Industrial Rate Impacts on Electrification Projects in Illinois and Michigan

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February 2026
White Paper

ACEEE

About ACEEE

The **American Council for an Energy-Efficient Economy** (ACEEE), a nonprofit research organization, develops policies to reduce energy waste and combat climate change. Its independent analysis advances investments, programs, and behaviors that use energy more effectively and help build an equitable clean energy future.

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Acknowledgments

The authors gratefully acknowledge external reviewers, internal reviewers, colleagues, and sponsors who supported this report. External expert reviewers included Elizabeth Boatman from 5 Lakes Energy, and Lauren Kubiak and Mohit Chhabra from the National Resources Defense Council. Internal reviewers included Mike Specian, Steve Nadel, Ben Somberg, Mark Kresowik, and Forest Bradley-Wright. The authors also gratefully acknowledge the assistance of Mariel Wolfson from New Buildings Institute. External review and support do not imply affiliation or endorsement. Last, we would like to thank the following members of ACEEE's editorial and communications team: Ben Somberg, Camron Assadi, Kate Doughty, Mark Rodeffer, Mary Robert Carter, Nick Roper, Rob Kerns, and Ethan Taylor for their help in launching this report.

Suggested citation

Johnson, Anna, Andrew Hoffmeister, Richard Hart, and Fikayo Omotesho. *Industrial Rate Impacts on Electrification Projects in Illinois and Michigan.* Washington, DC: ACEEE. https://www.aceee.org/white-paper/2026/02/industrial-rate-impacts-electrification-projects-illinois-and-michigan.

Data and licensing information

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Executive summary

Key findings

- Industries in Illinois and Michigan can boost competitiveness, save energy, and reach climate goals through industrial electrification, but electric rate structures are standing in the way.
- Illinois has high energy savings potential through electrification compared to other states because low-temperature process heat represents a higher fraction of total industrial heat demand compared to other states. Industrial electrification is likely needed to help Illinois reach its climate targets.
- Michigan, despite its ambitious climate goals, is one of the most gas-dependent states in the country. Industrial heat pumps (IHPs) would improve efficiency and reduce emissions in Michigan's industrial sector, particularly in the food and beverage and automotive sectors. Electrification is consistent with the state's MI Healthy Climate Plan and recently passed clean energy laws.
- To achieve these outcomes, utilities will need to restructure industrial tariffs.[1] However, utilities face a number of barriers to developing new rate structures that are supportive of large, flexible new electrical loads.
- Targeted industrial rates and programs can also effectively support industrial electrification.[2] Programs that offer discounted energy and demand charges for pilot projects and fuel switching initiatives can help drive adoption.
- Lessons from other sectors can help guide industrial electrification efforts. Examples include heat pump–specific rates for residential customers, electric vehicle rates that direct load to specific times of day, and data center–specific rates that support large loads.
- Legislative efforts can support industrial electrification through bills that encourage new flexible loads, prioritize clean energy, and shift peak demand. By introducing new policies, legislators spark key stakeholder dialog that informs ongoing utility proceedings and rate design.

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[1] A utility tariff is a schedule of rates that includes unit energy costs at different times of day and year, charges for peak demand, and fixed fees.

[2] For the purposes of this paper, the definition of industry does not extend to data centers and is limited to entities that process, produce, or assemble goods.

Electrification of low- to medium-temperature[3] industrial process heat is one of the most promising and accessible pathways for manufacturers to increase competitiveness, improve efficiency, modernize facilities, and save energy in the near term. Electrification can also help states and utilities meet energy goals, manage energy sources, and reduce air pollution. Electric industrial heat pumps (IHPs), for example, can reduce energy use associated with generating industrial process heat by up to one-third (Rightor et al. 2022).

This white paper investigates how energy bills change as industrial facilities electrify operations, with a focus on two Midwestern states, Illinois and Michigan. We find that electrification increases energy costs across all the rate tariffs studied. As a result, we highlight the opportunity to (a) change or create rate structures, also known as tariffs, to support electrification, and (b) start programs that encourage flexible heating loads in industry.

Midwestern utility regulators, rate developers, and program designers can turn to multiple sources for best practices, as we explore in this paper. First, they can look outside of the Midwest for design ideas for the industrial sector, such as BC Hydro's "clean energy" rate that offered incentives covering energy and demand charges over a seven-year lifetime. Second, they can turn to other sectors for ideas on more nuanced time-of-use or coincident peak rates. These rates incentivize more flexible demand, including energy storage or behind-the-meter generation to build flexible capacity. Third, they can develop special electrification rates that are based on separate meters for incremental new electrified demand; the goal is to reduce the impact of demand charges while still meeting cost-of-service requirements. Finally, they can partner with state policymakers to develop tax credits or granting programs that can offset financial burden for electrifying manufacturing facilities and help to overcome larger spark gaps (the price differential between average electricity and gas prices at the facility).

As industry electrifies, traditional cost allocation runs the risk of shifting a disproportionate burden onto early adopters. Utilities should not necessarily be required to subsidize electrification or provide discounts, but electrifying facilities should not be penalized by legacy rate designs that were never intended for new, large loads (DOE 2025). Fair allocation would mean aligning charges with the costs customers actually impose on the system and using targeted tools to incentivize decarbonization where it makes sense. Electrifying industrials should not have to pay more because tariffs were designed without these factors in mind.

[3] For the purpose of this work, low- to medium-temperature applications of industrial process heat refer to temperatures up to approximately 200°C (400°F).

Introduction

Industrial electrification is a proven solution for modernizing factories and cutting energy waste, while delivering essential co-benefits such as lower maintenance and insurance needs, improved air quality, and reduced carbon emissions. Yet, the capital and operating costs of electric technologies remain barriers to broad, sector-wide uptake. In the industrial Midwest, which is home to a significant portion of American manufacturing (figure 1), grasping the industrial electrification opportunity requires solutions in climate and economic development planning.

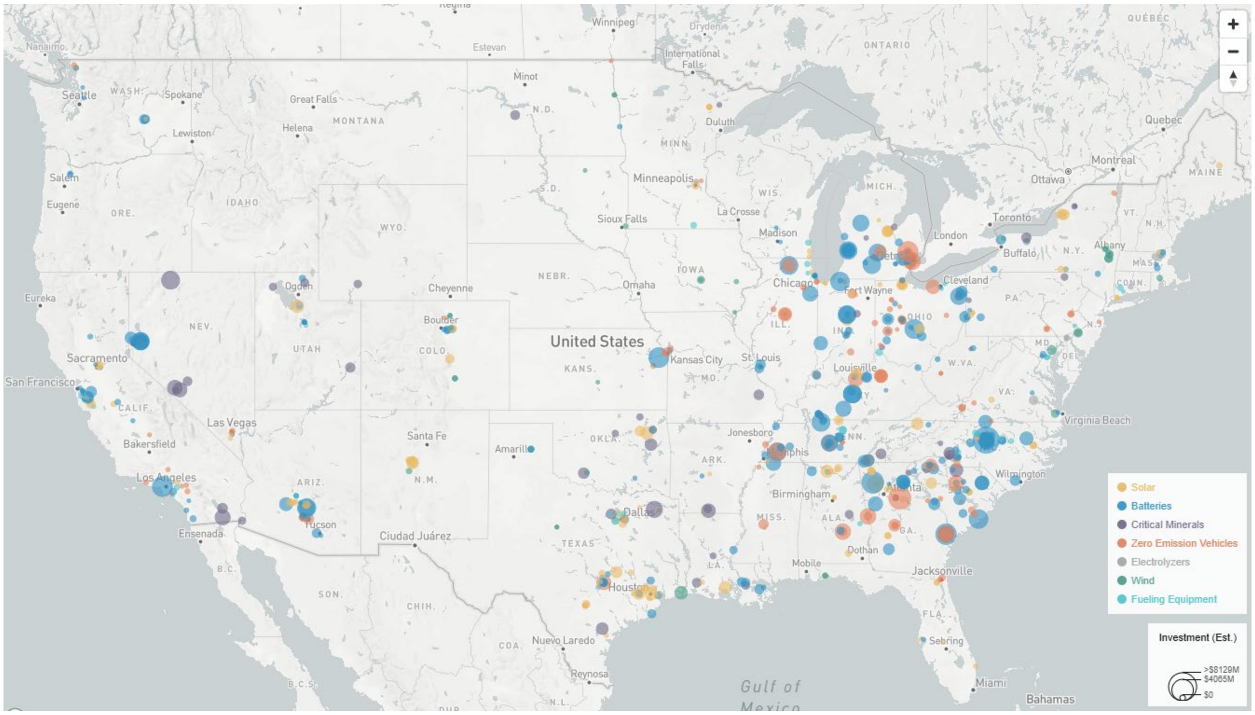

Figure 1. Announced manufacturing investment from January 1, 2018, to September 30, 2025, by estimated million dollars. Investments cluster especially prominently in both the Midwest and Southeast. Data source: Rhodium Group Climate Deck.

This paper summarizes the opportunities and remaining economic barriers to industrial electrification in Illinois and Michigan, laying the groundwork for targeted future research and advocacy efforts to achieve a clean, electrified industrial sector while avoiding negative impacts on other customer classes. We focus on the role of state policies and utility rate structures in enabling the installation of efficient industrial electrified technologies. Spark gaps—the ratio between average electricity to gas prices—are known to drive the economics of industrial projects. Nevertheless, the way that utilities and utility regulatory commissions structure rates and incentivize electrification can further influence project viability. As a case study, we examine low-temperature heating in the food and beverage sector in Michigan and Illinois, two Midwestern states with strong state-level climate goals and a robust industrial sector. We also discuss how capital expenditures interact with operational costs to affect facility return on investments (ROIs), and we explore how tariff design principles from other sectors, along with complementary programs and incentives, could help overcome economic barriers.

Industrial electrification technologies are ready today

A variety of electrified technologies deployable today can deliver high-quality heating for industrial processes. Higher-temperature and sector-specific technologies such as electric arc furnaces for steelmaking and aluminum smelters are already in place across the country. Flexible and cross-cutting technologies more suited to lower-temperature heating needs, such as industrial heat pumps and heat batteries, are newly mature commercial markets in the United States, with many early installations now operational.

Industrial heat pump technologies have been identified as a key path to cutting energy waste and emissions across the industrial sector. Electrifying just low-temperature process heating (under 165°C) using heat pumps could eliminate up to 5% of the scope 1 emissions from the U.S. industrial sector by 2030, totaling 77 MMT of CO_2 (Rissman 2022). This relatively conservative near-term reduction impact reflects the time required for industrial facilities to replace legacy boilers and infrastructure and install electrified technologies at scale. By 2050, this could grow to 16% of total industrial energy emissions averted, as a result of deploying industrial heat pumps for low-temperature process heating across a broader share of facilities and after multiple rounds of boiler replacement and electrification retrofits.

Industrial heat pumps remain a relatively expensive capital investment compared to legacy fossil fuel equipment, however. Capital costs for industrial heat pumps still run 5 to 10x the cost of gas boilers (table 1 expresses these costs in $/kW, a unifying metric representing the cost of heating power). The wide range of costs reflects different installation options and output temperatures

Many regional, state, and federal programs are working to defray the high initial costs of installing new electrified equipment. For example, the capital expenditures (CapEx) for industrial electrification projects that demonstrate greenhouse gas (GHG) emissions reductions and energy efficiency and/or demand flexibility benefits can be offset through state industrial decarbonization granting programs such as California's INDIGO program and Pennsylvania's RISE PA program (CEC 2025; Pennsylvania Department of Environmental Protection 2025). While California's program is funded through state carbon cap-and-trade funds, Pennsylvania's program is funded through an EPA grant.

Table 1. Summary of CapEx costs from three different sources for industrial heat pumps and gas boilers for lower temperature process heating purposes (excluding installation costs)

Source	Estimated IHP costs	Estimated gas boiler costs
Amarnath (2024)	600–800 $/kW	65–170 $/kW
Koski (2025)	850 $/kW	NA
Rissman (2022)	700–870 $/kW	234 $/kW

Supply chain investments, especially through a 2022 appropriation under the Defense Production Act, have also resulted in a maturing technology market for industrial electric technologies that are ready to be installed as legacy fossil fuel equipment (e.g., industrial boilers) reaches end of life. As a result of supply chain investments, lead times on industrial heat pump installations have dropped significantly.

Heat pumps plus thermal storage = efficient *and* flexible load

When heat is supplied by electric technologies that are limited in efficiency (e.g., resistance heaters or electric boilers, which cannot achieve efficiencies greater than 1), the operating cost difference between electricity and natural gas can be very difficult to overcome. Heat pump technologies, however, are able to achieve effective efficiencies greater than 1 because they transfer heat rather than generate it. A survey of installed industrial heat pumps in the United States found an average coefficient of performance (COP) of 2.8–4.3 (Hoffmeister et al. 2025). This represents 280–430% effective efficiencies, whereas gas boilers rarely deliver efficiencies above 85%, especially when these boilers deliver steam.

The ratio between average wholesale electricity prices and gas prices is referred to as the spark gap (see map below of average spark gaps for states, figure 2). In states with a spark gap greater than 4—the range in which efficiency gains from electrification bring facilities very close to breaking even (the gold-colored states in the map)—this operating cost differential will be very difficult to overcome without substantial policy support. In states with spark gaps at roughly 4 or below (light green states), heat pump installations may still have trouble delivering net-positive returns on investments (ROIs) within five years. Most industrial facilities look for projects to deliver simple paybacks or ROIs within three years to move forward on new capital expenditure upgrades, and small and medium manufacturers are often even more sensitive to these constraints. Even in states with the lowest spark gaps (dark green states) such as Pennsylvania, Ohio, and Washington, higher operating costs for electrified technologies are still considered a major barrier to progress.

Note that industrial plants purchase natural gas in one of three ways: from local distribution companies (LDCs) that own and deliver the commodity (sales volumes), from another supplier but delivered by the LDC (transport volumes), or direct from interstate pipeline operators. Figure 2 only captures average natural gas prices from local distribution companies. End users that purchase natural gas from pipeline operators often access even cheaper fuel, exacerbating the spark gap ratio. In many states, direct purchases account for over 75% of industrial gas volumes, meaning the average spark gap may underestimate the real competitiveness challenge.

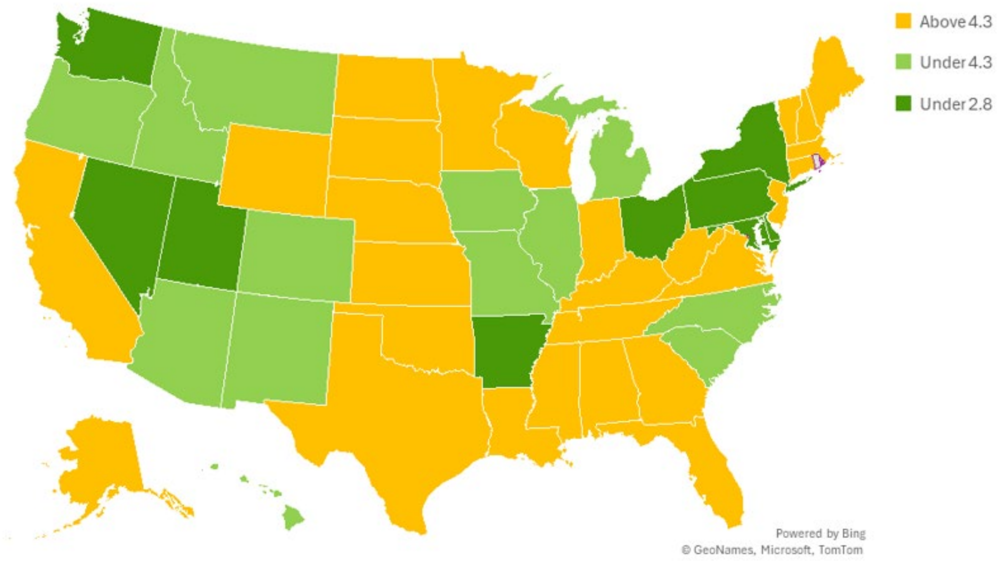

Figure 2. Industrial spark gap map, calculated from average prices from October 2023–October 2024, based on EIA data (U.S. Energy Information Administration 2025a).

Nonetheless, industrial electrification projects have successfully gone ahead in states with very high spark gaps, with support from state and federal policies and programs (figure 3). For example, a cluster of industrial electrification projects in California are the result of a combination of both state-level regulatory pressure and incentives (Bell 2024; Borgeson and Yaziji 2025).

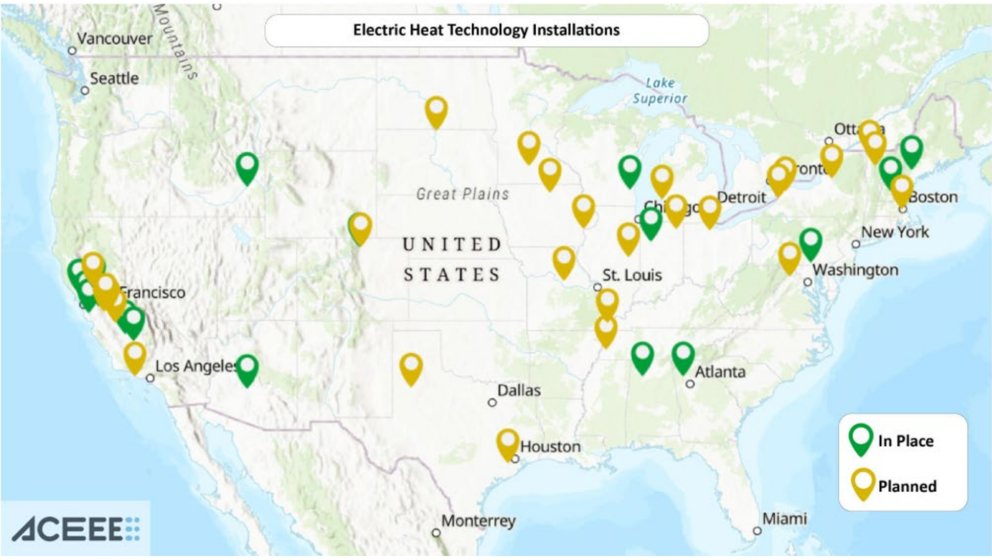

Figure 3. Map of electrification technology installations either in place or planned (Hoffmeister et al. 2025). Installations are clustered in some states with high spark gaps, such as California, where substantial state-level incentives drive electrification uptake.

Heat pumps run most efficiently and deliver the highest return on investment if they are operated relatively continuously, with few starts and stops (Uhlmann and Bertsch 2010; Li et al. 2024). This means that they are unlikely, on their own, to provide highly flexible or regularly interruptible services for the grid.[4]

Combined with energy storage, however, there is substantial potential for heat pumps to deliver high levels of both efficiency and flexibility. Most industrial energy demand is for the production of thermal energy—and unlike conventional batteries that store electricity, thermal storage stores heat directly, making it a relatively low cost and durable form of energy storage (Hurst et al. 2024). This industrial value proposition for large-scale thermal storage is reflected in the rapidly growing market for *heat batteries* or *thermal batteries*, which are grid-responsive systems that can preferentially convert renewable electricity into stored industrial heat, helping reduce renewable curtailment (Spees et al. 2023). These systems typically use phase change materials to retain heat from hours to days, offering longer-duration flexibility than most alternative energy storage.

Hot-water tanks, a simple and traditional thermal storage technology, can also provide some short-term buffering and resilience to heat pump systems at a low cost. These tanks are often incorporated into thermal system designs when installing heat pumps to ensure that consistent quality heat is delivered and to mitigate the slower start-up times of heat pumps compared to resistance heating or fossil fuel

[4] Some heat pumps, however, are designed to run in parallel with existing thermal systems (e.g., gas-fired boilers) and to operate in a grid-responsive manner by allowing operators to switch between drawing power from the grid or using fuel backup (e.g., Geiver 2024).

combustion heating (Ahrens et al. 2021). In some facilities, ice-based or chilled-water storage systems are also being explored for cooling or batch-process operations.

Industrial electrification responds to load growth

Since 2022, five-year electricity load growth forecasts have increased over 5x, from 23 GW of expected load growth nationwide in 2022 to 128 GW of expected load growth as of 2024. This growth is primarily driven by data centers and new-build manufacturing (Wilson et al. 2024). Most of the expected manufacturing-related load growth—focused within battery and semiconductor supply chains—is occurring in the southeastern states, MISO territory (Illinois, Indiana, and Michigan), PJM territories (especially Ohio), and the southwest (Wilson et al. 2024).

In addition to the construction of new facilities with high electricity demand, fuel switching from fossil fuel combustion to electric technologies in existing factories is slowly gaining momentum. Electricity has provided only ~14% of industrial energy demand for many decades (U.S. Energy Information Administration 2023). And for industrial process heating, which accounts for over 50% of industrial energy demand, only about 5% of the energy consumed is delivered by electrically powered process heating equipment (DOE 2022). The industrial sector, however, is reaching an energy transition point:

- A combination of top-down international, corporate, and state climate commitments and policies require deep cuts in carbon emissions from operations (e.g., Gallucci 2025).
- Increasing demand for natural gas, especially for export, is likely to drive gas fuel cost increases in the United States over the coming years (Ricker and Iraola 2025).
- The grid is becoming cleaner as interconnection queues fill with renewable power and storage (McCarthy and Olano 2024), while coal plants continue to retire (Gaffney and Rojanasakul 2025). In 14 states, at least 30% of generated electricity comes from renewable sources (U.S. Energy Information Administration 2025b).

As grid planners struggle to keep up with new demands, especially in regions of the country where manufacturing and data center pressures collide (Esram and Elliott 2024), the value of both efficiency and demand flexibility is likely to skyrocket in the short term (Johnson et al. 2024). Minimizing new load sizes and shifting loads away from coincident system peaks will reduce the need for investing in costly new grid infrastructure with slow development timelines. Grid connections can take at least four years, building new transmission lines can be a 10-year process, and there is currently a supply chain delay just for new transformers of over a year (IEA 2023; Rathi et al. 2025). For example, the Southwest Power Pool, which faces rapidly rising demand from data centers, home heating electrification, and electric vehicles, plans to use demand response programs to bridge the gap in bringing on new generation and transmission (Howland 2025).

A recent study focused on demand growth from data centers estimated that, nationwide, there is capacity for as great as 76 GW of new data center load, assuming the centers can achieve an average annual load curtailment rate of just 0.25%, for less than two hours at a time (Norris et al. 2025). The ability to incorporate new demand without building new grid infrastructure is the result of relatively low (nationwide average of 53%) capacity load factors.[5]

If industry can electrify efficiently and flexibly, so as to avoid adding new load during times of system peak demands, then industrial demand growth will be less costly for the grid and can circumvent concerns around stressing the grid as a result of electrification (Esram et al. 2024; Guernsey et al. 2021). More fully utilizing existing grid assets improves the profitability of existing utility resources, allowing utilities to continue to invest in providing reliable service to consumers without additional costly upgrades or the need to run expensive gas-powered peaker plants for short periods of time (U.S. Environmental Protection Agency 2022; Goldenberg et al. 2018).

The role of utility policy and rate structure in industrial electrification progress

A carefully designed electrification project for an industrial facility can deliver highly efficient and flexible heat demand, mitigating grid impacts of increased load while also reducing onsite GHG emissions and local air pollutants from fuel combustion. These reductions can be particularly meaningful in areas with nonattainment challenges, where industrial activity contributes to criteria air pollutant concentrations. In states with smaller spark gaps, the operating costs of new electric technologies are also likely to be lower.

Through a survey of the literature as well as a series of expert interviews, we identified the following major rate structure challenges from the perspective of industrial facilities looking to electrify.

- **Pricing structures that do not align with costs of coincident peaks,** that is times of true grid constraint, can expose industrial facilities to high charges that do not reflect their actual contribution to system peaks, reducing incentives to electrify or invest in demand side flexibility and potentially impacting system reliability (Aniti 2019; St. John 2022). Conversely, in most hours of the year, it is very inexpensive for the grid to provide additional electricity, meaning facilities could shift production or thermal loads into such low-cost periods if rate structures accurately signal them to do so. Broad time-of-use pricing often does not reflect times of true grid constraint, so additional load from an electrified industrial facility could coincide with systemwide or local peaks that require activation of expensive peaker plants. This is especially true as system peaks get narrower, more frequent, and more dramatic compared to baseload in grid systems, with an increasing prevalence of renewable energy sources (Baldwin 2024; Patel 2023). At the same time, rates that vary too frequently undermine the predictability many industrials need to plan operations. There must be a balance of grid-responsive signals and a manageable level of certainty for electric technologies to help end users capture the full value of their flexibility. Larger industrial facilities, in particular, often have flatter, more continuous energy demand profiles because they operate nearly continuously. They currently have limited flexibility to shift or curtail loads in demand response programs that require them to modify production schedules, although new electrified technologies combined with smart manufacturing are opening up opportunities.

[5] Capacity load factor is defined as the ratio of average system demand to peak system demand; higher factors mean that there is less variation in how completely grid resources are used, whereas lower factors represent a grid with dramatic system peaks and grid resources that are used less frequently.

- **Traditional event-based programs for load flexibility may not be viable in a more complex grid.** Traditional interruptible tariffs[6] or demand response programs pay for performance during an event, but they may not be the best way to handle a more complex grid, with more continuous need to balance supply and demand (Hale et al. 2018). Industrial facilities could balk at the need to respond to an increasing number of curtailment events, leading to a decrease in participation. Relatively predictable and well-defined coincident peak periods (though actual system peaks may not always align) could maximize participation. Meanwhile, rate structures designed to reward rapid and flexible responses to shifts in power availability could incentivize facilities to redesign thermal systems with energy storage or behind-the-meter generation resources, which allow regular load shifting as part of their operational model.
- **Demand charges and ratchets[7] can disincentivize increased electricity loads** due to electrification. Demand charges, assessed based on facility monthly peak demand, can account for over 30% of industrial energy bills. However, these charges are often only weakly correlated with demand during actual system peaks, especially for the vast majority of industrial loads that are not correlated with outdoor temperature. Demand charges trace back to mid-20th century grid challenges, and have been rendered obsolete by modern metering technologies as well as 21st-century changes in the generation mix and grid dynamics (RAP 2020). When industrial facilities add additional electric loads as a result of electrification, this can lead to disproportionate increases in demand charges, even when new loads are efficient, flexible, and strategically managed.
- **Lack of actionable price signals could constrain the benefits of electrification**. Many current industrial rates lack price granularity and/or the structure required to reward the flexibility enabled by electric technologies and controls. While full real-time pricing can be too complex for many customers to manage effectively, flat rates and/or high demand charges fail to provide adequate signals. The result is that industrial customers lack practical, intermediate rate options. In the United States, electric rates must generally be based on cost-of-service principles, but limited data on electric IHP performance load profiles make it difficult for utilities and regulators to accurately estimate costs and design appropriate rate structures that leverage the value and flexibility of electrified heat.

Conversely, barriers to introducing electrification-friendly rates from the perspective of utilities include

- **Insufficient coordination across utility departments leads to challenges in addressing cross-cutting issues.** For example, putting together a package of rate reform and incentives for industrial electrification will require expertise and input from energy efficiency, demand response, program development, and distribution planning departments to successfully drive program development beyond pilot scales. However, many utilities are still in the early stages of building their knowledge base and have limited familiarity with industrial electrification

[6] An interruptible tariff is a relatively low electricity baseline rate for a consumer, with the assumption that the consumer must be able to curtail power demand when signaled by the utility to do so, or risk paying extremely high costs during times of grid strain.

[7] A demand "ratchet" in an industrial tariff is the stipulation that a customer will be billed monthly demand charges equal either to the highest peak demand over a set time period (often the previous 11 months), or some percentage of that highest demand peak (80% is a common setting). This clause is meant to insure the utility against wide swings in peak demand from a large consumer, which could impact grid reliability.

opportunities. In states like Michigan, utilities serve only a small portion of large industrial customers. There are also definitional uncertainties, including whether electric IHPs qualify as energy efficiency measures under gas utility programs.

- **Complex, slow docket-based rate development is ineffective in the short term.** Many utility providers we interviewed did not see rate design as the best tool for driving changes in customer practices that were needed quickly. They expressed a preference for instead developing new programs or incentives, suggesting this might be a more flexible and quicker way to drive desired energy consumer behaviors. Rates affect industrial consumers' behavior in the long term, so redesigned industrial rates will be a necessary but not *sufficient* driver of industrial electrification practices. Supplementary programs and incentives are needed in the short term.
- **Justifying individual rates is challenging**. Regulators often expect adequate justification for new rate options, including demonstrating appropriate cost recovery and alignment with cost causation, and in some cases cost-effectiveness—meaning that the benefits to participating customers outweigh all costs without unfairly shifting costs to nonparticipating ratepayers. But the justification for supportive rates may not be clear when viewed in isolation, especially if they lower demand charges or other rate components or complicate cost recovery. In addition, these rates may fail to account for the broader societal and environmental benefits of electrification.
- **Developing new rate structures gets limited regulatory and utility support** ahead of wide-scale demand. Most utilities offer a relatively wide range of industrial rates, which can make public utility commissions (PUCs) and utilities hesitant to introduce new options for relatively few adopters. However, the most effective industrial electrification rates often rely on particular design elements, including lower demand charges and time-of-use pricing, that go beyond what existing rates provide. Developing such rates requires lengthy, resource-intensive regulatory processes. Additionally, because load profiles vary widely by industrial subsector, single opt-in rates are unlikely to address all customers. Utilities may ultimately need to develop a broader portfolio of rate options, recognizing that industrial gas rates are often very low and fail to reflect the full social and environmental costs of fossil fuel use.

Midwestern opportunities to incentivize industrial electrification

In the following sections, we examine how state-level policies and goals may help drive progress on industrial electrification and utility policy changes in Illinois and Michigan. These states have spark gaps that make electrification cost effective for certain industrial subsectors. State policymakers have also set state-level climate goals that will require substantial emissions reductions from the industrial sectors. Both state public utility commissions are also opening proceedings looking at issues that relate to industrial electrification: In Illinois, proceedings are around the future of gas, while Michigan is exploring efficient electrification, energy waste reduction, and demand response potentials across all sectors, including the industrial sector.

Opportunities for electrification to decarbonize the industrial sector in Illinois

Illinois is one of the top five industrial states in the country, and the industrial sector is a driving force in the state's economy. Industrial manufacturing accounts for 12.83% of total economic output, while providing jobs to 30% of workers in the state, directly and indirectly (Von Nessen 2022). Additionally, about 18% of statewide GHG emissions are from the industrial sector. Reducing these emissions is an essential step toward the state meeting its ambitious climate targets (Kibbey 2024).

The Illinois 2024 economic development plan identifies several industries with the greatest prospects for growth in the coming years. These include biopharmaceutical manufacturing, quantum computing, microelectronics and artificial intelligence (AI) research, clean energy manufacturing, biofuel production, advanced manufacturing (e.g., machinery, fabricated metals, chemicals, and other advanced materials), and next-generation food manufacturing and agricultural technologies (Illinois Department of Commerce & Economic Opportunity 2024). As Illinois pursues economic growth in these industries, the state can ensure it maintains alignment with climate goals by supporting efficiency and electrification investments and scaling up access to clean energy (Penrod 2024).

Illinois is already well positioned to capitalize on electrification, as it is one of the states with the largest energy savings potential through electrification. Dominant industrial subsectors—food and beverage, chemicals, refining—rely on large amounts of low- and medium-temperature process heating; in total an estimated 43% of industrial heat demand in Illinois is for this lower-temperature heat, which is directly electrifiable today, if economic, policy, and logistical barriers can be overcome (CAELP 2024). Six subsectors—container glass production, ammonia production, secondary steel production, beet sugar production, wet corn milling, and soybean oil production—are industrial processes with a substantial presence in the state that can be directly electrified with commercially available technologies (Hasanbeigi et al. 2023).

Illinois industrial and energy policy

Ambitious clean energy policies and targeted action plans are helping drive Illinois toward a more sustainable, electrified industrial sector. In addition to the Climate and Equitable Jobs Act and the 2024 Priority Climate Action Plan, Illinois's Hydrogen Economy Task Force is mapping how hydrogen can fit into the state's clean energy future. Future of Gas (FOG) proceedings in the state incorporate strategies for moving consumers off of gas distribution networks, including through Illinois Commerce Commission–selected pilots. Pilot projects currently under consideration include industrial electrification opportunities for the agricultural sector and for low-temperature industrial process heating. Illinois passed the Clean and Reliable Grid Affordability Act in Illinois in October 2025, which also encourages utility-scale energy storage, offering pilots greater access to flexibility and grid integration (Illinois General Assembly 2025).

The Climate and Equitable Jobs Act

Illinois's Climate and Equitable Jobs Act (CEJA), signed into law in 2021, requires that all coal, oil, and natural gas–fired electricity generating units reach zero emissions by 2045, with varying interim end dates depending on the fuel type. Although CEJA mainly addresses power and transportation decarbonization, the act has led to the creation of programs that increase renewable energy sources and access to clean energy technologies in industry. For example, the Clean Energy Contractor Incubator Program provides low-cost capital and assistance to clean-energy contractors. This program effectively increases the supply of clean technologies to industrial, commercial, and residential customers.

Illinois Priority Climate Action Plan

The Illinois 2024 Priority Climate Action Plan outlines state goals for reducing greenhouse gas emissions from the industrial sector. These goals include

- 5% improvement in industrial efficiency by 2030 and 25% by 2050
- Electrify 10% of low-temperature industrial heat by 2030 and 95% by 2050
- Convert 30% of medium- and high-temperature industrial heat in certain sectors to electricity or green hydrogen by 2050
- Reduce hyperpotent fluorinated gas emissions by 20% by 2030 and 67% by 2050

Illinois's application for the Environmental Protection Agency's Climate Pollution Reduction Grant, in pursuit of the state's Priority Climate Action Plan goals, outlines industrial decarbonization as one of the state's five greenhouse gas reduction measures (Illinois Environmental Protection Agency 2024). The initiatives proposed to support access to funding and market transformation of carbon-free solutions for industry are the Clean Industry Concierge and Fluorinated Gas Reduction Program, both of which provide direct technical support to the Illinois industrial sector (Kibbey 2024; Freed and Dolan 2025).

Illinois utility and regulatory environment

Illinois is a fully deregulated state, meaning that while utilities deliver power to consumers, all consumers have the opportunity to contract for power supply with the suppliers of their choice. This leads to a wide range of available industrial rate structures, as well as a complicated relationship between supply and distribution costs for individual customers. There are options to access time-of-use (ToU) rates that incentivize usage at off-peak demand times, and especially for larger industrial customers, dynamic rates that mirror wholesale market pricing fluctuations. While adding a new industrial rate specifically to incentivize electrification would not be a significant departure from past rate development practices, there are no current tariffs that explicitly support industrial electrification.

Two major utilities—ComEd and Ameren Illinois—operate under the oversight of the Illinois Commerce Commission (ICC). ComEd in particular faces increasing pressure as its service area anticipates 25 new data centers planned with a projected cumulative peak demand of 5,000 MW (Howland 2024). The utility submitted a multiyear grid plan to the ICC outlining a $4.4 billion investment through 2027 aimed at improving reliability and supporting electrification. The plan emphasizes infrastructure upgrades that incorporate multidirectional energy flows and enhance customer participation in energy supply (Illinois Commerce Commission 2024a). After initially rejecting ComEd's proposal for failing to meet affordability and environmental justice requirements under CEJA, the ICC ultimately approved ComEd's refiled multiyear grid plan in December 2024 (ComEd Media Relations 2024).

Similarly, the ICC approved Ameren Illinois's grid plan in the same month after substantial revisions. Ameren initially proposed $333 million in investments, but the ICC slashed this spending by 75%. The plan, which covers the same four-year period from 2024 to 2027, includes just $83 million in grid investments. It is centered on reliability, resiliency, customer experience, and the clean energy transition (Illinois Commerce Commission 2024c).

Illinois is also confronting the future of its natural gas system as the state pursues decarbonization. In March 2024, the ICC launched the Future of Gas proceedings, beginning with a series of public workshops to assess the impact of Illinois's decarbonization goals on the natural gas system (Illinois Commerce Commission 2024b). While roughly two-thirds of Illinois's industrial customers rely on the natural gas distribution system to power their industrial processes, most of that gas—greater than 94%

in 2023—is purchased through the transport market, where industrial customers buy gas directly from suppliers and then pay a separate "transport fee" to have the gas delivered through the utility-owned distribution pipelines (U.S. Energy Information Administration 2024b). Only a small percentage of industrial gas is purchased directly from utilities and thus regulated by the ICC, and even fewer industrials receive gas directly from interstate pipelines.

Because many small and medium industrial customers in Illinois are not transport customers, they are more likely to be exposed to increasing gas system distribution costs, especially as more residential and commercial customers transition off the gas system. Larger industrial facilities that rely on transport contracts are primarily insulated from traditional ratemaking tools, meaning that the majority of industrial gas molecules flowing through Illinois pipelines are not directly impacted by regulatory mechanisms that can equitably allocate the costs of a transitioning energy system.

Opportunities for electrification to decarbonize the industrial sector in Michigan

Michigan is home to over 600,000 manufacturing workers, of which more than 11,000 are employed by small and medium-sized manufacturers (Michigan Department of Labor and Economic Opportunity 2024). This strong industrial presence positions the state as a key player in the push toward decarbonization. Industry accounted for 28.05 MMT of CO_2e emissions in 2019, making up 15% of total statewide GHG emissions (Michigan Department of Environment, Great Lakes, and Energy 2022). This underscores both the challenges and opportunities Michigan faces in balancing industrial growth with environmental sustainability.

Michigan's industrial landscape is deeply intertwined with its energy consumption, economic output, and geographic distribution. The Lower Peninsula of Michigan serves as the state's industrial and economic hub, home to major urban centers. Detroit employs the highest number of workers in the automotive and parts manufacturing sector in the country, contributing to two-fifths of Michigan's manufacturing gross domestic product (GDP). Other major subsectors contributing to the state's GDP include machinery production, pulp and paper, fabricated metal products, chemicals, food and beverages, and plastics (figure 4). GHG emissions are concentrated in a small number of large industrial facilities: Fewer than 100 facilities contribute more than 93% of Michigan's direct manufacturing emissions (E. Boatman, Lead Consultant, 5LakesEnergy, pers. communication., October 2025).

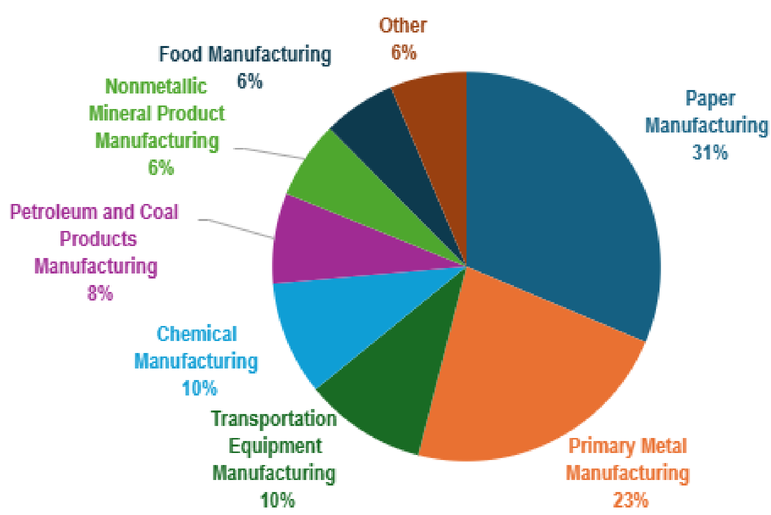

Figure 4. Distribution of industrial energy consumption in Michigan across industrial subsectors. Source: NREL 2018. Note that these data capture only large energy users.

Michigan consumes nearly four times more energy than it produces, ranking 11th in total energy use among U.S. states. The industrial sector alone accounts for 24.5% of total energy consumption in the state, following closely behind residential and transportation use. Natural gas plays a critical role in meeting industrial energy demands, with the industrial sector using nearly one-fifth of the state's natural gas supply.

Michigan industrial and energy policy

MI Healthy Climate Plan

Michigan's 2022 MI Healthy Climate Plan lays out an ambitious roadmap to reduce greenhouse gas emissions and transition toward a clean energy future. The state has set clear emissions targets: from a 2005 baseline, a 28% reduction in emissions by 2025, 52% by 2030, and carbon neutrality by 2050. Central to this strategy is a commitment to generate 60% of electricity from renewable sources and transition out of coal-fired power plants by 2030. The plan also aims to enhance sustainability beyond energy production, with a goal of increasing Michigan's recycling rate to 45% and cutting food waste in half by 2030.

To promote industrial electrification, the plan prioritizes innovation in clean energy and manufacturing processes. Key strategies include incentivizing the adoption of energy-efficient technologies such as combined heat and power (CHP) systems and promoting the use of renewable or lower-carbon fuel sources in new and existing facilities. The plan also emphasizes energy efficiency and electrification. In addition, the state also plans to explore the use of carbon capture, utilization, and sequestration (CCS) to mitigate the environmental impact of fossil fuel use. In fact, a CCS permitting bill package, SB 394-396, is currently being considered by the Michigan legislature.

MI Clean Energy Policy

In November 2023, Governor Gretchen Whitmer signed a series of new clean energy laws—Public Acts 229, 231, 233, 234, and 235—that address renewable energy standards and energy waste in the state. Collectively, these legislative measures will significantly impact Michigan's energy landscape through the establishment of clean and renewable energy standards, and the incorporation of environmental and public health considerations into the integrated resource planning (IRP) process. Public Act 229 specifically encourages industrial facilities to implement self-directed energy waste reduction plans, offering a pathway to both cost savings and sustainability.

Michigan's Department of Environment, Great Lakes, and Energy also plays a key role in advancing clean energy initiatives by promoting energy efficiency and sustainability through public awareness efforts and technology adoption programs for industrial and commercial customers. As part of this commitment, the Michigan Clean Energy Asset Roadmap provides various reports on the availability and market status of various clean energy technologies, including wind, solar, and geothermal. By combining legislative action with strategic planning and technical support, Michigan continues to develop a cleaner, more energy-efficient economy.

Michigan utility and regulatory environment

The Michigan Public Service Commission completed its statewide potential study of energy waste reduction, demand response, and efficient electrification in late 2025. While the industrial sector is included in the study's process electrification analysis, it is not treated as a central priority relative to buildings and transportation.

Michigan's largest electric utilities, DTE Electric and Consumers Energy, are laying the groundwork for a cleaner energy future through long-term planning and strategic investments. The 2022 DTE Electric Integrated Resource Plan outlines a 20-year (2023–2042) strategy to provide reliable and affordable electricity with an emphasis on a clean energy transition. By 2042, the plan aims to generate 15,400 MW of renewable electricity and to deploy a total of 2900 MW of battery electric storage, alongside achieving annual energy waste reduction savings of 1.5%. Expanding wind and solar capacity has the potential to reduce energy costs in the long term, creating stronger incentives for the adoption of electrification technologies by industrial customers (IEA News 2024). To further support this transition, DTE offers demand response programs for industrial customers such as the Alternative Electric Metal Melting Rider and the Electric Process Heat Rider, which provide financial incentives for reducing energy consumption during peak demand periods in key sectors.

Similarly, Consumers Energy's 2021 Clean Energy Plan (Consumers Energy 2021) highlights renewable energy, demand response programs, and battery electric storage as key measures in the clean energy transition. The plan projects approximately $650 million in energy savings by 2040 and aims to cut the company's market electricity purchases in half by 2032, reducing exposure to energy price volatility. This price stability presents a significant advantage for industrial customers looking to electrify, as it enables them to more accurately forecast operating costs when investing in electric equipment. Additionally, the utility also offers custom business incentives tailored to industrial customers such as Water and Air-Side Economizers and Floating Head Pressure Controls for Industrial, which enhance energy efficiency and deliver cost savings.

As Michigan's utilities continue expanding clean energy initiatives and financial incentives, industrial customers stand to benefit from lower costs, increased energy reliability, and a more sustainable path toward electrification.

Midwestern RTOs affect demand charges

In Michigan and Illinois, electricity bills are shaped significantly by transmission and wholesale market policies in MISO and PJM (referred to as both regional transmission organizations and independent system operators). In PJM, capacity prices recently reached a record $329.17/MW-day in the 2026/2027 capacity auction, which demonstrates how quickly costs can increase. MISO, meanwhile, is investing heavily in transmission system improvements. Its 2024 plan allocates $6.7 billion across 459 projects. These costs will be passed on to customers.

Both MISO and PJM impose demand charges on customers that are based on system-wide peaks:

- In PJM's case, the charges are determined by the five highest demand hours across the entire PJM region during the year, known as the 5 Coincident Peak (5CP) hours. A facility's contribution in these peak hours in one year determines their demand charges for the following year.
- In MISO's case, an auction in the spring of each year determines peak demand charges for the coming summer. Transmission customers are charged based on the customer's peak demand during the system-wide monthly peak; distribution customers have these charges passed through their local utility.

Both RTOs are under the jurisdiction of the Federal Energy Regulatory Commission and have existing stakeholder processes to address demand charges. They are not addressed in this report, which focuses on state-level actions.

Rate impacts on electrifying low-temperature process heating in the food and beverage industry

An estimated 97% of process heating demand in the food and beverage manufacturing subsector is for low temperatures (under 175°C), with 100% of heating demand under 300°C (Amarnath 2024). Additionally, the relatively constant demand for process heating during operating hours and the co-location of waste heating streams from refrigeration units makes a strong case for being able to maximize the efficiency of heat pump installations, often achieving COPs as high as 4 across food and beverage installations (Hoffmeister et al. 2025).

These efficiency gains may be able to help offset the still-substantial capital expenditure differential between traditional fossil fuel boilers and heat pumps. A heat pump sized to replace a small (<10 MMBtu) industrial boiler can run well over $1 million per MW, which is roughly 5–10 times the capital cost of a comparable fossil fuel boiler, and approximately 8–15 times the cost of an electric boiler (EECA 2023).

Integrated dairy example

Dairy processing is frequently identified as a key electrification opportunity, as there is consistent demand for low-temperature heating for pasteurization, concentration, evaporation, and for facility cleaning-in-place to ensure sanitized equipment. The vast majority of energy demand today in dairies is for fuels rather than electricity, including over 90% of milk powder energy demand, over 75% of cheese making energy demand, and over 65% of fresh milk production energy demand (Ladha-Sabur et al. 2019). There are also ready sources of waste heat from nearby refrigeration in dairies, allowing design of efficient thermal systems. Michigan is the sixth largest producer of dairy products in the country, producing roughly 5% of the national dairy supply (USDA Economic Research Service 2024). In 2023, there were 46 dairy production facilities in Michigan. While Illinois is not one of the top dairy producing states in the country, its robust food and beverage sector provides many opportunities for electrification of low-temperature process heating, and an industrial heat pump pilot proposal supported by the Illinois Milk Producers Association was submitted recently to the Illinois Commerce Commission's Future of Gas pilot program (ACEEE 2024).

Assuming that energy demand for heating strongly correlates with production throughput, we developed a model sized to the average dairy in Michigan, which produces 11,630 tons of milk annually. We assumed 18-hour working days × 7 days a week × 52 weeks a year (6,552 hr/year). To maximize heat pump operational efficiency, we assumed a constant energy demand throughout the 18 hours, but thermal storage tanks are part of system design to provide thermal buffering and speed operational startup, so some temporal flexibility can be incorporated into the system, using the water tanks as thermal storage. Generally, these tanks are sized to bridge the roughly 30 minutes it takes for heat pumps to reach operating temperatures at the beginning of the day, and to build thermal resilience into the system.

The system we modeled was built off energy consumption assumptions before and after electrification with industrial heat pumps developed by Zuberi et al. (2021), which ultimately requires 41.2 kWh per ton of milk product post electrification; based on our operating hour assumptions, this results in the need for a heat pump sized for 1,500 kW of heating demand—which would be a 500 kW heat pump, assuming a COP of 3. This would replace a roughly 1.8 MMBtu/hr boiler, a small industrial boiler that is particularly straightforward to electrify, with no boiler remaining in place for backup. To model the addition of heat pump load on top of baseline electricity demand, we used industrial load curves developed as part of the CalFlex project and selected a load shape that was one of the three most common shapes representative of medium-sized beverage facilities, identified as the weekday load shape in 14% of medium-sized food and beverage facilities in the dataset (see figure 5) (CalFlexHub 2025).

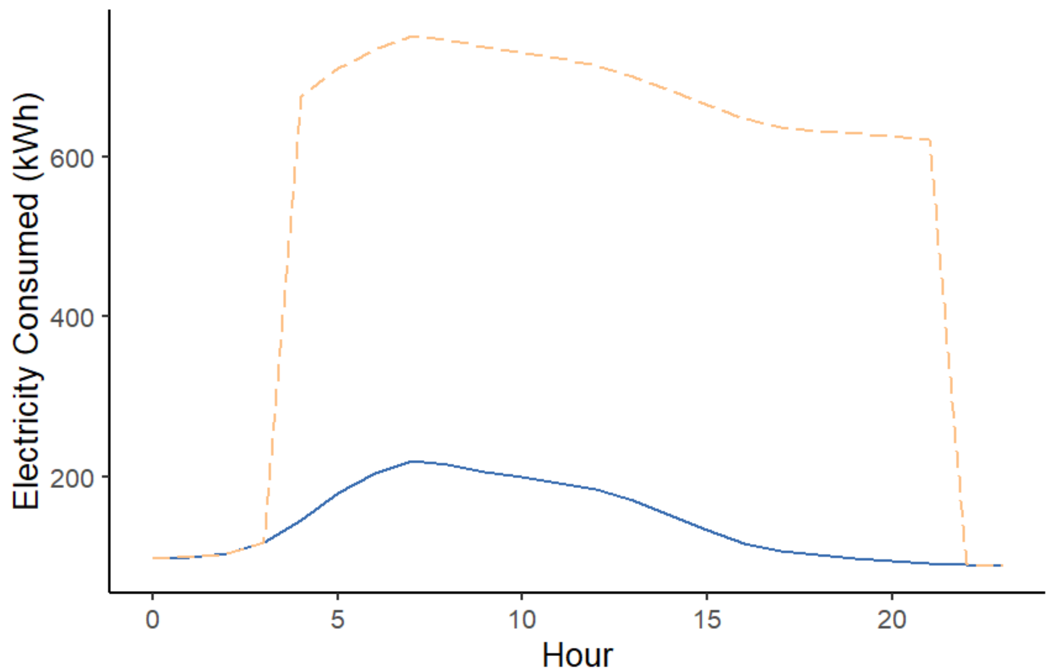

Figure 5. Daily load shape both before (blue line) and after (orange line) electrifying dairy process heating. Electrification—even of low-temperature heating—substantially increases industrial facility demand on the electricity grid.

Natural gas savings as a result of installation of an industrial heat pump

We assumed 80% operating efficiency for the 5 MMBtu (output rating) gas-fired boiler replaced by an electric industrial heat pump, and the same annual operating hours (6,552). Using average industrial natural gas prices from 2024 (table 2), and assuming an efficiency of 300% for the heat pump, switching from a gas boiler to a heat pump would save $284,561 annually in natural gas purchases in Illinois and $313,727 annually in natural gas purchases in Michigan, with both states reporting slightly higher prices than the national average price for industrial gas.

Table 2. Summary of gas consumption avoided when replacing a gas-fired boiler with an industrial heat pump, translated to annual operating costs savings

State	Industrial gas price (2024) $/thousand cubic feet	Gas consumption displaced annually (thousand cubic feet)	Natural gas avoided cost ($ annually)

Michigan	7.22	32,483	$284,561
Illinois	7.96	32,483	$313,727
U.S. average	6.82	32,483	$268,796

Calculating return on investment as a result of electrifying low temperature process heating under different Midwestern rate structures

We also estimated the operating costs, based on currently available industrial rates in Michigan and Illinois, from bringing on additional electricity demand. To estimate the impact of different industrial tariffs both before and after electrification, we used a modeling tool developed by the National Renewable Energy Lab (NREL), ReOpt Lite, and ran it in the "utility rate analysis" mode (NREL 2022). Based on interviews with utility providers and rate experts, we selected commonly accessed industrial tariff structures available to Michigan and Illinois industrials (table 3) and calculated annual electricity operating costs both before and after electrification.

Table 3. Industrial tariffs used to model operating cost impacts of electrification

State	Utility provider	Industrial tariff	Rate type	Notes
MI	DTE	D11	ToU	Full-service rate meant for 120 kV and above
MI	Consumers	Consumers Energy General Service D8	ToU	Tiered based on maximum consumer demand
MI	Consumers	Consumers Energy General ToU Service	ToU	A time-of-use rate with higher rates during evening grid peak hours and during summer months
IL	ComEd	ComEd— BES large load delivery class	Flat rate	No variation in rate by time, but minor seasonal variation in energy charges
IL	Ameren Illinois	DS-4 Large General Delivery Service	Demand based delivery + volumetric energy	Standard large industrial delivery rate, includes per-kW demand charges and per-kWh distribution and supply charges

We found that based on common rates within the industrial sectors in Illinois and Michigan, operating costs remain a major barrier to efficient electrification even in sectors for which heat pumps can operate in a highly efficient manner (table 4). Given the consistent demand for power from heat pumps, time-of-use (ToU) rates caused operating costs to increase substantially; without flexible technology solutions installed in parallel with a heat pump system, industry will be unlikely to take full advantage of time varying rates.

Table 4. Summary of operating cost variations, depending on which rate structure is accessed.

State	Tariff	Energy supply case	Total yr 1 electricity cost (before tax)	Annual gas costs deferred by electrification	Annual operating cost savings	IHP cost competitiveness
MI	DTE – D11	Baseline elec + IHP	$396,452		-$5,282	Needs incentives
		Baseline elec + gas	$106,609	$284,561		
MI	Consumers Energy - General ToU Service	Baseline elec + IHP	$715,381		$226,216	Needs incentives
		Baseline elec + gas	$204,605	$284,561		
MI	Consumers Energy - General Service D8	Baseline elec + IHP	$714,370		$215,190	Needs incentives
		Baseline elec + gas	$214,619	$284,561		
IL	ComEd – BES large load delivery class	Baseline elec + IHP	$457,035		-$17,847	Needs incentives
		Baseline elec + gas	$125,461	$313,727		
IL	Ameren – DS-4 large general service	Baseline elec + IHP	$422,432	$284,561	-$12,410	Needs incentives
		Baseline elec + gas	$166,661			

The proportional distribution of fixed charges, energy charges, and demand charges also varied substantially by rate structure (figure 6). In particular, post-electrification demand charges made up a larger proportion of operating costs for all cases, especially the non-ToU rates. This finding is consistent with other studies showing that demand charges increase dramatically unless new industrial load profiles are designed with peak demand shifts in mind (Lolli et al. 2021).

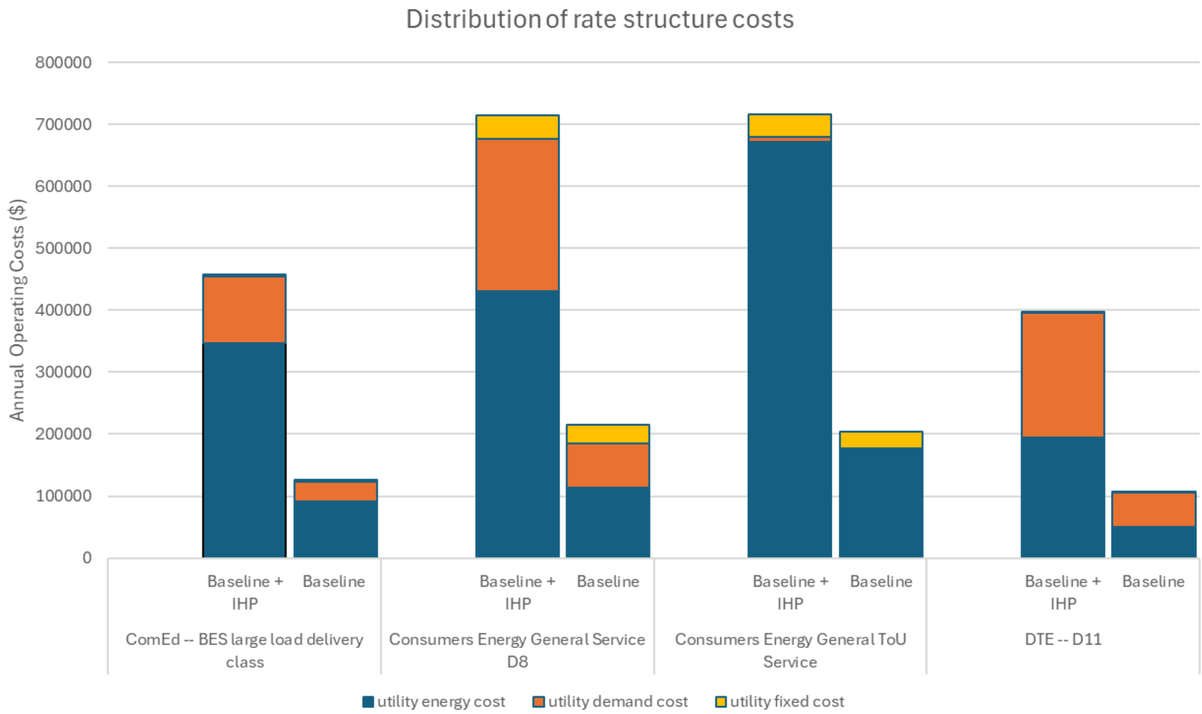

Figure 6. Utility rate structure proportional breakdown across different rate categories

Discussion

There has been very little movement on industrial electrification-specific rate design. When layered onto unfavorable spark gaps and high capital costs, adding new load to industrial facilities rarely leads to a return on investment from new electric technologies that falls within the preferred timeframe of industrials. While improved rate structures are unlikely to solve this problem singlehandedly, rates that are intentionally supportive of electrification while still covering the cost of service are a critical part of the solution. Even when there are annual energy savings as a result of the relatively favorable spark gaps in the Midwest, these savings are not yet enough to cut quickly into upfront CapEx and bring project costs down to under five years (and preferably under three).

However, these potential savings should attract the attention of Michigan utilities, which have a state-mandated interest in producing them. Both Consumers and DTE have forthcoming electrification cases. Between those and the energy waste reduction cases, there is ample room for higher-quality industrial rebates—particularly for less traditional measures with the potential to deliver deeper savings. For dual-service customers (especially transport customers), the utilities should be extremely interested in unlocking these savings opportunities, not only for their own returns but also to attract new industrial business that is currently being lost to the pipeline gas market.

Figure 7 shows our findings on expected payback times under a range of current rate structures. These findings are in line with other studies. Orozco et al. (2024) assessed the payback, in years, for a range of potential industrial heat pump installations across industrial subsectors based on assessments at actual sites in five subsectors: pulp and paper, chemicals, food processing, wood products, and high tech. In general, they found that unless the spark gap was less than 2.5 (a spark gap that exists in only seven states), projects did not reach a reasonable payback time period (which exists because of heat pump efficiency gains compared to legacy gas boilers), barring additional incentives or policy support. Current spark gaps in the Midwest are generally slightly above this threshold, at 3.46 in Illinois and 3.1 in Michigan.

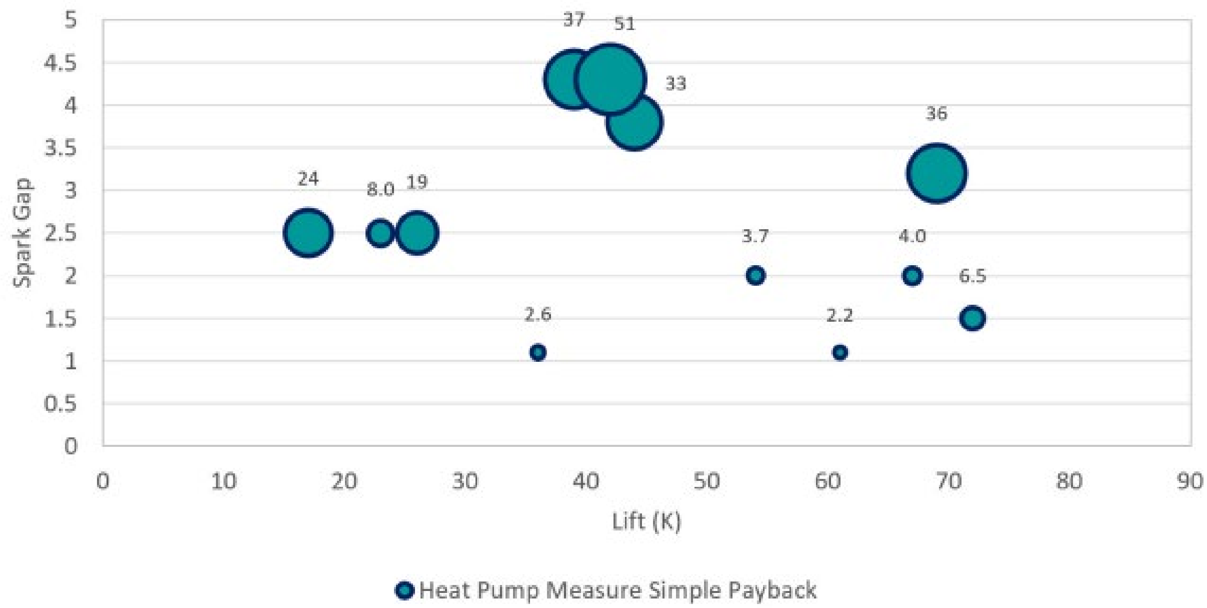

Figure 7. Expected payback, in years, for a variety of industrial heat pump installations, varying by spark gap and required temperature lift (the difference in temperature between heat source and sink). The number next to each bubble is the simple payback for an exemplary project. In general, projects with lower spark gaps (under 2) are most likely to provide reasonable payback time periods without further incentives (Orozco et al. 2024).

Industrial rate design examples from other regions

One of the only industrial tariffs we are aware of specifically meant to support electrification comes from BC Hydro, a public, regulated utility in British Columbia. They offer two discounted industrial rates, which provided seven years of discounted access to energy and demand charges on transmission services. Both programs are fully subscribed and no longer taking new customers. One rate type was aimed at supporting either (1) “clean industry” customers who are using electricity either to capture carbon or to produce renewable or low carbon fuels, or (2) “innovation” customers, which specifically was targeted at non-cryptocurrency data centers. They also provided a fuel switching rate, which was meant to support existing customers in switching to the grid and away from fossil fuels. This rate only applied to the fuel switching portion of the load (e.g., not the preexisting baseline electricity demand).

A recent legislative effort in California, SB-993, also attempted to establish a new industrial electrification tariff program. This program specifically targeted large, new flexible loads in the form of electrolytic hydrogen production or grid-responsive industrial process heating, including thermal energy storage. As a “clean energy development incentive rate time-of-use tariff,” it was meant to encourage new commercial or industrial electrical loads that (a) contribute toward statewide emissions reduction goals and (b) can preferentially consume low-cost clean power from the grid, while curtailing demand during peak hours (Senator Becker 2024). While unsuccessful legislatively, the core goals from this effort have been translated into an open proceedings for the California Public Utilities Commission (Rulemaking 22-07-005), focused on advancing demand flexibility through electric rates, specifically for industrial customers seeking to electrify process heating or produce electrolytic hydrogen (CPUC 2024).

Additional programmatic or incentive supports for industrial electrification

Very few states or utilities have implemented industrial rate designs to support electrification, but several have introduced incentive programs aimed at reducing the upfront costs of industrial electrification while giving facilities flexibility in how they design and manage new load. While these strategies do not directly address operating costs of newly electrified systems, they can lower capital expenditures and improve the overall return on investment, especially in states with already favorable spark gaps.

Colorado, for example, provides incentives to design and implement electrified thermal systems by funding early-stage feasibility studies to assess system performance and efficiency, and offering refundable tax credits of up to $8 million per facility for projects that reduce industrial GHG emissions (Colorado Energy Office 2025). For another example, Michigan's Department of Environment, Great Lakes, and Energy (EGLE) is considering allocating $2 million of its Climate Pollution Reduction Grant funding to a forthcoming Michigan Healthy Climate Challenge grant program in 2026. The program could function to support early design studies for industrial electrification.

Examples of innovative rate-making to enable electrification from other sectors

Most electrification-supportive rates today, however, exist in other sectors, primarily residential and transportation. For example, many residential heat pump rates seek to reduce costs for consumers in the winter: Most grids remain summer-peaking in both demand and capacity. In the summer, electric heat pumps are more efficient electric technologies than air conditioners, so utilities see direct electricity savings within the same fuel type. Many electrification-friendly rates are also paired with rebates or incentives to help offset capital costs of shifting to new electric technologies. There are also a growing number of rates targeted at new large data center loads, and in some cases, combined tariffs for data centers and industrial customers (Satchwell et al. 2025).[8] The main goal of these tariffs is to encourage local economic development while ensuring that other customer classes do not shoulder the burden of required grid investments to serve new load. Industry and data centers have distinct load profiles, flexibility needs, and grid impacts, meaning that separate rate structures may be more appropriate and effective.

Data center/large new load rates

The rapid growth of data center load in certain jurisdictions has shown that electric utilities and regulatory commissions can move quickly and creatively on new rates. This agility reflects state-specific

[8] The Smart Electric Power Alliance maintains a database of emerging large-load tariffs (SEPA 2025).

regulatory flexibility, such as provisions that allow trial or experimental rate filings, or expedited reviews for economic development projects. Both Illinois and Michigan could leverage similar pathways.

- Ohio Power has proposed new tariffs targeted to data centers (>25 MW monthly demand) or mobile data centers (>1 MW monthly demand). These new tariffs specifically focus only on data centers (new manufacturing centers are excluded), penalize customers for not using their full contracted capacity, and set minimum demand charges to ensure that grid costs to serve data centers are not unfairly transferred to other customers. These tariffs also allow limited on-site generation to reduce contracted capacity or facilitate load curtailment. This approach could benefit Michigan, where current restrictions limit large-scale onsite generation for industrial customers (PUCO 2024).
- Indiana Michigan Power's industrial power tariff requires a minimum 70 MW single facility load or 150 MW of aggregated new load, sets a minimum contract length plus exit fee if contract is terminated early, sets a minimum demand charge based on 80% of contracted capacity, and requires that customers pay for any necessary planning studies to serve the new load. While these tariffs do not currently include specific energy efficiency requirements for data centers, some commissions are beginning to explore whether such large, constant loads should meet baseline efficiency standards as part of rate approval (Indiana Michigan Power 2025).

Residential heat pump rates

- At the end of September 2024, Massachusetts regulators ordered one of the state's major utilities, National Grid, to develop lower seasonal rates for homes with heat pumps. A similar rate plan is already in effect by Unitil, another electric utility in the state. Massachusetts also offers rebates of up to $16,000 for heat pump installations, with at most $10,000 offered for higher-income households (Canary Media 2024a, 2024b).
- DTE Energy offers specialty rates for customers with installed whole-home air-source heat pumps or central air-conditioning (DTE 2025b).
- ComEd's Whole Home Electric program offers low-income households free replacement of fossil-fueled appliances and heating, ventilation, and air conditioning (HVAC) systems with electric alternatives such as heat pumps and induction stoves. They also offer rebates on electric home appliances such as electric clothes dryers, induction cooktops, and smart thermostats, as well as discounts on heat pump installations to residential customers and contractors (ComEd 2025b, 2025c, 2025d)
- National Grid NY offers rebates on heat pumps and other energy-efficient products and appliances (National Grid 2025b).

Electric vehicle (EV) rates

- Given the relative flexibility of charging schedules for electric vehicles, most rates in this sector seek to incentivize customers to add new load during overnight hours, to avoid additional load during grid peaks. Many of these rates are also paired with rebates for home charger installations.
- In May 2024, the California Public Utilities Commission (CPUC) approved the state's major utilities—Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric—to add fixed monthly fees to customers' electricity bills, while reducing kilowatt-hour charges. This new billing structure aims to reduce costs for low-income households and those affected by adverse weather conditions. This structure is also aimed at making it more cost efficient to charge EVs

and run heat pumps, thereby accelerating electrification. Critics say that this fixed rate will effectively punish frugal customers who use less electricity to save money on their bill. They also state that this fixed rate—$24.15 for non-low-income households—is much higher than the national average of $12. (Canary Media 2025a; CPUC 2025)

- DTE Energy is a Detroit-based gas and electric utility company with specialty base rates to fit the needs of different consumer types. They have EV electric pricing rates that offer lower rates overnight and during the weekend for customers who own electric vehicles and have a separate meter installed. They offer rebates for commercial customers with eligible EVs and EV chargers (DTE 2025a).
- For commercial customers, ComEd offers rebates on upgrades to electric vehicles (ComEd 2025a).
- National Grid NY offers a voluntary time-of-use rate for Upstate NY customers to charge their EVs and shift electric usage to off-peak hours (National Grid 2025a).
- Consumers Energy offers rebates on over 450 energy-efficient appliances and products, as well as electric vehicles and EV charger installations (Consumers Energy 2025a, 2025b; MPSC 2025).
- Portland General Electric (PGE) offers rebates on EV chargers and installation, and home improvement appliances such as heat pumps and smart thermostats (Portland General Electric 2025).

Conclusions

While many states, including Michigan and Illinois, have instituted climate and energy efficiency goals, these goals need to be paired with economic incentives for compliance. Rate structure reform can address shifting patterns of demand resulting from electrification of transportation and home heating, as well as the boom in data centers.

Electrification of industrial process heating is another expected shift in energy consumption patterns that is likely to be especially impactful for manufacturing hotspots such as the Midwest and Southeast in reducing emissions. Especially in states in the Midwest with ambitious state-level climate goals, industrial electrification is an essential strategy for cutting GHG emissions and building a resilient, cleaner, and safer manufacturing sector. We examined how current industrial rate structures available to midwestern customers in Michigan and Illinois would impact the economics of an industrial electrification project, and found that with today's rate structures, and lacking additional financial incentives, it would be very difficult to reach a return on investment in under five years for an industrial electrification project.

Utility regulators, rate developers, and program designers can use examples from other sectors and translate them to the industrial sector: for example, developing more nuanced time-of-use or coincident peak rates to incentivize more flexible demand (and concurrently incentivizing energy storage or behind-the-meter generation to build demand flexibility capacity), developing special "electrification" rates that separately meter additional new electrified demand and reduce the impact of demand charges, or partnering with state policymakers to develop tax credits or granting programs that can offset financial burden for electrifying manufacturing facilities and help to overcome larger spark gaps.

In Illinois, policymakers and advocates can take advantage of Future of Gas proceedings to conduct industrial electrification pilots and target utility incentives and rate reform strategies at industrial subsectors such as chemicals or food and beverages with great potential to decarbonize via electrification but requiring additional financial incentives to overcome only marginally favorable spark gaps. In Michigan, efficient electrification and demand response proceedings provide an opportunity to explore how key industrial subsectors such as vehicle manufacturing, pulp and paper, and food and beverage can provide flexibility services around peak periods while integrating additional electric load into the grid.

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