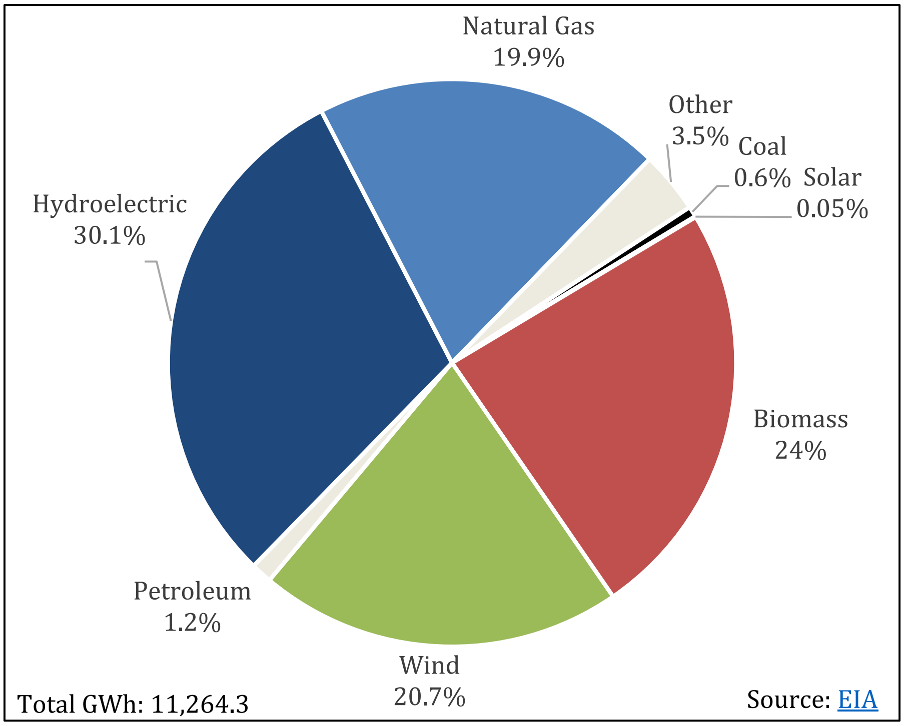
State Brief: Maine

BACKGROUND

Maine's Net Electric Generation, 2017



The largest source of Maine's net electricity generation is hydroelectricity, and the state second in the nation in total share of energy provided by hydroelectric resources. Over the last several years, most of the Pine Tree State's renewable generation has been supplied by woody biomass and hydroelectricity, and Maine is first in the nation in terms of electric generation from biomass sources. With hydroelectricity, biomass, and wind, renewable generation comprised almost three quarters of Maine's energy mix in 2017.

The state is somewhat reliant upon natural gas, which is imported via pipeline from Canada. Gas-fired generation dropped significantly from 2016 to 2017, providing the most electricity in 2016 (30.3%) and dropping to approximately 20% in 2017. The generation gap was partially filled with new generation from wind, which jumped from 14.5% to 20.7% over the same period. Maine does not have widespread natural gas distribution infrastructure for residential heating, making the state one of the largest 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. Due to mild summers, Maine's electricity consumption per capita is lower than the national average.

A 2019 report by the National Association of State Energy Officials and the Energy Futures Initiative found that Maine has 8,643 traditional energy workers (1.4% of total state employment) and an additional 8,647 workers employed in energy efficiency. The state has increased its wind generating capacity in recent years, and leads New England in installed wind capacity. 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, but Governor Janet Mills' administration is firmly advancing a pro-clean energy agenda and ended the moratorium in early 2019.

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 previous Governor LePage (R). Governor Mills is a Democrat, and 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,"[2] 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 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

The transition to a digital economy requires affordable, sustainable, and reliable electricity and presents challenges and opportunities to the grid. Emerging physical and cyber security threats, along with increased demand for faster outage response times, require, at minimum, real-time incident tracking and response capabilities. Increased grid penetration of renewable energy coupled with the adoption of advanced metering, energy storage, microgrids, electric vehicles, and other technologies to modernize our electric system will provide economic benefits, increase security, and ensure more reliable, resilient, and clean electricity. These innovations will require substantial planning and investment in grid technologies.

Grid modernization will require a suite of state and federal policy changes to support advancements in grid technologies, grid management, and utility regulation. Grid modernization strategies, while recognizing regional and inter-state diversity and avoiding one-size-fits-all plans, should take a holistic view of the electric system.

The GridWise Alliance's latest Grid Modernization Index ranks Maine 26th overall for grid modernization efforts. The state is in a good position to continue its modernization efforts. Maine's state legislature passed the Smart Grid Policy Act in 2010, which establishes a framework for developing a 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 energy usage data. In 2017, the MPUC made amendments to interconnection procedures for small generators and reviewed applications for non-transmission alternatives pilot projects. The MPUC also initiated a proceeding to consider whether IOUs can own microgrid assets. While there is no dedicated grid modernization plan in place, the State Energy Plan recommended taking actions such as reducing residential heating bills/electricity prices, reducing greenhouse gas (GHG) emissions, and streamlining renewable energy policies. Many of these areas were addressed in the 2019 legislative session, which focused heavily on climate and clean energy policies.

There are policies that Maine's policymakers could adopt to support in-state 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. Utilities would then be required to implement that plan within another specified timeframe. Strategies and/or plans should outline a clear set of grid modernization goals and describe methods to measure, report, verify, and enforce progress towards those goals.

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[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*.

[2] 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.

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 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, LD 581 directs utilities to provide customer usage data on billing statements.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while maximizing the value of grid resources. By deploying storage in strategic locations, utilities can more effectively manage their energy portfolios. First, storage provides management of intermittent demand – helping to flatten peak demand requirements for the utility. Second, the responsiveness of energy storage can allow the utility to implement voltage regulation and other ancillary services, which are useful for improving system efficiency. Third, storage can dispatch power to better integrate intermittent resources like renewable energy.

The flexibility of battery storage, combined with advanced metering infrastructure, allows customers to control, for instance, 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 a number of economic and environmental gains.

Two major trends have enabled increased deployment of energy storage: declining costs and technological advances. State policy can help maximize these benefits through a combination of establishing a framework for easy integration of energy storage into the grid and establishing a marketplace that monetizes the benefits of energy storage for cost-effective investment.

Maine is exploring methods to expand the deployment of energy storage. Proposed in the 2019 regular session, LD 1614 creates a legislative commission to study the economic, environmental, and energy benefits of energy storage to the electric power industry. As of August 2019, the bill had passed both legislative chambers and was awaiting the Governor's signature. 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 provide incentives for non-wires alternatives (NWAs).

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 MPUC 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 NWAs to large transmission and generation investments. Alternatively, the state might want to require that utilities 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. Maine made major advances to support NWAs with the enactment of LD 1181 in 2019, which requires utilities and the MPUC to consider non-transmission alternatives prior to approving transmission or distribution projects.

3. Consider creating 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 limit the amount of utility owned storage to be procured; require that a certain amount of storage be targeted to low-income customers; and create carve-outs for specific amounts of storage to be procured at the transmission, distribution, and customer levels. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework.

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 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.

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 2019 Bloomberg New Energy Finance report predicts that renewable resources will generate at least 60% of total global electricity and 43% of U.S. electricity 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 interest of policymakers to ensure that their states are well positioned to benefit from the transition to clean energy resources.

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

Customer-Oriented Policies

1. Interconnection, net metering, and streamlined permitting – In general, customers want a clear, streamlined, affordable, and predictable system for connecting renewable energy systems to the grid. In 2017, the MPUC replaced the state's net metering program with a "buy-all sell-all" policy, which removed retail rate compensation. Maine restored the state's net metering policy with the passage of LD 91 in 2019, guaranteeing that net metering customers will be credited at the full retail rate for excess electricity sent back to the grid. 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 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's legislature directed the MPUC to create a Community-Based Renewable Energy Production Incentive pilot program 2009, which expired at the end of 2018. Under the program, the development of community solar gardens was encouraged by incorporating a 1.5 compliance multiplier for solar generation under the state's RPS. The state also adopted a virtual net metering in 2012 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 improved upon its shared renewables policy in the 2019 legislative session

with the enactment of LD 1711, which increased the system size limit to five MW from the previous maximum capacity of 660 kW. The bill also calls for the development of 400 MW of distributed solar, 150 MW of which will be supplied by "large-scale shared distribution resources."

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. Over the last five years, over 16 gigawatts (GW) of renewable contracts have been announced by corporate entities. This is leading policymakers to provide additional avenues for businesses to procure 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 projects, 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, 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 utility investments 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 to account for different classes of renewable resource types. While the most recent MPUC report found that utilities were on track to meet RPS goals, the state adopted new portfolio standards in 2019 as part of Governor Mill's rigorous clean energy agenda. LD 1494 requires 100% of retail electricity sales to be from renewable sources by 2050 and establishes an interim target of 80% renewables by 2030.

This year, policymakers in Maine enacted GHG emissions reductions targets of 45% below 1990 levels by 2030 and 80% below 1990 levels by 2050 (LD 1679). Maine is currently 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. 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 policymakers 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 requirements that focus on peak demand; a moratorium on the construction of new peaking units or a phase out of existing units; incentives 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

Bloomberg New Energy Finance estimates that 57% of all new passenger vehicle sales will be electric by 2040 and that price parity with conventional vehicles will be met for most segments in the mid-2020s. Designing infrastructure that will facilitate easy connection of electric vehicles (EVs) to the grid is a key part of building a modernized grid. The relationship between the increased adoption of EVs and the availability of EV charging stations is complicated. On the one hand, consumer range anxiety creates a barrier to increased adoption. On the other hand, while greater availability of charging stations would ease this anxiety, the relatively low numbers of vehicles on the road provides little incentive to install and make these stations available to the public. The good news is that both supportive policies for developing charging infrastructure and advancements in technology have eased range anxiety.

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

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.[3] 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. Maine does not have incentives for citizens to purchase EVs, but recently established a limited grant program for the installation of EVSE for public and workplace charging and at multi-unit dwellings. Additional rebates for both EVs and EVSE will soon be available through Efficiency Maine Trust, supported by funding from the Volkswagen settlement.

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 attempt to pair the appropriate level of charging with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop an infrastructure plan through a stakeholder process.

   Regional collaborations are emerging around the U.S. to promote EVs and coordinate the development of 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, which is exploring regional policy options to reduce emissions from the transportation sector. The Mills administration is utilizing VW settlement funds to target emissions reductions from the transportation sector by installing charging networks across major transportation corridors.

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

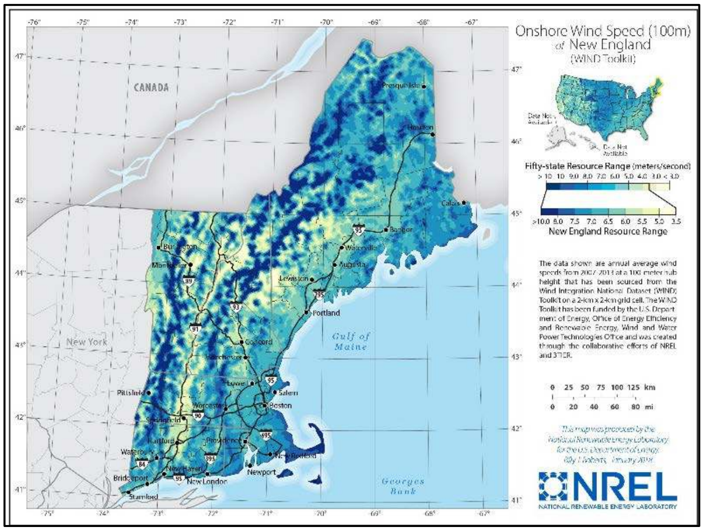
- August 14, 2019: Former Maine Landfills Finding New Life with Solar Development

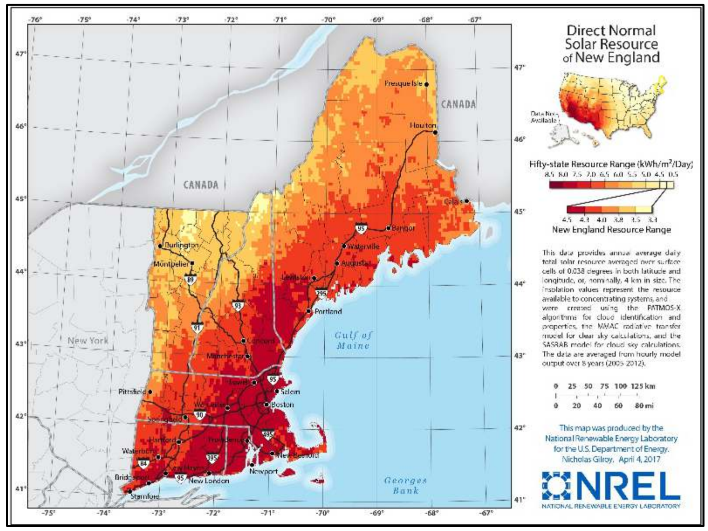
[3] A study by the Congressional Budget Office however suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

- August 7, 2019: [NextEra Energy Criticizes Approval of Maine Hydro Power Line]
- August 5, 2019: [Maine Prepared to Roll Out New Charging Stations, Electric Vehicle Rebates]
- July 30, 2019: [Maine Seeks Installers to Help Meet Goal of 100,000 Heat Pumps]
- July 25, 2019: [Transmission Deficit is Holding Back Wind in Maine]
- June 13, 2019: [Maine Steps Up Clean Energy Turnaround, Passes 100% RPS, Pro-Solar Bills]

MAINE'S WIND AND SOLAR RESOURCES

WIND https://windexchange.energy.gov/states/ME
SOLAR https://www.nrel.gov/gis/solar.html





OTHER RESOURCES

- SPOT for Clean Energy, Maine: https://spotforcleanenergy.org/state/maine/
- American Wind Energy Association (AWEA): https://www.awea.org/resources/fact-sheets/state-facts-sheets
- 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 Electric Vehicle Demand]
- The GridWise Alliance: [EVs - Driving Adoption, Capturing Benefits]
- The Regulatory Assistance Project: [Performance-Based Regulation]

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/

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