KEY FACTS

Data Center Power Play in Illinois

How Clean Energy Can Meet Rising Electricity Demand While Delivering Climate and Health Benefits

Based on new Union of Concerned Scientists analysis:

- ✔ **From 2026 to 2050, data center load growth will increase electricity system costs in Illinois by $24 billion to $37 billion, or 15 to 24 percent.**
  By requiring data centers to supply new carbon-free electricity resources, Illinois can protect other electricity consumers and stay consistent with its clean energy goals, while at the same time seeking improved federal policies.

- ✔ **Based on current trends, data centers will account for up to 72 percent of electricity demand growth in Illinois by 2030.**
  Overall electricity demand could increase by more than half by 2035. Data centers will still account for up to 65 percent of that growth by 2035 as electrification of other sectors starts to play a bigger role.

- ✔ **Under current policies, data center growth in Illinois will increase the use of in-state fossil fuel plants and rapidly escalate reliance on out-of-state sources of electricity.**
  With stronger federal and state policies for managing data center electricity demand, Illinois can meet the challenge of load growth with more in-state clean energy resources.

- ✔ **Stronger policies can limit the health and climate damages caused by data center load growth and increase economic benefits from clean energy.**
  By pursuing more in-state development of clean energy resources, Illinois can avoid a data center–caused spike in heat-trapping gases and harmful air pollutants while at the same time securing more jobs, tax revenue, and economic activity from new clean resources in the state.

Union of Concerned Scientists

Electricity demand is projected to surge in Illinois. In the short term, the emergence of artificial intelligence for training and using large language models has resulted in proposals to build increasingly large "hyperscale" data centers that can consume as much electricity as entire cities. In the longer term, electrification of economic sectors will drive up electricity demand even further.

How Illinois responds to growing electricity consumption will significantly affect how it achieves its clean energy goals under the 2021 Climate and Equitable Jobs Act (CEJA). That landmark legislation seeks to gradually reduce heat-trapping emissions from fossil fuel power plants in the state to zero by 2045 (Collingsworth 2021). CEJA and subsequent energy laws also promote the development of renewable resources in Illinois to replace the electricity generated by retiring coal and gas plants. Yet the rapid increase in demand from data centers could drive up emissions from Illinois power plants, and it could also increase the state's reliance on out-of-state electricity generation rather than building more clean energy itself.

The Union of Concerned Scientists (UCS) explored how Illinois can meet new electricity demand by utilizing policies and pathways that prioritize the needs of its residents to access clean energy. We focused on the role of data centers and the implications for Illinois' energy system of rapid—and highly uncertain—data center load growth.

Methodology

Using the Regional Energy Deployment System (ReEDS) electricity model from the National Renewable Energy Laboratory,[1] UCS examined several electricity demand and policy scenarios to estimate the impact of data center load growth nationally and at the state level. The results provide information on the generation mix, costs, emissions, and health impacts in different scenarios. *For a more detailed look into the analysis, see the national report on the project's webpage. For more information on methodology, see the technical appendix.*

The UCS state-level analysis explored the following scenarios:

The **Current Policies scenario** reflects recent changes in federal tax credits as enacted by the One Big Beautiful Bill Act in 2025. It also reflects various state electricity sector policies. With respect to Illinois, the scenario includes emissions limits under CEJA for fossil fuel power plants, but it does not include policies contained in the state's Clean and Reliable Grid Affordability Act because our modeling was completed prior to that law's October 2025 passage. UCS modeled plant retirements based on our projections of when the CEJA emissions limits would apply to individual plants. We modeled the Current Policies scenario under three different levels of data center electricity demand.

- **Mid Demand Growth:** This scenario uses our core, mid-case assumption for data center demand growth.
- **No Demand Growth:** This counterfactual scenario isolates the impacts of data center demand growth.
- **High Demand Growth:** This sensitivity assumes data center demand growth is near the higher end of the range of recent projections.

The **Illinois CO_2 Reduction Policy scenario** (CO_2 Reduction Policy) uses our Mid Demand Growth assumption for data center demand growth and explores the adoption of policies in addition to CEJA that would gradually reduce power plant carbon dioxide (CO_2) emissions attributable to in-state and imported generation sources used to supply Illinois electricity consumption. We assumed a 40 percent reduction in emissions from 2023 levels by 2030, a 70 percent reduction by 2040, and a 100 percent reduction by 2050.

The **Restored Tax Credits scenario** also uses the Mid Demand Growth assumption but includes the electricity sector tax credit provisions of the 2022 Inflation Reduction Act. This scenario serves as a point of comparison, making it possible to isolate the impact of recent rollbacks in federal tax credits.

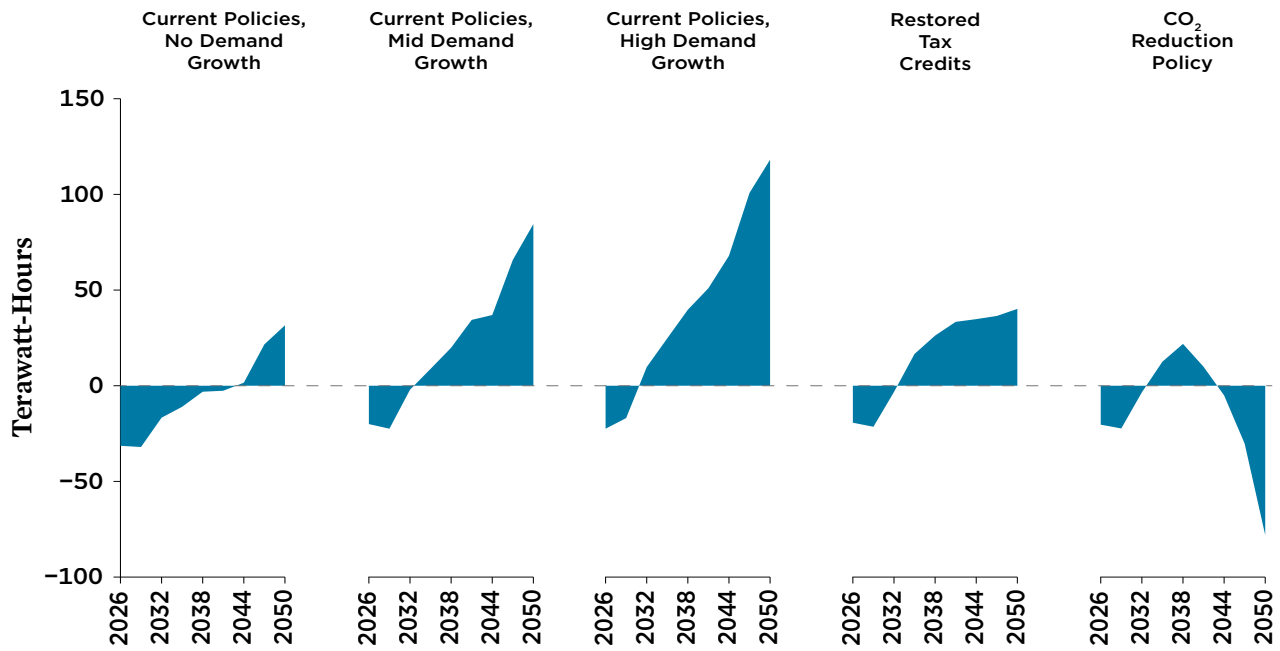
The Uncertainty of Data Center Load Growth

Northern Illinois and the Chicago area are among the nation's top data center markets (Cushman & Wakefield 2025). As of July 2025, Commonwealth Edison (ComEd), the electric utility serving the region, had received 75 applications for data center projects, totaling more than 28 gigawatts (GW) of combined load in different phases of its engineering study process (Pletz 2025). While it is likely that many of these projects will either end up smaller or not be built at all, that amount of new demand would more than double the total peak demand in ComEd's entire service territory.

Most of our scenarios used electricity demand projections developed by Evolved Energy Research and its reference growth trajectory for data center load growth. Given the high level of uncertainty of projected load growth from data centers, UCS adjusted the inputs based on announced builds and utility filings. We assumed that half of the capacity from announced data centers would get built. We also used a higher demand projection as a sensitivity.

For Illinois, UCS assumed that data center capacity increases from 2.6 GW in 2025 to 5.8 GW in 2030 under the Mid Demand Growth case and to 7.2 GW for the High Demand Growth case. In 2050, we assumed capacity increases to 10.4 GW under the Mid Demand Growth case and 16.8 GW in the High Demand Growth case.

FIGURE 1. Illinois Net Electricity Imports



Negative values show a net exporting status for Illinois, while positive values show the state as a net importer. Data center load growth drives steep increases in electricity imports for Illinois, while stronger policies moderate or even reverse that trend.

Overall, total electricity demand in Illinois is projected to grow 23 percent by 2030 in the Mid Demand Growth case and 29 percent in the High Demand Growth case. By 2050, it grows 76 percent in the Mid Demand Growth case and 105 percent in the High Demand Growth case. Data centers are the biggest driver of expected demand growth in the near term, representing 64 to 72 percent of Illinois's electricity demand growth between 2025 and 2030.

Results

Electricity Imports and Exports

Illinois is a net electricity exporter. In 2023, the state sent about one-fifth of the electricity it generated for use by consumers in other states (EIA 2024). Under current policies and excluding data center load growth, the modeling shows Illinois shifting to a modest level of electricity imports in the mid-2040s as additional coal- and gas-fired power plants retire due to age or economics or to meet emissions limits under CEJA (Figure 1; Current Policies, No Demand Growth). However, data center load growth in the Mid and High Demand Growth scenarios drives Illinois to become an energy importer earlier—around 2030 to 2035. It also steeply increases the amount of imports between 2030 and 2045 (Figure 1; Current Policies, Mid Demand Growth and High Demand Growth).

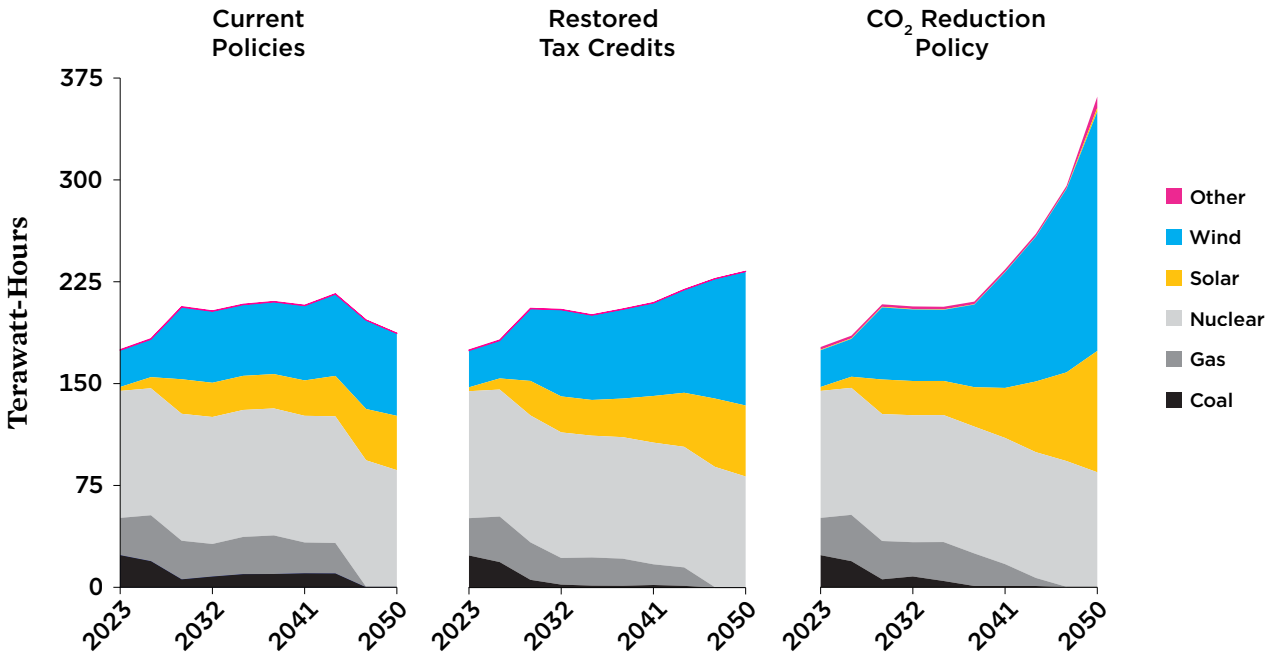
With stronger federal or state policies, Illinois can significantly limit its reliance on out-of-state electricity generation, giving the state more control over the sources of its power to support clean energy goals and in its ability to retain investment, revenue, and economic development. The Restored Tax Credits scenario avoids spikes in imports in the 2040s. The CO_2 Reduction Policy scenario results in fewer net imports; Illinois switches back to become a net exporter in the mid-2040s with the deployment of more in-state wind, solar, and storage.

Electricity Generation and Capacity

With respect to in-state electricity generation, UCS found that the Current Policies, Mid Demand Growth scenario increases cumulative generation over the study period by 12 percent; the increase is 16 percent in the High Demand Growth scenario. The increase in imports accounts for these small increases, both of which are in comparison with Current Policies, No Demand Growth.

Of the in-state generation increase that occurs due to data center–driven electricity demand, about two-thirds comes from solar and wind resources in Illinois; the balance is from gas and

FIGURE 2. Illinois Electricity Generation, Mid Demand Growth



Comparing the Current Policies, Mid Demand Growth case scenario with generation results from stronger state and federal policies shows much larger growth in output from wind and solar resources in Illinois.

Note: "Other" includes biopower, biopower with carbon capture and storage, hydropower, and oil and gas steam plants.

coal plants. **As a result of data center–driven electricity demand, Illinois gas plants run 34 percent more in the Mid Demand Growth scenario and 61 percent more in the High Demand Growth scenario compared with Current Policies, No Demand Growth. Coal plants run 21 percent more in the Mid Demand Growth scenario and 38 percent more in the High Demand Growth case.**

Meanwhile, the CO_2 Reduction Policy and Restored Tax Credits scenarios show noticeably more wind and solar generation from Illinois resources and less output from gas and coal plants (Figure 2). These scenarios reduce heat-trapping emissions and other air pollution from Illinois plants sooner. Moreover, they ensure that an increasing amount of the state's electricity is carbon-free and coming from Illinois-based clean resources.

With respect to capacity, UCS found that data center load growth under the Current Policies scenario results in additional solar, wind, and battery storage capacity in Illinois in 2050. However, more gas capacity remains for a longer period, until the state reaches the 2045 zero-emissions limit under CEJA. For example, the Mid and High Demand Growth cases lead to 3.4 GW more gas capacity remaining online in 2035 compared with no demand growth due to data centers.

In the CO_2 Reduction Policy and Restored Tax Credits scenarios, wind and solar increase to larger shares compared with Current Policies, Mid Demand Growth—especially in the 2040s as more in-state renewable resources are built and replace imports of electricity from other states (Figure 3, p. 5). Storage is also a more prominent feature, with significantly more battery capacity appearing in the second half of the analysis due to state and federal policies (see Box 1, p. 5).

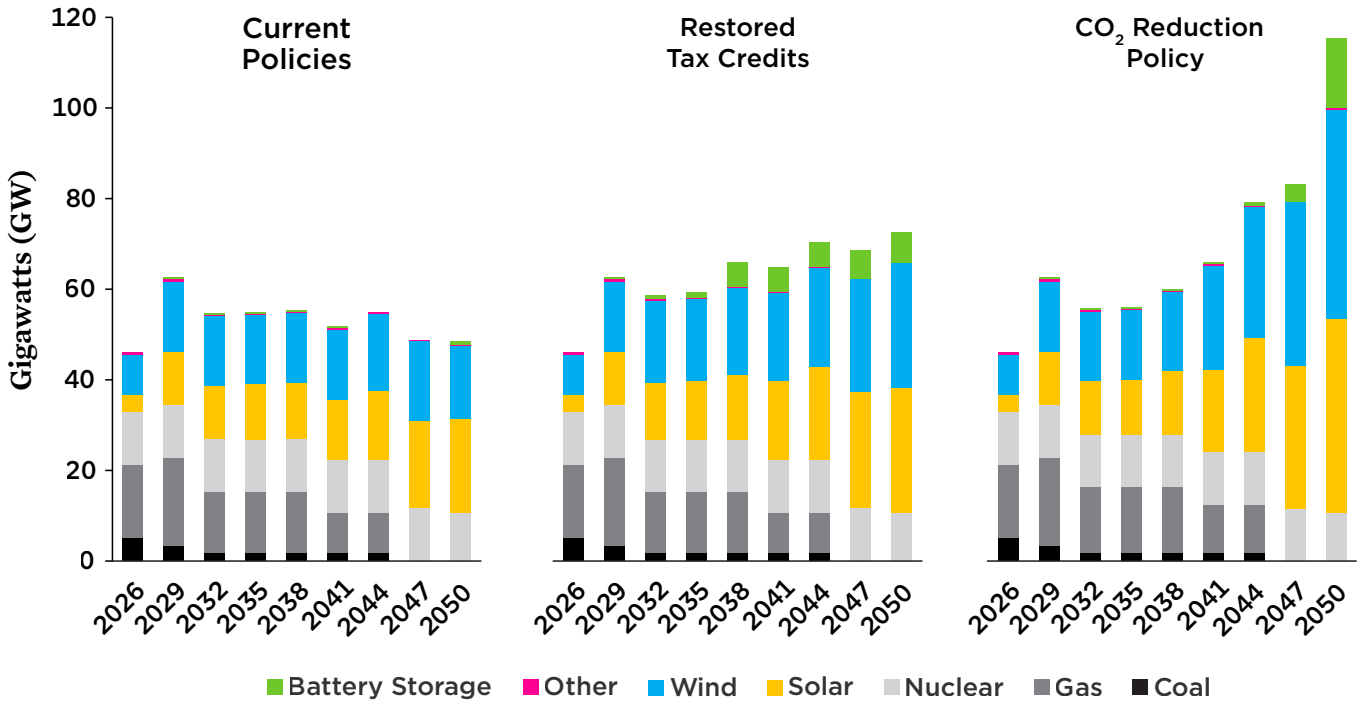
No new nuclear capacity is added in any scenario. It is more expensive than other options even with tax credits available through 2035.

Emissions Reductions

Overall, current Illinois policies drive CO_2 emissions reductions from the state's power sector, with notable reductions in 2030 and 2045 coinciding with CEJA emissions limit deadlines (Figure 4, p. 6). However, rising data center demand drives increased generation from remaining in-state gas and coal plants. As a result, the Current Policies, Mid and High Demand Growth scenarios also show increased emissions. Stronger state and federal policies could avoid the increases.

(continued on p. 6)

FIGURE 3. Illinois Electric Generating Capacity, Mid Demand Growth



Illinois solar and wind capacity is 18 to 52 GW higher by 2050 under the Restored Tax Credits and CO_2 Reduction Policy scenarios than in the Current Policies scenario. Energy storage capacity is 6 to 15 GW higher by 2050.

Note: "Other" includes biopower, biopower with carbon capture and storage, hydropower, and oil and gas steam plants.

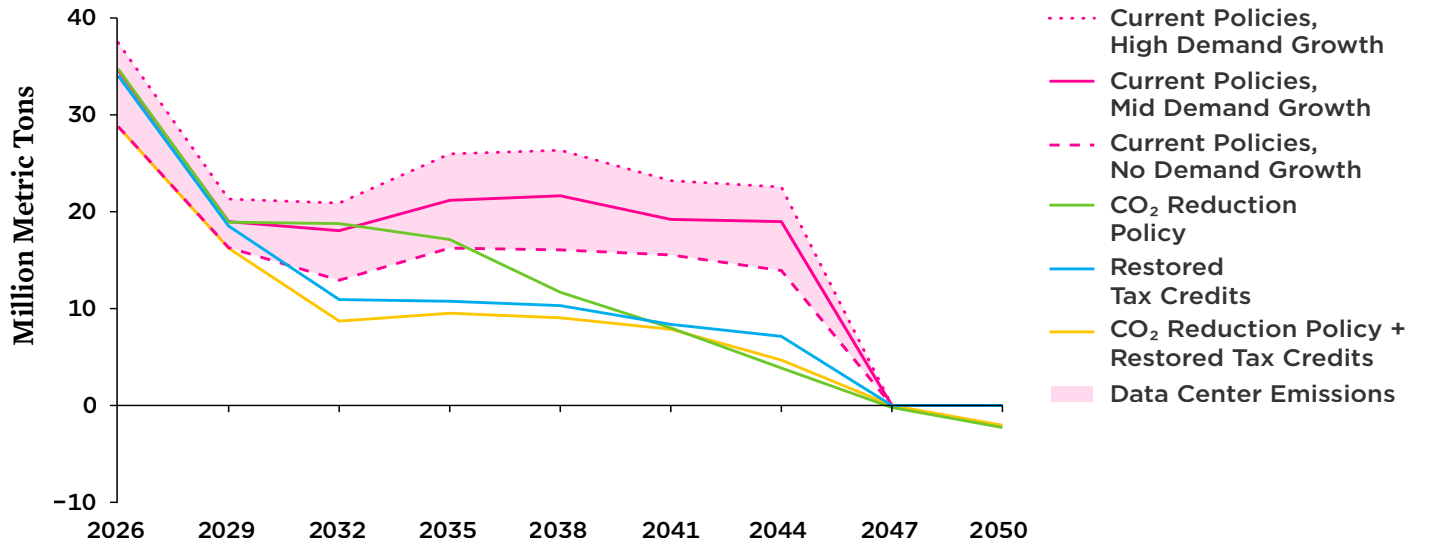
BOX 1.

Early Investments in Energy Storage Make Sense

A 2024 UCS analysis modeled the Illinois power system in order to assess how much energy storage the state may need to achieve its decarbonization goals under CEJA (Gignac 2024). We recommended that Illinois set an initial deployment target of at least 3 GW of four-hour-duration energy storage by 2030, a target that the state subsequently adopted in Public Act 104-0458. Our 2025 ReEDS modeling results did not select storage as a significant capacity resource until later years for scenarios in which storage tax credits remained available for a longer period of eligibility as was assumed in our previous analysis. Additionally, due to differences in the modeling tools utilized and assumptions made regarding Illinois' import-export status, the previous analysis showed higher load overall (due to an expectation that Illinois would continue to be a net electricity exporter) and much higher levels of wind and solar being built in Illinois; both of these tend to correlate with increased storage deployment.

UCS maintains our prior recommendation and supports Illinois' newly adopted target of securing at least 3 GW of four-hour-duration storage by 2030. Investing in a diverse set of clean energy capacity options is a hedge against the risk of future difficulties in siting and permitting large amounts of wind and solar. Also, adding storage reduces near-term emissions and lowers costs for Illinois ratepayers facing the threat of increasing load growth from data centers. The Restored Tax Credits scenario (Figure 3) illustrates the difference that federal credits for battery storage make, with more storage deployed in the late 2030s through mid-2040s than in the CO_2 Reduction Policy scenario. Accordingly, easing new Foreign Entities of Concern (FEOC) restrictions on the eligibility for federal tax credits, as well as increasing domestic manufacturing of batteries, would further aid Illinois' pursuit of its energy storage target. *See the technical appendix for additional discussion of FEOC.*

FIGURE 4. CO_2 Emissions by Scenario



The most positive scenario from a CO_2 emissions standpoint combines stronger state policy (the CO_2 Reduction Policy scenario) and stronger federal policy (the Restored Tax Credits scenario).

Indeed, restoring federal clean energy tax credits for wind and solar would reduce Illinois CO_2 emissions by 48 percent in 2035 and 61 percent in 2044 compared with the Current Policies, Mid Demand Growth case. These reductions would exceed those under the CO_2 Reduction Policy scenario through 2041, highlighting the importance of supportive federal policies for achieving state climate and clean energy requirements.

Data center load growth also affects emissions of other heat-trapping gases and harmful air pollutants. Compared with the Current Policies, No Demand Growth case, total methane emissions increase 31 percent under Mid Demand Growth and 53 percent under High Demand Growth. Total emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2), harmful pollutants and precursors to unhealthy particulate matter, are 24 and 36 percent higher for NOx and 14 and 28 percent higher for SO_2. Meanwhile, comparing the CO_2 Reduction Policy scenario with Current Policies, Mid Demand Growth, we found 18 percent lower methane emissions, 15 percent lower NOx emissions, and 32 percent lower SO_2 emissions with the stronger policy approach.

Health and Climate Impacts

Because data center load growth results in more air pollution and heat-trapping emissions from Illinois power plants, health costs and climate damages increase as well. Compared with the Current Policies, No Demand Growth scenario, from 2026 to 2050, data center load growth in Illinois would be responsible for:

- 68 to 241 additional mortalities in the Mid Demand Growth case and 118 to 403 additional mortalities in the High Demand Growth case;
- $1.23 billion more in health costs in the Mid Demand Growth case and $2.07 billion more in health costs in the High Demand Growth case; and
- $70 billion more in climate damages in the Mid Demand Growth case and $124 billion more in climate damages in the High Demand Growth case.

Stronger energy policies result in public health benefits, including avoided health-related costs from respiratory illness, heart attacks, and mortalities. Results show an estimated savings of 26 to 35 percent compared with current policies by 2050, ranging from $79 million to $111 million per year on average (Table 1, p. 7). The policies also avoid climate damages of $84 billion to $112 billion by 2050.

Costs of New Demand

Increased electricity demand from data centers increases the total electricity system costs for Illinois, mostly due to capital investments for building generation resources, operations and maintenance costs, and fuel costs. Compared with the Current Policies, No Demand Growth counterfactual scenario, the Mid Demand Growth scenario adds roughly $24 billion in system costs; the High Demand Growth scenario adds roughly $37 billion (Figure 5).

TABLE 1. Avoided Health and Climate Impacts of Stronger Policy Adoption

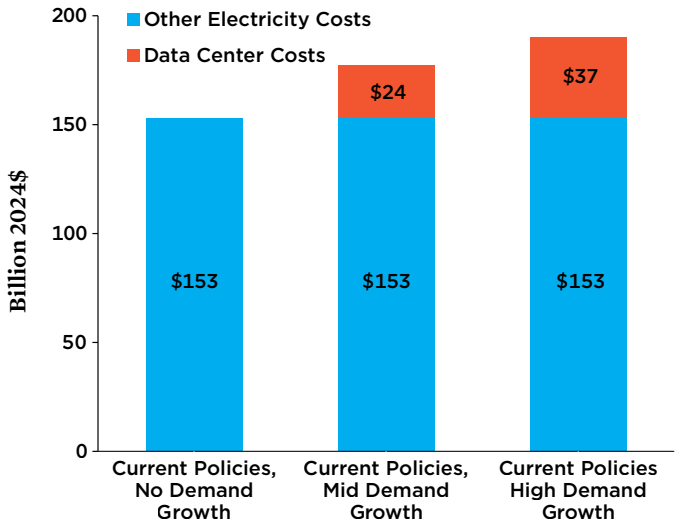
	Avoided Impact, Annual Average		Cumulative Avoided Impact, 2026–2050	
	CO_2 Reduction Policy	Restored Tax Credits	CO_2 Reduction Policy	Restored Tax Credits
Mortalities	5 to 15	7 to 21	123 to 379	166 to 531
Health Costs	$79.3 million	$111.1 million	$2 billion	$2.8 billion
Climate Damages	$3.4 billion	$4.5 billion	$84.4 billion	$112.4 billion

Notes: Dollar estimates represent median values.

With stronger federal policies—specifically the Restored Tax Credits scenario—Illinois system costs are greater than the Mid Demand Growth scenario ($198 billion compared with $177 billion) as more resources are built in the state. The CO_2 Reduction Policy scenario results in even more Illinois-based resources and has electricity system costs totaling $278 billion between 2026 and 2050 (a figure that could be reduced to $236 billion by restoring federal clean energy tax credits, a savings of 15 percent).

With each of the improved policy scenarios, Illinois would benefit from greater economic development, job growth, and tax revenue through the construction of significantly more in-state clean energy resources compared with Current Policies, Mid Demand Growth. These benefits are in addition to the lower health costs and avoided climate damages.

FIGURE 5. Electricity System Costs and Data Center Share, 2026–2050



Under current policies, the Mid Demand Growth and High Demand Growth scenarios are 15 and 24 percent more costly than the No Demand Growth scenario.

Conclusions and Recommendations

Under current policies, UCS modeling demonstrates that the addition of data center demand in Illinois drives higher use—and emissions—from in-state fossil plants and sharply increases reliance on imported electricity. The modeling also demonstrates that stronger policies can mitigate these trends and spur the development of additional clean energy resources in Illinois, producing greater economic activity and local tax revenue, improved health outcomes, and reduced climate damages attributable to Illinois electricity generation.

Illinois confronts numerous proposals for power-hungry data centers, as well as uncertain trajectories for the total amount of actual development. State decisionmakers must establish policies that protect consumers from added costs brought on by data center growth and help Illinois meet new demand with clean energy resources:

- **Require proposed data centers to secure new sources of carbon-free electricity deliverable to Illinois.** Instead of forcing Illinois to import increasing amounts of power that may come from out-of-state fossil plants, requiring data centers to bring their own new clean energy will yield more clean energy development in Illinois. For backup power, the state should require data centers and other large loads to use energy storage and minimize use of diesel or gas generation.
- **Increase transparency and accountability.** State policymakers should require data center companies to publicly report power needs, emissions, water use, and other data. Regulators must also hold utilities accountable for developing load forecasts based on realistic, firm commitments rather than speculative load.

- **Require data centers to pay for additional grid infrastructure and operating costs.** State regulators should require data centers and other large loads to pay for incremental transmission, grid upgrade, and operating costs. They should also require utilities to use rate-setting processes to track transmission costs caused by specific customers and then require those customers to pay the costs (Jacobs 2025).
- **Leverage the state's new integrated resource planning policies.** Recently adopted in Public Act 104-0458, Illinois's integrated resource planning makes it possible to adapt to the energy system's long-term needs. Such planning can assess ways to meet different levels of electricity demand with clean and affordable energy.
- **Ensure strong support for state clean energy policies.** Reversing recent changes to federal tax credit provisions for clean energy technologies remains a top priority for the country and for Illinois. That said, state policymakers should continue supporting renewable energy goals, effectively implement Illinois' new battery storage procurement program, and consider additional policies. For example, a carbon-free electricity standard would reduce reliance on electricity imported from out-of-state coal and gas power plants.

This fact sheet is part of a multistate analysis of ways to meet data center load growth with clean energy solutions. Learn more at www.ucs.org/resources/data-center-power-play.

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Organizational affiliations are listed for identification purposes only. The opinions expressed herein do not necessarily reflect those of the organizations that funded the work or the individuals who reviewed it. The Union of Concerned Scientists bears sole responsibility for the report's contents.

Endnotes

1. On December 1, 2025, the US Department of Energy announced that the National Renewable Energy Laboratory (NREL) would be renamed the National Laboratory of the Rockies. In our report and supporting materials, we have chosen to use the original name for clarity.

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