities (e.g., natural gas plants), communities have an opportunity to engage with them, regulators, and data center companies to consider options that are lower cost, are cleaner, or systematically limit risks to ratepayers.

- **Grid-enhancing technologies:** These technologies involve new approaches, including dynamic line rating and advanced conductors, that offer means for utilities to get more out of existing transmission infrastructure.²⁴ Because these approaches are relatively low cost and quick to deploy, they have the potential to significantly reduce overall costs to meet data center load and protect ratepayers from stranded asset risk. *Example: in 2024, National Grid deployed dynamic line rating across New York state, enabling the company to increase the amount of energy transferred by up to 40%.²⁵*
- **Local, large-scale clean generation:** Since clean generation can be brought online quickly and support low electricity prices, communities may wish to push for large-scale wind and solar deployments to accommodate new demand from data centers.²⁶ Community groups also can explore adding renewable energy to local contaminated lands, such as old landfills or old industrial sites. These “brightfield” projects can provide not only electricity but a means to revitalize blighted neighborhoods.²⁷ *See Case Study 2: Co-Located Solar in Wise County, Virginia on page 16 for an example.*
- **Large load tariffs:** Communities can also engage regulators, state officials, and their local utility to advocate for large load tariffs designed to appropriately distribute costs, mitigate stranded asset risks, and address potential reliability concerns.²⁸ *Example: the Georgia Public Service Commission adopted a large-load tariff requiring customers with loads larger than 100 MW to submit contracts to the commission for review and to pay for all transmission and distribution costs caused by the new load.²⁹*

Case Studies

Case Study 1: Peak Load Mitigation in Memphis, Tennessee

To demonstrate the potential benefits of these clean energy strategies, this analytical study models the potential impacts of deploying a selection of them in Memphis. The Memphis area is currently home to two xAI data centers — one 150 MW facility on Riverport Road, with plans to expand to 300 MW of grid supply, and a second, partially operational 260 MW data center in nearby Whitehaven, Tennessee.³⁰ Some reports suggest that xAI’s total data center capacity could reach or exceed 1 GW.³¹ Our analysis considers the known plans for at least 560 MW of data center infrastructure.

Rather than attempt to model theoretical technical capacity, this study aims to illustrate an optimistic but reasonably achievable level of local infrastructure investments based upon prior analyses and desktop research, and by drawing comparisons to existing programs in other jurisdictions. This study includes two scenarios, one aligned with existing plans from the local municipal utility MLGW, and the other representing our assessment of a more ambitious yet achievable deployment of community assets (see Exhibit 1).

This analysis found that if Memphis deployed nearly 750 MW of alternating current (ac) power through solar generation and approximately 280 MW of battery storage and VPP technologies, this energy capacity could offset 65% of the increased strain on Memphis’ local grid during peak demand hours on a hot summer afternoon. This is important because reducing peak demand can help to maintain system reliability and avoid the activation of microturbines or “peaker” plants, which are often gas-powered and more expensive to operate than baseload resources. It also helps defer the need for new and expensive infrastructure investments.

Exhibit 1 Data center peak energy demand mitigation scenarios

	Scenario 1: Base case	Scenario 2: Community deployment
Solar generation capacity deployed	83.3 MW ac	749.2 MW ac
Battery storage capacity deployed	230 MW dc	280 MW dc
Portion of data center energy demand offset by clean technologies during peak hours (1–7 p.m.)	13%	65%

Note: Scenario 1 is based on the existing 150 MW of battery backup at the Colossus data center as well as MLGW’s request for proposal in March 2025 for 100 MW of solar generation and 80 MW of utility-scale battery storage.

RMI Graphic. Source: MLGW, https://www.mlgw.com/news/news_325rfpbpsp

Moreover, these measures could mitigate the primary risks mentioned above: utility cost increases, unnecessary new infrastructure, and threats to grid reliability.

After assessing the Memphis region for viable clean energy deployment sites, several strategies were identified (see Exhibit 2) as potential opportunities for the community.

Exhibit 2 Potential generation and storage strategies analyzed

Generation Strategy type	Strategy	Location	Capacity (MW ac)	Annual generation (MWh)
BTM	Rooftop solar	xAI Data center 1 and 2	16.5 MW	24,578 MWh
	Adjacent solar farm	xAI data center 1's adjacent parcels	83.3 MW	124,598 MWh
Community level	Aggregate greenfield solar	Preselected sites from MLGW study and data center 2's adjacent parcels	604.8 MW	904,247 MWh
	Resilience hub network (solar + storage)	5 hubs dispersed across the city Example: Double Tree Elementary School can host an estimated 0.4 MW solar PV system.	2 MW (5 hubs x 0.4 MW)	2,990 MWh
	Brightfield	Johnston Yard Superfund site	42.6 MW	63,720 MWh
Solar PV total			749.2 MW	1,120,133 MWh

Storage Strategy type	Strategy	Location	Capacity (MW dc)
BTM	On-site battery storage	Data center 1	150 MW dc
	Adjacent battery storage	xAI data center's adjacent parcels	100 MW dc
Community level	Residential VPP battery program	Dispersed residential locations	30 MW dc
Battery storage total			280 MW dc

Note: Solar panels are assumed to be west facing to maximize their ability to mitigate peak load. RMI Graphic. Source: PVWatts, EDGE, Siemens.

BTM strategies at the data center include sizable rooftop solar systems, the existing battery installations, and documented plans to build a solar farm and commercial battery storage systems near the first data center facility. Community-based projects include greenfield solar, DR participation, a VPP program focused on residential battery technologies, resilience hubs that utilize solar PV and energy storage, and a “brightfield” — a brownfield site that can be remediated for renewable energy generation. See the Appendix for more detail on the methodology used in this analysis.

Opportunity for Demand Response

One notable strategy that is not included in Exhibit 2 is the existing DR program under the Tennessee Valley Authority (TVA). DR enrollments for industrial facilities can significantly reduce peak loads. Two sites are known to have DR enrollments with MLGW: Nucor Steel and the first xAI data center in Pidgeon Industrial Park. Other large-load users in the vicinity that could be good candidates for DR participation (if not enrolled already) include data center 2 in Whitehaven and MMC Materials, a concrete plant in Pidgeon Industrial Park.*

Although these DR capabilities can be significant, they are most helpful for communities if participating companies achieve the necessary load reductions via reduced operations or clean technologies (e.g., energy storage) rather than using polluting fossil fuel backup generators, which worsen local air quality.

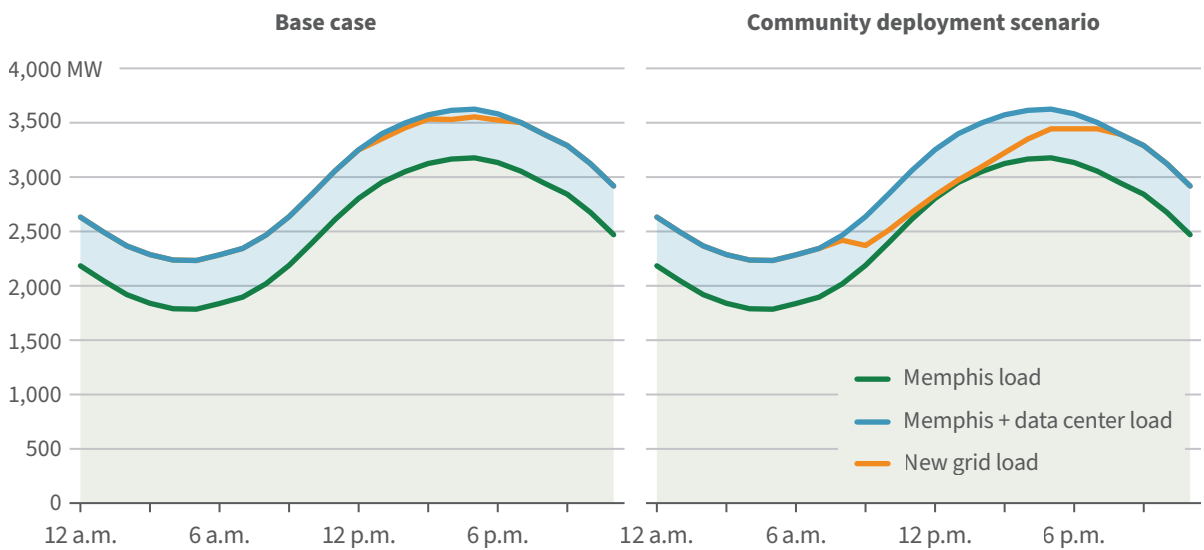
*This study does not provide quantitative estimates of this potential because study authors were unable to find sufficient public information to assess the existing capacity participating in the TVA program and potential additions.



The two graphs in Exhibit 3 show the impact of different levels of clean technology deployment on the energy demand during MLGW’s peak hours between 1 p.m. and 7 p.m.

- The graph on the left demonstrates the city’s current plans for local clean energy infrastructure. If the city implements 100 MW of solar generation capacity and 230 MW of battery storage, this could offset 13% of the data centers’ new energy requirements during peak hours.
- The graph on the right shows an ambitious scenario in which all recommended strategies are incorporated into local planning. In this case, the city could offset 65% of the data centers’ demand during peak hours.

Exhibit 3 Comparison of base case of generation deployed scenario (left) and the community deployment scenario (right)



RMI Graphic. Source: RMI Analysis.

This is a significant finding — meaning that clean energy interventions could cover a majority of the additional load introduced by the 560 MW data center facilities. It is important to note that although the strategies are expected to help mitigate the city’s load during peak hours, the new peak load is still higher than the city’s initial load without the data center. If the city wants to address this increase, it could explore a range of strategies such as additional battery storage, energy efficiency, or wind energy.

The scenarios shown here are meant to illustrate the potential impacts of deploying clean, localized energy systems and the benefits they can deliver. If these strategies are fully utilized, they could result in cleaner air, lower energy bills, less financial risk, and enhanced emergency services at local resilience hubs in the community.

Note: This analytical study is provided for illustrative purposes only. The clean energy strategies demonstrated here are hypothetical and based on documented interventions and well-researched technologies that the Memphis community could reasonably implement. They do not represent the city’s full technical potential, nor do they necessarily consider all relevant local technical or legal constraints. These findings should be interpreted as directional figures based on desktop research because access to detailed grid information and in-depth local context is limited.

Case Study 2: Co-Located Solar in Wise County, Virginia

What happens when data center companies, local governments, and community-based organizations effectively work together toward a common goal? Wise County offers a compelling answer. Its project, redeveloping a surface coal mine into a commercial solar plant, shows the value of strong public-private partnerships.

The Mineral Gap Solar Project was initiated by local advocates and executed by the county and a data center company working together. In 2017, DP Facilities' 45 MW Mineral Gap Data Center was built next to an abandoned surface coal mine owned by the Wise County Industrial Development Authority (IDA). Because the coal mine site had limited redevelopment opportunities, the plot remained unused until local activists took an interest. Appalachian Voices' Solar Workgroup of Southwest Virginia approached Wise County's Economic Development Office and IDA, as well as DP Facilities, to discuss building a solar plant on the abandoned surface coal mine to help power the data center, generate revenue for the county, and reduce emissions.

Throughout the development process, stakeholders maintained robust communication to ensure effective coordination. Early on, collaboration with the Solar Workgroup and Appalachian Voices allowed for community representation, limiting local project opposition. Then, by effectively splitting project management and financial responsibilities, DP Facilities and Wise County were able to finance the project and organize development. The IDA obtained a \$500,000 grant from Virginia's Abandoned Mine Land Economic Revitalization Program to develop the site, while DP Facilities paid for the solar array and its installation. Throughout the process, the county and DP Facilities coordinated with developers, Virginia-based McFall Excavating Inc. and Sun Tribe Solar to address challenges as they surfaced.

The site redevelopment and solar array supported the local economy and workforce training, and made it easier for future deployments of solar in the county. Between lease payments to the IDA, increased property taxes, and the creation of an estimated 32 local jobs during construction, the project was estimated to inject a total of "\$1.2 million into the local economy."³² Moreover, the developer is building the workforce by offering training to students at the local Mountain Empire Community College. Finally, the initiative prompted the county to adopt new inspection and permitting policies that support solar, leading SolSmart to recognize Wise County with a Gold designation.

Beyond its immediate benefits, the project may pave the way for future opportunities. As Brian Falin, executive director of the Wise County IDA, put it, this project offers a "textbook example of how these projects can be successful ... and the opportunities we have moving forward."

Although the colocated solar may not cover a major part of the data center's energy needs, it is a demonstration of the potential to supply power-hungry data centers with renewable energy. It also proves that even after data centers are built, data center companies, communities, and local governments can work together to mitigate harms, accelerate the energy transition, and provide multiple community co-benefits.

Actionable Steps

Communities that prepare early and proactively engage with developers, local authorities, utilities, and state regulators are best positioned to capture benefits while mitigating major risks. This section highlights steps that communities can take to fully evaluate and prepare for data center proposals and lists potential interventions for addressing priority concerns.

Develop an Engagement Plan and Identify Collective Priorities

Design a community engagement process: Communities should start by collectively deciding how they want to engage the data center developer, who should be at the table, and their shared priorities. Building a robust process includes:

- Identifying community members and relevant stakeholders (e.g., local elected leaders) who should be informed and invited to participate. Communities can use RMI's Community Advisory Board (CAB) Charter Template as a starting point.³³
- Conducting outreach to ensure that residents understand the data center's potential impacts (e.g., on energy and land use) and ways to share input.
- Requesting accessible channels for community members to offer comments or ask questions.
- Creating a community advisory board that will co-develop shared goals, timelines, and expectations with community representatives. The CAB Charter Template shows how to facilitate the process.

Failure to take these early steps runs the risk that projects will fail to identify shared opportunities and address critical community needs and, as a result, will face much greater community resistance.

Develop an engagement plan recommendation: Communities can set clear expectations for how data center developers should engage with them. This can include specifying the types of meetings that should occur, transparency and reporting requirements, timelines for input, and how community priorities must be incorporated into project planning. In developing this protocol, the CAB Charter Template mentioned above can be a useful resource.

Identify community priorities: Community priorities should cover both how to reduce potential harms from data center development and how to ensure lasting benefits. On the mitigation side, this could mean working with utilities, developers, and regulatory commissions to ensure that:

- Data centers are required to pay for an appropriate amount of the necessary grid and generation investments such that those costs are not excessively passed along to rate payers.
- Infrastructure is built responsibly to avoid stranded assets.
- Emissions from on-site generation are minimized.
- Reliability concerns are addressed up front.
- Backup power during emergency events or peak events is as clean as possible.

Once protections are in place, communities can also focus on advancing priorities such as workforce investments like job training programs, environmental protections like water conservation, affordable energy, and long-term land use planning. By organizing these priorities early, communities enter negotiations with a clear agenda that both safeguards against negative impacts and positions the project to deliver meaningful community benefits.

Enact Beneficial Local Policies and Programs

Adopt strong building energy codes or performance standards to manage data centers: To ensure high performance for data center facilities, it is important to both adopt strong codes prior to facility construction and enact performance standards for a building's efficient operation. Local energy codes can set minimum energy efficiency requirements and building design specifications for new buildings as well as those that undergo major retrofits.³⁴ Performance standards apply to existing buildings to ensure a minimum level of performance over their lifetime.³⁵ Depending on the jurisdiction, these may be determined by state energy code boards (e.g., Washington State Building Code Council) or a municipality's local council and implemented by a chief building official. Communities can consider these paired policies:

- **Performance standard:** Energy efficiency in buildings will help reduce energy consumption and curb demand. For data centers specifically, a performance standard can require them to perform to a certain PUE (power usage efficiency), a measure of how efficiently a building delivers energy to the IT equipment inside. Tracking PUE as a policy will require some type of interface, such as Energy Star Portfolio Manager or another approved tool.
- **American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.4 (A90.4):** This addendum has model code language for new data centers.³⁶

Streamline clean energy deployment to respond to data center growth: Local governments play a key role in creating enabling environments for deployment of clean energy technologies that are outlined in this report. Soft costs relating to customer acquisition, permitting, and interconnection collectively exceed material costs for clean technologies like distributed solar.³⁷ Local governments can play a critical role in reducing these costs for clean technologies by adopting streamlined or automated permitting (e.g., SolarAPP+) and implementing community outreach and adoption campaigns that provide streamlined pathways for community members (e.g., Solarize campaigns). SolSmart provides insights into best practices for local governments to support solar.³⁸

Review zoning rules: Zoning laws are local government regulations that divide land into zones and dictate what types of buildings are allowed in each. They are used to manage development, separate incompatible uses such as industrial facilities and residential areas, and maintain community character. Zoning laws can be a pathway for managing the infrastructure demands and environmental impacts of data centers. For example, Mesa City Council recently passed new rules that will impose specific design standards on data centers.³⁹

Explore financing tools for community projects: Municipalities can explore numerous financing mechanisms — such as green banks, community financing institutions, and infrastructure bonds — to fund local energy projects to deliver co-benefits to the community. In addition, specific technologies such as

battery storage are still eligible for federal incentives that provide direct payment for project costs.⁴⁰ The Wise County project, as an example, leveraged several sources of financing, including public funding, direct investment from the project owner, and a state grant.

As a first step, communities can turn to US Green Bank 50 to identify their state or local green bank. They may also be able to work with local credit unions, community development financial institutions, and community banks to help finance these projects.⁴¹ Communities could also consider partnering with data center developers to establish funds that are reinvested in local priorities such as resilience hubs, workforce development, and more. These community funds can be backed by large-load tariff revenue, direct investments from the data center developers, property taxes from the data center facility, and other funding streams.

Collaborate with the Data Center Company

Communities have the greatest ability to influence data center projects in the early phases of site development before all the plans are solidified and all the required permits are issued. Early engagement with a data center developer can illuminate mutually beneficial outcomes for all parties and support more effective, collaborative working relationships.

Encourage full use of BTM opportunities: Before issuing construction permits or approving zoning applications, local governments can engage with the data center company to align on best practices for project design and development and community expectations. Developers can use RMI's list of on-site efficiency and clean energy measures to reduce grid load and net energy demand and look to data center case studies for proven results.⁴²

Pursue formal project agreements with the data center: After collectively identifying key priorities, communities can request negotiated agreements that codify both protections and benefits. These agreements can take several forms, including:

- **Community Benefits Agreements (CBAs):** Legally binding contracts that outline direct community benefits such as workforce development programs, funding for renewable energy projects, or building design and operations standards. Examples of successful CBAs can be found in RMI's Community Benefits Catalog.⁴³
- **Good Neighbor Agreements:** Voluntary commitments that focus on consistent transparency, communication, and mitigation of project impacts such as noise, traffic, or water use.
- **Host Community Agreements:** Often used with large infrastructure projects, these spell out financial contributions or services that a developer provides directly to the host community.
- **Development Agreements or Franchise Agreements:** Tools negotiated with local governments that can set conditions for land use, infrastructure investments, or long-term operational responsibilities.

Examples of these agreement types can be found at the *Database of Community Benefits Frameworks Across the US* built by World Resources Institute and Data for Progress.⁴⁴ Although data centers are an emerging project type and largely lack precedent in formal project agreements with host communities, this database and RMI's Community Benefits Catalog provide real examples from other industries.

Propose clean energy partnership models: Local authorities can explore and encourage various business models with data center companies to drive clean energy investments in the community. Data centers could support local investments through direct ownership, subsidization, PPAs or leases with site hosts, and/or through payments to the utility via a large-load tariff — which could indirectly help finance local projects. As regulations and local priorities vary across states and communities, the best-fit partnership model will vary.

Engage Local Utilities, Utility Regulators, and Legislators

Partner with local utility on community solutions: Local leaders can work with utilities to accurately forecast load growth from data centers across varying scenarios to help ensure responsible investments in transmission, distribution, and generation infrastructure. Utilities also have a unique role in helping the community interconnect and integrate distributed resources and manage VPPs.

Implement tariff structures with ratepayer protections: In states such as Georgia and Indiana, utilities have adopted large-load tariffs that reflect the high, continuous load profile of data center facilities.⁴⁵ These tariffs address how large-load users will pay for grid upgrades needed to serve them with the intention of insulating other ratepayers from cost increases. These tariffs are an important mechanism for controlling utility costs, especially as American households are currently experiencing rising energy bills. See RMI's Large Load Tariff Principles for more information.⁴⁶

Inform supportive state policies and programs: State lawmakers and regulatory commissions have authority to take statewide actions to address data center load growth. Communities can support or advocate for state programs that link data center development to clean energy growth, efficiency upgrades, grid enhancements, and long-term community benefits.

Examples of innovative state policy approaches to mitigate the negative impacts of load growth include the following:

- Virginia, which hosts the largest cluster of data centers in the world, passed a law in May 2025 that requires its state utility, Dominion Energy, to propose a VPP pilot program with up to 450 MW of capacity by December 2025.⁴⁷ Data centers account for 25% of the state's electricity consumption, and the program will aim to alleviate stress on the grid during times of peak demand.⁴⁸
- Minnesota passed a law during its 2025 legislative special session that imposes an annual fee on large-scale data centers based on their peak demand.⁴⁹ For example, if peak demand is forecast to be 100–250 MW, the facility must pay \$2 million annually to a special revenue fund in the state treasury. If the peak demand is projected to be 750 MW or greater, the annual fee increases to \$5 million.

Although these new fees and program requirements represent important steps, the dollar amounts alone are not nearly sufficient to offset the cost increases that data center load growth can impose on ratepayers, making it essential that they be paired with the broader suite of clean energy, efficiency, and community benefit programs recommended here.

Conclusion

As data centers proliferate across the country, local governments and communities have an opportunity to engage with development companies to shape their energy future. There are a range of potential strategies to address these facilities' energy needs that can mitigate harms to the community and, in some cases, provide important benefits to residents and businesses. The purpose of this report is to summarize potential risks for communities and illustrate the potential that various clean energy solutions offer to supply the needed electricity and unlock these co-benefits, whether or not data center activity meets forecast expectations.

As the example of Memphis illustrates, even the strain from multiple, large-scale data center facilities can be managed through a portfolio of small- to large-scale solutions — offsetting strain on the local grid while providing important benefits to local communities. Meanwhile, the success of Wise County demonstrates the power of collaboration, coordination, and persistence in unlocking opportunities that serve companies, governments, and communities.

Communities seeking to build on these insights and successes have a range of practicable actions to help them prepare for and meet the current moment. Local governments can play a critical role across all these efforts, including coordinating discussions within communities, speeding the deployment of clean resources through supportive policies and programs, engaging data center partners, and reaching out to state and regional stakeholders to help cultivate the legislative and regulatory environments for these local efforts.

Although there are many questions about where the future of data centers and AI will take us all, communities have a wealth of opportunities to leverage this moment to move toward the clean, safe, secure energy future they deserve.

Appendix

Methodology for Memphis Analytical Study

Solar generation: The analytical study models solar generation with west-facing panels that, although they produce less electricity overall, are more effective at mitigating MLGW's summer, late-afternoon peak loads. Solar output data was sourced from the National Renewable Energy Laboratory (NREL) PVWatts Calculator.⁵⁰

Battery storage: The current model assumes that battery systems charge during the earliest hours that solar is available until they are fully charged, and discharge power for the three hours in the afternoon and evening with the highest peak demand. It is assumed that the minimum state of charge is 20% based on guidance from NREL REopt. The round-trip efficiency, which accounts for energy losses in charging and discharging, is assumed to be 89%.⁵¹

Hourly demand data for the city of Memphis: Actual hourly data was not available on the utility's website. To model the city's hourly load on a hot summer day, the study uses the highest recorded peak load on July 29, 2021, from MLGW as a reference and scales down hourly demand data from TVA, the utility's energy supplier, from the same day.⁵²

Hourly demand data for the data centers: As actual hourly load data was not available, the report models the hourly demand based on available research that estimates that AI training data centers have a capacity utilization rate of 80 percent. The model assumes 560 MW of data center capacity, comprising the anticipated capacity of the first data center (300 MW) and planned capacity for the second data center (260 MW).

Additional detail about potential strategies analyzed

BTM interventions

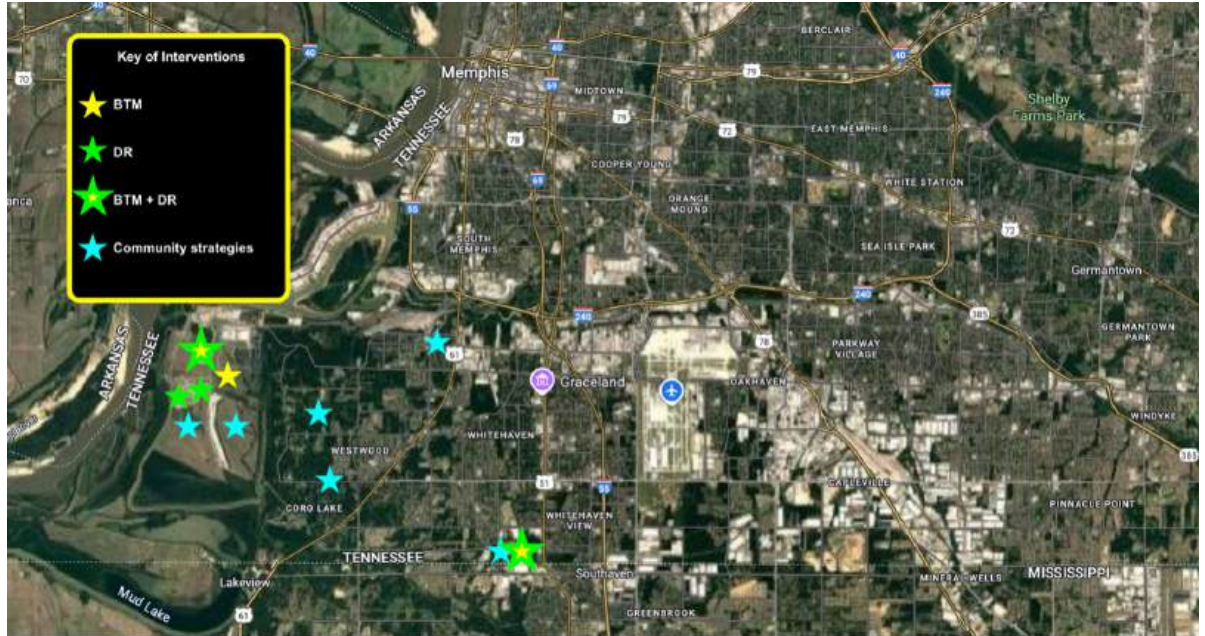
- **Rooftop solar:** Both data center facilities in the Memphis Pidgeon Industrial Park and Whitehaven, TN, have sufficient rooftop space for large commercial solar PV systems. This report assumes that these roofs are of sufficient strength and quality to support the added weight from installing PV solar.
- **Adjacent solar farm:** Based on a recent announcement from the local economic development agency, our analysis includes a baseline of 100 MW of ground mount solar PV generation.⁵³ This report assumes this 100 MW is the direct current value and adjusts the value to estimate the alternating current capacity. MLGW's ability to procure additional solar directly may be limited by its current contract with TVA.⁵⁴
- **On-site battery storage:** xAI installed 150 MW of Tesla Megapack batteries for energy backup to ensure that the facility can maintain operations during outages, voltage fluctuations, and periods of peak demand.⁵⁵ These types of energy storage systems can be especially helpful in the Memphis context given that the xAI data center facilities are being used heavily for AI training, which can entail rapid fluctuations in electricity demand that can erode local power quality.⁵⁶ Batteries such as these Tesla colocated systems can mitigate power quality degradation as they can react to large data center load fluctuations with the necessary speed and power output.⁵⁷

- **Adjacent battery storage:** Per local news reports, xAI is planning to lease land for 100 MW of battery storage next to the first data center in Pidgeon Industrial Park.⁵⁸

Community-based strategies

- **Greenfield solar:** Based on an MLGW integrated resource plan report, our analysis includes potential solar generation from preselected sites that are located closest to and downstream from the data center sites.⁵⁹ These are also located near existing substations. The MLGW report highlights the opportunity for a total of 3.3 GW of solar across Memphis — far more than was included in this analysis.
- **Residential battery VPP pilot program:** Using data from existing residential battery VPP programs around the country, this report estimates the potential size of a similar program in Memphis. Based on the average percentage of customers enrolled and the average kW per customer in five comparable programs, it was estimated that MLGW could achieve 30 MW of enrolled capacity with around 2,500 participating customers.
- **Resilience hub:** Double Tree Elementary School was identified as an example site for a community resilience hub, which can employ solar and storage solutions. The school has ample potential for solar energy generation and is in a residential neighborhood, making it well suited for providing essential services, distributing resources, and offering reliable power during outages. Resilience hubs could be scaled across the city. In our model, the battery storage capacity for resilience hubs is included in the VPP battery program estimate.
- **Brightfield:** A brightfield is a landfill or former industrial site that has been repurposed to host renewable energy generation. According to the Environmental Protection Agency's RE-Powering Mapper that provides data on known brownfield sites, the Johnston Yard Superfund site, downstream from the first data center, can host approximately 43 MW.⁶⁰
- **Demand response program:** Nucor Steel, a manufacturing facility in Pidgeon Industrial Park, is a large-load energy customer that has participated in a DR program with MLGW. MLGW has reported that xAI has also signed an agreement for the first data center facility to shed load during peak demand hours.⁶¹ Although there was limited information about the full scope of this DR program across MLGW's footprint, this type of industrial demand response can significantly reduce strain on the grid during peak periods by curtailing hundreds of megawatts, if not gigawatts, of demand. The second data center and MMC Materials, a concrete manufacturer, were identified as potential candidates for additional demand response capacity (if they are not already enrolled).⁶²

Exhibit A1 Map of potential sites for implementation



Note: Not pictured: VPP pilot program and four additional resilience hubs.
RMI Graphic. Source: Google Maps.

Citations

1. Arman Shehabi et al., *2024 United States Data Center Energy Usage Report*, Lawrence Berkeley National Laboratory, Report No. LBNL-2001637 (2024), <https://doi.org/10.71468/P1WC7Q>.
2. “Americas Data Center H1 2025 Update,” Cushman & Wakefield, accessed October 23, 2025, <https://digital.cushmanwakefield.com/Americas-Data-Center-H1-2025-Update/45/>.
3. “FAQ,” Loudoun County, accessed October 8, 2025, <https://www.loudoun.gov/Faq.aspx?QID=1799>.
4. Matthew Zeitlin, “Heatmap Poll: Only 44% of Americans Would Welcome a Data Center Nearby,” *Heatmap*, September 11, 2025, <https://heatmap.news/politics/data-center-survey>.
5. Mary Whitfill Roeloffs, “Electric Bills Are Up 10% So Far This Year—Why They Could Keep Getting Costlier,” *Forbes*, August 19, 2025, <https://www.forbes.com/sites/maryroeloffs/2025/08/19/electric-bills-are-up-10-so-far-this-year-why-they-could-keep-getting-costlier/>.
6. Claire Wayner et al., “Going the Distance on Interconnection Queue Reform,” RMI, August 2, 2023, <https://rmi.org/going-the-distance-on-interconnection-queue-reform/>; Jesse Cohen, Tyler Fitch, and Lauren Shwisberg, “Gas Turbine Supply Constraints Threaten Grid Reliability; More Affordable Near-Term Solutions Can Help,” RMI, June 18, 2025, <https://rmi.org/gas-turbine-supply-constraints-threaten-grid-reliability-more-affordable-near-term-solutions-can-help/>.
7. Yuki Numata et al., *Fast, Flexible Solutions for Data Centers*, RMI, July 17, 2025, <https://rmi.org/fast-flexible-solutions-for-data-centers/>; Cara Goldenberg and Kaja Rebane, *How to Restructure Utility Incentives: The Four Pillars of Comprehensive Performance-Based Regulation*, RMI, July 2024, https://rmi.org/wp-content/uploads/dlm_uploads/2024/07/RMI_how_to_restructure_utility_incentives.pdf.
8. Brian Martucci, “A Fraction of Proposed Data Centers Will Get Built. Utilities Are Wising Up,” *Utility Dive*, May 15, 2025, <https://www.utilitydive.com/news/a-fraction-of-proposed-data-centers-will-get-built-utilities-are-wising-up/748214/>.
9. Amory B. Lovins, *Artificial Intelligence Meets Natural Stupidity: Managing the Risks*, May 10, 2025, https://integrative-design-for-radical-energy-efficiency.stanford.edu/sites/extreme_energy_efficiency/files/media/file/data-centersaiel-dr-16-10-may-2025.pdf.
10. David Meyer, “Big Tech’s Data Center Boom Poses New Risk to U.S. Grid Operators,” Reuters, March 19, 2025, <https://www.reuters.com/technology/big-techs-data-center-boom-poses-new-risk-us-grid-operators-2025-03-19/>.
11. Leonardo Nicoletti, Naureen Malik, and Andre Tartar, “AI Needs So Much Power, It’s Making Yours Worse,” *Bloomberg*, December 27, 2024, <https://www.bloomberg.com/graphics/2024-ai-power-home-appliances/>.

12. Numata et al., *Fast, Flexible Solutions for Data Centers*, 2025.
13. “Qualified Data Center Host Municipality Fee,” Town of Bozrah, CT, accessed October 8, 2025.
14. “xAI Marks Its Spot in Memphis,” Memphis Chamber of Commerce, last updated April 30, 2025, <https://memphischamber.com/economic-development/xai/>; “2025 xAI Update,” MLGW, accessed October 8, 2025, <https://www.mlgw.com/images/content/files/pdf/new/xAI%202025%20Update.pdf>.
15. Alex Engel, Uday Varadarajan, and David Posner, *How “Power Couples” Can Help the United States Win the Global AI Race*, RMI, February 20, 2025, <https://rmi.org/how-power-couples-can-help-the-united-states-win-the-global-ai-race/>.
16. “More Power, Same Footprint: Unlocking Bring-Your-Own-Power at Hyperscale,” PlantedSolar, September 17, 2025, <https://www.planted solar.com/blog/data-center-solar-construction>.
17. *Project Flow for Building Owners Pursuing Onsite Community Solar in New York City*, National Renewable Energy Laboratory, 2024, <https://docs.nrel.gov/docs/fy24osti/90021.pdf>.
18. Kevin Brehm et al., *Meeting Summer Peaks: The Need for Virtual Power Plants*, RMI, July 2024, https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf.
19. Ryan Hledik and Kate Peters, *Real Reliability: The Value of Virtual Power*, Brattle, February 2023, <https://www.brattle.com/real-reliability/>.
20. Kevin Brehm and Mary Tobin, *Virtual Power Plant Flipbook*, RMI, July 2024, https://rmi.org/wp-content/uploads/dlm_uploads/2024/07/VP3_flipbook_v1_3.pdf.
21. “Solarize Procurement Guidance,” RMI, accessed October 8, 2025, <https://cityrenewables.org/solarize/>; and Ryan Shea et al., *Electrify Your Community: A Five-Step Guide to Develop a Local Home Electrification Program*, RMI, November 20, 2024, <https://rmi.org/electrify-your-community/>.
22. Christy Edwards, “Office of Sustainability Shares Results of Solarize Asheville Buncombe Campaign,” City of Asheville, NC, February 15, 2022, <https://www.ashevilenc.gov/news/office-of-sustainability-shares-results-of-solarize-asheville-buncombe-campaign/>.
23. Nina Lakhani, “‘We Needed to Get Off the Grid’: New Orleans’ Community-Driven Response to Blackouts,” *Guardian*, November 16, 2023, <https://www.theguardian.com/environment/2023/nov/16/we-needed-to-get-off-the-grid-new-orleans-responds-to-its-crisis-with-community-lighthouses>.
24. Katie Mulvaney et al., *GETting Interconnected in PJM: Grid-Enhancing Technologies (GETs) Can Increase the Speed and Scale of New Entry from PJM’s Queue*, RMI, February 2024, https://rmi.org/wp-content/uploads/dlm_uploads/2024/02/GETs_insight_brief_v3.pdf.
25. Bizclik Admin, “National Grid: Dynamic Tech Enhances New York Power Lines,” *Energy Digital*, August 16, 2024, <https://energydigital.com/articles/national-grid-enhances-new-york-power-lines-with-dynamic-tech>.

26. Numata et al., *Fast, Flexible Solutions for Data Centers*, 2025.
27. Matthew Popkin and Akshay Krishnan, *The Future of Landfills Is Bright: How State and Local Governments Can Leverage Landfill Solar to Bring Clean Energy and Jobs to Communities across America*, RMI, 2021, <https://rmi.org/insight/the-future-of-landfills-is-bright>.
28. “Large Load Tariff Design Principles,” RMI, accessed October 8, 2025, <https://rmi.org/insight/large-load-tariff-principles/>.
29. David Chernicoff, “Georgia Follows Ohio’s Lead in Moving Energy Costs to Data Centers,” *Data Center Frontier*, February 7, 2025, <https://www.datacenterfrontier.com/energy/article/55263580/georgia-follows-ohios-lead-in-moving-energy-costs-to-data-centers>.
30. “2025 xAI Update,” MLGW, accessed October 8, 2025, <https://www.mlgw.com/images/content/files/pdf/new/xAI%202025%20Update.pdf>; Matthew Gooding, “Elon Musk’s xAI buys 1 million sq ft site for second Memphis data center,” *Data Center Dynamics*, March 10, 2025, <https://www.datacenterdynamics.com/en/news/elon-musks-xai-buys-one-million-sq-ft-site-for-second-memphis-data-center/>.
31. Jeremie Ontiveros, Dylan Patel, Wei Zhou, et al., “xAI’s Colossus 2 - First Gigawatt Datacenter In The World, Unique RL Methodology, Capital Raise,” *Semi Analysis*, September 16, 2025, <https://newsletter.semianalysis.com/p/xais-colossus-2-first-gigawatt-datacenter>.
32. “Mineral Gap Data Center: Solar Powered Tech Innovation,” Sun Tribe, accessed October 9, 2025, <https://suntribesolar.com/case-study/mineral-gap-solar-to-rural-communities/>.
33. Erifili Draklellis, Kristine Chan-Lizardo, Zach Clayton, “Community Engagement Toolkit,” RMI, October 2025, <https://rmi.org/insight/community-engagement-toolkit/>.
34. “Codes 101,” U.S. Department of Energy, accessed October 9, 2025, <https://www.energycodes.gov/codes-101>.
35. “Building Performance Standards,” US Department of Energy, accessed October 9, 2025, <https://www.energycodes.gov/BPS>.
36. “Energy Standard for Data Centers,” ASHRAE, accessed on October 9, 2025, https://www.ashrae.org/file%20library/technical%20resources/standards%20and%20guidelines/standards%20addenda/90_4_2022_g_20240131.pdf.
37. Vignesh Ramaswamy et al., *U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023*, September 2023, <https://docs.nrel.gov/docs/fy23osti/87303.pdf>.
38. “Solsmart,” accessed October 9, 2025, <https://solsmart.org/>.
39. Ignacio Ventura, “Mesa City Council Approves New Data Center Zoning Rules,” July 14, 2025, <https://www.kjzz.org/business/2025-07-14/mesa-city-council-approves-new-data-center-zoning-rules>.

40. "Clean Electricity Investment Credit," Internal Revenue Service, accessed October 9, 2025, <https://www.irs.gov/credits-deductions/clean-electricity-investment-credit>.
41. "Enhancing Clean Energy Finance Capabilities Among Community-Based Financial Institutions," University of New Hampshire Carsey School of Public Policy, accessed October 9, 2025, <https://carsey.unh.edu/center-impact-finance/current-projects/enhancing-clean-energy-finance-capabilities-among-community-based-financial-institutions>.
42. Numata et al., *Fast, Flexible Solutions for Data Centers*, 2025; and "Save Energy in the Data Center / Server Room: Additional Resources," Energy Star, accessed October 9, 2025, <https://www.energystar.gov/products/save-energy-data-center-server-room-additional-resources>.
43. Kristine Chan-Lizardo, Zach Clayton, and David Valdes, *RMI's Community Benefits Catalog*, RMI, 2025, <https://rmi.org/insight/rmis-community-benefits-catalog/>.
44. "Database of Community Benefits Frameworks across the U.S.," *WRI* and Data for Progress, accessed October 9, 2025, <https://www.wri.org/cbf-database>.
45. Ethan Howland, "Indiana Regulators Approve 'Large Load' Interconnection Rules," *Utility Dive*, February 20, 2025, <https://www.utilitydive.com/news/indiana-iurc-large-load-interconnection-data-center-aep-amazon-google/740452/>; and "News Release: PSC Approves Rule to Allow New Power Usage Terms for Data Centers," Georgia Public Service Commission, January 23, 2025, https://psc.ga.gov/site/assets/files/8617/media_advisory_data_centers_rule_1-23-2025.pdf.
46. "Large Load Tariff Design Principles," RMI, 2025.
47. Brian Martucci, "Virginia Utility-Scale VPP Pilot Mandate Is First Amid National Push," *Utility Dive*, May 12, 2025, <https://www.utilitydive.com/news/virginia-leads-with-utility-scale-vpp-pilot-amid-national-push/747770/>.
48. Ana Boyd and Todd Olinsky-Paul, *Load Growth: What States Are Doing to Accommodate Increasing Electric Demand*, CESA, July 2025, <https://www.cesa.org/wp-content/uploads/Load-Growth.pdf>.
49. Aaron Repinski and Paul J. Utke, "Data Centers See Changes in Environmental and Energy Regulations, Tax Provisions," Minnesota House of Representatives, accessed October 9, 2025, <https://www.house.mn.gov/NewLaws/story/2025/5641>.
50. "PVWatts Calculator," NREL, accessed October 9, 2025, <https://pvwatts.nrel.gov/>.
51. "Powerwall 3," Tesla, accessed October 9, 2025, <https://energylibrary.tesla.com/docs/Public/EnergyStorage/Powerwall/3/Datasheet/en-us/Powerwall-3-Datasheet.pdf>.
52. "Facts & Figures: For Year Ending December 31, 2021," MLGW, accessed October 9, 2025, https://www.mlgw.com/images/content/files/pdf/FactsFigures%202021_v5_EJ.pdf; and "Hourly Electric Grid Monitor," US Energy Information Administration, accessed October 9, 2025, https://www.eia.gov/electricity/gridmonitor/dashboard/electric_overview/US48/US48.

53. Corey David and Jacob Wilt, “xAI Affiliate to Sublease Land for Solar Farm Project in Memphis: Everything We Know,” *Memphis Commercial Appeal*, September 17, 2025, <https://www.yahoo.com/news/articles/xai-affiliate-sublease-land-solar-220657705.html>.
54. Tom Hrach, “Memphis’ Antiquated TVA Contract Keeps Community from Getting Power from the Sun,” *Tennessee Lookout*, February 19, 2025, <https://tennesseelookout.com/2025/02/19/memphis-antiquated-tva-contract-keeps-community-from-getting-power-from-the-sun/>.
55. Georgina Jedikovska, “xAI to Use Tesla Megapack Batteries to Power World’s Largest AI Supercomputer,” *Interesting Engineering*, May 9, 2025, <https://interestingengineering.com/energy/xai-to-use-tesla-megapack-batteries-to-power-worlds-largest-ai-supercomputer>.
56. Christopher R. Knittel, Juan Ramon L. Senga, and Shen Wang, “Flexible Data Centers and the Grid: Lower Costs, Higher Emissions?” National Bureau of Economic Research, July 2025, https://www.nber.org/system/files/working_papers/w34065/w34065.pdf.
57. “Colossus,” xAI, accessed October 9, 2025, <https://x.ai/colossus>.
58. David and Wilt, “xAI Affiliate to Sublease Land for Solar Farm Project in Memphis,” 2025.
59. “Resource Plan and Transmission Discussion PSAT Meeting,” Siemens, 2020.
60. “U.S. EPA RE-Powering America’s Land Initiative Mapper,” EPA, accessed October 9, 2025, <https://geopub.epa.gov/repoweringApp/?page=Page-1>.
61. Caleb Powell, “Tennessee Green Star Partnership Member Highlight: Nucor Memphis,” Tennessee Department of Environment and Conservation, April 2023, https://www.tn.gov/content/dam/tn/environment/sustainable-practices/programs/tgsp/opsp_tgsp_member-highlights/2023/opsp_tgsp_member-highlight-april-2023_nucor-steel-memphis.pdf; and “2025 xAI Update,” MLGW, accessed October 9, 2025, <https://www.mlgw.com/images/content/files/pdf/new/xAI%202025%20Update.pdf>.
62. “Water and Energy Conservation Technologies in Stationary Concrete Batching Plants,” *Vocal Media*, accessed October 9, 2025, <https://vocal.media/01/water-and-energy-conservation-technologies-in-stationary-concrete-batching-plants>.

Steve Abbott, Jasmine Chiu, and Nour Elgoweili, *Lightening the Load: Scaling Clean Solutions for Data Centers and Communities*, RMI and Young, Gifted & Green, 2025.

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Young, Gifted & Green

100 Florida Ave NE #912
Washington, DC 20002

www.younggiftedgreen.org



RMI Innovation Center

22830 Two Rivers Road
Basalt, CO 81621

www.rmi.org