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STATE LEGISLATIVE OPTIONS TO PROMOTE INDUSTRIAL ELECTRIFICATION

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Promoting industrial electrification requires comprehensive policy support across multiple jurisdictions. This brief covers the policy levers that state legislators can use.

A complementary brief explores policy levers available to utilities and utility regulators.

Electrification can eliminate industrial emissions but faces challenges

The industrial sector is a pillar of the United States economy, manufacturing everything from steel to food products. It also emits 30 percent of the country's greenhouse gases (GHG),[1] mainly from burning fossil fuels to create heat for industrial processes. Besides reducing heat demand through efficiency improvements, electrification powered by clean energy is the best option to eliminate GHGs and other pollution from industry. Compared to clean electricity, green hydrogen uses much more energy, sustainable bioenergy is in short supply, and carbon capture fails to address upstream methane leakage or capture all on-site carbon dioxide (CO_2).[2] No technical barriers exist to electrified heating, as electricity can deliver heat at any temperature demanded by industry.

However, most U.S. industrial firms need economic incentives to electrify, as they pay roughly 4.7 times more for electricity than for the same amount of energy from natural gas, on average.[3] While the superior efficiency of electrical heating compared to fossil fuel combustion (thanks to heat pumps at low temperatures, and by avoiding energy losses in exhaust gases at high temperatures) makes up some of this "spark gap," electricity is still the more expensive option in most cases today. Closing the spark gap will be the single most impactful step in decarbonizing U.S. industry, since energy costs dominate the lifetime expense of owning and operating industrial heating equipment.

Fortunately, state legislators can help close the spark gap and accelerate industrial electrification by lowering electricity prices, incentivizing clean manufacturing, creating markets for cleanly produced industrial products, and fairly pricing fossil fuel use. To address additional barriers to electrification, these measures should be deployed alongside energy efficiency and emissions standards; support for research, development, and demonstration; and programs to help firms access high-skill workers.

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[1] U.S. Environmental Protection Agency. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022.* 2024. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks. Note that this figure allocates emissions from the electricity sector to the end-use sectors purchasing electricity; the industry sector is responsible for 23% of U.S. GHGs if electric power is considered a separate sector.

[2] Rissman and Sawe. *The Industrial Zero Emissions Calculator.* 2024. Energy Innovation. https://energyinnovation.org/report/industrial-zero-emissions-calculator/

[3] U.S. Energy Information Administration. State Energy Data System (2025 updates). Table E5. Industrial sector energy price estimates, 2024. https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_sum/html/sum_pr_ind.html&sid=US

State-level legislative policy options to promote industrial electrification

Policies to encourage utility regulations that lower industrial electricity costs

Utility regulations can lower manufacturing electricity costs, either by encouraging consumption patterns that reduce the expense of serving industrial customers or by increasing renewables deployment to lower average electricity prices for all customers. But some regulatory interventions require legislative authorization, and legislative backing can help ensure regulators prioritize vital policy changes and reach outcomes aligned with the public interest.

Legislators can update the utility commission's governing statute in ways that direct regulators to consider and advance industrial electrification alongside existing goals like affordability, reliability, and safety. Updates can include designating electrification and demand flexibility as statutory objectives, incorporating state decarbonization goals into utility planning, and requiring that cost-benefit analyses consider the cost of carbon. This gives the commission clear statutory authority to approve electrification-supporting rates, programs, and investments. Pairing this with an affirmative utility obligation to offer the timely interconnection, adequate capacity planning, and supportive rate structures needed to accommodate customer electrification and demand flexibility can ensure that utilities facilitate rather than impede industrial load growth and flexibility.

Beyond that, legislators can consider mandating utility regulators implement the policies detailed in our parallel regulator-focused brief, including rate reforms and incentive programs that allow industries to reduce their costs by load shifting or obtaining their own clean energy, as well as policies to procure and interconnect more clean energy and storage.

They may also consider authorizing or removing statutory barriers to the following regulatory interventions, many of which utility commissions cannot pursue under current law without legislative action.

- **Special electricity rates** for industrial firms, connected to the system benefits firms provide (e.g., flexibility and system balancing, new load that improves utilization of under-utilized parts of the system or at under-utilized times of day).
- **Targeted incentives**, such as funding for electric industrial heating equipment tied to flexible electricity consumption (e.g., as an eligibility requirement or through a separate flexibility incentive), with incentive levels that reflect the cost savings from system-balancing.
- **Gas transition proceedings** that require evaluation of non-pipeline alternatives (e.g., electrification, efficiency, direct geothermal or solar heat, etc.), and their selection wherever cost-effective. Additionally, reform exit fees for gas customers so they don't deter electrification, while managing gas system cost recovery to protect remaining customers (e.g., renters, low-income households) from stranded costs.
- **Virtual power plant (VPP) regulatory frameworks** that enable third-party ownership and management of VPPs. Today, many states' rules assume utilities will aggregate distributed energy resources, leaving no clear path for independent aggregators. VPPs digitally pool distributed energy resources so they act collectively as a flexible grid resource, lowering system costs by providing peak and ancillary services more cheaply than peaker plants and deferring grid infrastructure upgrades.
- **Allowing private networks** connecting a renewable generation source to a co-located or nearby load to cross public rights-of-way and third-party land (by easement), and clarifying that operating or selling power over such a line does not by itself render the operator a regulated public utility.

- **All-source procurement requests for proposals (RFPs)** that make fossil fuel power plants compete on a level playing field with low-cost renewables and storage.
- **Long-term contracts for clean energy**, whose financial viability relies on revenue certainty over the project lifetime. States can revisit contract length limits or indirect limits like prudency review — the process by which regulators can retroactively deny a utility cost recovery for decisions later judged unreasonable. Because a long contract that looks unfavorable years later could be second-guessed, this risk deters utilities from signing the long-term agreements clean-energy projects need to secure financing. One approach is to create a "safe harbor" that deems contracts prudent if they were procured through a commission-approved competitive process, like an all-source RFP (suggested above).
- **Clean industrial parks:** States can establish fair standby and supplemental-service tariffs and a clear regulatory category for sites that co-locate clean generation, storage, and flexible industrial loads, so the arrangement is not penalized by punitive backup charges or stalled by legal ambiguity. Ensure these parks can participate in wholesale markets (for capacity, energy, and ancillary services) and distribution-level demand flexibility programs rather than being locked out by participation rules designed around conventional generators.

Policies to facilitate renewable generation, transmission, and energy storage deployment

Accelerated clean energy deployment and interconnection can lower the costs of meeting demand. Of the many tools at states' disposal, those below are some of the most impactful per dollar spent.

- **Clean energy financing support:** Concessional loans, de-risking tools, and aggregation of many projects by a state agency or green bank (a public, quasi-public, or nonprofit entity that finances climate projects) can catalyze renewables and battery deployment by addressing the higher perceived risk of financing new technologies and small projects. Well-designed mechanisms "crowd in" several dollars of private capital for every public dollar spent.
- **Streamlined siting and permitting:** States can streamline siting and permitting barriers of renewable energy and batteries by creating a one-stop siting and permitting authority, adopting performance-based permitting, pre-identifying and authorizing renewable energy zones, transmission corridors, and setting standards and deadlines for local permitting.
- **Optimize existing transmission capacity:** States can create deploy-first mandates and streamline permitting for grid-enhancing technologies (GETs), i.e., dynamic line ratings, power flow controllers, topology optimization and advanced conductors (reconductoring with high-capacity composite-core lines), which raise the capacity of existing transmission facilities at much lower cost than new lines. Deploy-first mandates, or requirements that utilities justify the exclusion of GETs or advanced conductors from their transmission plans, can counteract incentives for incumbent utilities to prioritize large capital builds over cheaper operational fixes.
- **Re-use spare interconnection capacity:** Many coal power plants have closed in recent years, and more are projected to retire. Even some that are not retiring do not use their full interconnection capacity. Building solar or wind near these plants can allow the renewables to use the coal plant's surplus or newly available grid interconnection capacity.

Incentives and financing for clean manufacturing

Utility interventions cannot eliminate the spark gap on their own, making additional legislation that rewards electrified manufacturing—and offsets the spark gap—critical.

Production incentives can help offset electrified facilities' higher operating costs.

- **Clean commodity production tax credit:** Rewards GHG reductions in commodity production (e.g., relative to a declining benchmark emissions intensity), which firms can achieve by switching from fossil fuels to electricity (or clean electricity, depending on the policy's emissions accounting requirements). Commodities are homogenous, standardized products (such as steel, cement, aluminum, and basic chemicals like ammonia), allowing for fair comparison of GHG reductions across manufacturers.
- **Clean heat production tax credit:** Rewards firms for every unit of zero-emissions heat (e.g., electric heat) used productively in a manufacturing process. The credit would ideally equal the energy cost premium for electrified heat and should be adjusted for efficiency and paired with an energy efficiency standard to avoid incentivizing waste.

Demand-side incentives can create and grow markets for low-carbon industrial products, providing the demand certainty that manufacturers often need to invest in new production methods.

- **Green public procurement:** Mandates state procurement of low-carbon construction materials for building and transportation projects via a minimum embodied emissions threshold for specific materials, ideally with attached funding to cover the green premium.
- **Clean materials purchase incentives:** A grant or tax credit to buyers of low-carbon materials that offsets the green premium for those materials, structured similarly to green public procurement but for materials sold to private buyers for in-state projects.

Embodied emissions measurement and environmental product declarations: Production and demand-side incentives depend on credible, standardized, third party-verified accounting of products' embodied emissions. States pursuing those incentives should establish robust measurement and verification requirements for embodied emissions, ideally aligned with leading international frameworks such as those behind the European Union's carbon border adjustment mechanism (CBAM).

Capital cost incentives and financing can help firms cover the upfront costs of electrified equipment and relevant facility upgrades. Financing can be provided by state agencies or a green bank.

- **Clean heat investment tax credit:** Offsets a portion of the capital costs of industrial equipment that delivers low-emissions heat, as well as relevant facility upgrades. By-right tax credits create more certainty and therefore help make projects bankable, but where public cost containment is important, the tax credit can be discretionary and should prioritize applicants who would reduce the most emissions or the most emissions per tax-credit dollar.
- **Cost-sharing demonstration grants:** Covers a portion of the upfront costs of large-scale demonstrations or early deployments of advanced clean industrial technologies, accelerating their commercialization and bankability.
- **Concessional loans for clean industry:** Low-cost, long-term financing for clean industrial projects that have a payback but are perceived as too risky by commercial lenders.
- **De-risking tools:** Loan guarantees, first loss protection, loan aggregation, and other tools that lower financial risks of clean industrial projects can encourage private investment. Because public funds are exposed only if projects underperform, these tools typically cost the state less than grants or tax credits.

Policies to fairly price industrial fossil fuel use

Ensuring industrial fossil fuel prices accurately reflect their economic and social costs can lower the spark gap. This option is a strong complement to incentives, lowering the incentive size needed to unlock industrial electrification.

Elimination or reform of fossil fuel subsidies can ensure fossil fuel prices are not artificially low. A range of fossil fuel subsidy mechanisms can apply, many of which are indirect:

- Preferential tax treatment
- Below-market leasing of public land and minerals for extraction
- Economic development grants
- Public investments in enabling infrastructure
- Loans, loan guarantees, and public financing on preferential terms
- Publicly subsidized insurance or assumption of liability, or shielding fossil fuel producers from liability without government, assuming that liability (i.e., harmed people have no recourse)
- The socialization of cleanup costs for abandoned projects, disasters, etc.

Fees on GHGs and health-harming pollutants emitted during the manufacturing process can lower the spark gap by raising the price of fossil fuel combustion.

- **Carbon pricing:** Either a carbon tax that puts a price on every unit of GHGs emitted (fixed price, variable GHG reductions) or a cap-and-trade policy requiring firms to purchase credits to emit GHGs above a certain limit (variable carbon prices, fixed GHG reductions). Cap-and-trade with a price collar (a floor and ceiling) blends the two mechanisms.
- **Carbon contracts for difference:** In some cases, mitigating a ton of GHG emissions may be more expensive than paying the carbon price on those emissions. A carbon contract for differences pays firms the difference, so they invest in decarbonization instead of paying to emit.
- **Embedded-carbon consumption tax:** A state likely cannot directly impose a CBAM, but it may be able to approximate the effect through its consumption-tax authority. An excise or sales tax set according to a product's embodied emissions and applied identically to in-state and out-of-state goods could place the same effective carbon price on all goods sold in-state, so local producers are not disadvantaged. This is a novel, legally untested approach that would require careful design to survive constitutional review (chiefly the dormant Commerce Clause) and to credit carbon prices already paid, whether in-state or elsewhere (to avoid double-taxation on the same unit of goods sold).
- **Fees on health-harming pollutants:** Air pollutants like particulates, nitrogen oxides, and sulfur dioxide contribute to a range of negative health outcomes, including higher rates of heart disease, lung diseases, stroke, and early death. Charging firms fees based on the quantity of health-harming pollutants they emit (ideally weighted by population exposure, which varies by location) complements Clean Air Act requirements by pricing the harm from emissions the Act permits, internalizing an externality that pricing GHGs alone does not address.

Rate reform for industrial transport customers, who buy gas directly from producers or marketers at lower rates than going through gas utilities (but still rely on a utility's distribution system to deliver it) can ensure those customers pay their fair share of the distribution system's fixed costs. While interstate transport rates largely fall under federal jurisdiction, local distribution rates fall largely within state jurisdiction, so lawmakers can direct public utility commissions to ensure that these transport customers

pay the fixed system costs they are responsible for. Many large industrial transport customers connect directly to interstate pipelines and do not rely on local utilities for delivery; their rates are largely outside state authority. States might retain some authority over these facilities through generally applicable taxes or environmental requirements but not through rate-setting.

Other policies to enable electrified industry

Certain enabling policies can address non-financial barriers to industrial electrification (e.g., firms' competing priorities and risk aversion, limited availability of skilled workers and technologies) and would ideally be passed alongside policies to reduce or offset the spark gap.

Equipment- or facility-level standards can limit industrial emissions or energy use, requiring facilities to switch to cleaner processes even if they are more expensive. Standards that focus on performance (emissions or energy use) rather than technology-specific mandates are generally preferred for the flexibility they provide industrial firms. Standards are ideally used when the cost premium is moderate and will not meaningfully affect final product prices, limiting leakage and impacts on consumers. (Incentives, discussed above, complement standards by targeting higher-cost options.)

Workforce training and development policies can ensure enough skilled workers are available to install and operate electrified industrial technologies. These include vocational programs, apprenticeship programs, tools and resources to help existing industrial workers transition to new technologies, and platforms that connect prospective workers with employers.

Research and development of electric heating technologies can help commercialize technologies that are still at the lab and pilot stage, namely high-temperature heating equipment. They can also lower upfront costs and improve the efficiency of commercial technologies like heat pumps and medium-temperature thermal batteries, accelerating their uptake among industrial firms.

Technical assistance can address the information gaps and risk aversion that cause firms to delay electrification even when projects pencil out. Electrified manufacturing technologies are rarely a firm's core focus, so internal expertise is limited and the perceived risk of an unfamiliar process is high. States can fund energy audits and facility assessments that identify electrification opportunities and quantify their costs and benefits. They can also operate peer-exchange programs that lower perceived risk by showing the technology working at comparable facilities. These programs could complement the Department of Energy's Industrial Training and Assessment Centers program.

New legislation can meaningfully reduce the spark gap

The spark gap and other barriers to electrifying industry are not insurmountable, but overcoming them requires a multi-pronged policy strategy. Regulatory interventions cannot eliminate the spark gap on their own, but they can lower it enough to be meaningfully offset by financial incentives (without placing too much fiscal burden on the state), especially if paired with policies that shift some of the costs to the market (e.g., emissions standards, carbon pricing). Thoughtful legislation can also clear non-financial barriers: workforce, technology readiness, and information.

An effective policy strategy should contain policies in each category— including regulatory and legislative interventions—but does not require every policy option within each category. Further analysis and modeling can help determine the levers most relevant to a state's political and economic context.

To learn more about regulatory and policy options, please contact Energy Innovation's industry team at industry@energyinnovation.org.

