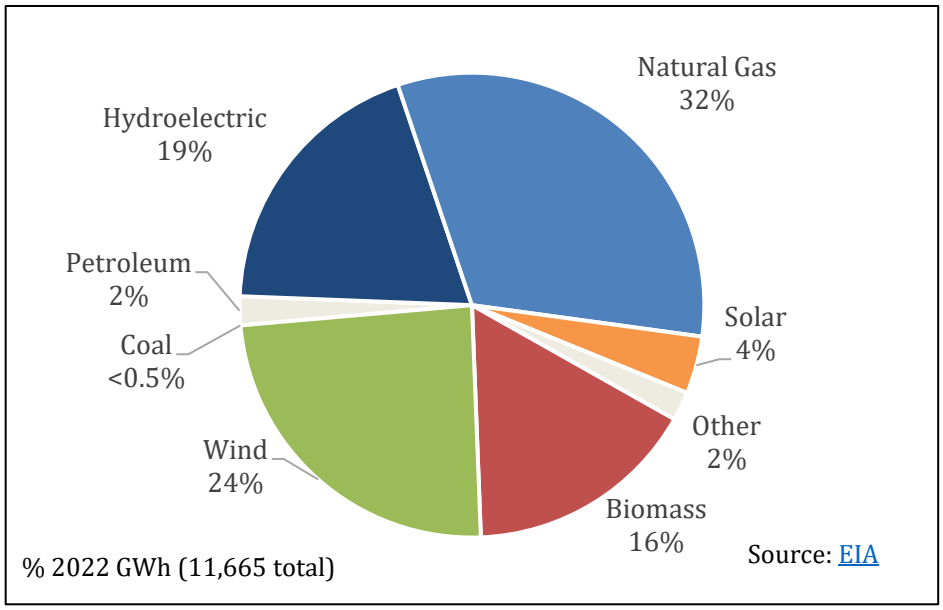
State Brief: Maine

BACKGROUND

Maine's Estimated Net Annual Electric Generation, 2022



Maine is a net-electricity importer. The state is somewhat reliant upon natural gas, which is imported via pipeline, mostly from Canada. In 2022, natural gas was the largest source of electricity generation in the state. However, Maine does not have widespread natural gas distribution infrastructure for residential heating, making the state the largest consumer of fuel oil for home heating.

Maine derives a significant portion of its electric generation mix from its considerable renewable resources. Maine has increased its wind generating capacity to in recent years, and leads New England in installed wind capacity. 24% of the state's electric generation comes from wind. The Maine Wind Energy Act of 2003 encourages development of wind energy in the state, and the legislature established goals of 3,000 megawatts (MW) of installed wind capacity by 2020 and 8,000 MW by 2030. However, with 1,031 MW of installed capacity, the state lags behind these goals. In 2019, Governor Mills launched the Maine Offshore Wind Initiative to explore offshore wind development in the Gulf of Maine. In 2023, the Initiative released the Maine Offshore Wind Roadmap, which provides strategies and recommendations for supporting the development of offshore wind and the offshore wind industry in the state. The state also has significant hydroelectric and ocean energy potential. The Pine Tree State is the second largest producer of electricity from biomass resources, behind Vermont. The Solar Energy Industries Association (SEIA) ranks the state 30th in the country in terms of installed solar capacity (722 MW) and 36th for projected growth over the next five years (1,209 MW expected).

The 2023 U.S. Energy and Employment Report found that in 2022, Maine had an estimated 25,658 energy workers (4% of total state employment), which includes 8,684 workers employed in energy efficiency. In a 2022 report, Maine ranked 43rd nationally for clean energy jobs, with approximately 12,493 workers employed by the industry.

The state's electric and natural gas utilities are regulated by the three-member Maine Public Utilities Commission (MPUC). Commissioners are appointed by the Governor, who also selects the chair. Maine is under unified democratic control. Governor Janet Mills was elected in 2018 and democratic majorities control both chambers of the state legislature.

POLICY STRENGTHS AND OPPORTUNITIES

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[1] an important framework for policymakers to consider. The basic idea behind policy stacking is that there is an interdependency and sequencing of state policy that, when done effectively, can yield greater market certainty, private sector investment, and likelihood of achieving stated public policy objectives.

[1] V.A. Krasko and E. Doris, *National Renewable Energy Laboratory*, 2012. Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions. http://www.nrel.gov/docs/fy13osti/56428.pdf.

In theory, but not always in practice, clean energy policies can be categorized into one of three tiers of the policy stack. Tier 1, market preparation policies, remove technical, legal, regulatory, and infrastructure-related barriers to clean energy technology adoption. Tier 2, market creation policies, create a market and/or signal state support for clean energy technologies. Tier 3, market expansion policies, create incentives and other programs to expand an existing clean energy market by encouraging or facilitating technology uptake by additional market participants.

For example, before financial incentives for combined heat and power (CHP) will be successful, two key considerations for deployment are having clear interconnection standards and favorable stand-by rates for customers who opt to add CHP. In this example, states should adopt policies to address interconnection and stand-by rates before adopting financial incentive programs.

INVESTING IN THE WORKFORCE

In 2022, there were nearly 3.1 million net-zero aligned jobs in the U.S., comprising over 40% of total energy jobs. However, a lack of qualified candidates across occupations and education levels could impede states' abilities to modernize their grids and deploy clean energy resources. To ensure that the workforce can meet industry demand, policymakers can consider several policies to educate and train qualified candidates. This can simultaneously enhance industry employment and provide economic opportunity to individuals and local communities.

Governor Mills has established a goal of doubling Maine's clean energy and energy efficiency jobs by 2030. In furtherance of that goal, the Clean Energy Partnership was established. The Partnership will promote public-private collaboration to address growing workforce needs, support and build supply chains, and promote opportunities for clean energy in the state. Maine has also released the 2022 Maine Clean Energy Workforce Analysis Report.

The policies states can explore to address workforce development include:

1. **Incentive Programs –** States can attract new workers to the field by providing financial and other incentives to students who pursue education in specified trades or in the science, technology, engineering, and math (STEM) fields. States might require that graduating students remain and work in the state for a given time to remain eligible for the incentive. In conjunction with this, states might also provide economic development incentives to companies employing students with training in specified STEM and trades fields. To ensure safety in the workplace, states can adopt programs that will cover the costs of OSHA training.

   Initiatives to improve access to broadband and public transportation in underserved communities can boost access to educational and employment opportunities.

2. **Education and Continuing Education –** Existing electrician training and mentorship programs can be expanded to encourage more young people to enter the industry. Policymakers can direct public colleges and universities, with input from industry, offices of economic and workforce development, and other interested parties, to create new trades and STEM programs. This could include the development of "green" credentialing programs. States can also provide financial resources to organizations that educate or retrain students in STEM and trades professions.

   For the state's existing energy workforce, policymakers might direct state departments of workforce services or their equivalent to work with utilities and other interested parties to develop continuing education and training programs for existing utility employees to remain in their field or to transition to a new role. Incentive programs might also be developed for employers that design roles that include ongoing skills development and continuous learning to help keep pace with evolving roles.

3. **Establishing an Office of Workforce Development –** States might also consider establishing a dedicated workforce development office. In some states, these have been established to specifically address training needs in energy transition communities.

The Interstate Renewable Energy Council (IREC) developed a set of Career Maps to demonstrate the various types of careers offered in the clean energy industry. The Green Buildings Career Map, the Solar Career Map, and the HVAC/R Map are helpful tools for anyone from job seekers and employers to policymakers looking to explore the employment opportunities presented by the industry. IREC also created a Registered Apprentices Toolkit for Clean Energy Employers, which provides information about and resources for implementing Registered Apprenticeship Programs (RAPs) to spur the development of a clean energy workforce.

MODERNIZING UTILITIES AND EMPOWERING CONSUMERS

The electric grid is a complex system of generation, transmission, and distribution. Aging infrastructure and emerging technologies are forcing the grid to modernize to keep pace with historic and emerging expectations. Grid modernization encompasses a broad range of actions intended to make the electrical system more resilient, interactive, and capable of meeting current and future demand.

The transition to a digital economy requires affordable, sustainable, and reliable electricity and creates challenges and opportunities for grid management. Emerging physical and cybersecurity threats and increased demand for faster outage response times require, at minimum, real-time incident tracking and response capabilities. Increased grid penetration of distributed energy resources (DERs) such as renewable energy coupled with increasing adoption of energy efficiency, energy storage, microgrids, and other technologies will provide economic benefits, increase security, and ensure more reliable, resilient, and clean energy. Utility-scale renewable energy may require expanded transmission capabilities. As adoption of these innovations increases, so too will the need for modern grid technology to strengthen the grid, the implementation of which will require substantial planning and investment by states and utilities.

By allowing a two-way flow of information between the electric grid and grid operators and between utilities and their customers, new technologies enable utilities to better manage the grid and provide opportunities for consumers to customize their services to fit their priorities and to reduce their electric bills. By enabling better tracking and management of resources, emerging technologies improve system reliability and resiliency. These technologies also allow grid operators to incorporate central and distributed energy resources, energy storage technologies, and electric vehicles (EVs). This all assists in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency.

On the customer's side of the meter, dynamic pricing, advanced metering infrastructure (AMI), and other technologies allow a more dynamic exchange of information and electricity between a consumer and their electric provider. Grid modernization is associated with greater consumer choice by allowing customers to meet their energy priorities by producing and storing their own energy or through contracting for innovative clean energy services from different providers.

Grid modernization will require a suite of policy changes to support advancements in grid technologies, grid management, and utility regulation.

Maine's state legislature passed the Smart Grid Policy Act in 2010, which established a framework for developing a comprehensive grid modernization policy and articulated a suite of policy goals, including improved reliability, security, and efficiency of the power system, integration of renewable generation and energy storage, and availability of energy usage data. The 2015 State Energy Plan recommended taking action to reduce residential energy bills, limit greenhouse gas (GHG) emissions, and streamline renewable energy policies. Many of these recommendations were addressed in the 2019 legislative session, which focused heavily on climate and clean energy policies. Senate Paper 697, enacted in 2022, directs the MPUC to set minimum performance standards for utilities serving more than 50,000 customers in the state. The Act also requires utilities to develop and submit, to the MPUC, integrated grid plans to improve system reliability and resiliency and to promote the state's greenhouse gas reduction goals and climate policies. The law further requires the MPUC to initiate collaborative proceedings every five years to identify priorities for utilities' grid plans and requires that utilities consider energy storage in their integrated grid planning.

The Infrastructure Investment and Jobs Act of 2021 (IIJA) is a landmark federal spending bill that includes funding earmarked for grid modernization projects. This includes $11 billion for Department of Energy (DOE) grants directed specifically towards electric infrastructure resiliency projects (including grid hardening against severe weather and cybersecurity improvements), $2.5 billion for transmission development, and $3 billion for the Smart Grid Investment Matching Grant Program.[2] Enacted August 2022, the Inflation Reduction Act (IRA) set aside $2 billion for loans for constructing new high-capacity transmission lines and upgrading interties. The bill includes funding for technical assistance and grants for states and tribal governments, which includes assistance for siting

[2] For more information on the grid-related earmarks included in the IIJA, see Potomac Law Group's January 2022 analysis: "The Infrastructure, Investment & Jobs Act of 2021: What's in It for You? (Part V: Grid Infrastructure and Resiliency)." Available: https://www.potomaclaw.com/news-Infrastructure-Investment-Jobs-Act-of-2021-Whats-In-It-For-You-Part-V-Grid-Infrastructure-and-Resiliency.

transmission projects. The bill also directs DOE to undertake interregional transmission planning, modeling, and analysis, including analysis of transmission for offshore wind and the use of grid-enhancing technologies (GETs).[3]

There are policies that Maine's policymakers could adopt to support in-state modernization efforts.

1. Require that utilities develop plans to enhance cybersecurity and measure and report on the results of grid modernization efforts.

2. States might also provide incentives or cost recovery mechanisms for utilities that meet grid modernization goals.

3. Maine, a state with extensive deployment of smart meters, has established policy regarding customer data access and privacy protections. The state requires that utilities make customer usage data available to individual customers, and the independent organization Efficiency Maine has statutory authority to request energy use data for the implementation of energy efficiency programs. Third party organizations have limited ability to use customer data, but the state's largest IOU, Central Maine Power, has implemented the Green Button Connect program, a platform for downloading and sharing energy use data to approved third parties. The state could extend customer data access requirements to include all utilities and ensure that the statute or code clarifies who owns the energy data associated with customer energy usage, protects customer privacy, outlines the process for allowing direct access to data by third parties, and promotes access to the highest resolution of data possible. Enacted in 2019, House Paper 425 directs investor-owned utilities to provide comparative customer usage data on billing statements.

The adoption of incentives for or a requirement to integrate a certain amount of renewable energy and energy storage on the grid alongside enhanced building energy standards and electric vehicle policies can support grid modernization efforts.

MAINSTREAMING RENEWABLES

Renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). With increased deployment, utilities are learning more about how to integrate renewables effectively, investors are becoming more comfortable with the technologies, and building code officials are recognizing common standards and best practices for integrating distributed renewable energy resources. In the U.S., the expansion of renewable energy has been one of the most consequential shifts in electricity generation over the last decade. According to the EIA, renewable energy generation surpassed coal and nuclear generation in 2022, and more than half of all new generation capacity in 2023 is expected to be solar. As of 2022, there were more than 470,000 jobs in the wind and solar industry. Accordingly, it is in the interest of policymakers to ensure that their states are well positioned to benefit from this shift.

While the IIJA doesn't provide money for specific renewable energy projects, the funding in the Act will benefit renewable energy development as grid resiliency, increased deployment of energy storage, and modernized transmission are all essential to the successful integration of renewable energy generation. The IRA appropriated $369 billion to fund a variety of energy and climate initiatives – the largest climate investment in U.S. history. The bill also extended the investment tax credit (ITC) and the production tax credit (PTC) through the end of 2024 and revived the PTC for solar projects. For projects placed in service in 2025, the bill "effectively extended" the ITC and PTC by creating new tax credits for zero emission facilities. The bill also extended the residential energy property tax credit through 2034 and created a new advanced manufacturing production credit, to apply to sales of components for constructing wind and solar energy facilities beginning in 2023.[4]

The IRA also includes several provisions related to energy equity, including $3 billion to the Environmental Protection Agency (EPA) for grants for community-led projects in disadvantaged communities and $27 billion for nonprofit, state, and local climate finance institutions supporting the deployment of low- and zero-emission

[3] J. Runyon and J. Engel. 2022. "The Inflation Reduction Act is Signed into Law." *PowerGrid International*. 16 August. Available: https://www.power-grid.com/td/the-inflation-reduction-act-is-signed-into-law/#gref.

[4] For a detailed discussion of the IRA's tax provisions, see: A.S. Levin-Nussbaum. 2022. "Update: President Biden Signs Historic Legislation Providing Expansive Clean Energy Tax Incentives." *The National Law Review*. 17 August. Available: https://www.natlawreview.com/article/update-president-biden-signs-historic-legislation-providing-expansive-clean-energy.

technologies. In support of rural communities, the bill also includes a $1 billion appropriation to the U.S. Department of Agriculture (USDA) for loans to finance renewable energy projects, $1 billion for USDA's Rural Energy for America Programs, and $9.7 billion to USDA to finance rural electric cooperatives' purchases of renewable energy.

To reduce barriers to customer and utility participation in the renewable energy market, and to build upon the federal initiatives, policymakers in Maine might consider several options.

Customer-Oriented Policies

1. **Interconnection, Net Energy Metering (NEM), and Streamlined Permitting** – In general, customers want a clear, streamlined, affordable, and predictable system for connecting renewable energy systems to the grid. Enacted in 2019, House Paper 77 amended the state's net energy billing policy to provide a kWh credit for excess electricity sent back to the grid. Any credits remaining at the end of a 12-month period expire. Policymakers might consider crediting excess generation at the full retail rate and/or allowing carryforward of excess generation. The state might also consider establishing either statewide standards for streamlined permitting processes, or resources to support local governments that voluntarily implement a streamlined program. In May 2021, NREL launched the SolarAPP+, an online platform designed to automate the solar permitting process. By running compliance checks and processing permit approvals, the service is intended to drastically reduce permit wait times. Currently restricted to rooftop solar, thirty-two communities in five states have adopted the platform, processing over 15,000 permits for more than 100 MW of generation with an estimated 15,000 hours saved in permit review time.

2. **Shared Renewables** – Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies where they live or work. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the project or the generation provided by the system. Maine adopted virtual net metering in 2019 under their net energy billing policy to enable shared ownership of renewable facilities. Virtual net metering allows a customer to receive credits from a shared system as if the generation were on site. Virtual net metering is different from a power purchase agreement (PPA), which pays the customer for the proportion of power they produce. Because it is treated as a credit on the customer's bill, the customer can avoid the tax implications of a PPA payment - which can adversely affect the economics of the system (and may come as a surprise to the participant). Maine requires that the MPUC procure 250 MW of the output of shared renewable projects.

   Low credit ratings often deter participation in renewable energy markets; this can affect low- and moderate-income (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to encourage participation by LMI households; this can increase adoption of renewable technologies and reduce energy costs. Low-income participation can be encouraged either through a percentage mandate for the overall annual contracted capacity, as Maine has done, or by offering a higher rate of payment for the portion of shared solar capacity attributed to low-income customers. States that have a shared renewables program may want to coordinate this program with implementation of the federal Weatherization Assistance Program (WAP) to provide recipients of assistance with access to participation in a shared system.

3. **Adapt Energy Assistance Programs** – Programs such as the Low-Income Home Energy Assistance Program (LIHEAP) and WAP provide assistance for paying utility bills and reducing household energy costs. Including distributed energy resources as eligible for funding under these programs can reduce energy costs and increase energy security for those LMI families who are able to benefit from WAP and LIHEAP. Colorado, for example, includes rooftop solar in their WAP program. For approval to add solar to a state's implementation of WAP, a state must show that the investment would be cost-effective – achieving a Savings to Investment Ratio (SIR) of 1.0 or more.[5] Since 2015, Maine has received $27.1 million from WAP and $3.9 million from the State Energy Program (SEP) which has helped to fund a number of energy initiatives in the state.

[5] For guidance on the state approval process, see WAP Memorandum 024 (2017), the Solar Template for Incorporating Solar Photovoltaics into WAP, and the Preliminary Assessment Guide for Integrating Renewable Energy into Weatherization (2019).

4. **Fund Distributed Generation (DG) for Community Organizations** – Organizations or groups that provide support services for LMI communities can be provided funding to install solar or other distributed energy resources. Sites such as homeless shelters, food banks, clinics, and community centers often have enough rooftop area for solar installations. After installation, these resources can reduce an organization's utility bills, freeing up funds for other activities that support the community. Maine's carve-out in its shared renewables policy includes subscriptions by organizations serving low-income households.

5. **On-Bill Financing/Pay As You Save (PAYS)** – On-bill Financing and Repayment programs enable consumers to invest in energy upgrades with no upfront payment. The utility or a third party will pay the initial costs to install the upgrade with the cost of that upgrade recovered through the utility bill. Because repayment includes consideration of the cost savings resulting from the energy upgrade, customers can see monetary benefits almost immediately. Once equipment costs are recovered, the equipment belongs to the customer. State policies that reduce lending risk by creating a loan loss reserve and/or a credit enhancement fund can encourage lending to customers that might otherwise not qualify for a loan and can keep interest rates low.

6. **Corporate Procurement** – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Since 2014, over 70 gigawatts (GW) of renewable energy has been procured by corporate entities. In the first half of 2022, corporations entered contracts for 21 GW. This is leading policymakers to provide additional avenues for businesses to procure renewable energy. Maine's policy allows companies to own shares in shared renewable projects, develop or lease onsite renewable energy projects, purchase green energy through their utilities, access competitive wholesale markets, and allows for retail choice. Policymakers might also consider explicitly incorporating corporate renewable procurement targets into utilities' integrated grid planning process. By integrating these renewable purchase commitments into this process, utilities can avoid over-building resources and stranding generation assets.

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas (GHG) emissions and increase investments in clean energy resources. Utilities are also setting their own GHG reduction goals and are increasingly investing in clean energy resources. Maine's original RPS was adopted in 1997 as a part of the state's electricity restructuring law and has been amended over time to account for different classes of renewable resource types. The state adopted new portfolio standards in 2019 as part of Governor Mill's rigorous clean energy agenda. Senate Paper 457 requires 100% of retail electricity sales to be from renewable resources by 2050 and establishes an interim target of 80% renewables by 2030.

In 2019, policymakers in Maine adopted GHG emissions reductions targets of 45% below 1990 levels by 2030 and 80% below 1990 levels by 2050 (Senate Paper 550). Maine is a member of the Regional Greenhouse Gas Initiative (RGGI), an emissions trading scheme that reduces the region's carbon emissions and incentivizes the development of energy efficiency measures and renewable energy projects. Efficiency Maine Trust directs revenue from carbon credit auctions toward energy efficiency investments and carbon reduction programs. House Paper 1142, enacted in the 2018 session, updated the state's carbon allowance budget by requiring that the state's carbon budget decline by 2.5% of the 2014 base year budget. Avangrid has set a goal to reach carbon neutrality by 2030.

1. **Transmission Development Policies** – Renewable energy resources rely heavily on robust transmission networks that connect generation to demand. For states within regional transmission organizations (RTOs), state governments can fund utility commission and energy office engagement in RTO processes, and generally support transmission build-out through these channels. In non-RTO states or single-state RTOs like New York and California, one successful model has been the creation of a state transmission authority, which handles state transmission planning in cooperation with incumbent utilities. New Mexico's Renewable Energy Transmission Authority provides an instructive example – it informs transmission investments to push forward key transmission projects that achieve the state's clean energy goals cost-effectively.

2. **Competitive Procurement Requirements** – Senate Paper 457 requires the MPUC to direct the procurement of renewable energy and energy storage needed to meet the state's goals. A best practice is "all-source procurement," a process that allows all resources to compete to fill a system need identified by the utility. Policymakers in Maine might consider revisiting planning and procurement rules and asking whether the current process results in policy-aligned procurement.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while also maximizing the value of grid resources. By deploying storage to strategic locations, utilities can more effectively manage their energy portfolios. First, storage allows utilities to manage intermittent demand – helping reduce peak demand requirements. Because the generation resources that provide peak power are the system's most expensive, reducing peak demand can save consumers money. Second, the responsiveness of energy storage can allow utilities to implement voltage regulation and other ancillary services, which improve system efficiency. Third, because storage technologies can both store and dispatch power, storage enables better integration of intermittent power generation resources, like wind and solar, to the grid.

The flexibility of battery storage combined with advanced metering infrastructure can allow customers to control how and when they use energy from the grid or from solar panels installed on their home or business. In most cases, this can provide greater cost savings than standalone solar systems. Combined with time-varying rates or real-time pricing programs, state policy can further support customer choice and open a new market for energy services. Prices that better reflect the time-varying and location-dependent costs of producing and delivering electricity can also lead to a number of economic and environmental gains.

Energy storage can also help the commercial sector avoid demand charges, which establish an incremental cost above energy usage based on the highest period (highest 15 minutes, for example) of demand during the month. Eliminating spikes in demand with storage can reduce these costly charges for businesses. As utilities around the country consider implementing or extending demand charges to other sectors, energy storage will become more relevant as both a customer cost-saving investment and a system efficiency measure.

Declining costs and technological advancements in battery storage have contributed to increased deployment. The EIA expects total battery storage deployment to nearly triple from 7.8 GW in 2022 to 30 GW in 2025. State policies can further encourage this by establishing both a framework for easy integration of energy storage resources onto the grid and a marketplace that monetizes the benefits of energy storage for cost-effective investment.

Maine is exploring methods to expand the deployment of energy storage. Enacted in the 2019 regular session, House Paper 1166 created a legislative commission to study the economic, environmental, and energy benefits of energy storage. Furthermore, pursuant to the Smart Grid Policy Act, the MPUC opened a docket in 2016 on the development of a non-transmission alternative corridor, which would incorporate the "deployment and development of advanced electricity storage and peak shaving technologies." The docket was closed in 2018, and the MPUC ordered Central Maine Power and Emera Maine to file rate proposals that would examine "wires and non-wires solutions on an equal footing from a rate-making perspective." Enacted in 2021, Senate Paper 213 sets an energy storage target of 300 MW of installed capacity by 2025 and 400 MW by 2030. The bill also instructs the Efficiency Maine Trust to conduct an energy storage pilot program to begin in 2022. The pilot program will provide energy storage systems to critical care facilities to support operations during outages and emergencies.

The IIJA provides a unique opportunity for funding energy storage projects. The IIJA provides $505 million for grants to support energy storage demonstration projects, more than $7 billion for building out the U.S. battery supply chain, and $14 billion for grid resilience programs that include energy storage as a qualified technology. The IRA extended the ITC to include standalone energy storage systems. When the ITC is replaced by the technology neutral Clean Electricity Investment Tax Credit (CEITC) in 2025, qualified storage facilities placed in service after 2024 will remain eligible. The advanced manufacturing production credit will apply to battery cells and modules and the critical minerals used in their production. The $27 billion GHG Reduction Fund, also established by the bill, will provide funding enabling low-income or disadvantaged communities to adopt zero-emission technologies including energy storage.

There are several policy opportunities to take advantage of the growing technological advances in and declining costs of energy storage and build upon recent federal initiatives. The recommendations here draw heavily from the Interstate Renewable Energy Council's (IREC) 2017 report, "Charging Ahead – An Energy Storage Guide for Policymakers." Policymakers in Maine could consider the following:

1. Amend existing interconnection and net metering policies to ensure that storage can connect to the grid through a transparent and simple process. IREC has produced a series of protocols that states can adopt. States can

establish best practices for interconnection and net metering in statute, or legislation can provide an instruction to the utilities commission to implement these best practices.

2. Instruct the utilities commission to evaluate the value of energy storage in multiple strategic locations across the utility system and consider a requirement to deploy storage where it is cost-effective or identify the price point at which it will be cost-effective. Ensure that cost-effectiveness calculations include all of the benefits storage can deliver to the system, including frequency regulation and avoided investments in new infrastructure.

3. Finance and incentivize energy storage for customers and utilities. Incentives could enable customers to use storage to manage their electric load and store locally produced renewable energy. Incentives in the form of rebates, grants, and tax credits can provide a bridge to scalable deployment for storage. Incentives can be designed to decline as storage values become more readily monetized and/or as the cost of storage decreases. Policymakers could allow utilities that provide incentives to customers to recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This should signal to customers the value of leveraging storage while better aligning customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might want to start first with a policy that provides grants to pilot projects. Policy might also target solar system owners. Financial incentives should be designed to ensure that the state will meet other goals including emissions and peak demand reductions, and equitable access to clean energy.

4. Clear data access policies that allow third parties to provide energy management services based on signals from the utility can greatly increase the value of efforts to monetize the value stream offered by energy storage. State policy should include measures to protect customer data, while also encouraging the use of this information to facilitate additional improvements to grid management and customer services. To address this, policymakers can develop legislation or rules that clarify who owns the energy data associated with customer energy usage; protect customer privacy; outline the process for allowing direct access to data by third parties; and promote access to the highest resolution of data possible.

5. Consider taking advantage of the "direct pay" option available to state and local governments for energy storage investment tax credits (ITC) available in the IRA. The direct pay option allows states (or other qualified entities without tax obligations) to be directly refunded a 30% ITC from the federal government after the project is online. The IRA also allows for up to a 70% credit for projects that incorporate domestic components, serve low-moderate income communities, and/or are located in energy communities.

THE BUILT ENVIRONMENT

In the U.S., buildings consume nearly 40% of total energy used.[6] Because it reduces energy demand and emissions and creates savings for utility customers, energy efficiency[7] often plays a prominent role in state energy and climate policies. Coupled with beneficial electrification, which involves replacing direct fossil fuel use with electricity, there is even greater potential to reduce energy costs and pollution, and provide more resilient, comfortable, and healthy buildings. This is especially the case in states where increasing levels of low carbon resources are supplying the electric grid. When policies are adopted to shift energy sources for such things as space and water heating, to highly efficient electric alternatives, states can maximize achieving the dual objectives of increased energy efficiency and reduced emissions. In some cases, this can also result in lower energy costs.

The American Council for an Energy Efficient Economy (ACEEE) publishes a State Energy Efficiency Scorecard that evaluates states' energy efficiency programs and policies in six policy areas, focusing on equity and policies that assist low-income and disadvantaged households. Maine is ranked 5th in the 2022 report. In addition to its Energy Efficiency Scorecard, ACEEE tracks how states are incorporating equity into their energy efficiency and clean energy programs and policies. The Efficiency Maine Trust (EMT) has focused on increasing engagement with LMI customers with increased outreach and incentives. EMT has also increased outreach to small businesses. Recent EMT program budgets set aside certain allocations to be used to support LMI programs. Maine's climate plan establishes a goal of 15,000 heat pumps installed in income-eligible households and recommends doubling the pace of weatherization in the state. Efficiency Maine has established a training program to support heat pump installation.

[6] For additional information, see ACEEE Building Policies and Codes.

[7] Energy efficiency includes a multitude of measures to reduce energy consumption. These measures range from behavioral changes to installing energy efficient appliances to full building renovations, including updating a building's envelope.

Maine has taken several steps to incorporate energy efficiency and beneficial electrification into its built environment. A third-party administrator, Efficiency Maine, implements energy efficiency programs in the state. Maine allows state agencies to enter into energy savings performance contracts (ESPCs). In 2019, the Maine Legislature adopted updated building codes, requiring that the Maine Uniform Building and Energy Code (MUBEC) be updated to the 2015 International Energy Conservation Code (IECC), that the code be subsequently kept up to date with the latest version of the IECC, and that all municipalities, regardless of size, adopt the MUBEC. Enacted in 2019, House Paper 1071 required Efficiency Maine to conduct a study assessing barriers in the state to beneficial electrification in the transportation and heating sectors. Also enacted in 2019, Senate Paper 597 established funding to meet a goal of installing 100,000 high-performance heat pumps to reduce the state's reliance on heating oil in homes. The state recently surpassed that goal, two years ahead of schedule. In 2021, House Paper 696 established appliance efficiency standards for a suite of products. In 2022, House Paper 1227 set new efficiency standards for projects funded by the Maine State Housing Authority and House Paper 1159 established a trust for financing energy efficiency improvements and GHG emissions reduction measures for energy-intensive businesses. Enacted in 2023, House Paper 696 requires Efficiency Maine to develop a home energy scoring system for residential properties. The MPUC is authorized to adopt decoupling and incentive mechanisms for utilities.

The IIJA provides $500 million for grants to fund energy efficiency and renewable energy upgrades in public schools, $3.5 billion for the Weatherization Assistance Program, and increases funding for the Energy Efficiency and Conservation Block Grant program by $550 million and the State Energy Program by $500 million. The IRA appropriates $4.3 billion to DOE for an energy efficiency rebate program that will be administered through state energy offices. Another $4.3 billion appropriation will fund electrification rebates for single- and multi-family homes. The bill also extends the tax credits for residential energy efficiency improvements and new efficient home construction and increases the maximum deduction for energy efficient commercial buildings. A $837.5 million appropriation will be used by the Department of Housing and Urban Development (HUD) for resiliency, energy efficiency, renewable energy, and grid integration projects at public housing units.

Policymakers in Maine can consider a variety of policies to encourage energy efficiency and beneficial electrification:

Energy Efficiency Policies

1. **Building Codes** – The DOE projects that, over time, improvements in building codes can have the greatest single impact on energy efficiency within the built environment. On average, commercial buildings waste 30% of energy used.[8] Because buildings will be around for generations, energy efficiency within the built environment is a matter of statewide and long-term importance. States can set requirements for energy systems, require statements of energy use, and set performance standards for energy use or emissions. Building codes can be required by state legislation or implemented through 'home rule', where local governments set their own standards or adopt more strict building codes than those mandated by the state. In 2019, changes to the Maine residential and commercial building codes established a stretch code that can be adopted by municipalities.

   The IIJA includes a $225 million appropriation for a competitive grant program to support the "sustained cost-effective implementation of updated building energy codes." The grant program will run for five years, through fiscal years 2022 – 2026. In December 2022, DOE issued the Resilient and Efficient Codes Implementation Funding Opportunity Announcement to support the adoption of updated building energy codes. Approximately $45 million is available for this competitive grant program. The program requires the participation of a "relevant state agency" and projects must be tied to "an updated building energy code."

2. **Low-Income Energy Efficiency Programs** – While equity should be incorporated into all policy development, it is often necessary to ensure that specific programs are targeted towards historically underserved populations. Recent research suggests that weatherization improvements can reduce energy use by 25-35%, allowing households to reduce their financial energy burden. The federal WAP program provides energy efficiency upgrades for income qualified homeowners. However, there might be difficulty in reaching individuals who are eligible. Policymakers might require outreach and education programs targeted at eligible groups.

[8] For more information, see the Office of Energy Efficiency & Renewable Energy's Commercial Buildings Integration (CBI) Program.

Maine's Home Energy Assistance Program (HEAP) offers assistance with energy bill payments and energy-related repairs.

3. **Energy Efficiency Resource Standards (EERS)** – EERSs require utilities to demonstrate a reduction in energy demand from programs offered to their consumers. Because this means selling less energy and reducing revenues, there is not always an incentive for the utility to make their consumers more productive or efficient users of energy. If legislatures want to ensure a more productive and efficient energy distribution system that takes advantage of the latest technological innovations, they may want to require that a utility demonstrate a percent reduction in demand through efficiency or "demand side" programs. Legislators can also instruct their utility commissions to consider energy efficiency when approving rate cases by allowing cost-recovery of energy efficiency improvements through utility bills.

   Maine's EERS was updated in the first special session of the 2021 session to reflect the state's goals of "achieving the maximum achievable cost-effective electricity and natural gas program savings" (rather than percentage-based targets), weatherizing 35,000 homes and buildings, and installing at least 115,000 heat pumps in homes.

4. **Revenue Decoupling and Performance-Based Incentives** – Utilities earn revenue by selling energy. As a result, there is little to no incentive for them to promote energy efficiency because it leads to a reduction in sales, and therefore a reduction in revenue. Revenue decoupling disconnects revenue from the amount of energy sold. This provides utilities with a set amount of revenue regardless of the amount of energy sold. While this does not directly incentivize energy efficiency, it does remove the inherent disincentive to promote energy efficiency.

   Incentive policies can be layered on top of a decoupling policy. For example, if a utility meets set energy reduction targets, then performance-based incentives can provide monetary rewards for meeting those targets. While Maine allows decoupling, as noted above, as the energy mix changes, it is important to incorporate a regular review of decoupling and other incentive policies to ensure they are still meeting their intended purpose.

Electrification Policies

1. **Strategically Target Beneficial Electrification –** Target areas of beneficial electrification in buildings include space and water heating systems and other systems and appliances that typically use natural gas or another fossil fuel as an energy source. According to the Environment and Energy Study Institute, new electric heat pump technology can heat space and water at efficiencies of 200 to 300 percent, compared to 67 percent efficiency in typical Energy Star gas water heaters.[9] This not only allows savings on energy bills, but it also results in reduced GHG emissions and improved indoor air quality. As discussed above, Maine is actively promoting the adoption of heat pump technologies.

2. **Adopt Tools for Advancing Electrification –** Building codes and financial incentive programs can be used to advance beneficial electrification. While in some states, local governments are primarily responsible for adopting and implementing building energy codes, in other states, a state legislature, or a code commission tasked by the legislature, adopts and implements statewide standards. Incentive programs established and implemented by states, local governments, or utilities can target replacing systems and appliances that traditionally rely on fossil fuel resources with high efficiency electric systems and appliances including water heaters, furnaces, ovens, and ranges. As an example, heat pump water heaters and space heating systems can serve as high efficiency replacements for traditionally fossil-based equipment. In conjunction with utility regulatory policy, these technologies can also serve as demand response tools.

   As a note, cities across the country are implementing new building codes promoting beneficial electrification by limiting or banning the installation of natural gas in new construction. State legislatures can pass enabling legislation, allowing municipalities to make independent decisions on beneficial electrification. On the other hand, some states have adopted pre-emptive legislation, banning local governments from adopting policies that limit utility service.[10]

[9] For more information, see EESI's Beneficial Electrification.
[10] See: "States that Outlaw Gas Bans Account for 31% of US Residential/Commercial Gas Use." S&P Global, 9 June 2022. Available: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/states-that-outlaw-gas-bans-account-for-31-of-us-residential-commercial-gas-use-70749584.

Programmatically, there will always be greatest benefit by combining measures – incentives that bundle improvements will generate greater gains than individual measures. For example, a high efficiency heat pump will be much more effective and efficient when coupled with improved building insulation. Rather than only realizing the gains of the new mechanical component, this combination of measures will increase the efficiency of the entire system.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

Bloomberg New Energy Finance estimates that nearly 80% of new car sales in the U.S. will be electric by 2040. Therefore, a key part of building a modernized grid involves designing infrastructure that will facilitate easy connection of electric vehicles (EVs) to the grid. One of the most important barriers to increased adoption of EVs is the consumer's awareness of the availability of EV charging stations. Ultimately, drivers want to be sure that their car will get them where they need to go. The good news is that both supportive policies for developing charging infrastructure and technological advancements have eased "range anxiety."

Maine has several programs to incentivize the purchase of EVs and the installation of EV charging equipment. Efficiency Maine Trust offers rebates for the purchase or lease of a qualified EV. Maine has EV deployment and acquisition goals of 50% of state light-duty vehicle purchases by 2025 and 100% by 2030. The state has also adopted California's zero emissions vehicle (ZEV) and low emission vehicle (LEV) requirements and standards. In December 2021, the state's energy office released the Maine Clean Transportation Roadmap, which provides strategies and policy recommendations for advancing transportation electrification and reducing vehicle miles travelled in the state. ACEEE publishes a State Transportation Electrification Scorecard that evaluates states' progress in electrifying transportation in six key policy areas and offers nationally applicable policy recommendations. Maine ranked 11th in the 2023 report.

The IIJA provides nearly $5 billion over the next five years to support the electrification of the transportation sector. In 2022, $615 million was made available for the installation of charging stations along designated alternative fuel corridors, through a new National Electric Vehicle Infrastructure (NEVI) formula grant program. To be eligible to receive this funding, states must have submitted a NEVI plan to the Federal Highway Administration (FHWA) by August 2022. All 50 states plus D.C. and Puerto Rico submitted a NEVI plan. Maine will receive an estimated $4,110,043 in Fiscal Year 2023.

The Act also provides approximately $1.1 billion for grants to state and local governments to assist with the purchase or lease of low- or no-emission vehicles for transportation fleets. To be eligible, a state must have a Zero-Emission Fleet Transition Plan in place.

The IRA extended the $7,500 EV tax credit for purchases of new plug-in EVs through 2032 and removed the eligibility cap based on number of vehicles sold by manufacturers. The Act includes requirements for material sourcing that must be met by manufacturers starting in 2027. The IRA also created a new $4,000 refundable tax credit for the purchase of used EVs and a new credit for commercial EVs. Appropriations in the Act include $1 billion for replacing medium- and heavy-duty vehicles with EVs, $3 billion to fund projects to reduce transportation sector emissions, and $3 billion to procure alternatively fueled vehicles for the federal fleet.

There are several policy opportunities to further encourage and prepare for increased market penetration of EVs in the state, including:

1. **Utility Investment in "Make-Ready" Infrastructure and Utility-Run Programs** – "Make-ready" means building and upgrading the infrastructure necessary for the installation of a charging station. RMI recommends that policies providing incentives for utilities to invest in make-ready infrastructure or charging infrastructure itself should be performance-based and encourage investments in locations that are unlikely to be targeted by the private sector, such as low-income and multi-unit dwellings. Additionally, utilities can incentivize EVs by incorporating charging rate incentives and time of use rates to reduce the cost of electricity used for charging. Eligibility for a charging rate incentive may be limited to users with separate or advanced metering systems. Some utilities also offer financial incentives for the purchase of EVs or EV charging equipment. In some states, enabling legislation might be required to direct or authorize a public utilities commission to allow regulated utilities to recover the costs of providing these incentives.

2. **Parking Infrastructure Requirements** – In tandem with the implementation of Maine's NEVI plan, legislation could set requirements for parking lots and other infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations. Maine's Statewide Building Energy Codes could also be updated to include requirements for EV charging infrastructure.

3. **Rental Properties and HOAs** – Legislation can also make it easier for lessees, renters, and members of a homeowners' association (HOA) to install charging equipment. Typically, lessors are directed to allow lessees, at their own cost, to install charging systems. In some cases, lessees are required to maintain additional insurance for the system. Legislation related to HOAs typically directs these organizations to avoid restrictions that would inhibit the installation of charging equipment.

4. **EV and Charging Equipment Financing and Financial Incentives** – Providing financial incentives and innovative financing options can help spur greater market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing the high up-front costs of EVs and EV charging equipment. While sales tax credits are typically applied at the time of purchase, property and income tax credits may do less to address upfront cost barriers, as the credit is not applied at the time of purchase.[11] States have adopted other financial incentives including low-interest loans, grants, vouchers, and rebates. A handful of states qualify EV charging equipment under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.

   States might consider adopting programs to incentivize the purchase of used EVs. With increasing battery capacities and falling prices, there are an increasing number of EVs with relatively low mileage that are being traded in. States might also consider programs that target low- and moderate-income (LMI) customers that may not qualify for a loan directly. Such a program could facilitate sales through such things as loan loss reserve and interest buy down programs.

5. **HOV and HOT Incentives** – Allowing EVs to use high-occupancy vehicle (HOV) or high-occupancy toll (HOT) lanes, regardless of number of passengers and without paying the toll, may make EV ownership more attractive. Most states require that EVs using these lanes display a decal or a particular license plate; others also limit eligibility to certain types of vehicles or to a certain number of vehicles.

6. **Federal Congestion Mitigation and Air Quality (CMAQ) Funds** – CMAQ funds (almost $2.6 billion in fiscal year 2023) are available to states to assist them in meeting Clean Air Act requirements. State funds can be used to deploy EV charging infrastructure. There may be a unique opportunity to pair a request for CMAQ funds with a commitment from utilities to invest in charging infrastructure as a public/private partnership that would leverage the federal investment.

NEWS

- July 27, 2023: Maine Plans to Use Offshore Wind for Half Its Energy Needs by 2040
- July 25, 2023: Maine Lawmakers Endorse Proposal That Would Jumpstart Offshore Wind Projects
- July 21, 2023: After Maine Surpasses 100,000 Heat Pump Goal Two Years Ahead of Schedule, Governor Mills Sets New, Ambitious Target
- June 21, 2023: Maine Becomes Third State This Year to Pass Legislation Prohibiting Utilities From Charging Ratepayers for Political Activities
- June 19, 2023: Wind Turbine Ports Run by Union Labor Could Help Maine be Leader in Climate, Industry
- June 18, 2023: Power Companies Spend Millions to Fight Maine's Proposed Non-Profit Utility
- April 27, 2023: Maine Transmission Line is Stalled Despite Court Victories
- April 20, 2023: Maine Energy: Much Delayed US-Canada Hydro Project Gets Go-Ahead

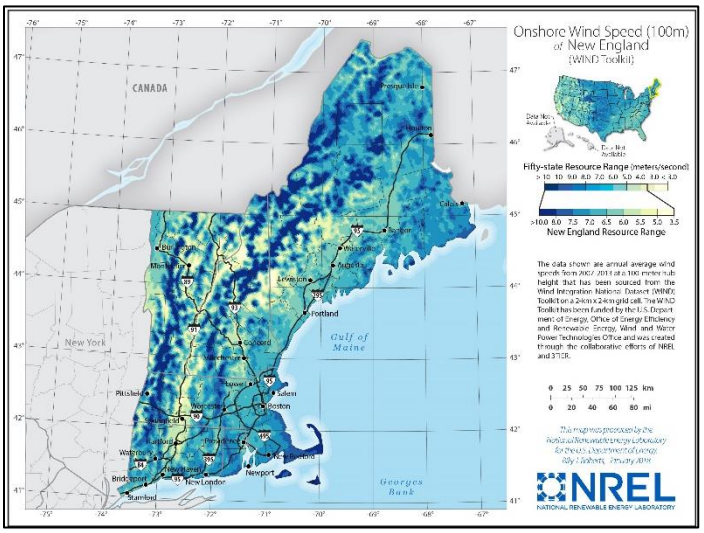
[11] A study by the Congressional Research Service suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

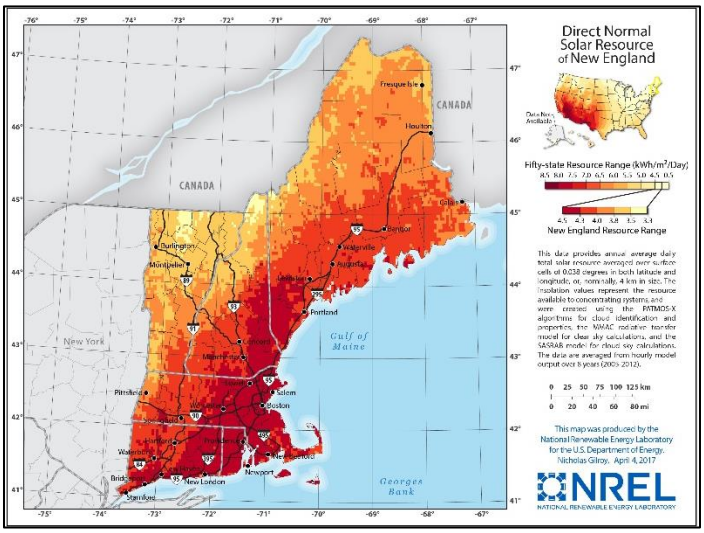
OTHER RESOURCES

- Maine Governor's Energy Office: http://www.maine.gov/energy/
- The American Council for an Energy-Efficient Economy State and Local Policy Database, Maine: https://database.aceee.org/state/maine
- The Database of State Incentives for Renewables and Efficiency, Maine: http://programs.dsireusa.org/system/program?state=ME
- U.S. Department of Energy's Alternative Fuels Data Center, Maine: https://afdc.energy.gov/states/me
- U.S. Energy Information Administration, Maine: https://www.eia.gov/state/?sid=ME
- American Clean Power Association, State Fact Sheets: https://cleanpower.org/facts/state-fact-sheets/
- SPOT for Clean Energy, Maine: https://spotforcleanenergy.org/state/maine/

NEW ENGLAND'S WIND AND SOLAR RESOURCES

WIND https://windexchange.energy.gov/states/ME





Our Resources

CNEE Homepage: http://cnee.colostate.edu/

The SPOT for Clean Energy: https://spotforcleanenergy.org/

The Advanced Energy Legislation (AEL) Tracker: https://www.aeltracker.org/

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