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PATHWAYS TO 2035

Expanding Non-Federal Climate Leadership in the United States

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Key Messages

- **In 2025, national and global developments have negatively impacted U.S. climate and clean energy transitions through redirections of federal funding, policies, and regulations, economic uncertainties, and related challenges to subnational action and implementation.** These forces create obstacles to the highest-ambition pathways envisioned previously to achieve U.S. 2035 goals.

- **Nevertheless, opportunities remain to support continued U.S. action that would enable substantial reductions in economy-wide greenhouse gas emissions while enhancing prosperity, energy security and public health.** Under the U.S. federalist system, states, cities and other subnational governments retain significant policy authorities; industry and business actors continue to invest in clean technologies; and faster-than-expected cost reductions in clean technologies enhance the influence of market-driven forces.

- **Considering these new factors, our assessment of feasibly expanded non-federal climate action combined with renewed federal engagement after 2028 indicates that the United States can still achieve up to a 56% reduction in GHG emissions below 2005 levels by 2035.** In such scenarios, accelerated climate action from non-climate-leading states will be critical.

- **Without federal re-engagement and accelerated actions from non-leading states, enhanced climate action from more ambitious regions could still reduce overall U.S. GHG emissions by 44% by 2035.** Without any enhanced actions, current policies under federal and non-federal actors would result in a 35% economy-wide reduction in GHGs.

- Current positive market dynamics create a number of feasible options for enhancing actions while lowering energy costs in lagging states—for example, through regional spillover, bottom-up actions from leading local governments, and cost-effective electricity grid planning. Reductions in electricity, transport, and methane emissions emissions offer the greatest opportunity for additional actions over the next decade.

- Overall, subnational governments, notably states and cities, can drive decarbonization utilizing accelerated renewable energy targets, methane intensity standards, EV policies, vehicle miles traveled reduction policies, building appliance electrification targets, and more.

- Electricity demand growth in particular has recently become much more uncertain due to rapid changes in the dynamics of data centers, efficiency, electric vehicles, heat pumps and more. With expanded climate policies from non-federal actors and renewed federal re-engagement, total electricity demand could increase by 34% in 2035, relative to 2021 levels; data centers play a large role, making up 30% of this growth, with the rest coming from EVs, heat pumps, and other end-use electrification.

- Overall, electrification of end-use sectors is necessary for longer-term U.S. decarbonization, so ensuring this demand is served with clean electricity sources will be critical. Solar, wind, and storage capacity additions to the grid reach up to 117 GW/year on average by 2035.

Introduction

Since January 2025, the U.S. federal climate policy landscape has changed rapidly. With executive orders to redefine U.S. energy goals,[1] prop up the coal industry,[2] limit state climate policy authority,[3] and propose the phaseout of environmental legislation,[4] the federal agenda has shifted toward fossil fuel expansion while constraining support for renewable energy and other low-emission technologies and policies. The 2025 budget reconciliation bill terminates many tax credits and grant programs created under the Inflation Reduction Act (IRA) ahead of schedule.[5] The Environmental Protection Agency (EPA) has initiated rollbacks of climate regulations, including emissions standards for fossil fuel power plants[6] and freight trucks.[7] Through the Congressional Review Act, the current administration also attempted to remove California's ability to set its own vehicle emissions standards — a key state-level policy lever for vehicle electrification.[8,9]

While many of these actions are being challenged through the court system, the outcomes are uncertain and may take months to years to resolve. Regardless, the near-term impacts remain, and collectively, these federal actions pose a major challenge to the ability of the United States to mitigate greenhouse gas (GHG) emissions across the economy and reach previously communicated climate targets under the Paris Agreement. Federal policy changes have delayed the implementation of climate policies across states and cities,[10] discouraged long-term private investment in clean energy technologies,[11] and strained coordination with global allies.[12,13] They are also associated with substantial economic and health costs.[14]

Other factors contribute to uncertainty around U.S. climate trajectories, with rapid changes in dynamics that push in divergent directions. Electricity demand growth, for example, has become more difficult to predict with potential increases driven by new data center expansion, increases in electrification of end-use sectors such as more electric vehicles (EVs) and heat pumps, and increases in energy efficiency.[15] Similarly, deployment of renewable energy is more uncertain due to the combination of decreased federal policy and incentive support, unexpectedly fast decreases in solar and wind costs which now typically make renewables the cheapest forms of new energy generation and the fastest to deploy,[16,17] and supply limitations associated with natural gas turbines.[18] Furthermore, recent tariffs imposed by the administration are expected to drive up the costs of clean energy technologies[19] and stall GDP growth,[20] which would alter future emissions trajectories in different directions.

Despite these uncertainties, subnational governments and other non-federal actors have continued to make meaningful progress toward the clean energy transition by setting their own climate policies and targets. These actors represent a significant part of the United States: in aggregate, non-federal actors taking actions on climate constitute roughly two-thirds of the U.S. population and three-fourths of U.S. GDP — equivalent to the world's third largest economy.[21] They also can take advantage of substantial policy authorities within the U.S. federalist system. As just a few examples, states have substantial policy authority over electricity generation and building codes, and cities have substantial policy authority on waste, zoning, and transportation. Recent examples of actions under these authorities include New York City's congestion pricing program,[22] Oregon's carbon pricing program,[23] and California's state plan to deploy heat pumps.[24] Additionally, a subset of U.S. states, as part of the U.S. Climate Alliance, launched a multi-state effort to promote clean vehicles.[25] In the coming years, leadership from non-federal actors can continue to deliver enhanced emissions reductions and lay the groundwork for faster progress under renewed future federal leadership.

In this broader context, several aspects of pathways to expand U.S. non-federal action are notable. First, as a result of decades of work in some cases, there are a number of states, cities, or other actors that have already enacted policies toward the most ambitious end of their current policy options. While all remaining opportunities are important to investigate and implement, the high level of current action means that the scope for major additional increases to ambition in these already high-ambition jurisdictions is limited. Accordingly, a critical component in this analysis will be to identify and implement opportunities within jurisdictions that are currently at levels of moderate or low ambition.

For example, high-ambition cities within low-ambition states present some potential areas for focus and expansion of climate-related policies. Austin, Texas, has a 2040 net-zero GHG target and one of the most ambitious renewable portfolio standards in the country, as well as comprehensive plans to expand EV infrastructure and increase EV adoption.[26] Such trends also exist in cities like Miami, Phoenix, and Milwaukee, which have enacted bold climate initiatives despite weak state-level support. [27,28,29] Cities also play a key role in restricting new sales of fossil fuel appliances and promoting public transit and micromobility, such as New York City's ban on fossil fuels in new construction starting in 2026,[30] and Ann Arbor's target for a carbon-neutral transportation system by 2030.[31]

Similarly, retooling the focus of climate-related policies around other goals, such as cheap, easily affordable electricity, may support acceleration of action in lower-ambition states. Other approaches, including regional spillover effects, private sector actions, and market forces, can also play a role. Ambitious climate action can cross state and city boundaries, generating ripple effects in neighboring regions, for example through the adoption of renewable portfolio standards in climate-leading states.[34,35] Similar spillover impacts could apply to other key policies like clean car standards and building codes. Adopting innovative climate policies also increases the likelihood that others will follow suit through policy learning. Corporations can reduce emissions from their own supply chains and operations, and commitments from automanufactures can ramp up EV deployment and keep transportation decarbonization goals within reach. The rapidly declining cost of renewable energy technologies like solar and wind reinforces these dynamics by lowering barriers to clean energy deployment. Together, these forces can push non-leading states toward a clean energy transition, and drive ambitious and innovative climate action nationwide.

This analysis assesses the impacts of expanding non-federal climate action under the current federal climate policy landscape on U.S. emissions trajectories and sectoral transformations. Specifically, it highlights the implications of enacting ambitious climate policies from non-climate-leading states and a future federal government. This study also examines changes that are needed within the electricity sector to support rising electricity demand growth, with renewable energy playing an important role. Finally, this study identifies key policy levers from actors across all of society that are needed to achieve these high-ambition pathways.

Innovative tools to model expanded non-federal climate action

Scenario design

Using a field-leading integrated assessment model and a transparent modeling framework, this study assesses major climate-related policies at the federal and state levels that can help achieve greenhouse gas emissions reductions in the United States. Three distinct scenarios are modeled to represent recent federal climate policy changes and expanded climate action from non-federal actors (Table 1). See *Technical Appendix* for detailed information on scenario assumptions.

Table 1. Scenario descriptions

Scenario	Federal policy	Non-federal policy
Current Policies	Existing policies	Existing policies
Enhanced Ambition (Low)	Existing policies	Leading states adopt high-ambition climate actions. Non-leading states adopt actions at a lower ambition level and slower pace.
Enhanced Ambition (High)	Renewed federal engagement on climate policy after 2028	All states adopt high-ambition climate actions with some level of differentiation.

The *Current Policies* scenario includes changes to the Inflation Reduction Act and Bipartisan Infrastructure Law under the recently passed One Big Beautiful Bill Act and assumes the removal of the California waiver, which allowed states to set their own vehicle emissions standards. The Environmental Protection Agency's regulations on tailpipe emissions and fossil fuel power plants are assumed to be repealed. States and other non-federal actors continue to implement key existing policies, including renewable portfolio standards and building energy efficiency resource standards.

The *Enhanced Ambition (Low)* scenario assumes that climate-leading states strengthen their climate actions, and non-leading states adopt less ambitious climate actions at a slower pace. Table 2 includes a list of enhanced non-federal actions in this scenario.

The *Enhanced Ambition (High)* scenario assumes that in addition to the climate-leading states, non-leading states also adopt high-ambition policies driven by various approaches, including strong bottom-up climate leadership from local governments, bold business commitments and investments in clean energy technologies, and regional spillover impacts. This scenario still maintains some level of differentiation in ambition between states. This scenario also includes re-engagement on climate policy from the federal government after 2028, including tax credits for renewable energy, regulations on fossil fuel power plants, tailpipe emissions standards, and more. Table 2 includes a list of enhanced non-federal actions in this scenario.

Table 2. New and enhanced non-federal policies modeled in the *Enhanced Ambition* scenarios.

Sector	Policy Type
Electricity	Renewable portfolio standards
	Clean electricity standards
	Coal phaseout policies
Transportation	LDV electrification policies
	M/HDV electrification policies
	Bus electrification targets
	Vehicle miles traveled reduction policies
	Low carbon fuel standards
Buildings	Energy efficiency resource standards
	Zero-emission appliance standards
	Zero-emission construction standards
Industry	Cement CCS targets
Methane	Oil and gas methane regulations
	Landfill waste methane regulations
	Enhanced waste diversion efforts
Other	HFC regulations
	Expanded funding for wildfire mitigation, tree planting, conservation and healthy soils

A comprehensive state tiering system

Given the heterogeneity in climate policy across states, being able to differentiate future climate ambition levels from states was a focal point of this study. For example, it would be overly optimistic to assume that all U.S. states can adopt California's policies on their current timeline. Therefore, in order to set the appropriate level of enhanced climate ambition for each state, this study created a new, systematic methodology to group the 50 states and District of Columbia into three tiers based on their propensity to adopt high-ambition climate action. This new tiering system allows for more realistic representation of future non-federal ambition and helps to identify areas where enhanced action from non-climate-leading states would be most impactful.

The distribution of states across the three tiers varies by sector (electricity, transportation, buildings, industry, and lands). Sector-specific tiers are primarily determined by existing state-level policies, while also accounting for progress in emissions reductions, local climate policies, and other climate commitments. In each sector, Tier 1 states are the climate leaders, and are assumed to adopt the most ambitious climate policies; Tier 2 states have some climate policies on-the-books but are not as ambitious as Tier 1, and therefore adopt policies at a slower rate; Tier 3 states have little to no climate action, and are therefore limited in their adoption of new policies. See *Technical Appendix* for a list of the sector-specific tiers and more information on the underlying methodology.

Driving U.S. climate ambition through non-federal leadership

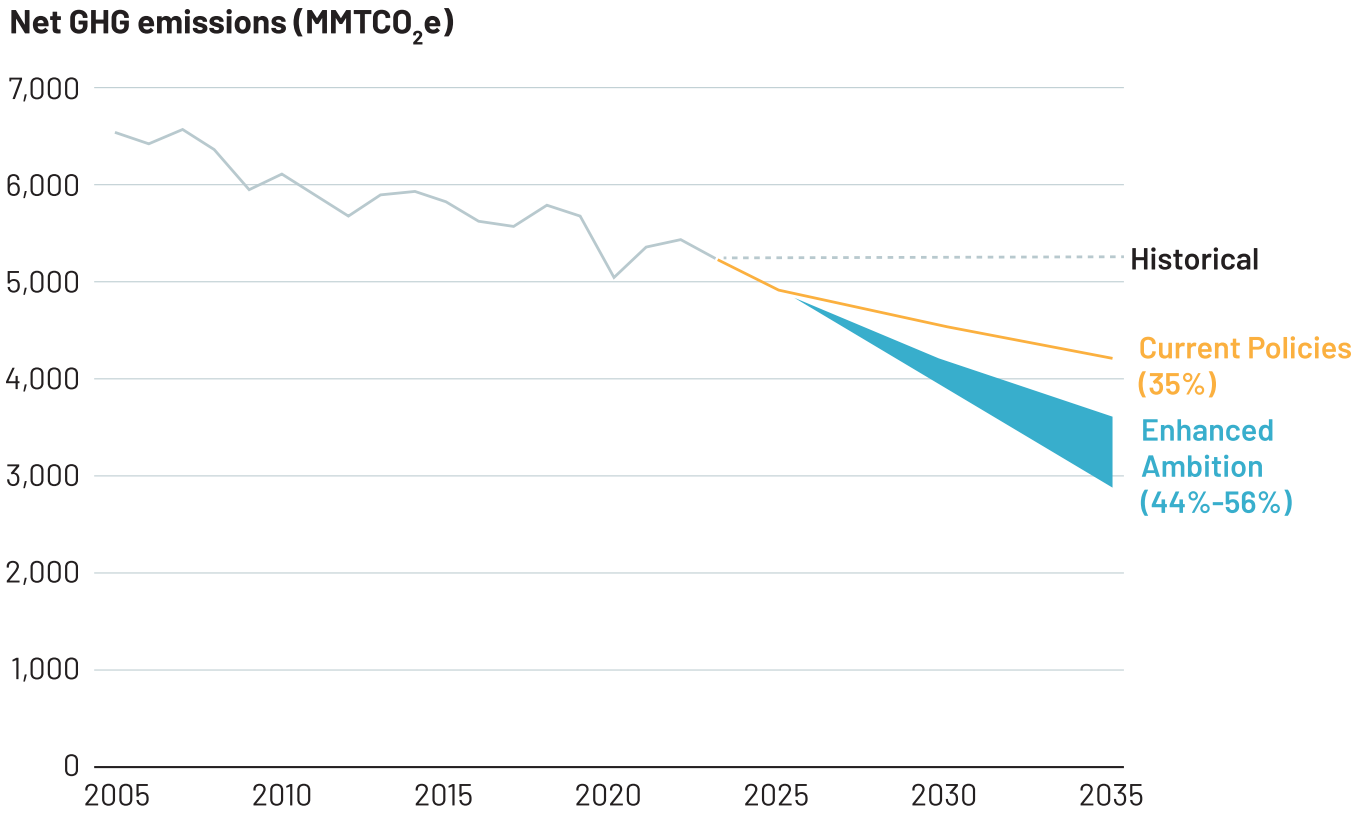

Figure 1. Net greenhouse gas emissions in 2035. Historical data through 2023 is taken from the latest Environmental Protection Agency inventory, which uses the 100-year global warming potential to convert non-CO_2 gases into CO_2 equivalents.[37] The *Enhanced Ambition (High)* scenario achieves 56% emissions reductions below 2005 levels in 2035 (2,869 $MMTCO_2e$), and the *Enhanced Ambition (Low)* scenario achieves 44% reductions in 2035 (3,610 $MMTCO_2e$). In contrast, the *Current Policies* scenario reduces emissions by 35% in 2035 (4,231 $MMTCO_2e$).

Over the last two decades, the United States has reduced its greenhouse gas (GHG) emissions by 19%, primarily a result of reduced coal consumption and improvements in energy efficiency.[37] This study finds that expanded actions from non-federal actors and renewed engagement from the federal government after 2028 can achieve up to 56% emissions reductions below 2005 levels by 2035 (2,869 $MMTCO_2e$). Without federal re-engagement and accelerated actions from non-leading states, enhanced actions from leading states can help the United States achieve a 44% reduction by 2035 (3,610 $MMTCO_2e$). Without any enhanced actions, existing non-federal policies and limited federal policies lower emissions by 35% in 2035 under the *Current Policies* scenario (4,231 $MMTCO_2e$) (Figure 1).

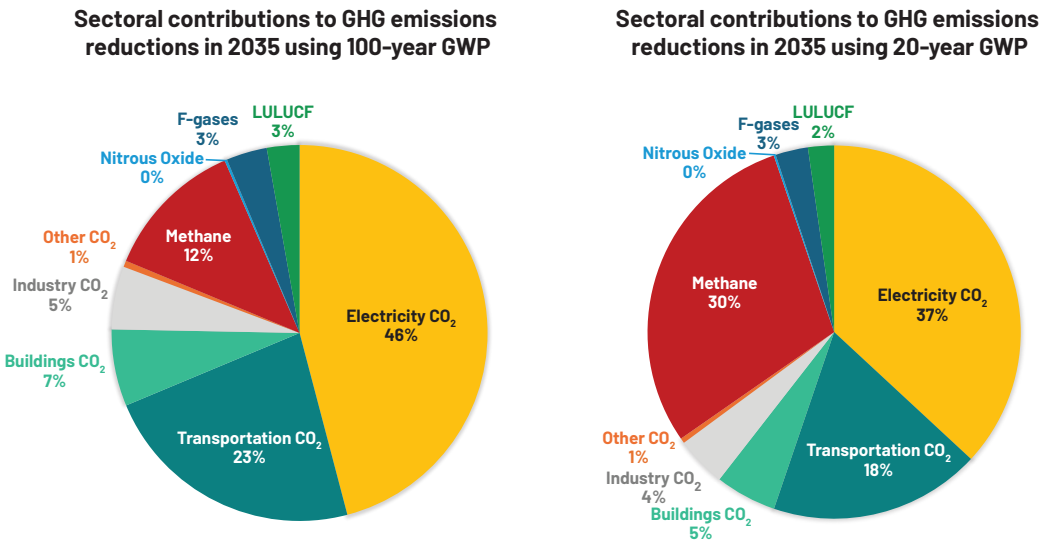

Figure 2. Sectoral contributions to total GHG emissions reductions in 2035 relative to 2021 levels under the *Enhanced Ambition (High)* scenario. Panel a) uses the AR5 100-year global warming potential (GWP) for all non-CO_2 gases, and panel b) uses the AR5 20-year GWP for methane. When considering the short-term impact of methane, methane becomes a more significant contributor toward GHG emissions reductions.

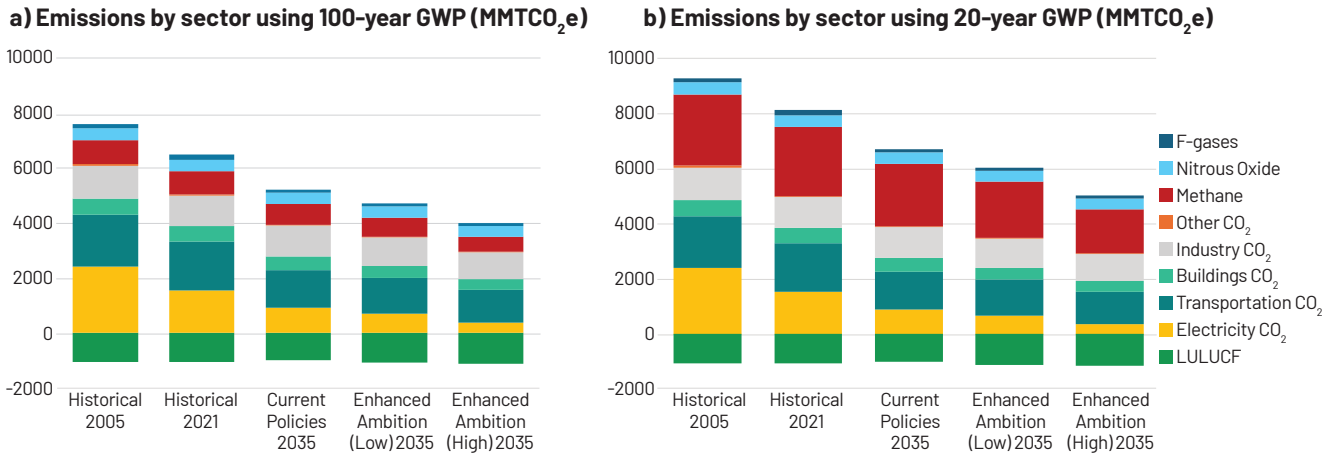

Figure 3. U.S. GHG emissions by sector, in units of $MMTCO_2e$. Both panels show historical emissions in 2005 and 2021, and projected emissions in 2035 under *Current Policies*, *Enhanced Ambition (Low)* and *Enhanced Ambition (High)*, broken down by sector. Panel a) uses the AR5 100-year GWP for all non-CO_2 gases, and panel b) uses the AR5 20-year GWP for methane. When considering the short-term impact of methane, methane becomes a more significant contributor toward GHG emissions reductions.

Under *Enhanced Ambition (High)*, the largest contributor toward economy-wide emissions reductions in 2035, relative to 2021 levels, is the electricity sector, making up 46% of the overall emissions reductions (Figure 2a, 3a). Transportation is the second largest contributor, followed by methane, contributing to 23% and 12% of total reductions in 2035, respectively. While the 100-year GWP is used in country-level emissions accounting by convention, methane is much more potent over a shorter time frame. Sectoral emissions reductions in 2035 are therefore also evaluated using methane's 20-year global GWP (Figure 2b, 3b). When evaluated this way, methane surpasses the transportation sector and becomes the second largest contributor towards emission differences, responsible for 30% of the overall emissions reductions.

Electricity sector as a key area for near-term decarbonization

Decarbonizing the electricity sector by deploying clean, carbon-free electricity is a critical opportunity for non-federal action under current circumstances. After decades of remaining flat, U.S. electricity demand is expected to surge in the near term with the proliferation of data centers across the country, additional electrification of end-use sectors (e.g. electric vehicles and heat pumps), and heightened peak demand under climate change.[38] Data centers accounted for 4-5% of U.S. electricity consumption in 2023,[39] and are expected to account for anywhere between 8-15% in 2035.[40]

Renewables provide a cost-effective, scalable solution to meet the increasing demand for electricity,[41] especially as the coal industry declines due to unfavorable economics[42] and the natural gas industry faces supply chain limitations.[43] The costs of solar and wind have fallen sharply over the last decade, making them more competitive with fossil fuels.[44] In 2024, renewable generation surpassed coal generation for the first time, with ten states generating over a third of their energy from solar and wind.[45]

The critical role of renewable energy in supporting new electricity loads

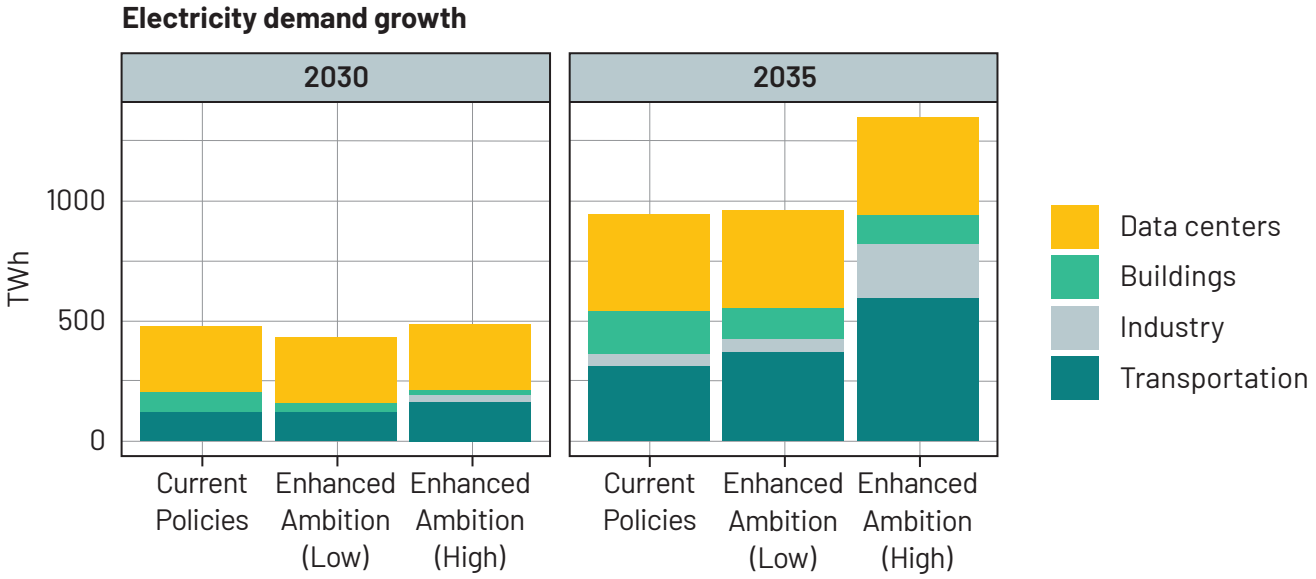

Figure 4. Electricity demand growth by sector in 2030 and 2035, relative to 2021 levels, across scenarios.

Under *Enhanced Ambition (High),* electricity demand rises by 34% (1,352 TWh) by 2035 from 2021 levels, due to comprehensive measures that increase electrification across all sectors and data center growth. The transportation sector contributes to 44% of the total demand growth, followed by data centers, accounting for nearly 30% of the growth. Energy efficiency measures for residential and commercial buildings lead to less electricity consumption from buildings relative to *Current Policies*. In comparison, electricity demand grows by 24% under *Enhanced Ambition (Low)* and *Current Policies*, with data centers making up over 40% of the growth (Figure 4).

Annual capacity additions

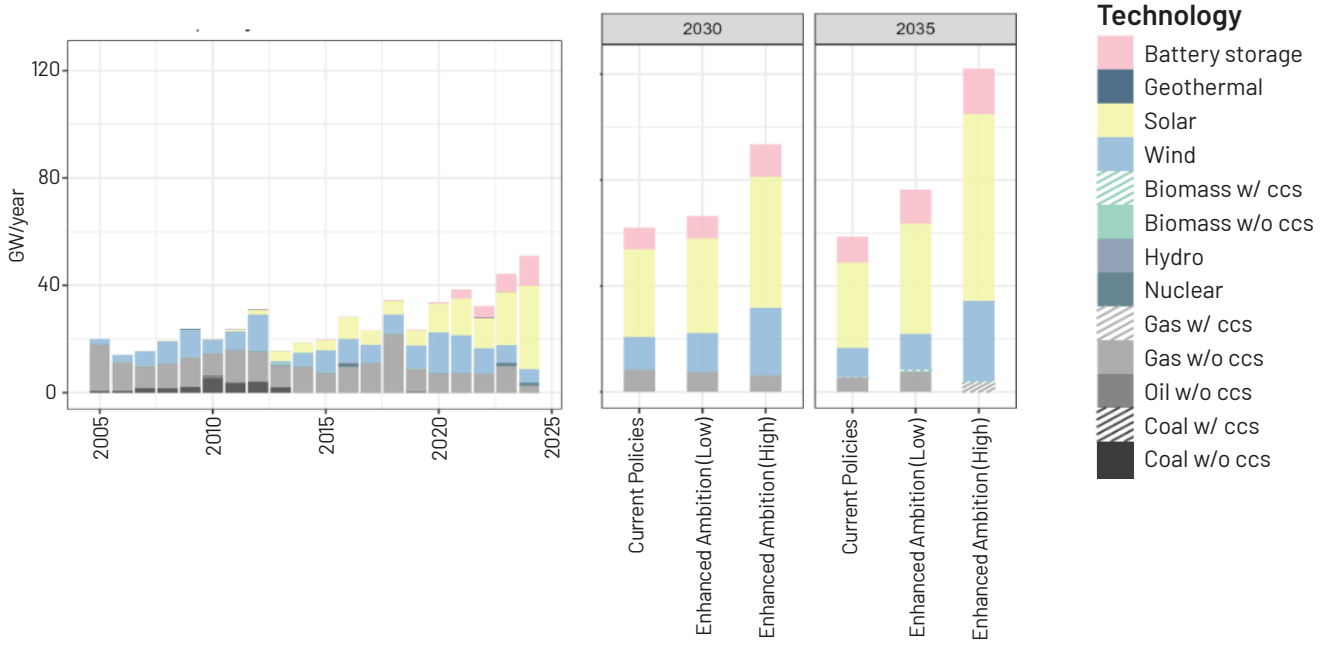

Figure 5. Annual capacity additions, in units of GW/year. Historical capacity additions through 2024, taken from the U.S. Energy Information Administration, are shown on the left.[46] Projected average annual additions in 2030 and 2035 across scenarios are shown on the right.

Renewable energy is key for meeting the increase in demand from data centers and end-use electrification (Figure 5). Solar, wind and storage capacity additions to the grid reach 117 GW/year on average in 2035 under *Enhanced Ambition (High)*, 57 GW/year under *Enhanced Ambition (Low)*, and 52 GW/year under *Current Policies*. The ability to rapidly build renewables and connect them to the grid becomes critical for meeting new electricity demand growth, and will require overcoming challenges related to slow permitting and siting processes. Currently, over 2 TW of zero-carbon electricity is waiting in the interconnection queue.[47]

New natural gas capacity plays a smaller role due to constraints related to gas turbine supply[18] and clean energy policies. Across scenarios, 6-8 GW/year of unabated natural gas capacity is added to the grid on average by 2030. In 2035, *Enhanced Ambition (High)* has no new additions of unabated gas, but does see 4 GW/year of new capacity from natural gas retrofitted with carbon capture and storage (CCS). This compares to 7 GW/year and 5 GW/year of new unabated gas capacity under *Enhanced Ambition (Low)* and *Current Policies*, respectively.

Across all scenarios, non-leading states are responsible for nearly 80% of the total electricity demand growth in 2035. The lack of ambitious policies around renewable deployment in these states presents a challenge to both decarbonizing this sector and supporting the increase in electricity demand growth. States can better position themselves to unlock the direct and indirect economic growth associated with data centers by accelerating the deployment of renewables and more effectively managing electricity loads.

Driving down electricity sector emissions with clean energy policies

Electricity generation

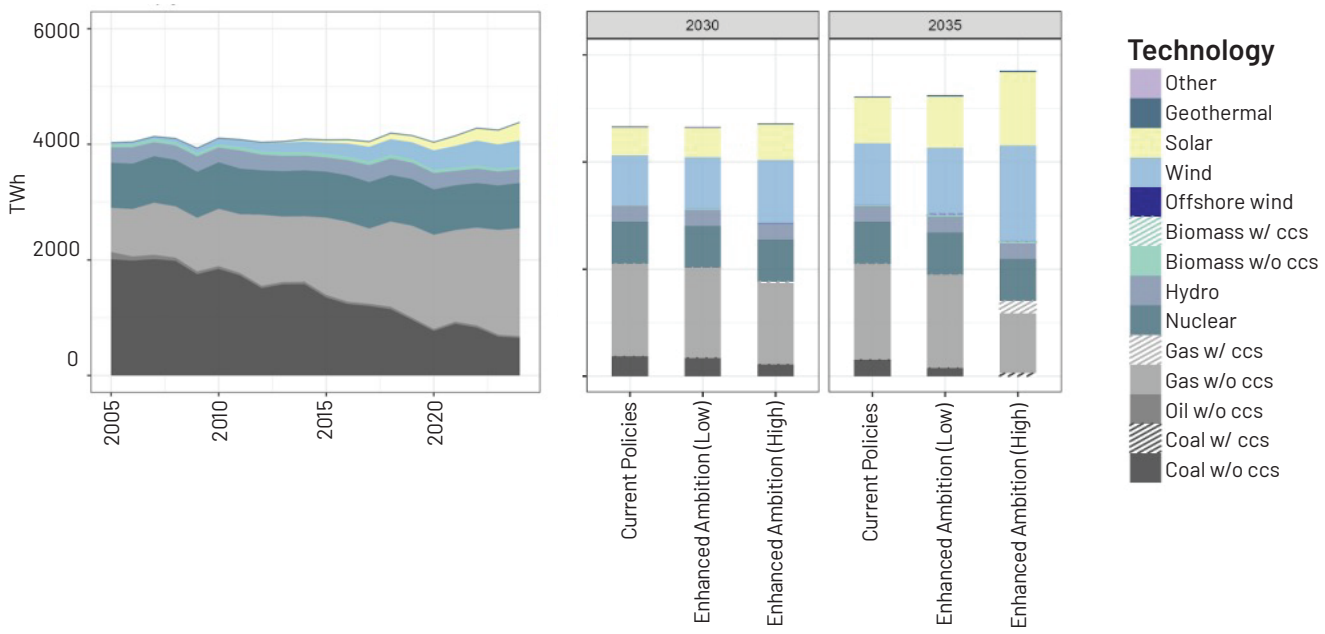

Figure 6. Annual electricity generation, in units of TWh. Historical generation by technology through 2024, taken from the Energy Information Administration, is shown on the left.[48] Projected generation in 2030 and 2035 across scenarios is shown on the right.

Under *Enhanced Ambition (High)*, expanded renewable portfolio standards (RPS) and clean energy standards from non-federal actors, paired with renewed federal engagement on tax credits for clean energy technologies and regulations on fossil fuel power plants, drive down emissions by 75% in 2035 from 2021 levels. The electric grid is 80% clean in 2035, with 55% of total generation from solar and wind. The share of unabated natural gas drops to 23% of the mix, and unabated coal generation is completely phased out by 2035, replaced primarily by renewables and some CCS technologies (Figure 6).

Without expanded actions from non-leading states and federal re-engagement, *Enhanced Ambition (Low)* delivers emissions reductions of 55% in 2035 as a result of accelerated actions from leading states. Under this scenario, the United States achieves a 63% clean grid, with 42% of the grid mix coming from solar and wind sources. The share of unabated coal drops from 23% in 2021 to 3% in 2035, and unabated natural gas falls slightly from 2021 levels to 33% (Figure 6).

Electricity sector emissions continue to fall under *Current Policies*, reaching 41% reductions below 2021 levels by 2035 as a result of planned coal retirements, existing state-level RPS, and to a lesser extent, federal tax credits for renewable energy, which effectively expire after 2025. Clean energy sources make up 59% of the generation mix in 2035, with 38% from solar and wind. Unabated coal power continues to decline, falling to 5% in 2035, with unabated natural gas remaining close to today's levels at 34% of total electricity generation (Figure 6).

While the IRA's 45Q tax credit for CCS technically remains, termination of the greenhouse gas reporting program would make this credit difficult to claim;[49] thus, the credit is assumed to be effectively rolled back under *Current Policies* and *Enhanced Ambition (Low)*. However, CCS technologies emerge by 2035 as a result of state- and regional-level clean energy policies (Figure 6).

Transformations across the economy

Beyond the electricity sector, bold climate actions across other sectors of the economy can help deliver near-term emissions reductions.

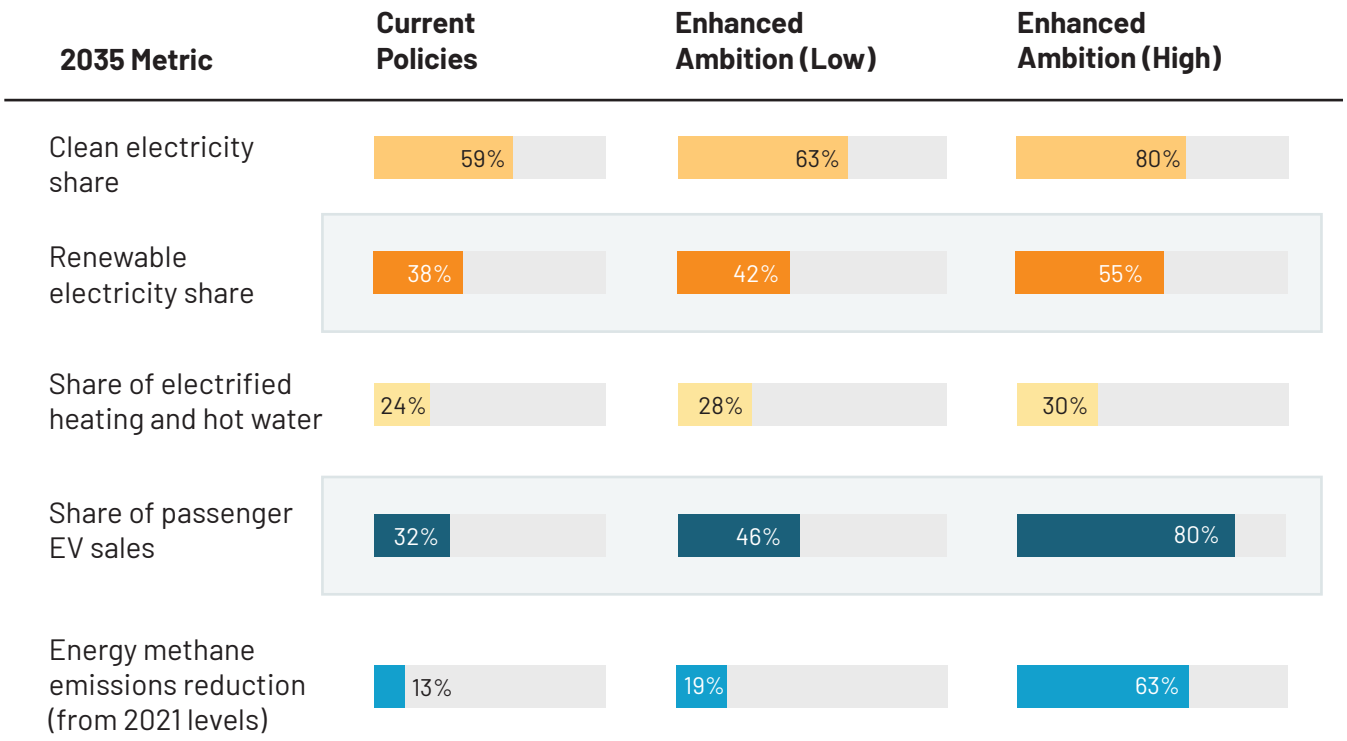

Figure 7. 2035 metrics across sectors.

Methane mitigation presents an important opportunity for near-term decarbonization. *Enhanced Ambition (High)* includes renewed oil and gas methane regulations and incentives to abate agricultural methane emissions from the federal government, as well as widespread bottom-up actions to regulate oil and gas methane and enhance landfill methane capture and waste diversion efforts. As a result, overall methane emissions reductions reach 37% and reductions from the energy sector reach 63% in 2035, compared to 2021 levels (Figure 7). *Enhanced Ambition (Low),* which includes only enhanced actions from leading states in oil and gas and waste methane, achieves a 19% reduction in both overall methane emissions and energy methane emissions in 2035. In contrast, *Current Policies* assumes that only cost-effective abatement strategies are pursued, achieving a 10% reduction in overall methane emissions and a 13% reduction in energy methane emissions.

Transportation is another key area for further progress; in recent years, the sector has realized significant improvements in fuel efficiency and seen increasing electric vehicle (EV) sales, reaching 10% of U.S. new car sales in 2024.[50] However, a formal removal of the California waiver would hinder states' ability to accelerate EV adoption. The *Enhanced Ambition (High)* scenario includes expanded non-federal actions like additional EV subsidies, low-carbon fuel standards, clean car coalitions, automaker commitments, and vehicle miles traveled reduction strategies, and assumes that the federal government reinstates tailpipe emissions standards to further promote EV sales in all states, leading to reductions of 33%, relative to 2021 levels,

in 2035. With only climate-leading states adopting high-ambition policies and without support from the federal government, *Enhanced Ambition (Low)* reaches 26% reductions. Annual electric light-duty vehicle sales rise to 46-80% and electric freight truck sales increase to 13-41% in 2035 under *Enhanced Ambition (Low)* and *Enhanced Ambition (High)*, respectively (Figure 7). This compares to a 22% decline in transport emissions under *Current Policies*, driven primarily by market forces and limited state-level policies, with 32% electric passenger car sales and 6% electric freight truck sales in 2035 (Figure 6).

In the buildings sector, emissions fall by 30% under *Enhanced Ambition (High)* through widespread adoption of zero-emission appliance standards and construction standards, more ambitious energy efficiency standards, and renewed federal policies related to building efficiency and electrification. These policies increase heating and hot water appliance electrification from 18% in 2021 to 30% in 2035. *Enhanced Ambition (Low)* achieves 22% emissions reductions and a 28% electric share of heating and water appliances. In comparison, *Current Policies* lowers buildings emissions by 10% in 2035 with a 24% electric share as a result of expiring federal tax credits and market forces (Figure 7).

The industrial sector sees emissions decline by 12% under *Enhanced Ambition (High)* through additional policies supporting the adoption of advanced biofuels, hydrogen, carbon capture and storage, and direct air capture. The *Enhanced Ambition (Low)* achieves a 6% emissions reduction in 2035. Emissions roughly stay flat under *Current Policies*.

A roadmap to high-ambition pathways in 2035

This section reviews concrete policy levers across each economy-wide sector that can help achieve the transformations modeled under the *Enhanced Ambition* scenarios. These key actions go beyond those explicitly included in the modeling, which can be limited in its representation of certain actions. Policy levers were identified through a comprehensive literature review, as well as a robust stakeholder engagement process from a September 2024 CGS report.[51] Each sector begins with an overview of the policy landscape, then dives into policy levers across each actor type. The impact of each policy lever is described, followed by examples of implementation already taking place within the United States, with a focus on examples that are beginning to emerge within non-leading states where possible. If widely adopted, these policies can drive meaningful climate action in the United States, even under federal policy rollbacks.

Electricity Sector

Overview

Though the current administration has rolled back clean energy programs and incentives, tax credits remain for geothermal, hydropower, battery storage, and nuclear energy systems. Additionally, new federal programs incentivize nuclear deployment and innovation, aiming to expand nuclear capacity to 400 GW by 2050.[52]

States can fill the gap by setting renewable and clean energy standards, allocating funding for grid modernizations and renewable energy (RE) initiatives, enacting permitting reform, implementing carbon pricing programs, and supporting flexible load growth initiatives. Localities can invest in clean energy projects and microgrid enhancements, and enable a just energy transition through community choice aggregation, group purchasing programs, and clean energy workforce training programs. The

concentration of data centers in urban areas also gives municipal leaders an opportunity to ensure these facilities run on 100% carbon-free electricity, integrate demand response capabilities, and contribute new clean energy capacity to the grid. Regional collaboration includes clean energy regulation and deployment, interstate transmission infrastructure, and regional carbon pricing programs, while private actors are driving community-oriented clean energy investment, piloting grid enhancing and long duration energy storage technologies, and establishing innovative energy demand response programs.[53]

State

Renewable and clean energy standards (RPS): In the absence of federal incentives for renewables, states can enact or strengthen their RPS, which require utilities to provide a minimum percentage of energy from zero- or low-emission sources. RPS policies drove close to half of the expansion in RE generation since 2000 and play a key role in diversifying state RE mixes, lowering greenhouse gas (GHG) emissions, and encouraging regional spillover of RE expansion.[54] For example, Virginia requires all utilities to reach 100% RE generation by 2050 while Nevada requires 50% of energy sales be from RE by 2030.[55] States like Minnesota are enabling RPS compliance by recommending hourly matching of clean energy production and consumption, which ensures clean energy is used when and where it is most critically needed.[56]

Carbon pricing programs: At the state level, California and Washington have cap and trade programs that set a limit on GHG emissions for major polluters and require them to buy allowances to offset them.[57,58] In Oregon, the Climate Protection Program sets a declining cap on GHG emissions, but does not allow entities to trade to comply with this standard.[59] California's cap and trade system is among the largest multi-sectoral trading systems globally, and the funds generated from the program are used to help state agencies implement programs to further reduce GHG emissions, with 35% of the revenue directed to disadvantaged and low-income communities.[57] Cross-state programs, such as the Regional Greenhouse Gas Initiative (RGGI), can expand carbon market participation beyond state lines. See the Regional section for more detail.

Removing barriers for near-term clean energy deployment: Policymakers can streamline permitting, expand procurement solicitations, encourage all-source bids, and direct state-led procurement (where possible) to ensure clean energy projects move forward on time.[60] In August 2025, Colorado's Governor reaffirmed the state's commitment to near-term deployment, directing agencies to eliminate bottlenecks, expedite interconnection and approvals, ensure eligible projects start in time, and help residents access rebates for clean energy technologies like electric vehicles (EVs) and heat pumps.[61] State-level legislation on permitting and siting reform, such as those in Washington[62] and New York[63], can further streamline siting and permitting processes by requiring completed environmental impact statements within a specified time frame and soliciting early input from stakeholders. Additionally, Utah has promoted small-scale solar deployment by exempting portable solar panels from interconnection requirements.[64]

Connecting RE projects to the grid using existing interconnection infrastructure, such as the sites of retiring coal plants, provides a cost-effective solution to expedite clean energy deployment. Kentucky, a state historically reliant on the coal industry, recently approved the first phase of a 210 MW solar project on a reclaimed coal mine. This project is part of the larger Appalachian energy transition, and will be one of the largest single-site solar projects in the Eastern United States once completed.[65]

Flexible load growth initiatives: States can use their legislative and executive authority to promote flexible load growth, allowing large loads to be temporarily reduced during high demand times by utilizing on-site generation, moving workloads to other locations, or reducing operations.[66] This near-term strategy

helps accommodate the rapidly increasing electricity demand of industrial users like data centers. North Carolina's bipartisan Energy Policy Task Force includes a Load Growth Subcommittee focused on technological and policy solutions to the increasing energy demand from data centers (see details in Box 1).[67] Texas policymakers also enacted a law in June 2025 granting the Electric Reliability Council of Texas the authority to mandate curtailments for large energy users and setting operational and financial requirements in place for these users.[68]

Box 1. North Carolina: A Bipartisan Approach to Load Growth and Demand Response

In August 2025, North Carolina Governor Josh Stein issued Executive Order No. 23, establishing the North Carolina Energy Policy Task Force. This bipartisan body brings together representatives from the public, private, and nonprofit sectors to advise the Governor, General Assembly, and other policymakers on strategies to manage rising energy demand while ensuring consistent and affordable access to clean energy. The Executive Order also created two subcommittees: the Technical Advisory Subcommittee and the Load Growth Subcommittee. The Technical Advisory Subcommittee will conduct modeling of the state's energy system to provide evidence-based inputs for policy development.

The Load Growth Subcommittee represents an innovative approach to demand response. Its directive includes forecasting future energy demand, assessing the implications of new large-scale loads on resource capacity, identifying technological and policy solutions to increase load flexibility and demand response, and developing strategies to avoid stranded assets while maintaining ratepayer affordability. For the first time, North Carolina is convening large industrial energy users, utilities, regulators, environmental advocates, and residential consumer representatives in a single forum to address load growth challenges collaboratively. The subcommittee's composition and scope broaden stakeholder engagement and shift state energy planning toward a more proactive approach, paving the way for robust demand response strategies that enhance grid reliability.[67]

Local

Community choice aggregation: Cities and municipalities can complement state-level RE targets, or lead on RE deployment in the absence of state-level leadership, through clean energy procurement. In 10 states, local governments are authorized to procure energy on behalf of residents and businesses from alternative suppliers while transmission and distribution remain with the existing utility through community choice aggregation (CCA). CCA also enables communities to negotiate lower costs for ratepayers, with electricity prices often dropping by 15-20% compared to regular utility service.[69] Ohio's enabling CCA legislation has allowed cities such as Cleveland to implement programs that, in their first year, saved local consumers over $12 million while delivering 100% RE at a rate 28% below the standard service offer.[70]

Data center regulations: Municipal leaders have the authority to regulate data center impacts on the environment, including local energy and water supply. Emerging regulatory approaches include: mandating the use of 100% carbon-free power (Santa Clara County, CA);[71] requiring verification that local infrastructure can meet full demand (York County, VA[72]; DeKalb County, GA);[73] imposing stricter siting and zoning standards to mitigate community impacts (Loudon,[74] Fairfax,[75] and Henrico[76] Counties, VA); and convening task forces to study risks and benefits (Prince George's County, MD).[77] Local governments can

also mandate transparent energy reporting, set energy performance standards, and require facilities to procure 100% renewable or carbon-free energy.[78] Stronger measures include ensuring that renewable procurement adds new clean capacity[79] and requiring grid-aware operations and demand response capabilities so facilities can adjust load to support grid reliability.[80]

Investment in distributed energy resources (DERs), microgrids, and virtual power plants (VPPs): Localities can invest in small-scale DERs such as solar panels, EVs, and heat pumps, which generate and store energy close to their consumption sites.[81] Microgrids, which are interconnected networks of DERs, can provide backup energy when there are disruptions, and VPPs stabilize local grids by aggregating energy from DERs located across a locality's grid.[82,83] Fort Wayne (IN) has created a microgrid composed of over 12,000 floating solar panels and battery energy storage, projected to save the city $8–10 million in energy costs over the first 20 years while providing 40% of annual energy demand.[84] This microgrid is also one of the only systems nationwide that provides energy for local water and sewer facilities.[85] Similarly, in late 2024, Chelsea (MA) launched a virtual microgrid utilizing software coordination to link 1,000 kW of solar and 1,000 kWh of batteries to the grid. Chelsea's virtual microgrid is designed to reduce energy bills for lower-income residents, and the city has actively engaged environmental justice organizations and other community members in the planning and deployment process.[86]

Regional

Transmission infrastructure: Cooperating on cross-state transmission infrastructure can improve access to clean energy, enhance grid reliability, and reduce operational costs.[87] The Midwestern Governors Association has facilitated grid-related interstate collaboration, including creating MID-GRID 2035, a regional transmission education and planning initiative meant to improve the Midwest's future of transmission buildout.[87] Another recent example is the Helix-Hiple transmission line to integrate new RE sources and enhance cross-border grid reliability between Michigan and Indiana.[88] The Helix-Hiple and the coinciding upgrades to the Michigan-based Nelson Road–Oneida line are projected to generate approximately $6.2 billion in revenue for the state over the next 20 years, create close to 35,000 new jobs, and provide energy to 1.7 million homes.[88]

Collaborative clean energy deployment: State collaboration on the development and deployment of clean and RE technologies is a key component of regional decarbonization. Utah, Idaho, and Wyoming signed a tri-state Memorandum of Understanding in April 2025 to coordinate siting, permitting, and environmental review for next-generation nuclear reactors.[89]

Carbon pricing programs: Cross-state cap and trade programs can reduce pollutants and GHG emissions while generating revenue for state initiatives. In its first 18 years of operation, the Regional Greenhouse Gas Initiative (RGGI) generated 2.7 billion in energy savings and saved 7.8 $MtCO_2$, while using program proceeds to fund energy efficiency, bill assistance, and renewable energy projects.[90]

Private sector

Investments in grid enhancing technologies (GETs): Promoting GETs can enhance RE integration while lowering operational costs for utilities. In 2024, Duke Energy showcased the value of grid-enhancements by rebuilding the 40-mile Lee-Milburnie transmission line in North Carolina to include modern support structures and cables that can combat extreme weather. These enhancements are projected to generate $2.1 billion in benefits, reduce the length of service interruptions by 10%, and connect 1,600 MW of solar and 260 MW of storage to the grid.[91]

Demonstration projects: Cross-sector partnerships and investments in demonstration projects can accelerate the commercialization of clean energy innovations. In September 2025, the Salt River Project and Google announced a formal agreement to test the operational abilities of long-duration energy storage technologies and investigate performance improvements to support the deployment of these technologies at scale in Arizona.[92] In Becker (MN), Xcel Energy is piloting a long-duration battery storage project to replace the Sherco coal plant by 2025.[93]

Demand response programs: Utilities and other energy producers can pilot demand response programs to test demand-side solutions in addressing increasing energy demand needs. In Minnesota, Xcel Energy implemented multiple programs to aid businesses and residential customers in reducing energy costs by lowering their consumption during peak demand periods (see details in Box 2). Utilities can also take advantage of the fact that regions like PJM and ERCOT, which have the highest concentration of data centers, also have some of the largest VPP capacity. This capacity can be dispatched as a demand response resource to help offset peak demand from data centers.[94]

Box 2. Xcel Energy: Piloting Innovative Demand Response Programs

Utilities and other energy providers play a critical role in addressing the rapidly increasing demand from industrial users such as data centers, as they are uniquely positioned to implement policies and programs tailored to state-specific contexts.

Xcel Energy is currently testing several demand-side solutions in Minnesota to reduce grid strain and reliance on peaker plants:

- **Critical Peak Pricing Pilot Program**: Uses a tiered rate structure to drive changes in energy usage. Specialized interval meters track usage, and electricity is priced according to the time period. Customers save money if they shift consumption away from high-priced peak periods.[95]
- **Peak Flex Credit Program**: Offers monthly credits and reduced demand charges ranging from 25-40% to commercial customers who lower consumption during peak demand events. Participants can choose summer-only or year-round availability, and third-party aggregators can also bundle small businesses to meet minimum eligibility requirements.[96]
- **Saver's Switch Program**: Helps reduce residential cooling load by allowing the utility to remotely cycle central air conditioners during peak demand over summer. In exchange, households receive a credit on their October energy bill.[97]

Transportation Sector

Overview

While many loans and tax incentives from the federal government have been frozen, rescinded, or rolled back in recent months, tax credits that encourage clean transportation fuel production and investments for electric vehicle (EV) charging through the National Electric Vehicle Infrastructure (NEVI) Program still remain.

Key policies, particularly at the state and local levels, can support a shift to EVs and fuels with lower carbon content, while also promoting mode shifting and development strategies that require less carbon-intensive transportation. States have a crucial role to play in setting the pace for electrification and in providing financial and technical support to local governments, tribes, higher education institutions, K-12 schools, and businesses. Cities, with their intimate knowledge of local context and needs, complement the efforts of states and collaborate with residents to design low carbon transportation systems that bolster health outcomes and accessibility. The private sector can fill in the gap by taking steps to reduce the upfront cost of EVs and charging infrastructure.

State

EV incentives and infrastructure support: In the absence of federal incentives, states can provide rebates for light-duty EVs to reduce the upfront cost for individuals, governmental entities, and businesses. Pennsylvania, for example, provides point of sale income-based rebates of up to $4,000 for new and used EVs.[98] Texas also provides grants to repower or replace medium- and heavy-duty vehicles (MHDVs) and equipment with all-electric models—up to 100% of the incremental cost of projects for governmental entities, and up to 75% for nongovernmental entities.[99]

To improve reliability and accessibility of charging systems, states can improve EV infrastructure through funding efforts, state requirements, and state-wide EV plans, filling in the gap for existing federal programs such as NEVI. Alabama, for example, provides state-funded charging infrastructure grants in areas of the state and for types of chargers that are not eligible for the federal program.[100]

Public fleet EV procurement targets: States can lead by setting EV procurement goals for public fleets and school buses. Michigan has set a goal of transitioning all light-duty vehicles (LDVs) in the state fleet to zero-emission vehicles by 2033, and all MHDVs by 2040.[101] Further, Michigan's Healthy Climate Plan outlines strategies to expand funding options for fleet conversions for local governments, small businesses, and school bus fleets.[102] In 2022, Connecticut Governor Ned Lamnont passed legislation that requires school buses operating in low-income communities to be electrified by 2030 and all buses to be electrified by 2040.[103] Connecticut has leveraged their state green bank to provide low-interest, long-term financing options for schools.[104]

Low-carbon fuel standard (LCFS): New Mexico and other states have begun implementing market-based mechanisms to reduce the carbon intensity of the state's transportation fuel mix over time. The LCFS in New Mexico creates a market in which the producers of high-carbon fuels purchase credits from the producers of low-carbon fuels. Low-carbon fuels include, but are not limited to, electricity. In addition to reducing the carbon footprint of the state, the market is expected to improve health outcomes for New Mexicans and to stimulate the economy.[105]

Vehicle Miles Traveled (VMT) reduction strategies: To complement electrification policies, state-wide VMT reduction goals and public transit expansion can shift passengers towards sustainable modes of transportation. Minnesota's Statewide Multimodal Transportation Plan provides a comprehensive vision with strategies including: increasing access to public transportation such as Bus Rapid Transit, creating safer opportunities for citizens to walk and bike, reducing per capita VMT 20% by 2050, building the state's transportation workforce, expanding intermodal and multimodal freight opportunities, and expanding on the state's NextGen Highways work to colocate new transmission lines within existing highways or other linear infrastructure rights of way.[106]

Local

Municipal EV adoption: Cities can complement state electrification efforts through EV adoption goals and local ordinances. Detroit (MI) aims to transition the city LDV fleet to EVs by 2034, installing over 200 public chargers at city facilities, garages, streets, and parking lots, while Charleston (SC) is working towards a 100% electric bus fleet by 2040.[107,108] Shelby County's (TN) Green Fleet Ordinance sets out a timeline to end county purchases of fully gas-reliant LDVs by 2033, while Madison (WI) adopted an ordinance setting requirements for installation of EV charging stations at commercial and residential parking facilities.[109,110]

Sustainable planning practices: To reduce reliance on single occupancy vehicles, cities can encourage sustainable modes of transportation such as walking, biking, and public transit through incentives, urban planning, and congestion pricing (see details in Box 3). While some cities, such as Orlando (FL) and Des Moines (IA), have set mode shift targets, others, such as Birmingham (AL), provide vouchers to encourage biking and bus riding.[111–113] Bus rapid transit (BRT) is a reliable alternative to car use; Wake County (NC) plans to dedicate 20 miles of transit lanes to BRT routes by 2035.[114] In Charlotte (NC), their Strategic Mobility Plan aims to reduce car dependency by 2040 by expanding transit options, enhancing pedestrian and cycling infrastructure, and achieving a 50/50 mode share between single-occupancy vehicles and alternative transportation modes.[115]

EV-ready ordinances: Local building and zoning codes can ease the transition to EVs by requiring charging infrastructure in new commercial and residential developments and parking lots, lowering the cost of future EV adoption. In Minneapolis (MN), all buildings with at least nine residential units must provide at least one EV-ready space with 208/240v outlets, while hotels, offices, buildings with over ten residential units, or non-residential buildings with at least twenty off-street parking spaces must provide a percentage of EV-ready spaces in addition to its required EV charging spaces.[116]

Box 3. NYC Congestion Pricing: A Model for Improving Urban Mobility

In January 2025, New York City launched the nation's first urban congestion pricing program. The program utilizes a phased toll system that charges LDVs $9 to enter the Congestion Relief Zone (CRZ) in Manhattan during peak hours. In the first six months of implementation, traffic congestion in the CRZ improved remarkably compared with 2024 levels, with fewer vehicle entries and traffic delays, and increased bus speeds and ridership across all forms of public transit. Traffic safety, noise pollution, and air quality indicators also improved.[117]

The program generated approximately $216 million in revenue during its first four months,[118] and is projected to exceed $500 million by the end of 2025,[119] with profits going toward capital improvements for the NYC public transit system.[118] Despite its success, in February 2025, the U.S. Department of Transportation rescinded federal approval for the program, with Secretary Duffy stating that revenue from tolls should fund roads rather than public transit projects.[120] While polling shows that the program was unpopular before it started, the program is expected to gain popularity as additional benefits are realized.[119] The long-term durability of such a politically contentious policy remains to be seen, but in the meantime, tolling remains active and the program stands out as a model for how cities can assert control over local transportation policy.[121]

Regional

Clean vehicle programs: Established in May 2025 by the U.S. Climate Alliance, the coalition consists of states who have chosen to adopt and implement clean vehicle programs. The coalition aims to continue progress towards state transportation goals, collaborate and share solutions that can eventually be scaled by the federal government, and forge meaningful partnerships with industry and manufacturing partners.[122]

Coordinating on EV commitments: In 2024, Climate Mayors—a bipartisan network of 350 U.S. mayors who demonstrate climate leadership—committed to electrifying 50% of their municipal fleets by 2030. This initiative is expected to yield 80,000 to 100,000 new LDVs and MDVs, significantly reducing greenhouse gas emissions from U.S. municipalities. The effort builds on the progress of the Climate Mayors Purchasing Collaborative, which helped to accelerate fleet transitions by reducing the costs of EVs and charging infrastructure.[123]

Other

Utility incentives: Utilities can help consumers maximize savings when making the switch to an EV. Duke Energy Florida recently announced the launch of three new programs: the Charger Prep Credit, which provides rebates for charger installation, the Off-Peak Charging Credit, which allows residential customers to receive credits on their electricity bill for charging during off-peak hours, and the Fleet Advisory Program, which gives business rebates to conduct fleet electrification studies.[124]

EV production commitments: To complement state and city efforts, commitments from the auto manufacturing industry will be important in ramping up EV deployment and keeping vehicle decarbonization on track. Though California can no longer enforce its mandated sales targets, in 2024, Stellantis partnered with the state, promising to meet sales targets even under ACCII rollback.[33]

Fleet electrification targets: The Corporate Electric Vehicle Alliance provides support to companies across the country interested in electrifying their corporate fleets. Members of the alliance include Amazon, AT&T, Best Buy, and IKEA.[125] Amazon plans to incorporate 100,000 EV delivery vehicles by 2030, and FedEx aims for an all-electric global pickup and delivery fleet by 2040.[126]

Buildings Sector

Overview

With substantial cuts to federal standards and incentives within the buildings sector, a few Inflation Reduction Act (IRA) credits remain, including the High-efficiency Electric Home Rebate Program, which expires in mid-2031, providing opportunities for low- to middle-income households to upgrade to electric appliances. Both the New Energy Efficient Home Credit and the Energy Efficient Commercial Buildings Deduction now expire on July 1, 2026, providing a short window of opportunity to use these credits for efficiency initiatives.

States have high capacity to go beyond federal climate ambition within the building sector, given their broad authority to promulgate codes for new and existing buildings, adjust appliance standards, and offer incentives for green building.[127] States can also tailor their building policies to regional needs, considering issues like electricity costs and the area's climate. Cities have similar authority to go beyond federal and state standards, though some exceptions exist in policy realms where states claim preemption,[128] while

businesses primarily impact this sector through their structure footprint. The distribution of power within the buildings sector gives subnational actors substantial authority to counteract ongoing federal rollbacks.

State

Energy efficiency standards: States can mandate efficiency improvements for electricity and gas utilities through Energy Efficiency Resource Standards (EERS), a prevalent policy enacted by 27 states for electricity sales and 20 states for gas sales, or improve shell efficiency through adoption of ambitious energy codes. In 2008, Iowa began requiring that investor-owned electricity and gas utilities submit four-year energy efficiency plans, ratcheting up efficiency requirements over time.[129] Adoption of statewide energy codes, either a model code, such as those outlined by the International Energy Conservation Code (IECC) every three years, or a unique state-created energy code, such as those in Washington and Vermont, allows states to improve shell efficiency within new construction. States can also empower local jurisdictions to adopt stricter energy codes, known as stretch codes. Currently, residential energy codes exist in 43 states, while commercial codes have been adopted by 42 states.[130]

Zero-emission construction and appliance standards: States can establish appliance standards to improve baseline energy or water efficiency; in Nevada, such standards cover 14 products, including lamps, residential fans, and commercial cooking appliances.[131] A few states ban sales of new gas appliances, including New York, which will require new construction to be all-electric beginning in 2026,[132] and in 2024, nine states signed a memorandum of understanding committing to expansion of heat pump sales, targeting 65% of residential heating, hot water, and air conditioning shipments by 2030, reaching 90% by 2040.[133] In alignment with this goal, the Northeast States for Coordinated Air Use Management (NESCAUM) created model policy options for achieving heat pump adoption targets.

Incentives for energy efficiency improvements and electrification: States can employ a range of incentives and financial supports including loan programs, home energy rebates, weatherization funding, and Property Assessed Clean Energy (PACE) financing to help defray the cost of building decarbonization. To assist with weatherization, Texas provides direct cash assistance for utility bills with weatherization enrollment and upgrades, and provides exceptions to the cost-effectiveness mandates it usually requires for low-income programs.[134] PACE financing programs, like those enabled in Missouri, allow building owners to complete energy efficiency upgrades or renewable installations without having to pay the entire cost upfront.[135]

Performance-based requirements: States can also mandate improvements through building performance standards or clean heat plans, which require gas distribution utilities to reduce emissions and/or energy intensities. In Maryland, owners of buildings 35,000 square feet or greater must benchmark their emissions annually, reaching net-zero by 2040, facing fees for emissions beyond compliance targets.[136] To reduce gas distribution emissions, utilities in Colorado must file Clean Heat Plans,[137] articulating strategies for reducing their emissions 4% by 2025 and 22% by 2030, relative to 2015 levels.

Local

Building codes: To improve local shell efficiency, cities can pass building codes more stringent than those that exist at the state level; the city of Austin (TX) recently adopted the 2024 IECC building standard,[138] surpassing Texas' 2015 IECC standard.[139] City-level LEED certification requirements can also improve efficiency in new and existing buildings. In Atlanta (GA), all new and substantially renovated municipal buildings over 5,000 square feet must obtain a minimum of LEED Silver Certification, and all city-financed facilities over 25,000 square feet must gain LEED certification over a phase-in period of 10 years.[140]

Additionally, municipal building codes can help consumers prepare for future climate friendly upgrades by requiring solar or EV-ready infrastructure (see details in Box 4). San Antonio (TX), for example, requires that one and two-family dwellings reserve electrical service space for future solar installations, and that those with a garage install an EV charging receptacle.[141]

Green building incentives: Cities can employ a suite of incentives to encourage green building and renovation for both homeowners and developers. For homeowners, financial incentives including rebates, low-interest loans, and project funding can help offset the cost of installing electric and energy efficient technologies. Developers can additionally benefit from PACE financing and non-financial incentives, such as expedited permitting, reduced parking requirements, and density bonuses. In Overland Park (KS), builders of new dwellings can receive permitting fee reductions by incorporating EV-ready parking or solar-ready infrastructure; developers can receive a $600 reduction per dwelling for including south-facing unobstructed roof area reserved for future solar panel installation, or a 10% reduction in fees if half of their buildings have solar-ready features.[142]

Benchmarking standards: Setting ambitious decarbonization targets requires accurate data on energy consumption. Cities including Atlanta (GA) and Des Moines (IA) require that all properties exceeding 25,000 square feet benchmark their annual energy and water consumption to better understand how they consume resources year-to-year.[143,144] In Houston (TX), building managers use benchmarking to require city-owned buildings to reduce emissions by 5% year-over-year.[145]

Box 4. Norfolk, Virginia: A Model for Accessible Transit and Green Infrastructure

In 2017, the mayor of Norfolk, Virginia, signed the Global Covenant of Mayors for Climate and Energy, and the following year, the City Council formed the Mayor's Advisory Commission on Climate Change Mitigation and Adaptation.[146] This municipal leadership laid the groundwork for transit initiatives such as the TRAFFIX vanpool program, a public-private partnership between Hampton Roads Transit and TRAFFIX Commuter Options, that leases vehicles to groups of commuters, with costs shared among riders.[147] Norfolk also offers GoPass365, a year-long commuter pass available as an incentive through participating universities and businesses,[148] and the Student Freedom Pass, which provides free unlimited rides to youth aged 13–17.[149]

Norfolk has also put forth ambitious green building targets and policies as part of its participation in the Better Buildings Challenge. The city is working to reduce municipal energy use by 20% (from 2019 levels) by 2032 via capital improvements such as new LED lighting and energy-efficient HVAC system retrofits.[150] Furthermore, Norfolk has earned SolSmart Gold certification for its work to ensure new municipal buildings are solar-ready.[151] The city is tracking its buildings sector progress using an innovative, real-time dashboard that is available to the public.[150] Collectively, these initiatives demonstrate how cross-sectoral climate action enhances a city's capacity for sustainable climate action.

Other

Households as energy infrastructure: To power growing electricity demand at data centers, hyperscalers can contribute to the upfront costs of installations of heat pumps, rooftop solar, and storage in residential buildings. Peak demand reduction resulting from such initiatives could offset the need for new capacity; in Georgia, for example, the state's projected 6.7 GW of new demand for data centers could be more than

offset by upgrading nearly half a million homes with heat pumps (1.5 GW) and expanding use of rooftop solar and storage (5.4 GW). Further, these upgrades could save money for both operators and consumers, as upgrade cost-shares could be lower than the cost of building new fossil capacity, also lowering household energy costs in the long-run through efficiency savings.[152]

Utility partnerships: Construction companies and energy providers can collaborate to construct cleaner homes and neighborhoods. In Colorado, Dandelion Energy and home builder Lennar pledged to build ground-source geothermal into more than 1,500 new homes over the next two years.[153] In New Hampshire, utility Eversource and Elkridge Construction LLC collaborated to construct a neighborhood of net-zero homes.[154]

Green schools: State and local governments can encourage the proliferation of clean new construction across their public facilities, including at new and renovated schools. The Decarbonizing Public Schools Program in the state of Maryland uses funds from the Energy Administration to construct new net-zero schools.[155]

Real estate initiatives: Companies and large real-estate holders can partner with cities and utilities to invest in electrification and efficiency in commercial and institutional buildings.

Industry Sector

Overview

Though some federal incentives remain, reducing emissions in hard-to-decarbonize technologies will be more difficult under federal rollbacks and project cancellations, given the need for continued investment in research and development and pilot projects, which subnational entities do not always have the funds to support. States can continue to support emissions reductions through energy efficiency programs and extraction policies. At the city level, fewer opportunities remain relative to other sectors, though city purchasing policies can encourage use of low-carbon materials. Businesses have more opportunities to encourage ambitious practices by leveraging their access to finance and ability to inform industry practices. Within the industrial sector, states and businesses have the greatest potential to enact ambitious policies, while taking advantage of remaining federal funding.

State

Energy efficiency standards and incentives: Energy efficiency is an important lever for industrial decarbonization given its cost-effectiveness and availability. To promote improvements in energy-intensive industries, Alabama provides education and training to small and medium-sized manufacturers on the use of alternative energy sources to help increase energy efficiency,[156] while Kentucky provides state and local government-issued bonds to industrial buildings to cover the cost of efficiency projects.[157]

State buy-clean policies: To reduce emissions from creation of construction materials, states can mandate or incentivize the use of lower-carbon industrial materials including steel, concrete, and asphalt. One such state policy, the Buy Clean California Act, establishes a maximum acceptable Global Warming Potential for four carbon-intensive materials when used in public works projects: structural steel, concrete reinforcing steel, flat glass, and insulation.[158]

Electrification standards and incentives: Though electrification technologies remain nascent for high-heat processes, commercialized industrial heat pumps can supply low-temperature heat for industrial processes. States can encourage the transition to heat pumps through mandates or incentives including clean heat production tax credits or cost-sharing grants. California's Industrial Decarbonization and Improvement of Grid Operations program uses proceeds from their cap-and-trade program to fund greenhouse gas reduction projects; in particular, those aimed at scaling up industrial electrification.[159]

Local

Sustainable procurement: Cities can use purchasing policies to reduce the emissions impact of commodities and building materials. In 2023, Austin (TX) passed a resolution directing the City Manager to "explore a plan to transition all future city contracts and projects to low-embodied-carbon concrete."[160]

Regional

Clean buying: By forming coalitions, organizations and jurisdictions can shape industrial markets by transforming high-carbon construction materials like cement and steel. The State Buy Clean Partnership, led by the U.S. Climate Alliance, brings 13 states together to share best practices and expand efforts to procure low-carbon industrial materials.[161]

Other

Clean energy innovation: Deploying new technologies such as hydrogen, carbon capture and storage, and direct air capture, will be critical for decarbonizing the industrial sector. In Louisiana, Hyundai is constructing a hydrogen-integrated steel mill, with plans to convert from blue to green hydrogen. Hyundai cites Louisiana's Industrial Tax Exemption Program and Quality Jobs Program as enabling this project, despite the loss of Inflation Reduction Act funds under the One Big Beautiful Bill Act.[162]

Utility incentives: To encourage industrial energy efficiency, utilities and utility commissions can provide rebates or incentives for upgrades. In Florida, the Orlando Utilities Commission provides $550 or $250 per kW of demand reduction for non-lighting and lighting projects, respectively,[163] while Georgia Power offers rebates and incentives to industrial facilities that install energy-efficient equipment.[164]

CH_4 Methane

Overview

Energy and agriculture are the largest sources of methane emissions, followed by waste.[158] Significant cuts to the regulatory and funding landscape, including the repeal of oil and gas methane regulations and freezing of funding for orphan well plugging, pose challenges to addressing methane emissions. Though a few programs remain, including the Abandoned Mine Land Reclamation Program Fund,[165] defunded programs and loss of a uniform regulatory landscape means methane abatement will require a patchwork of subnational initiatives, especially at the state level.

States have the greatest potential to enact ambitious policies, complemented by city and business efforts. Even without nationwide standards on methane emissions, states can set their own regulations on oil and gas production and landfills. Methane emissions associated with the extraction of oil and gas

can be mitigated at a relatively low cost, or at a net profit, through regulations on venting and flaring, and monitoring of pipelines. At the city level, waste management and reduction policies can reduce local emissions, while businesses can adopt pioneering practices to address methane emissions from oil and gas. Additional research and development is needed to address methane emissions from agriculture, especially enteric fermentation from ruminants.

State

Gas certification regulations: To reduce the methane intensity of gas, states or cities could require that pipeline gas entering their jurisdiction be certified as having a low methane intensity (below 0.2%). Though this policy is not yet on the books in any states, a bill proposed in California in 2023 would have required the state to establish a gas certification standard and encourage procurement of gas certified to have an emissions intensity of less than 0.2% across the supply chain. [166] Use of this type of policy in states like Illinois, across which a substantial portion of interstate gas pipelines travel, could have a considerable impact on the methane intensity of the nation's gas supply. [167]

Bans on routine flaring and venting: Routine flaring and venting are controlled processes that release the gas from oil production into the atmosphere, and are a major source of methane emissions. States such as Alaska, Colorado, New Mexico, North Dakota, Pennsylvania, and Wyoming have regulations that limit venting and flaring from oil and gas operations.[168] Colorado only permits flaring during disruption, maintenance, and production evaluation.[169]

Leak detection at operating and abandoned sites: Implementing leak detection and repair programs can proactively curb emissions from leaky infrastructure. New Mexico, for example, has strict rules that require operators to detect leaks, isolate them within 48 hours, and repair them within 15 days. North Dakota launched an initiative that will use artificial intelligence to monitor and predict methane leaks in real-time.[170] Following extraction, oil and gas wells sometimes become abandoned, leaking methane into the atmosphere. Using drones and community reporting, the Ohio Department of Natural Resources identifies, locates, and plugs orphaned wells, utilizing funding from the state tax on oil and gas production.[171]

Landfill monitoring regulations: State-level regulations to capture methane emissions from landfills will be important for mitigating methane from the waste sector. Michigan, California, Oregon, Maryland, and Washington all have landfill methane regulations.[172–176] Landfills operating in Michigan, for instance, must self-monitor methane emissions and fix leaks through patching or gas collection systems, and landfill owners and operators have a 90-day window to address noncompliant emissions.[172]

Local

Composting mandates: Municipal composting programs can significantly reduce the stream of organic waste entering landfills, which generates methane when it decomposes in the absence of oxygen. In Seattle (WA), commercial establishments must process food waste onsite or contract a composting service for processing.[177] In Saint Paul (MN), a local resolution established a goal of 15% of waste stream composted by 2050, and the city contracts with haulers to provide composting services to residents.[178] In April 2025, a mandatory curbside composting law went into effect in New York City (NY),[179] and smaller cities such as Laurel (MD) have also recently put mandatory composting ordinances into effect.[180]

Zero waste targets: Many cities establish zero waste targets to conserve the long-term flow of resources and mitigate environmental impacts associated with the full life cycle of goods, from product use to creation to disposal.[181] These goals are often accompanied with waste diversion targets, such as Austin's (TX) goal of diverting 90% of solid waste from landfills by 2040, as outlined in the city's Zero Waste Strategic Plan. To achieve this target, Austin has adopted several supporting policies, such as the Universal Recycling and Composting Ordinance, Single Use Products and Packing Ordinance, and Construction and Demolition Recycling Ordinance.[182]

Other

Methane intensity reduction: Businesses and utilities can establish programs to detect and reduce fugitive methane emissions. Total Energies, in partnership with Colorado State University, developed a tool to detect methane emissions, as part of its goal to reduce emissions 50% from 2020 levels by 2025, and 80% by 2030, maintaining a methane intensity below 0.1% across facilities.[183]

Lands Sector

Overview

While the U.S. federal government owns a significant portion of public lands, subnational entities can take actions to bolster forests and minimize agricultural land emissions. State policies can protect and enhance carbon sinks through wildfire mitigation, conservation, and reforestation, while on the agricultural side, climate-smart agricultural practices can reduce emissions. States can also provide financial and technical support to local governments, tribes, higher education institutions, K-12 schools, and businesses, amplifying grants and other programs from the federal government. Local governments can improve resident health and well-being by increasing urban tree canopies and encouraging sustainable lawn management practices. Private entities can contribute to research and development, and prioritize sustainable agricultural and procurement practices in their supply chains.

State

Wildfire mitigation: As wildfires become more severe and frequent, it is crucial to mitigate their impacts. The Arizona Department of Forestry and Fire Management's Community Challenge Grant Program supports local and tribal governments, non-profit organizations, and public educational institutions in implementing sustainable urban and community forestry programs.[184] In 2025, the Wyoming state legislature passed House Bill 192, which mandates that utilities establish wildfire mitigation plans to prevent utility-caused ignitions.[185] Additionally, recognizing the threat that wildfires pose to residents, the Wyoming Budget Department compiles wildfire mitigation and recovery grants from the federal government that individuals, small businesses, state agencies, and local and tribal governments can take advantage of.[186]

Forest management: States can lead a variety of efforts to bolster their forests. In 2024, Wisconsin's governor signed Executive Order 221, pledging to plant 100 million trees by 2030, conserve 125,000 acres of forestland, plant 99 million trees in rural areas, and plant one million trees in urban areas.[187] The Michigan Department of Natural Resources, in partnership with the DTE Foundation and ReLeaf Michigan, offers grants to support tree planting and urban forestry. As part of their comprehensive plan to address climate change, Delaware initiated "A Tree for Every Delawarean," the goal of which is to plant one tree for every person in Delaware. The program includes funding opportunities, resources, and workshops.[188]

Healthy soils financial and technical assistance: Soil health is important not only for crop yield, but also carbon sequestration. Oklahoma's new Soil Health Implementation Program (SHIP) helps advance soil health and regenerative agricultural practices across the state. Eligible producers may receive up to $40,000 in reimbursements for implementing practices aligned with approved SHIP conservation plans.[189] Minnesota provides incentives, grants, and technical assistance to support the establishment of soil health best practices, like cover crops and crop diversification. The state also offers a Soil Health Financial Assistance Program, Soil Health Delivery Grants, Cover Crop Demonstration Grants, and a Soil Health Practices Program.[189,190]

Local

Increase tree canopy: Cities such as Meridian (OH) and Fort Worth (TX), have created Urban Forestry Management Plans to manage urban tree canopies through an approach that maximizes human health, sustainability, and resilience. [191,192] Pittsburgh's Equitable Street Tree Investment Strategy targets ten low-income, low-canopy neighborhoods for focused tree maintenance, plantings, and urban forest education.[193]

Restoration programs: Cities may also lead efforts to restore vital ecosystems that have been impacted by human activity. Through the Reforestation & Wetland Restoration Program, the Milwaukee (WI) Metropolitan Sewerage District is working with public and private landowners to plant six million trees and restore and enhance 4,000 acres of wetlands in the Greater Milwaukee Watershed.[194]

Incentives to plant native trees and shrubs: Following the lead of local governments like Des Moines (IA), cities can incentivize growing native trees and plants by providing subsidies for converting land to native plants.[195]

Other

Tree planting initiatives: In partnership with American Forests, Salesforce committed to conserving, restoring, and growing 100 million trees, targeting forests in California damaged by the Camp Fire and areas in Dallas and Phoenix identified as having high tree canopy disparity and extreme heat.[196] Chestnut Carbon, a carbon removal company, has signed a 25-year agreement with Microsoft to provide them with removal credits in AK, TX, and LA. This agreement would oversee the restoration of 60,000 acres by planting over 35 million biodiverse and native trees.[197]

University programs and research: Universities play a vital role in land management and education. Michigan State University's Forest Carbon and Climate Program aims to increase understanding and implementation of climate-smart forest management through education, research, stakeholder engagement, and partnerships. Oklahoma State University partners with agriculture producers for field trials to evaluate cover crops and no-till cropping systems and research new potential practices.

Regenerative farming practices: Several U.S. companies including Walmart are prioritizing regenerative farming in their supply chain.[198]

Conclusion

Recent policy and economic dynamics have substantially affected the implementation of climate and energy transition strategies in the United States. Complicating the picture are several areas where rapid changes in technologies, costs, and overall economic policies and activities are sometimes operating in opposite directions. Nevertheless, in the near term, accelerating emissions reductions will depend on identifying and implementing opportunities for enhanced action from non-federal actors such as states and cities. Actions such as those identified in the roadmap section of this report will drive down emissions more rapidly in the coming years, and create conditions for more widespread adoption if a future federal government were to reorient toward climate-focused policies.

This analysis seeks to recognize those uncertainties by presenting a relatively wide range of scenarios that include (a) simply continuing roughly along the lines of current policies (b) actions from currently leading states but less from lagging regions and the federal government; and (c) enhanced actions from all non-federal actors with eventual federal re-engagement. Our approach shows that with enhanced actions, U.S. 2035 emissions could decrease up to 56% below 2005 levels by 2035. Actions from leading states, cities, and regions alone could deliver 44% reductions. Current policies only would lead to a roughly 35% reduction, though this should not be considered a worst-case scenario.

The transformations represented in the *Enhanced Ambition* scenarios are expected to come with substantial challenges under current circumstances, including the lack of federally-backed funding, political barriers, and uneven ambition across states. While non-federal leadership will be the driving force behind climate action over the next few years, future federal engagement will be critical for achieving the highest possible level of reductions. The design of federal investment strategies, regulations, and legislation in a future administration may look different from what is included in this analysis. Future federal governments may not, of course, be willing or able to deliver legislation as comprehensive as the Inflation Reduction Act, and some of the regulations may be approached as incentives instead of requirements (e.g., oil refinery standards and direct air capture targets).

Nonetheless, this study underscores the importance of non-federal actions in driving U.S. climate ambition in the near term. Critically, enhanced actions are needed not just from states that are already leading on climate, but also from those that currently have few climate policies on the books. Where state-level climate action is limited, bottom-up leadership from cities, combined with policy efforts from neighboring states and market forces, can help accelerate decarbonization efforts. Moreover, the mid-term elections in 2026 may shift the composition of Congress, which could slow federal rollbacks of climate policy and create more favorable conditions for non-federal climate policy. Ultimately, achieving a pace of emissions reductions necessary to approach earlier 2035 goals and the 2050 net zero target will require subnational governments and other non-federal actors enhancing their climate policies in the near term, businesses focusing on cost effective and clean technology deployment, and a future advancement of climate policies and investments from the federal government.

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