

Mapping US policy
on energy efficiency in buildings:

Existing and planned activities and initiatives at federal and sub-federal levels

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U.S. DEPARTMENT OF
ENERGY

Office of
**ENERGY EFFICIENCY &
RENEWABLE ENERGY**



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Introduction

The European Union (EU) has made a commitment to achieve net-zero carbon emissions by 2050. Reaching this goal requires concerted action and effort across multiple industries and sectors, including the buildings sector, which accounts for roughly one-third of Europe's greenhouse gas (GHG) emissions. The EU Renovation Wave, launched in October 2020, points the way to a decarbonized and clean-energy system by retrofitting old buildings and constructing new sustainable buildings. To this end, the European Commission has activated relevant legislation and a series of directives and programs to address every component of the buildings sector.

On the other side of the Atlantic, the buildings sector also contributes about one-third of overall GHG emissions in the United States (US). Buildings-related emissions in the US, however, are by far the highest in the G20 on a per-capita basis. Like the EU, the US has pledged to achieve net-zero carbon emissions by 2050, and achieving energy efficiency and decarbonization of buildings is already a top priority in many states and local jurisdictions.

The EU and the US are each taking important steps to achieve their respective goals, but they can accelerate progress through the mutual exchange of best practices, policies, business models and technology development. The purpose of this paper is to inform EU audiences through a high-level mapping of US policy on energy efficiency in buildings, as well as on the latest policy developments in the US – existing and planned – that aim to move the country towards meeting its climate commitments. This paper serves as a framing document to accompany the related series of 'US-EU Exchange' webinar summaries, which further flesh out key subtopics related to decarbonizing buildings in the US.

Governance

Energy policy in the US is determined, in part, through the interaction of laws enacted at federal, state and local levels. At the federal level, energy policy is established by the executive (Office of the President) and legislative (Congress) branches and implemented by one of several federal agencies or departments including the Department of Energy (DOE), the Department of Housing and Urban Development (HUD), and the Environmental Protection Agency (EPA).

State governments in the US essentially mirror the structure of the federal government in that they include legislative, executive and judicial branches. The chief state-level executive is known as the 'governor'. Typically, most state governments include departments, authorities or agencies that lead implementation efforts in the following policy areas related to energy and sustainability: energy, environment, housing, economic development, and emergency management. State government powers are determined locally, which accounts for some variety, but there are two major categories of authority. 'Home rule' states are those that allow cities and municipalities to pass laws as desired, as long as those laws align with the state constitution and existing state laws. 'Dillon's Rule' states limit the authority of cities and municipalities to pass laws without first obtaining special permission from the state legislature. There are 31 states that the National League of Cities classifies as falling under Dillon's Rule, with eight categorized as home rule and the others falling somewhere in between. This is a particularly relevant distinction when considering the possibility of any municipality passing an ambitious policy aimed at regulating building performance.

Public Utility Commissions (PUCs), or Public Service Commissions (PSCs), are the state-level governing bodies that regulate rates and services provided by public utilities, including natural gas and electric utilities. The state governor appoints most commissioners, while some are appointed by the state legislature, and others are elected. PUCs, which vary in terms of utility coverage, are mandated and funded at the state level. They are relevant to buildings because they determine funding levels for utility-run energy-efficiency or demand-side management programs.

Municipal and local governments provide policies and services that are not addressed by the state or federal governments. Local governments include counties and their major cities, towns and other municipalities. There are often varying and overlapping jurisdictions of power between federal, state and local governments, but any area or service not pre-empted by federal, state or county authority is typically a municipal responsibility. Such responsibilities usually include the provision of police and fire departments, waste-management and planning services, and school-district operation. The authority of municipal-level governments to enact environmental regulations tends to be limited but can have an impact on issues such as waste management, building codes and transit infrastructure.

Local governments are not limited to cities, but also include counties. The structures of local government are highly variable. As an example, in city governments, there are traditionally two main elected bodies: the city council (the legislative body), and the mayor (the executive). Cities can grant anywhere from strong to weak mayoral powers, depending on local structure and orientation. Environmental departments, usually under the auspices of the mayor, often share considerable overlap with other departments, including transportation, public health, parks, and planning.

Existing energy efficiency policy types

Major existing policies related to energy efficiency and decarbonization in buildings fall into a few different categories, and are segmented to apply to new construction and major renovation projects or existing buildings.

New construction and major renovation

Energy codes for residential and commercial buildings in the US typically reference a certain version of the International Energy Conservation Code (IECC), with or without specific amendments. California, the most populous state, and Washington promulgate their own codes. Codes are typically enforced at local or municipal level, and adopted at state level, with the exception of the eight Home Rule states. In most cases they regulate only the design and construction of new buildings and major renovations, and do not affect the operation of buildings once they are occupied. Model energy codes are developed at the national level through the code and standards development organizations International Code Council (ICC) and American Society for Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE). Cities then consider if they want to adopt the model code as written, or including their own amendments. Some states allow cities to adopt 'stretch' codes that are more stringent than the base state-wide code. Some states (like Massachusetts) use their resources to develop a stretch code that cities can consider for adoption.

Another emerging category of policies in this space focuses on the goal of electrification by phasing out fossil fuel use in new construction and major renovations. Notably New York City passed a bill of this type into law in December 2021, becoming the largest city in the US (and the first in a cold-weather climate) to begin the phase-out of fossil fuel combustion in new buildings as of 2024. Modelling suggests that this law will prevent 2.1 million tons of carbon emissions by 2040.¹ Many jurisdictions in California have passed similar laws including San Francisco and San Jose.² As many as 45 cities in the Bay Area have moved in some form towards phasing out fossil fuels, including gas-bans or through code-based approaches (electric-required reach codes or electric-preferred reach codes).³ At the same time, 19 US states have passed laws aimed at prohibiting the introduction of gas-bans – presenting a formidable barrier to building electrification in a large portion of the country, including Texas, Florida and Ohio.

Existing buildings

There are several major types of policies that target energy use in the existing building stock. This set of policies is meant to touch buildings that may not be undergoing any sort of renovation project and thus wouldn't trigger code requirements.

More than three-dozen cities and other jurisdictions in the US have adopted benchmarking policies. At minimum, these require the owners of certain types and sizes of private-sector buildings to report whole-building energy data to local government on an annual basis. The local authority can then publicly disclose that data if the law includes a transparency component. The supporting logic is that the reporting and disclosure of this data will make building owners more aware of their overall energy performance and of how their performance stacks up against the competition, while also providing other market actors with valuable data. Building labelling requirements, meanwhile, obligate building owners to display an energy score or ranking based on benchmarked data in a publicly visible location on the property. These are the only policies so far that have reached single-family households in the US.⁴

¹ Tan, Y, Shah A, Gruenwald T. "Stopping Gas Hookups in New Construction in NYC Would Cut Carbon and Costs," December 10, 2021.

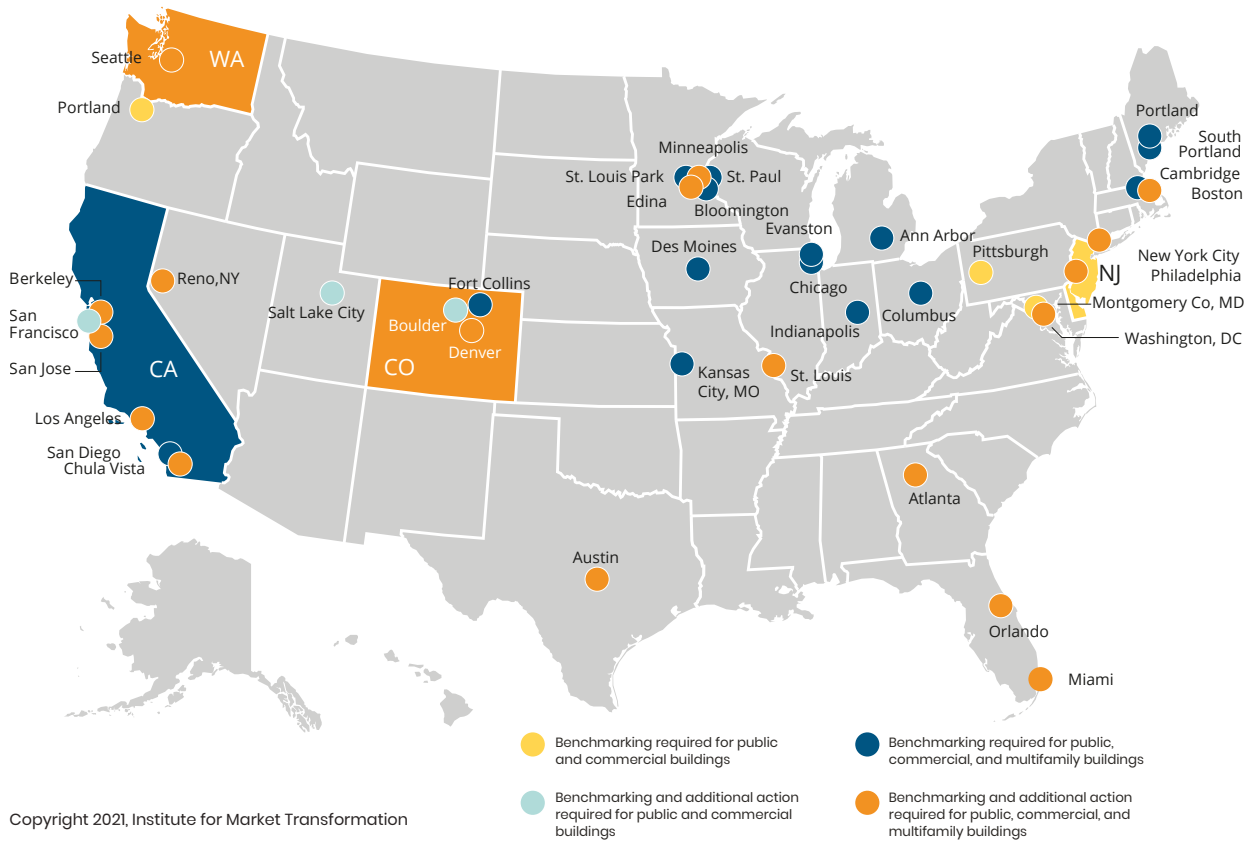
<https://rmi.org/stopping-gas-hookups-in-new-construction-in-nyc-would-cut-carbon-and-costs/>

² <https://www.sierraclub.org/articles/2021/07/californias-cities-lead-way-gas-free-future>

³ <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/gas-ban-monitor-building-electrification-evolves-as-19-states-prohibit-bans-65518738>

⁴ <https://www.naseo.org/issues/buildings/home-energy-labeling>

U.S. City, Country, and State Policies for Existing Buildings: Benchmarking, Transparency, and Beyond



Energy audit requirements, another policy type, mandate that building owners must undergo an energy audit or some other form of professional energy-performance assessment on a periodic basis (e.g. every five to 10 years). Energy audits typically identify both low-cost and capital-intensive upgrade opportunities, and also analyze energy savings against various payback metrics. Building owners are not obligated to take further action following an audit: the intent behind the auditing requirement is merely to ensure that building owners have the information they need to improve a building’s energy performance. Retro-commissioning⁵ and tune-up laws go beyond this to identify operational improvements and other low-cost building upgrades that owners are required to implement on a periodic basis, typically, like audits, every five to 10 years.⁶

Building performance standards (BPS), also called building energy performance standards, are the newest type of building performance policy and have been passed in eight US jurisdictions as of February 2022. These standards require that buildings meet specific energy- or emissions-performance levels that become stricter over time on a prescribed reporting schedule. BPS set specific energy or emissions targets using a range of metrics, including energy-use intensity (EUI), GHG-emissions intensity, or third-party scoring (e.g. ENERGY STAR) for existing buildings over a certain size.

⁵ ‘Retro-commissioning’ and ‘re-commissioning’ are terms often used interchangeably. The major difference between the two is that retro-commissioning is for buildings that have not undergone commissioning before, while re-commissioning is for buildings that have been commissioned previously. Source: <https://www.eeiengineers.com/services/building-commissioning/retro-commissioning/>

⁶ The Institute for Market Transformation provides a helpful nationwide comparison of different audit, retro-commissioning and tune-up requirements: <https://www.imt.org/wp-content/uploads/2021/01/IMT-Comparison-of-Audit-TuneUp-RCx-Policies-January-2021.pdf>

Owners are required to implement whatever measures are necessary to meet those targets or face paying a fine.⁷ All BPS consist of three main elements: the metric used to measure performance (such as GHG emissions or site energy); the target that each building or type of building needs to achieve; and the path by which the target is to be achieved. It is important to note that BPS policies are a tool that can help jurisdictions move towards electrifying buildings as well, depending on the parameters and metrics included in the policy.

U.S. City and State Policies for Existing Buildings: Building Performance Standards

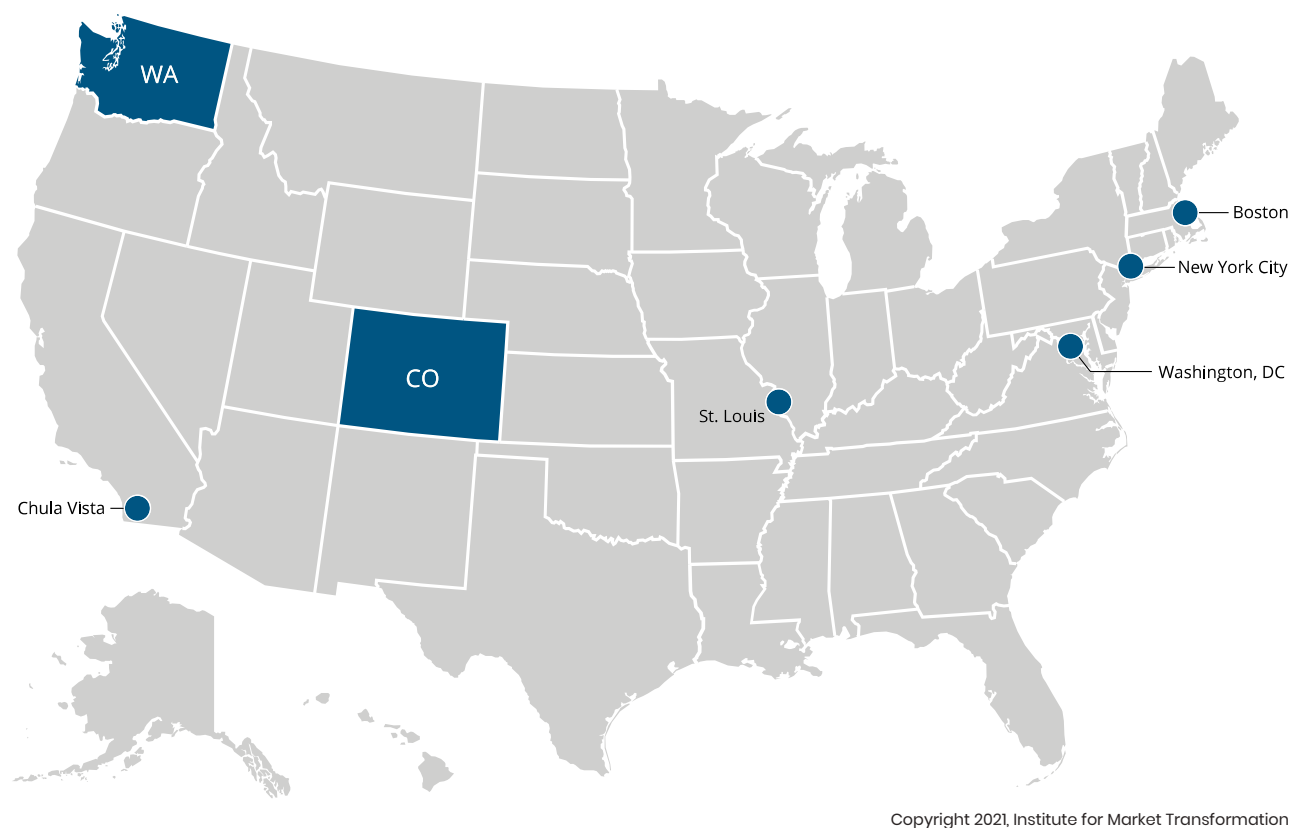


Figure 1: U.S. City and State Policies for Existing Buildings: Building Performance Standards

National climate and energy goals

If the US is to meet its 2030 climate targets and achieve climate neutrality by 2050, the buildings sector will have to step up both the rate and depth of building renovations by a significant margin, and this will require corresponding levels of investment. After President Biden took office in January 2021, the US rejoined the Paris Agreement with the express intention of achieving net-zero energy emissions across the whole economy by 2050. Tucked into President Biden's US\$2.3 trillion infrastructure plan in the early days of his administration was the aim of achieving 100% carbon-free electricity by 2035.⁸ The Biden administration also announced, in April 2021, a new goal of achieving a 50–52% reduction in net GHG emissions by 2030. These are encouraging developments, but a significant reduction in buildings-related emissions will be an absolute requirement for success on the ground.

⁷ More information on BPS can be found at imt.org/bps.

⁸ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

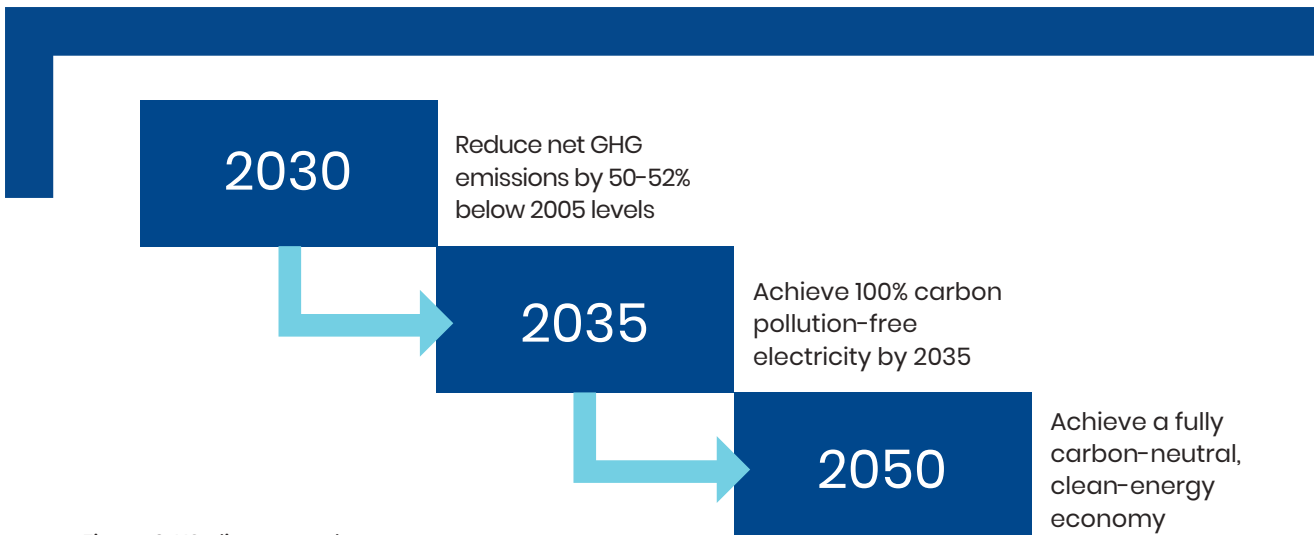
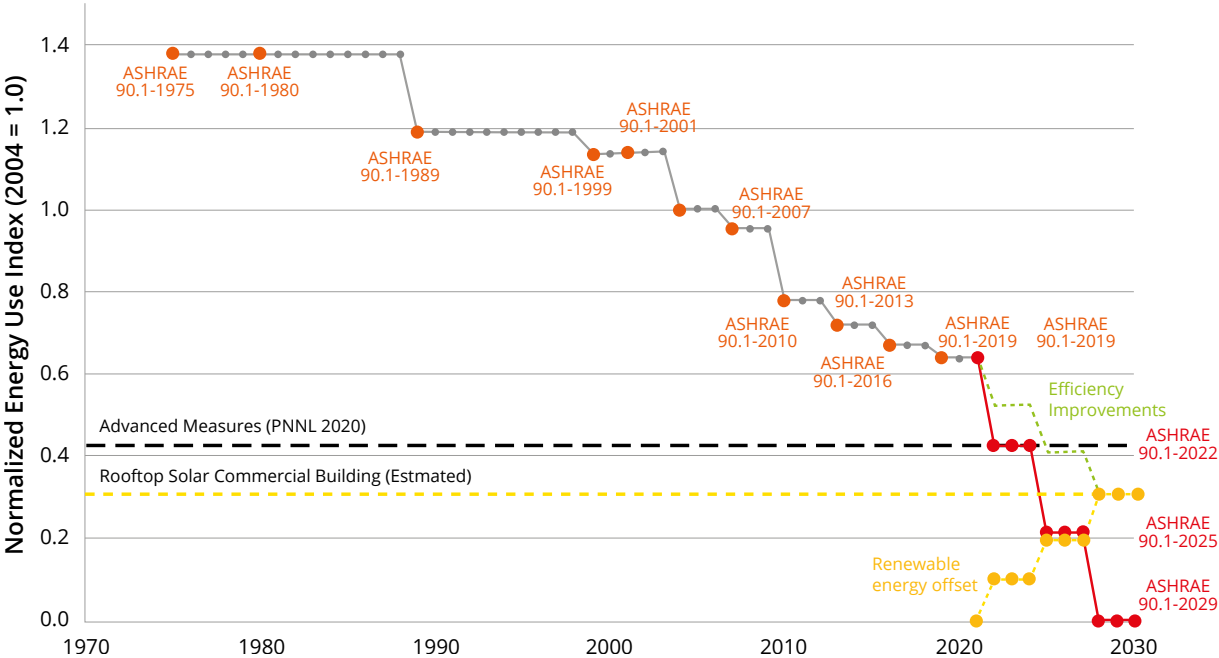


Figure 2: US climate goals

Bearing in mind the built environment’s role in supporting these federal goals, action needs to be taken across all levels of government (federal, state, and local). This involves targeting both new construction projects and renovations through stronger energy codes and requirements to upgrade existing building stock. The graph below shows the remaining gap between current energy performance levels and net-zero emissions, but also shows how improvements to the energy code,⁹ which will affect new buildings and renovations, are expected to move the needle closer to the 2030 target (the red line). It should be noted however that the timeline for energy code adoption varies from state to state, and county to county. Some states adopt a new code within a year or two of its publication. Others may take quite a while longer. This lag, as well as the fact that important energy efficiency measures are frequently amended out, will affect the ability of building code changes to impact building emissions by 2030.

Efficiency Gap for Achieving Net Zero Commercial Building with Energy Codes



Source: Franconi, E, J. Ierond, C. Nambiar, D. kim, D. Winiarski, and M. Rosenberg. Filling the Efficiency Gap to Achieve Zero Energy Buildings with Energy Codes. PNNL-30547, Pacific Northwest National Laboratory, Richland, Washington [publication pending].

Figure 3: Efficiency Gap for Achieving Net Zero Commercial Building with Energy Codes

⁹ At present, there is no national energy code in the US.

On the existing building side, in January 2022 the Biden administration announced the [National Building Performance Standards Coalition](#), a group of 33 state and local governments committed to exploring equitable building retrofit policies by Earth Day 2024. More than 12% of the US population live in the Coalition's communities and their homes, offices, schools, and other buildings represent nearly 20% of the nation's building stock. The map on the right shows the initial cohort of jurisdictions in the Coalition at its launch.

National Building Performance Standards Coalition (January 21, 2022)

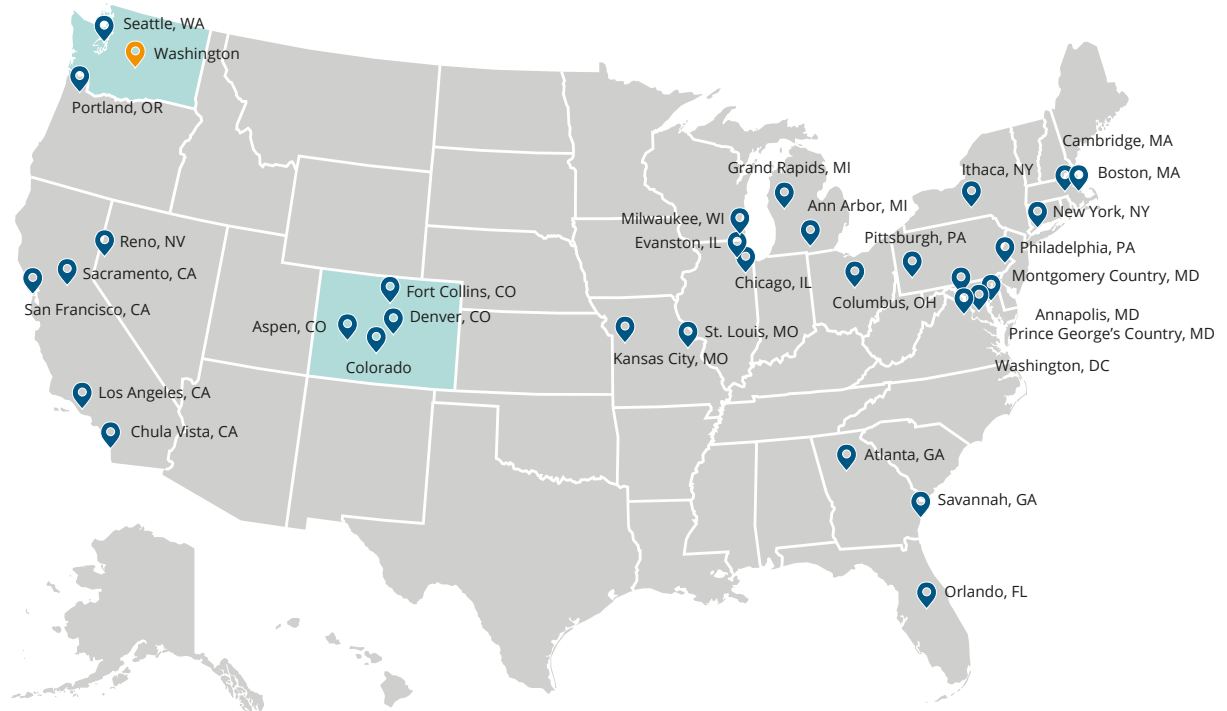


Figure 4: National Building Performance Standards Coalition

Budgetary and recovery initiatives

Ahead of his inauguration in January 2021, President Biden proposed a legislative framework program, the Build Back Better agenda, to bolster the economy, expand social services, create jobs, repair decaying infrastructure, provide COVID-19 relief, and make significant progress towards achieving national and global climate goals. Current efforts to put these plans into action are described in the following section.

Infrastructure Investment and Jobs Act

President Biden signed the Infrastructure Investment and Jobs Act into law on 15 November 2021, signaling the largest US investment to date to address climate change. The Act includes more than US\$62 billion for the Department of Energy (DOE) to deliver on four main goals around clean energy: 1) invest in manufacturing and workers; 2) expand access to energy efficiency and clean energy; 3) deliver more reliable, clean and affordable power; and 4) build innovative technologies. A key part of that will allow the DOE to expand and improve existing grant and loan programs, distributed at state level, that target energy-efficiency and weatherization projects. The following section provides a high-level summary of a subset of the funding opportunities included in the law to support certain buildings-efficiency programs run by the DOE.

Energy Efficiency and Conservation Block Grant Program (USD 550 million over five years)

This program provides grants to assist cities, counties, states, tribes, and territories in implementing strategies to cut fossil-fuel emissions, reduce energy use, and improve energy efficiency. The program will allocate up to 98% of the total appropriation via formula grants with 68% apportioned to eligible units of local government, 28% to states, and 2% to Indian tribes. The approximate 2% remaining is set aside for competitive grants available to units of local government, including Indian tribes, that are not eligible for formula grants, and to consortia of local governments.

State Energy Program (USD 500 million through 2026)

The State Energy Program provides annual formula funding and technical assistance to 50 states, the District of Columbia, and the five US territories to enhance energy security, advance state-led energy initiatives, and increase energy affordability. The Infrastructure Investment and Jobs Act authorizes and appropriates US\$500 million through the SEP. In addition, the legislation adds transmission and distribution planning and the promotion of demand-response technology and transportation electrification to the list of focus activities for the program.

Weatherization Assistance Program (WAP) (USD 3.5 billion over five years)

This longstanding program provides grants to cover weatherization work for low-income households across the country. This allocation of funds will significantly expand the number of households who receive weatherization services from the program, which currently serves about 35,000 households per year on an annual budget of over US\$300 million.

Low-Income Home Energy Assistance Program (USD 500 million through 2007)

This program disperses funds to low-income households to manage costs associated with home energy bills, energy crises, weatherization, and minor energy-related home repairs. This program is especially important given that heating costs are expected to rise significantly this winter¹⁰ (approximately 30% for natural gas, 43% for heating oil, and a staggering 54% for propane).

Cost-Effective Codes Implementation for Efficiency and Resilience (US\$225 million)

This program provides competitive grants to state or regional partnerships to support the adoption and implementation of updated building-energy codes, including training and data collection. Priority criteria for building codes supported through these grants include prospective energy savings, long-term sustainability, and other prospective benefits such as resilience, peak load reduction, and occupant safety and health.

Energy Efficiency Revolving Loan Fund Capitalization Grant Program (US\$250 million)

Established under the Department of Energy's State Energy Program, this grant program provides funds to states to establish revolving loan funds and grant programs for commercial and residential energy audits, upgrades, and retrofits to decrease energy use and carbon emissions and improve the comfort and safety of buildings. Of the allocated amount, 40% will be apportioned to states according to the State Energy Program formula, while the remaining 60% will be allocated to a set of priority states based on per-capita energy use, per-capita carbon emissions, and other criteria established by the DOE. The legislation encourages states to use these funds to leverage private-capital investments.

Energy Auditor Training Grant Program (US\$40 million)

The program provides competitive grants to states for training residential and commercial energy auditors. States can use grant funds to cover eligible training activities as well as trainees' wages during the period of training and certification.

¹⁰ <https://www.eia.gov/todayinenergy/detail.php?id=49936>

Build Back America Act

If the Build Back Better budget-reconciliation bill passes, it will likely create significant additional funding opportunities. The bill includes US\$555 billion for renewable energy and clean transportation incentives, and is crucial to achieving the goal of cutting emissions by 50% by 2030. Programs in the Build Back Better Act include funding and tax credit provisions to tackle emissions from the transportation and electric power sectors, as well as for the electrification and weatherization of homes, especially low-income. The tax credits are tied to requirements that ensure high labor standards, and are projected to create millions of jobs nationally.



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