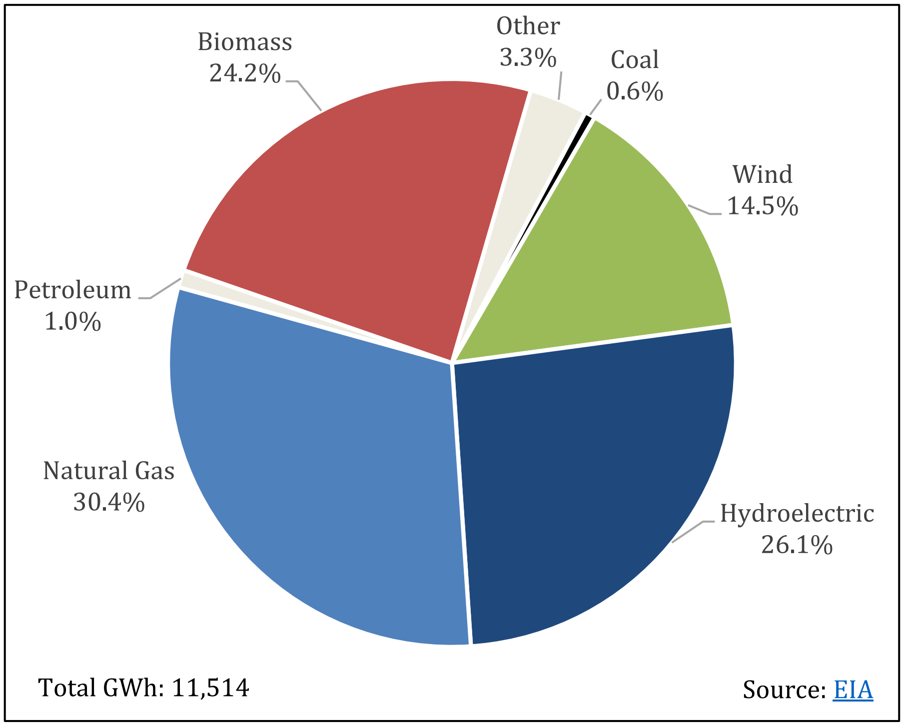
State Brief: Maine

BACKGROUND



The largest source of Maine's net electricity generation is natural gas, most of which is imported via pipeline from Canada. The state does not have natural gas distribution infrastructure for widespread residential heating, making the state one of the highest consumers of petroleum as fuel oil for home heating during the long, cold winters. Natural gas and electricity prices tend to peak during the state's winters, and the state's electricity consumption per capita is lower than the national average due to mild summers. Most of the Pine Tree state's renewable generation capacity is comprised of woody biomass and hydroelectricity, and Maine is second in the nation in terms of electricity generation from biomass sources. With hydroelectricity, biomass, and wind, renewable generation comprised almost two-thirds of Maine's energy mix in 2016. The state's renewable generation increased to almost 75% in 2017.

The state has significantly increased its wind generating capacity in recent years and leads the Independent System Operation (ISO) New England in wind generation. The Maine Wind Energy Act of 2003 encourages development of wind energy in the state, and the legislature established goals of 2,000 megawatts (MW) of installed wind capacity by 2015 and 3,000 MW by 2030. In January 2018, Governor Paul LePage issued an executive order that placed a moratorium on the issuance of wind permits in of the state to study the economic impacts of wind facilities on the environment, property values, and tourism. Advocacy groups challenged the constitutionality of the order and arguments were heard on July 14, 2018, in Cumberland County Court.

The state's electric utilities are regulated by the three-member Maine Public Utilities Commission (MPUC). Commissioners are appointed by the Governor, who also selects the chair. All current members were appointed by sitting Governor LePage (R). The split legislature features a Democratically controlled House and a Republican-held Senate.

POLICY STRENGTHS AND OPPORTUNITIES[1]

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking," 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.

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

[1] For more information on policy opportunities, please visit the SPOT for Clean Energy. For more information on specific policy actions related to these opportunities, please review the *Clean Energy Policy Guide for State Legislatures*.

clean energy technologies. Tier 3, market expansion policies, create incentives and other programs in 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.

GRID MODERNIZATION

Policymakers can view grid modernization as creating a policy structure that supports and ties together many other initiatives, such as smart metering infrastructure, customer data management, energy storage, electric vehicle infrastructure, and utility business models.

In the last two decades, new digital technologies have enabled utilities to better manage the grid and provide opportunities for consumers to customize their services to fit their priorities. These technologies allow a two-way flow of information between the electric grid and grid operators and between utilities and their customers. Emerging technologies improve system reliability and resiliency by enabling better tracking and management of resources. These technologies allow grid operators to incorporate central and distributed energy resources, energy storage technologies, electric vehicles, and assist in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency. On the customer's side of the meter, advanced metering infrastructure, dynamic pricing, and other emerging technologies allow an exchange of information and electricity between a consumer and their electric provider.

Maine's state legislature passed the Smart Grid Policy Act in 2010, which establishes a framework for developing statewide comprehensive grid modernization policy and articulates 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 consumption data. In the N.C. Clean Energy Technology Center's 50 States of Grid Modernization annual report, Maine placed in the top 10 states for actions taken in 2017.[2] Of the actions taken, the MPUC made amendments to interconnection procedures for small generators and reviewed applications for non-transmission alternatives pilot projects. Maine also initiated a proceeding to consider whether IOUs may own microgrid assets.

The Environmental and Energy Technology Council of Maine (E2Tech) is currently working with the Governor's Energy Office to solicit stakeholder input in the creation of the Maine Energy Roadmap, which builds upon the Maine Comprehensive Energy Plan Update of 2015. The state Energy Plan recommended taking actions such as reducing residential heating bills/electricity prices, reducing GHG emissions, and streamlining renewable energy policies.

The state could consider the following actions to advance grid modernization efforts:

1. Require that utilities develop plans to enhance cybersecurity, integrate distributed energy resources (including electric vehicles and energy storage), and measure and report on the results of grid modernization efforts. States may also decide to require that utilities propose a ten-year grid modernization plan within a specified timeframe.

2. 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 eligibility for using 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 legislation or rules 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 by third parties.

[2] In GridWise Alliance's latest Grid Modernization Index, Maine fell in the middle range of states' overall scores.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand to maximize the value of grid resources. By deploying storage in strategic locations, utilities can more effectively manage their energy portfolios. First, storage can dispatch power to better integrate intermittent resources like renewable energy. Second, it provides management of intermittent demand – helping to flatten peak demand requirements for the utility. Third, the responsiveness of energy storage can allow the utility to implement voltage regulation and other ancillary services, useful for improving system efficiency. Finally, energy storage can help the commercial sector avoid costly demand charges. As utilities around the country consider extending demand charges to the residential sector, this will become an even more important issue.

The flexibility of battery storage, combined with advanced metering infrastructure, allows 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 lead to several economic and environmental gains.

Storage provides multiple benefits to both the customer and the utility. State planning and regulatory policies can help maximize these benefits through a combination of 1) establishing a framework for easy integration of energy storage into the grid and 2) establishing a marketplace that monetizes the benefits of energy storage for cost effective investment. When combined with smart meters, distributed battery storage offers benefits for both the customer and the utility. Policymakers may find it is in the state's best interests, both short and long term, to bolster this growing industry through incentives. Some states credit renewable energy storage with a multiplier under its renewable portfolio standard (RPS).

Maine does not yet have sizeable deployment of energy storage. The state proposed a bill in the regular 2018 session directing the MPUC to study the economic, environmental, and energy benefits of energy storage to the electric power industry. The bill was not passed prior to adjournment, and it will appear on the agenda for the next special session. Furthermore, pursuant to the Smart Grid Policy Act, the MPUC opened a docket on the development of a non-transmission alternative corridor, which would incorporate the "deployment and development of advanced electricity storage and peak shaving technologies."

There are several policy opportunities to take advantage of the growing technological advances and declining costs within the energy storage sector. To develop supportive state policies, policymakers in Maine could consider the following:

1. Amend existing interconnection policies to ensure that storage can connect to the grid through a transparent and simple process. The Interstate Renewable Energy Council (IREC) has produced a series of interconnection protocols that states can easily adopt. The state could establish best practices for interconnecting storage in statute, or legislation could provide an instruction to the PUC to update existing policy.

2. Require the inclusion of energy storage as a critical piece of the energy system as both a demand and supply management resource. Some states have required that utilities evaluate the cost effectiveness of non-wires alternatives (NWAs) to large transmission and generation investments. Alternatively, the state might want to require utilities to develop a distribution investment plan that identifies the locations on the distribution system where energy storage or other distributed resources would offer the greatest value.

3. Consider adding a mandatory energy storage procurement target or requirement for energy storage with a documented process for periodic review of progress towards that goal. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework. Five states currently have energy storage goals that range from five megawatt hours (MWh) to two gigawatts (GW).

4. 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. 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 would help reduce their demand charges. Policymakers might want to start first with a policy to incentivize solar system owners.

MAINSTREAMING RENEWABLES

As the renewable energy industry has matured, technology has improved, and global production of generating equipment has increased, renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). A Bloomberg New Energy Finance report from this year predicts that at least 50% of total global electricity will be renewable by 2050. 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 these reasons, it is in the interests of policymakers to ensure that their states are well positioned to benefit from the transition to clean and sustainable energy resources.

To reduce barriers to customer and utility participation in the renewable energy market, Maine might consider several policy options.

Customer-Oriented Policies

1. Interconnection, net metering, and streamlined permitting – The MPUC issued an order in 2017 that replaced the state's net metering program with a "buy-all sell-all" policy, changing the compensation structure. In contrast to traditional net metering or net billing programs, customers participating in Maine's buy-all, sell-all program do not receive a retail rate credit for energy consumed directly on-site, behind the meter. In general, customers want a clear, streamlined, affordable, and predictable system for connecting renewable energy systems to the grid. To ensure this, Maine's policymakers could consider adopting IREC's model interconnection procedures and credit net excess generation at the customer's retail rate. 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. State incentives, such as tax credits, financial incentives, or loans can be tied to systems that are established within a designated streamlined permitting jurisdiction.

2. Shared Renewables – Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the generation provided by the system. Maine's legislature directed the MPUC to create a Community-Based Renewable Energy Production Incentive pilot program 2009, which expires at the end of 2018. Under the program, the development of community solar gardens is encouraged by incorporating a 1.5 compliance multiplier for solar generation under the state RPS. The state also adopted a virtual net metering policy in 2012, named "net energy billing," 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 can improve upon its shared renewables policy by increasing the system size limit to at least 5 MW; currently, net energy billing is limited to a maximum of 660 kW.

   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, 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 renewable program may want to coordinate this program with implementation of the federal Weatherization Assistance Program to provide recipients of assistance with participation in a shared renewable system.

There are several additional policy options that Maine might consider to promote renewable energy uptake by low- and moderate-income consumers. Generally, successful state policies should be tailored to these customers, be cost-effective and financially sustainable, have measurable performance indicators, and be flexible enough to allow later changes in design.

3. Corporate Procurement – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. In just the last four years, over nine GW of renewable contracts have been announced by corporate entities. In the first quarter of 2018 alone, corporations signed 14 agreements for over 1700 MW of renewable energy. 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 facilities, develop or lease onsite renewable energy projects, access competitive wholesale markets, and allows for retail choice in selecting electricity provider. Maine might consider allowing companies to purchase renewable energy credits (RECs) or renewable energy through a green tariff to expand its renewable energy market, using the Corporate Renewable Energy Buyers' Principles as guidelines for designing a renewable energy standard offer. In addition, it is prudent to incorporate corporate renewable procurement commitments into long-term planning. By accounting for renewable purchase commitments prior to issuing a request for long-term contract proposals, the MPUC can avoid over-building resources and stranding generation assets.

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas emissions and increase investments in clean energy resources. States might see an emissions or clean peak standard as the next step in a progression from RPSs.

Maine's RPS was adopted in 1997 as a part of the state's electricity restructuring law and has been amended to account for different classes of renewable resource types. The RPS establishes a total goal of 40% electricity generation from renewable sources by 2022, 30% of which must be satisfied by the state's existing renewable facilities, while 10% of the state's electricity mix must be comprised of new renewable sources by 2017.[3] The MPUC is required to submit an annual report to the legislature on progress toward RPS compliance; the most recent report finds that utilities are on track to meet RPS goals.

Maine established GHG emissions reductions goals in 2003 that call for a long-term reduction of GHGs by 75% to 80% relative to 2003 levels. Maine is currently a member of the Regional Greenhouse Gas Initiative (RGGI), an emissions trading scheme that reduces the region's carbon emissions and incentives the development of energy efficiency measures and renewable generation projects. Efficiency Maine Trust directs revenue from carbon credit auctions toward energy efficiency investments and carbon reduction programs. LD 1647, passed in the 2018 session, updates the state's carbon allowance budget by requiring 2.5% reductions annually starting at 2022 compared with the 2014 base year budget.

To increase utility adoption of clean energy technologies, Maine's policy makers might consider adopting a clean peak standard. Clean peak standards aim to increase the share of clean energy resources used to meet peak demand and decrease energy bills over the long-term by reducing peak demand in the hours when energy costs are highest. These objectives can be met through different policy options including: planning and procurement that focuses on peak demand; a moratorium on the construction of new peaking units or a phase out of existing units; incentives – including carve-outs in states with RPSs – for clean energy resources delivered during peak times; and/or adopting a new clean peak standard that sets a target for clean energy deliveries during peak times.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

An estimated 55% of new car sales 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. Another important barrier to increased adoption of EVs is their higher up-front cost as compared to similar conventionally fueled vehicles. The good news is that both supportive policies for developing charging infrastructure and technological

[3] The RPS also includes carve-outs for wind installation of 2,000 MW by 2015, 3,000 MW by 2020, and 8,000 MW by 2030. As of 2017, Maine had installed just under 1,000 MW of wind nameplate capacity.

advancements have eased "range anxiety." See the U.S. Department of Energy's Alternative Fuels Data Center for a map of refueling locations for EVs and other alternative fuel vehicles.

Maine is positioned to explore the potential for incentives or credits related to EVs and EV supply equipment (EVSE). Policy could be updated to further encourage and prepare for increased market penetration of EVs:

1. EV and EVSE Financing and Financial Incentives – Providing additional 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 high up-front costs of EVs and EVSE. 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 receipt of the credit is typically removed in time from the purchase.[4] States have adopted other financial incentives including low-interest loans, grants, vouchers and rebates. A handful of states qualify EVSE 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. The state currently does not have incentives for citizens to purchase EVs or to install EVSEs. Central Maine Power offers matching grants to non-profits for purchase or lease of EVs and for the installation of charging stations.

2. Charging Infrastructure Plan – Locating charging infrastructure is different from locating conventional fueling stations. For the most part, EVs are cars used for commuting and local trips. Furthermore, while a driver of a conventional vehicle stops only briefly at a gas station for the specific purpose of filling up, a driver of an EV is generally looking to refuel when they are parked for a longer period of time, for example when going shopping, going to a restaurant, or going to work. Charging infrastructure plans should target these types of locations and attempt to pair the appropriate level of charging infrastructure with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop such a plan through a stakeholder process.

   Regional collaborations around the U.S. are emerging to coordinate the development of EV transportation and charging infrastructure. In May 2018, Maine joined 11 other states and the District of Columbia to release the Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure. The states in this region, from D.C. to Maine, will collaborate to invest in public EV charging infrastructure, promote EV sales across the region, and develop complementary policies and programs. Maine is also a member of the Transportation and Climate Initiative (TCI) of Northeast and Mid-Atlantic States. In 2016, Governor LePage and Québec Premier Philippe Couillard announced a public-private partnership to expand EV charging infrastructure between Portland and Québec City.

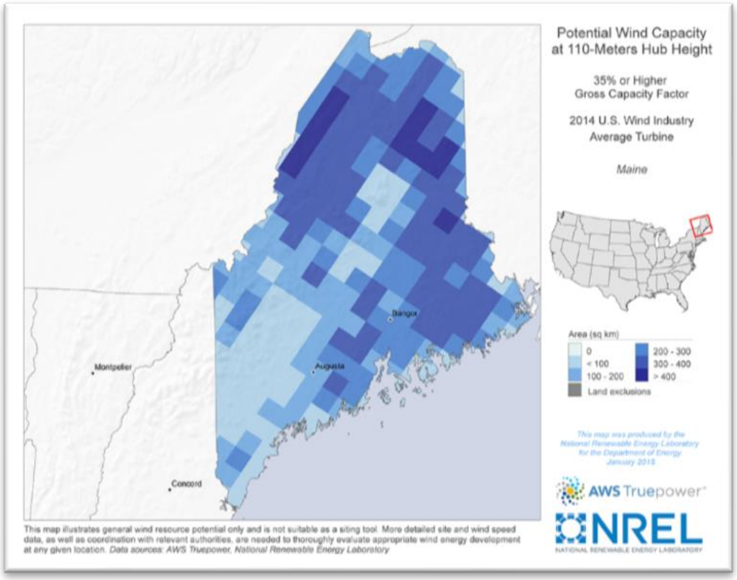
3. Parking Infrastructure Requirements – In tandem with the development of a statewide plan, legislation could set requirements for EV parking infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations. These locations supply power to the point where a utility or third-party developer might install an EV charging station. Maine's statewide building energy code could also be updated to include requirements for EV charging infrastructure.

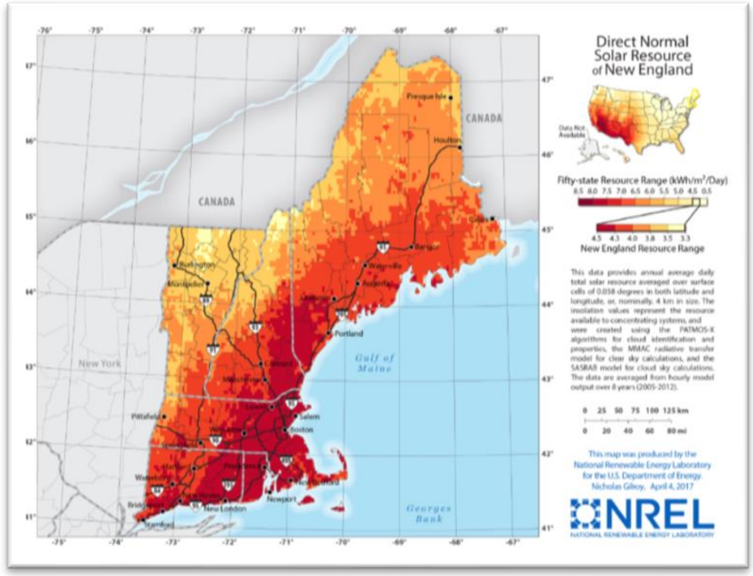
NEWS

- July 10, 2018: A Microgrid System on Maine's Isle Au Haut Could One Day Be A Model for The Entire Nation
- July 2, 2018: New Wind Industry Investments in Maine Hinge on Election of Governor
- June 13, 2018: Power Price Plunge Prompts Maine Regulators to Reconsider Offshore Wind Project
- May 8, 2018: NextEra Energy Moves Forward on First of Four Large Maine Solar Farms
- April 5, 2018: Maine Solar Advocates Powerless Again as House Upholds LePage's Veto by 3 Votes

[4] A study by the Congressional Budget Office however suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

MAINE'S WIND AND SOLAR RESOURCES
WIND https://windexchange.energy.gov/states/ME[5]
SOLAR https://www.nrel.gov/gis/solar.html





OTHER RESOURCES

- SPOT for Clean Energy, Maine: https://spotforcleanenergy.org/state/maine/
- American Wind Energy Association, Maine: http://awea.files.cms-plus.com/FileDownloads/pdfs/Maine.pdf
- 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. Energy Information Administration, Maine: https://www.eia.gov/state/?sid=ME
- Maine Governor's Energy Office: http://www.maine.gov/energy/
- National Renewable Energy Laboratory Biomass Maps: https://www.nrel.gov/gis/biomass.html
- U.S. Department of Energy's Alternative Fuels Data Center, Maine: https://www.afdc.energy.gov/states/me
- The Rocky Mountain Institute: From Gas to Grid – Building Charging Infrastructure to Power EV Demand
- The GridWise Alliance, Inc., EVs - Driving Adoption, Capturing Benefits: http://gridwise.org/evs-driving-adoption-capturing-benefits/
- The Regulatory Assistance Project, Performance-Based Regulation: https://www.raponline.org/event/performance-based-regulation-the-power-of-outcomes-part-1/

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/

Clean Energy Policy Guide for State Legislatures: http://cnee.colostate.edu/cleanenergypolicyguide/

The Energy Policy Podcast: http://energypodcast.colostate.edu/

CNEE Contact Information: Tom Plant, Senior Policy Advisor; Tom.Plant@colostate.edu

[5] Please see your packet for a higher resolution wind energy capacity map.

