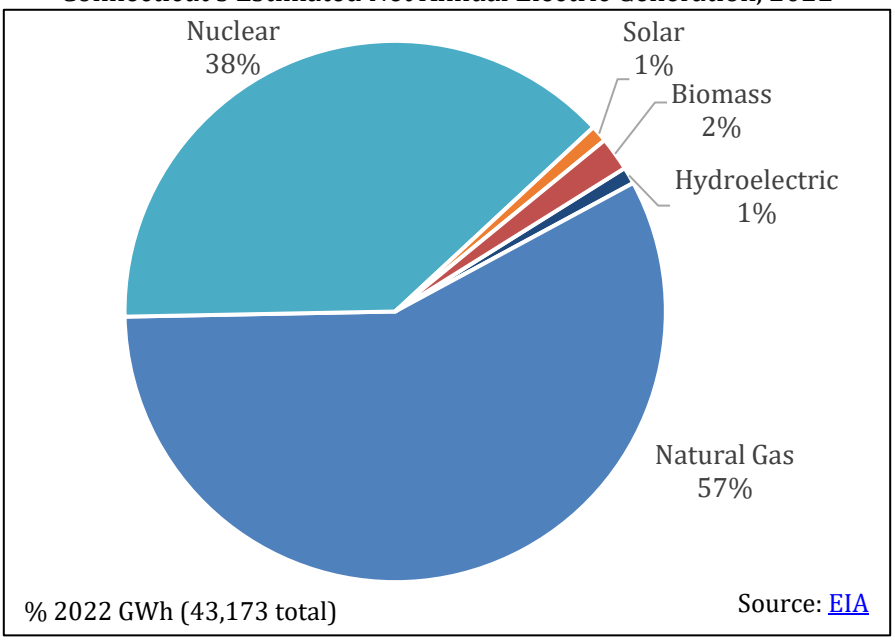
State Brief: Connecticut

BACKGROUND

Connecticut's energy mix is dominated by natural gas and nuclear, accounting for 57% and 38%, respectively, of the state's net generation in 2022. Approximately 43% of homes rely on petroleum-derived fuels for household heating. Connecticut's last remaining coal-fired electric generation plant closed in 2021. In April 2023, the state had the second highest residential electricity retail rate in the U.S., behind Hawaii. Due to mild summers and the prevalence of petroleum use for home heating, Connecticut has the sixth lowest per capita electricity consumption in the nation.

Connecticut's Estimated Net Annual Electric Generation, 2022



Connecticut established a renewable portfolio standard (RPS) in 1998, which required that electric suppliers meet a 13% renewable energy target by 2009. Revised several times since its adoption, the Constitution State's RPS currently requires that electric suppliers meet a 48% by 2030 target. Connecticut is a member of the Regional Greenhouse Gas Initiative (RGGI), a 12-state cap-and-trade program intended to reduce carbon emissions from the power sector.

The Solar Energy Industries Association (SEIA) ranks the state 22nd in the country in terms of installed solar capacity (1,278 megawatts (MW)) and 39th for projected growth over the next five years (928 MW expected). Connecticut's two utility scale wind turbines came online in 2015 with a combined capacity of 5 MW. Enacted in 2019, House Bill 7156 required the Department of Energy and Environmental Protection (DEEP) to issue a solicitation for up to 2,000 MW of offshore wind capacity. In December 2019, DEEP selected the first prospective offshore wind project for the state, the 804 MW Park City Wind Project.

The 2023 U.S. Energy and Employment Report found that in 2022, Connecticut had an estimated 72,937 energy workers (4.4% of total state employment), which includes 34,477 workers employed in energy efficiency. In a 2022 report, Connecticut ranked 27th nationally for clean energy jobs, with approximately 41,458 Connecticuters employed by the industry.

The three members of the bipartisan Connecticut Public Utilities Regulatory Authority (PURA) are appointed by the Governor. PURA regulates the state's two investor-owned electric utilities and three gas utilities. The state is under unified control with Democratic majorities in both chambers of the General Assembly and Governor Edwards "Ned" Lamont Jr. leading the executive branch.

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. 2012. "Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions." *National Renewable Energy Laboratory*. Available: 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.

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.

In 2019, PURA launched its Equitable Modern Grid Initiative. Under this initiative, PURA has opened procedures to revise state policies related to utility rate design, advanced metering infrastructure, energy storage, interconnection, grid resilience, transportation electrification, and resource adequacy. Enacted in 2020, House Bill 7006 required PURA to implement performance-based regulation (PBR) of electric distribution companies . As part of PURA's continued investigation into PBR, it issued a final decision in April of 2023 to align regulatory goals and outcomes with the public interest and utility performance.

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]

Although Connecticut has made significant progress with their Equitable Modern Grid Initiative, there are policies that policymakers could support or enact to promote in-state grid modernization efforts:

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

2. Require that integrated resource plans (IRPs) include plans to enhance cybersecurity, integrate distributed energy resources (including EVs and energy storage), increase smart meter deployment and demand response and/or demand-side management (DSM) programs, and measure and report on the results of grid modernization efforts.

3. State policy should include measures to protect data regarding customer behavior but can also encourage the use of this information to facilitate additional improvements in grid management and customer service. In Connecticut, customers have access to a wealth of energy usage data.

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 EV 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 over 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 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.

[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.

To reduce barriers to customer and utility participation in the renewable energy market, and to build upon the federal initiatives, policymakers in Connecticut 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 2018, Senate Bill 9 sunset monthly net metering in January 2022 for new customers and in 2039 for existing customers, allowing PURA to develop NEM rates for customers participating in the new renewable energy solutions programs established by the bill.

   The Residential Renewable Energy Solutions Program provides residential consumers with a choice between two tariff options. The "netting tariff" operates similarly to NEM by providing monthly retail rate bill credits for excess generation supplied to the grid. These credits roll over until the customer terminates their utility service. The "buy-all tariff" provides a 20-year fixed payment per kilowatt-hour (kWh) of energy supplied to the grid. Payments are applied directly to customers' bills, with optional annual cash outs. The residential program offers bonus per-kWh payments for low- and middle-income (LMI) households as well as for installations in "distressed municipalities." The Non-Residential Renewable Energy Solutions Program replaced Connecticut's Low Emission Renewable Energy Credit and Zero Emission Renewable Energy Credit (LREC/ZREC) and Virtual Net Metering programs with a tariff system similar to that offered by the residential program. Tariff rates under the non-residential program vary by system size. Aggregated and virtual net metering are available to municipal, state, or agricultural customers participating in this program.

   Enacted in 2022, Senate Bill 4 prohibits homeowner associations from unreasonably restricting owners' abilities to install rooftop solar and electric vehicle charging infrastructure. The state might 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. Senate Bill 9 required DEEP to develop a Statewide Shared Clean Energy Facility (SCEF) Program. The program's goal is to develop 50 MW annually for a total of 225 MW.

   Low credit ratings often deter participation in renewable energy markets; this can affect 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 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. Connecticut's SCEF program includes a 20% carve-out for low-income subscribers.

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, Connecticut has received $24 million from WAP and $6.1 million from the State Energy Program (SEP) which has helped to fund a number of energy initiatives in the state.

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. Connecticut's SCEF program includes a 60% carve-out for a "combination" of LMI customers and low-income service organizations.

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. Connecticut has enabled on-bill financing for residential customers since 2013 with the passage of House Bill 6360.

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.

   Connecticut allows businesses to install and receive bill credits for renewable energy projects through the Non-Residential Renewable Energy Solutions Program. The state might consider authorizing green power purchasing and/or green tariffs. Policymakers might also consider incorporating corporate renewable procurement targets into the state's IRP process. By integrating these renewable purchase commitments into the IRP, 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. Connecticut has a long history of climate action, signing on to the New England Governors and Eastern Canadian Premiers (NEG/ECP) Climate Change Action Plan in 2001, becoming an original signatory to RGGI in 2005, and setting a mandatory greenhouse gas (GHG) reduction target of 80% below 2001 levels by 2050 in 2008. As mentioned above, Connecticut first enacted an RPS in 1998, most recently revised in 2018. Connecticut's Green Bank was the first to be established in the nation and the bipartisan initiative remains one of the most effective state green banks in the country. The Green Bank offers several financing options and financial incentives to a wide range of residential and commercial customers. Utilities in the state are also taking the lead. Eversource and Avangrid, the parent company of United Illuminating, have goals to reach carbon neutrality by 2030.

To increase utility adoption of clean energy technologies, Connecticut's policymakers might consider the following:

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. The Connecticut Siting Council

[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).

is the permitting authority for energy facilities in the state, including transmission lines 69 kilovolts or larger. In January 2023, five New England States (Connecticut, Massachusetts, Maine, New Hampshire, and Rhode Island) announced a joint initiative to pursue federal funds for investments in electric transmission infrastructure to support clean energy integration, reliability, resilience, and affordability. This work is being done under the New England States Regional Transmission Initiative, which was established in the Fall of 2022.

2. **Competitive Procurement Requirements** – In most states, consumers have little choice about where their electricity comes from. As utilities find that renewable energy is increasingly the lowest-cost electricity source, they have to decide how much they should buy and when. Unfortunately for customers, utilities may have either a vested interest in continuing to operate fossil plants, or they doubt the efficacy of new renewable resources. States can overcome reluctance to renewable energy by requiring utility procurement decisions to undergo a competitive process, revealing the lowest cost alternatives to the utility's existing contracts and fleet of power plants. A best practice is "all-source procurement," a process that allows all resources to compete to fill a system need identified by the utility.

   States can start by requiring utility commissions to begin a participative planning process that links planning outcomes to procurement decisions and ensures that state policy objectives are included in system planning. For some states, this might mean setting up a planning process. For others, it might involve revisiting planning and procurement rules and asking whether the current process results in policy-aligned procurement. States might amend existing rules to require utility commission approval of utility plans or require consideration of public comments. Regulators may need explicit direction to consider objectives beyond reliability, affordability, and safety.

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.

In 2021, Connecticut became the eighth state to adopt an energy storage target. Senate Bill 952 established a procurement target of 1,000 MW by the end of 2030. Following an investigation and review process, PURA created the Energy Storage Solutions program to be administered by Eversource, United Illuminating, and the Connecticut Green Bank. The program's goal is the deployment of 580 MW of distributed storage projects in the state and it offers

both upfront and performance-based incentives to spur adoption by residential and commercial customers. By March 2023, the program had approved 46.4 MW/139.4 MWh of commercial projects and over 1 MW of residential projects.

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 IREC's 2017 report, "Charging Ahead – An Energy Storage Guide for Policymakers." Policymakers in Connecticut could consider the following:

1. Amend existing interconnection policies to ensure that storage can connect to the grid through a transparent and simple process. IREC has produced a series of interconnection protocols that states can easily adopt. The state could establish best practices for interconnection in statute, or legislation could provide an instruction to utilities to implement these best practices.

2. Clarify the classification of energy storage as an energy management technology and not as "generation" to encourage utility investment in restructured markets. Most states that have restructured utility markets exclude utility ownership of generation.

3. 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.

4. 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 to large transmission and generation investments. Alternatively, states 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.

5. Add energy storage as an eligible technology under existing clean energy policies like renewable portfolio standards or energy efficiency programs. Massachusetts was the first state in the nation to include energy storage in its three-year energy efficiency plan in 2019.

6. Finance and incentivize energy storage for customers and utilities. Incentives can 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 of 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 could also signal to customers the value of leveraging storage and better align 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. Incentive programs 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.

7. 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 data regarding customer behavior but can also encourage the use of this information to facilitate additional investments in energy storage. In Connecticut, customers have access to a wealth of energy usage data.

8. 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. Connecticut ranked ninth 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.

Connecticut's building codes are implemented by the Department of Administrative Services, which established the 2021 International Energy Conservation Code (IECC) as the minimum building efficiency code for the state in 2022. Energy savings performance contracting (ESPC) is authorized in Connecticut and DEEP provides technical support and other resources, including pre-approved contracts, to state and local government entities looking to take advantage of the program. Connecticut's leadership in energy efficiency traces to 1998 (House Bill 5005), which established the Connecticut Energy Efficiency Fund, which the state's utilities administer to implement customer energy efficiency programs in line with the Comprehensive Energy Strategy (CES) created by DEEP every four years. Enacted in 2011, Senate Bill 1243 created DEEP and established energy efficiency as Connecticut's first fuel, directing the procurement of "all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible." Utilities prepare, and annually update, three-year plans establishing programs, budgets, and performance metrics for meeting this goal. Revenue decoupling was required for electric and natural gas utilities in 2007 and both types of utilities earn a performance incentive for managing energy efficiency programs.

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 Connecticut can consider a variety of policies to encourage energy efficiency and beneficial electrification:

[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.

Energy Efficiency Policies

1. **Appliance Efficiency Standards** – Appliance efficiency standards set minimum requirements for efficiency in everything from washing machines to water heaters. Efficiency standards save consumers money on utility bills and reduce energy demand on the grid, most importantly reducing peak energy demand. Some states have elected to adopt the federal appliance standards that were in effect on January 1, 2017.[8] These include, among other things, standards on metal halide lamp fixtures, residential furnaces and boilers, and external AC to DC power supplies. Executive Order 21-3 directed DEEP to establish additional appliance efficiency standards.

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.

   The Connecticut Energy Assistance Program (CEAP) offers assistance with heating energy bill payment as well as shut-off protection and repair or replacement of heating equipment. DEEP's Equitable Energy Efficiency (E3) program was established in 2020 to identify and address barriers to energy efficiency program participation, particularly for LMI customers. A final report, issued July 2021, describes goals, actions, and new programs to ensure more equitable access to energy efficiency programs in the state. A number of financing and other incentive programs are available for low-income Connecticuters.

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. As noted above. Connecticut requires the procurement of "all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible." Utility plans for program years 2022 – 2024 anticipate annual savings of 524 gigawatt hours (GWh) through electric efficiency programs and 1,424 million cubic feet (MMcf) through natural gas efficiency programs.

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.

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.

[8] Based upon research conducted by the Center for the New Energy Economy.
[9] For more information, see EESI's Beneficial Electrification.

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]

Executive Order 21-3 directed DEEP to include strategies to reduce building and industrial GHG emissions. Subsequent CES proceedings have evaluated building decarbonization strategies and technologies, which may be included in the forthcoming CES. In April 2022, after finding it inconsistent with the state's existing CES and GHG emissions reduction goals, PURA issued a decision winding down the natural gas expansion plan (authorized by Public Act 13-298) and ordering natural gas utilities to immediately cease marketing and enrollment activities.

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 this "range anxiety."

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. Connecticut ranked 12th out of the 33 states included in the 2023 report.

Connecticut offers a handful of incentives to drive transportation electrification in the state. DEEP administers the EVConnecticut program that provides up-to-date information on EVs, charging infrastructure availability, and incentives. Enacted in 2016, House Bill 5510 required utilities to include EV charging projections in their distribution planning and required an analysis of the impact of EVs in the state's IRP. Executive Order 21-3 requires that all new light-duty vehicles leased by state agencies be "100% zero carbon" by 2030 and that DOT cease purchasing or providing funding for diesel buses by the end of 2023 and sets a target of achieving a statewide electric bus fleet by 2035.

In 2022, Senate Bill 4 made a number of changes related to EVs and charging infrastructure including accelerating state fleet procurement deadlines, establishing the "right to charge" for renters and residents of common interest communities and multifamily dwellings, and creating property tax exemptions and parking infrastructure requirements for new construction. Connecticut has adopted California's clean car standards; Senate Bill 4 authorized DEEP to implement California's standards for medium- and heavy-duty vehicles. The Green Bank's C-PACE (commercial property assessed clean energy) program was expanded to include the installation of EV charging infrastructure and the Bank offers an innovative system for earning carbon offsets through EV charging.

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

[10] See: "States That Outlaw Gas Bans Account for 31% of U.S. 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.

August 2022. All 50 states plus D.C. and Puerto Rico submitted a NEVI plan. Connecticut will receive an estimated $11,183,049 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. **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 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. Connecticut's Hydrogen and Electric Automobile Purchase Rebate (CHEAPR) program provides rebates for new and used vehicles.

3. **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.

4. **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.

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

NEWS

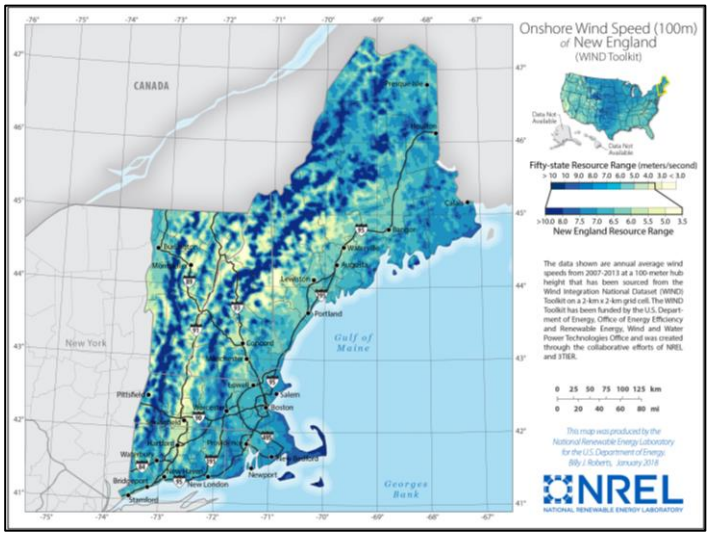
- August 22, 2023: Revolution Wind Receives Federal Record of Decision
- August 18, 2023: Connecticut's Renewable Energy Focus Gains Momentum
- August 7, 2022: Northeast Grid Operator Weighs First Environmental Justice Position
- August 2, 2023: Connecticut and UConn are Leaders in Clean Energy and Sustainability
- July 18, 2022: Connecticut Mapping Tool Aims to Bring Visibility to Environmental Justice Communities
- July 17, 2023: UConn Selected to Lead Clean-Energy Project to Help U.S. Industries in Decarbonizing Efforts
- June 27, 2023: $6 Million in Volkswagen Settlement Funds to Expand Electric Vehicle Charging Stations in Connecticut
- June 20, 2023: Verogy Installs Second Solar Project for Connecticut Ad Agency
- May 22, 2023: Is CT's Largest Offshore Wind Project Headed For The Shoals?
- May 20, 2023: New Program Will Help Connecticut Homes Be More Energy Efficient. Some Say it's Just a Start
- May 15, 2023: Connecticut Colleges and Towns Ask: Should They Make Motorists Pay to Charge Electric Vehicles?
- March 27, 2023: Connecticut Commercial Energy Storage Demand Spurs Government Action
- March 6, 2023: New London State Pier Terminal Getting Ready for South Fork Wind Project
- February 15, 2023: Performance-Based Regulation Top of Mind For PURA In 2023
- January 27, 2023: State EValuateCT Dashboard Highlighting Connecticut's Electric Vehicle Infrastructure and Market

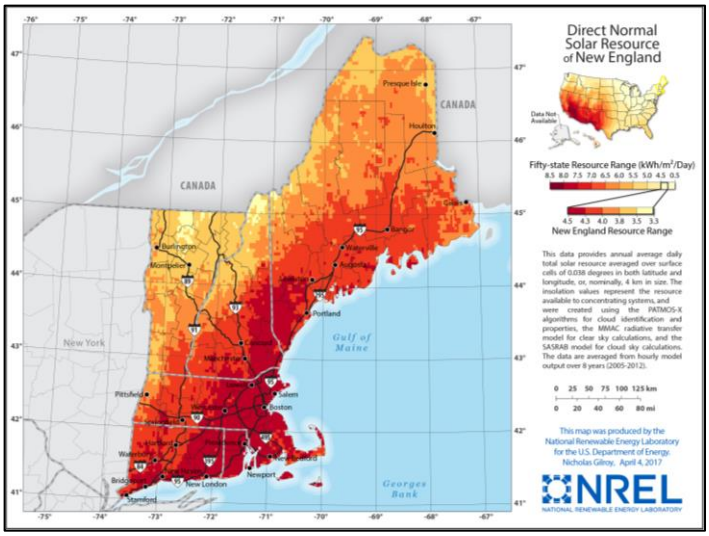
OTHER RESOURCES

- Connecticut Energy Expo (October 19-21, 2023): https://goenergyexpo.com/
- Department of Energy and Environmental Protection (DEEP): http://www.ct.gov/deep/site/default.asp
- The American Council for an Energy-Efficient Economy State and Local Policy Database, Connecticut: http://database.aceee.org/state/connecticut
- The Database of State Incentives for Renewables and Efficiency, Connecticut: http://programs.dsireusa.org/system/program?fromSir=0&state=CT
- U.S. Department of Energy's Alternative Fuels Data Center, Connecticut: https://afdc.energy.gov/states/ct
- U.S. Energy Information Administration, Connecticut: https://www.eia.gov/state/?sid=CT
- American Clean Power Association, State Fact Sheets: https://cleanpower.org/facts/state-fact-sheets/
- SPOT for Clean Energy, Connecticut: https://spotforcleanenergy.org/state/connecticut/

CONNECTICUT'S WIND AND SOLAR RESOURCES

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





Our Resources

CNEE Homepage: https://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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