



# State Energy Efficiency Policy in a New Era: A Toolkit for Governors

## Executive Summary

Governors support energy efficiency for a variety of benefits: to reduce energy waste and save costs on meeting state decarbonization goals, to enhance energy reliability and resiliency, to reduce air pollution and improve public health, and to foster economic development. Energy efficiency is defined as reducing energy consumption while maintaining the same level of performance. Over the last 20 years, energy intensity, or energy use relative to economic output, has been reduced by half, and is expected to decrease at an average annual rate of 1.5 percent through 2050.<sup>1</sup> Energy efficiency plays an important role in meeting state energy and environmental goals. Now, in addition to traditional energy efficiency measures that are often thought of as LED lighting and energy efficient appliances, new digital and data-driven solutions, such as building automation, are creating new opportunities for Governors and state energy policymakers to pursue.

Energy efficiency measures and their resulting emissions reductions are vital to meeting ambitious state and federal decarbonization goals. Sixteen Governors plus D.C. have ordered or signed into law 100 percent clean energy or zero-carbon electricity generation goals.<sup>2</sup> **Massachusetts'** Governor Charlie Baker also signed into law recent climate legislation and **Louisiana** Governor John Bel Edwards also issued an executive order in 2020 setting a goal of making Louisiana carbon neutral by 2050 and joined the U.S. Climate Alliance in May 2021.<sup>3,4</sup> The Biden-Harris Administration has also established decarbonization targets and prioritized energy efficiency by executive order putting "the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050" and setting energy efficiency and renewable energy investment priorities for environmental justice priorities.<sup>5</sup> The recently proposed federal infrastructure plan has a goal of achieving 100 percent carbon-free electricity by 2035 and envisions adopting a combined federal clean energy and energy efficiency standard.<sup>6</sup>

To take advantage of opportunities to reduce energy consumption, Governors have a robust set of policy levers and tools they can consider, as seen in the table below.

## Governors' Toolkit on Energy Efficiency

State Policy Measures	Gubernatorial Tools
Leading by Example	<ul style="list-style-type: none"> <li>• Issue an executive order to set energy savings targets for public buildings.</li> <li>• Establish an inter-agency working group to guide policy implementation.</li> <li>• Benchmark facility energy consumption and identify energy savings opportunities.</li> <li>• Encourage public-private partnerships to finance a greater number of projects.</li> <li>• Establish a Governor's recognition program to award business owners and citizens.</li> </ul>
Setting Energy Goals	<ul style="list-style-type: none"> <li>• Direct a state agency to conduct an energy savings potential study.</li> <li>• Establish energy efficiency goals in state energy or decarbonization plans.</li> <li>• Integrate efficiency into state resilience frameworks.</li> <li>• Establish demand response programs at the utility level.</li> </ul>
Adopting Codes and Standards	<ul style="list-style-type: none"> <li>• Propose legislation regarding appliance efficiency standards or building energy codes.</li> <li>• Nominate members to a relevant state building code council.</li> </ul>
Driving Utility Action	<ul style="list-style-type: none"> <li>• Request or direct public utility regulators to consider utility rate reforms that encourage energy efficiency such as revenue decoupling or performance-based incentives along with time-of-use rates.</li> <li>• Request public utility regulators to require utilities to submit an integrated resource plan that directs the consideration of energy efficiency measures.</li> <li>• Direct public utility regulators to leverage its governing authority over utilities to implement changes that align with public policy energy goals.</li> </ul>
Financing and Funding Energy Efficiency Programs	<ul style="list-style-type: none"> <li>• Propose and/or support legislation to create a public benefits fund that funds efficiency measures.</li> <li>• Order state agencies and provide funding/financial incentives to improve energy efficiency in public facilities.</li> <li>• Establish state energy efficiency financial incentive programs such as state-sponsored grant or loan programs.</li> <li>• Promote financing institutions like a Green Bank to guide energy improvements.</li> </ul>
Delivering Outreach and Education	<ul style="list-style-type: none"> <li>• Launch a public awareness campaign to promote state and utility energy efficiency programs.</li> <li>• Connect consumers to available technical assistance such as discounted energy audits for their home or business.</li> <li>• Establish hiring pathways through apprenticeship programs for the energy sector.</li> </ul>
Reaching Environmental Justice Communities and Emerging Sectors	<ul style="list-style-type: none"> <li>• Propose funding for rural and agricultural energy efficiency programs in the state budget.</li> <li>• Develop robust programs to address the needs of environmental justice communities.</li> <li>• Expand energy efficiency programs to address efficiency for natural gas.</li> <li>• Deliver affordability/bill support for those facing utility disconnections.</li> <li>• Provide state funds to supplement federal weatherization and affordability programs.</li> </ul>
Establishing Transportation Efficiency Targets	<ul style="list-style-type: none"> <li>• Set goals to transition state fleets to zero-emission vehicles.</li> <li>• Establish statewide vehicle electrification goals for all vehicle classes.</li> <li>• Set statewide fuel efficiency standards.</li> </ul>

## Introduction

Energy efficiency is the ability to complete a task or provide a service using less energy than might otherwise be needed. Residents and businesses have used a range of technologies to achieve this: equipment such as efficient lighting, appliances and electronics; efficient building materials such as those that provide greater insulation; operation efficiency provided by facility energy management systems; and data analytics that support behavioral changes.

On the state, federal and corporate level, there is significant action on establishing greenhouse gas reduction and decarbonization goals, and strategies to meet these targets. Energy efficiency plays a key role in U.S. climate plans and has the potential to halve existing U.S. energy use and emissions by 2050.<sup>7</sup> President Biden has proposed a national Energy Efficiency and Clean Electricity Standard to help meet a 100 percent carbon free electricity goal by 2035. Additionally, focusing on energy efficiency can help create jobs in all states, and can help with economic recovery in sectors that were disrupted by the COVID-19 pandemic.<sup>8</sup>

Energy efficiency has become an increasingly important component in meeting state energy priorities. Sixteen Governors have committed to a 100 percent carbon-free electricity goal with a final target date that often ranges between 2040 and 2050.<sup>9</sup> For example, **New York** has a 100 percent economy-wide clean energy goal and relies on an aggressive energy efficiency resource standard as part of its strategy. The New York Public Service Commission has ordered utilities to increase energy efficiency to account for one-third of the state's 40 percent decarbonization goal by 2030.<sup>10</sup> Twenty-eight states also have existing energy savings or energy efficiency resource plans in place.<sup>11</sup>

Furthermore, states are considering transportation efficiency alongside energy efficiency. In 2018, the transportation sector became the largest source of emissions in the country.<sup>12</sup> States are rapidly moving to incentivize the adoption of electric vehicles and consider strategies to reduce traffic congestion. **California, Colorado and New Jersey** are establishing transportation system efficiency goals to reduce sector-wide emissions. On the East Coast, 12 states and D.C. have joined the Transportation Climate Initiative with a goal to cut greenhouse gas emissions from the transportation sector by 26 percent from 2022 to 2032.<sup>13</sup> NGA has further discussed transportation electrification in reports including [The Road Ahead: Planning for Electric Vehicles by Managing Grid Interactions](#) and [Transportation Electrification: States Rev Up](#).

## Why Do Governors Support Energy Efficiency?

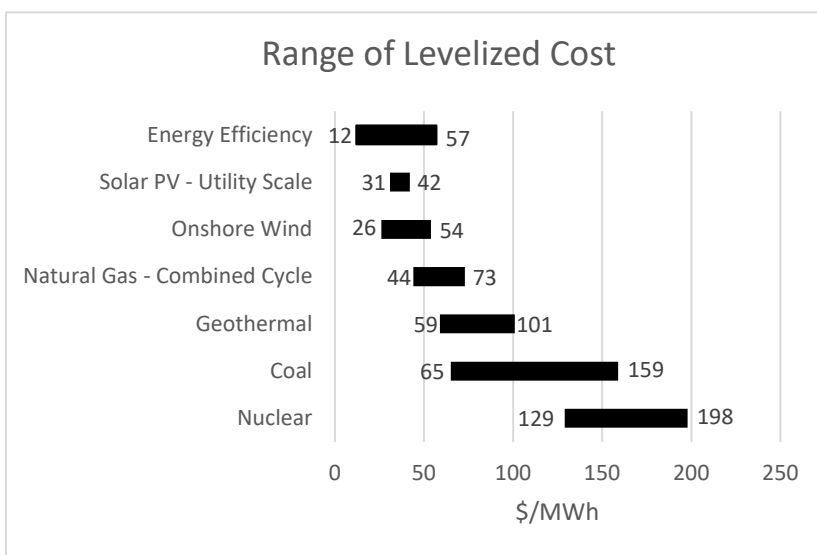
Governors support energy efficiency for a variety of benefits: cost savings (primarily), as well as improved reliability and resilience, emissions reductions and health benefits, enhanced economic and workforce development, and improved energy affordability.

### Cost Savings

The average cost of investing in energy efficiency is between \$12 and \$57 per MWh, which is lower than the levelized cost of investing in new sources of many other energy generation resources.<sup>16</sup>

However, in 2020 renewable energy sources, like wind and utility scale solar, have closed the cost gap as seen in Figure 1. Additionally, federal tax credits change project cost-

**Figure 1 – 2020 Levelized Cost of Generating Electricity<sup>14,15</sup>**



effectiveness, making these sources subject to fluctuation. Nevertheless, energy efficiency remains a cheaper energy source compared to new generation projects.

### Reliability and Resilience

Energy efficiency delivers both reliability and resiliency benefits. With more frequent extreme weather events, such as those seen in Texas and other parts of the South earlier in 2021, energy efficiency can be crucial to ensuring citizens have electricity and other critical services, such as clean drinking water.<sup>17</sup> Energy efficiency lowers overall energy use and allows utilities to meet demand with less generation, lessening the need to meet requirements for reserve capacity.<sup>18</sup> Further, energy efficiency can reduce the needed capacity—and therefore cost—of on-site backup generation or storage at critical facilities.

### Emissions Reductions and Health Benefits

Energy efficiency improvements reduce demand for electricity generation and fuel use, thus lowering emissions from power plants. Emissions reductions provide health benefits by reducing exposure to pollutants and reducing premature deaths or lost workdays due to illness.<sup>19</sup> These emissions reduction benefits also play into decarbonization strategies overall. The American Council for an Energy-Efficient Economy found that energy efficiency can deliver half of all energy reductions needed to reduce greenhouse gas

emissions by 80 to 100 percent by 2050.<sup>20</sup> Additionally, transportation efficiency strategies, such as a shift to 80 percent light-duty electric vehicles, could account for half of the modeled emissions reductions.

### **Economic and Workforce Development Benefits**

Manufacturing and installing energy efficiency technologies yield direct and indirect job creation benefits, helping to stimulate economic growth. Indirect jobs are defined as those jobs generated in the supply chain (e.g., jobs created by insulation or tool manufacturers) and support industries involved in an industry that is directly impacted by an expenditure. Induced jobs are jobs that are created by the re-spending of received income resulting from direct and indirect job creation in the region (e.g., EE implementation workers spend money on food, housing, and other consumer activities).<sup>21</sup> The latest energy jobs report found that energy efficiency accounts for the second most jobs in the energy sector, with 2.38 million jobs reported in 2020.<sup>22</sup> Energy efficiency jobs have expanded 12.4 percent annually from 2015-2019, growing faster than the overall economy's rate of 6 percent.<sup>23</sup> Additionally, President Biden is proposing significant investments in energy efficiency by retrofitting more than two million homes, which will provide jobs across all states.<sup>24</sup>

### **Energy Affordability**

Low-income households comprise around 33 percent of the U.S. population.<sup>25</sup> Much of the low-income population lives in older and inefficient homes. As a result, low-income households spend a higher percentage of their income (about 14 percent) on energy costs compared to non-low-income households (about 3 percent) and often cannot afford the upfront investments in energy efficiency improvements.<sup>26</sup> Furthermore, the economic downturn during the pandemic has exacerbated this situation for low-income households. Energy customers who were struggling prior to the pandemic have had difficulties paying energy bills and face an uneven recovery. Energy efficiency improvements can significantly reduce household energy consumption, lessening the energy burden for low-income households.

## What are the Barriers to Greater Efficiency?

While energy efficiency offers various benefits, states face several barriers to reaping these greater savings: high up-front costs, utility regulatory disincentives, changing energy market trends, lack of consumer awareness, managing workforce gaps, and accurately valuing energy savings.

1. **High Up-Front Costs** – To maximize energy savings, comprehensive energy efficiency retrofits at buildings typically combine longer-term measures, like chiller and boiler replacements, that are expensive with shorter-term retrofits, like lighting retrofits, that are typically lower in costs to make up-front costs less prohibitive. This process can lower project payback periods to make them more acceptable for state budgeting. However, as short-term retrofits are completed and there are competing budget priorities, there is less “low-hanging fruit” to shorten project payback periods and more expensive efficiency measures may be deferred.
2. **Utility Regulatory Disincentives** – Regulatory structures can diminish savings opportunities as markets are typically structured to incentivize greater utility profits through more energy usage.<sup>27</sup>
3. **Workforce Gaps** – A lack of experienced candidates has led to 72 to 84 percent of energy efficiency employers to face struggles with hiring processes.<sup>28</sup> Additionally, economic impacts due to COVID-19, greatly exacerbated unemployment rates, shedding over 300,000 jobs in the clean energy sector. Energy efficiency jobs took the biggest hit out of the sector, falling 11 percent due to the inability to enter residential or commercial buildings.<sup>29</sup>
4. **Valuing Energy Savings** – Energy efficiency retrofits create additional benefits, known as non-energy benefits, which are, however, often excluded from project valuation. Non-energy benefits include improved indoor air quality, reduced operating costs, job creation potential, and energy security for the grid in the case of cyber-attacks or natural disaster events. Leaving out these benefits will alter project cost-effectiveness.<sup>30</sup>
5. **Lack of Consumer Awareness** – Energy consumers often do not prioritize energy efficiency improvements due to a lack of knowledge about their energy usage, the benefits of energy efficiency, and programs that help address financial barriers. Typically, consumers incorrectly estimate appliance energy usage and prefer curtailment strategies reduction to efficiency strategies. This leads to a reactive rather than a proactive mindset and lack of information on energy savings best practices.<sup>31</sup>

## How Can Governors Advance Energy Efficiency?

Governors have a robust suite of policy levers they can use to advance energy efficiency. The following table identifies tools Governors can use take to implement energy efficiency projects across the following seven categories:

1. Establish lead-by-example programs for state buildings and fleets.
2. Set efficiency goals as part of state energy plan.
3. Incorporate net-zero technology through energy codes and standards.
4. Provide regulatory incentives to drive utility action on energy efficiency.
5. Establish energy efficiency financing pathways.
6. Educate consumers and businesses.
7. Address barriers for underserved communities and emerging sectors.
8. Establishing transportation efficiency targets.

### 1. Establish Lead-by-Example Programs for State Buildings

States have a unique opportunity to lead by example by addressing energy consumption in state-owned and operated buildings. Through executive action, Governors can direct agencies to pursue measures to reduce energy consumption and expenditures, such as building retrofits and purchasing efficiency equipment.

#### Energy Savings Targets for State Buildings

A direct way for a Governor to implement their policy agenda is through executive orders.

Governors have issued orders setting energy savings targets for state buildings. **Connecticut** Governor Ned Lamont issued his first Executive Order in April 2019 enhancing the state's existing lead-by-

#### Figure 2: Connecticut Lead-by-Example Results

Connecticut efforts at leading by example have produced some significant benefits

- Completed 200 energy efficiency projects in state buildings, achieving \$5 million in annual savings.
- Finances projects through bonding, tax-exempt leases, and utility programs to ensure multiple funding sources that remain cost-effective
- Established a web-based platform, EnergyCAP, for compiling and tracking state energy data (all state energy accounts have been integrated into the system) and initiated auto electronic data transfer for linked state utility counts into EnergyCAP.



example efforts. The order establishes requirements for state office buildings and vehicle fleets to reduce greenhouse gas emissions by 45 percent below 2001 levels.<sup>32</sup> The order is accompanied by annual reports to track results, which can be seen in Figure 2.

In 2019, **Pennsylvania** Governor Tom Wolf signed an executive order addressing climate change, energy conservation, and sustainable governance. This order requires state agencies to reduce energy consumption by 3 percent annually and 21 percent by 2025 compared to 2017 levels. In 2021, Gov. Wolf doubled down on lead-by-example, announcing plans to develop solar arrays that will power nearly 50 percent of state electricity usage. The Project to Utilize Light and Solar Energy will go into effect in 2023.<sup>33</sup> In 2019, **Maryland** Governor Larry Hogan issued an executive order requiring state buildings to reduce energy usage by 10 percent over the next 10 years.<sup>34</sup>

### **Building Energy Benchmarking and Disclosure**

Energy use at state government facilities accounts for nearly 10 percent of a typical government's annual budget.<sup>35</sup> The U.S. EPA estimates that 40 percent of all commercial building stock is benchmarked. These facts indicate that there is a large opportunity for energy savings and cost reductions through building energy benchmarking and disclosure. By metering and tracking energy consumption in state buildings at a granular level—and benchmarking consumption in those buildings—Governors can identify where to deploy energy saving measures and retrofits most effectively.

**Washington** Governor Jay Inslee signed into law clean buildings legislation, which requires commercial buildings larger than 50,000 square feet to benchmark their energy usage. Once benchmarked, the buildings must achieve energy savings of 15 percent less than 2009-2018 levels, which are spurred by state energy efficiency incentives.<sup>36</sup> Other states with effective benchmarking programs for state buildings include **Arkansas, Colorado, Kentucky** and **Minnesota**.

### **Incentivizing State Agency Participation**

Many states have also pursued ways to increase state agency interest in implementing energy efficiency improvements. Alongside Governor directives, it is important to communicate the benefits of energy efficiency to agency heads and facility operations managers. For example, energy efficiency retrofits can result in more modern and comfortable buildings and can provide opportunities for agencies to address deferred maintenance.

A mechanism some states have carried out to encourage agencies to pursue energy efficiency is known as a “shared-savings” model, in which an agency is allowed to keep a



portion of the energy savings to be put to specified uses. States with legislation authorizing this mechanism include **North Carolina** and **Oregon**.<sup>37,38</sup> To further incentivize agencies, Governors can publicly recognize agencies, facilities, or state employees that have gone above and beyond in their pursuit of energy savings. For example, former **Rhode Island** Governor Gina Raimondo developed an annual awards program in 2017 to recognize state agencies' successes in achieving greater energy savings.<sup>39</sup>

### **Implementation and Financing Programs**

Governors can be creative in policymaking and generally innovative policies lend themselves to be successful lead-by-example initiatives. **Tennessee** prioritizes lead-by-example initiatives through the state's EmPower TN program. The state appropriated \$37.5 million for energy efficiency projects, while as of 2020, \$37.4 million is allocated toward 39 projects in state-owned buildings. These projects include LED replacements in state parks, replacing a state university chiller, and installing energy controls in office buildings. Overall, the program will achieve annual utility savings of \$4.3 million with an average payback of 8.7 years.<sup>40</sup>

## **2. Incorporate Efficiency in Energy Planning Processes**

Governors can strengthen their energy planning process by including energy efficiency as a resource or setting specific energy efficiency resource targets. More than 40 states have comprehensive energy plans to guide their policy process, assess energy supply and demand, and spur economic development.<sup>41</sup> Governors can establish a vision for their state's energy future and direct the development of state energy plans and considerations of energy efficiency in utility integrated resource plans.

### **Conducting an Energy Efficiency Potential Study**

A key precursor to establishing energy savings goals is the implementation of an energy efficiency potential study. Typically, these studies play three functions: (1) making the case for energy efficiency measures and upgrades, (2) identifying alternatives to current energy supply activities, and (3) determining total efficiency project costs.<sup>42</sup> Each function serves an important role in facilitating energy efficiency projects. The **Wisconsin** Public Service Commission (PSC) completed an energy efficiency potential assessment and found that the state could achieve an average annual energy savings rate of 2 percent from 2019 to 2030.<sup>1,43</sup> The **Hawai'i** Public Utilities Commission released the Hawai'i Statewide Market Potential Study in August 2020. The findings showed that in 2030, the achievable potential

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<sup>1</sup> For a complete listing of state-wide energy efficiency potential studies, the U.S. Department of Energy maintains an online compilation: <https://www.energy.gov/eere/spsc/energy-efficiency-potential-studies-catalog>.

in the Business-as-Usual scenario is 1,329 GWh in cumulative savings, while the achievable high potential is 1,755 GWh.<sup>44</sup>

### **Setting Energy Efficiency Goals**

Energy Efficiency Resource Standards establish specific, long-term energy savings targets for utilities. There are various types of energy resource strategies including reducing energy use over a baseline year, reducing energy consumption annually, or tying energy savings relative to sales or GDP. As of July 2020, 28 states have established Energy Efficiency Resource Standards.<sup>45</sup> In July 2018, the **Arkansas** Public Service Commission reaffirmed and increased its energy reduction targets through 2022 by raising annual energy savings targets from 1 percent to 1.2 percent of sales annually, expected to save the state approximately 445 million kWh annually.<sup>46</sup>

In 2020, **Virginia** set a 100 percent clean electricity goal, while establishing an energy efficiency resource standard concurrently. The standard requires the commonwealth's two largest utilities to achieve incremental energy efficiency savings of 0.5 and 1.25 percent, respectively. In 2020, **New Jersey** Governor Phil Murphy outlined strategies to achieve the Energy Master Plan and meet a goal of 100 percent clean energy by 2050.<sup>47</sup> Energy efficiency commitments from the master plan include reducing energy consumption from the building sector, enacting annual energy efficiency standards of 0.75 percent and 2 percent for natural gas and electricity utilities, and supporting investments in underserved communities.

### **Integrating Efficiency into Resilience Frameworks**

States are enhancing energy resilience in an effort to meet the threats of natural disasters. Energy efficiency can reduce power needs during severe weather events or power outages. President Biden has aimed to *Build Back Better* by setting new building code standards and integrating demand-side management with an equity focus to ensure that low-income communities are considered.<sup>48</sup> **North Carolina** created the Climate Risk Assessment and Resilience Plan in response to an executive order by Governor Roy Cooper. The plan calls for reducing power demand, modernizing grid assets with smart meters, and diversifying transmission and distribution components.<sup>49</sup>

### **Promoting Demand Response Mechanisms**

States can encourage energy efficiency through demand response programs where customers are incentivized to reduce or shift their electricity use during times of peak electricity demand. Demand response plays a key role in system resiliency by putting less strain on the electric grid. Maryland requires its utilities through the EmPower **Maryland** program to offer customers rebates for reducing electricity usage during key periods. This

program has provided more than \$40 million in customer rebates and \$400 million in wholesale market savings.<sup>50</sup> **South Carolina** requires its utilities to include energy efficiency and demand response measures as part of its integrated resource plans.<sup>51</sup>

### **Grid-Interactive Efficient Buildings**

Grid-interactive efficient buildings have advanced building controls that dynamically interact with the power grid, curtail demand in response to price and congestion signals, and improve system resilience. As generation sources become more diverse and flexible, these buildings are better able to respond to these changes, ultimately limiting peak loads and yielding reliable grid services. Additionally, grid-interactive efficient buildings reduce energy costs and consumption for residents and businesses through optimal deployment of efficiency.

These buildings may have a blend of energy efficiency, energy storage, distributed energy generation, and load flexible technologies. Most significantly, smart controls allow for bidirectional energy flow between the building and the grid. By adopting enabling technologies, buildings can have a smoother energy load profile that delivers operational cost savings by being responsive to time-variable rate structures.

How states approach grid-interactive building policies varies and includes demand response mechanisms or regulatory incentives. Those working on integrated grid planning that recognizes the value of load flexibility and opportunities for grid-interactive buildings include California, Hawai'i, Minnesota, Nevada and New York.<sup>52</sup> As for demand response, in 2020, Massachusetts instituted the Clean Peak Standard, which requires certain clean energy resources and energy storage to meet peak demand. Eligible resources must generate or discharge energy during peak demand periods to earn credits.

## **3. Incorporating Net-Zero Technology through Energy Codes and Standards**

States can set energy performance thresholds for buildings or equipment by establishing energy codes and appliance and equipment efficiency standards. Codes are developed by a national or international code-making body that involves public and private sector experts. Governors can support the adoption of these codes and standards often through legislation or revised regulatory processes and, for buildings, support compliance enforcement in new construction and major building retrofits.

## **Building Energy Codes**

In 2020, approximately 40 percent of all U.S. energy consumption was from residential and commercial buildings.<sup>53</sup> States can achieve significant energy savings leveraging the latest construction technologies and methods by adopting and enforcing up-to-date energy codes. **California** recently adopted net-zero energy building codes, as every new residential build will require both renewable sources like rooftop solar panels and energy efficiency to ensure a net-zero energy impact. This is part of an emerging trend, some states have also started to adopt programs focused on the concept of net-zero buildings, which is defined as “an energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy.”<sup>54</sup>

Some Governors are taking unique approaches to building energy code adoption and enforcement. **New York** released *New Efficiency, New York*, which sets a statewide energy efficiency target and proposes a comprehensive energy efficiency initiative to help meet it. The plan outlines accelerating building energy codes, including the use of “stretch” codes that can overlay base energy codes to achieve greater energy savings, typically in the range of 10 to 20 percent.<sup>55</sup> The codes are a key component of the state’s comprehensive energy efficiency strategy; the overall energy efficiency plan is expected to meet one-third of the state’s GHG emissions reduction goals by 2025.<sup>56</sup> Additionally, former Governor Andrew Cuomo launched a \$30 million efficient building program to improve low-emitting building designs.<sup>57</sup> Enforcement is also necessary to ensure that states are adhering to their building energy codes. Various resources are available to states, including ones from the DOE, such as the Building Energy Codes Program.<sup>58</sup>

## **Appliance and Equipment Efficiency Standards**

Appliance and equipment efficiency standards set minimum energy performance levels for residential and commercial appliances and electronic equipment to which manufacturers and retailers must adhere. Generally, federal legislation has established appliance and commercial equipment standards which are promulgated through a U.S. Department of Energy rulemaking process. These standards are reviewed every seven years to maintain alignment with technological advances.<sup>59</sup> States can adopt more stringent efficiency standards that go beyond federal requirements and can establish or adopt standards where federal ones are absent.

**California** has been a national leader in this respect, establishing the first state-level efficiency standards in 1974. The state has since maintained and updated these standards. Fourteen states have established or currently maintain appliance and

equipment water and energy efficiency standards.<sup>60</sup> Appliance and equipment standards save households an average of \$321 annually in energy bills. With current standards, consumers and businesses will have saved \$2 trillion from energy bills by 2030.<sup>61</sup>

**Massachusetts** Governor Charlie Baker required regulators to develop new energy and water efficiency standards as part of new climate legislation. The legislation was part of an overall agreement to reduce emissions by 50 percent by 2030, furthering a trend of incorporating energy efficiency strategies into decarbonization plans.<sup>62</sup>

#### **4. Provide Regulatory Incentives to Support Utility Action on Energy Efficiency**

The utility sector plays a vital role in advancing energy efficiency, with many electric and gas utilities serving the role of program administrator, generally under the oversight of state utility regulators. However, typical utility business models, traditionally based on a “cost-of-service-plus” model that allows utilities to recover costs and earn a profit that is set by the PUC, favor capital investments in infrastructure and generation. Thus, utilities profit from greater energy sales, creating a deterrent for energy efficiency investments. Governors can encourage state regulators to support utility rate realignment strategies and alternative cost-recovery structures that remove disincentives or directly incentivize utility support for energy efficiency. These strategies are described below.

##### **Decoupling Utility Revenues from Electricity or Natural Gas Sales**

Revenue decoupling is a mechanism that separates utility profits from sales volumes, removing a disincentive for utilities to pursue energy efficiency. Decoupling involves three key design elements: (1) determining how to apply decoupling (to generation, transmission and distribution under traditional, vertically integrated markets as well as to transmission and distribution utilities in restructured markets); (2) deciding what sort of mechanism to use; and (3) setting the time intervals for collecting surcharges or processing revenues.<sup>63</sup> Currently, 24 states have enacted some version of a decoupling policy.<sup>64</sup>

##### **Providing Performance Incentives to Utilities that Meet Energy Efficiency Goals**

A focus for many states includes direct performance incentives, known as performance-based compensation or performance-based regulation, which allow utilities to earn a bonus amount for achieving certain goals. This can take one or more forms: an incentive tied to a share of the energy efficiency savings; an incentive based on achieving a set target; or an increased rate of return based on savings performance. As of 2020, 25 states offer a utility performance incentive.<sup>65</sup>

For example, utilities in **Georgia** can recover a higher rate on their investment for energy efficiency projects that meet certain criteria for energy savings. This amount is based on the energy savings of the project, granting utilities a percentage of a program's or project's energy cost savings, typically 8.5 percent, when the program or project achieves at least 50 percent energy savings. **Arizona** offers its utilities structured performance incentives for energy cost savings if they meet 85 percent of the state-set efficiency goals.<sup>66</sup>

An increasing number of states are considering ways to advance energy efficiency through broad utility reform initiatives.<sup>67</sup> In 2018, the Public Utilities Commission of **Ohio** released a roadmap called PowerForward Ohio. The roadmap promotes grid modernization efforts while focusing on innovative approaches that benefit ratepayers. The goal of PowerForward is to enable the grid to serve as an open, secure-access platform, which more companies other than traditional utilities could use to offer energy efficiency programs, provide energy management, or supply other services. PowerForward makes several recommendations including creating planning workgroups, having utilities propose time of use rate designs that could encourage greater energy efficiency investments, and utilizing energy data to enhance retail offerings.<sup>68</sup>

## **5. Establish Energy Efficiency Financing Pathways**

Governors can help consumers overcome the higher upfront costs of energy efficiency upgrades through support for legislation or regulations that establish financing mechanisms. The initial revenue from many current financing programs comes from a mix of public benefits funds—a fee on customer's utility bills to support energy efficiency upgrades—and other public policy objectives, green banks, or property assessment programs that may use bonds or support from traditional financing institutions.



Figure 2: Energy Efficiency Financing Programs

Financing Programs	What is it?	Examples
<b>Property-Assessed-Clean-Energy Financing (PACE)</b>	PACE is a financing mechanism that allows state and local governments to fund upfront costs for energy efficiency, renewable energy, and water conservation projects; these costs are paid back over 10 to 20 years on property tax bills. PACE can be used for commercial, residential and nonprofit facilities.	PACE legislation has passed in 37 states, with active programs in 26 states. <sup>69</sup> <b>Pennsylvania</b> Gov. Wolf signed commercial PACE legislation into law in 2018. The legislation created energy improvement districts to finance energy efficiency or renewable energy projects, to be paid by property taxes. <sup>70</sup>
<b>Energy Savings Performance Contracts (ESPCs)</b>	With ESPCs, a facility owner partners with an energy service company to implement energy conservation measures and facility retrofits. The energy service company is then repaid from resulting energy cost savings. <sup>71</sup>	In 2019, <b>Minnesota</b> Governor Tim Walz issued an executive order (EO-19-25) requiring state buildings to achieve 30 percent reductions in energy usage per square foot. The state will use its existing ESPC program to implement conservation measures. <sup>72</sup>
<b>On-Bill Repayment</b>	On-bill repayments, also referred to as on-bill financing, is a mechanism by which utilities cover a portion of the upfront costs of energy efficiency projects for their customers. Those costs are then paid back over time through a line item on that customer's monthly utility bill. As of 2021, there were 110 on-bill programs nationwide. <sup>73</sup>	<b>Hawai'i</b> launched an innovative on-bill financing program for renewable energy and energy efficiency retrofits in April 2019 called the Green Energy Money \$aver program for homeowners, renters, nonprofits, small businesses and multi-family rental projects. This program, which is administered outside of the utility by the state's Green Infrastructure Authority, ties the repayment obligation for energy improvements to the utility meter rather than an individual or organization. Approval is not based on applicant credit and the on-bill repayment obligation is transferable to the next owner or tenant. <sup>74</sup>
<b>Green Bonds</b>	Green bonds are a bond instrument that fund energy efficiency, clean energy and other sustainable projects. They may attract new investors and stronger demand for the bond, allowing issuers to raise capital, get better pricing or arrange longer repayment terms.	In 2013, <b>New York</b> issued \$24.3 million in residential energy efficiency financing revenue bonds for investments in residential buildings. In 2018 and 2019, the state-issued revenue bonds to fund solar installations as well as energy efficiency projects. <sup>75</sup>
<b>Green Banks</b>	Green Banks leverage public and private dollars to create low-cost, long-term financing to promote "green energy measures" such as energy efficiency projects and renewable projects.	<b>Connecticut</b> established the first state green bank in 2011. The bank invests in energy efficiency through multiple mechanisms, including a commercial PACE program for local businesses <sup>76</sup> and loans to multi-family housing. <sup>77</sup> The bank's successful approach has yielded \$6 of private investment for every public dollar, with more than \$1 billion in funding deployed. <sup>78</sup>



## 6. Educate Consumers and Businesses

Governors can leverage their platform to highlight opportunities for energy efficiency through public awareness campaigns, Governors' awards programs, or technical assistance.

### **Public Awareness Campaigns and Governors' Awards Programs**

Governors can direct public awareness campaigns to increase energy savings. **Utah's** Energy Action Plan released in 2018 includes core components aimed at increasing public engagement and awareness. The plan builds on previous plans issued by former Governor Gary Herbert that set an energy vision for the state. The key public awareness strategies include:

- Expanding education initiatives through scholarship programs at universities or teacher training at the Governor's Energy Summit;
- Organizing energy events such as the Governor's Energy Summit which brings together over 1,400 attendees to discuss sustainability priorities; and
- Increasing energy communications through press releases and advertising campaigns.<sup>79</sup>

Every year, **Idaho's** Governor recognizes leaders in energy efficiency. Awards are separated for buildings and industry, as well as one local leader. **Tennessee** offers energy education programs for state K-12 students. The programs include workshops that reached more than 2,000 students and educators in 2019, as well as camps that hosted more than 20,000 students and 120 educators. The programs are designed to teach energy literacy in topics such as energy efficiency, renewable energy and electricity generation.<sup>80</sup>

### **Technical Assistance**

The Energize **Connecticut** program offers technical assistance to remove barriers for customers' energy efficiency upgrades. The program is staffed with industry professionals and offers financial incentives that cover 40 percent of project costs, as well as low-rate financing, or "express rebates" for quick efficiency upgrades.<sup>81</sup> States also have access to resources through regional energy efficiency networks. The collaborative approach of the Southwest Industrial Energy Efficiency Network has been an effective knowledge-sharing platform in that area of the United States. It facilitated the **Colorado** Industrial Energy Challenge to encourage industrial companies to set energy efficiency goals. The Challenge offered technical assistance and public recognition from the state energy office. In 2017, 13 facilities applied for recognition and saved energy costs of \$1.7 million.<sup>82</sup>

## **7. Address Barriers for Low-Income and Rural Communities**

Rural energy consumers face a higher energy burden (the percent of their income spent on energy bills) compared to their urban counterparts.<sup>83</sup> States also face unique challenges in providing energy efficiency improvements to rural and agricultural customers. This is due to a variety of factors including that the infrastructure, energy access, and fuel mix are often more limited in rural areas. For example, rural households often use propane, oil and kerosene for heating since they typically lack access to lower-priced natural gas. Populations and housing are less dense, which can lead to higher costs associated with providing energy services (utilities have fewer customers per mile of power line). Additionally, there are other factors, such as state utility commissions, that often do not have the same oversight over municipal utilities or rural electric cooperatives that commissions have with investor-owned utilities.<sup>84</sup> On top of these barriers, the economic impact from COVID-19 has exacerbated conditions for those facing severe energy burdens.

### **Addressing Utility Arrearages**

The economic effects of the COVID-19 pandemic led to staggering numbers of customers behind on their utility bills and total arrearages. The National Energy Assistance Directors Association estimates that up to 20 percent of residential customers have late payments and there are \$32 billion in electric and gas utility arrearages as of the end of 2020.<sup>85</sup> Many states have allocated federal stimulus money toward reducing customer and utility debts.

Many states including **Kentucky, Michigan** and **New Mexico** used CARES Act funding for one-time assistance on energy bills.<sup>86</sup> States are also often not fully aware of those requiring assistance. To address this issue, **Illinois** and **Washington** have data-sharing agreements. Regulated utilities must submit disconnection information on utility customers in exchange for program assistance in these states. Governors can use their public platform to inform customers about existing bill payment assistance programs.

### **Targeting Rural or Agricultural Efficiency**

Governors can advance energy efficiency in rural and agricultural areas by encouraging legislators and state utility commissions to include municipal utilities and co-ops in energy efficiency resource standards or establish their own voluntary energy savings goals.

**Iowa's** Utilities Board requires co-ops and municipalities to set energy savings targets; however, the Board does not have oversight on these targets. **New Mexico's** Public Regulation Commission mandates co-ops to consider electricity efficiency targets, peak demand reduction goals, or other similar benchmarks, and requires the co-ops to annually report on their progress.<sup>87</sup>

Another way that Governors can advance rural energy efficiency programs is to directly address rural energy consumption and the unique needs of rural communities through their comprehensive state energy plans. In 2019, **Michigan** developed an Agriculture and Rural Communities Energy Roadmap. It highlighted how energy efficiency strategies typically exclude agricultural or rural areas and took a targeted approach to include these sectors.<sup>88</sup>

Agricultural efficiency is a critical priority for states as effective policies can improve efficiency across large, industrial-style farms. **Maryland** and **Massachusetts** are working with farmers through audits to identify energy savings opportunities. In Maryland, audits of 25 farms found significant electricity and propane savings that could reduce costs by \$115,000 annually for farmers. Massachusetts similarly undertook audits for 22 farmers targeted at lighting, which would reduce costs by \$350-900 annually in farms.<sup>89</sup> The **Florida** Office of Energy operates several agricultural efficiency programs to reduce energy consumption. In 2017, the office launched a statewide program offering energy audits and energy efficiency upgrades to agriculture producers. The program has conducted various energy audits and will reimburse farmers up to 80 percent or up to \$25,000 for making the recommended efficiency renovations.<sup>90</sup>

State programs are increasingly targeting efficiency improvements in the industrial sector due to its large potential for reductions. The industrial sector consumed more than one third of all energy in the U.S. in 2020.<sup>91</sup> Due to economies of scale, investing in industrial energy savings is cheaper than average energy efficiency measures, costing one cent per kWh less compared to aggregated average energy efficiency costs.<sup>92</sup> However, these programs are more difficult to design and implement due to a lack of standardized industrial measures. Governors can help prioritize the development of policies and programs to focus on achieving greater industrial energy savings.

## **8. Establishing Transportation Efficiency Targets**

The transportation sector contributes 28 percent of all greenhouse gas emissions, the largest source in the country. Many states have adopted vehicle electrification targets or pledged to reduce emissions from state fleets. States are beginning to have specific zero-emission vehicle targets for the transportation sector as part of broader energy plans.

### **Transportation Lead-by-Example**

Many states require some form of government fleet electrification or emissions reduction strategy. The **Colorado** Electric Vehicle Plan, pushed by Governor Jared Polis, called for 200 EVs in the state fleet by 2020, which utilized a procurement process leveraging

economies of scale. The state met its 2020 goal and is now requiring all state vehicles with an appropriate use case to be electric by 2030.<sup>93</sup> Additionally, **North Carolina** Gov. Cooper issued Executive Order 80 which, among many other strategies, required state agencies to prioritize ZEV purchases and develop a Motor Fleet ZEV Plan. The plan will track vehicle conversions and total vehicle miles traveled.<sup>94</sup>

In 2021, **Hawai'i** Governor David Ige signed into law Act 74 which set a goal for 100 percent of the state's light-duty passenger car fleet to be 100 percent ZEV by 2030; as soon as practicable but no later than 2030, all new light-duty multi-purpose passenger vehicles and trucks be ZEV; and the state's entire light-duty fleet to be ZEV by 2035. A contract allows state and county agencies to procure electric vehicles, supporting infrastructure, and services—without upfront capital investment—by bundling electric vehicle services, infrastructure and assets on a user fee basis (\$/mile).<sup>95,96</sup>

Beyond vehicle electrification strategies, states have also established fuel efficiency requirements for their state fleets. President Biden's Administration is planning to establish improved vehicle fuel economy standards.<sup>97</sup> Many states have preceded this action by setting fuel emission goals or fuel efficiency standards. **New Hampshire** set goals to reduce state fleet greenhouse gas emissions by 30 percent by 2030, based on a 2010 baseline.<sup>98</sup> **Vermont** requires its state fleet to be the most fuel-efficient vehicles in their respective class.<sup>99</sup> **Tennessee** has a state vehicles code, requiring 100 percent of passenger fleet purchases to be energy efficient. These requirements may be satisfied by purchasing hybrid, electric, flex, fuel-efficient (above 25 mpg), or other similar vehicles. The state also released a goal to have 200,000 electric vehicles on the road by 2028 and is currently working through a fleet electrification plan.<sup>100</sup>

### **Regional Collaboratives**

States are working to promote transportation electrification strategies either individually or through regional collaborations. Regional collaborations include:

- ZEV Task Force MOU – Nine original Governors signed MOU to commit to 3.3 million EVs on the road by 2025. Five additional Governors have signed onto the pledge, with many states increasing their EV commitments.<sup>101</sup>
- Transportation Climate Initiative (TCI) – Twelve states on the East Coast are working on pledges to build on the Regional Greenhouse Gas Initiative by putting a cap on transportation emissions and trading credits for vehicle electrification strategies.<sup>102</sup>
- REV West – Eight Governors signed a regional collaboration to create EV corridors across their intermountain western states.<sup>103</sup>

## What's Next for Energy Efficiency?

### Water-Energy Nexus

Energy and water are two critical and interconnected resources. Approximately 13 percent of U.S. energy is used to pump, treat, and deliver water to end-users.<sup>104</sup> At the same time, substantial amounts of water are used to extract, generate and transport energy as well as to cool some types of power plants. Electricity consumes four percent of water, largely due to evaporation and leaks.<sup>105</sup> The term “energy-water nexus” is used to capture the interdependencies of these two critical resources.

There are many opportunities to coordinate state water and energy policies to conserve limited resources. Integrating these policies can unlock benefits for both systems and achieve consumer cost savings. A starting point for states is to target water efficiency in appliance standards. **Colorado, Massachusetts, Hawai'i, New Jersey** and **Washington** adopted efficiency standards for faucets, showerheads and dishwashers among other products.<sup>106</sup> **Maryland** offers an energy-water infrastructure grant program that provides grants for local communities to incorporate energy efficiency in water infrastructure systems. The program has reported savings of 157,908 kWh annually.<sup>107</sup>

### Big Data, Connected Technologies, and Efficiency

As technology continues to advance, digital solutions, sensors, and analytics platforms are providing new opportunities to identify and address waste energy. Data centers are significant energy sinks, consuming one percent of the world's electricity. Additional key opportunities in connected technologies include:

- Providing real-time, web-based monitoring of energy use in public and commercial facilities;
- Leveraging low-cost analytics to enable greater demand response;
- Benchmarking commercial sector buildings to identify those facilities in greatest need of energy efficiency improvements; and
- Providing customers with the ability to access their integral energy consumption data and better understand their usage patterns.<sup>108</sup>

During the COVID-19 pandemic, workers relied extensively on information systems to ensure safe communication. It underscored the need for connected technologies, in addition to incorporating energy efficiency strategies within information systems. Incorporating technology from big data companies can enable states to further enhance their information technology energy efficiency. Governors seeking to enact efficiency

policies can keep up with technology advances and ensure their states are business friendly. Leveraging new data measurement strategies may enable access to more efficient technologies, as states will need to continue to stay ahead of the curve.

## **Corporate Commitments**

Fortune 500 companies are increasingly committing to sustainability goals. A quarter of these companies now have carbon neutral commitments, including both renewables deployment and energy efficiency strategies.<sup>109</sup> Google is one such company with these commitments, as it plans to be carbon neutral by 2030. It already purchases enough renewable credits to offset existing energy usage but is now working to reduce its overall emissions footprint. Energy efficiency remains a core focus for Google, which is implementing conservation measures to ensure its data centers are twice as energy efficient as typical data centers.<sup>110</sup>

## **Conclusion**

Energy efficiency offers Governors a chance to lead by example and capture cost savings, create jobs, reduce energy consumption, prevent pollution, and strengthen grid security. States must engage utilities to provide affordable rates and increase access to energy efficiency projects. As efforts to decarbonize continue to grow, Governors should consider making energy efficiency a core component of any energy plan.

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## **Authors**

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