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POLICY BRIEF

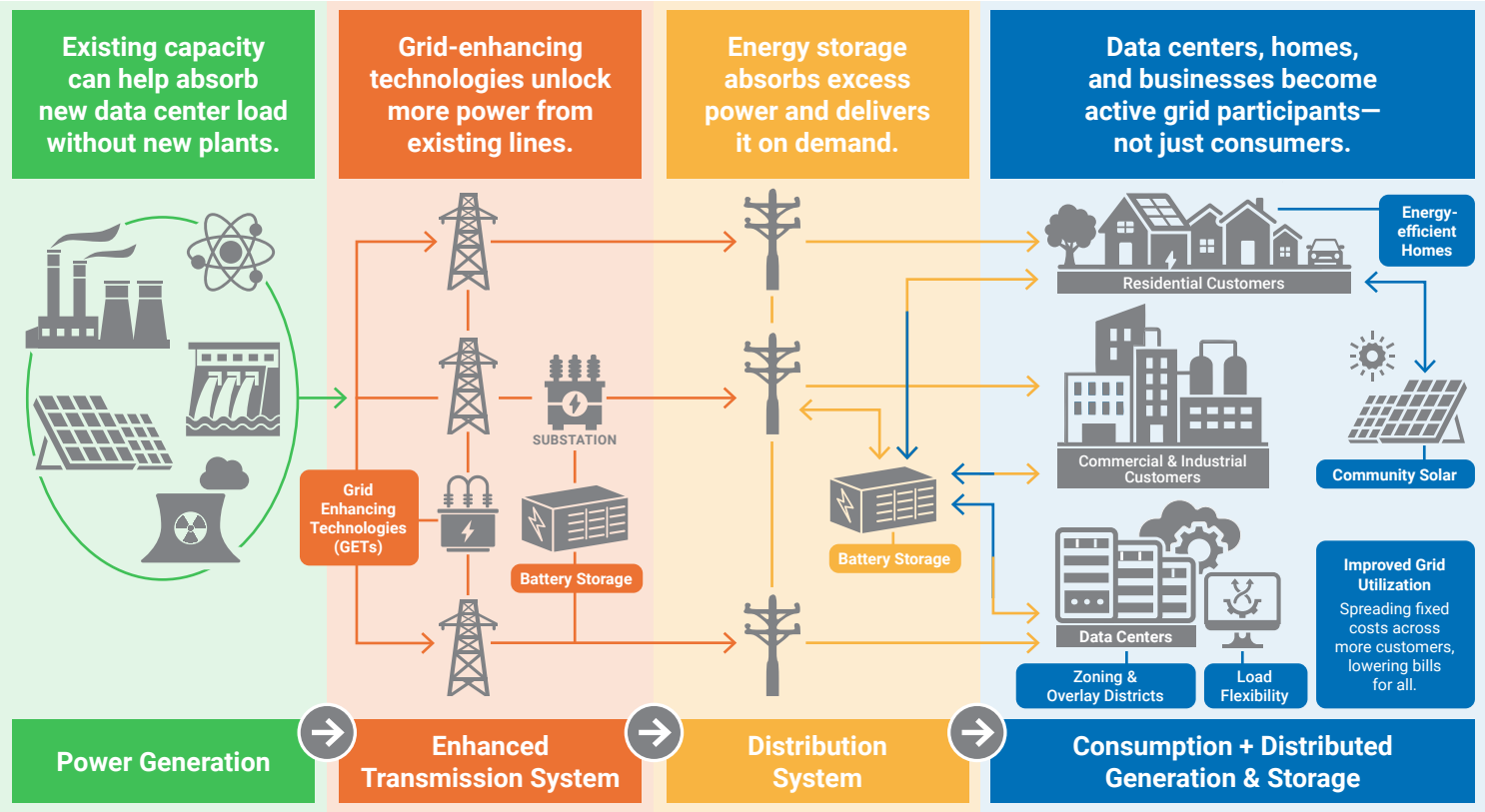
Powering the Boom: Data Centers and What They Mean for Tennessee's Energy Future.

Part II: A Policy Roadmap for Managing Tennessee's Data Center Growth

Tennessee is at an inflection point: a sevenfold increase in data center electricity consumption in five years has resulted in a sustained increase in energy demand while residential bills continue to rise. Nearly 1,340 data centers are planned across the Tennessee Valley Authority's (TVA) seven-state territory—developments valued at approximately $912B.[1]

How Tennessee responds to this demand surge will determine whether the state can capture the economic benefits while keeping energy costs affordable.

Tennessee has the tools to meet demand growth and capture the economic benefits of the data center boom.



Source: Author's design based on TVA's integrated system and the policy recommendations in this brief.

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Part I of the *Powering the Boom* series, highlighted challenges associated with recent data center growth, including increased residential bills in counties hosting data centers and pending requests to TVA for grid connection that are five times more than existing data center demand to the system. Efforts to address this growth are already underway, and in Part II, we share four additional strategies for policymakers to consider that could help shape a comprehensive approach to sustain an efficient, reliable, and affordable electricity system.

POLICY RECOMMENDATIONS

- Treat large data centers as grid partners, not just grid customers.
- Maximize existing grid capacity before building new infrastructure.
- Invest strategically in transmission infrastructure for long-term growth.
- Empower communities to guide data center development to reduce conflicts.

Without careful planning, Tennesseans could bear the costs of data center-driven growth.

Increased demand from data centers could result in negative impacts for both power providers and their customers. If demand continues to grow faster than planned, TVA could be forced to purchase power at higher rates, implement policies that raise customer costs (such as intentionally reducing electricity use—blackouts—and rate increases), and delay new industrial and commercial customers from joining the grid, slowing economic development.[2]

Managing data center-driven growth strategically can create benefits for existing customers.

Data centers can also help lower other customers' bills by better distributing costs and can support residential energy-efficient upgrades.

Distribute Costs Across Customers. The costs of power system infrastructure such as power plants and lines are distributed across customers. When new customers join the system, increased grid utilization spreads the fixed costs of generation, transmission, and distribution to a wider customer pool—lowering costs for all ratepayers.[3]

Support Energy Efficiency. Data centers have supported investments such as heat pumps in residences with outdated systems to help free up grid capacity for their own use. Such energy efficiency upgrades can help data centers meet up to a third of their power needs while also helping to lower bills of residential customers.[4]

Google is pairing development of its $4B data center in West Memphis with two funds supporting energy efficiency efforts.

West Memphis Energy Impact Fund: $25M that supports weatherization efforts, addresses roof leaks or electrical hazards, and provides energy efficiency upgrades.[5]

Greater West Memphis Energy Affordability Fund: Awarding $1.25M to local nonprofits in support of energy affordability and efficiency, community solar and storage, and workforce development.[6]

Source: Memphis Business Journal; Elevate Energy.

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TVA could make better use of its existing system to accommodate new demand.

Like highways built to handle rush hour, TVA's electric system is built to meet the few hours when electricity demand is highest—the coldest and hottest days of the year—even though much of that capacity is not needed during typical hours. Between 2016 and 2024, TVA's average system utilization was just 53.1%, meaning average electricity demand was only about half of peak demand. If some data center electricity use can be shifted away from peak periods, their additional demand could improve system utilization, spreading fixed costs across more customers and potentially lowering rates for all ratepayers.[7]

TVA could also strengthen transmission connections to neighboring grids to access more affordable and reliable power when needed. Transmission lines are the highways that carry electricity: even when lower-cost power is available elsewhere, congestion on those lines can prevent it from reaching TVA—better transmission can deliver cheaper power daily and reduce outages during supply shortfalls. During Winter Storm Elliott (Dec. 2022), TVA lost more than 6,000 MW of generation due to equipment failures and natural gas supply disruptions just as demand surged. Meanwhile, surplus wind power was out of reach because of transmission constraints. Additional transmission capacity between TVA and neighboring grids could have reduced outages and saved consumers up to $95M.[8,9]

Tennessee has begun to take steps to address data center expansion.

State agencies, policymakers, and communities are beginning to respond to this unparalleled growth. At the state level, two efforts attempt to limit costs to residential customers—from new legislation prohibiting local governments and utilities from absorbing large (50MW+ capacity) data centers' infrastructure costs and the governor's signing of the "Ratepayer Protection Pledge" to hold data centers responsible for their own infrastructure costs. Nashville established the state's first local data center zoning restrictions, and officials across Tennessee are establishing temporary moratoriums to evaluate what rules they need.[10]

Policymakers can act now to maximize the economic benefits of data centers.

Four targeted strategies can help Tennessee manage data center-driven growth, protect ratepayers from rising costs, and position the state to capture the full economic benefits of the data center boom.

Treat large data centers as grid partners, not just grid customers.

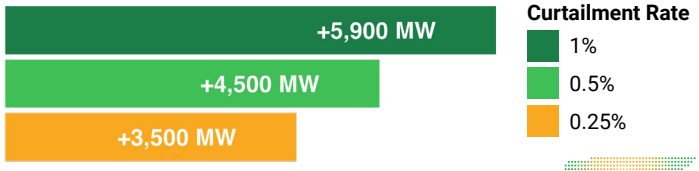
Data centers should be expected to operate as active partners in maintaining an affordable and reliable grid. TVA should consider requiring large data centers to:

- **Cover the costs of the transmission and distribution infrastructure needed to serve them, rather than shifting those costs onto existing customers.** TVA's board is set to vote on a new rate class for data center customers at its August board meeting.[11]
- **Set up flexible load programs as the standard**—allowing data centers to temporarily reduce or shift their electricity consumption during periods of peak demand or grid emergencies.

Peer state regulators have set load flexibility as a mandatory condition for grid connection.

Texas recently authorized the curtailment of data centers and other large flexible loads of at least 75 MW during grid emergencies, reducing projected summer peak demand by approximately 3,700 MW. The TVA-Google partnership demonstrates the potential of flexible demand, unlocking approximately 1,000 MW of grid capacity across five local power companies by shifting non-urgent machine-learning workloads away from peak demand periods.[12,13]

TVA could have between 3,500 MW and 5,900 MW of power available from new data centers through demand flexibility—the power serving 2.2M to 3.7M Tennessee homes annually, on average.[14]



Source: Nicholas Institute of Energy, Environment & Sustainability.

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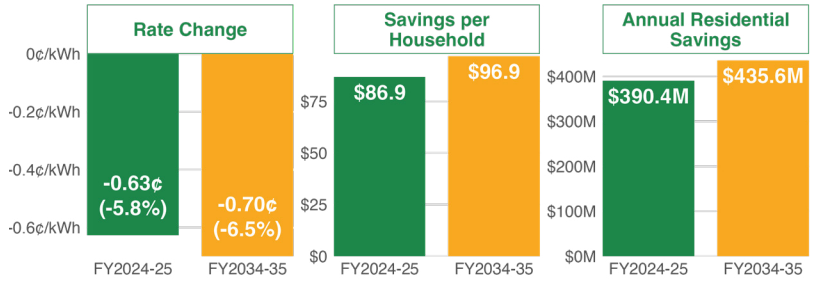
- **Reduce their grid impact by generating power on site (behind-the-meter).** Meta (Gallatin) and Google (Clarksville) have signed power purchase agreements (PPAs) with TVA to match their electricity consumption with clean electricity being put back in the grid. Data centers utilizing low-emission, on-site generation can reduce grid strain and minimize conflicts with local communities. In North Carolina (Apple) and Texas (Google), data centers are co-located with renewable energy infrastructure that fully or mostly powers the centers' operations.[15]

Maximize existing grid capacity before building new infrastructure.

Policies and targets to better measure grid utilization can help make best use of TVA's existing grid capacity. Think*Tennessee's* analysis of TVA's Draft IRP and 10-K form estimated that a 10 percentage-point increase in system utilization (to an average of 63.1%) could deliver electricity rates nearly 6% lower than today, equal to $390.4M in potential savings—$86.90 per residential customer.[16]

To ensure better use of existing capacity before approving new capital investments that would increase customers' bills, Virginia now requires utilities to measure, report, and improve grid utilization. Its State Corporation Commission must also analyze opportunities to deploy grid utilization tools like battery storage, virtual power plants, and flexibility.[17]

New data center load can improve system utilization—putting more of TVA's existing infrastructure to work and bringing $87/year in potential savings to residential customers today, and $97/year by 2035.



Source: TVA FY2024-25 10-K Form; TVA 2026 Draft Integrated Resource Plan; EIA Form 861.

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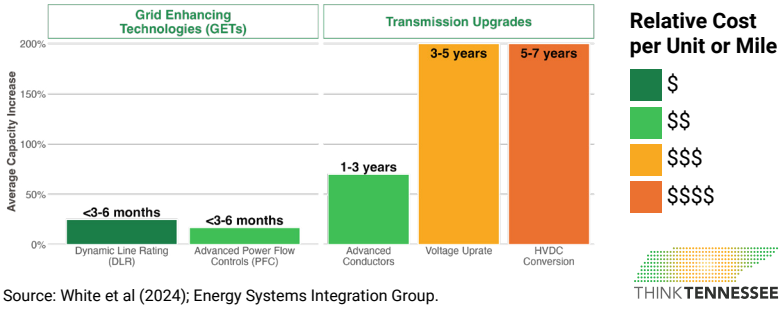
Grid-Enhancing Technologies (GETs) can help TVA to deliver more electricity over today's transmission network, sooner and at a lower cost than building new infrastructure. TVA's Regional Grid Transformation initiative can help prioritize service areas with the highest congestion and lowest system utilization.[18]

Grid-enhancing technologies (GETs) can increase existing lines' capacity within months, and at a portion of the cost of traditional infrastructure upgrades.[19]



Source: White et al (2024); Energy Systems Integration Group.

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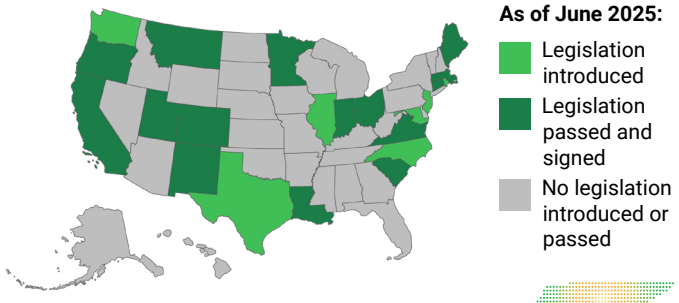
Several peer states have already taken legislative action to promote the deployment of GETs.[20]



Source: GridStrategies.

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Invest strategically in transmission infrastructure for long-term growth.

Even with better utilization, Tennessee's projected growth will require additional transmission capacity. New lines and upgrades to existing infrastructure should be strategically prioritized to support long-term reliability while driving consumer savings.

A long-term transmission investment plan—backed by DOE financing—could drive consumer savings for TVA customers.

Tennessee needs to enhance transmission infrastructure for additional capacity. Other large providers have used federal Department of Energy (DOE) loans to support billion-dollar investments in high-voltage transmission projects.[21]

- The Public Utility Commission of Texas (PUCT) approved ERCOT's 765 kV transmission lines, which cost 22% more than 345 kV lines but are projected to save consumers an additional $229M annually.[22]
- The Southern Company (Alabama and Georgia) received a $26.5B DOE loan package—driving $7B in customer savings through 16,700 MW of new or upgraded generation and 1,300 miles of transmission and grid enhancement projects.[23]

Empower communities to guide data center development to reduce conflicts.

Local governments should have the planning tools needed to guide data center development to reduce conflicts with communities while supporting Tennessee's economic growth. Zoning districts specifically for data centers, overlay districts, and special permit requirements can help communities determine where data centers are appropriate, establish design and noise standards, and steer development toward locations with adequate electric, water, and transportation infrastructure.

- **Special Permit Requirements:** adopted in Phoenix, Arizona, for all new data centers—where developers must demonstrate utility capacity, document water sourcing, comply with noise limits, and meet design standards.[24]
- **Overlay District:** Atlanta, Georgia, prohibited data center development within the Beltline Overlay district, a major transportation route with green spaces and trails.[25]

Communities should also establish reasonable standards for on-site power generation to minimize local air quality, noise, and other community impacts while incentivizing low-emission energy sources, where appropriate.

The decisions made in the next few years will shape Tennessee's energy landscape for decades. The four strategies in this brief give TVA, policymakers, and local communities a roadmap for managing load growth and capturing data center investments as an economic asset, while protecting the households and communities that live in the Tennessee Valley.

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    By FY2034-35, as TVA's planned capacity additions come online, electricity rates would be 6.5% lower at a 63.1% utilization rate relative to one 10 percentage points lower—representing $435.6M in residential savings and $96.9 per household.

    FY2035 projections hold fixed costs constant in 2025 dollars and incorporate TVA's planned ~6,200 MW of natural gas capacity additions and the IRP 2026 Table 2-2 retirement schedule, reducing net available capacity to approximately 27,248 MW and raising the fixed cost base to $8,567M due to new capacity costs.

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