

2013 Comprehensive Energy Strategy for Connecticut

PREPARED BY

The Connecticut Department of Energy
and Environmental Protection



FEBRUARY 19, 2013



Dannel P. Malloy

GOVERNOR
STATE OF CONNECTICUT

Dear Reader,

It is my pleasure to present you with Connecticut's Comprehensive Energy Strategy.

For too long, Connecticut residents and businesses have paid too high a price for energy in our state: to heat our homes, fuel our vehicles, and power our businesses. Our dependence on fossil fuels has contributed to serious air pollution problems and the build-up of greenhouse gases and other harmful emissions in the atmosphere. Shortly after I took office, we began a statewide effort to conserve energy and control the cost of electricity. We have made great strides in the past two years. Our efforts, which include consolidating state agencies to streamline energy policymaking and strengthening renewable power and energy efficiency programs by leveraging private capital to deliver clean energy at some of the cheapest prices in the country, have led to our state's electricity rates decreasing by 12% across the board.

As this Strategy shows, we still have a lot to do to lift the energy burden—both economic and environmental—from our families and businesses. We need to deploy a portfolio of energy options for consumers and expand energy efficiency as the surest way to lower energy bills, reduce the budget stress from electricity costs, and improve our state's competitiveness. And in the wake of recent storms, we must do more to ensure that our residents and businesses have a greater degree of energy resiliency when disaster strikes.

This Strategy lays out a coordinated approach to address our collective energy, economic, and environmental challenges. It will ensure that all parties involved in energy in the state are pulling together in the same direction toward a cheaper, cleaner, and more reliable energy future. This Strategy emerged from a broad-gauge policy process that builds on the work of the Department of Energy and Environmental Protection in coordination with the Connecticut General Assembly, the Connecticut Energy Advisory Board, and numerous state agencies and stakeholder groups. More importantly, I am pleased that Connecticut's energy strategy was shaped by the hundreds of Connecticut citizens who offered comments at the ten public and technical meetings held throughout the state.

Connecticut's Comprehensive Energy Strategy provides a clean break from Connecticut's energy past and puts our state back in control of our energy future. As we move forward, we will be empowered and guided to make decisions that will reduce the amount we pay for electricity and heating, create jobs and spur economic development, provide us with better transportation options that support economic development, and create a healthier environment for our families.

Sincerely,

A handwritten signature in blue ink, appearing to read "Dannel P. Malloy".

Governor Dannel P. Malloy



2013 Connecticut Comprehensive Energy Strategy

Executive Summary

Connecticut's Comprehensive Energy Strategy gives the state a more systematic basis for addressing energy opportunities and challenges. It provides a foundation for better informed policy, regulatory, and legislative decisions – as well as better energy choices at the household and business level. This Strategy covers all fuels in all sectors with a planning horizon out to 2050. It offers analysis of the state's current energy circumstances and a set of recommendations designed to advance the Governor's agenda of moving Connecticut toward a cheaper, cleaner, and more reliable energy future.

This Strategy was released in draft format in October 2012, and has since been refined and improved in response to thousands of comments received from hundreds of commentators. Created in coordination with the Connecticut Energy Advisory Board, the Strategy benefited significantly from input received from the Public Utilities Regulatory Authority, members of the General Assembly, the Office of Consumer Counsel, the Connecticut Siting Council, and a number of other state agencies.

At the heart of the Strategy are a series of policy proposals aimed at expanding energy choices, lowering utility bills for Connecticut residents and businesses, improving environmental conditions, creating clean energy jobs, and enhancing the quality of life in the state. The Strategy offers recommendations in five major priority areas:

- Energy efficiency
- Industrial energy needs
- Electricity supply including renewable power
- Natural gas
- Transportation

By integrating energy, environmental, and economic goals, the Strategy breaks new ground and advances a broad and robust structure for thinking through energy options. It moves away from subsidizing favored technologies or companies toward a flexible "finance" model that encourages entrepreneurship and private sector leadership in scaling up clean energy projects. Emphasis is placed not on "picking winners" but on using limited government resources to leverage private capital and increase the flow of funds into energy efficiency, renewable power, natural gas availability, and a 21st century transportation infrastructure that promotes mobility options, transportation-oriented development, and market-based opportunities for clean fuels and clean vehicles.



2013 Connecticut Comprehensive Energy Strategy

This Strategy builds on the fundamental premise that the public's interest in and ongoing commitment to clean energy depends on the emergence of new technologies that compete with fossil fuel alternatives. It therefore proposes an array of economic incentives designed to drive down the cost of new energy technologies. By harnessing market forces and competitive pressures, this policy framework promises to spur innovation while offering support for a portfolio of renewable power generation alternatives.

The Strategy further seeks to align Connecticut's energy future with the emerging opportunity provided by shale gas for a lower-cost, less-polluting, and domestically available (and thus more reliable) foundation for society's energy needs. In identifying natural gas as a bridge to a truly sustainable energy future, it puts forward a seven-year game plan for expanding access to natural gas across Connecticut with a goal of providing nearly 300,000 Connecticut homes, businesses, and other facilities with an energy choice that includes natural gas.

Department of Energy and Environmental Protection (DEEP) analysis suggests that the initiatives advanced below will measurably reduce Connecticut's greenhouse gas emissions -- putting the state on a trajectory toward progress on climate change. But significant additional measures and breakthrough technologies will be required to achieve the goal of an 80% emissions reduction by 2050 as spelled out in the state's 2008 Global Warming Solutions Act.

The Strategy offers a structure for guiding the state's ongoing efforts to address its citizens' energy needs, meet the challenges of protecting the environment, and build a foundation for economic prosperity and job growth. The principles, goals, and policies spelled out below represent not just the fruits of months of effort by dozens of people from the Governor on down, but also the formal embodiment of Connecticut's future energy plans. As directed by the legislature, the Strategy will inform and guide future decisionmaking not only within DEEP but also at the Public Utilities Regulatory Authority and other state agencies as well.

Energy Efficiency

Energy conservation offers a mechanism for reducing utility bills for every family and business in Connecticut while creating thousands of new jobs. The Strategy calls for an expanded commitment to "all cost-effective" energy efficiency through programs that:

- Reach all sectors and all buildings – government, municipalities, universities, colleges, schools, hospitals, places of worship, commercial and industrial facilities, and homes including houses, apartments, condos, and senior living centers – with special focus on groups that have not been fully reached by past efficiency programs such as small businesses and the low-income community
- Go beyond a traditional focus on upgraded lighting and weather stripping to deliver deeper efficiency gains in heating, air conditioning, ventilation, insulation, windows, furnaces, boilers, and other appliances such as refrigerators, as well as process efficiencies in the industrial sector



2013 Connecticut Comprehensive Energy Strategy

- Leverage private capital through innovative financing mechanisms including Connecticut’s first-in-the-nation Green Bank (the “Clean Energy Finance and Investment Authority”), standardized energy efficiency performance contracts, and the state’s new Commercial Property-Assessed Clean Energy (C-PACE) program
- Reinvigorate and broaden the existing Home Energy Solutions program to ensure that additional ratepayer dollars achieve maximum reach and impact with carefully established goals and metrics to ensure ongoing performance improvements
- Incentivize Connecticut’s utilities to deliver on efficiency goals through “decoupling” and performance-based rates of return
- Establish building efficiency standards for both new construction and retrofits as well as a mechanism for benchmarking building efficiency and disclosing efficiency scores at the time of rental or sale
- Advance information technology opportunities for greater efficiency including a smart grid, advanced meters, and smart appliances on a carefully structured basis.

Industry

Connecticut’s competitiveness and prospects for economic growth require special attention to energy needs in the industrial sector. Thus, the Strategy proposes to:

- Ensure that expanded energy efficiency programs reach all of the state’s manufacturing companies
- Provide the industrial sector with support for efficiency investments that go beyond buildings to include specialized process efficiency programs and combined heat and power projects
- Prioritize factories and other industrial “anchor loads” in the extension of natural gas mains
- Launch a Clean Energy Business Solutions Program to be managed by CEFIA under the direction of the Department of Economic and Community Development in support of job creation and retention where energy costs are a critical factor

Electricity

Providing Connecticut’s citizens with cheaper, cleaner, and more reliable electricity is a core focus of the Strategy. To advance this agenda, DEEP proposes to:

- Build on the analysis of the recently released Integrated Resources Plan to ensure that Connecticut has adequate power generation capacity over the next decade to match electricity supply with demand, including potentially lowering electricity costs through contracting for low-cost generation at times of peak demand
- Keep both generation and transmission costs down through proper planning, infrastructure investments, and engagement in federal and regional energy decisionmaking processes including increased scrutiny of the rules and incentives established by the Federal Energy Regulatory Commission and the Independent Systems Operator (ISO – New England), which runs the wholesale electricity marketplace in our region



2013 Connecticut Comprehensive Energy Strategy

- Use economic incentives (including reverse auctions, declining subsidies, Power Purchase Agreements, etc.) to bring down the cost of renewable electricity, spur innovation, and promote a portfolio of alternative energy technologies that can compete with existing fossil fuel generation over time
- Focus on the deployment of renewable energy at scale using limited government resources to induce private sector investment through the Connecticut Green Bank (CEFIA), Zero (and Low) Emissions Renewable Energy Credits, and other innovative financing mechanisms
- Refine Connecticut's Renewable Portfolio Standard (which calls for 20% renewable power by 2020) with an eye toward considering: (1) raising the target, (2) broadening what counts as "renewable," and (3) expanding in-state clean power generation
- Explore opportunities for large-scale hydropower to provide low-cost, clean base-load generation as well as the potential for load-following (and thus "peak shaving") electricity
- Promote more "distributed generation" with proposals to expand virtual net metering and submetering and to launch a pilot program of microgrids that would keep critical facilities (hospitals, prisons, sewage treatment plants, etc.) and core services (police and fire departments, warming centers, grocery stores, gas stations, pharmacies, banks, and phone charging locations) in a number of cities and towns "up" when the grid is down
- Ensure greater grid resilience through tree trimming, hardening of wires and poles, and funding for improved information technologies that allow outages to be tracked and restored more quickly while providing better communications with affected communities and individuals
- Launch an Advanced Energy Innovation Hub at UConn's new Technology Park that would support basic research on topics such as: fuel cells, batteries and storage, microgrid engineering, and small-scale hydropower
- Develop a cyber security strategy for Connecticut consistent with the emerging threat to the electric grid and other elements of the state's critical infrastructure.

Natural Gas

America's energy situation has been dramatically transformed by the increased availability of domestic shale gas at prices that are now significantly lower than oil. One of the nation's largest reserves of this gas -- the Marcellus Shale -- is in Pennsylvania and New York (as well as Ohio and West Virginia) less than 100 miles off Connecticut's western border. Because natural gas combustion produces lower emissions than oil or coal, conversion to natural gas promises a cheaper, cleaner, and more reliable fuel for heating, power generation, and perhaps transportation. DEEP acknowledges that there are significant environmental and public health issues associated with the drilling and transport of natural gas, which the state will actively address wherever possible.

As things now stand, Connecticut is not well positioned to take advantage of the emerging natural gas opportunity. Only 31% of Connecticut homes heat with gas today, compared with 47% in Massachusetts and



2013 Connecticut Comprehensive Energy Strategy

48% in Rhode Island. The percentage of commercial and industrial entities with access to gas is only slightly higher. The Strategy proposes to make gas available to as many as 300,000 additional Connecticut homes and businesses, beginning with the roughly 217,00 customers who are on gas mains now but not heating with gas. Specifically, it calls for:

- Financing options for homeowners and businesses to eliminate the upfront burden of converting furnaces, boilers, and other appliances to natural gas – with the average residential cost of about \$7500 being paid back over a decade through an “on-bill repayment” system that would be collected by the gas companies but funded by banks and the capital markets, providing the average household with immediate cost savings of about \$600 - 800 per year
- Alternative financing for low-income homeowners through community banks and credit unions with the state providing incentives or financing through CEFA
- A time-limited tax credit for those who sign up for conversion to gas -- providing a means for defining the universe of potential new gas customers and creating greater clarity as to where gas infrastructure investments can most economically be made
- Expansion of natural gas pipeline capacity into Connecticut to meet the anticipated rise in demand for gas as a result of expanded infrastructure and gas availability
- Regulatory changes (i.e., extended payback periods) that would enable potential gas customers who are not on but are near gas mains to have their connections financed by the state’s gas companies and repaid through the added revenues of their expanded customer base
- Roughly 900 miles of gas mains to be built with a particular focus on providing “anchor loads” (factories, hospitals, schools, or other facilities with significant energy consumption) with access to gas mains
- Incentives for the state’s gas companies to ramp-up the required construction quickly, which DEEP estimates will translate into as many as 7000 jobs
- Utility construction projects to be linked so that the construction cost of new gas mains can be shared with those installing water or sewer pipes, fiber optic cables, or underground electric lines.

Transportation

Cars, trucks, buses, trains, and planes account for 32% of the energy consumed in Connecticut and an even higher percentage of the fossil fuels burned. Providing the state’s citizens with mobility options is therefore a high priority of the Strategy, which calls for:

- Expanded commitment to transport-oriented development and a broader mobility focus that encourages bikeways, walking paths, and other quality of life investments
- Secure funding for transportation infrastructure in support of reduced road congestion, improved air quality, and a strengthened platform for economic growth and job creation
- Investment in a clean fuels/vehicles initiative that will ensure that the basic infrastructure needed for vehicle choice will be in place including:



2013 Connecticut Comprehensive Energy Strategy

- Sufficient public electric vehicle charging stations (requiring an incremental 100 stations statewide) so that no one in the state need suffer from “range anxiety”
- Support for conversion of fleets (delivery vans, taxis, garbage trucks, public works vehicles, etc.) to natural gas in conjunction with private sector-funded construction of natural gas filling stations that will be publicly available
- Establishment of a core set of Liquefied Natural Gas (LNG) stations at truck stops in support of the growing number of long haul trucking fleets considering conversion to natural gas as their primary fuel
- Expanded hydrogen filling stations as demand for fuel cell-powered vehicles grows
- Improved fuel economy in Connecticut vehicles and development of second-generation, advanced biofuels

Comprehensive Energy Strategy—Process for Public Comment

On October 5, 2012 DEEP issued a draft of the 2012 Comprehensive Energy Strategy for public comment. DEEP solicited written comments from stakeholders and interested persons, with an initial filing deadline of December 14, 2012, subsequently extended to December 21, 2012 at the request of a number of stakeholders. All written comments received by DEEP on the draft 2012 Strategy can be accessed on the Department’s website¹, along with other reference materials, background documents, and sources utilized in the preparation of both the draft and final Comprehensive Energy Strategy.

DEEP also held six technical meetings² at its New Britain Office, at which the public and stakeholders were given the opportunity to present oral testimony and to ask DEEP staff and consultants questions about the analyses underlying the findings and recommendations in the draft 2012 Strategy. In addition, DEEP conducted five public hearings at locations around the state³ to receive further public comments on the draft document. All of the comments received have been summarized in an index which can be found in Appendix F. DEEP would like to thank all of the stakeholders who participated in the technical meetings, the public hearings, and those who took the time to submit written comments. Robust participation throughout the development process has contributed to an in-depth dialogue about energy policy in the state.

¹ [http://www.dpuc.state.ct.us/DEEPEnergy.nsf/\\$EnergyView?OpenForm&Start=1&Count=30&Expand=4.3&Seq=7](http://www.dpuc.state.ct.us/DEEPEnergy.nsf/$EnergyView?OpenForm&Start=1&Count=30&Expand=4.3&Seq=7)

² November 14, 2012 – Transportation Sector; November 15, 2012 – Electricity Sector; November 16, 2012 - Natural Gas Sector; November 27, 2012 - Buildings Sector; and November 28, 2012 – Industry Sector.

Audio recordings of these meetings are available at:

[http://www.dpuc.state.ct.us/DEEPEnergy.nsf/\\$EnergyView?OpenForm&Start=1&Count=30&Expand=4.2&Seq=6](http://www.dpuc.state.ct.us/DEEPEnergy.nsf/$EnergyView?OpenForm&Start=1&Count=30&Expand=4.2&Seq=6)

³ November 14, 2012, at Bridgeport City Hall; November 19, 2012, at Kennedy Mitchell Hall of Records, New Haven; November 20, 2012, in the Phoenix Auditorium, at DEEP’s offices, Hartford; November 20, 2012, at UCONN – Center for Environmental Sciences and Engineering, Storrs; and November 26, 2012, at City Hall Auditorium, Torrington. Audio recordings of these public hearings are available at:

[http://www.dpuc.state.ct.us/DEEPEnergy.nsf/\\$EnergyView?OpenForm&Start=1&Count=30&Expand=4.2&Seq=6](http://www.dpuc.state.ct.us/DEEPEnergy.nsf/$EnergyView?OpenForm&Start=1&Count=30&Expand=4.2&Seq=6)



2013 Connecticut Comprehensive Energy Strategy

This document will guide and direct the state's ongoing efforts to meet the challenges of protecting the environment and providing safe and reasonably priced energy for the Connecticut residents and businesses. The CES is the formal embodiment of the state's policies in this regard, and will inform and direct future decisions, not only those of DEEP and PURA, but also those of other state agencies tasked with implementing state energy policy. We are grateful for the time, effort and attention of all who have contributed to this final product.

Next Steps: Implementation and Performance Measurement

With this document finalizing the strategy for delivering a cheaper, cleaner, and more reliable energy future for Connecticut's residents and businesses, DEEP's attention will turn to implementing Governor Malloy's vision and tracking progress on the many elements of the Strategy with a set of quantitative metrics. DEEP will engage the Connecticut Energy Advisory Board, the Energy Efficiency Board, the Connecticut Energy Finance and Investment Authority, the Low-Income Advisory Board, and other state agencies, as the Department determines both how best to advance progress quickly and what metrics to measure. Among the goals that DEEP seeks to advance:

- Lower electricity rates and reduced overall energy bills for both residents and businesses
- Reduced heating costs tracked by type of fuel
- Decline in air emissions from power generation, heating, and other energy use
- Growth in the number of megawatts of installed renewable generation capacity
- Expanded availability of demand response resources to reduce electricity needs on the power system's peak days
- Increased energy savings from efficiency investments
- More alternative-fuel vehicles on the roads
- Reduced electricity consumption by sector and reductions in statewide energy demand
- Private dollars leveraged per public dollar invested in renewable energy
- Rise in number of clean energy jobs created – by sector
- Decreased greenhouse gas emissions, measured against targets established by the state's Global Warming Solutions Act (PA 08-98)
- Further deployment of distributed generation capacity including functioning microgrids
- Improvements in energy security including: resource diversity, redundancy, modularity, preparedness and substitutability

These goals and associated metrics can provide a starting point for establishing key benchmarks that will be used to monitor progress as well as inform policymakers about potential refinements to the Strategy that might be needed to ensure optimal progress in Connecticut on the path to a cheaper, cleaner, and more reliable energy future. Recommendations in the Strategy include specific legislative proposals; state agency



2013 Connecticut Comprehensive Energy Strategy

initiatives, and regulatory changes. In the months and years ahead, DEEP will engage a range of stakeholders, including sister state agencies, regional planning agencies, academic institutions, municipalities, various boards and commissions and other public and private entities in the swift and thorough implementation of the Strategy.