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G7 POWER SYSTEMS SCORECARD

COUNTRY PROFILE: US¹

May 2024

Synopsis

OVERALL COUNTRY SCORE: 216/400

Under the Biden administration, the United States has seen a dramatic shift towards meeting international climate obligations and building its renewable energy capacity as it works to attain a carbon-free electricity sector by 2035. The Bipartisan Infrastructure Bill, the Inflation Reduction Act, and numerous executive actions have endowed the Department of Energy (DOE) and the Federal Energy Regulatory Commission (FERC) with new funds and certain new authorities respectively to accelerate the development of green energy technologies and their integration into America's existing electrical grids.

The US is already championing some areas key to power systems decarbonisation. Among them are policies facilitating long-term storage ramp-up, and the Environmental Protection Agency's (EPA) recently adopted regulations might prove to be among the first within the G7 towards facilitating a phase-out of both unabated coal and gas fired generation. However, the US is working from a very low renewables base and needs to address the poorly connected and ageing grids systems. The scope and speed of change needed within the next decade is so far not reflected in either the country's renewable project pipeline or federal policy implementation on the state level in many states.

Country context

Analysing the US's progress towards G7 goals is challenging due to the country's decentralised energy infrastructure. Most programs that the DOE oversees involve awarding grants and incentivising investment for renewable energy projects to be carried out by other actors, such as utility companies and local governments. FERC can enforce federal regulations, but it does not give the federal government primacy over the states in terms of actually building renewable energy infrastructure. The Biden administration can be as ambitious as it wants, but the states and utility companies themselves will have to match

¹ To see the whole Scorecard, including the scoring methodology, visit <https://www.e3g.org/g7-power-systems-scorecard>



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that ambition if the US is to one day achieve a net zero power sector. The behaviour of large states with substantial energy infrastructure in particular, such as California and Texas, will have significant impacts on the US's ability to meet its goals. That being said, the last few years have seen a robust push for American climate leadership on the global stage, with the federal government scaling up its climate mitigation finance and participating in numerous international energy transition partnerships.

Headline message – Benchmarks 1–2 (Section 1: Infrastructure/Energy mix)

SCORE: 31/120

Despite the steady decline in coal generation over the past years, the US electricity mix is dominated by coal and gas generation, with only two-fifths of the total electricity produced from low-carbon electricity sources. The declining coal generation has been largely replaced by gas fired power, with the share of gas generation growing by 2.5 times in the last two decades. Today, the US is responsible for 20% of global gas demand, operates the largest gas fleet in the world and has the largest pipeline of new gas powerplants in planning or construction. Renewable capacity has ramped up in the last couple of years, but the scale is as yet insufficient to deliver on the country's net zero electricity target. Further progress is impeded by time-consuming permitting procedures and lack of grid interconnection.

Headline message – Benchmarks 3–5 (Section 2: Policies/Targets)

SCORE: 185/280

The Inflation Reduction Act (IRA) and the Bipartisan Infrastructure Law (BIL) have put significant incentives for faster transformation of power systems in place across the board – from enabling faster energy storage deployment and boosting grid flexibility to more affordable retrofits of the existing buildings stock. EPA's latest regulations on existing coal and new gas power plant emissions also provide the first important milestones towards phasing out unabated fossil fuel generation.

However, the US is lagging on national target setting, be it on fossil fuel generation phase-out, electrification, or efficiency. Additionally, though incentives provided by IRA and BIL facilitate consumer action, the frameworks mandating state action are missing, and the overall compliance with federal standards is lacking. Internationally, the US must step up its game as the world's largest economy and do more to support power systems decarbonisation in developing countries.



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Benchmark 1: Reducing fossil fuel reliance

SCORE: 13/60

About 60% of electricity in the US is generated by fossil fuel power plants, with gas playing the dominant role in country's electricity mix. Though the US has managed to more than halve its coal generation over the past two decades, it has largely done so by replacing it with gas generation. It now operates the biggest gas power fleet in the world, taking up 20% of global gas demand. The US nuclear power fleet is among the oldest in the world and its share is likely to further decline in the coming years.

1.1 New unabated coal and gas power plants in planning or construction

SCORE: 0/15

There are no new coal power plants in construction in the US and the existing coal fleet has been gradually retired over the last decade. Operating coal capacity shrank by 102 GW between 2015 and 2023. However, as of 2023, 0.8 GW of announced coal projects are still in the pipeline.²

Despite gas contributing a relatively small share of new capacity additions, compared to solar, wind and energy storage,³ the US still has 37.8 GW of gas in power projects either in construction, approved or announced, and ranks fourth globally in terms of the size of its gas power plant pipeline after China, Brazil and Vietnam.⁴

1.2 Share in electricity generation: fossil fuels

SCORE: 2/15

In 2023, 59.1% of electricity in the United States was generated from fossil fuels. Gas is the largest source of electricity with 42.4% of total generation, followed by coal (15.9% of total generation). Petroleum and other fossil gases account for the rest of fossil fuel-based generation (0.8%).⁵

The total share of fossil fuel-based generation slightly declined year-on-year (from 59.8% in 2022), while the share of gas fired generation grew by 3%. In

² Global Energy Monitor, updated January 2024, [Global Coal Plant Tracker](#)

³ World Resources Institute, February 2024, [State of the US clean energy transition: Recent progress, and what comes next](#)

⁴ Global Energy Monitor, February 2024, [Global Oil and Gas Plant Tracker](#)

⁵ Ember, updated April 2024, [Yearly Electricity Data](#)



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absolute terms, the US showed the fastest gas-in-power growth globally and now accounts for 25% of global gas generation.⁶

1.3 Share in electricity generation: non-renewable low-carbon tech

SCORE: 5/15

18.2% of electricity in the United States is generated by nuclear power stations. The share of nuclear generation has declined slightly (about 1.5%) over the past two decades. The average age of US commercial nuclear power reactors was about 42 years as of 2023, most of them already running on an extended operating license.⁷ While some of these power plants will retire over the coming years, the pipeline of new large-scale nuclear projects already in construction amounts to around 1% of today's total capacity.⁸ Further decline in nuclear capacity over the coming years is thus to be expected.

1.4 Carbon intensity of power index

SCORE: 6/15

Carbon intensity of electricity in the United States was 385.9 gCO₂/kWh in 2022,⁹ making it the country with the third highest emissions intensity level in the G7 after Japan and Germany.¹⁰

Benchmark 2: Ramping up renewables

SCORE: 18/60

Deployment of solar and wind power, as well as of storage capacity, has taken off in the past years, spurred by the incentives provided through the IRA. The current speed of renewables ramp-up is however insufficient to put the country on track to net zero electricity by 2035, given the low share of renewables in today's country mix. Renewables are being further held up by lack of available interconnection to the grid, with ca. 2600 GW of solar, wind, and storage projects queuing up for interconnection.

⁶ Ember, May 2024, **Global Electricity Review**

⁷ U.S. Energy Information Administration, **How old are U.S. nuclear power plants, and when was the newest one built?** (webpage, accessed May 2024)

⁸ Global Energy Monitor, October 2023, **Global Nuclear Power Tracker**

⁹ Ember, **Electricity Data Explorer**

¹⁰ U.S. Energy Information Administration, November 2023, **U.S. Energy-Related Carbon Dioxide Emissions, 2022**



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2.1 Share of variable RES in electricity generation

SCORE: 5/15

Solar and wind account for 15.6% of the electricity generation mix, with 5.6% and 10% respectively.

Together with non-variable renewables and nuclear generation, variable renewables make up 40% of the total generation mix. Despite the steadily declining share of coal-based generation, this is insufficient to put the country on track towards net zero power within the next ten years.

Worth noting, however, is the fast growth of variable renewable capacity, solar in particular, in 2023.¹¹

2.2 Share of other RES in electricity generation

SCORE: 2/15

Non-variable renewables account for 7% of total electricity generation, with bioenergy contributing 1.1%, hydropower 5.5%, and other renewables 0.4% to the generation mix.¹²

2.3 Variable RES pipeline capacity vs country's announced target

SCORE: 5/15

No national renewable target has been announced for 2030, aside from the offshore wind target of 30 GW. An analysis conducted by NREL,¹³ however, suggest that the incentives adopted within the IRA and BIL enable renewables' growth to 938 GW capacity by 2030.

The current solar and wind project pipeline will allow the United States to grow variable RES capacity by ca. 253 GW by 2030, with ca. 136 GW solar¹⁴ and 117 GW wind projects¹⁵ announced, undergoing approval procedures (pre-construction) or in construction. The future of ca. 18% of solar and 36% of wind projects in this pipeline is uncertain, as they have been only announced so far

¹¹ Solar Energy Industries Association, December 2023, [Solar Market Insight Report Q4 2023](#)

¹² Ember, [Electricity Data Explorer](#)

¹³ NREL, March 2023, [Evaluating impacts of the Inflation Reduction Act and bipartisan infrastructure law on the U.S. power system](#)

¹⁴ Global Energy Monitor, December 2023, [Global Solar Power Tracker – Solar Farm Capacity by Country \(MW\)](#)

¹⁵ Global Energy Monitor, December 2023, [Global Wind Power Tracker – Wind Farm Capacity by Country \(MW\)](#)



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and are yet to secure financing and go through the required permitting procedures before they are approved.

This pipeline will less than double the currently installed capacity (141.7 GW wind and 114.4 GW solar¹⁶) and, given the low share of renewables in the current power mix, is highly insufficient to reach the announced target of 80% clean energy by 2030.

2.4 Average permitting time for VRE

SCORE: 6/15

Lead times for renewable projects and key enabling infrastructure are long in the US. They are driven by supply chain bottlenecks,¹⁷ permitting delays, and the long queue for grid interconnections, highlighting the urgent necessity to ramp up grid deployment. As of 2023, the average timeline for an electricity project (wind, solar, storage, hydrogen) to obtain the necessary National Environmental Policy Act (NEPA) review was 4.5 years; for transmission projects this timeline was 6.5 years.¹⁸

The Biden administration has put in place several programmes aimed at shortening the permitting period for renewable projects and transmission infrastructure, the central one being the Permitting Action Plan to quicken federal permitting procedures. However, the scope of the Act is limited as it doesn't apply to state level. The total capacity active in the queues is growing year-over-year, with 2600 GW of projects (over 1,570 GW of generation and an estimated 1,030 GW of storage capacity) seeking transmission access. Over 95% of these projects are either renewable generation capacity (1086 GW solar, 366 GW wind) or storage.¹⁹

The typical duration from connection request to commercial operation increased from <2 years for projects built in 2000–2007 to over 4 years for those built in 2018–2023, with a median of 5 years for projects built in 2023.

¹⁶ Ember, [Electricity Data Explorer](#)

¹⁷ Solar Energy Industries Association, December 2023, [Solar Market Insight Report Q4 2023](#)

¹⁸ American Clean Power, April 2023, [U.S. permitting delays hold back economy, cost jobs](#)

¹⁹ Berkeley Lab, April 2024, [Queued up: Characteristics of power plants seeking transmission interconnection](#)



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Benchmark 3: Adapting the power systems to high-RES share

SCORE: 85/120

The IRA and the BIL have put significant incentives for faster transformation of power systems in place, particularly in the areas of energy storage and grids flexibility. Yet more is needed to incentivise faster grid deployment and connectivity across power systems, as well as enabling end use flexibility, digitalisation of the power system and power market adjustments to provide a level playing field for renewable generation.

3.1 Policies to limit curtailment to a minimum that ensures optimal RES capacity utilisation

SCORE: 5/15

The United States currently does not have any curtailment reduction goals in place at the federal level²⁰ Curtailment is rising as grid deployment is not keeping up with the speed of renewables ramp-up. Average national onshore wind power curtailment in 2022 was 5.3%.²¹

There are some policies to facilitate grid flexibility and optimal integration of renewable capacity into the system, though the overall scope of policies to address curtailment is limited.

The BIL provided the funding for the DOE's Grid Resilience and Innovation Partnerships (GRIP), which will administer up to \$10.5 billion in grants for projects that improve grid flexibility and reliability as infrastructure is updated, and that bolster grid resilience in the face of worsening extreme weather events.²²

A subunit of GRIP that is of particular interest is the Smart Grids Grants. This program provides \$3 billion to increase the capacity of American grid transmission systems, accounting for the increasing integration of renewable energy and better enabling grids to adjust to fluctuations in demand and disruptions.²³

²⁰ NREL, July 2022, **Reframing curtailment: Why too much of a good thing is still a good thing**

²¹ U.S. Department of Energy, August 2023, **Land-Based Wind Market Report: 2023 Edition**

²² Grid Deployment Office, **Grid Resilience and Innovation Partnerships (GRIP) program** (webpage, accessed May 2024)

²³ Grid Deployment Office, **Smart Grid Grants** (webpage, accessed May 2024)



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States

In 2022, California’s Independent System Operator (CAISO) – the state’s primary grid operator – curtailed 2.4 TWh of utility-scale wind and solar output. 2.3 TWh had already been curtailed by October 2023, largely due to grid congestion issues and the fact that solar generation has been outpacing upgrades in transmission capacity.²⁴ Solar accounts for the bulk of energy curtailed. CAISO says it is exploring solutions to reduce curtailment in renewable power including increasing energy storage, improving regional market coordination, and enhancing demand response. However, California’s government has no specific curtailment reduction goals beyond bringing grid operation in line with its broader renewable energy goals.

According to the Electric Reliability Council of Texas (ERCOT), the state’s primary grid operator, Texas curtailed 5% of its total available wind generation and 9% of its total available solar generation in 2022.²⁵ These curtailments were due to resources outpacing low system electricity demand and limited transmission line capacity. Texas’s government also has not set any explicit curtailment reduction goals, although in December 2022 ERCOT established a voluntary curtailment program that allows larger, more flexible energy customers to reduce their power during periods of higher power demand.²⁶

3.2 Active steps by the national grid operator to plan for short spells of 100% RE power

SCORE: 11/15

Several programs and grants have been set up at the federal level that should accelerate grid development towards a system able to sustain 100% clean electricity by 2035, in line with the Biden administration’s target. However, there are no policies targeting services currently provided by fossil fuel generators (e.g. inertia and black start), or a pronounced system operability strategy on federal or state levels.

In January 2022, the DOE launched its Building a Better Grid Initiative, a program designed to promote the nationwide development of high-capacity electric transmission lines as well as invest in more flexible and resilient distribution

²⁴ U.S. Energy Information Administration, October 2023, **Solar and wind power curtailments are rising in California**

²⁵ U.S. Energy Information Administration, July 2023, **As Texas wind and solar capacity increase, energy curtailments are also likely to rise**

²⁶ Enerknol Pulse, 8 December 2022, **Texas grid operator establishes voluntary curtailment program to manage peak demand.** (Webpage, accessed May 2024)



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systems for electrical grids.²⁷ Enabled by the BIL, it is specifically involved with preparing the US electricity grid to meet the Biden administration's 2035 goal of 100% clean electricity.

This initiative administers:

- > The \$2.5 billion Transmission Facilitation Program to develop transmission lines and improve access to clean energy sources.
- > \$2.3 billion in grants over five years to be distributed to states, territories, and tribes to modernise grids and help them better withstand extreme weather events and natural disasters.
- > The \$10.5 billion Grid Resilience and Innovation Partnerships program which finances improvements to grid flexibility and distribution infrastructure.
- > The \$760 million Transmission Siting and Economic Development Grants program which issues grants for both the production of particular high-voltage interstate or offshore electricity transmission lines and the economic development of communities that might be impacted by the construction of such projects.

This initiative also oversees the National Transmission Planning Study which will identify the regional and interregional planning processes needed to further modernise the grid in line with national goals.

States

On 8 May 2022, California briefly ran completely on 100% renewable energy when the state broke its own previous generation records and produced enough renewable electricity to meet 103% of consumer demand.²⁸ CAISO is continuing to build on this accomplishment and preparing California's grid for less reliance on fossil fuels.

Regional independent system operators such as Independent System Operator New England (ISO-NE) are planning for higher rates of clean energy to accommodate state targets that specify 100% renewable energy transmission.²⁹

²⁷ Grid Deployment Office, **Building a Better Grid Initiative** (webpage, accessed May 2024)

²⁸ NPR, May 2022, **California just ran on 100% renewable energy, but fossil fuels aren't fading away yet**

²⁹ ISO New England, July 2022, **On the Horizon – 2022 Regional Electricity Outlook**



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Other regional system operators such as Midcontinent ISO have reliability imperatives to identify the challenges associated with a rapidly changing grid infrastructure.³⁰

3.3 Effective policies to ramp up electricity storage

SCORE: 15/15

The US is starting from a relatively low base: according to the American Clean Power Association, the US has so far only built 3% of the total energy storage needed by 2030 to meet its climate goals.³¹ But the IRA and several other programs have brought the much-needed change of pace, including on long-duration energy storage (LDES).

- > The IRA contains a new Investment Tax Credit (ITC) for energy storage.³² Previously, energy storage projects were only eligible for the United States' ITC if the batteries involved were connected to a solar project. The IRA now allows for standalone energy storage projects, which can provide both backup power to critical load centres and enhance grid flexibility and reliability, to be eligible for the ITC as well. The change is expected to allow significantly more investment in the energy storage industry.
- > The Biden administration's Long Duration Storage Shot initiative established the goal of reducing the cost of grid-scale energy storage by 90% for systems that deliver over ten hours of duration within the decade.³³ In September 2023, the DOE announced \$325 million in funding for 15 projects across 17 states and one tribal nation developing LDES technologies.³⁴
- > The DOE has also been following the Energy Storage Grand Challenge Roadmap published in December 2020. It's the Department's first comprehensive energy storage strategy and it addresses technology development, manufacturing and supply chains, technology transition, policy valuation, and workforce development.³⁵

³⁰ Midcontinent ISO, February 2024, **MISO's latest reliability imperative report**

³¹ Tang, A., October 2022, **The Inflation Reduction Act will turbocharge energy storage**, Utility Dive

³² Tang, A., October 2022, **The Inflation Reduction Act will turbocharge energy storage**, Utility Dive

³³ Office of Energy Efficiency & Renewable Energy, **Long Duration Storage Shot** (webpage, accessed May 2024)

³⁴ Department of Energy, September 2023, **Biden–Harris administration announces \$325 million for long-duration energy storage projects to increase grid resilience and protect America's communities**

³⁵ U.S. Department of Energy, December 2020, **Energy Storage Grand Challenge Roadmap 2020**



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States

At least eight states have energy storage targets and policies: Maine, Connecticut, Vermont, New York, Virginia, Illinois, Nevada, and California.³⁶

California was the first state to implement an energy storage goal in 2013, setting a procurement target of 1,325 megawatts by 2020.³⁷ As of 2024, California has installed over 8,000 MW of battery storage capacity, although the state projects that 52,000 MW will be needed by 2045 to meet the state's carbon-neutral energy goal.³⁸

Texas does not have an explicitly set procurement target or delivery target for energy storage. However, with the renewable energy boom currently sweeping the state, Texas is projected to add more battery capacity to its power grid than any other state in 2024 and could surpass California in battery grid employment by 2025.³⁹

3.4 Effective policies to increase end use flexibility

SCORE: 11/15

There are policies to enable demand side response in the US but barriers still remain, and more is needed to unlock the full DSR potential, particularly on the retail market.

EPA's Energy Policy Act of 2005 mandates FERC to conduct an annual assessment of demand response performance and progress, the 2023 report being the eighteenth since the launch of the initiative. Several regulations have been issued by the FERC to improve demand response measures and enable DRM's participation in the electricity markets.

In 2021, the United States registered 29 GW of peak demand savings potential across all its demand response programmes. Over 10 million residential, commercial, and industrial customers were enrolled (about 6.2% of all customers⁴⁰), resulting in total energy savings of 1,154 GWh in 2022.⁴¹

³⁶ Utility Dive, February 2022, **As states ramp up storage targets, policy maneuvering becomes key**

³⁷ California Public Utilities Commission, **Energy Storage** (webpage, accessed May 2024)

³⁸ California Energy Commission, latest update April 2024, **California Energy Storage System Survey**

³⁹ Canary Media, February 2024, **Texas will add more grid batteries than any other state in 2024**

⁴⁰ Statista, October 2023, **Number of ultimate customers served by the electric industry in the United States**

⁴¹ IEA, last updated July 2023, **Demand response**



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There are several alliances at the sub-national level driving this work including the Association for Demand Response and Smart Grid (ADS), Peak Load Management Alliance (PLMA), and New England Demand Response Initiative (NEDRI).⁴²

The BIL provided the funding for the DOE's GRIP, which will administer up to \$10.5 billion in grants for projects that improve grid flexibility and reliability as infrastructure is updated and that bolster grid resilience in the face of worsening extreme weather events.⁴³

A subunit of GRIP that is of particular interest is the Smart Grids Grants. This program provides \$3 billion to increase the capacity of American grid transmission systems, accounting for the increasing integration of renewable energy and better enabling grids to adjust to fluctuations in demand and disruptions.⁴⁴

States

In 2022, California's Public Utilities Commission (CPUC) introduced new demand flexibility standards that require the state's large electricity providers to offer voluntary rates based on real-time electricity costs.⁴⁵ The goal is to improve access to real-time energy costs and better encourage the use of renewable energy, while also making RE more capable of meeting energy needs at differing levels of demand.

3.5 Effective policies to accelerate grid development

SCORE: 10/15

Ageing grid infrastructure and the slow pace of grid deployment and modernisation have long been the main bottlenecks to deploying and connecting renewable capacity to the system. Several studies have been launched to inform transmission planning process, and some programs deployed to help fund transmission projects. A recent decision by Congress has given the federal government new authority to override objections from state regulators to facilitate long-distance transmission line permitting. But more needs to be done

⁴² Office of Electricity, **Demand Response** (webpage, accessed May 2024)

⁴³ Grid Deployment Office, **Grid Resilience and Innovation Partnerships (GRIP) Program** (webpage, accessed May 2024)

⁴⁴ Grid Deployment Office, **Smart Grid Grants** (webpage, accessed May 2024)

⁴⁵ California Public Utilities Commission, n.d., **Demand flexibility management white paper & rulemaking**



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to facilitate connectivity between the US's three grid systems and coordinate the local efforts by utilities.

The need for grid development and deployment have been highlighted at the US federal level. The DOE's Grid Deployment Office (GDO) was launched in August 2022 specifically to invest in renewable generation facilities and integrate them for improved and expanded transmission and distribution systems. It oversees over \$26 billion in funding available for several programs designed to drive investment in and develop grid resilience in the United States.⁴⁶ The GDO's Transmission Division oversees the National Transmission Planning Study as well as the National Transmission Needs Study.

The Planning Study is ongoing and will "inform regional and interregional transmission planning processes" and "identify strategies to accelerate decarbonization while maintaining system reliability".⁴⁷ The Needs Study assessed issues associated with current and projected future needs in America's power sector so that industry and public actors can suggest solutions to those issues.⁴⁸ While these studies provide some planning framework for grid development, neither constitute proper delivery strategies. The Needs Study has warned that America's transmission network may need to expand by two-thirds or more by 2035 to meet the administration's clean electricity target.

The Infrastructure Investment and Jobs Act (IIJA) provides funding for new transmission lines, including a total of \$65 billion for grid infrastructure.⁴⁹ The IIJA also gives the FERC the authority to override state objections to national transmission corridors designated by the DOE.⁵⁰ This is a departure from existing legal precedent which allowed state-level regulators to reject power lines planned by DOE.

The BIL provided the funding for the DOE's GRIP which will administer up to \$10.5 billion in grants for projects that improve grid flexibility and reliability as infrastructure is updated and that bolster grid resilience in the face of worsening extreme weather events.⁵¹

⁴⁶ Grid Deployment Office, n.d., **Creating a clean, reliable, resilient electric grid**

⁴⁷ Grid Deployment Office, **National Transmission Planning Study** (webpage, accessed May 2024)

⁴⁸ U.S. Department of Energy, October 2023, **National Transmission Needs Study**

⁴⁹ The White House, August 2021, **Updated fact sheet: Bipartisan Infrastructure Investment and Jobs Act**

⁵⁰ E&E News, September 2021, **Power lines are infrastructure bill's big climate win**

⁵¹ Grid Deployment Office, **Grid Resilience and Innovation Partnerships (GRIP) Program** (webpage, accessed May 2024)



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States

California's Clean Energy Transition Plan includes a section specifically on modernising the grid and updating the transmission system to accommodate the anticipated growth of clean energy resources.⁵² CAISO, CPUC, and the California Energy Commission (CEC) also coordinated to create a 20-Year Transmission Outlook to provide long-term planning and forecasting in the effort to meet the state's goal of a carbon-free supply of electricity by 2045.⁵³ The Transmission Outlook estimates the approximate cost of necessary transmission development at \$30.5 billion.

In response to the 2021 Arctic blast that caused casualties and massive power outages, ERCOT developed a Roadmap to Improving Grid Reliability which included several steps for addressing resiliency and transmission issues in the Texan energy grid. Pertinent examples of actions include eliminating barriers to distributed generation, energy storage, and demand/response flexibility and integrating solar forecasts into planning models as renewables expand in the state.

3.6 Effective policies to enable the required digitalisation of power systems

SCORE: 10/15

There is no overarching energy system digitalisation strategy or policy framework in the US. However, some policies have been brought forward, especially those enabling the rollout of smart meters, with about two-thirds of US electricity customers equipped with smart meters,⁵⁴ and elements of smart grids.

At the federal level, the US has been innovating the use of smart grids in energy infrastructure since 2007.⁵⁵ Some components of their deployment include relays and feeder switches that automatically adjust and reroute power amid problems with substations. The DOE's Grid Modernization Initiative has been serving as the framework for integrating smart grids and other technologies into America's energy infrastructure since 2015.⁵⁶ It is coordinated through the Grid Modernization Lab Consortium partnership through which the DOE and national

⁵² Governor Gavin Newsom, May 2023, **Building the electricity grid of the future: California's Clean Energy Transition Plan**

⁵³ CAISO, May 2022, **20-Year Transmission Outlook**

⁵⁴ Federal Energy Regulatory Commission, December 2023, **2023 Assessment of demand response and advanced metering**

⁵⁵ Office of Electricity, May 2022, **2020 Smart grid system report**

⁵⁶ U.S. Department of Energy, November 2015, **Grid modernization multi-year program plan**



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research laboratories can pool resources and collaborate on modernisation efforts.

A subunit of GRIP (see indicator 3.5), the Smart Grids Grants program, provides \$3 billion to increase the capacity of American grid transmission systems, accounting for the increasing integration of renewable energy and better enabling grids to adjust to fluctuations in demand and disruptions.⁵⁷

There are programs to facilitate digitalisation at the utility level, among them the Digitizing Utilities Prize Round⁵⁸, launched last year.

States

California's Public Utilities Commission instituted rulemaking in 2008 to respond to both federal and state-level legislation requiring consideration of integrating Smart Grid technology.⁵⁹ This catalysed a process through which the state's three main utilities (Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas and Electric Company) each developed and implemented Smart Grid deployment plans.

3.7 Effective mechanisms or frameworks to prevent preferential treatment for fossil fuel-based generation over RES on the market

SCORE: 9/15

There are both vertically integrated and liberalised power markets in the United States, which makes the overall picture less homogenous. There are several mechanisms to enable a level playing field between renewable and fossil fuel assets in the vertically integrated markets, including Renewable Energy Certificates (RECs) and carbon offsets. In the liberalised markets, gas tends to have the upper hand due to the very low domestic cost, leading to a coal-to-gas switch.

Most if not all of the recent DOE programs referenced throughout this scorecard prioritise the development of renewable energy both through funding projects directly and encouraging action on the part of individuals, companies, and local governments through tax credits and financial incentives. These types of policies

⁵⁷ Grid Deployment Office, **Smart Grid Grants** (webpage, accessed May 2024)

⁵⁸ Office of Electricity, October 2023, **U.S. Department of Energy launches Digitizing Utilities Prize for grid reliability and resilience solutions**

⁵⁹ Public Utilities Commission of the State of California, December 2008, **Rulemaking 08-12-009**



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have expanded dramatically under the Biden administration but have been implemented in the United States since the 1970s.⁶⁰

Renewable Energy Certificates are offered for purchase to consumers, allowing companies to support renewable electricity use claims, expand consumers' electricity service choices, and support renewable electricity development.⁶¹

Most states have implemented their own Renewable Portfolio Standards, designed to increase the use of renewables-based generation as they require or encourage electricity suppliers to provide their customers with a stated minimum of electricity from eligible renewable sources. As of November 2022, 36 states and the District of Columbia had established a Renewable Portfolio Standard (RPS) or a renewable energy goal. In 12 of those states (and the District of Columbia), the requirement is for 100% clean electricity by 2050 or earlier.⁶²

In 2022 the U.S. Department of State together with the Bezos Earth Fund and the Rockefeller Foundation launched the Energy Transition Accelerator (ETA),⁶³ a program to generate private finance to help developing countries transition to clean energy. The ETA is in essence a program that should incentivise companies in the US to purchase carbon offsets to offset their Scope 1, 2, or 3 emissions, as a net adjustment. The government is preparing a guideline for the use of carbon offsets aimed to ensure credits reflect real emission cuts.⁶⁴

Certain states, such as Massachusetts, are developing Forward Clean Energy Markets to reward clean energy in deregulated power markets.⁶⁵

⁶⁰ Congressional Research Service, February 2023, **Renewable energy and energy efficiency incentives: A summary of federal programs**

⁶¹ Environmental Protection Agency, **Market instruments** (webpage, accessed May 2024)

⁶² U.S. Energy Information Administration, updated November 2022, **Renewable energy explained**

⁶³ Energy Transition Accelerator, <https://www.etaccelerator.org/> (webpage, accessed May 2024)

⁶⁴ Reuters, 19 April 2024, **US to launch carbon offset guidelines to boost integrity**

⁶⁵ Massachusetts Department of Energy Resources, January 2023, **New England Forward Clean Energy Market – Proposed market rules, version 1**



E3G

3.8 Electrification rate target and roadmap to support delivery

SCORE: 14/15

As of May 2024, there is no federal electrification target, though a separate target has been set for the transport sector.

The Biden administration has set a goal to electrify all new light-duty vehicles by 2027, and to make all federal vehicle acquisitions electric by 2035. The Inflation Reduction Act and the Bipartisan Infrastructure Law included multiple policies and programs to promote the US manufacturing and supply chain of these clean vehicles. Policies in the Bipartisan Infrastructure Law include \$6.135 billion for battery material processing, manufacturing, and recycling grants.⁶⁶

No target exists for electrifying heat, although, IRA includes several provisions that are designed to help offset the costs of electric heat pumps in home residences and commercial buildings.

States

In February 2024, nine states signed a memorandum of understanding (MOU) setting a 2030 target for heat pumps to make up 65% of residential heating, cooling, and water heating equipment sales. By 2040, the goal is for heat pumps to account for 90% of the HVAC and water heating market.⁶⁷

Benchmark 4: Governance / International leadership

SCORE: 50/80

While the newest EPA regulations on emissions reduction in existing coal and new gas powerplants introduce a set of important milestones towards moving away from fossil fuel-based generation, they are not sufficient to put the country on track for a net zero power system by 2035. Both unabated coal and gas phase-out dates are missing so far. Globally, the US has shown leadership on coal phase-out by joining PPCA last year. However, being the world's largest economy, it is expected to and needs to deliver more on supporting power systems decarbonisation in developing countries within the Just Energy Transition Partnerships (JETPs), its climate finance commitments and other initiatives.

⁶⁶ Electrification Coalition, **Federal EV policy** (webpage, accessed May 2024)

⁶⁷ The Verge, 7 February 2024, **Nine states, including California and New York, sign heat pump agreement to clean up air pollution**



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4.1 2035 carbon neutral power system commitment adopted in national legislation

SCORE: 10/10

At the federal level, the Biden administration's executive order on tackling the climate crisis at home and abroad includes a commitment to a 100% carbon pollution-free electricity sector by 2035.⁶⁸ The executive order has spurred various policy changes but hasn't itself been translated into a form of federal law, and can be relatively easily overruled by the next administration.

At the subnational level, 23 states along with the District of Columbia (DC) and Puerto Rico have 100% clean electricity or clean energy targets.⁶⁹ Of these, however, only DC, New Jersey, Michigan, and Rhode Island have targets set for 2035 or sooner.

A note on Texas, which is highly relevant as the energy capital of the United States. It leads the US states in overall energy production, provides more than a quarter of domestically-produced US energy, the largest wind capacity in the country and overtook California on utility-scale solar capacity in 2023.⁷⁰ Texas got a head start on renewables in 1999 when the state deregulated its electricity market, introduced financial credits to diversify the energy portfolio, and set initially modest renewable energy wattage goals.⁷¹ The result over the last two and a half decades has been a market-driven RE windfall. Even though policymakers at the state level are significantly more hostile to renewable energy policies today, the development of the energy portfolio makes Texas impossible to ignore in any study of American energy transition.

4.2 Global leadership on supporting power systems decarbonisation in developing countries

SCORE: 7/10

As the world's largest economy, the US plays an important role in accelerating power systems decarbonisation in developing economies. However, it is underperforming on several fronts, given the size of its economy and the fair

⁶⁸ The White House, January 2021, [Executive order on tackling the climate crisis at home and abroad](#)

⁶⁹ Clean Energy States Alliance, [Table of 100% clean energy states](#) (webpage, accessed May 2024)

⁷⁰ Public Citizen, March 2024, [Why Texas least California in wind, but not solar](#)

⁷¹ The Texas Tribune, 25 May 2023, [Texas power struggle: How the nation's top wind power state turned against renewable energy](#)



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share of climate finance it needs to provide.⁷² There are gaps in enabling the committed finance flows to the JETPs, overall climate finance, and making sure international public finance flows in fossil fuels are efficiently re-routed to facilitate clean energy deployment in third countries.

President Biden pledged in 2021 to scale up US international public climate finance to \$11 billion annually by 2024. Projects suggest climate finance exceeded \$9.5 billion in 2023, putting the US well on track to meet the President's goal. These totals do not include the additional funds the US contributes to multilateral development banks that also support climate finance.⁷³

The United States participates in JETPs with Indonesia,⁷⁴ South Africa,⁷⁵ and Vietnam.⁷⁶ However, the US government needs to do more to make sure the promised finance is going where it's needed.

The United States, alongside Germany, finances a project coordinated by the European Bank for Reconstruction and Development to support the construction of renewable energy infrastructure in Egypt (including wind, solar, and electric vehicles) and reduce methane emissions from its oil and gas sector.⁷⁷

The Net Zero World Initiative provides technical assistance, expertise, and finance to partners to assist their construction of secure clean energy systems.⁷⁸ The following countries are currently partnered with the US in the Initiative: Argentina, Chile, Egypt, Indonesia, Nigeria, Singapore, Thailand, and Ukraine.

The Department of Energy participates in 25 unique bilateral and multilateral partnerships for international energy policy coordination,⁷⁹ ten of which

⁷² ODI, June 2022, **A fair share of climate finance? An appraisal of past performance, future pledges and prospective contributors**

⁷³ U.S. Department of State, December 2023, **Progress report on President Biden's Climate Finance Pledge**

⁷⁴ U.S. Department of the Treasury, February 2023, **Government of Indonesia and international partners launch Just Energy Transition Partnership secretariat to drive Indonesia's energy transformation**

⁷⁵ U.S. Department of the Treasury, November 2022, **U.S. Departments of the Treasury and State, and South African President Cyril Ramaphosa announce endorsement of the South Africa Just Energy Transition Partnership investment plan**

⁷⁶ U.S. Embassy & Consulate in Vietnam, December 2022, **International agreement to support Vietnam's ambitious climate and energy goals**

⁷⁷ U.S. Embassy in Egypt, November 2022, **Accelerating Egypt's clean energy transition**

⁷⁸ NREL, **Net Zero World Initiative** (webpage, accessed May 2024)

⁷⁹ Office of International Affairs, **International Affairs Initiatives** (webpage, accessed May 2024)



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explicitly involve cooperation pertaining to renewable energy: the Clean Energy Ministerial (CEM), the US–EU Energy Council; the G7/G20 Ministers Meeting; The Partnership for Transatlantic Energy and Climate Cooperation; The Energy and Climate Partnerships of the Americas; the US–India Energy Partnerships; The US–Kazakhstan Energy Partnership; the US–Japan Strategic Energy Partnership; The US–Korea Energy Policy Dialogue; and the US–Indonesia Energy Policy Dialogue.

The Agency for International Development operates multiple energy-based programs:⁸⁰ USAID–National Renewable Energy Lab Partnership; Energy Efficiency for Development; Scaling Up Renewable Energy; Energy Utility Partnership Program, Power Africa.

4.3 International commitments on power systems decarbonisation through alliances or networks such as the PPCA, Glasgow Coal to Clean Power Initiative etc.

SCORE: 8/10

COP28 saw the US make substantial strides in international climate commitments. It joined Australia, Canada, and the European Commission to launch the Clean Energy Ministerial Battery Storage Initiative, a partnership aimed at advancing the development of battery technology, its deployment, and reducing its cost through robust supply chain management.⁸¹

The United States is not party to the Paris Declaration on Carbon Pricing in the Americas,⁸² though Washington State and California are.

Also at the COP28, the US became a signatory to the Powering Past Coal Alliance.⁸³ It also joined the Green Public Procurement Pledge⁸⁴ and the UN 24/7 Carbon-Free Energy Compact.⁸⁵ However, the US is not party to the Glasgow Coal to Clean Power Transition Initiative.

⁸⁰ USAID, **Renewable energy** (webpage, accessed May 2024)

⁸¹ Clean Energy Ministerial, **Supercharging battery storage** (webpage, accessed May 2024)

⁸² Government of Canada, December 2017, **Paris Declaration on carbon pricing in the Americas**

⁸³ AP News, 2 December 2023, **US joins in other nations in swearing off coal power to clean the climate**

⁸⁴ Industrial Decarbonization Accelerator, December 2023, **COP28: Governments with huge global buying power double down on their commitment to buy green steel, cement and concrete**

⁸⁵ Sustainable Energy for All, December 2023, **United States government joins UN 24/7 carbon-free energy compact**



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The following states and territories participate as subnational members of the Powering Past Coal Alliance: California, Connecticut, Hawaii, Minnesota, New Jersey, New Mexico, New York, Oregon, Puerto Rico, Washington, Colorado.

The following states participate as subnational members of the Glasgow Coal to Clean Power Transition Initiative: Hawaii and Oregon.

4.4 Net zero power system roadmap to drive delivery of 2035 commitment

SCORE: 5/10

There is no action plan or roadmap to deliver on the 2035 net zero power systems commitment. However, at the federal level, the National Renewable Energy Lab released a study on achieving clean electricity by 2035.⁸⁶ This study used NREL's Regional Energy Deployment System to map out scenarios that represented different ways to achieve a net zero power grid by 2035. All scenarios required rapid scaling up and deployment of renewable energy technology, with wind and solar needing to provide 60% to 80% of overall energy generation.

23 states, as well as the District of Columbia and Puerto Rico, have adopted 100% clean energy goals.⁸⁷ Only three aim for reaching net zero power systems by 2035 or earlier: New Jersey (2035), District of Columbia (2032) and Rhode Island (2033). In addition, Maine and Minnesota aim to reach 80% RES-based and clean electricity, respectively, by 2030 which broadly puts these two states on track for net zero electricity by 2035. While these plans are not the kind of deployment roadmaps that utility companies themselves would prepare, they are foundational policy documents produced by the state governments that provide the framework through which they, municipal governments, and private organisations will work to meet each state's respective carbon neutrality goal.

4.5 Critical role of renewables, interconnection, and demand side measures reflected in country's energy security framework

SCORE: 8/10

The role of renewables, energy demand reduction, energy efficiency, and improving grid flexibility have been elements of US thinking about energy security for almost two decades. The foundations were laid with the US Energy Independence and Security Act (2007). The Act, however, hasn't been updated

⁸⁶ NREL, 2022, [Examining supply-side options to achieve 100% clean electricity by 2035](#)

⁸⁷ Clean Energy States Alliance, [Table of 100% clean energy states](#) (webpage, accessed May 2024)



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since then and doesn't reflect the rise of wind and solar as key renewables solutions over the past decades, the focus being on biomass and geothermal.

Despite the absence of an up-to-date overarching framework, some key elements have been taken forward, among them the rollout of heat pump manufacturing in follow-up to the Biden administration's Defence Production Act.⁸⁸ The DOE outlines renewables deployment, improving efficiency of buildings, vehicles, appliances and electronics, increasing storage capacity, and modernising the grid as key elements of energy independence and security.⁸⁹

The US Energy Independence and Security Act (EISA), signed in 2007 by President Bush, directly aims to increase the share of domestically generated renewable electricity, boost efficiency of energy intensive appliances, buildings and vehicles, and reinforce energy reduction goals for federal agencies. The EISA guides government action in this area today; for example, the Smart Grid Investment Matching Grant Program, the predecessor of the Smart Grids Grants Program, was established directly under EISA.

In November 2023, DOE announced a \$169 million support program for nine projects to accelerate electric heat pump manufacturing across the country. This is a direct follow-up to the Defense Production Act (DPA), which aims to increase domestic production of five key clean energy technologies including heat pumps.⁹⁰

In March 2023, the United States partnered with Canada to launch the one-year Joint Energy Transformation Task Force to promote collective energy security, reinforce supply chains for critical minerals and other materials necessary for renewable energy, and promote grid integration and resilience.⁹¹ The Taskforce has been renewed in May 2024 for an additional year to further promote areas of common priority including through the Partnership for Global Infrastructure Investment and Canada's upcoming role as host of the G7 in 2025.⁹²

⁸⁸ Department of Energy, November 2023, **Biden–Harris administration announces \$169 million to accelerate electric heat pump manufacturing as part of investing in America agenda**

⁸⁹ Office of Energy Efficiency & Renewable Energy, **Energy independence and security** (webpage, accessed May 2024)

⁹⁰ Department of Energy, November 2023, **Biden–Harris administration announces \$169 million to accelerate electric heat pump manufacturing as part of investing in America agenda**

⁹¹ The White House, 24 March 2023, **Joint statement by President Biden and Prime Minister Trudeau**

⁹² U.S. Embassy & Consulates in Canada, May 2024, **U.S.–Canada joint statement on the extension of the Bilateral Energy Transformation Task Force**



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4.6 Unabated coal phase-out date and roadmap to support delivery

SCORE: 5/10

A phase-out date is implied by the 2035 net zero power commitment, yet none such has been adopted. There is also no roadmap to implement coal phase-out.

EPA's newly adopted suite of standards aiming to reduce pollution from fossil fuel fired power plants mandates the existing coal plants to address their carbon emissions in the coming year. Coal plants that expect to operate beyond 2039 will have to reduce their carbon emissions by 90% by 2032, two years later than initially proposed in the draft rule released in May 2023. Coal plants closing by 2039 will have to reduce their emissions 16% by 2030 (based on what's achievable using 40% gas co-firing, though plants can use any technology they want to achieve the necessary reductions). Those plants scheduled to retire before 2032 are exempt from reducing emissions but do have reporting requirements.⁹³

If fully implemented, these rules could lead to the closure of most of the country's coal plants before 2040.⁹⁴ However, EPA is likely to be challenged in court on these rules: West Virginia Attorney General Patrick Morrissey and US Senator Shelley Moore Capito of West Virginia have already stated this intent, and more lawsuits are likely to be expected from republican-led states and industry groups.⁹⁵

4.7 Unabated gas phase-out date and roadmap to support delivery

SCORE: 1/10

No such date has been announced. However, EPA's newly adopted suite of standards⁹⁶ aiming to reduce pollution from fossil fuel fired power plants regulates emissions for new gas power plants. The regulations essentially exclude any new baseload gas power from coming online unless abated. The three categories of new gas power plants are covered, based on their hours of operation over the course of a year:

⁹³ World Resources Institute, May 2024, **4 things to know about US EPA's new power plant rules**

⁹⁴ Environmental Protection Agency, April 2024, **Regulatory impact analysis for the new source performance standards for greenhouse gas emissions from new, modified, and reconstructed fossil fuel-fired electric generating units; emission guidelines for greenhouse gas emissions from existing fossil fuel-fired electric generating units; and repeal of the Affordable Clean Energy Rule**

⁹⁵ Reuters, 25 April 2024, **Explainer: New EPA power sector rules set up likely legal clashes**

⁹⁶ EPA, April 2024, **Biden-Harris administration finalizes suite of standards to reduce pollution from fossil fuel-fired power plants**



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- > **“Baseload” plants**, which operate more than 40% of the time: reductions required equivalent to 90% carbon capture and sequestration by 2032.
 - > **“Intermediate” natural gas plants**, which operate 20%–40% of the time: required to meet a performance threshold of an efficient simple cycle plant, or 1,150 pounds of carbon dioxide per megawatt hour (CO₂/MWh).
 - > **Peaker plants**, which operate less than 20% of the time: required to use lower-emitting fuels such as natural gas, which is already common practice, rather than diesel or high-emitting alternatives.⁹⁷

EPA is planning to release a similar set of rules for existing gas fired power plants towards the end of 2024.

4.8 2030 target for share of total RES in electricity generation

SCORE: 6/10

DOE has estimated that the IRA and BIL enable clean energy in the US to reach 80% total share of generation by 2030.⁹⁸ However, no explicit target for renewable generation has been set for this timeframe and the existing targets on wind and solar are not sufficient to reach 80% clean electricity:

- > In 2023, the DOE released its Offshore Wind Energy Strategy aimed at enabling the deployment of 30 GW of offshore wind capacity by 2030, and set the nation on the pathway to 110 GW or more by 2030.
- > There is no national solar power target, with the DOE’s Solar Energy Technology Office mainly focusing on cost reduction and re-shoring of production and value chains. However, the Solar Energy Industries Association has announced a new target for solar to reach 30% of US electricity generation by 2030. Even with this rather ambitious target by the industry association (which implies growing the current share of solar generation in the power mix by a factor of six in the next six years), the US is not going to achieve 80% of clean electricity by 2030 unless it formulates clear and ambitious deployment targets for onshore wind as well, underpinned by a delivery roadmap.

⁹⁷ World Resources Institute, May 2024, **4 things to know about US EPA’s new power plant rules**

⁹⁸ Office of Policy, August 2023, **Investing in American energy: Significant impacts of the Inflation Reduction Act and Bipartisan Infrastructure Law on the U.S. energy economy and emissions reductions**



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Benchmark 5: Reducing energy waste

SCORE: 50/80

The energy efficiency programme spending has been substantially increased with the IRA and puts country broadly on track for 4% annual energy efficiency improvements, though real progress depends on the implementation and state action. Key elements enabling efficient power systems decarbonisation are still missing including a national power savings target, ambitious standards for some key appliances including lighting and space heating, and federal and state-level policies addressing faster retrofits of the existing buildings stock.

5.1 Efficient policies to retrofit / renovate buildings

SCORE: 12/20

To retrofit 80% of the existing US building stock by 2050, annual retrofit rates must increase about 15-fold for residences and twofold for commercial buildings.⁹⁹ Building energy policies in the US have traditionally emphasised new construction over existing buildings, with building energy codes being the primary tool to mandate minimum acceptable levels of energy efficiency – for both new residential and commercial building construction, and major alterations and additions. The adoption of these codes at state level is however patchy, with only a handful of states complying with the federal framework.

The IRA created multiple programs and tax incentives to improve the energy efficiency of both new and existing buildings – targeting consumers rather than states. These financial incentives are designed to encourage individuals and businesses to retrofit their homes and facilities with renewable and more energy efficient appliances and infrastructure. The tax credits are available for a decade from 1 January 2023.¹⁰⁰

In August 2023, the DOE announced \$46 million in funding for 29 projects across 15 states to develop advanced building technologies and retrofit practices that target energy waste. These funds comprise the Buildings Energy Frontiers and Innovation Technologies (BENEFIT) program.¹⁰¹ The innovations that BENEFIT funds will help modernise buildings to reduce their GHG emissions and cut down

⁹⁹ Nadel and Hinge, June 2020, **Mandatory building Performance Standards: A key policy for achieving climate goals**. ACEEE White Paper

¹⁰⁰ RMI, August 2022, **The Inflation Reduction Act could transform the US buildings sector**

¹⁰¹ Department of Energy, August 2023, **DOE announces \$46 million to boost energy efficiency and slash emissions in residential and commercial buildings**



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wasteful energy consumption, with several projects emphasising improvements to space conditioning and water heating. Residential and commercial buildings are currently the largest energy consuming sector of the US economy.

The High-efficiency Electric Home Rebate Program, adopted in 2022, offers support for low- and moderate-income households. Qualifying participants can receive up to \$8000 for an ENERGY STAR® certified heat pump, \$4000 for an electrical panel upgrade, and additional incentives for wiring, air sealing and insulation.

The IRA has unlocked various credits for building owners aiming to boost their buildings' efficiency. Among them are the Energy-Efficient Home Improvement Credit, allowing homeowners to offset up to 30% of the cost of the highest tier qualifying heat pumps (with a maximum of \$2000); the Residential Clean Energy Credit, encouraging early adoption of geothermal heat pumps and offsetting 30% of the cost before 1 January 2033, 26% before 1 January 2034, and 22% before 1 January 2035; and the Commercial Investment Credit, which increases the energy tax credits available for businesses from 10% to 30% on qualifying geothermal heat pump system installation costs.

Under the Energy-efficient Commercial Buildings Tax Deduction, the IRA further offers business owners tax benefits for retrofits to heating, cooling, ventilation and hot water systems.

In addition, the IRA has appropriated \$500m in funds to support the manufacturing of heat pumps through the Defense Production Act.¹⁰²

Despite these significant incentives to private and commercial buildings owners, a comprehensive framework to address buildings renovation at federal and state levels is so far missing. Only 15 states have adopted frameworks addressing the existing buildings stock, most of them incomplete/ineffective.

¹⁰² Copeland E360 Blog, January 2023, [How U.S. climate legislation is driving adoption of sustainable heat pump solutions](#)



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5.2 National energy/power savings target

SCORE: 8/20

As an IEA member, the US has committed to achieve 4% energy efficiency improvements per year by 2030, and has reached this rate in 2023 already with \$86 billion allocated to the goal under the Inflation Reduction Act.¹⁰³

While the IRA incentives target individual and industrial consumers, there is no energy efficiency target at the federal level. Setting such standards for utility companies has historically been managed at the state level due to the variation of energy portfolios across the country, though there is legally nothing preventing Congress from passing legislation creating national EERS targets. The DOE is currently reviewing the National Action Plan for Energy Efficiency “Vision for 2025: A Framework for Change” that should facilitate the development and implementation of more ambitious state-level energy savings programs.

29 states and the District of Columbia have so far adopted energy efficiency resource standards (EERS) ranging between 0.6% and 2.5% of annual electricity sales. A couple of states have adopted cumulative savings targets over several years (e.g. North Carolina – 12.5% by 2021, New Hampshire – 3.1% between 2018 and 2020). 20 states have also adopted gas savings targets, often within the same EERS regulating energy efficiency savings. The savings metrics are sometimes different (e.g. percentage of peak demand, instead of annual electric sales), and some of the states apply mandatory EERS, while in some (e.g. Delaware, Missouri), the savings targets are mandatory.

Overall, given the number of states without an efficiency target and the on average low savings targets of those states that have adopted some, more action is required both on federal and state level to boost the overall efficiency of power systems in the US.¹⁰⁴

5.3 Sufficient spending on energy efficiency programmes

SCORE: 18/20

The IRA has substantially increased energy efficiency programme spending, with \$86 billion for energy efficiency provisions. This puts the country broadly on track for 4% annual energy efficiency improvements, though real progress depends on the implementation.

¹⁰³ Reuters, 5 December 2023, [Energy efficiency could offer major climate wins. But what is it?](#)

¹⁰⁴ American Council for an Energy-Efficient Economy, [State and Local Policy Database](#) (accessed May 2024)



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The IRA provides grants, loans and tax rebates for low-carbon vehicles. It also targets efficiency in the residential sector with measures including tax credits, rebates, and support grants for low-income households and disadvantaged communities.

US electric utilities reported spending approximately \$3.4 billion on energy efficiency customer incentives in 2022 according to the DOE's own annual report on electric power.¹⁰⁵ The totals featured in this report compile financial data from all of the US's public and private utility entities across the 50 states and territories. Splitting them into public and private totals would require significant additional data analysis.

5.4 High-quality appliance and equipment standards and labelling

SCORE: 12/20

The EPA administers the voluntary ENERGY STAR labelling program for appliances. Founded in 1992, ENERGY STAR is a public-private partnership that enjoys participation from thousands of organisations. It has led to the labelling of energy efficient products such as heating and cooling systems, larger household appliances, water heaters, lighting mechanisms, personal electronics, and building materials.¹⁰⁶

The DOE establishes energy efficiency standards for a broad range of appliances and equipment covering more than 60 different products. These include consumer products such as washing machines, commercial and industrial products such as electric motors, lighting products such as traffic signals and pedestrian modules, and all manner of plumbing products.¹⁰⁷ Authority to regulate the standards of these products is granted by Congress and compliance with them is required by law.

While the labelling is extensive, the performance targets for some key appliances, in particular lighting and space heating, are falling behind other G7 countries.

¹⁰⁵ U.S. Energy Information Administration, October 2023, **Electric Power Annual**, Table 10.1

¹⁰⁶ Energy Star, <https://www.energystar.gov/> (webpage, accessed May 2024)

¹⁰⁷ Office of Energy Efficiency & Renewable Energy, **Standards and test procedures** (webpage, accessed May 2024)



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E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

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