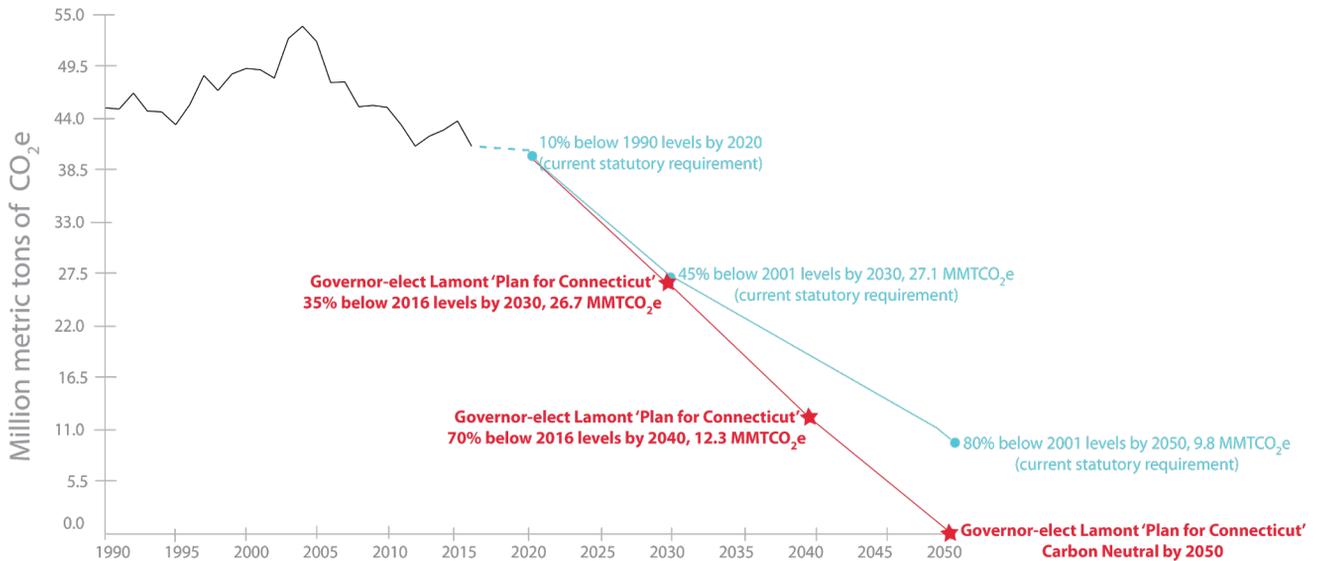


Green New Deal

Decarbonization + Grid Modernization = Job Creation



Supporting 38,000 green energy jobs and counting



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ATTACHMENT A
ENERGY POLICY COMMITTEE PROCESS OVERVIEW MEMO

Memo

To: Lisa Tepper Bates (Transition Steering Committee Member) and Justin Horton (Transition Policy Director and Legal Counsel)

From: Transition Policy Committee – Energy

CC: Lamont-Bysiewicz Transition Policy Committee

Date: December 12, 2018

Re: Energy Policy Committee – Process, Findings, and Recommendations

Introduction

The Energy Policy Committee (“the Energy Committee”) was tasked by the Lamont-Bysiewicz Transition Policy Committee (“the Policy Committee”) with developing plans for the implementation of the Lamont policy platform (“the Plan”)¹ (including additional opportunities from the Energy Committee with regards to this agenda), providing suggestions regarding the timing of executing on that agenda, and identifying key deliverables that are attainable in the first 100 days of the Administration. The successful completion of these tasks also required that the Energy Committee articulate how implementation of these policies will (1) create jobs and spur economic growth, and (2) define the fiscal impacts of this policy implementation with the goal of identifying ways to cut government expenses.

This memo provides a detailed overview of the process, findings, and recommendations from the Energy Committee to meet the tasks assigned by the Policy Committee.

The Plan, within the section entitled “Addressing Climate Change & Expanding Renewable Energy,”² provides an ambitious set of policies in the following six (6) areas, including:

- Resiliency Against Rising Sea Level³
- Invest in Sustainable Transportation
- Pursue Energy Conservation
- Modernize Our Grid
- Expand Renewable Energy

¹ Lamont for Governor – Ned’s Plan for Connecticut

² Ibid (pp. 49-52)

³ Environment Committee led on resiliency against rising sea levels, with the Energy Committee (Working Group B) providing support on energy-related recommendations for grid modernization, microgrids, and infrastructure planning (i.e., CIRCA process at UCONN).

- Pursue Regional Solutions

The Plan also provided the Energy Committee guidance with respect to the principles and expectations of Governor-elect Lamont when he states “In order to continue Connecticut’s transition toward sustainable energy sources, to increase employment in the green economy, and to lower energy costs, I will...” As a result, in the final evaluation and prioritization of the “Top 10” policy recommendations by the Committee, the following criteria were established by the Co-Chairs:

1. **Jobs** – clearly, creating jobs and spurring economic growth are the top priorities of Governor-elect Lamont as he says “Our transition to a sustainable future will create thousands of new jobs in clean energy and efficiency...We have already seen good-paying jobs created in the fuel cell, solar installation, and home weatherization industries”;⁴
2. **Climate Change** – addressing both mitigation (i.e., reducing greenhouse gas emissions and its associated local and global societal benefits) and adaptation (i.e., ensuring local resilience against natural disasters through science-based planning and proper siting) were central to Governor-elect Lamont’s climate change and energy policies; and
3. **Energy Affordability and Equity** – lowering energy costs for everyone, with an emphasis on underserved communities (e.g., low-to-moderate income households, seniors, people living with disabilities, and communities of color), through investments in energy efficiency, peak shaving, renewable energy during peak periods, and regional efforts to name a few. Reducing energy costs are a top priority of Governor-elect Lamont when he says “Crippling property taxes, regionally uncompetitive electricity rates, and a stagnant economy strain family resources and contribute to an unacceptable reality: Connecticut residents are in danger of losing their homes, and seniors and people of color are particularly under threat.”⁵

This process led to a set of consensus-supported essential and “Top 10” priority policy recommendations.

Feedback from State Agency Leaders

To assist the Energy Committee with its review of proposed policies, it requested official briefings from the following agencies:

- **Department of Energy and Environmental Protection** – Commissioner Rob Klee and Deputy Commissioner Mary Sotos presented on Tuesday, December 4, 2018, DEEP’s work on climate change, sustainable energy, operations, and other areas of relevance – see Attachment L.

⁴ Lamont for Governor, Ned’s Plan for Connecticut (pp. 8)

⁵ Ibid (pp. 40).

- **Public Utilities Regulatory Authority** – Chair Katie Scharf Dykes, Vice Chair Jack Betkoski III, and Commissioner Michael Caron presented on Wednesday, December 5, 2018, PURA’s work on energy regulations, grid modernization, regional challenges to energy issues, and other areas of relevance – see attachment M.
- **Office of Consumer Counsel** – Consumer Counsel Elin Katz, Principal Attorney Joseph Rosenthal, Associate Rate Specialist Taren O’Connor presented on Thursday, December 6, 2018, OCC’s work on electric rates, consumer protection, and other areas of relevance.
- **Department of Administrative Services** – Chief Cyber Security Risk Officer Art House presented on Thursday, December 6, 2018, his work enhancing cyber security prevention and protection efforts in a comprehensive, cross-agency and cross-sector manner.

The feedback from these agency officials was invaluable to the Energy Committee process elucidating the challenges and opportunities of various policy proposals.

Recommendations

The Energy Committee has two sets of recommendations, including (1) three essential recommendations, and (2) “Top 10” policy recommendations.

Essential Recommendations

The following recommendations are essential in terms of having the necessary key goal and human capital to successfully implement the “Top 10” recommendations, including:

- **Greenhouse Gas Emissions Reductions Targets** – Governor-elect Lamont has set ambitious greenhouse gas emissions reduction targets that the Energy Committee supports, including 70 percent below current levels by 2040 and carbon neutral by 2050 – see Attachment D.⁶
- **Green Economy and Jobs Fund** – by reducing greenhouse gas emissions, thousands of new jobs will be created helping to revitalize Connecticut’s economy. In order to nurture and support job training and advanced manufacturing in Connecticut’s green economy, Governor-elect Lamont would assemble a group of industry leaders, Connecticut Technical High School System, community colleges, Connecticut State Colleges and Universities, Workforce Investment Boards, unions, and other stakeholders to provide leadership and administer resources,⁷ under the auspices of the Department of Economic and Community Development and Department of Labor, for programs (e.g., workforce development, training, vouchers, etc.) that advance the

⁶ Since the greenhouse gas emission reduction target established under PA 18-82 (i.e., 45 percent below 2001 levels by 2030) is nearly the same as the Governor-elect’s proposed target, the Energy Committee recommends that the Governor-elect’s policy focus on greenhouse gas emission reductions for 2040 and 2050.

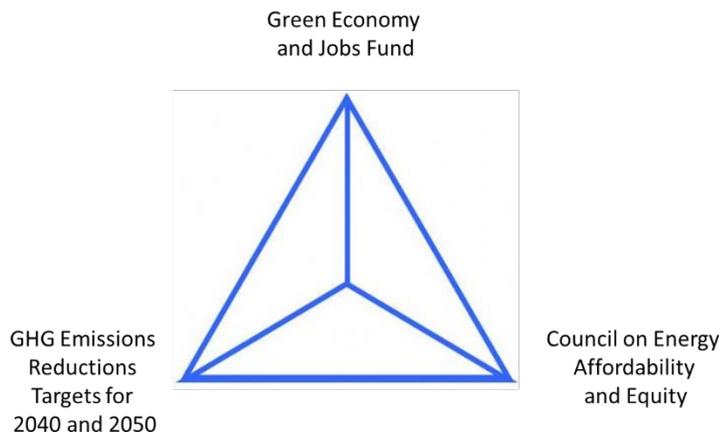
⁷ Beyond any available resources from the General Fund, resources could include proportional allotments from the Connecticut Energy Efficiency Fund (i.e., through the CAM) and Connecticut Green Bank (i.e., through the CEF). Resources from the CEEF and CTGB to support the task force would be contingent upon the legislative protection of the CAM and CEF.

green economy, with particular emphasis on energy efficiency, emerging growth industries like offshore wind, and technologies that are manufactured in Connecticut; and

- **Council on Energy Affordability and Equity** – in order to combat the impact of rising energy costs on Connecticut’s families (see Attachment E) and businesses,⁸ Governor-elect Lamont would establish a Council on Energy Affordability and Equity to address areas such as arrearages and shut-offs, access to clean and affordable energy to low-income households, working in tandem through a collaborative effort among state agencies to conduct appropriate “cost-effectiveness” and cost-benefit analyses with regards to energy, grid infrastructure, and renewable energy investments.

These are the essential recommendations that form the foundation to a successful sustainable energy policy – see Figure 1.

Figure 1. Three Essential Recommendations Forming the Foundation of Successful Sustainable Energy Policy



“Top 10” Recommendations

The following “Top 10” policy recommendations are from the Energy Committee:

- **Expand Energy Efficiency** – as the largest green energy contributor to job creation and energy cost burden reduction on Connecticut’s families and businesses, increase the statewide statutory goal to invest in energy efficiency so that energy demand can be reduced from 1.6 million MMBtu to 2.0 million MMBtu per year and ensure accessibility and affordability in low-to-moderate income communities to energy efficiency improvements in their homes. Reduce the affordability gap so that most households at 60 percent of the state median income are not paying more than 10 percent of their income on energy.
- **Protect Ratepayers** – prevent diversions of ratepayer funds (i.e., C&LMF-CAM, CEF, and RGGI) for energy efficiency and renewable energy to the General Fund – see Attachment F for annual

⁸ Standard offer electric rates in Eversource Energy and United Illuminating service territories are set to increase on January 1, 2019.

investment, jobs, tax revenues, and climate change benefits from these funds). Also, review the reforms instituted by PURA relating to alternate residential electric suppliers to ensure that consumers are receiving clear and adequate information relating to electricity costs and make reforms where necessary.

- **Amend Section 7 of PA 18-50** – expand the yearly caps for commercial and shared clean energy facilities (e.g., to 50 percent of Massachusetts caps), remove the caps on individual projects which are currently tied to the load of host sites, ensure an orderly transition from the current net metering to a new system that includes a tariff-based compensation structure to support jobs in the local state-based industry, and ensure accessibility and affordability in low-to-moderate income communities.
- **Expand Lead by Example** – emphasize the importance of State Government to “Lead by Example” by (1) reducing energy consumption in state buildings by 40 percent from current levels by 2030 (from 20 percent by 2019), including state- and quasi-public-owned affordable housing, (2) converting state vehicles to zero emission for 50 percent of the light duty fleet and 30 percent of buses from current levels by 2030, (3) ensuring proper building codes for energy and transportation-related measures, and (4) implementing a pilot carbon charge across state buildings and vehicles. These actions will create jobs and lower energy costs for State Government.⁹ Serious consideration by the Governor-elect should be given to appointing an interagency liaison (e.g., Director of Sustainability) with an office in the Capitol in order to successfully implement and report on progress towards achieving these important cost-saving recommendations.
- **Expand Renewable Portfolio Standards** – expand the Class I RPS to 35 percent by 2025, 50 percent by 2030, 80 percent by 2040, and 100 percent by 2050, while (1) reducing the policy cost exposure on ratepayers by reducing the alternative compliance payment (ACP) in 2030 and 2040, (2) reducing emissions by phasing out dirty biomass, and (3) procuring 2,000 MW of zero-emission offshore wind by 2030 using competitive procurements with labor and wage provisions that ensure high-quality jobs for Connecticut workers.
- **Modern Grid and Resiliency Planning** – support the buildout of a modern and efficient grid that maximizes integration of distributed energy resources (e.g., energy efficiency, renewable energy, demand response, battery storage, etc.) as well as microgrids (e.g., fuel cells, battery storage, etc.), electric vehicles, renewable heating and cooling (including insulation and building envelope), smart meters, district heating loops, and other advanced technologies while ensuring that cyber security efforts and reducing winter peak demand are an integral part of the platform. Support resiliency planning processes to ensure that the modern grid infrastructure buildout is done responsibly given anticipated future natural disasters (e.g., coastal flooding, snow storms, heat waves, etc.).
- **Invest in Zero-Emission Vehicle Infrastructure** – support the private sector and utility buildout of the nation’s leading electric car charging infrastructure, and hydrogen fueling infrastructure,

⁹ Agencies with LBE projects larger than \$10 million should determine whether Project Labor Agreements would be in the public’s interest, in accordance with subsection (a) of section 31-56b.

including utilization of the VW settlement funds to support transportation decarbonization goals. Support utility investment in make-ready infrastructure to complement the competitive market, and ensure accessibility and affordability in low-to-moderate income communities.

- **Promote Regional Energy and Environmental Collaboration** – while taking into account regional authorities and state jurisdictions, provide leadership to re-initiate and guide the pursuit of necessary regional solutions to help advance Connecticut’s and New England’s energy policy goals, including, but not limited to: reforms in the wholesale electricity markets; the Regional Greenhouse Gas Initiative (RGGI), the Transportation Climate Initiative, improved harmonization of RPS eligibility/targets among the six States, etc. Governor-elect Lamont would offer to host a New England Energy Summit (or “Regional Energy Policy Initiative”) in collaboration with the six New England Governors and regional stakeholders (e.g., NEPOOL, ISO-NE, NESCOE, NECPUC, NEPGA, etc.). This effort would also recognize the key voice and role of legislative bodies in New England and would strongly encourage active participation of key energy policymakers from each state at the Summit and subsequent regional dialogue.
- **Expand CHEAPR Incentives** – commit to establishing a sustainable funding source for the Connecticut Hydrogen and Electric Automobile Purchase Rebate (CHEAPR) that does not impact electric ratepayers, including consideration for revenues from GHG reduction fund (CGA Sec. 22a-201c), revenue from congestion pricing, revenue from the General Fund, TCI cap and invest program, revenue from sales taxes on zero emission vehicles, and/or continued electric utility contributions, and ensuring accessibility and affordability in low-to-moderate income communities.
- **Lead on Transportation Climate Initiative** – lead the regional effort on the Transportation Climate Initiative to establish a cap and invest program for transportation-related greenhouse gas emissions, and convene a summit to initiate the design phase of the program.

These are the “Top 10” policy recommendations from the Energy Committee.

It is important to note that consensus was not reached on all of these “Top 10” policies, nor their overall policy design objectives given some of the following challenges:

- **Alternate Electric Suppliers** – was included as part of the “Protect Ratepayers” within the “Top 10” recommendations, however, this specific recommendation from Working Group A did not receive full consensus from the Energy Committee members – see Attachment G.
- **Amend Section 7 of PA 18-50** – there were a number of policy recommendations from Working Group B that were consolidated into the “Amend Section 7 of PA 18-50” within the “Top 10” recommendation of the Energy Committee, however, many of Working Group B’s recommendations did not receive full consensus within Working Group B (see Attachment H), including:¹⁰

¹⁰ It should be noted that within the Governor-elect’s “Plan for Connecticut” that he notes that the recently passed SB 9 (i.e., PA 18-50) should be reviewed to ensure that net metering fairly compensates homeowners, while he is opposed to cost-shifting to other ratepayers. He also notes the extension and improvement of the ZREC program.

- Expand deployment of share clean energy projects
 - Expand C&I behind-the-meter renewables
 - Ensure fair compensation for residential solar
 - Pursue carbon pricing strategy
 - Update utility business model to support more distributed generation
 - Expand C&I fuel cells
 - Raise or eliminate the cap on the size of behind-the-meter systems
 - Encourage battery storage devices
- **Transportation Climate Initiative** – was included as “Lead on Transportation Climate Initiative” within the “Top 10” recommendations, however this specific recommendation from Working Group C did not receive full consensus within Working Group C’s recommendations – see Attachment I.¹¹

Given the lack of consensus on these various policies, various compromises will need to be pursued among the stakeholders in order to make progress. The identified policy priorities (i.e., jobs, climate change, and energy affordability and equity) should serve as a guide for evaluating the future proposals.

Process and Findings

The Energy Committee was comprised of 26 members and co-chaired by Representative Lonnie Reed (Co-Chair of the Energy & Technology Committee of the Connecticut General Assembly) and Bryan Garcia (President and CEO of the Connecticut Green Bank) – see Attachment B.

In order to achieve the tasks outlined by the Policy Committee, the Energy Committee split up into five (5) Working Groups – see Attachment C, including:

- Working Group A – Pursue Energy Conservation
- Working Group B – Expand Renewable Energy, Modernize Our Grid, and Resiliency Against Rising Sea Level
- Working Group C – Invest in Sustainable Transportation
- Working Group D – Jobs and Workforce Development
- Working Group E – Pursue Regional Solutions

The Working Groups were charged with:

1. Thoroughly capturing the Governor-elect Lamont’s policy platform, as well as additional considerations from the Working Group members for review on worksheets;
2. Accurately representing the final recommendations of each Working Group to the Energy Committee in a presentation; and
3. Working together to consolidate priority recommendations within and across Working Group(s).

¹¹ It should be noted that within the Governor-elect’s “Plan for Connecticut” that participating in the Transportation Climate Initiative was included.

The following is a summary of each of the five (5) Working Group processes and findings.

Working Group A – Pursue Energy Conservation

Working Group A was comprised of 11 Energy Policy Committee members and co-led by Leticia Colon (Chair of Efficiency for All) and Brenda Watson (Executive Director of Operation Fuel).

This group identified six (6) recommendations, of which four (4) were directly from “Ned’s Plan for Connecticut” – see Attachment G. Of these recommendations, the following were the “Top 5” recommendations from the group:

1. Prevent diversion of EE and CEF Funds
2. Reduce energy burdens
3. Reform energy boards and GC3
4. Lead by Example (state buildings)
5. Evaluate alternate electric suppliers in the residential market

Each of these recommendations was consolidated into the final “Top 10” recommendations,¹² except the “Reform energy boards and GC3” recommendation. It was felt by Working Group A and the Energy Committee, that this policy recommendation could be part of an Executive Order since Governor-elect Lamont has the ability to appoint members (including more diverse representation from housing, Connecticut Green Bank, energy efficiency contractors, LMI stakeholders, etc.) to these respective boards (i.e., Low Income Energy Assistance Board – LIEAB, Energy Efficiency Board – EEB, and Governor’s Council on Climate Change – GC3). Consideration could be given to appoint additional representatives to serve on the Joint Committee of the Conservation and Load Management Fund and the Connecticut Green Bank.¹³

Working Group B – Expand Renewable Energy, Grid Modernization, and Resiliency Against Rising Sea Level

Working Group B was comprised of 22 Energy Policy Committee members and co-led by Jennifer Arasimowicz (General Counsel for FuelCell Energy), John Humphries (Executive Director of the Connecticut Roundtable on Climate and Jobs), Joseph MacDougald (Executive Director of the Center for Energy and Environmental Law at UCONN), Pat McDonnell (Vice President of Regulatory Affairs for United Illuminating), and Brad Mondschein (Attorney with Pullman & Comley). The Environment

¹² The “Prevent diversion of EE and CEF Funds” and “End alternate electric suppliers,” recommendations of Working Group A were consolidated into the “Protect Ratepayers” recommendation of the Energy Committee. The “Reduce energy burdens” recommendation of Working Group A became “Expand Energy Efficiency” recommendation of the Energy Committee. The “Lead by Example” Working Group A recommendation was consolidated into the “Lead by Example” recommendation of the Energy Committee.

¹³ Section 16-245m(d)(2)

Committee took the lead on Resiliency Against Rising Sea Level with support from Energy Committee members.¹⁴

Working Group B had a presentation from Orsted US Offshore Wind and Constitution Wind as part of its review process.

This group identified fifty-three (53) recommendations, of which fourteen (14) were directly from “Ned’s Plan for Connecticut” – see Attachment H. Of these recommendations, the following were the “Top 10” recommendations from the group:¹⁵

1. Make changes to Public Act 18-50
2. Strengthen RPS goals
3. Off-shore wind mandate of 2000 MW by 2030
4. Emission reduction goal strengthening
5. Lead by Example
6. Protect against sea level rise
7. Support microgrids
8. Support a modern and efficient electric grid to maximize integration of DG and new technologies
9. Plan for electrification of transportation and buildings
10. Plan for Grid 2.0

Each of these recommendations was consolidated into the final “Top 10” recommendations¹⁶ except the “Emission reduction goal strengthening” recommendation. It was felt by Working Group B and the Energy Committee, that this policy recommendation was an essential recommendation and included as such in the three essential recommendations.

Working Group C – Invest in Sustainable Transportation

Working Group C was comprised of 9 Energy Policy Committee members and co-led by Claire Coleman (Climate and Energy Attorney with the Connecticut Fund for the Environment) and Greg Butler (General Counsel of Eversource Energy).

This group identified fourteen (14) recommendations, of which five (5) were directly from “Ned’s Plan for Connecticut” – see Attachment I. Of these recommendations, the following were the “Top 5” recommendations from the group:

1. Sustainable CHEAPR funding

¹⁴ It should be noted that Jennifer Arasimowicz and Joseph MacDougald were the co-leads from the Energy Committee working with the Environment Committee on Resiliency Against Rising Sea Level.

¹⁵ Note – Working Group B was allowed to recommend a “Top 10” list versus “Top 5” given that they included three of the six areas of focus within Ned’s Plan for Connecticut.

¹⁶ The “off-shore wind mandate” Working Group B recommendation was consolidated into the “Expand Renewable Portfolio Standard” recommendation of the Energy Committee. The “Lead by Example” Working Group B recommendation was consolidated into the “Lead by Example” recommendation of the Energy Committee.

2. ZEV infrastructure investments
3. State fleet clean vehicle mandates
4. EV-ready building codes
5. Transportation Climate Initiative regional cap-and-invest program

Each of these recommendations was consolidated into the final “Top 10” recommendations.¹⁷

Working Group D – Jobs and Workforce Development

Working Group D was comprised of 9 Energy Policy Committee members and co-led by Chris Bachant (Agent with Carpenters 326), Andrea Comer (Vice President of Workforce Strategies for CBIA), and John Harrity (Retired President of the Connecticut Machinists Union).

Working Group D had a presentation from the Center for Energy Workforce Development (CEWD), and participated in the Orsted US Offshore Wind and Constitution Wind presentations as part of its review process.

This group identified seven (7) recommendations, of which three (3) were directly from “Ned’s Plan for Connecticut” – see Attachment J. Of these recommendations, the following were the “Top 5” recommendations from the group:

1. Major commitment to offshore wind projects, including good local jobs, requiring focused efforts on training and recruitment of workers
2. Support major expansion of energy efficiency activities, including energy efficiency technician training with apprenticeships
3. Drastic shift in transportation policy, including retraining combustion engine technicians in electric and hydrogen vehicle repair
4. Increased deployment of fuel cells for microgrid and strategic resilience, with supported growth of fuel cell manufacturing and maintenance jobs
5. Workforce development for green jobs and funding for training and transportation

All of these recommendations were consolidated into an essential recommendation “Green Economy and Jobs Fund” as it was felt by Working Group D and the Energy Committee that this policy recommendation was an essential recommendation and included as such in the three essential recommendations.

The Green Economy and Jobs Fund would provide financial resources for workforce development training programs through ratepayer investment. Through effective and collaborative approaches to economic and workforce development in green energy, these ratepayer investments will ensure a robust pipeline for the anticipated energy jobs that will result from energy efficiency, offshore wind, fuel cells, renewable heating and cooling, and other green energy technologies. Additionally, these

¹⁷ The “State fleet clean vehicles mandate” and “EV-ready building codes” Working Group C recommendations were consolidated into the “Lead by Example” recommendation of the Energy Committee.

investments should include skill standards for program participants, alignment with state apprenticeship initiatives, and input from labor and industry. Lastly, the investments should include the goal of career pathways training and employment for disadvantaged communities and populations, including veterans and young adults.

Working Group E – Regional Energy Issues

Working Group E was comprised of 8 Energy Policy Committee members and co-led by Sandi Hennequin (Vice President of US Public Affairs for Emera Energy) and Sebastian Lombardi (Counsel with Day Pitney).

Working Group E had presentations from ISO-New England and Synapse Energy Economics as part of its review process.

This group identified one (1) recommendation, of which one (1) was directly from “Ned’s Plan for Connecticut” – see Attachment K:

1. Regional energy initiatives

This recommendation was consolidated into the final “Top 10” recommendations.

Innovative and Cross-Cutting Ideas

In the middle of the process, the Policy Committee sought innovative and cross-cutting proposals for consideration. They invited the various committees to submit individually or collectively, ideas that cut across at least two (of the fifteen) policy areas. The following proposals were submitted by or with support from the Energy Committee co-chairs and/or members:

- Investing in Artistic and Sustainable Energy Infrastructure (in collaboration with the Arts, Culture and Tourism and Environment Committees);
- Carbon Pricing (in collaboration with the Environment Committee);
- Connecticut State and Northeast Regional Bank (in collaboration with the Environment, Jobs/Economy, and Transportation Committees);
- Rapid Expansion of Electric Buses;
- Establishing a Coordinate Plan for Offshore Wind Workforce Development; and
- Green and Healthy Homes (in collaboration with the Digital Strategy, Environment, and Housing Committees).

The following proposals were selected to be presented to the Governor-elect in a special memo:

- **Connecticut State and Northeast Regional Infrastructure Bank** – to expand the Connecticut Green Bank’s purview to attract private investment in other environmental markets (e.g., waste – like food waste to anaerobic digestion,¹⁸ zero-emission vehicle infrastructure – like EV bus

¹⁸ Which consolidated in a “Farm Energy” proposal from the Agriculture Committee

station locations,¹⁹ and resiliency – like lowering insurance costs through lower interest loans), while exploring the creation of a Connecticut Infrastructure Bank and potentially a Regional Infrastructure Bank to invest in the mobility infrastructure (e.g., roads, highways, bridges, etc.). For further details – see Attachment W.

- **Green and Healthy Homes** – an interagency initiative working to secure health sector funds to pay for remediation of health and safety issues in housing that can be integrated into a model that includes community health workers for outreach and education and energy efficiency upgrades. For further details – see Attachment X.

Additional Key Attachments

Based on the discussions among members of the various Working Groups, the following executive summaries were provided as key additional attachments:

- Draft Report from the Governor’s Council on Climate Change – Building A Low Carbon Future for Connecticut – Attachment N
- Acadia Center Memo to the Next Governor of Connecticut – Attachment O
- Energy Efficiency Jobs in America by E4 the Future – Attachment P
- Home Energy Affordability in Connecticut – Attachment Q
- ISO-New England Overview and Regional Energy Challenges and Opportunities – Attachment R

As there were numerous conversations and the need to reduce costs, there was also discussion about the importance of quantifying the associated co-benefits of policy actions. The following documents were included as attachments as methodologies deemed by state agencies in Connecticut as reasonable estimates of various benefits:

- Economic Development from Green Energy Investment – Methodology for Estimating Jobs – Attachment S
- Tax Revenue Generation from Green Investment – Methodology for Estimating Tax Revenues – Attachment T
- Environmental Air Pollution Reduction – Methodology for Estimating CO₂, NO_x, SO₂, and PM Emission Reductions – Attachment U
- Public Health Benefits from Air Pollution Reduction – Methodology for Estimating Public Health Benefits – Attachment V

Conclusion

Energy Committee members are pleased to provide Governor-elect Lamont and the Policy Committee with our review of the policy platform. Our Committee included further options to consider and

¹⁹ Which consolidated in a “Rapid Expansion of Electric Buses” proposal from the Energy Committee

suggestions for timing the agenda’s implementation. We identified key deliverables attainable in the Administration’s first 100 days, detailing how these policies will create jobs and spur economic growth. We also defined the fiscal impacts and identified ways to cut government expenses.

As diverse and disparate as Energy Committee members were, we all worked together in a civil and thoughtful manner that respected one another’s values and intentions. We addressed the “big picture” in keeping with Governor-elect Lamont’s optimistic vision for the future of the State of Connecticut. We found the Governor-elect’s plan to be admirably ambitious, demanding strategies that create jobs in our communities, confront global climate change through local and regional action, and reduce energy costs on our families and businesses. We see this as a modern-day program to reduce greenhouse gas emissions, provide meaningful work with a respectable living wage, and encourage citizens to actively engage in our democracy²⁰ – a “Green New Deal.”²¹

We relish being part of this process to support Governor-elect Lamont’s vision for a better Connecticut and look forward to working with his Administration and the Legislature in the days, weeks, months, and years ahead to assist him in achieving his goals.

²⁰ Concept of framing this policy platform as the “Green New Deal for CT” was proposed by John Humphries, Executive Director of the Connecticut Roundtable on Climate and Jobs.

²¹ See e.g., “A Green New Deal: A Progressive Vision for Environmental Sustainability And Economic Stability” (September 2018) published by Data for Progress (<http://bit.ly/GreenNewDeal9-18>).

ATTACHMENT B
ENERGY POLICY COMMITTEE

CO-CHAIRS	
Lonnie Reed State Representative Co-Chair of Energy & Technology Committee	Bryan Garcia President and CEO Connecticut Green Bank

MEMBERS	
Andrea Comer ¹ Vice President of Workforce Strategies CBIA	John Mandyck CEO Urban Green Council
Brad Mondschein ² Attorney Pullman & Comley	Joseph MacDougald ³ Professor in Residence Exec. Dir, Center for Energy & Environmental Law University of Connecticut School of Law
Brenda Watson ⁴ Executive Director Operation Fuel	Kevin Hennessy Director Dominion Energy
Chris Bachant ⁵ Business Agent Carpenters 326	Leticia Colon de Mejias ⁶ Chair Efficiency For All
Claire Coleman ⁷ Climate and Energy Attorney Connecticut Fund for the Environment	Michael Trahan Executive Director Solar Connecticut
Elin Katz Consumer Counsel Office of Consumer Counsel	Pat McDonnell ⁸ Vice President of Regulatory Affairs United Illuminating
Erik Anderson Manager CED Greentech East	Sandi Hennequin ⁹ Vice President of US Public Affairs Emera Energy
Greg Butler ¹⁰ General Counsel Eversource Energy	Sebastian Lombardi ¹¹ Attorney Day Pitney
Jay Beatty Managing Director New Harbor	Stephan Hartmann Manager of Business Development Ross Solar

¹ Co-Lead of Working Group D

² Co-Lead of Working Group B

³ Co-Lead of Working Group B – Liaison with Environment Committee

⁴ Co-Lead of Working Group A

⁵ Co-Lead of Working Group D

⁶ Co-Lead of Working Group A

⁷ Co-Lead of Working Group C

⁸ Co-Lead of Working Group B

⁹ Co-Lead of Working Group E

¹⁰ Co-Lead of Working Group C

¹¹ Co-Lead of Working Group E

Jennifer Arasimowicz ¹² General Counsel FuelCell Energy	Stephen Cowell President E4 the Future
John Harrity ¹³ Former President Connecticut State Council of Machinists	Tim Schneider Co-Owner and CEO Earthlight Technologies
John Humphries ¹⁴ Executive Director Connecticut Roundtable on Climate and Jobs	Tom Swan Executive Director Connecticut Citizen Action Group

¹² Co-Lead of Working Group B – Liaison with Environment Committee

¹³ Co-Lead of Working Group D

¹⁴ Co-Lead of Working Group B

ATTACHMENT C
ENERGY POLICY COMMITTEE MEMBERS

Name	Working Group A	Working Group B	Working Group C	Working Group D	Working Group E
Lonnie Reed ¹	X	X	X	X	X
Bryan Garcia ²	X	X	X	X	X
Andrea Comer ³				X	
Brad Mondschein ⁴		X			
Brenda Watson ⁵	X	X			X
Chris Bachant ⁶		X		X	
Claire Coleman ⁷	X	X	X		X
Elin Katz	X	X	X		
Erik Anderson		X		X	
Greg Butler ⁸		X	X		
Jay Beatty					X
Jennifer Arasimowicz ⁹		X	X	X	
John Harry ¹⁰		X		X	
John Humphries ¹¹		X	X		
John Mandyck	X				
Joseph MacDougald ¹²		X	X		
Kevin Hennessy		X		X	X
Leticia Colon de Mejias ¹³	X			X	
Michael Trahan		X			
Pat McDonnell ¹⁴	X	X	X		
Sandi Hennequin ¹⁵		X			X
Sebastian Lombardi ¹⁶		X			X
Stephan Hartmann		X			
Stephen Cowell	X				
Tim Schneider	X	X			
Tom Swan	X	X			

¹ Co-Chair of Energy Policy Committee

² Co-Chair of Energy Policy Committee

³ Co-Lead of Working Group D

⁴ Co-Lead of Working Group B

⁵ Co-Lead of Working Group A

⁶ Co-Lead of Working Group D

⁷ Co-Lead of Working Group C

⁸ Co-Lead of Working Group C

⁹ Co-Lead of Working Group B – Liaison with Environment Committee

¹⁰ Co-Lead of Working Group D

¹¹ Co-Lead of Working Group B

¹² Co-Lead of Working Group B – Liaison with Environment Committee

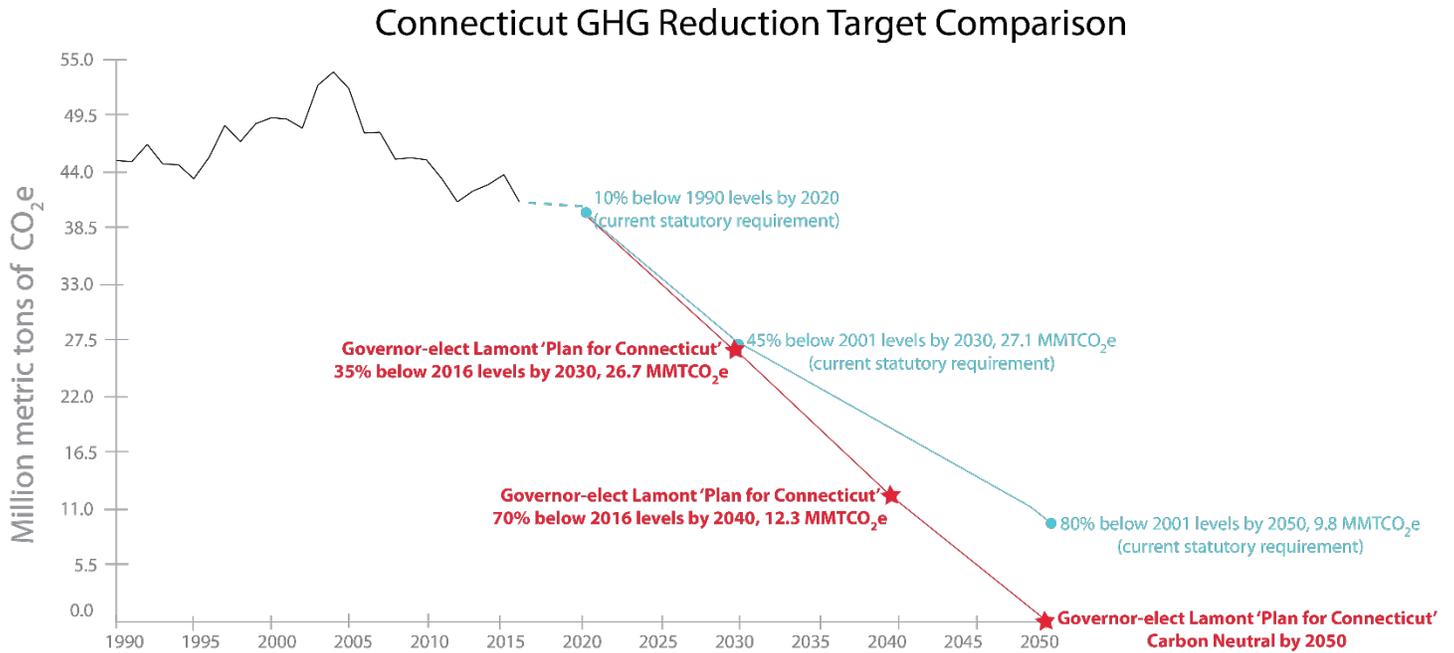
¹³ Co-Lead of Working Group A

¹⁴ Co-Lead of Working Group B

¹⁵ Co-Lead of Working Group E

¹⁶ Co-Lead of Working Group E

ATTACHMENT D
CONNECTICUT GHG REDUCTION TARGET COMPARISON (1990-2050)¹



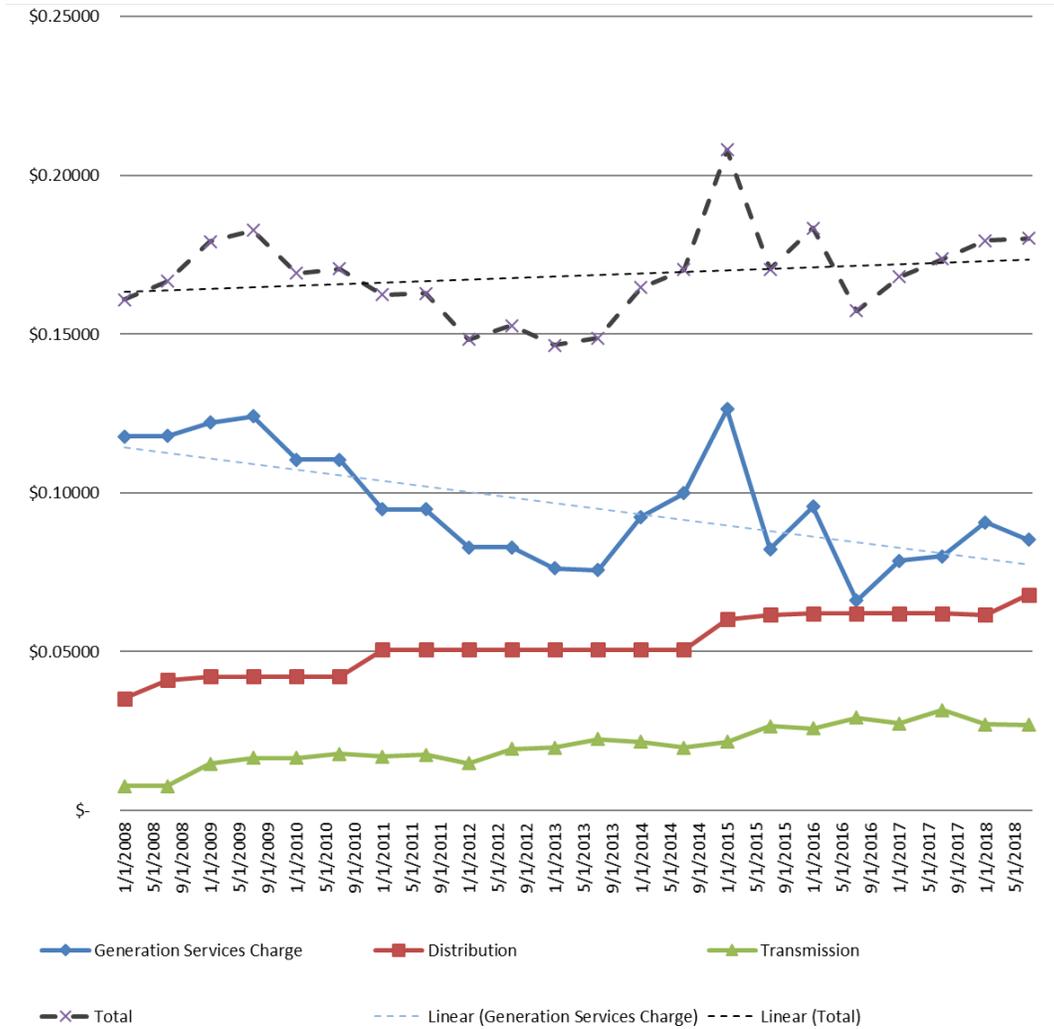
“These targets are tougher than required under the Paris Agreement, but are achievable, measurable goals that will guide our state’s energy and environmental policy.”

Governor-elect Ned Lamont
 Plan for Connecticut

¹ Graphic developed and provided by Keri Enright-Kato, Director, Office of Climate Change at the Connecticut Department of Energy and Environmental Protection

ATTACHMENT E
CONNECTICUT ELECTRICITY RATES – FAMILIES (2008-2018)¹

Eversource Energy Residential Customer Rates (\$/kWh) by Bill Components



“I have spoken to many families throughout this campaign and have heard so much about how difficult it is for families to afford their energy needs, particularly during winter. I will work diligently to bring energy costs down through a variety of steps, including investments in energy efficiency, peak shaving, more competitive bidding, and smart metering.”

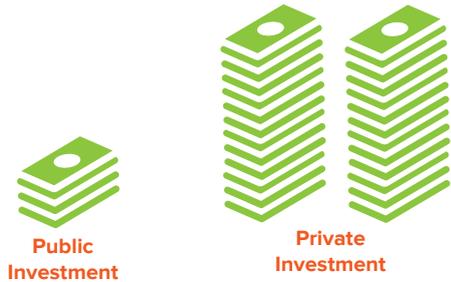
Governor-elect Ned Lamont
 Plan for Connecticut

¹ Graphic developed and provided by Elin Katz, Consumer Counsel of the Office of Consumer Counsel

ATTACHMENT F

ANNUAL SOCIETAL BENEFITS FROM RATEPAYER FUNDS INVESTED IN CONNECTICUT'S GREEN ECONOMY

INVESTMENT



Mobilizing **\$950 million of public and private investment** in Connecticut's green economy per year through energy efficiency, renewable energy, and other green energy technologies.

JOBS

Supporting **38,000** green energy jobs



Supporting an industry of **38,000 design, installation, and manufacturing green energy jobs** in Connecticut.

TAX REVENUES



Generating **\$65 million of individual, corporate, and sales tax revenues** for the General Fund per year in Connecticut as a result of green energy deployment.

CLIMATE CHANGE



Reducing nearly **250 thousand tons of greenhouse gas emissions** per year that cause local public health issues and contribute to global climate change.

The numbers presented are from Eversource Energy and United Illuminating (as administrators of the Conservation Adjustment Mechanism and RGGI allowance proceeds) and Connecticut Green Bank (as administrator of the Clean Energy Fund and RGGI allowance proceeds) through the Joint Committee (i.e., Section 16-245m(d)(2)).

ATTACHMENT G

WORKING GROUP A – PURSUE ENERGY CONSERVATION – POLICY RECOMMENDATIONS

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Protect Ratepayer Funds	<p>Pledges to never support a budget that diverts money from the Energy Efficiency Fund, Green Bank, RGGI and other dedicated funding sources</p> <p>To support a stabilized energy efficiency and clean energy market, maintain and create local jobs, support our carbon and energy stability goals and close the energy affordability gap.</p>	Y	H	I	IL	L A	N	H	H S +	Y P *	
Expand Energy Efficiency and Conservation	<p>Set energy targets for savings from the program initiatives to approximate those that are established in neighboring states. Lower energy costs for families through all cost effective measures such as: increased CL&M EE goals, peak shaving, competitive bidding, smart metering, weatherization, thermal improvements coupled with electric heat pumps, light upgrades and water saving measures. Expand residential energy efficiency to lower residential, commercial energy waste and increase our grid’s performance while lowering peak energy demands.</p> <p>As the largest green energy contributor to job creation and energy cost burden reduction for Connecticut’s families and businesses,</p>	Y	H	I		L A	N	H	H S +	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group A’s Top 10 Priorities (P*)

ATTACHMENT G

WORKING GROUP A – PURSUE ENERGY CONSERVATION – POLICY RECOMMENDATIONS

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
	<p>increase the goal to reduce demand to 2.8 percent of electric consumption and 1.5 percent of natural gas consumption, and ensure accessibility and affordability in low-to-moderate income communities.</p> <p>Increase the statewide statutory goal to invest in residential single family and multifamily energy efficiency so that energy demand can be reduced from 1.6 million MMBtu to 2.0 million MMBtu per year and ensure accessibility and affordability in low-to-moderate income communities to energy efficiency improvements in their homes. Reduce the affordability gap so that most households at 60% of the state median income are not paying more than 10% of their income for energy.</p>										
Reform Governance Structures	<p>In an effort to diversify representation on various boards, reform Low Income Energy Advisory Board, EEB and GC3 to be more inclusive of other stakeholders (e.g., contractors, LMI service providers, etc.) and improve coordination of programs. Establish a Council on Energy Affordability and Equity. Council will address equity such as arrearages and shut-off's, conduct appropriate "cost-effectiveness" and cost-benefit analyses.</p>	N	H	I	A / E O	A	N	N	N	Y	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group A’s Top 10 Priorities (P*)

ATTACHMENT G

WORKING GROUP A – PURSUE ENERGY CONSERVATION – POLICY RECOMMENDATIONS

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Lead by Example	Support legislation to expand and accelerate the existing “Lead by Example” program to 40 percent reduction from current levels by 2030 in energy use while fostering in-state job creation and economic development while reducing the state’s substantial energy costs.	Y	H	I	A	L A	Y +	M	H	Y P *	
Alternate Electric Suppliers	<p>Amend existing law regarding competitive electric suppliers, PA-14-75, An Act Concerning Electric Customer Consumer Protection, banning LIHEAP eligible customers from competitive electric suppliers. Will save federal and state dollars, according to OCC, most customers pay more than standard service, month after month. Bad actors are targeting seniors, low-income, ESL, and customers living with disabilities.</p> <p>Although a regulatory environment with stronger consumer protection measures would be preferable to the status quo, experience in Massachusetts and in other states demonstrates that stronger consumer protection measures are insufficient to transform the competitive supply market from one that causes significant net harm to one that provides net benefits.</p>	Y	H	S	A	L	Y -	N	H	N P *	<p>NY banned LIHEAP customers from competitive supply</p> <p>https://www.energymarketers.com/Documents/Comp_Supply_Report_Final_032918.pdf</p>

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group A’s Top 10 Priorities (P*)

ATTACHMENT G

WORKING GROUP A – PURSUE ENERGY CONSERVATION – POLICY RECOMMENDATIONS

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Green and Healthy Homes Initiative	<p>Move forward with CT Green and Healthy Homes Project to establish sustainable, scalable model addressing housing interventions that reduce energy burdens, improve health outcomes and stabilize housing in low income communities.</p> <p>It should be noted that this recommendation was selected as an “Innovative and Cross-Cutting” proposal as well by the Policy Committee through a competitive cross-committee process.</p>	Y	H	I	A / E O	L / A		M	H	Y	Baltimore, Philadelphia, Cleveland have all demonstrated strong outcomes in terms of public health improvements

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group A’s Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Protect Ratepayer Funds for Efficiency and Renewables	Pledge to not raid Energy Efficiency and Green Bank Funds, and consider supporting legislative changes that would protect funds from being diverted for uses other than energy efficiency and clean energy.	Y	H	I	EO	A L	N	H	H \$+	Y	
Strengthen Climate Goals	Reduce GHG emissions by 35 percent by 2030; Reduce GHG emissions by 70 percent by 2040; Carbon Neutral by 2050.	Y	H	I	IL	L	N	L	L	P* Y	
Strengthen the RPS	Strengthen Class I RPS to no less than 35% by 2025; 50% by 2030; 80% by 2040; and 100% by 2050 [working group proposal: with declining ACP over time (\$30 for 2030; \$20 for 2040; and \$10 for 2050 and beyond)]; DEEP should exercise procurement authority for Class I resources to meet these targets.	Y	H	I	IL	L	N	H	\$+	P* Y	
Establish a mandate for offshore wind (OSW)	Mandate 2000 MW of OSW by 2030, with periodic solicitations of a minimum 400 MW.	N	H	I	IL	L	N	H	\$+	P* Y	
Green Legislative Agenda	Announce Green Legislative Agenda implementing the expansion of renewables and the creation of jobs both in short term (solar and fuel cell) and long term (off-shore wind and small hydro)	Y	H	I	IL	L	?	H	L \$+	P* Y	
Modernize the Grid	Support efforts to modernize the grid, including improving current transmission and distribution systems, integrate DG, storage, bringing in sustainable energy from distant sources, substation upgrades allowing for distribution voltage optimization, enabling time-varying rates and improved system operation and awareness, and improving grid resiliency from extreme weather, geomagnetic disturbances, and cyber-related threats.	Y	H	M	O	L A	N	M	\$+	P* Y	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B’s Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Establish robust Lead By Example Program	Direct agencies, OPM and OTT to prioritize LBE Revise LBE statute to: a) provide predictable funding stream and to allow performance contracts not to be counted toward debt limit since these contracts pay for themselves; b) establish more ambitious savings target; c) require consideration of project labor agreements for large projects and provide scoring preferences to incentivize the use of in-state labor; and d) support PPA’s and ESAs as procurement tools to lower energy costs without having to use general obligation bond funds	N	H	I	EO IL	A L	N	M	M \$+	P* Y	
Phase down biomass in Class I to reduce carbon intensity of the RPS	Support DEEP’s intention to incorporate biomass phasedown policy into the IRP; need to clean up the RPS by reducing the proportion of the requirement met by biomass	N	M	I	A	A	N	L	N	P* Y	
Expand DG	Support the growth of DG to provide economic, environmental, and energy security benefits to electricity customers.	Y	H		O	L A	N	H	L \$+	P* Y	
Improved Resiliency Planning	Support for UCONN CIRCA Sea Level Rise Projection process and a positive command to use these projections as part of any integrated resource plan.	N	H	I	EO	L A	L	N	?	P* Y	
Expand deployment of shared clean energy projects	Raise the 25 MW/yr cap on shared clean energy projects to at least 50 MW/yr to achieve a minimum of 300 MW deployment in 6 years.	N	H	I	IL	L	N	H	L \$+	P* N	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B’s Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Expand C&I Behind-the-Meter renewables	Raise the 50 MW/yr cap on C&I renewables: Possibility: Utilize an annual cap equal to the average annual deployment of all 8 ZREC solicitations for year one. Then adjust the annual cap each year based on market input triggers.	N	H	I	IL	L	N	H	L \$+	P* N	
Ensure fair compensation for residential solar	Review PA 18-50 to ensure that net metering fairly compensates homeowners who produce solar power and reflects the value of carbon being offset. Clarify purposes of interim residential tariff.	Y	H	I	IL	L	N	M	N	P* N	
Pursue Carbon Pricing Strategy	Pledge to work with RGGI states to explore an economy-wide carbon pricing mechanism	N	L	L	A	L	?	?	?	N	
Update utility business model to support more distributed generation (DG)	State of Hawaii is transitioning away from the decades-old utility model by linking performance incentives to performance metrics including incentives for HI utilities to connect more customer-sited efficiency and DG systems. The state is moving to break the link between revenues, and utility investments in infrastructure. Solar industry leaders and HI utilities are working collaboratively to advance a cleaner, more reliable and affordable energy system.	N	H	I	IL	L	N	M	N	P* N	State of Hawaii: SB 2939 SD2 (Act 005) creates the Hawaii Ratepayer Protection Act In light of the expected high cost to modernize an outdated electric grid.
Expand C&I fuel cells	Raise the 10 MW/yr cap on C&I fuel cells	N	M	I	IL	L	N	M	M \$+	P* N	
Raise or eliminate the cap on the size of BTM systems	Raise or remove the cap on the size of individual systems to maximize use of rooftops and other locations	N	M	I	IL	L	N	M	\$+	P* N	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B’s Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Encourage battery storage devices	Battery storage expands DG and grows clean energy jobs. Protections must be in place to safeguard consumers' energy independence, including battery storage options that enhance the reliability/efficiency of the electric grid and reduce the need for additional consumer-funded electric generation facilities.	Y	H	I	IL	L	N	L	\$+	P* N	State of Colorado's 2018 S.B.9, allows residents to install, interconnect, and use energy storage on their property without unnecessary restrictions or discriminatory rate
Improved Resiliency Planning	State and town partnerships to ensure sea-level rise and resiliency are more deeply imbedded into planning and zoning.	Y	H	S		A	?	N	?	P*	
Improved Resiliency Planning	Protecting our coastline by hardening our communities against the impacts of climate change like sea-level rise as part of resiliency strategy.	Y	H	S		A L	?	N	?	P*	
Battery Storage	Research and identify opportunities to integrate battery storage to reduce and displace carbon emissions; To maximize emissions reductions, pairing energy storage with renewable energy generation may be a key strategy.	Y	M	M		A	M	L	N	P*	
Fuel Cells for public facilities	Fuel cell installation to power LOB, Capitol and Bradley Airport	N	M	I	EO	A	?	L	L \$+		
Support RGGI	CT should continue to provide leadership to RGGI and prevent future raids of RGGI funds	Y	H	I	A	A	N	M	\$+	Y	
Value of Solar Study	Undertake a Value of Solar study to be conducted by PURA, CASE or CERC (cost/benefit analysis)	Y	M	M		A	N	N	N	Y	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B's Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Substation upgrades to allow for distribution voltage optimization	Create an Interconnection Working Group to review 2017's Northeast Solar Coalition Report On Interconnection Requirements For The Solar Industry In The Northeast, a report which speaks to policy inconsistencies (direct transfer switch, power factor requirements, reverse power flow, etc.) and how to streamline the benefit of consumers. This plan was requested and funded by the U.S. Institute For Sustainable Communities. None of its recommendations have been instituted in CT.	N	H	I	EO	A	N	N	\$+	N	http://nesemc.com/home/interconnection.html
State employees work from home	Order all Agencies to allow workers to work from home unless necessary to be in offices	N	L	S	EO	A	N	N	Y	N	
Update requirements for microgrids	Direct DEEP to change criteria for microgrid that requires 115% of peak load (only need load required for emergency use/shelter).	N	M	S		A	N	L	N		
Support CT manufacturers	Provide bonus points for generation equipment manufactured in Connecticut.	N	M	S		A	N	M	\$+		
Update requirements for microgrids	Allow ownership by third parties on behalf of a Municipality or non-profit (i.e., university).	N	M	S		A	N	L	N		
Support In-State Renewables	Support in procurement processes for locally sited clean energy projects over out of state installed clean energy.	N	M	M		A	N	M	\$+		
Include resiliency as a factor in procurements	Factor resilience and reliability as much as greenhouse gas emissions in project evaluations.	N	M	M		L	N	M	N		

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B's Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Alternative approaches to resiliency	Explore non-wires alternatives to achieve resiliency and reliability.	N	M	M		L	N	L	?	N	
Improved Resiliency Planning	Grid Status Transparency	N	M	I	IL	L	N	N	N	N	
Streamlined permitting; siting incentives	Streamline community solar permitting process and VNM rules to speed construction of medium-to-large solar installations over brownfields, parking lots, and warehouses. Create standards that drive clean energy development to sites that lack other good uses while keeping the door open to owners of productive lands who want to integrate clean energy into their mix of uses. Provide adders to incentivize deployment of renewable energy on brownfields and parking lots as opposed to farmlands.	Y	H	M		A	N	M	N	N	See Connecticut Rooftop Solar PV Permitting Guide - https://www.energizect.com/sites/default/files/uploads/CT_RooftopSolarPVPermitting%20Guide%205.30.14.pdf
Implement R-PACE	Revise R-PACE statutes to provide private homeowners in Connecticut access to the program.	Y	L	L		L	N	M	N		
ZREC extension	Support the extension and improvement of ZREC program.	Y	H	I	IL	L	N	M	M \$+	N	
Study the feasibility of adding T-RECs to the RPS	Expand Class III RPS to include renewable heating and cooling.	N	M	M		L	N	H	\$+		
Deploy more DG via location incentives	Provide incentives for low income housing, car ports, roofs and others as done in the Mass SMART program	N	M	M		L	N	L	L		MA SMART program; see also Northeast Solar

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B’s Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
											Coalition Report on Interconnection
Uniform Permitting	Implement a statewide uniform permitting process	N	H	S		A	L	N	N		
Phase in requirement that Class I fuel cells are "cleaner" (for CHP or "tri-gen" or use biogas) while increasing the percentage of fuel cells in the RPS	Increase over time proportion of fuel cells that are for CHP or "tri-gen" (hydrogen for ZEVs) and/or the threshold % of gas consumed that comes from renewable sources (landfills, anaerobic digesters using farm and/or food waste, waste water, or other waste sources) to reduce carbon intensity of the RPS, support ZEV infrastructure and create a market for renewable gas; as fuel cells shift become "cleaner", they also get a bigger chunk of the RPS.	N	M	L		L	N	M	\$+	N	
Clarify interim program for renewables compensation	Ensure orderly transition from current compensation approaches (net metering, LREC/ZREC) to new tariff-based approaches by revising statute to clearly describe interim program and amend transition timelines.	N	H	I	IL	L	N	L	N	N	
Deploy more LREC by increasing size limit	Increase cap on systems sizes for low emission to 3 MW;	N	M	S		L	N	L	N	N	
CASE Shared Solar recommendations	Direct DEEP to Implement CASE recommendations relating to renewables that were given to E&T Committee related to shared solar	N	M	M		L A	N	M	\$+	N	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B’s Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Community Choice Aggregation (CCA)	CCA is a way by which towns, including residents and businesses, choose their electricity provider, with the electricity still being delivered by the existing utility. CCA has the potential to lower the cost of electricity for a town's residents and businesses, increase the renewable mix, or both.	N	M	M		L	N	N	N	N	https://www.massclimateaction.org/community_aggregation http://acadiacenter.org/wp-content/uploads/2017/11/Acadia-Center_Community_EnergyVision_Action-Guide_CT.pdf (see p10)
Raise limits on deployment of solar	Nearly half of the 1,600MW MASS SMART program has already been claimed by MA customers. The program was expected to last 4 years. A successor program to this 1 week old SMART is being discussed. In 2016 CT CGA cut commercial solar development in from 100MW to 50MW. Current SCEF program is 25MW. The MA experience demonstrates that CT's solar caps on commercial PV and SCEF are significantly lower than demand. To meet consumer demand for lower cost solar, and grow jobs, CT's solar goals should be 70% of the MA goal. Acadia Center reports well over 1,000 jobs would be created by bumping CT's solar install goals.	N	H	I	IL	L	N	L	M \$+	N	
Remove limits on shared clean energy facilities	Adopt recommendation in CGA-ordered 2014 study by CT Academy of Science and Engineering (CASE) that SCEF legislation, " ... should not provide a capacity size limit for SCEFs" (i.e. remove cap)	N	H	I	IL	L	N	L	\$+	N	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B's Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Protect right to self-consumption for residential solar customers	Last year, State of Nevada was first to guarantee residents the right to generate their own electricity and offset their own internal usage one-for-one at the full retail rate, in the same way they can install energy efficient light bulbs or appliances and save energy at the retail rate. The law was passed to block the local utility from forcing consumers to buy all power from the utility and tell consumers what rate they'd pay consumer for excess generation even though consumer might be trying to use that generation to offset own load.	N	H	I	IL	L	N	L	N	N	Nevada state legislature's 2017 Assembly Bill 405
Incentivize new DG resources and support storage in disadvantaged communities	State of CA created the Self-Generation Incentive Program (SGIP) that provides incentives to support existing, new, and emerging DG resources with rebates for DG systems installed on the customer's side of the meter. 25% of SGIP funds goes to energy storage projects in disadvantaged communities.	N	H	I	IL	L	N	L	N	N	California CPUC Decision 17-10-004
Address concern over cost shifting	Direct DEEP to conduct a solar cost/benefit analysis. More than 20 state reports and a national report on all the reports conclude utilities' cost shift argument is, for the most part, a self-serving myth. When there is a cost shift, the magnitude is essentially meaningless - whether as a benefit or a cost.	Y	H	I	EO	A	L	N	N	N	2017 DOE's LBNL Report on Cost Shift; 2014 Maine P.L Chapter 562; 2014 Minnesota VoS study; 2014 Nevada Assembly Bill (AB) 428; 2012 Vermont Act 125; 2011 Mississippi PSC AD-2. https://www.brookings.edu/research/

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B's Top 10 Priorities (P*)

ATTACHMENT H

WORKING GROUP B – EXPAND RENEWABLE ENERGY, MODERNIZE OUR GRID, RESILIENCY AGAINST RISING SEA LEVEL – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
											oof-top-solar-net-metering-is-a-net-benefit/
Remove limitations on VNM program	Remove caps on VNM opportunities for both State and Municipal Off-takers and allow VNM to commercial customers. [b] VNM projects in the queue that should be honored before moving towards a competitive solicitation. Adopt VNM best practices drafted by Interstate Renewable Energy Coalition (IREC)	N	H	I	IL	L	N	L	N	N	
Mandate DG on new construction	California incentives mandate that the construction of new homes include advanced energy efficiency measures and rooftop solar. Californians expected to save a net \$1.7 billion on energy bills, advancing the top Lamont energy position to create jobs and reach 100% by 2050 goal.	N	M	L		L	N	M	\$+	N	California Energy Commission Building Energy Efficiency Standards contained in the CA Code of Regulations Title 24, Part 6 i
Streamline municipal permitting for solar projects	CA muni's must adopt a solar ordinance by September 30, 2015 to create a streamlined resi solar permit process that conforms to best practices for expeditious and efficient permitting of small residential rooftop solar systems. CT Green Bank's 2015 CT Rooftop Solar PV Permitting Guide compiled best practices for solar PV permitting. The CT Guide was the basis for 2016 CT state legislation that failed to pass intact through the Energy Committee.	Y	H	I	IL	L	N	L	N		2016 CT Green Bank's CT Rooftop Solar PV Permitting Guide; 2014 California's AB 2188
Fix ratepayer impact statement legislation	Starting in 2019, CGA's OFA must assess whether bills will have a significant financial impact on the cost of electricity for most CT ratepayers (PA 17-144). Law unfairly doesn't account for benefits to ratepayers.	N	H	I	IL	L	N	N	N	N	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group B's Top 10 Priorities (P*)

ATTACHMENT I

WORKING GROUP C – INVEST IN SUSTAINABLE TRANSPORTATION – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
CHEAPR: Support widespread adoption of ZEVs by protecting CHEAPR tax credits	<ul style="list-style-type: none"> • Commit to establishing sustainable funding source that does not impact ratepayers, including: revenue from GHG reduction fund pursuant to CGA Sec. 22a-201c; revenue from congestion pricing; revenue from general fund; TCI cap & invest on transportation emissions; revenue from sales tax from EVs; and/or continued utility contributions. • Incentives should also be designed to increase environmental justice and equity. Low-income communities suffer disproportionately from health impacts related to air pollution from conventional cars, and would benefit most from electrification of our transportation sector. In order to make EVs a reality for all, CT also needs an income eligible program that offers bigger rebates and rebates for used cars to customers in lower income brackets. 	Y	H	I	IL	L	Y	N	L S +	Y P *	Existing CT program, California Clean Vehicle Rebate Project (CVRP) and Clean Cars 4 All Program, Delaware (CVRP), Massachusetts (MOR-EV), New York (Drive Clean Rebate), Oregon (Zero Emission Vehicle Rebate)
State Fleet Clean Vehicle Mandates (Lead By Example)	To meet our economy-wide GHG-reduction targets under the GWSA, the state should commit to at least 50 percent of light duty fleet (excluding emergency vehicles) and at least 30 percent of our transit buses to zero emission buses (ZEBs) from current levels by 2030. ZEBs are highly cost-effective and will yield significant air pollution benefits in over-burdened communities and achieve significant reductions in GHG emissions.	N	H	I	E O	L / A	Y	L	L	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group C’s Top 10 Priorities (P*)

ATTACHMENT I

WORKING GROUP C – INVEST IN SUSTAINABLE TRANSPORTATION – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
ZEV Infrastructure: Support the private sector and utility build out of the nation's leading electric car charging infrastructure	Directive or Executive order supporting key principles of grid modernization that will result in private sector and utility build out of electric car charging infrastructure, and hydrogen fueling infrastructure. Support utility investment in make-ready infrastructure to complement the competitive market and help to overcome barriers to entry in important market segments, including low-income communities and multi-family housing.	Y	H	I	E O	A	N	L	S +	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group C’s Top 10 Priorities (P*)

ATTACHMENT I

WORKING GROUP C – INVEST IN SUSTAINABLE TRANSPORTATION – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
EV Ready Building Codes	<p>Support EV-ready building codes, which require new construction to include electrical infrastructure to support EV charging stations, are critical to supporting the charging needs of the growing EV market. EV-ready building codes have two tiers of requirements for parking spaces. “EV Wired” spaces are ready to go for charger installation. “EV Capable” spaces are designed to reduce the cost of charger installations in the future as EV demand increases.</p> <p>Specific Proposal: Update building codes to require that new construction include EV Wired and EV Capable spaces in single-family, multi-unit, and commercial buildings. The percentages for different building types should include:</p> <ul style="list-style-type: none"> • 1-3 family (w/ 1+ parking space) → At least 1 EV Wired space per garage/carport • Multi-unit residential or commercial (w/ 2-0 parking spaces) → At least 4 EV Ready spaces (with minimum of 2 EV Wired. • Multi-unit residential or commercial (w/ at least 11 parking spaces) → 20% EV Ready parking spaces with a minimum of 10% EV Wired. 	N	H	I	E O	A	N	L	M	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group C’s Top 10 Priorities (P*)

ATTACHMENT I

WORKING GROUP C – INVEST IN SUSTAINABLE TRANSPORTATION – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
TCI Regional Cap & Invest: Participate in Transportation and Climate Initiative to help meet clean air and emission goals for transportation	Directive or Executive Order or public release that Connecticut will <u>lead</u> the regional effort to establish a cap and invest program for transportation emissions, and convene summit to initiate the design phase of the program.	Y	H	I	E O	A	N	L	\$ +	N P *	RGGI
Clean Car Standards: Support widespread adoption of ZEVs by adopting stronger emission standards in the state and opposing federal efforts to loosen regulation	Approve amendment to CT's regulation (greenhouse gas provisions of the Connecticut Low Emission Vehicle Program), to update the "National Compliance Option" in line with changes being made in California as a Section 177 of the Clean Air Act (CAA) state. Defend California's right to establish stricter emissions standards under the CAA (the California waiver), and work with Attorney General Tong to continue to engage in litigation against repeal of Obama-era clean car standards and oppose the Trump Administration's proposed the Safer Affordable Fuel-Efficient Vehicles Rule for MYs 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule) that freezes the standards at the MY 2021 level.	Y	H	I	O	A	N	L	L	Y	CA and Section 177 States
Transit-Oriented Development (TOD)	Create a statewide TOD authority that would establish standards for development in and around freestanding rail and CTfastrak stations,	N	M	I	E O	A	Y +	M		Y	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group C's Top 10 Priorities (P*)

ATTACHMENT I

WORKING GROUP C – INVEST IN SUSTAINABLE TRANSPORTATION – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
	for both public and private development that is intended to spur economic growth										
EV Direct Sales	Allow direct sales of EVs and encourage all dealerships to engage all consumers in all localities re: EV opportunities.	N	M	S	IL	L	N	L	\$ +	Y	Many other states, including MA, RI, NY, and NJ (with no impact on auto dealer employment. See https://acadiacenter.org/wp-content/uploads/2017/05/Acadia-Center_EV-Direct-Sales-Analysis_20170517.pdf).
Charging Rate for Electric Transit & School Buses	Adopt new rate class for public transit and school buses for more economical charging	N	M	S	EO	A	N		L	N	California (PG&E)
Clean Autonomous Vehicles	Incent/encourage autonomous vehicles and shared ride vehicles (Uber, LYFT, taxi) to be ZEVs	N	M	L	A / L	L / A	N		S +	Y	Austin, TX; CA bill (SB 1014)

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group C’s Top 10 Priorities (P*)

ATTACHMENT I

WORKING GROUP C – INVEST IN SUSTAINABLE TRANSPORTATION – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
State and Regional Infrastructure Bank	Expand the Connecticut Green Bank’s authority beyond “clean energy” to attract private investment in other environmental markets (e.g., waste, water, resiliency, agriculture, etc.) while seeking to establish a Connecticut State and Northeast Regional Infrastructure Bank to attract investment in mobility infrastructure (e.g., roads, bridges, highways, internet), etc. It should be noted that this recommendation was selected as an “Innovative and Cross-Cutting” proposal as well by the Policy Committee through a competitive cross-committee process.	N	H	S	A	L / A	N	H	L S +	Y	CT Green Bank selected by Harvard University for the “Innovations in American Government Awards” in 2017
Energy Burden Study	Conduct a study on energy burden for low income residents and environmental justice communities, including how electricity, heating and gasoline costs impact these populations.	N	M		A	L / A	Y		N	Y	Similar studies conducted by VEIC; ACEEE; Synapse; Efficiency for All.
Electronic Tolling (with congestion pricing)	Support tolls on large tractor trailers to reduce highway congestion and to reduce dirty diesel emissions, and potentially expand proposal to support variable electronic tolling (congestion pricing) for all vehicles.	Y	H	S	IL	L	Y	L	\$ +	Y	For Congestion or Variable Pricing: California (Orange County, San Diego), Lee County, Florida; Singapore, London, Stockholm.

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group C’s Top 10 Priorities (P*)

ATTACHMENT I

WORKING GROUP C – INVEST IN SUSTAINABLE TRANSPORTATION – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
C-PACE financing for Zero Emission Vehicle Charging Stations	Allow C-PACE to be able to finance zero emission recharging stations (e.g., electric vehicle recharging stations) as a clean energy improvement on a property. Do not require the Savings to Investment Ratio to apply to zero-emission vehicle charging infrastructure.	N	M	S	IL	L	N	L	N S +	Y	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group C’s Top 10 Priorities (P*)

ATTACHMENT J

WORKING GROUP D – JOBS AND WORKFORCE DEVELOPMENT – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Commit to Offshore Wind Projects	State investment in offshore wind will bring great returns, including New London as a regional hub for pre-assembly and staging of wind turbines for projects all along the East Coast. Commitment to approve 2000 MW by 2030 incentivizes New London pier improvements, hiring/training of skilled workers, and expansion of onshore support activities. Estimates vary, but 4,000+ jobs is a conservative prediction. Bold commitment with major buy-in signals serious commitment that matches neighboring states – but with New London harbor as a regional center.	N	H	I	A	L	Y +	H	M	Y P *	
Offshore Wind Projects Should Include Good, Local Jobs	Key to success of the offshore wind program is the inclusion of project labor agreements in RFPs. NY’s Department of Public Service (PURA equivalent) just ruled that PLAs were permitted in that state’s RFPs. Administration should make a commitment to local and diverse hiring, and utilization of skilled trades with professional, efficient work practices, and good-paying jobs. PLAs and use of union labor assure adherence to those goals.	N	M	L	IL	L / A	Y +	H	L	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group D’s Top 10 Priorities (P*)

ATTACHMENT J

WORKING GROUP D – JOBS AND WORKFORCE DEVELOPMENT – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Support Major Expansion of Energy Efficiency Activities	Energy efficiency measures for residential and commercial properties would reduce carbon emissions while producing major savings for property owners. Moreover, a significant “ramping up” of energy efficiency audits and activities has the potential to create 13,000 new jobs. Training programs at technical high schools and community colleges must be informed by industry to ensure alignment with their needs and connection to in-demand positions. Energy efficiency is also a prerequisite to utilizing renewable power sources in a healthy and energy efficient setting.	Y	M	I	E O	A	N	H	M	Y P *	
Drastic Shift in Transportation Policy	In 2017, 36% of our carbon emissions came from transportation sources, a clear indication that a drastic, permanent overhaul is needed. EVs, hydrogen & fuel cell cars, charging & hydrogen fuel stations, renewable energy buses, rail & other mass transit options will be necessary. This transportation transformation has the potential to create approximately 15,000 new jobs from this transportation transformation. In addition, the transition will necessitate training for new technologies, while simultaneously moderating existing fossil fuel jobs that may decline.	N	H	I	E O	A	N	L	?	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),
Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group D’s Top 10 Priorities (P*)

ATTACHMENT J

WORKING GROUP D – JOBS AND WORKFORCE DEVELOPMENT – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Increased Deployment of Fuel Cells for Microgrid Application & Strategic Resiliency	Connecticut-manufactured fuel cells are the perfect technology for microgrid applications, especially as an instrument of strategic resiliency. Every 100MW of fuel cell production employs 200 workers. Strategic siting should include the State Capitol, Legislative Office Building, and Bradley International Airport as showcases of this exportable technology.	Y	M	L	A	A	L	L	H	Y P *	
Expansion/Adaptation of Workforce Development Providers to Green Jobs	Over the past eight years, CT’s workforce development programs have been keenly focused on the urgent need for skilled manufacturing workers. As the state embraces the emerging green economy, a similar strategy must be implemented, creating pipeline initiatives that foster collaboration among technical high schools, community colleges, workforce investment boards and industry partners. Surveys of the green industry employers will inform program design, need for apprenticeships, open the job and incumbent worker training, credentials/certificates, etc. Potential employment for the new green economy represents thousands of new jobs.	Y	H	I	A	A	Y +	L	L	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),
Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group D’s Top 10 Priorities (P*)

ATTACHMENT J

WORKING GROUP D – JOBS AND WORKFORCE DEVELOPMENT – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
Use of a Portion of RGGI / Ratepayer Allocations to Fund Training & Transportation	RGGI (i.e., \$20 million) & ratepayer funding of approximately \$200 million goes to the CT Green Bank (i.e., \$0.001/kWh) and the Energy Efficiency Fund (i.e., \$0.006/kWh). Those entities should mutually agree to utilize up to \$5 million (with proportional contributions) to help fund training for green jobs with the understanding that if funds are curtailed, the training money would be withdrawn. An additional need exists for transportation for workers to job sites. The committee suggests rideshare (Uber, Lyft) limited-time vouchers for new employees.	N	M	M	IL	L	Y +	N	L	Y P *	

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group D’s Top 10 Priorities (P*)

ATTACHMENT K

WORKING GROUP E – PURSUE REGIONAL SOLUTIONS – POLICY RECOMMENDATION SUMMARY

Name	Description	Lamont Plan	Priority	Timing	1st 100 Days	Leg/Admin	Fiscal Impact	Job Creation	Cost Savings	Consensus	Best Practice Examples for Study
<p>Regional Energy Policy Initiative – provide leadership in pursuit of region solution(s) to help advance Connecticut – and New England’s – energy policy goals.</p>	<p>This regional initiative focuses on keystone goals of Governor-Elect Lamont, including most importantly, addressing climate change by reducing carbon emissions and expanding renewable energy, while also addressing regional fuel security-related issues, and encompasses several areas of focus:</p> <ul style="list-style-type: none"> • Focused efforts to develop a proposed regional framework/conceptual approach(es), taking into account various authorities and features of the ISO-NE and state jurisdictional markets (potential solution spaces could include: a forward construct in the wholesale markets to procure and compensate for new and/or existing clean energy resources, better harmonization of the RPS's from the various states, a regional carbon tax, carbon pricing in the wholesale energy market, a regional Zero Emissions Credit (ZEC) program, etc.); • Re-engaging the region in robust discussions beginning with a New England Energy Summit (or "Regional Energy Policy Initiative") among the six New England State Governors. In pursuit of potential regional solutions, these efforts should also promote the collaboration/coordination and information-sharing among the energy committee legislative leaders in other states as well as with other regional stakeholders (including NEPOOL, ISO-NE, NESCOE, NECPUC, NEPGA, etc.); • Continued engagement and leadership in RGGI efforts; and • Connecticut providing a leadership role in regional effort to establish a cap and invest program for transportation emissions. 	Y	H	M	A	A	N	M	M	Y P *	<p>New England already provides some positive examples of successful regional collaboration including:</p> <ul style="list-style-type: none"> • RGGI, • TCI, and • Other regional efforts that have resulted in broad consensus among the six NE states within the NEPOOL/ISO-NE stakeholder process to improve the wholesale electricity markets.

Lamont Plan – Yes (Y), No (N)

Priority – Low (L), Med (M), High (H)

Timing – Immediate/<6 mos (I), Short/2019 (S), Med/1-3 yrs (M), Long/>3 yrs (L)

First 100 Days – Announce (A), Intro Legislation (IL), Executive Order (EO), Ongoing (O)

Legislative/Administrative – L, A

Fiscal Impact (i.e. upfront budget cost) – Increase (Y+), Decrease (Y-), None (N)

Job Creation – None (N), Low (L), Med (M), High (H)

Cost Savings (i.e. longer-term impact) – Low (L), Med (M), High (H),

Source of Income (e.g., tax revenues) (\$+)

Consensus – Yes (Y), No (N), Incorporated into Group E’s Top 10 Priorities (P*)



Transition Memo

To: Governor-Elect Ned Lamont

From: Commissioner Robert J. Klee

Agency Description

It is the mission of the Department of Energy and Environmental Protection (DEEP) to conserve, improve and protect the air, water and other natural resources and environment of the State of Connecticut while fostering sustainable development. The Agency's mission includes the goals of reducing electrical rates and decreasing costs for Connecticut ratepayers, ensuring the reliability of the state's energy supply, increasing the use of clean energy and developing the state's energy-related economy.

Public Act 11-80 established the Department of Energy and Environmental Protection. The majority of the Commissioner's statutory responsibilities are found in the following titles of the Connecticut General Statutes: 15, 16, 16a, 22a, 23, 25, and 26.

Total headcount as of November 1, 2018: 857

Office of the Commissioner – Chief of Staff, Offices of Affirmative Action, Legal Counsel, Adjudications, Office of Planning, Policy, and Program Development, and the Bureau of Central Services.

Office of the Deputy Commissioner of Energy (Public Utilities Regulatory Authority and Energy and Technology Policy) – Public Utilities Regulatory Authority (PURA): Divisions of Utility Regulation, Administration, and Procurement. Bureau of Energy and Technology Policy: Offices of Climate Change, Technology and Research; Energy Supply; and Energy Demand.

Office of the Deputy Commissioner of Environmental Quality (Air, Waste and Water) – Bureau of Air Management: Divisions of Engineering & Enforcement; Planning & Standards; and Radiation. Bureau of Materials Management and Compliance Assurance: Divisions of Waste Engineering & Enforcement; Emergency Response and Spill Prevention; and Water Permitting and Enforcement. Bureau of Water Protection & Land Reuse: Divisions of Remediation; Water Planning & Management; Land & Water Resources.

Office of the Deputy Commissioner of Environmental Conservation (Outdoor Recreation and Natural Resources) – Bureau of Natural Resources: Divisions of Forestry; Inland Fisheries; Marine Fisheries; and Wildlife. Bureau of Outdoor Recreation: Divisions of Boating; Environmental Conservation Police; and State Parks & Public Outreach.

FY 2019 Agency Budget: \$163 million (including all appropriated and non-appropriated funding sources).

Upcoming Dates/Deadlines

Report/Plan Name	Last Submitted	Next Due
Equitable Distribution of Conservation and Renewable Energy Funds in Connecticut	March 1, 2018	March 1, 2019
Permitting Statistics	Fall 2017	Fall 2018
Enforcement Statistics	Fall 2017	Fall 2018
State Water Plan	February 2018	February 2019
Integrated Resource Plan	March 2015	Early 2019
Blue Plan	In Progress	March 1, 2019
Comprehensive Energy Strategy	January 2018	October 1, 2020
Climate Action Plan		Early 2019

Representation on Boards, Commissions and Authorities

- | | |
|---|--|
| i. Governor's Council for Agricultural Development | xxvi. Connecticut Greenways Council |
| ii. Connecticut Airport Authority | xxvii. Connecticut Advisory Commission on Intergovernmental Relations |
| iii. Connecticut Bicycle and Pedestrian Advisory Board | xxviii. Invasive Plants Council |
| iv. Bioscience Innovation Advisory Committee | xxix. Long Island Sound, Central, Advisory Council |
| v. Bi-State Long Island Sound Marine Resources Committee | xxx. Long Island Sound, Eastern, Advisory Council |
| vi. Blight at the Municipal Level Task Force | xxxi. Long Island Sound, Western, Advisory Council |
| vii. Brownfield Remediation Liability Working Group | xxxii. Low-Income Energy Advisory Board |
| viii. Building Code Training Council | xxxiii. Connecticut Maritime Commission |
| ix. Capital Region Development Authority | xxxiv. Governor's Council on Climate Change |
| x. Central Long Island Sound Advisory Council | xxxv. Natural Heritage, Open Space and Watershed Land Acquisition Review Board |
| xi. Chemical Innovations Institute Board of Directors | xxxvi. Nitrogen Credit Advisory Board |
| xii. Clean Energy Finance and Investment Authority Board of Directors | xxxvii. Nuclear Energy Advisory Council |
| xiii. Board of Code Training and Education Control | xxxviii. Legislative Committee on State Planning and Development |
| xiv. Community Economic Development Program Board of Directors | xxxix. Public Health Preparedness Advisory Committee |
| xv. Competiveness Council, Conn. PA 10-75 s. 19 | xl. Committee to Review School Construction Regulations and Priority Listings for School Construction Projects |
| xvi. Connecticut Development Authority | xli. Connecticut Siting Council |
| xvii. Connecticut Innovations | xlii. Special Contaminated Property Remediation and Insurance Fund Advisory Board |
| xviii. Commission on Connecticut's Future | xliii. State Contracting Standards Board |
| xix. Eastern Long Island Sound Advisory Council | xliv. Legislative Committee on State Planning and Development |
| xx. Energy Conservation Management Board | xlvi. State Properties Review Board |
| xxi. Council on Environmental Quality | xlvi. Western Long Island Sound Advisory Council |
| xxii. Farmland Preservation Advisory Board | |
| xxiii. Finance Advisory Committee | |
| xxiv. Forest Practices Advisory Board | |
| xxv. Freedom of Information Commission | |

Policy Priorities for 2019

Plan for Resilience

Public Act 18-82 requires that state-funded infrastructure projects account for up to 20 inches of sea level rise by 2050. DEEP will have a role in assisting state agencies and local governments meet this requirement, including through coordination with the Connecticut Institute for Climate Resilience and Climate Adaptation (CIRCA).

Acquire and Manage Conservation Land

DEEP should continue to acquire and manage conservation and recreation lands for the benefit of the public. Passport to Parks funds should be utilized to enhance park and forest management, ensuring that the nine million-plus annual visitors are provided the full measure of improvements and staffing necessary to ensure public safety and cleanliness, as well as natural resource protection for public lands.

Adopt the State Water Plan

DEEP will assist in the resubmittal of the State Water Plan for legislative endorsement. In the meantime, state agencies must continue to act in accordance with the State Water Plan as drafted, as directed by Executive Order 66.

Oppose Federal Actions that Harm Connecticut's Environment

Where regulatory rollbacks at the federal level threaten Connecticut's air and water quality, such as the weakening of vehicle emission standards and replacement of the Clean Power Plan, DEEP should continue to take leadership with like-minded states to ensure that the effects of these rollbacks on Connecticut's environment and human health are considered.

Promote Waste Reduction

Connecticut faces a growing shortfall in waste disposal capacity and rising costs for recycling and waste management. To address both of these challenges, DEEP should continue to promote the adoption of unit-based pricing for MSW (so-called "pay as you throw"), including the creation of waste reduction requirements, and promote the creation of product stewardship programs for packaging and other components of the waste stream.

Address Emerging Contaminants

As more information comes to light on the health and environmental effects of certain perfluorinated compounds and other chemicals, DEEP must respond proactively, including closely coordinating with the state Department of Health to respond when such chemicals are determined to cause a threat to human health.

Advance Local, Regional, and National Fish and Wildlife Conservation

Through such actions as implementation of State Wildlife Action Plans and State Forest Action Plans, and growing the next generation of fish and wildlife enthusiasts, DEEP should continue to promote the conservation of wildlife.

Implement Passport to Parks

Continue implementation of a program to increase customer service and public safety in state parks, forests and wildlife management areas using dedicated revenue from CT vehicle registrations. Vehicles with CT license plates obtain free day-use parking at all state parks, forests and wildlife management areas in return.

Continue LEAN & Process Improvement

DEEP must continue to use process improvement techniques and data-informed program management to efficiently focus resources on permitting and enforcement priorities.

Focus on Economic Development & Brownfields

DEEP must continue working with local, state, and federal agencies to convert contaminated brownfields to productive use. This includes the adoption of modernized Remediation Standard Regulations.

Advance Local, Regional, and National Leadership on Climate Change

DEEP must continue to participate in regional partnerships to advance climate science and sound public policy, including the Transportation and Climate Initiative, and U.S. Climate Alliance.

Decrease Greenhouse Gas Emissions by Implementing Recommendations of Governor's Council on Climate Change

Public Act 18-82 requires the state to achieve of a 45% reduction in emissions from 2001 levels by 2030. Meeting that goal will require a rapid acceleration of our efforts to decarbonize thermal energy, the electric grid, and our transportation system. DEEP should continue to align energy policies with meeting climate goals, including through the adoption of the next Integrated Resource Plan (IRP) and Climate Action Plan in early 2019.

Increase Uptake of Zero-Emission Vehicles

Connecticut must accelerate the adoption of electric vehicles, which requires investments in charging infrastructure, extending the CHEAPR rebate program, implementing the recommendations outlined in the forthcoming Electric Vehicle Road Map, and integrating electric vehicle charging projections into PURA's grid modernization proceedings. The state should also pursue policies that increase the integration of ZEVs into the state fleet.

Implement New Energy Programs and Grid Modernization

Public Act 18-50 provides a foundation for sustainable investments in renewable energy. Full implementation of this legislation should be a priority for the next administration. Concurrently, PURA's grid modernization proceeding will address how distributed energy resources can be best integrated and optimized to reduce costs and improve system reliability and resiliency.

Adopt Regional Greenhouse Gas Initiative Program Changes

The eight states that make up the Regional Greenhouse Gas Initiative (RGGI) recently agreed to changes to strengthen the program. Updated regulations reflecting these changes are currently out for public comment prior to being submitted to the Legislative Regulation Review Committee. DEEP anticipates the updated regulations will be fully adopted by mid-2019.

Adopt the Blue Plan

Pursuant to Public Act 15-66, DEEP is responsible for developing a marine spatial plan for Long Island Sound to protect existing traditional uses and avoid future use conflicts. Ultimately, Blue Plan policies will guide existing regulatory programs. The Draft Plan must be submitted to the legislature by March 2019.

Major Projects Underway

Silver Sands State Park – Milford

Long overdue beach amenities for sanitation, safety and park operations are currently under construction for the 2019 season.

Seaside State Park– Waterford

DEEP has engaged in a process to solicit developers for a State Park lodge/hotel, including the reuse of existing National Register listed historic buildings. The review is ongoing. Any future project will need bond commission approval for site improvements and necessary pre-construction activities.

Harkness Memorial State Park – Waterford

Design is currently underway for restoration of the historic carriage house complex.

Sleeping Giant State Park – Hamden; Wharton Brook, Wallingford

Tornados and storms in May 2018 resulted in significant damage; parks are closed and repairs underway.

Mid-Connecticut recycling infrastructure transformation – Hartford

An RFP administered by DEEP sought the redevelopment of MIRA's waste-to-energy facility in Hartford to emphasize recycling technologies. Negotiations between the selected developer and MIRA are continuing and further state action may be necessary to bring the project to fruition.

Statewide Tree Removal

DEEP has inventoried over 15,000 dead or diseased trees that may pose a risk on the state's public lands. Removal is estimated at \$8 million.

The East Coast Greenway

The 200 miles of the East Coast Greenway that runs through Connecticut showcase the state's diverse cultural and natural resources. This multi-year effort to provide contiguous access will continue.

Clean Energy Procurements

Procurements for renewable and zero-carbon energy are ongoing and new rounds may be planned in coming years.

Lead by Example (LBE)

Connecticut state agencies spend approximately \$80 million per year on energy costs - saving 20% (conservative estimate of efficiency improvements available) would translate into significant operating savings per year. Through a collaborative inter-agency process, a pipeline of projects for different agencies is being developed.

New London Port

In a 2018 procurement, DEEP selected 200 MW of wind energy. Economic co-benefits of the selection include \$15 million in private investment in New London State Pier to allow substantial aspects of the project to be constructed in New London. The wind project is expected to lead to the creation of over 1,400 direct, indirect and induced jobs. DEEP is an active participant in the Port Authority and will play a role in environmental permitting of these projects.

CRRRA Landfills

DEEP assumed responsibility for long-term post-closure care of landfills from CRRRA. Significant work has been completed at all sites and ongoing monitoring is being performed.

Dam Management

There are 5,500 dams on the landscape, of which approximately 3,000 are regulated by DEEP due to potential hazards to person or property should they fail. The state has made significant progress in addressing unsafe privately-owned dams and repairing state-owned dams, including the recent removal of the Springborn Dam, the largest dam removal in Connecticut history. Dam repair and removal projects for state-owned dams are conducted by DEEP on an ongoing basis.

Phosphorus Reduction Strategy

DEEP completed issuance of updated permits limiting phosphorus in municipal and industrial discharge to protect water quality. This requires upgrades to a number of wastewater treatment plans around the state.

Remediation and Site Cleanups

DEEP is involved in a number of significant remediation projects around the state in various phases of completion. These include the Stratford Army Engine Plant, Raymark Industries Superfund (NPL) Site, Durham Meadow Federal Superfund Site, and Tylerville Center State Superfund Site, among several others. Since 2011, DEEP has completed the cleanup of 421 contaminated properties and putting 3,624 acres back into use.

National Estuarial Research Reserve (NERR) Designation

The NERR system is a federal/state partnership that establishes a location dedicated to estuarine research, monitoring, education, and stewardship. DEEP is nearing completion of an extensive public process to nominate a NERR.

Long Island Sound Trawl Survey

DEEP continues its trawl survey with the R/V John Dempsey, adding to a 30+ year database of marine fish survey data.

Major Legislation, Programs and Program Expansions Undertaken since January 2011

DEEP Formation

Public Act 11-80 merged energy offices into Connecticut's environmental agency on July 1, 2011, creating the Department of Energy and Environmental Protection (DEEP).

Renewable Energy & GHG Reduction

Since 2011, Connecticut has doubled its renewable portfolio standard (RPS) from 20% by 2020 to 40% by 2030 and set a mid-term target to reduce greenhouse gas 45% by 2030.

Focus on Materials Management

Public Act 14-94 established the Materials Innovation and Recycling Authority and called for the modernization of infrastructure, created RecycleCT, and set a goal of 60% diversion from disposal by 2024.

Cleaner Air & Water

DEEP adopted several regulations to reduce emissions of ozone precursors from fuel-burning equipment, municipal waste combustors, paints and consumer products. Pursuant to Public Act 10-158, DEEP completed rulemaking process for Water Quality Standards and received approval from the EPA on December 11, 2013.

Sustainable Parks Funding and Increased Public Access

In 2018, Public Act 18-7 created the Passport to the Parks Fund, which allows all Connecticut residents with Connecticut license plates free access to state parks.

STATE OF CONNECTICUT
PUBLIC UTILITIES REGULATORY AUTHORITY (PURA)
10 Franklin Square, New Britain, CT 06051
860-827-1553
www.ct.gov/pura

Transition Memo

To: Governor-Elect Ned Lamont

From: Katie Dykes, Chair
John W. Betkoski, III, Vice Chairman
Michael Caron, Commissioner

Agency Description

Utility services—electricity, natural gas, water, and telecommunications—are the backbone of Connecticut, providing the essential services on which our society depends for safety, health, and a thriving economy. In 2017, Connecticut families and businesses spent well above *six billion dollars* on utility services regulated by the Public Utilities Regulatory Authority (PURA).

PURA is statutorily charged with regulating the rates and service quality of Connecticut's investor-owned electricity, natural gas, water and telecommunication companies along with other utility regulatory responsibilities. In the industries that are still wholly regulated, PURA balances the public's right to safe, adequate and reliable utility service at reasonable rates with the provider's right to a reasonable return on its investment. PURA also keeps watch over competitive utility services to promote equity among the competitors while customers reap the price and quality benefits of competition and are protected from unfair business practices.

PURA replaced the former Department of Public Utility Control (DPUC) and along with the Bureau of Energy and Technology Policy, is part of the Energy Branch of the Department of Energy and Environmental Protection (DEEP). DEEP was created in July 2011 and brings together the state's Department of Environmental Protection (DEP), the Department of Public Utility Control (PURA) and an energy policy group that had been based at the Office of Policy and Management.

Statutory Authority

Title 16 of the Connecticut General Statutes

Staffing and Budget

- Average Full-Time Employees: 67 current, of 70 FTEs allocated to PURA
- Operating Expenses: FY 19 budget of approximately \$11.5 million
- Funding: Special PUC Fund (funded through utility assessments), plus additional federal grant dollars supporting the PURA Gas Pipeline Safety Unit

Areas of Focus

PURA implements its regulatory responsibilities through a broad range of activities, including adjudicating contested dockets, but also conducting field inspections, pursuing enforcement cases, drafting regulations, issuing reports, monitoring emergency response, overseeing procurements, dispersing grants, licensing and certifying market participants, assisting customers with resolution of individual disputes, coordinating with regional bodies, and litigating before federal agencies. The sector areas of PURA's regulatory program and related accomplishments for 2017-2018 are described in more detail below, with related actions planned for 2019 and beyond listed in bullets.

Electricity Markets & Distribution

PURA directly regulates the distribution rates and services of the state's two investor-owned electric distribution companies (EDCs), Eversource and United Illuminating Company (UI). PURA also has oversight responsibility for several key state-jurisdictional markets for clean energy, including the LREC/ZREC program, Energy Efficiency Partners, as well as the state's Renewable Portfolio Standard. In addition, PURA actively advocates for Connecticut ratepayers' interests in stakeholder processes in the ISO-New England wholesale electricity markets, including before the Federal Energy Regulatory Commission (FERC).

1. Regulating Electric Utility Rates & Services – PURA reviews and approves the distribution rates charged by the EDCs in rate cases that are filed every ~3 years; annual “true up” proceedings for ongoing costs; and a host of special proceedings to address issues like storm cost recovery, vegetation management, and rate design issues, such as the fixed residential customer charge. PURA completed rate case decisions for Eversource in 2017 (approving rates for 2018-2020), and for United Illuminating in 2016 (covering 2017-2019). Upcoming in 2019 & beyond:

- (December 2018) PURA expects to conclude Docket 18-01-15 considering the implications of the 2017 *Federal Tax Cuts & Jobs Act* for utility customer rates.
- (2019) UI may submit a new rate case application sometime in 2019, for rates effective in 2020.

2. Modernizing the Grid, Integrating Distributed Energy Resources (DERs) - With increased adoption of distributed energy resources—better utility planning and investment in the distribution grid will necessary to ensure DERs are integrated in a way that minimizes costs and maximizes the benefits DERs can provide. PURA launched an investigation (Docket 17-12-03) to ensure Connecticut's grid modernization strategy is focused on the highest-impact problems/opportunities. The docket has examined (1) the major drivers of distribution system costs, (2) how electric customer demand will change over time, especially in light of the state's carbon goals, and (3) the current and future desired functionality of the distribution system. PURA has already approved several innovative utility pilot projects for grid modernization, including hosting capacity mapping and a portal to share the best sites for interconnection with developers (Docket Nos. 17-06-02/17-06-03), and is evaluating a pilot that tests the effectiveness of targeted DER to defer capacity upgrades (Docket No. 17-06-03). Upcoming in 2019:

- (January 2019) PURA will issue its Phase I decision in Docket 17-12-03, identifying the priority and sequence for grid modernization implementation dockets to follow in Phase II. These Phase II dockets will potentially cover: electric vehicle integration, valuation of DER costs and benefits, rate design for beneficial electrification, distribution system planning, and utility grid modernization investments (e.g., smart grid).

- (2019) PURA expects to issue a request for a utility pilot to identify the best models (e.g., rate design, pairing charging with distributed generation, optimizing for bus charging locations, etc.) to enable the electrification of public transit fleets.
- (2019) Many of the building blocks of grid modernization and transportation electrification—such as interoperability, forecasting, etc.—are more technical (than policy) in nature, and may benefit from uniformity to catalyze a regional market. PURA is advancing an initiative at the regional level to develop model standards and policies in these areas that could be adopted by individual commissions.

3. Developing Markets for Clean Energy – PURA administers many of the state’s markets for clean energy investment. PURA certifies facility eligibility and oversees annual compliance with the state’s Renewable Portfolio Standard, which requires 40% of electricity sales to be from Class I renewables by 2030. PURA also oversees the state’s legacy LREC/ZREC program to support commercial and industrial behind-the-meter Class I renewables. Upcoming in 2019:

- Section 7 of Public Act 18-50 directed PURA to implement major changes to compensation for behind-the-meter (BTM) renewables (Docket No. 18-08-33). The legislation requires PURA to approve a new procurement plan for BTM renewables, with two tariff options. The legislation also allows PURA to establish added compensation for electric system benefits provided by BTM resources, including peak reduction, locational benefits, and other benefits. Major milestones in the schedule for Docket 18-08-33:
 - (Spring 2019) Approve an interim tariff for residential solar PV, in advance of the expected expiration of the Residential Solar Investment Program in December 2019.
 - (August 2019) Approve a permanent tariff for residential solar PV.
 - (January 2020) Approve the procurement plan for commercial and industrial solar PV. PURA will review and approve a Shared Clean Energy Facilities Program submitted by DEEP.
- (2020) Together with DEEP, PURA represents Connecticut on the board of the Regional Greenhouse Gas Initiative, Inc. a multi-state cap-and-trade program to reduce GHG emissions in the electric sector. The RGGI states are currently working to integrate two new states, Virginia and New Jersey, into the program. The RGGI states will undertake a comprehensive review of the program in 2020, which could include opportunities for further expansion into additional states.

4. Supporting Investment in Energy Efficiency – PURA administers the Electric Efficiency Partners (EE Partners) program, which authorizes up to \$60 million in ratepayer funding annually for projects that support enhanced demand-side management technologies. PURA submits an annual report to the General Assembly on the operation of the EE Partners program to date (Docket No. 18-01-28 for the latest report). In October 2018, PURA approved grant funding for an innovative demand response application enabling customers to respond to price signals in real time (Docket No. 17-11-27). Upcoming in 2019:

- (2019) PURA will consider modifications to the EE Partners proposal process to adopt an RFP approach (Docket No. 07-06-59RE02), as well as two pending EE Partners applications.

5. Advocating for Connecticut in Regional Electricity Markets – PURA collaborates with DEEP, the Office of Consumer Council, and the CT Attorney General’s Office in representing Connecticut’s interests in stakeholder processes and litigation regarding the ISO-New England wholesale electricity markets. A failure to adapt ISO-NE’s market design to regional needs—including achieving carbon goals and resolving the region’s fuel security problem— has exposed Connecticut ratepayers to the possibility of state-

procured resources (e.g., solar, offshore wind) being counted towards Connecticut’s generation capacity requirements, while generators needed for fuel security (e.g., Exelon-owned Mystic power plants) are seeking expensive cost-of-service contracts to stay online. In 2017-2018, PURA opposed changes to ISO-NE market design that erect barriers to the development of clean energy resources; challenged the rate to be paid to Exelon-owned Mystic power plants (anticipated be nearly \$600 million over two years) as excessive; and actively litigated to reduce transmission ROEs and ensure tax cut benefits for gas pipelines are returned to customers.

- (2019) In response to Executive Order No. 59 and June Special Session Public Act 17-3, PURA will finalize its at risk determination for the Millstone Power Station, and review any contracts for zero carbon generation facilities that may result from such determination and DEEP’s solicitation.
- (2019) PURA will advocate for comprehensive solutions to the region’s electricity market structure, including complementary approaches to achieving state public policy objectives and resolve fuel security reliability challenges through innovative market-based designs that harmonize the best features of ISO-NE and state jurisdictional markets.

6. Ensuring Safe & Reliable Electric Service – Connecticut has experienced a series of major storm events in recent years, most notably in 2011 and 2012, that have caused widespread power outages and significant damage to the electric distribution system. PURA has already approved a five-year (2013-2017), \$400 million resiliency program for Eversource Energy including enhanced tree trimming, system hardening, and system automation. In 2016, PURA approved a four-year (2017-2020), \$50 million resiliency program for United Illuminating of system hardening, including a project to relocate and elevate the Pequonnock Substation in Bridgeport that is at risk of coastal flooding. These investments are underway. Upcoming:

- (January 2019) PURA will issue a report to the General Assembly on the reliability of the electric distribution system, with a special focus on long-term trends in major storm events, including ratepayer cost and system impacts.
- (January 2019) PURA will issue a report to the General Assembly on the reliability of the electric distribution system, with a special focus on recent trends in major storm events, including ratepayer cost and system impacts.

Retail Electricity Sales

Connecticut deregulated its electric industry in 1998, allowing third-party suppliers to compete with the electric utilities to sell electricity to retail customers. Today, approximately 30% of residential customers and more than 90% of commercial and industrial customers have chosen to rely on one of the more than 60 third-party suppliers licensed by PURA to sell electricity in Connecticut, while the remainder rely on the utilities’ Standard Service and Last Resort Service rates.

1. Standard Service & Last Resort Service – As part of a PURA-approved plan, the PURA Procurement Manager and the electric utilities review bids each quarter to supply the utilities’ retail electricity rates. These rates are updated each year in January and June.

2. Promoting Transparency & Competition – PURA promotes consumer choice and supplier competition by maintaining an online [rate board](#) with up to date information to compare competitive retail rate offerings. The rate board approximately 30,000 unique visitors per year.

- (2019) PURA will continue several investigations into suppliers' failure to timely and accurately provide summary information (including the next month's rate) as statutorily required for customers' bills.

3. Enforcing Consumer Protections – PURA implements a comprehensive regulatory program to ensure compliance with basic consumer protections in the retail supplier market. In 2017-2018, PURA issued and is adjudicating three substantial notices of violation against suppliers and opened two additional formal investigations related to deceptive marketing. PURA issued and is adjudicating a notice of violation against one supplier related to compliance with summary bill information requirements. PURA also conducted numerous informal investigations into allegations of deceptive marketing, transfers of licenses and customers, and compliance with statutes regarding pricing and contract provisions. PURA is prepared for a similar level of enforcement activity to continue in 2019 and beyond.

Natural Gas Distribution

PURA regulates three gas utilities or local distribution companies (LDCs) that operate within Connecticut. The LDCs are: Connecticut Natural Gas Corporation, Southern Connecticut Gas Company (both subsidiaries of Avangrid, Inc.), and Yankee Gas Services Company d/b/a Eversource Energy. Collectively, the three gas LDCs provide natural gas service to over 600,000 customers in approximately 118 of the 169 towns in Connecticut.

1. Regulating Rates & Services – PURA periodically reviews rate case applications from the gas LDCs. A rate case for SCG was concluded in 2017, while PURA expects to issue decisions in pending rate cases involving Yankee in December 2018, and CNG in January 2019.

2. Oversight of Natural Gas Supply – Connecticut's gas LDCs maintain pipeline capacity contracts and LNG facilities to ensure adequate supply of natural gas for their firm customers. PURA conducts periodic dockets to review gas supply forecasts and fuel cost true-ups.

3. Natural Gas Expansion Program – In 2013, PURA approved a new framework for the gas LDCs to provide service to new customers. Since that time, 70,000 customers have switched to gas.

4. Tracking and Remediating Gas Leaks – The safety and integrity of the distribution system is a top priority for PURA. PURA closely monitors the type and number of leaks on the systems. PURA requires the LDCs to remedy any leak that represents a risk to safety. In addition, since 2010, PURA has been requiring the LDCs to accelerate their programs to replace all legacy cast iron and bare steel pipe with state-of-the-art plastic pipe within 20 years.

- (2019) PURA is reviewing the methodologies used by the LDCs to estimate Lost and Unaccounted For Gas (LAUF), improve accuracy in reporting and to provide actionable data for purposes of reducing LAUF.

Natural Gas Pipeline Safety

PURA is committed to ensuring that gas transportation systems in Connecticut are designed, built, operated and maintained safely. PURA's Gas Pipeline Safety Unit (GPSU) ensures the safety of natural gas and propane infrastructure by conducting more than 500 field inspections per year of new construction and operation and maintenance activities on existing pipeline facilities and plants, as well as reviews of company plans, procedures and records. Key activities include:

1. Enforcement –PURA’s GPSU took over 220 enforcement actions in 2017-2018 for violations of pipeline safety regulations, resulting in the collection of approximately \$1.5 million in civil penalties.

3. Call Before You Dig (CBYD) – The CBYD program protects public safety by ensuring that utilities mark out buried infrastructure prior to excavation activities taking place. In 2017-2018, PURA investigated over 600 reports of CBYD damages and violations.

Water

PURA regulates ten investor-owned water companies in Connecticut, including rates and service, land sales, mergers and acquisitions, affiliate transactions, and the issues detailed below. PURA also serves on the multi-agency State Water Planning Council. Key initiatives include:

1. Modernizing Water Infrastructure – Between 2017-2018, PURA adjudicated and approved 24 applications for Water Infrastructure and Conservation Adjustments (WICA) for the purpose of accelerating the replacement or rehabilitation of aging water systems as well as to encourage conservation and system resilience. In addition to WICA, PURA has approved decoupling mechanisms for some water companies. This mechanism supports water conservation by removing utility disincentives to lower customer sales.

2. Viability of Small Water Systems -- PURA shares with the Department of Public Health (DPH) oversight responsibility for numerous small water systems in the state. In 2017-2018, PURA and DPH jointly developed a more efficient and thorough process to regulate small water systems that are in need of improvements or, in some cases, possible takeover by a larger water utility.

3. Ensuring a Resilient Water Supply – With the change in the global climate, Connecticut may experience drier summers over the next 25 years. In 2016, PURA allowed a regulated water company to recover the extraordinary costs associated with providing water to customers who were experiencing water shortages due to drier than normal conditions.

Telecommunications & Cable

PURA continues to regulate certain segments of the telecommunications and cable industry. The general trend has been towards deregulation in this area, and PURA’s primary role is to ensure market competitiveness, infrastructure access and integrity, and protect the public interest. Key initiatives include:

1. Streamlining Small Cell Antenna Siting for Broadband and Cellular Networks – In 2017, PURA developed new, streamlined procedures for handling the hundreds of applications PURA receives to place small cell antennae on utility poles. The new procedures facilitate the continued build-out of Connecticut’s advance broadband and cellular networks and better enable PURA to focus adjudicatory efforts on those siting applications with objections from adjacent property owners.

- (2019) Single Pole Administrator - The proper and efficient use of the telecommunications gain on utility poles is essential for ensuring that Connecticut remains at the forefront of high-speed telecommunications. PURA is examining the role of the pole owners (i.e. the EDCs and the incumbent telecommunications company) to ensure the infrastructure is conducive to maintaining a competitive market.

Assisting Utility Customers

PURA's Consumer Affairs Unit (CAU) provides information and dispute resolution for utility customers, including complaints involving electric suppliers, high bill disputes, billing errors, payment arrangement negotiation, service termination, and quality of service. The CAU has managed approximately 4,000 complaints per year, including over 20,000 calls answered by the CAU's call center. In addition to assisting customers, the CAU takes primary responsibility in dockets involving electric supplier consumer protection investigations, arrearage forgiveness programs, uncollectible accounts and termination procedures, and an ongoing investigation to determine the feasibility, costs and benefits of placing hardship customers on standard service.

Other Functions

1. Emergency Management – PURA participates in all aspects of emergency preparedness and response involving the state's utilities, including reviewing emergency response plans, monitor utility response and facilitate intergovernmental communications during emergencies, and performing oversight on system damage and utility restoration activities after the fact.

2. Cybersecurity – In April 2016, PURA released a Cybersecurity Action Plan in Docket No. 14-05-12, establishing a cybersecurity assessment framework of Connecticut's Electric, Gas and major water companies. With the guidance of Connecticut's Chief Cybersecurity Officer, Arthur House, PURA leads a team that conducts reviews and produces an annual report about the utilities' cybersecurity defense capabilities. Reports have been issued in 2017 and 2018. Upcoming in 2019:

- (2019) PURA has been working with other New England states to create the New England Utility Cybersecurity Intelligence Collaborative (NEUCIC) to provide access to cybersecurity data to utilities owning and operating critical infrastructure. The model will be piloted in New England and is expected be operational in 2019.

Organizational Structure & Management Team

PURA's leadership structure includes three Commissioners, appointed to fixed terms by the Governor and confirmed by the General Assembly. PURA's staff are divided into functional units that report up through the Chair (unit managers indicated in parentheses):

- **Legal Program** (Office Director-Legal) – Staffed by six staff attorneys, who provide adjudications support and handle general law matters (ethics, FOI, intergovernmental representation, etc.)
- **Electric Sector Unit** (Director of Utility Regulation) – Seven multi-disciplinary staff manage policy and adjudication related to PURA's oversight of the state's two electric distribution companies (Eversource and United Illuminating), the state's Renewable Portfolio Standard, LREC/ZREC market, and supports PURA's participation in regional and federal electricity matters.
- **Multi-Sector Unit** (Director of Utility Regulation) – The multi-sector unit consists of eighteen multi-disciplinary staff members that perform financial and technical analysis for PURA's oversight of Connecticut's gas utilities, water utilities, telecommunications companies, and cable providers. The Gas Pipeline Safety Unit (GPSU) is also in the Multi-Sector group and employs seven engineers that oversee the safety of gas distribution and transmission systems.

- **Office of Business & Consumer Affairs** (Office Director) – The Office of Business & Consumer Affairs consists of the Consumer Affairs Unit, which maintains a call center and helps utility customers resolve complaints and inquiries; the Special Enforcement Unit (two staff) which manages PURA’s compliance and enforcement responsibilities for the state’s competitive retail electric supplier market; and the nascent Licensing Unit, which will streamline implementation of licensing and certification activities.
- **Procurement Division & Docket Control** (Procurement Manager) – Oversees the electric utilities’ procurements for Standard Service and Last Resort Service retail generation rate offerings, as well as electricity procurements for state buildings. Three staff process and manage all document filings in the approximately 800 dockets PURA adjudicates each year.
- **Advocacy & Regulatory Operations** (Director) - The Advocacy and Regulatory Operations Division (A&O) is headed by a Director who is responsible for Community/Intergovernmental Relations, Press/Public Information, Prosecutorial, Mediation and Alternative Dispute Resolution, Whistleblower cases, and Emergency/Storm Preparedness

Representation on Boards, Commissions and Authorities

PURA Commissioners are members of national and regional networks of public utility and other state officials, which are important channels for collaboration and policy coordination in the interstate markets Connecticut participates in. PURA Vice Chairman Jack Betkoski recently concluded his term as the President of the National Association of Regulatory Utility Commissioners (**NARUC**), the first Connecticut commissioner to head that national organization. PURA Chair Katie Dykes presently serves as the President and Commissioner Michael Caron as Treasurer of the New England Conference of Public Utility Commissioners (**NECPUC**), which will host its annual Symposium in Hartford, June 2-5 2019. She also represents Governor Malloy in regional electricity market matters as Connecticut’s representative to the New England States Committee on Electricity (**NESCOE**), and as Vice Chair the Board of Directors of the Regional Greenhouse Gas Initiative (**RGGI**), the nation’s first multi-state cap and trade program for greenhouse gas reductions.

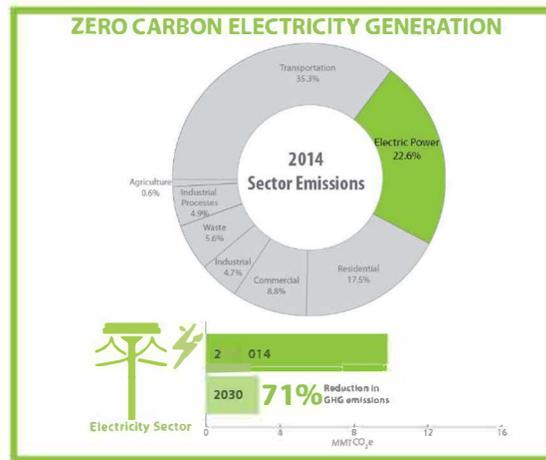
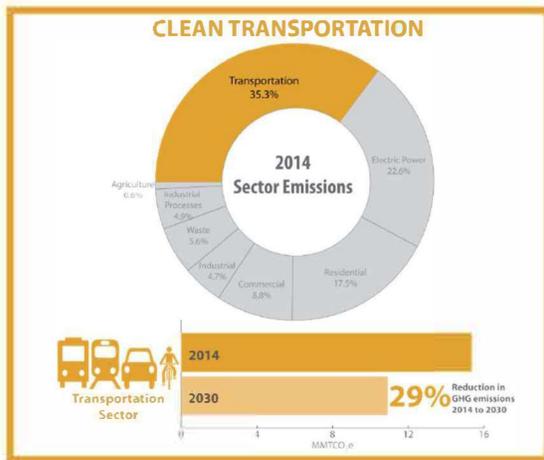
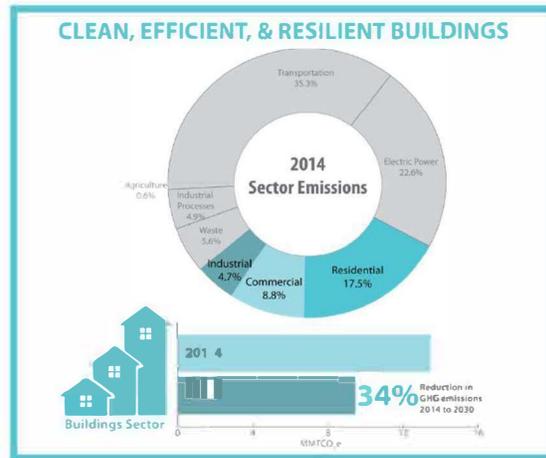
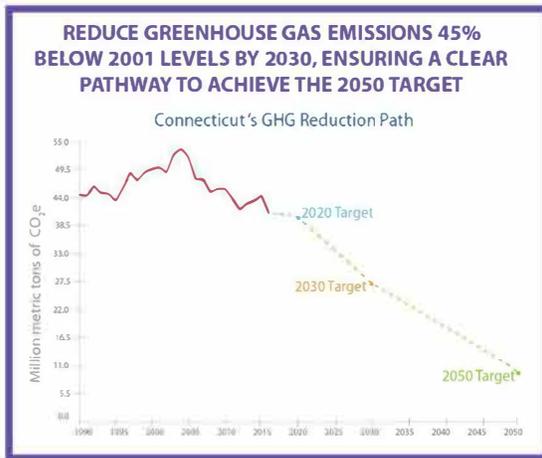
PURA has filing rights and frequently appears, through the CT AGO, in proceedings at the Federal Energy Regulatory Commission (**FERC**), which regulates the region’s transmission and wholesale electricity markets, as well as the Federal Communications Commission (**FCC**).

Within Connecticut, PURA participates by statute or designation on the Governor’s Council on Climate Change, the Connecticut Siting Council, the Low Income Energy Advisory Board, the Connecticut Economic Resource Center, and the State Water Planning Council.

ATTACHMENT N
GOVERNOR MALLOY'S COUNCIL ON CLIMATE CHANGE –
EXECUTIVE SUMMARY OF CLIMATE STRATEGY

BUILDING A LOW CARBON FUTURE FOR CONNECTICUT

ACHIEVING A 45% GHG REDUCTION BY 2030



RECOMMENDATIONS FROM THE GOVERNOR'S COUNCIL ON CLIMATE CHANGE

DRAFT REPORT DECEMBER 5, 2018

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EXECUTIVE SUMMARY

Carbon dioxide (CO₂) is the greenhouse gas (GHG) that represents the greatest warming potential, due to its atmospheric abundance and long atmospheric lifetime (hundreds to thousands of years).¹ The global CO₂ concentration has surpassed 400 parts per million (ppm), a level higher than at any time in the last 3 million years. Since the start of the 20th century, the Earth has warmed 0.9°C (1.8°F) since the pre-industrial period²; and the last four years have been the warmest years on record. The Intergovernmental Panel on Climate Change (IPCC) recently released a Special Report on Global Warming of 1.5°C, stating that there is high confidence that “global warming is likely to reach 1.5°C (3°F) between 2030 and 2052 if it continues to increase at the current rate.”³ The last time temperatures were 1-2°C (3-5°F) higher than they are now — some 125,000 years ago — sea levels were 5-6 meters (16-19 feet) higher. A 1.5°C (3°F) change in temperature will also have devastating impacts on ecosystems, water supplies, human health, and socioeconomic sectors.

The IPCC Special Report notes that if anthropogenic GHG emissions stopped today, the 1.5°C (3°F) limit would not be exceeded, but global emissions to date “will persist for centuries to millennia.” The clear and sober findings of this report deepen our urgency to

accelerate mitigation and adaptation efforts to reduce the risks and impacts associated with a 1.5 -2°C (3-5°F) increase in global temperature from pre-industrial levels.

Moreover, the recently released Fourth National Climate Assessment, Volume II draws a direct connection between the warming atmosphere and the resulting changes that affect lives, communities, and livelihoods. The impacts of observed warming are already being felt in the United States and are projected to intensify in the future. The severity of future impacts will depend largely on actions taken to reduce GHG emissions and our ability to integrate climate adaptation strategies into existing investments, policies, and practices.⁴

With over 600 miles of coastline and 2.2 million people living in shoreline communities in Connecticut, the State’s residents and communities are extremely vulnerable to the impacts of weather and climate events. Connecticut residents are already beginning to experience such effects as climate change ramps up. For instance, in Connecticut alone, Hurricane Irene (2011) caused power outages affecting 754,000 customers and over \$1 billion in damage, and Hurricane Sandy (2012) caused power outages affecting more than

¹ Why does CO₂ get most of the attention when there are so many other heat-trapping gases? Union of Concerned Scientists. August 3, 2017. Retrieved from <https://www.ucsusa.org/global-warming/science-and-impacts/science/CO2-and-global-warming-faq.html#bf-toc-1>

² Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, B. DeAngelo, S. Doherty, K. Hayhoe, R. Horton, J.P. Kossin, P.C. Taylor, A.M. Waple, and C.P. Weaver, 2017: Executive summary. In: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 12-34, doi: [10.7930/JODJ5CTG](https://doi.org/10.7930/JODJ5CTG).

³ IPCC, 2018 [In Press]: Summary for Policymakers. In: *Global Warming of 1.5 °C an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and*

related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

⁴ Jay, A., D.R. Reidmiller, C.W. Avery, D. Barrie, B.J. DeAngelo, A. Dave, M. Dzaugis, M. Kolian, K.L.M. Lewis, K. Reeves, and D. Winner, 2018: Overview. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA. doi: [10.7930/NCA4.2018.CH1](https://doi.org/10.7930/NCA4.2018.CH1)

600,000 customers and inflicted almost \$2 billion in statewide damages.⁵ The latter forced thousands of Connecticut residents to evacuate, saw thousands apply for FEMA assistance, damaged roads and infrastructure, and took nine days for utilities to restore power.⁶ Many of Connecticut's coastal communities and assets face escalating risk of storm events exacerbated by climate change.

Connecticut's commitment to address climate change is evident in the policies, programs, and voluntary actions it has pursued over the past 15 years. Passage of the 2008 Global Warming Solutions Act, which set forth a statutory requirement to reduce GHG emissions 10 percent below 1990 levels by 2020 and 80 percent below 2001 levels by 2050, establishes a commitment that the State will mitigate harmful GHG emissions. While long-term GHG reduction trends indicate the Connecticut is on a trajectory to meet its targets, the urgency of action cannot be overstated. Beyond 2020, far deeper cuts are needed to ensure meeting the 2030 and 2050 targets.

Anticipating the need to ensure the State maintains a downward trajectory, Governor Malloy issued Executive Order No. 46, creating the Governor's Council on Climate Change (GC3). The GC3 was tasked with 1) "examining the efficacy of existing of existing policies and regulations designed to reduce greenhouse gas emissions and identify new strategies"; 2) "establish[ing] interim goals that, if met, will ensure that the state will achieve the 2050 target"; 3) "recommend[ing] policies, regulations, or legislative actions that will assist in achieving the interim goals and 2050 target"; and 4) "monitor[ing] greenhouse gas emission levels ... annually to establish whether the state is poised to meet the interim goals and

⁵ NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2018). Retrieved from <https://www.ncdc.noaa.gov/billions/>

the 2050 target." After a thorough review of a variety of scenarios on how the State can drive down GHG emissions in the electric, building, and transportation sectors, the GC3 unanimously recommended an economy-wide GHG emission reduction target of 45 percent below 2001 levels by 2030. As one of the most ambitious mid-term reduction targets in the nation, the target places the State on a linear downward trajectory from today's GHG emissions to the 80 percent reduction the Global Warming Solutions Act requires by 2050.

The GC3's mid-term reduction target recommendation was adopted by the Connecticut General Assembly when it passed [An Act Concerning Climate Change Planning and Resiliency](#) (Public Act 18-82). The 2030 target of reducing GHG emissions 45 percent below 2001 levels by was signed into law by Governor Malloy on June 20, 2018.

Summary of Recommendations

The recommendations in this report build upon the successful policies and measures the State has implemented to date, propose strengthening existing programs, and put forth new strategies to help Connecticut reach its mid- and long-term GHG reduction targets. The recommendations underscore that there is no single solution; instead, they offer a balanced mix of strategies that allow for flexibility and mid-course adjustments as technologies and costs change over time.

The GC3's analysis of a variety of scenarios to determine the best pathway to meet the 2030 and 2050 targets helped establish a long-

⁶ Burgeson, John. Rising Above the Tide: 5 Years Since Sandy. CTPost. October 28, 2017. Retrieved from <https://www.ctpost.com/local/article/Rising-above-the-tide-5-years-since-Sandy-12313727.php>

term vision for decarbonizing Connecticut's economy. Three broad, fundamental objectives emerged from this vision:

1. Zero-carbon electricity generation
2. Clean transportation
3. Clean, efficient, and resilient buildings

The following proposed strategies and suite of recommendations would put Connecticut on track to meet these objectives and help build a strong foundation for achieving a zero-carbon future. Additional actions, beyond those proposed in this report, will need to be regularly evaluated and integrated into state and local planning efforts, and acted upon by public and private entities alike.

Whenever possible, climate change policymaking should assess the multiple added benefits, also known as co-benefits, of policies enacted to reduce GHG emissions. The co-benefits of reduced GHG

emissions include: job growth and local economic benefits; livable and resilient communities; public health benefits; and potential innovation in technology, energy, and resource management practices. These benefits, which depend on the specific nature of the policy enacted, could consist of improved air and water quality, improved soil and ecosystem health, energy cost savings, sustainable land management, and so on. While co-benefits can be difficult to monitor, quantify, and monetize, when properly valued they often help demonstrate that the positive societal impacts of climate policy actions outweigh the costs.

Utilizing existing and proven technologies, the following set of sector-specific recommendations and supporting suite of strategies were developed with the above objectives in mind. We believe they put Connecticut on a sustainable path to meeting its ambitious 2030 target and help position it to meet its transformative 2050 target.

GHG EMISSIONS REDUCTION RECOMMENDATIONS AND SUITE OF STRATEGY

CROSS SECTOR

IPCC's recent Special Report on Global Warming of 1.5°C recommended putting a price on carbon (combined with other policy measures) may be the most efficient and effective way to reduce carbon emissions. In the absence of such a policy, the damages resulting from burning carbon-intensive fuels are largely "externalized"—meaning the price of carbon-intensive fuels, goods, and services does not reflect the cost of climate damage. While Connecticut and other jurisdictions have implemented policies that foster adoption of zero-carbon renewable energy technologies and promote energy conservation and load management, economists widely agree that without a price on carbon, we will not be able to transition to a zero-carbon economy at the pace and scale that is necessary to avoid 1.5-2°C warming. Worldwide there is growing attention to using market-based mechanisms that set a fee or price on the carbon content of all fuels, or cap carbon emissions through the sale of emission allowances. Internalizing the cost of carbon can efficiently reduce emissions, change behavior, and transform the market.

Consumer awareness and education on the economic and environmental benefits of low- and zero-carbon technologies is crucial for increasing customer adoption of existing and emerging technologies. Government, non-profit, and private-sector actors can all play a role in educating and informing consumers through outreach campaigns, marketing programs, and formal and informal platforms.

Preparing for the future impacts of climate change is just as important as emissions mitigation. Communities will need to adapt to more extreme weather events, which will likely have severe impacts on Connecticut's infrastructure. Adopting policies and standards that improve our resiliency and ability to adapt will be critical.

- Co-benefits include:
- Environmental sustainability
 - Health and well-being
 - Economic development

Suite of Strategies

1. Implement an economy-wide carbon fee that assesses the carbon content of fossil fuels and sets a price per ton of carbon emitted.

Emissions Reduction Impact	Implementation Entities
HIGH	Governor, General Assembly, DRS, DEEP, OPM

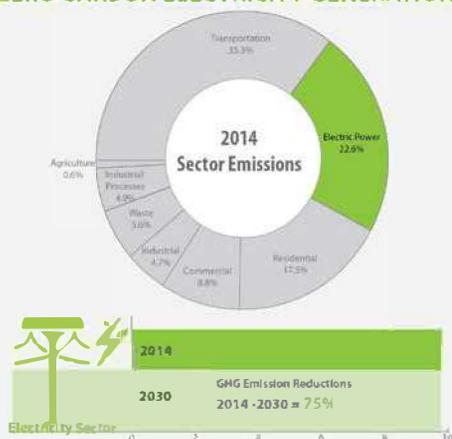
2. Implement an economy-wide cap-and-invest program that sets a limit on carbon emissions and allows the market to determine a carbon price based on least-cost reduction measures.

Emissions Reduction Impact	Implementation Entities
HIGH	Governor, General Assembly, DEEP

Put a price on Carbon

<p>Expand consumer education and awareness efforts to increase the uptake of zero- and low-carbon technology and resiliency measures</p>	1. Increase visibility of EnergizeCT resources.	
	Emissions Reduction Impact	Implementation Entities
	LOW	DEEP, CT Green Bank, utilities administering C&LM Plan, CT Energy Efficiency Board
	2. Enhance outreach efforts by using social media campaigns, webinars, case studies, testimonials, and the utilities' customer-engagement platforms.	
	Emissions Reduction Impact	Implementation Entities
	LOW	DEEP, CT Green Bank, utilities administering C&LM Plan, CT Energy Efficiency Board
<p>Pursuing an integrated approach to GHG mitigation, adaptation, and resiliency</p>	3. Increase training of real-estate industry professionals on integrating U.S. DOE Home Energy Scores and information on energy efficiency, renewables, and resiliency into real-estate transactions processes.	
	Emissions Reduction Impact	Implementation Entities
	LOW	DEEP, CT Green Bank, Multiple Listing Services, Real Estate Trade Organizations, utilities administering C&LM Plan, CT Energy Efficiency Board
	1. Prioritize opportunities for achieving synergies among actions that cut carbon pollution and prepare for the impacts of climate change.	
	Emissions Reduction Impact	Implementation Entities
	HIGH	OPM, DEEP, DOT, BAS, DOI
2. Ensure that state building codes and performance standards are coordinated to incorporate Insurance Institute for Business and Home Safety best practices for resiliency.		
Emissions Reduction Impact	Implementation Entities	
HIGH	Governor, General Assembly, DEEP	

ZERO CARBON ELECTRICITY GENERATION



As the second-largest source of emissions, the electricity sector makes up 22.6% of Connecticut's economy-wide GHG emissions. Connecticut has taken numerous actions to accelerate the transition toward cleaner electricity while reducing energy costs, improving system reliability, and minimizing negative environmental impacts. To meet the State's 2030 target, emissions from the electricity sector must be reduced 71% from 2014 levels.

As the building and transportation sectors move towards electrification, zero-carbon electricity generation will play a critical role in achieving a low-carbon future. This first requires retaining zero-carbon nuclear resources in the near-term and developing a comprehensive plan to ensure these resources are replaced with zero-carbon supply or demand reduction in the long-term following the expiration of their licenses. To bring more zero-carbon renewables online, Renewable Portfolio Standards (RPSs) throughout New England have helped provide a clear signal to attract diverse resources. In the coming years Connecticut will need to ensure that its RPS fully reflects the need for a zero-carbon portfolio. Distributed energy resources hosted by residents, businesses, and governments can help alleviate the siting challenges faced by grid-scale projects, and a new compensation design now being developed is expected to make these resources more cost-effective for Connecticut ratepayers. In addition to supply changes, demand-side measures and conservation will also play an important role in reducing emissions. In New England, electricity demand reduction measures can now compete with supply options to meet (or reduce) the total system's need, helping to achieve emission reductions at least cost. Overall, this transition will require a combination of technological innovation, innovative financing, price signals, and further improvements in state, regional, and federal policies.

- Co-benefits include:
- Enhancing energy system security
 - Economic development
 - Environmental sustainability
 - Health and well-being

Commit at least 50 megawatts of demand reduction per year to the ISO New England forward-capacity market

Suite of Strategies

1. Reduce electricity consumption by 1-2 million megawatt hours by replacing existing inefficient electric-resistance space- and water-heating equipment with high-efficiency renewable thermal technology (RTT). This reduction should be implemented through the Conservation and Load Management Plan and other efficiency-procurement strategies.

Emissions Reduction Impact	Implementation Entities
HIGH	DEEP, utilities administering C&LM Plan, CT Energy Efficiency Board, CT Green Bank, installers

2. Invest in electric measures that reduce peak demand such as exterior lighting, retail lighting, lighting in state buildings, and high efficiency refrigeration. These type of reductions should be implemented through the C&LM Plan and other efficiency-procurement strategies.

Emissions Reduction Impact	Implementation Entities
HIGH	DEEP, utilities administering C&LM Plan, CT Energy Efficiency Board, CT Green Bank, installers

Achieve at least 66% zero-carbon energy generation by 2030

1. Meet the RPS target of 40% by 2030, with an aim to reduce the carbon intensity of the RPS.	
Emissions Reduction Impact	Implementation Entities
HIGH	DEEP, renewable energy developers, CT Green Bank, PURA
2. Ensure a transparent and predictable compensation framework to maintain at least the historical average deployment of 40-90 megawatts of additional residential behind-the-meter renewable energy resources per year.	
Emissions Reduction Impact	Implementation Entities
HIGH	DEEP, CT Green Bank, PURA, renewable energy developers
3. Deploy at least 50 megawatts per year commercial distributed solar and 10 megawatts per year of fuel cells.	
Emissions Reduction Impact	Implementation Entities
HIGH	EDCs, DEEP, CT Green Bank, PURA, renewable energy developers
4. Implement a shared clean energy program deploying at least 25 megawatts per year, with a focus on low- and moderate-income customers.	
Emissions Reduction Impact	Implementation Entities
HIGH	EDCs, DEEP, CT Green Bank, PURA, acVocates, renewable energy developers
5. Maintain in-state zero-carbon nuclear generation and develop a long-term zero-carbon replacement strategy equivalent to 2,100 megawatts.	
Emissions Reduction Impact	Implementation Entities
HIGH	Governor, General Assembly, DEEP
6. Exercise procurement authority for zero-carbon energy through competitive bidding processes that drive down prices.	
Emissions Reduction Impact	Implementation Entities
HIGH	DEEP, PURA

Optimize grid-management strategies to reduce carbon emissions

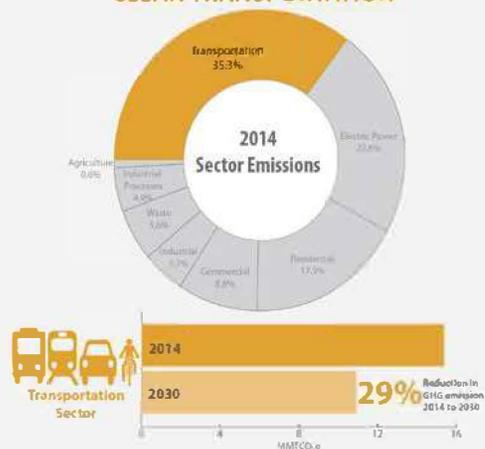
1. Increase adoption of smart-management technologies to optimize flexibility of distributed energy resources.

Emissions Reduction Impact	Implementation Entities
HIGH	PURA, EDCs

2. Over the next 2-5 years, research and identify opportunities to integrate battery storage and distributed renewable energy technologies to displace carbon emissions.

Emissions Reduction Impact	Implementation Entities
HIGH	DEEP, PURA, CT Green Bank, EDCs

CLEAN TRANSPORTATION



The transportation sector continues to be the single largest source of emissions in Connecticut, contributing %, principally from the use of fossil fuels in passenger cars and light-duty trucks. To meet the economy-wide 2030 target, emissions from the transportation sector must be reduced 29% from 2014 levels.

This will require Connecticut to accelerate its transition toward a modern, clean transportation system — facilitating access to low- and zero-emitting passenger vehicles, public transit, alternative modes of travel, and efficient movement of goods and services.

The primary strategies for this transformation include: retaining stringent fuel-economy and low- and zero-emission standards; creating price signals to accelerate adoption of electric vehicles (EVs); and reducing the vehicle miles traveled (VMT) growth rate through increased use of public transit services and alternatives modes of transportation, supporting transit-oriented development (TOD), and encouraging sustainable land-use planning. Identifying sustainable funding to implement these strategies will be essential.

- Co-benefits include:
- Health and well-being
 - Environmental sustainability
 - Enhancing energy system security
 - Economic development

Suite of Strategies

1. Maintain adherence to Corporate Average Fuel Economy (CAFE) and GHG emission standards mid-term review 2016 final determination.

Maintain increasing fuel economy and low- and zero-emissions standards

Emissions Reduction Impact	Implementation Entities
HIGH	Federal government, California Air Resources Board, DEEP

<p>Increase light-duty ZEV penetration rate to at least 20% by 2030</p>	2. Maintain adherence to California low- and zero-emission vehicle requirements.	
	Emissions Reduction Impact	Implementation Entities
	HIGH	Federal government, California Air Resources Board, DEEP
	1. Implement price signals to incentivize EV adoption and reduce electric system impacts.	
	Emissions Reduction Impact	Implementation Entities
	HIGH	PURA, EDCs
<p>Advance initiatives that eliminate the rate of annual VMT growth by 2030</p>	2. Expand EV charging network to ensure consumer confidence, reduce range anxiety, and ensure equitable access.	
	Emissions Reduction Impact	Implementation Entities
	MEDIUM	DEEP, PURA, EDCs, private sector
	3. Develop a state fleet transportation Lead by Example program that sets annual emission reduction targets and enables increasing adoption of zero-emission vehicles.	
	Emissions Reduction Impact	Implementation Entities
	MEDIUM	DAS, DEEP, OPM
<p>Advance initiatives that eliminate the rate of annual VMT growth by 2030</p>	1. Implement transit-oriented development projects and adopt state policies and local zoning regulations that support walkable, mixed-use, and sustainable urban and suburban development in areas served by transit.	
	Emissions Reduction Impact	Implementation Entities
	MEDIUM	DOT, OPM, DECD, municipalities
	2. Encourage, incentivize, and support alternative modes and active transportation that reduce single-occupant vehicle driving.	
Emissions Reduction Impact	Implementation Entities	
LOW	DOT, OPM, municipalities	

Develop sustainable funding for transportation electrification and transportation infrastructure

1. Implement a multi-state cap-and-invest program that sets a limit on transportation sector emissions and reinvests program proceeds in measures that drive down emissions, provide benefits to citizens, protect existing transportation funding, generate sufficient additional funding to support transportation infrastructure and operation, and mitigate costs to consumers.

Emissions Reduction Impact	Implementation Entities
HIGH	Governor, General Assembly, DEEP

2. Implement user-based transportation fees — market mechanisms to reduce traffic congestion and improve efficiency of travel for all drivers.

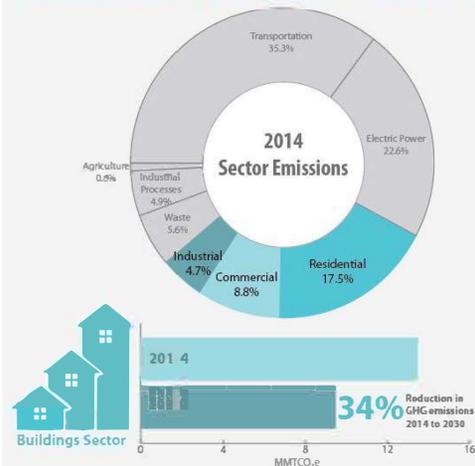
Emissions Reduction Impact	Implementation Entities
MEDIUM	Governor, General Assembly, DOT, OPM

CLEAN, EFFICIENT, & RESILIENT BUILDINGS

The building sector contributes approximately 31% of total GHG emissions in Connecticut. Heating, ventilation, and air conditioning (HVAC) comprise roughly 60% of all building energy consumption. Over 80% of Connecticut households and commercial and industrial buildings are heated with fossil fuels.

To meet the economy-wide 2030 target, emissions from the building sector must be reduced 34%. In concert with building energy conservation improvements, Connecticut must accelerate decarbonization of building energy end-uses by increasing deployment of renewable thermal technologies (RTTs) such as cold-climate air- and ground-source heat pumps and heat pump water heaters. This will require increased education and training of our HVAC workforce, and the expansion of consumer motivation to adopt building energy efficiency measures and RTTs. Additionally, there must be a commitment to building stronger, more resilient homes and businesses. Enhancing Connecticut's building codes will result in structures that are better able to withstand the natural perils of a coastal state in an era of escalating climate impacts.

- Co-benefits include:
- Social development
 - Health and well-being
 - Environmental sustainability
 - Enhancing energy system security
 - Economic development



Accelerate adoption of building thermal energy conservation improvements such as weatherization, insulation, efficient windows, and efficient HVAC

Suite of Strategies

1. Prioritize building envelope improvements and expand access to thermal energy-efficiency measures through innovative financing options for all income levels.

Emissions Reduction Impact	Implementation Entities
HIGH	DEEP, utilities administering C&LM Plan, CT Energy Efficiency Board, CT Green Bank, Capital for Change, CHFA, DOH, DECD, DAS

2. Ensure building codes are continuously aligned with the most recent International Energy Conservation Code standards.

Emissions Reduction Impact	Implementation Entities
HIGH	FDAS, DEEP

3. Track and reduce energy consumption and associated GHG emissions in state and municipal buildings, including setting Lead by Example targets for 2030.

Emissions Reduction Impact	Implementation Entities
MEDIUM	DEEP, utilities administering C&LM Plan, CT Energy Efficiency Board, CT Green Bank, OPM, DAS, Sustainable CT, municipalities

4. Review consistency of energy efficiency cost-effectiveness testing with public policy goals.

Emissions Reduction Impact	Implementation Entities
MEDIUM	DEEP, CT Energy Efficiency Board, utilities administering C&LM Plan

Transition building fossil fuel thermal loads to efficient renewable thermal technologies

1. Develop sustainable funding mechanisms to incentivize replacement of fossil-fuel space and water heating with efficient RTTs.

Emissions Reduction Impact	Implementation Entities
HIGH	Governor, General Assembly, DEEP, OPM, CT Green Bank

2. Incentivize installation of RTTs in new construction.

Emissions Reduction Impact	Implementation Entities
MEDIUM	DEEP, utilities administering C&LM Plan, CT Energy Efficiency Board, CT Green Bank, Housing Authorities

Improve training and technical capacity of workforce	1. Expand training programs to include RTT installations and standards.	
	Emissions Reduction Impact	Implementation Entities
	MEDIUM	Industry trade organizations, utilities administering C&LM Plan, state colleges and universities, Department of Education/Technical High School System, manufacturers, NEEP

Memo

To: The Next Governor of Connecticut

From: Acadia Center

Date: November 2018

Re: Strengthening Connecticut's economy, competitiveness, and overall quality of life.

Message:

The next governor can revitalize Connecticut by modernizing transportation and energy through five reforms that will unlock significant new economic, consumer, and public health benefits for our state.



TRANSPORTATION



GENERATION



BUILDINGS



GRID



CHOICE

Building a Stronger Connecticut

Memorandum to the Next Governor - November 2018

Overview: The Next Governor Can Revitalize Connecticut By Modernizing Transportation and Energy

The next governor of Connecticut faces an exciting opportunity: to use proven transportation and energy reforms to revitalize and strengthen Connecticut's economy, competitiveness, and overall quality of life.

The next governor can seize this opportunity by pursuing five reforms.

- 1. Modernize our transportation infrastructure to improve safety, access, and convenience;**
- 2. Transition power generation to cheaper, cleaner, and more resilient local sources;**
- 3. Improve energy performance in buildings to reduce costly energy use and emissions;**
- 4. Reform energy grid rules to reduce high energy costs and speed energy innovation;**
- 5. Give communities and consumers more control over their energy choices.**

These reforms will unlock significant new economic, consumer, and public health benefits for our state. For instance—modernizing transportation only—could produce over \$6.9 billion in new economic benefits, add 14,900 new jobs, and create \$3.7 billion in public health and other benefits.

Remaking the transportation and energy systems must be a core part of Connecticut's new economic strategy. Newly-unleashed investment and innovation will drive economic progress, improved quality of life, and more equitable benefits for all residents and communities. More detail on the five reforms follows.

1. Modernize Connecticut's Outdated Transportation Infrastructure to Improve Safety, Access, and Convenience

The Transportation System and Current Challenges

Connecticut's transportation system—its network of highways, trains, public transit, airports, ports, and walking and biking corridors—is vital to the state's economy. It facilitates the movement of goods and connects people to jobs, shopping, recreation, and other services. However, the system needs critical improvements to address three major challenges and better serve the state's communities and businesses.

Update Transportation Infrastructure: The state's transportation infrastructure and transit options need substantial investment to create a safe, modern, and resilient system. Connecticut's aging and deficient roads and bridges cost drivers about \$6.1 billion annually through increased vehicle

operating costs, congestion delays, and accidents.¹ Approximately four out of every five miles of Connecticut's major roads are in mediocre or poor condition.² More than 300 Connecticut bridges have been rated structurally deficient.³

Improve Transportation Access and Equity: Transportation options must be expanded and improved in communities that remain underserved and overburdened by the current system, delivering more affordable, accessible options and reducing the disproportionate impacts of local air pollution. Traffic congestion continues to worsen in Connecticut's major urban areas, costing approximately \$2.4 billion annually in lost time and wasted fuel.⁴ Despite recent progress, public transportation in Connecticut remains significantly underfunded, resulting in major service cutbacks and inadequate statewide access.⁵ Public bus transportation is either limited or non-existent in 70 Connecticut towns.⁶

Reduce Transportation Emissions: Transportation is the largest source of Connecticut's greenhouse gas ("GHG") emissions, which must be reduced for the state to meet its

climate goals.⁷ Inefficient and outdated transportation infrastructure greatly contributes to public health problems, particularly in congested, often lower-income, neighborhoods. Transportation is the primary cause of nitrogen oxide (“NOx”) pollution in Connecticut—emitting about 67% of this local air pollutant.⁸ NOx leads to ground-level ozone and smog, which can trigger asthma attacks, among other public health harms.⁹

Major Benefits from New Policy Approach to Transportation Emissions

A safe, modern, and clean transportation system would offer transformative benefits to Connecticut’s economy. By capping transportation GHG emissions and auctioning allowances—much like Connecticut already does for GHG emissions in the electric generation sector¹⁰—the state could generate about \$2.45 billion in new revenue between 2019-2030. That revenue could then be reinvested in the transportation system to target certain modern improvements, as demonstrated by the sample portfolio shown in Table 1.

Acadia Center has examined the benefits of transportation reforms in other states¹¹ in order to estimate some of the new economic activity and other monetary benefits that would be generated if Connecticut invested in cost-effective transportation improvements focused on expanding consumer access and reducing emissions. These economy-wide benefits would include:

- Creation of about 14,900 long-term jobs (in other words, not project-related construction jobs);
- Over \$2 billion in new wages,¹² primarily from newly-created jobs;
- \$6.9 billion in new business sales, resulting from project-related spending, spending of new wages in the local economy, and spending of cost-savings generated by lowered transportation expenses;
- Nearly \$3.7 billion in other benefits, including fewer hours spent in traffic and improved health outcomes, as well as \$86 million in savings from avoided costs of GHG emissions.¹³

These benefit estimates flow from a sample portfolio of transportation improvements that focus on clean electric vehicles (“EV” or “EVs”), transit, and other mobility options.

This portfolio has many benefits for Connecticut. For example, electrifying passenger vehicles, buses, and port equipment will improve air quality and reduce operating costs for vehicle owners and taxpayers. Expanding rail, bus transit, and walking and biking will reduce travel in single-occupancy vehicles, improve mobility, and expand

Table 1: Investment Portfolio for Connecticut’s Proceeds from New Emissions Policy¹⁴

Connecticut	Possible Investment Portfolio	2019-2030 Total Revenue (millions)	Average Annual Revenue (millions)
EV & Charging Infrastructure Rebates	56%	\$1,374	\$114
Rapid Transit (Bus & Streetcar)	20%	\$491	\$41
Intercity Rail (Trains & Commuter Rails)	10%	\$245	\$20
Walking & Biking Infrastructure	8%	\$196	\$16
Port Electrification	6%	\$147	\$12
Total	100%	\$2453	\$204

consumer options. By 2030, investment guided by this sample portfolio could result in:

- About 460,000 electric vehicles—17% of the passenger vehicle fleet—as well as associated charging infrastructure, aligned with Acadia Center’s EnergyVision 2030 recommendation for reducing GHG emissions 45% by 2030.¹⁵ This level of annual support would also align with Connecticut meeting its commitment to electrify about 155,000 passenger vehicles by 2025 under the Multi-State Zero-Emission Vehicle Memorandum of Understanding;
- Over 350 electric buses and their charging infrastructure to expand CT DOT’s service and replace aging and polluting diesel vehicles;¹⁶
- Construction of two small streetcar systems, similar in scale to the proposed New Haven Streetcar;¹⁷
- Over 700 miles of new walking and biking trails throughout the state to add new capacity and complete existing gaps in regional trail networks;¹⁸
- Electrification of ports throughout the state, including electric shore power investments and electrification of drayage equipment;¹⁹
- Commuter rail enhancements throughout Connecticut.

Improving Connecticut’s transportation system will require a suite of complementary policies. Valuing carbon emissions from transportation, potentially through a regional cap-and-invest program,²⁰ would complement other policies by generating revenue for reinvestment in significant transportation improvements. These improvements would allow the system to better serve the public while creating new jobs and attracting and retaining businesses.

The next governor should act quickly to put a price on transportation emissions to reap the many benefits and accelerate progress to a more modern, equitable, low-carbon transportation system.

2. Transition Electric Generation to Cheaper, Cleaner, and More Resilient Local Sources

The Electric Generation Sector and Current Challenges

Our modern world depends on electricity to power essential needs—lighting, cooling and heating, motors, and electronics. Connecticut is no different. Electric power is at the core of its economic well-being and quality of life. Improvements to Connecticut’s electric generation sector are necessary, however, due to several pressing challenges.

Strengthen Energy Independence: Electric generation in Connecticut (and the New England region) continues to rely heavily on an imported fossil fuel, natural gas, for power production—roughly 49% of electric generation in 2016.²¹ This makes Connecticut’s economy vulnerable to market conditions largely outside of its control, such as electricity price spikes caused by natural gas supply constraints in the winter.²²

Grow In-State Clean Energy Industries: Connecticut needs to protect and expand its in-state clean energy industries to maximize long-term economic growth and better compete with neighboring states. Offshore wind and rooftop solar are the two most promising clean energy resources for maximizing economic impact in Connecticut, as discussed in more detail below.

Reduce Electric Generation Emissions: The electric generation sector remains a significant source of GHG emissions, despite recent strong progress.²³ To meet its new clean energy and climate commitments, Connecticut will need to deploy more renewables at a faster pace, primarily rooftop solar and offshore wind.²⁴

Accelerate the Electric Generation Sector Transition to Boost the Economy

With clean energy and its zero-emissions performance now competing with fossil fuels on cost,²⁵ the time is right for Connecticut to move faster on local power supply options that are cheaper, cleaner, and more resilient than imported fossil fuels. The economic rewards would be immense. Investing in local clean power—primarily offshore wind and rooftop solar—means prioritizing economic growth and job creation in Connecticut.

Offshore wind and rooftop solar both represent immediate opportunities for strong and sustained positive economic impact in Connecticut. As carbon-free power, offshore wind has incredible potential in Connecticut and the region. Good wind speeds, shallow water and close proximity to population centers make it a nearly ideal grid-scale renewable resource. The federal offshore areas currently available for leasing have an annual generation potential roughly

equal to the amount of electricity consumed annually by Connecticut—almost 29,000 gigawatt hours in 2016—significantly more than even the generation capacity of the state’s lone nuclear power plant.²⁶

Chart 1: Annual Offshore Wind Potential and CT Electricity Consumption



Source: BOEM, EIA

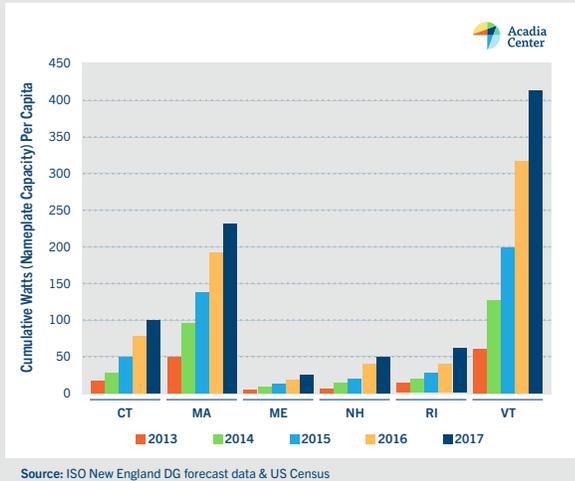
Major Benefits from New Policy Approach to Wind Power

With three deep-water ports and a skilled manufacturing sector, Connecticut is well-positioned to launch its own offshore wind industry. An offshore wind build-out at the scale required to meet Connecticut’s clean energy and climate goals would provide a major boost to Connecticut’s economy and skilled labor market. Acadia Center has estimated that if Connecticut were to pursue a build-out of 2,000 MW of offshore wind by 2030, it would produce the following benefits:

- Over \$3 billion in new economic growth for Connecticut, primarily from construction activities as deployment at this scale would probably take place in phases over the relevant timeframe;²⁷
- At least 4,000 new jobs, primarily focused in the skilled trades and concentrated in Connecticut’s shoreline economy around its deepwater ports, which means more high-paying jobs for New London, Bridgeport, and New Haven;²⁸
- Significant long-term utility bill savings for Connecticut’s electric ratepayers, likely in the range of several hundred million dollars based on a bill savings analysis performed by Massachusetts for its recent offshore wind bid selection.²⁹

Ramping up the in-state solar industry would also boost Connecticut's economy and job market. Distributed solar, which includes rooftop and other small-scale solar, is a key part of Connecticut's important and growing clean energy economy. The industry currently employs about 2,170 people in Connecticut—11% more than in 2015.³⁰ Distributed solar also gives Connecticut residents and businesses another way to control their energy use and reduce high energy costs.

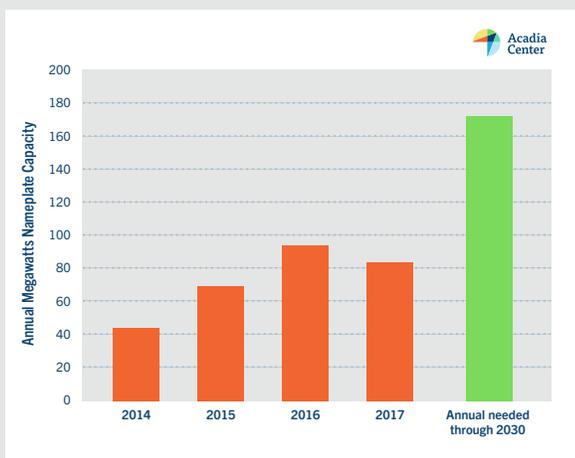
Chart 2: Solar Deployment Per Capita in New England



Source: ISO New England DG forecast data & US Census

Yet Connecticut can do much more to take advantage of distributed solar's economic benefits. Connecticut lags other New England states in its pace of deployment.³¹

Chart 3: CT Annual Distributed Solar Installations Versus 2030 Climate Target



Source: ISO New England and Acadia Center's EnergyVision 2030

Vermont has installed four times more distributed solar per person than Connecticut, and Massachusetts nearly two times more per person.³² These higher deployment rates in nearby states indicate that Connecticut's in-state solar industry could expand, if supported by effective solar policies.

Connecticut's current deployment rate will not be sufficient for meeting its climate goals, as Acadia Center has modeled through its EnergyVision 2030 project.³³ Connecticut will need to more than double its current annual rate of distributed solar installations to stay on track through 2030.

Major Benefits from New Policy Approach to Solar Power

Doubling the installation work of the existing in-state solar industry would help Connecticut's economy. Acadia Center has estimated that increasing distributed solar installations to about 160 MW annually—an achievable target based on current installation rates in other New England states—would result in:

- Approximately 1,960 new jobs in Connecticut, with that employment level sustained through 2030;³⁴
- Increased personal income of at least \$216 million, which means greater spending power and more in-state economic activity;³⁵
- About \$13.6 million annually in new state tax revenue (personal income and sales taxes) generated by new jobs and economic activity.³⁶

To capture the full economic potential of rooftop solar and offshore wind for Connecticut, existing policies will need to be changed to maximize cost-effective deployment of both resources. New solar laws put in place in 2018 will need to be revisited. Both industries will need clear, sustained policy support through 2030. The next governor of Connecticut should move quickly to prioritize these two in-state clean energy industries by giving them central roles in economic development strategy.

3. Improve Energy Performance in Buildings to Reduce Costly Energy Use and Emissions

The Building Sector and Current Challenges

To advance Connecticut's economic well-being and quality of life, improving energy usage in buildings must play a key role. The poor energy performance of the many aging buildings in Connecticut burdens household budgets, business competitiveness, and public health. Unnecessary energy consumption in our buildings makes our energy system

more expensive and increases pollution emissions. Two major challenges exist for the building sector, and solutions to each are available that will help boost Connecticut's economy.

Increase Commitment to Energy Efficiency: Connecticut needs to give more residents and businesses access to its award-winning, high-quality energy efficiency programs by increasing energy efficiency savings targets to match those in leading states, among other policy reforms. Connecticut invests in cost-effective electric efficiency at roughly half the levels pursued in Massachusetts and Rhode Island (see Chart 4).³⁷ Energy efficiency program funding must also be fully restored and protected by undoing the ongoing legislative fund raid imposed in late 2017. The energy efficiency industry employs more than 34,000 people,³⁸ but those jobs and the health of that industry overall have been imperiled by the severe fund raid.

Move to Clean Heating Technologies: Connecticut's building sector relies heavily on fossil fuels for its heating needs—for instance, 35% of Connecticut households use natural gas and 45% use fuel oil or propane.³⁹ This overreliance on imported fossil fuels ends up costing Connecticut consumers roughly \$1.2 billion annually.⁴⁰ Converting the building sector to more affordable clean heating technologies is now possible with recent advances in performance and cost reductions. Heat pumps are the most promising of these newer technologies—offering highly efficient performance, consumer savings, and zero on-site emissions.

High Building Energy Performance Unlocks Significant Benefits

Energy efficiency is at a critical moment in Connecticut. Despite good progress made over the last two decades through Connecticut's energy efficiency programs—officially named the Conservation and Load Management

("C&LM") programs—Connecticut now risks falling behind nearly all other states in New England on efficiency.

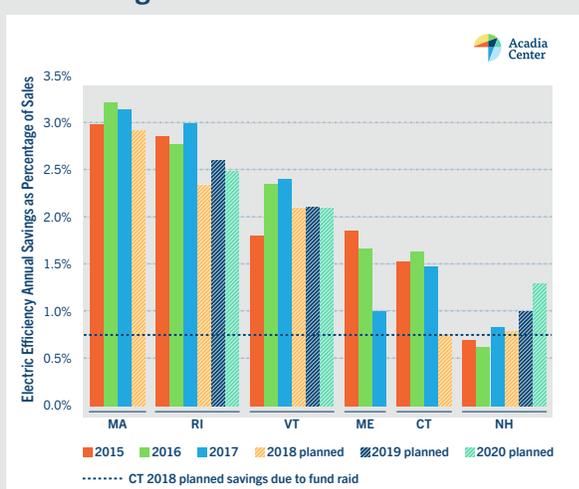
Two factors have driven this concerning reality. First, most states in the region have committed to, and implemented, more ambitious energy savings targets than Connecticut. Second, the two-year legislative diversion of approximately \$117 million in ratepayer funding for electric efficiency will decrease energy savings substantially in our state.⁴¹ Chart 4 illustrates these two points.

Massachusetts, Rhode Island, and Vermont have been obtaining significantly more electric efficiency savings than Connecticut for several years now. Due to the current fund raid, 2018 will see a major drop in Connecticut's electric efficiency performance—a drop sufficient to place our state at, or close to, the bottom of the New England region.

This drastic loss of efficiency savings has serious repercussions for Connecticut's consumers, economy, and environment. It makes power more expensive. Connecticut residents, businesses, and municipalities will pay approximately \$275 million in higher utility bills if the full two years of the fund raid are not undone.⁴² The economy will also lose ground. Because the efficiency programs produce \$7 in economic growth for every \$1 they spend on cost-effective energy efficiency, Connecticut will sacrifice an economic boost of approximately \$889 million—again, if the fund raid remains in place.⁴³ Connecticut communities will also suffer increased local air pollution, as an additional 1.6 million gallons of oil will be burned annually.⁴⁴

The next governor of Connecticut must help restore efficiency as a core economic and energy strategy by moving to undo the current fund raid in early 2019. Combined with setting higher efficiency savings targets, this could unlock immediate economic, consumer, and public health benefits for our state. For example, Acadia Center has estimated that just one year of full investment in electric efficiency would give the following boost to Connecticut's economy:

Chart 4: Electric Efficiency Savings Levels in New England



Major Benefits from New Policy Approach to Energy Efficiency

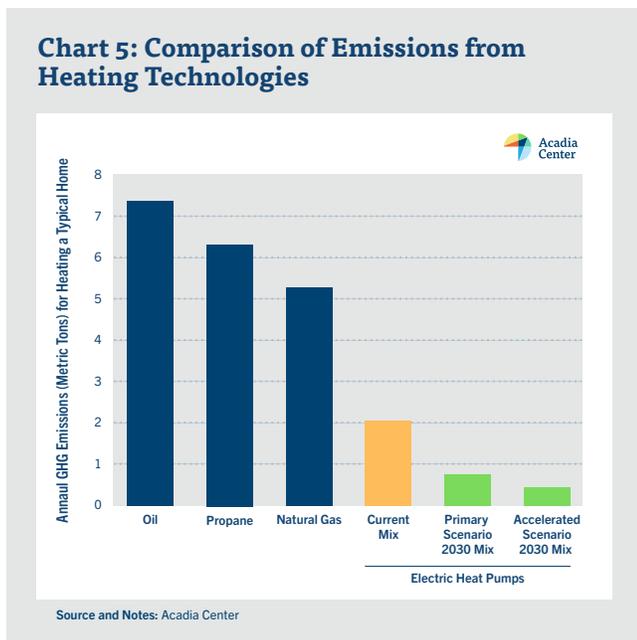
- \$1.8 billion in economic growth from increased efficiency services, upgrades, renovations, or retrofits provided to thousands of residents and businesses;
- Over \$ 1.1 billion in important consumer and energy system benefits, such as customer bill savings, water savings, less strain on the energy grid, and reduced pollution compliance costs;
- Approximately 13,000 jobs, primarily in Connecticut's building performance industry, but also jobs created by new household and business spending.

Other states in the region have moved to seize these valuable benefits to improve their economies and competitiveness. Connecticut needs to do the same.

Clean Heating and Cooling for Buildings – Electric Heat Pumps

Thanks to advances in technology and significant cost reductions, electric heat pumps have become a new tool for heating and cooling buildings more efficiently while reducing emissions.⁴⁵ Heat pumps extract heat from either outside air or the ground and move it into a building to heat it. An air conditioner is a type of heat pump that moves heat from inside a building to the outside to cool it; heat pumps simply reverse this process during the heating season and can now efficiently function even in cold Northeastern winters.

Heat pumps are also far more efficient than traditional electric resistance heating and, with today's electric generation mix, provide immediate GHG emissions reductions. Currently, heat pumps reduce emissions about 70% compared to oil heat and about 60% compared to natural gas.⁴⁶



As generation grows cleaner, emissions from heat pumps will continue to decline. Installing heat pumps today creates a “renewable-ready” infrastructure that will take advantage of a cleaner energy grid as renewables continue to come on line at a faster rate.

An immediate opportunity for accelerating heat pump deployment in Connecticut is in the residential new construction market. In the four more urbanized states in the Northeast—Connecticut, Massachusetts, New York, and Rhode Island—83% of residential new construction over the last five years was heated by gas or propane.⁴⁷ The homes built in 2017 alone will emit about 2 million metric

tons of CO₂ over the fifteen-year life of their heating equipment, more than half of which could have been avoided if heat pumps were installed instead.⁴⁸ In Connecticut alone, 1,343 new homes were built with natural gas heating.⁴⁹ The cost to ratepayers of connecting these new homes to gas distribution infrastructure was about \$23 million. Almost all of this new cost could have been avoided with heat pumps.⁵⁰

Speeding the switch to clean heating technologies will require strong policy support from the next governor. Working in combination, several reforms will help expand the heat pump market in Connecticut: increased consumer awareness and education, improved market and customer strategies for manufacturers, distributors, and installers, advancements in heat pump controls and other related innovations, and specialized incentives and financing to increase consumer uptake. Helping residents and businesses switch to clean heating technologies could also be a focus of Connecticut's energy efficiency programs, if changes are made to the rules governing those programs.

4. Reform Connecticut's Energy Grid Rules to Reduce High Energy Costs and Speed Energy Innovation

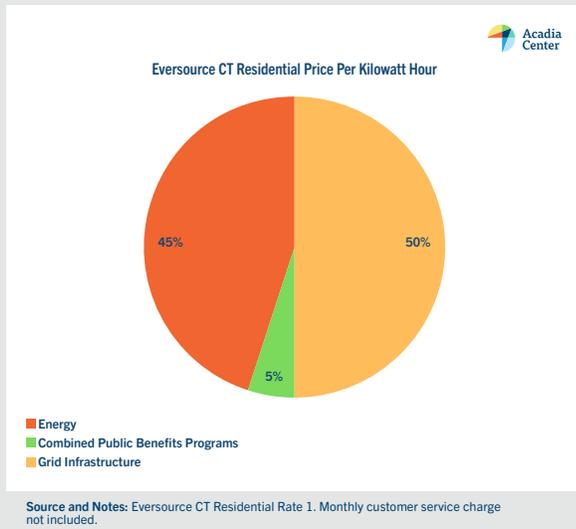
The Energy Grid and Current Challenges

The rules and regulations that drive the decision making for Connecticut's energy grid are out of sync with technological advances and consumer expectations for a clean, reliable energy system. Local energy resources like energy efficiency, rooftop solar, and energy storage are superior tools that can solve grid problems—instead of relying only on building expensive, traditional infrastructure projects. Sophisticated metering technology can support innovations in how consumers pay and are paid for electricity, rewarding them for optimizing their energy generation and consumption. Updated rules, planning processes, and financial incentives can enable the adoption of technologies critical to meet 2030 and longer-term emissions reduction targets.

High grid costs in Connecticut also need to be addressed. Residents, businesses, and municipalities pay not only for the electricity they consume, but also for the energy grid infrastructure that delivers it—basically, the poles and wires of the electric system. For residential customers in Connecticut, this grid cost dominates the retail price of electricity. Half of the price of one kilowatt hour of electricity goes to paying for the grid infrastructure that delivers that electricity to the customer.

These high grid infrastructure costs are a burden on Connecticut's consumers and communities. Any effort to reduce energy costs in Connecticut must include serious examination of all major cost components of the retail price of electricity, not just energy supply.

Chart 6: Major Components of Retail Electricity Price in CT



Reforming Grid Rules Results in Real Benefits to Consumers

Creating a more affordable, customer-centric electricity grid of the future for Connecticut will require wide-ranging reforms.⁵² Consumers need to be protected and given more opportunities to participate in clean energy. Energy grid planning and stakeholder processes need dramatic improvement. The utility business model and incentives must change to be better aligned with policy goals. And consumers need more granular price signals for both energy consumption and generation.

Pursuing these reforms will be worth it, however, because they can result in real benefits on many fronts, but especially for consumers and the broader economy. Examples from Acadia Center's grid reform efforts include:

Major Examples of New Policy Approach to Grid Rules

- Decreasing high fixed monthly charges for over 1 million residential electric utility customers in Connecticut, which will encourage efficient consumption of electricity and help alleviate energy cost burdens for low-income customers;
- Helping create a new regulatory framework through the Rhode Island Power Sector Transformation Initiative and rate case settlement that will lead to a more efficient grid, a cleaner and cheaper energy system, and a utility business model that helps advance the public interest;
- Winning the reversal of an anti-solar fee, or demand charge, in Massachusetts that would have unfairly penalized households that chose to install rooftop solar.

The next governor should pursue a package of energy grid and utility reforms that will modernize the grid, provide better options for consumers to control their energy costs, advance grid and utility innovation, and significantly reduce pollution emissions. These reforms would help bring down Connecticut's high grid costs, alleviating a significant financial burden on Connecticut's residents, businesses, and communities.

5. Give Communities and Consumers More Control Over Their Energy Choices

The Current Challenges for Connecticut Communities

Any effort to revitalize Connecticut must focus on its communities—where we live, work, and play. Energy system reforms have an important role here too. Communities want more control over their energy options because they are on the front lines of creating a sustainable, low-carbon economic future. Unfortunately, state policies and outdated rules often prevent community action on energy. Current barriers in Connecticut include:

Community Energy Codes Not Allowed: A community energy code, or stretch code, allows a community to adopt more stringent energy conservation provisions than those required by the base state building energy code. No stretch code exists in Connecticut and communities are not allowed to adopt policies more stringent than the state code.⁵³

New Construction Requirements Lacking: Connecticut building code does not require that new homes be "EV-Ready" or "Solar-Ready", meaning that they are built to allow these technologies to be added later more easily, if desired by future homeowners. This effectively blocks communities from preparing their new housing stock for the cleanest transportation and energy technologies.⁵⁴

Community Choice Aggregation Not Available: Community Choice Aggregation ("CCA") allows communities to pool residential, business, and municipal electricity load and then purchase and/or develop clean electricity on behalf of customers participating in the CCA program. State law does not currently authorize CCA in Connecticut.⁵⁵

Empowering Communities Will Help Revitalize Connecticut

The next governor needs to empower Connecticut's communities to lead the way on energy innovation. Rooted in their immediate surroundings and championed by respected neighbors, local energy initiatives have great capacity to change behavior, establish new norms, and advance local clean energy options. The fixed scope of local projects often translates into lower hurdles for implementation and a more straightforward evaluation process. Community-based action that successfully demonstrates innovations in energy efficiency, distributed generation, and smart energy management can be scaled up to the state level and provide a crucial backstop to federal rollbacks. Connecticut communities need to be at the center of any state energy planning and reforms.

Conclusion: Transportation and Energy Reforms Build a Stronger Connecticut

The five transportation and energy reforms described in this memorandum can open a new, bold future for Connecticut—one that is prosperous and innovative, economically vibrant, and healthier for Connecticut's people and communities. Over and over, the facts show that the opportunity to transform Connecticut is real—billions of dollars in economic growth and thousands of new jobs are within reach. By putting key transportation and energy policies in place, the next governor can help our state revitalize its economy, compete for businesses and talent, attract the next generation to its towns and cities, and attain a high quality of life for its residents. Acadia Center is eager to begin this crucial work with the next governor.

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1 See TRIP, *Connecticut Transportation By The Numbers: Meeting the State's Need for Safe and Efficient Mobility* (May 2017) (http://www.tripnet.org/docs/CT_Transportation_by_the_Numbers_TRIP_Report_May_2017.pdf), p. 1 (summary of key transportation facts).

2 See id.

3 See TRIP, *Preserving Connecticut's Bridges: The Conditions and Funding Needs of Connecticut's Aging Bridge System* (September 2018) (http://www.tripnet.org/docs/CT_Preserving_Connecticut_Bridges_TRIP_Report_September_2018.pdf), at p. 1 (executive summary).

4 See *Connecticut Transportation By The Numbers*, supra, at p. 6.

5 See Connecticut Association for Community Transportation, *The Reality of Failing to Fund Transportation* (2018) (<http://www.cact.info/documents/FINAL2018TheRealityofFailingtoFundTransportation.pdf>), at p. 2.

6 See Connecticut Association for Community Transportation, *Connecticut's Connections: Shaping the Economy Through Transportation* (February 2016) (http://www.cact.info/documents/FINALLegislativePaper_Feb.2320162.20.16.pdf), at p. 3.

7 For GHG emissions data by sector for Connecticut, see U.S. EIA data available online: <https://www.eia.gov/environment/emissions/state/>. Connecticut must reduce GHG emissions to levels set in law; targets exist for 2020, 2030, and 2050. See Conn. Gen. Stat. §22a-200a.

8 See CT Department of Energy & Environmental Protection, *State of Connecticut Mitigation Plan under Volkswagen 2.0L and 3.0L Vehicle Partial Consent Decrees*, Appendix D (April 2018) (https://www.ct.gov/deep/lib/deep/air/mobile/vw/CT_VW_Final_Mitigation_Plan.pdf), at p. 4.

9 See id., at p. 5.

10 See Acadia Center, *Outpacing the Nation: RGGI's Environmental and Economic Success* (September 2017) (https://acadiacenter.org/wp-content/uploads/2017/09/Acadia-Center_RGGI-Report_Outpacing-the-Nation.pdf). Since its launch in 2009, the Regional Greenhouse Gas Initiative, also known as RGGI, has reduced electric generation emissions by 40%. During that same timeframe, RGGI member states have experienced 4.3% more economic growth than non-RGGI states.

11 See economic analysis reports for: the New Haven Rail Line Expansion in CT; the MA South Station High Speed Intercity Rail Expansion; the

NH Capital Corridor Rail Expansion; the RI South County Commuter Rail Expansion; the Cincinnati Modern Streetcar; the Downtown Los Angeles Streetcar; Bus Rapid Transit in Madison, WI; Rural and Small Urban Transit Systems in ND; Bus Expansion for Greenville Transit Authority in SC; Biking and Pedestrian Trails in NC; and NREL's National Economic Value Assessment of Plug-In Electric Vehicles. Further detail available upon request.

12 Note that new wages are a subset of new business sales.

13 See U.S. EPA's social cost of carbon methodology.

14 Benefits will vary based on the final investment portfolio developed with stakeholder input; this analysis is intended to show the scale of the opportunity for Connecticut.

15 See <http://2030.acadiacenter.org>. This number of electric vehicle rebates assumes CHEAPR program levels of \$3,000 for long-range battery EVs and \$2,500 for shorter range battery electric vehicles and plug-in hybrid EVs. It also assumes a \$2,000 incentive for L2 EV chargers and \$20,000 for DC fast chargers. The National Renewable Energy Lab estimates that 338,200 workplace and public L2 and L1 chargers will be needed per million EVs; this analysis considers 80% of these chargers will be L2. NREL also estimates the need for 470 DCFCs per million EVs. See <https://www.nrel.gov/docs/fy17osti/66980.pdf>.

16 Assuming a cost of \$750,000 per bus, \$350,000 per 6-port fast-charger, and \$250,000 per charger installation. See <http://fortune.com/2017/09/19/electric-cars-buses-proterra/> and https://cafcg.org/sites/default/files/5_CARB-ACT-Cost-Model-Discussions_CaFCG-Bus-Team-Meeting-Aug2016.pdf.

17 The proposed New Haven Streetcar is a 3.6-mile loop with an estimated cost of \$30 million. See https://www.lightrailnow.org/news/n_newslog2010q1.htm#NH_20100225.

18 Assuming a cost of \$280,000 per mile, based on: <https://www.ncdot.gov/bikeped/walkbikenc/pictures/EconomyImpact-Analysis.pdf>.

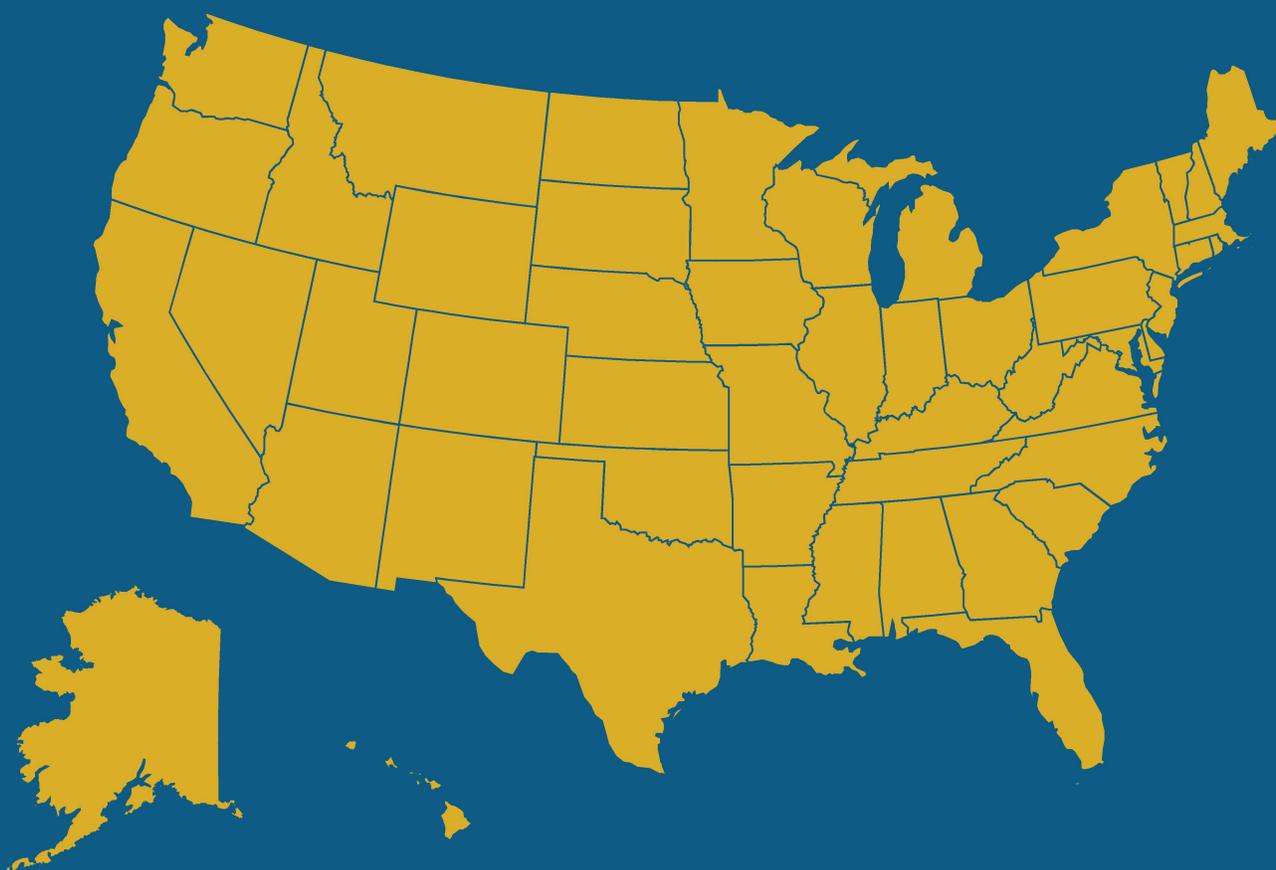
19 See <http://www.cleanairactionplan.org/documents/preliminary-cost-estimates-select-caap-strategies.pdf> and <http://www.dem.ri.gov/mobile/pdf/story6.pdf> for cost estimates for electric port technologies.

20 For more information on this regional collaboration, often called the Transportation & Climate Initiative, see <https://www.transportationandclimate.org/>.

- 21** See ISO-New England, *2017 Regional System Plan* (November 2017) (<https://www.iso-ne.com/system-planning/system-plans-studies/rsp/>), at p. 97. Connecticut has no oil or natural gas reserves.
- 22** See *id.*, at pp. 102-103.
- 23** See Acadia Center, *Greenhouse Gas Emissions and Fuel Consumption in New England: Fact Sheet on Key Regional Statistics and Trends* (May 2018) (<https://acadiacenter.org/wp-content/uploads/2018/05/Acadia-Center-Regional-Emissions-and-Fuel-Consumption-in-New-England-May-2018-.pdf>).
- 24** See Acadia Center, *Connecticut: Pathway to 2030* (<http://2030.acadiacenter.org/full-reports/>).
- 25** For example, the 800 MW offshore wind project recently selected by Massachusetts will have a leveled price below wholesale market prices for energy and renewable energy credits, saving Massachusetts ratepayers approximately \$1.4 billion over the twenty years of the long-term contract. See Letter to MA Department of Public Utilities from MA Department of Energy Resources dated August 1, 2018 (<https://eeaonline.eea.state.ma.us/EEA/FileService/FileService.Api/file/FileRoom/9676906>), at pp. 3-4.
- 26** See Acadia Center, *The Offshore Wind Opportunity in Connecticut: Policy Action Needed to Ensure In-State Jobs and Economic Growth* (September 2017) (https://acadiacenter.org/wp-content/uploads/2017/09/Acadia-Center-CT-Offshore-Wind-Opportunity_9_20_2017.pdf). Offshore wind's generation potential will only grow in the New England region; more federal lease areas are expected to be made available for offshore wind development in coming years.
- 27** Acadia Center estimate based on data in E2's recent offshore wind report, *Offshore Wind: Generating Economic Benefits on the East Coast* (August 2018) (https://www.e2.org/wp-content/uploads/2018/08/E2-OCS-Report-Final-8_30_18.pdf), combined with project pricing from the Vineyard Wind 800 MW project selected by Massachusetts, see Letter to MA Department of Public Utilities from MA Department of Energy Resources dated August 1, 2018 (<https://eeaonline.eea.state.ma.us/EEA/FileService/FileService.Api/file/FileRoom/9676906>), at pp. 3-4.
- 28** Acadia Center estimate based on recent New England offshore wind bids and report entitled, *U.S. Job Creation in Offshore Wind: A Report for the Roadmap Project for Multi-State Cooperation on Offshore Wind* (October 2017) (<https://cesa.org/assets/Uploads/US-job-creation-in-offshore-wind.pdf>).
- 29** See Letter to MA Department of Public Utilities from MA Department of Energy Resources dated August 1, 2018 (<https://eeaonline.eea.state.ma.us/EEA/FileService/FileService.Api/file/FileRoom/9676906>), at p. 4.
- 30** See <http://www.thesolarfoundation.org/wp-content/uploads/2018/02/Solar-Jobs-By-State-1.pdf>.
- 31** See Acadia Center, *Connecticut: Pathway to 2030* (<http://2030.acadiacenter.org/full-reports/>).
- 32** See *id.* Acadia Center analysis based on ISO-New England distributed generation forecast data and U.S. Census data.
- 33** See *id.*
- 34** Acadia Center analysis using 2015 economic impact study by the Connecticut Center for Economic Analysis that evaluated Connecticut's existing rooftop solar deployment program.
- 35** Acadia Center analysis using same study.
- 36** Same.
- 37** See also Acadia Center, *Connecticut: Pathway to 2030* (<http://2030.acadiacenter.org/full-reports/>).
- 38** See U.S. DOE, U.S. Energy and Employment Report (January 2017), CT State Chart.
- 39** See U.S. EIA <https://www.eia.gov/state/?sid=CT>.
- 40** Acadia Center analysis of SEDS data for Connecticut for 2016.
- 41** The original diversion of energy efficiency ratepayer funding was for \$127 million over two fiscal years (FY18 and FY19). The General Assembly restored \$10 million of the diverted funds through the budget passed in the 2018 legislative session. The total amount of the funding diversion for the C&LM programs now stands at \$117 million. The first payment to the State of \$63.5 million in diverted ratepayer funds has already occurred. The second payment is due in June 2019. This discussion does not include the legislative diversions that also exist for Connecticut's Regional Greenhouse Gas Initiative auction proceeds and for the Connecticut Green Bank. Any restoration of energy efficiency and clean energy funding should involve those revenue sources as well.
- 42** See Connecticut Energy Efficiency Board, *2017 Annual Legislative Report, Executive Summary* (available online: <https://www.energizect.com/sites/default/files/Final-2017-Annual-Legislative-Report-WEB-2-20-18.pdf>). Acadia Center currently serves as the elected Chair of the Energy Efficiency Board, a stakeholder advisory body that helps oversee Connecticut's energy efficiency programs.
- 43** See *id.*
- 44** See *id.*
- 45** See Acadia Center, *EnergyVision 2030: Buildings Companion Brief* (2017), at pp. 3-4.
- 46** See *id.*
- 47** Acadia Center analysis of data from NYSERDA, *Residential Statewide Baseline Study Volume 1*, and Reed, Faesy, Howland, "Accelerating the Pace to Fossil-Free Residential New Construction," *2018 Summer Study Paper for ACEEE*.
- 48** See Acadia Center, *EnergyVision 2030: Buildings Companion Brief*; NYSERDA, *Residential Statewide Baseline Study Volume 1*; and Reed, Faesy, Howland, "Accelerating the Pace to Fossil-Free Residential New Construction," *2018 Summer Study Paper for ACEEE*.
- 49** Acadia Center analysis of data from Reed, Faesy, Howland, "Accelerating the Pace to Fossil-Free Residential New Construction," *2018 Summer Study Paper for ACEEE*.
- 50** Acadia Center analysis using methodology from *Incentives for Change* (2017).
- 51** The Energy component covers the costs of generating and supplying electricity. The Grid Infrastructure component includes the costs of electricity delivery, mainly transmission and distribution infrastructure costs. The Combined Public Benefits Programs component includes costs for several public benefits programs, such as funding for the energy efficiency programs (the Conservation and Load Management programs mentioned earlier) and for the Connecticut Green Bank. The monthly customer service charge, also known as the residential fixed charge, was not included. Currently, the residential fixed charge for Eversource customers is \$9.21 per month and for United Illuminating customers is \$10.04 per month. The amount of the residential fixed charge should also be a consideration when examining energy grid costs.
- 52** See Acadia Center, *Grid Modernization and Utility Reform Policy Options: A Menu for the Northeast* (July 2018) (<https://acadiacenter.org/wp-content/uploads/2018/07/Acadia-Center-Grid-Modernization-and-Utility-Reform-Policy-Menu-July-2018.pdf>).
- 53** See Acadia Center, *Community|EnergyVision Action Guide for Connecticut* (2017), at p. 8 (<https://acadiacenter.org/wp-content/uploads/2017/11/Acadia-Center-Community-EnergyVision-Action-Guide-CT.pdf>).
- 54** See *id.*
- 55** See *id.*, at p. 10.

ENERGY EFFICIENCY JOBS IN AMERICA

2.25 MILLION AMERICANS WORK IN ENERGY EFFICIENCY



SEPTEMBER 2018



#EEJOBSINAMERICA

#Faces
Of EE

Energy Efficiency Jobs in America

September 2018



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ENERGY EFFICIENCY JOBS IN AMERICA¹

2.25 MILLION AMERICANS WORK IN ENERGY EFFICIENCY

ENERGY EFFICIENCY—AMERICA’S JOB POWERHOUSE

Across every time zone, state, county, and even zip code, energy efficiency solutions are creating new economic opportunities. Whether it’s new efficient technologies spurring brand-new companies or established businesses expanding, America’s job growth is being powered by energy efficiency.

Energy efficiency added the most new jobs in 2017 of the entire energy sector. Its workers now outnumber elementary and middle school teachers and are nearly double those in U.S. law enforcement. In fact, there are now as many energy efficiency workers as there are waitstaff in U.S. bars and restaurants.

A BIGGER PICTURE

This report focuses solely on the energy sector of the economy. Jobs in retail trade, vehicle efficiency-related work, and the 4.2 million jobs related to efficient manufacturing processes are excluded from these numbers.

IN PERSPECTIVE

No. 1 Energy efficiency is the fastest growing jobs sector in energy, accounting for half of the entire energy industry’s job growth (133,000) in 2017

11% of energy efficiency jobs held by veterans, greater than the national average of veterans in the workforce (6%)

315,578 manufacturing jobs in energy efficiency, an increase of nearly 10% in 2017 alone

2X Energy efficiency employs twice as many workers in the USA as all fossil fuel sectors combined

PRESENTED BY



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#FACESOFFEE

SEPTEMBER 2018
E2FS: 18-08-B

TOP 10 STATES FOR ENERGY EFFICIENCY JOBS

RANK	STATE	TOTAL	ENERGY STAR & EFFICIENT LIGHTING	HVAC, RENEWABLE HEATING & COOLING	ADVANCED BUILDING MATERIALS/ INSULATION	OTHER*
1	California	310,433	69,011	183,278	18,677	39,468
2	Texas	154,565	57,203	63,074	20,152	14,135
3	New York	117,339	35,184	38,030	7,305	12,666
4	Florida	112,620	30,757	66,614	31,167	8,236
5	Illinois	86,916	12,416	7,619	7,440	13,782
6	Massachusetts	84,556	13,637	58,558	10,811	8,501
7	Michigan	84,052	14,009	41,252	48,643	18,856
8	North Carolina	84,020	42,223	34,206	5,885	10,243
9	Ohio	79,653	15,487	31,034	19,718	4,878
10	Virginia	76,621	19,939	30,092	10,568	16,022

ENERGY EFFICIENCY NOW EMPLOYS MORE WORKERS THAN THE FOSSIL FUEL INDUSTRY IN 40 STATES AND THE DISTRICT OF COLUMBIA



*Other such as energy audits, building certifications, and software services

POLICY LEADERSHIP

To continue creating hundreds of thousands of jobs for Americans across all states and counties,

CONGRESS MUST:

1. Properly fund smart efficiency policies (which historically enjoy robust bipartisan support)
2. Invest in infrastructure, e.g., interval meters to enable data analytics and boost grid resilience
3. Renew the Commercial and Residential building tax credits
4. Fund strong State Energy Program and Weatherization Assistance Programs
5. Maintain and protect high quality ENERGY STAR brand

State leadership on energy efficiency plays a vital role in driving America’s energy economy.

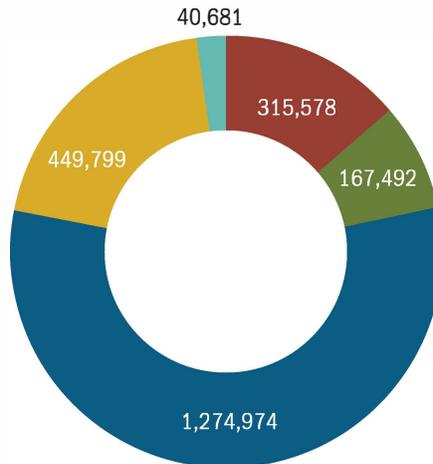
STATE POLICYMAKERS MUST SUPPORT:

1. Strong energy efficiency standards with consistent funding
2. Broader use of performance contracting in public buildings
3. Innovative commercial and residential PACE programs
4. Modernization of utility regulation with revenue protection, decoupling, performance rates and ability to earn a profit on procurement of energy efficiency as a service.

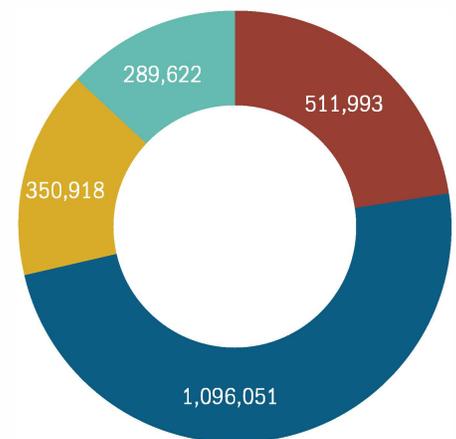
ENERGY EFFICIENCY JOBS—WHERE ARE THEY?

Energy efficiency workers do much more than reduce energy use. They improve operations of existing buildings, and they design and build a better future. Consumers, municipalities, and business owners incorporate lower energy consumption options into everyday procurement decisions; in homes, offices, schools, and municipal infrastructure. Squeezing out waste drives EE job creation.

ACROSS INDUSTRIES BY SUPPLY CHAIN



ACROSS TECHNOLOGIES BY SECTOR



#FacesOfEE

To meet “real people” working in energy efficiency jobs around the country, follow #FacesOfEE on social media channels, and tweets by @FacesOfEE

- Manufacturing - 14%
- Sales & Distribution - 7%
- Construction & Repairs - 57%
- Professional Services* - 20%
- Other** - 2%

*Professional Services includes finance/accounting, architecture, engineering, R&D, etc

**Other such as maintenance, and business and nonprofit organizations

- ENERGY STAR Appliances & Efficient Lighting - 23%
- HVAC* - 49%
- Building Materials & Insulation - 16%
- Other** - 13%

*Heating, Ventilation, Air Conditioning of higher than standard efficiency/renewable heating & cooling

**Other such as energy audits, building certifications, and software services

MORE ENERGY EFFICIENCY = MORE CONSTRUCTION JOBS



More than 1 out of every 6 US construction workers spend 50% or more of their time on Energy Efficiency (18%)



Nearly 60% of energy efficiency's 2.25 million employees work in construction (1.27 million)

80%

of energy efficiency construction businesses say employees spend a majority of time on energy efficiency—an increase from last year (74%)

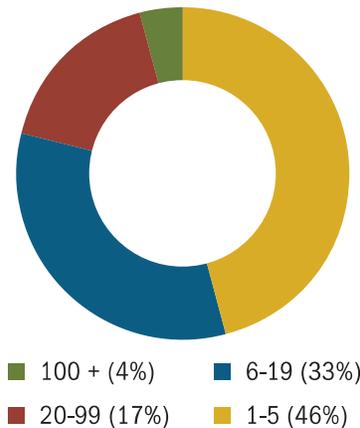
EE JOBS ACROSS THE COUNTRY

- // These jobs are local. **99.7%** of U.S. counties have energy efficiency jobs
- // Energy efficiency now employs workers in more than **3,000** of America's **3,007** counties
- // More than **300,000** Americans living in rural areas work in energy efficiency
- // America's Top 25 metro areas employ **900,000** workers in energy efficiency
- // **35%** of U.S. energy workers are involved in energy efficiency

GROWTH ACROSS AMERICA

There are **353,269** energy efficiency businesses in America

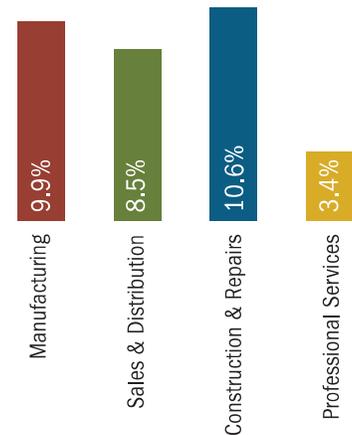
SMALL EE BUSINESS BY EMPLOYEE COUNT



GROWTH FOR THE FUTURE

Energy efficiency businesses are projecting **9% growth in jobs** for 2018

...and the job growth is expected across all major industries



WHAT DO ENERGY EFFICIENCY WORKERS DO?

Among other vital tasks and endeavors that are essential across the U.S., energy efficiency workers:

- // Manufacture and install high efficiency systems, windows, and insulation in existing & new homes, commercial & industrial buildings
- // Construct high performance buildings meeting LEED Certification
- // Upgrade and repair heating, air conditioning and ventilation (HVAC) and water heating equipment
- // Install energy-saving LED lighting
- // Manufacture and install ENERGY STAR-certified appliances, lighting, ceiling fans, commercial cooking equipment, refrigerators, boilers
- // Save money for businesses, homeowners, schools, states, counties, municipalities, U.S. armed forces, and more

511,933 JOBS

ENERGY STAR Appliances & Efficient Lighting

- // **+7%** growth rate
- // Includes household and commercial appliances, e.g., refrigerators, dishwashers, ceiling fans, and various advanced lighting types; ENERGY STAR market penetration continues to increase
- // More jobs than real estate brokers and sales agents combined

350,918 JOBS

Building Materials & Insulation

- // **270,000+** jobs in construction and manufacturing
- // Advanced materials create higher-performance buildings; recycled materials mitigate waste stream issues, among other benefits
- // Outnumbers all U.S. pharmacists

1,096,051 JOBS

HVAC (Heating Ventilation & Air Conditioning)

- // **+5.6%** growth rate
- // Heating, Ventilation, Air Conditioning of higher than standard efficiency. Includes renewable heating and cooling technologies
- // More than all of America's legal workers combined, including lawyers, court reporters, judges, and paralegals

289,622 JOBS

Vital Energy Efficiency Services

- // **208,000** jobs in construction and manufacturing
- // Includes energy audits, building certifications, and software services
- // More than all athletes, coaches, umpires and referees, scouts, and other sports officials combined

ABOUT THE REPORT

The job numbers come from the national [2018 U.S. Energy and Employment Report](#) (USEER), which focuses on all energy jobs. The USEER analyzes data from the U.S. Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) to track employment across many energy production, transmission, and distribution subsectors. In addition, the 2018 USEER relies on a unique supplemental survey of 23,000 business representatives across the U.S. Created and conducted by BW Research and approved by the Office of Management and Budget and U.S. Department of Energy (DOE), this survey is used to identify energy-related employment within key subsectors of the broader industries as classified by the BLS and to assign them into their component energy and energy efficiency sectors.

For further questions regarding this report, visit the Energy Efficiency Jobs in America FAQ at www.e2.org/eejobsamerica/faq or contact E4TheFuture or E2 directly.



ABOUT E4TheFuture

E4TheFuture is dedicated to bringing clean, efficient energy home for every American and promotes energy solutions to advance climate protection and economic fairness. Visit www.E4TheFuture.org



ABOUT E2

E2 is a national, nonpartisan group of business leaders, investors and others who advocate for smart policies that are good for the environment and good for the economy. Visit www.e2.org



ABOUT BW Research

BW Research Partnership is a full-service, economic and workforce research consulting firm with offices in Carlsbad, California and Wrentham, Massachusetts. It is the nation's leading provider of accurate, comprehensive energy and clean energy research studies, including the United States Energy and Employment Report (USEER), National Solar Jobs Census, wind industry analyses for the National Renewable Energy Laboratory and the Natural Resources Defense Council, and state-level clean energy reports for Massachusetts, New York, Illinois, Vermont, Iowa, Rhode Island, Florida, and Missouri, among others.

ENDNOTES

1 Unless otherwise stated, all data are from the 2018 U.S. Energy and Employment Report, May 2018, by NASEO and EFI (see Pages 15-17 for methodology details). This methodology -- adopted by the U.S. Dept. of Energy for its 2017 U.S. Energy and Employment Report, approved by the Office of Management and Budget and grounded on data collected by the Bureau of Labor Statistics -- provides the broadly accepted best accounting of all U.S. energy workers.

Connecticut

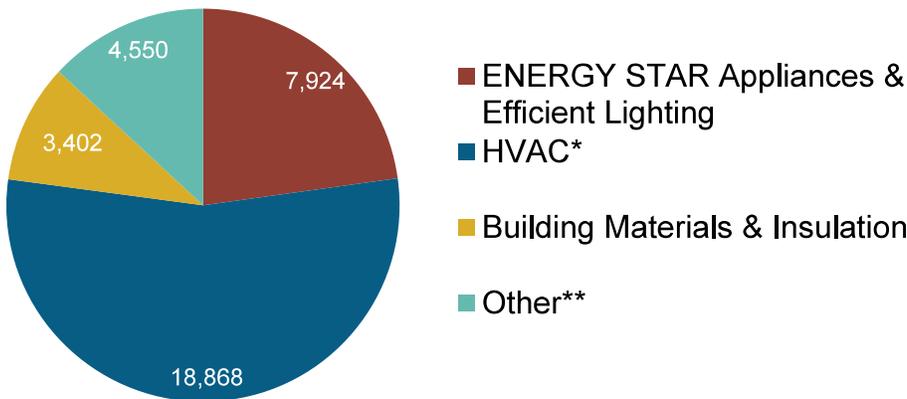
Energy Efficiency Jobs in America

34,743
Total Jobs

What are EE Jobs?

Delivery of goods and services that lower energy use by improving technologies, appliances, buildings, and energy systems.

Jobs by Sector



*Heating, Ventilation, Air Conditioning of higher than standard efficiency/renewable heating & cooling
**Other such as energy audits, building certifications, and software services

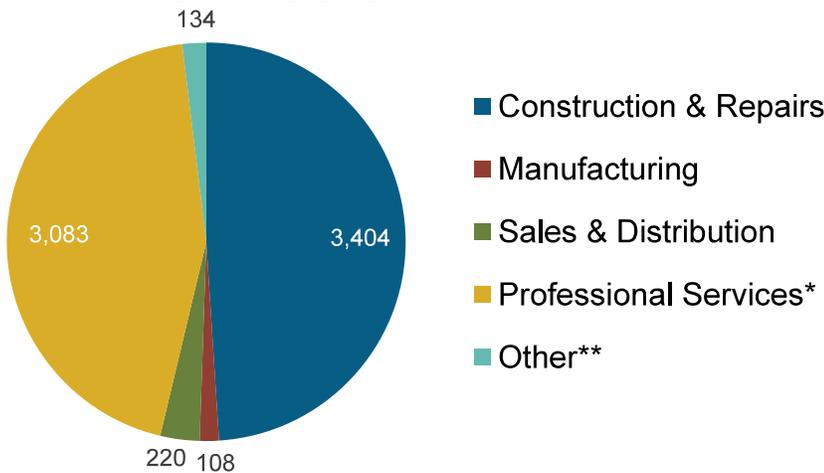
In Connecticut, EE Jobs Comprise:

28%
of All Construction Jobs

47%
of All Energy Sector Jobs

6%
of Connecticut residents employed in EE are Veterans

Firms by Supply Chain



*Professional services includes finance/accounting, architecture, engineering, R&D, etc.
**Other such as maintenance, and business and nonprofit organizations

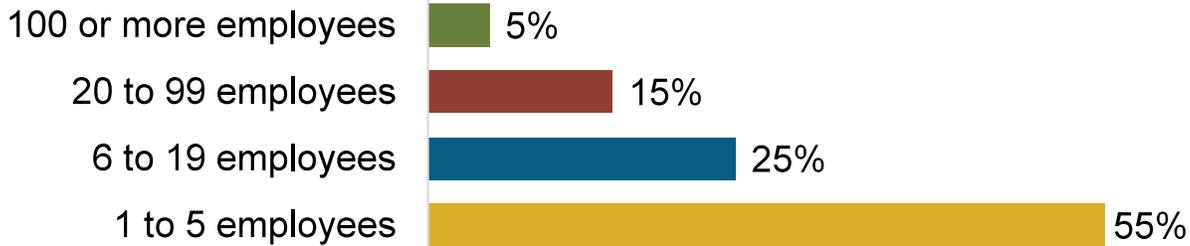
Presented by:



Good for the Economy.
Good for the Environment.

6,949 Energy Efficiency Businesses

Firm Size



Where are EE Jobs?

Congressional		Metropolitan Areas	
District	Jobs	Area	Jobs
1	7,930	Bridgeport-Stamford-Norwalk	2,377
2	5,370	Hartford-W. Hartford-E. Hartford	3,387
3	7,133	New Haven-Milford	15,844
4	8,752	Norwich-New London	2,114
5	5,558	Rural	5,383

We manufacture glass interior storm windows so people can save energy & money.

Kimber Degling,
Innerglass Window
Systems, Granby, CT

Energy efficiency:
America's
Job-creation
powerhouse

Faces of
EE
JOBS



State Upper House

District	Jobs	District	Jobs	District	Jobs	District	Jobs
1	1,763	11	1,033	21	1,668	31	695
2	550	12	1,069	22	668	32	828
3	1,197	13	1,198	23	73	33	886
4	878	14	985	24	1,841	34	-
5	1,108	15	996	25	2,034	35	349
6	454	16	447	26	1,163	36	1,313
7	706	17	279	27	2,227		
8	1,205	18	891	28	1,210		
9	977	19	721	29	489		
10	1,218	20	1,092	30	534		

State Lower House

District	Jobs	District	Jobs	District	Jobs	District	Jobs	District	Jobs
1	206	32	195	63	614	94	-	125	607
2	1,593	33	370	64	267	95	149	126	172
3	496	34	286	65	-	96	-	127	-
4	859	35	198	66	481	97	111	128	141
5	195	36	408	67	298	98	386	129	-
6	-	37	130	68	198	99	-	130	-
7	65	38	527	69	290	100	-	131	176
8	375	39	-	70	215	101	229	132	821
9	706	40	382	71	137	102	-	133	-
10	-	41	-	72	313	103	-	134	794
11	452	42	257	73	164	104	191	135	130
12	-	43	130	74	-	105	149	136	-
13	485	44	183	75	-	106	99	137	908
14	-	45	43	76	84	107	275	138	-
15	290	46	308	77	405	108	95	139	27
16	443	47	225	78	88	109	-	140	-
17	187	48	118	79	-	110	-	141	332
18	444	49	31	80	95	111	373	142	-
19	366	50	238	81	99	112	229	143	-
20	-	51	107	82	294	113	481	144	1,620
21	80	52	107	83	-	114	302	145	607
22	202	53	15	84	-	115	218	146	-
23	436	54	4	85	805	116	-	147	-
24	458	55	160	86	401	117	519	148	-
25	-	56	-	87	-	118	164	149	1,103
26	-	57	179	88	433	119	-	150	210
27	-	58	256	89	504	120	462	151	-
28	202	59	-	90	-	121	69		
29	260	60	107	91	-	122	317		
30	416	61	221	92	603	123	-		
31	34	62	233	93	397	124	427		

**HOME ENERGY AFFORDABILITY
IN CONNECTICUT:**

The Affordability Gap (2017)

Prepared for:

Operation Fuel
Brenda Watson, Acting Director
Hartford, Connecticut

Prepared by:

Roger D. Colton
Fisher, Sheehan & Colton
Public Finance and General Economics
Belmont, Massachusetts

October 2017

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Glossary

Affordable home energy burden: A home energy bill that does not exceed 6% of gross household income. The 6% applies to combined heating and electricity.

Aggregate Home Energy Affordability Gap: The Home Energy Affordability Gap on a per-household basis multiplied by the number of households in a particular geographic area and/or Poverty Range.

Deep Poverty: Income which places a household at or below 50% of the Federal Poverty Level.

Federal Poverty Level: A measure of low-income status updated annually by the U.S. Department of Health and Human Services.

Home Energy Affordability Gap: The dollar difference between actual home energy bills and affordable home energy bills for a specified geographic area. The Home Energy Affordability Gap is calculated before application of external assistance such as fuel assistance or utility rate discounts.

Home energy burden: A home energy bill as a percentage of income. For example, a household with a home energy bill of \$2,000 and a gross household income of \$8,000 has a home energy burden of 25%.

LIHEAP: The Federal Low-Income Home Energy Assistance Program, operated as a state block grant program and administered by state agencies.

Introduction

Connecticut's Home Energy Affordability Gap increased in 2017 relative to the prior year. As has been true for several years, home energy costs continue to pose a crushing burden to low-income residents of the state. Particularly for households with incomes in "Deep Poverty," home energy costs threaten not only the ability of Connecticut households to retain access to energy services, but also threaten access to housing, food, medical care and other necessities of life. The Home Energy Affordability Gap in Connecticut leaves an aggregate Gap substantially higher than available assistance resources. The size of the Affordability Gap indicates the extent of the home energy affordability crisis in Connecticut.

Home energy unaffordability in Connecticut is a statewide phenomenon. It affects areas of the state both rural and urban. It affects areas of the state both North and South, both East and West. The discussion below continues a series of annual reports examining home energy affordability in Connecticut. The Home Energy Affordability Gap measures the dollar amount by which actual home energy bills exceed affordable home energy bills. In this respect, "affordability" is examined in terms of home energy burdens, bills as a percentage of income. For example, if a Connecticut household has an annual income of \$12,000 and an annual home energy bill of

\$3,000, that household has a home energy burden of 25% ($\$3,000 / \$12,000 = 0.25$). An affordable home energy burden is set at 6%.¹

¹ The 6% is a calculated figure. It is based on the premise that utility costs should not exceed 20% of shelter costs. Moreover, it is based on the premise that total shelter costs should not exceed 30% of income. 20% of 30% yields a 6% affordable utility burden.

It is universally accepted that total shelter costs are “unaffordable” if they exceed 30% of income. Total shelter costs include not only rent/mortgage, but all utilities (except telephone). See generally, Mary Schwartz and Ellen Wilson (2008). “Who Can Afford to Live in a Home: A Look at Data from the 2006 American Community Survey,” U.S. Census Bureau: Washington D.C. They state in relevant part:

The conventional public policy indicator of housing affordability in the United States is the percent of income spent on housing. Housing expenditures that exceed 30 percent of household income have historically been viewed as an indicator of a housing affordability problem. The conventional 30 percent of household income that a household can devote to housing costs before the household is said to be “burdened” evolved from the United States National Housing Act of 1937.

* * *

Because the 30 percent rule was deemed a rule of thumb for the amount of income that a family could spend and still have enough left over for other nondiscretionary spending, it made its way to owner-occupied housing too. Prior to the mid-1990s the Federal housing enterprises (Fannie Mae and Freddie Mac) would not purchase mortgages unless the principal, interest, tax, and insurance payment (PITI) did not exceed 28 percent of the borrower’s income for a conventional loan and 29 percent for an FHA insured loan. Because lenders were unwilling to hold mortgages in their portfolios, this simple lender ratio of PITI to income was one of many “hurdles” a prospective borrower needed to overcome to qualify for a mortgage. There are other qualifying ratios as well; most of which hover around 30 percent of income. The amount of debt outstanding and the size and frequency of payments on consumer installment loans and credit cards influence the lender’s subjective estimation of prospective homebuyers’ ability to meet the ongoing expenses of homeownership. Through the mid-1990s, under Fannie Mae guidelines for a conventional loan, total allowable consumer debt could not exceed eight percent of borrower’s income for conventional mortgage loans and 12 percent for FHA-insured mortgages. So through the mid-1990s, underwriting standards reflected the lender’s perception of loan risk. That is, a household could afford to spend nearly 30 percent of income for servicing housing debt and another 12 percent to service consumer debt. Above these thresholds, a household could not afford the home and the lender could not afford the risk. While there are many underwriting standards, none of them made their ways into the public policy lexicon like the 30 percent of income indicator of housing affordability.

The mid to late 1990s ushered in many less stringent guidelines. Many households whose housing costs exceed 30 percent of their incomes are choosing then to devote larger shares of their incomes to larger, more amenity-laden homes. These households often still have enough income left over to meet their non-housing expenses. For them, the 30 percent ratio is not an indicator of a true housing affordability problem but rather a lifestyle choice. But for those households at the bottom rungs of the income ladder, the use of housing costs in excess of 30 percent of their limited in-

Methodology

The Home Energy Affordability Gap calculated for each Connecticut legislative district is determined based on the same fundamental model used for the annual Home Energy Affordability Gap calculated nationwide.² The Affordability Gap is that dollar amount by which home energy bills in a specified geographic region exceed what home energy bills would be if they were set equal to an affordable percentage of income. The Home Energy Affordability Gap model considers a bill “affordable” if it does not exceed six percent (6%) of annual household income.

The Home Energy Affordability Gap is a function of two calculations: (1) household income; and (2) household energy bills. Household income is based on the Federal Poverty Level for the median household size in the geographic region being studied. While the Federal Poverty Level is uniform for the 48 contiguous States, income by geographic area differs by geographic area. Poverty Level is a function of household size. Since median household size differs by geographic area (both between and within states), so, too, does the income used in the calculation of the Home Energy Affordability Gap.³ For example, 100% of Federal Poverty Level in a geographic area with a median household size of two persons will be lower than 100% of Federal Poverty Level in a geographic area with a median household size of three persons.

Home energy bills determined for the Home Energy Affordability Gap are a function of the following primary factors, each of which is examined at a county level:

- Tenure of household (owner/renter).
- Housing unit size (by tenure).
- Heating Degree Days (HDDs) and Cooling Degree Days (CDDs).
- Household size (by tenure).
- Heating fuel mix (by tenure).
- Energy use intensities (by fuel and by end use).

comes as an indicator of a housing affordability problem is as relevant today as it was four decades ago.

² See generally, www.HomeEnergyAffordabilityGap.com (last accessed October 11, 2017).

³ The geographic area serving as the basis for the Home Energy Affordability Gap calculation is the county.

Separate bills are calculated for four end-uses: (1) space-heating; (2) space cooling; (3) domestic hot water; and (4) electric appliances (including lighting and refrigerators). Bills are calculated using the U.S. Department of Energy’s “energy intensities” most recently made publicly available through the U.S. Department of Energy’s Residential Energy Consumption Survey (RECS). The energy intensities for each state are those published for the Census Division in which the state is located. Connecticut, for example, is located in the “New England” Census Division. State-specific demographic data is obtained from the American Community Survey (ACS) published by the U.S. Census Bureau. The analysis uses three-year average ACS data; for example, the “2016” data is the three-year average (2014, 2015 and 2016) with the most recent year being the reporting year. Heating Degree Days (HDDs) and Cooling Degree Days (CDDs) are obtained from the National Weather Service’s Climate Prediction Center on a county-by-county basis. State price data for each end-use is obtained from the Energy Information Administration’s (EIA) fuel-specific price reports (e.g., Natural Gas Monthly, Electric Power Monthly) at a statewide level.

Changes in “Second Series” Affordability Gap Analysis.

The analysis of the Connecticut Home Energy Affordability Gap undertaken in 2017 continues several modifications to Affordability Gap calculations undertaken prior to 2013. As a result, the Affordability Gap presented in this report continues the “Second Series” of the Affordability Gap, with results in this and subsequent years not directly comparable to the Affordability Gap calculated in 2012 and before. While remaining fundamentally the same, several improvements were introduced in both data and methodology in the Affordability Gap (2nd Series).⁴

The most fundamental change in the Home Energy Affordability Gap (2nd Series) is the move to a use of the American Community Survey (ACS) as the source of foundational demographic data. The ACS offers several advantages compared to the Decennial Census.⁵ While year-to-year changes are smoothed out through the use of multi-year averages, the ACS nonetheless is updated on an annual basis.⁶ As a result, numerous demographic inputs into the Affordability Gap (2nd Series) will reflect year-to-year changes on a county-by-county basis, including:

- The distribution of heating fuels by tenure;

⁴ For example, data on housing unit size (both heated square feet and cooled square feet) is no longer calculated based on the number of rooms. Instead, Energy Information Administration / Department of Energy (EIA/DOE) data on square feet of heated and cooled living space per household member is used beginning with the Home Energy Affordability Gap (2nd Series). A distinction is now made between heated living space and cooled living space, rather than using total living space.

⁵ The Affordability Gap (1st Series) relied on the 2000 Census as its source of demographic data.

⁶ Given the earlier publication date of the 2017 Connecticut Home Energy Affordability Gap analysis, Census data was not updated from 2016’s Census data. Census data is generally updated in late Fall of each year.

- The average household size by tenure;
- The distribution of owner/renter status;
- The distribution of household size; and
- The distribution of households by ratio of income to Poverty Level.

The change resulting in perhaps the greatest dollar difference in the aggregate and average Affordability Gap between the *First Series* and the *Second Series*, however, is a change in the treatment of income for households with income at or below 50% of the Federal Poverty Level. Over time, it became evident that income for households with income below 50% of Poverty Level is not normally distributed. Rather than using the mid-point of the Poverty range (i.e., 25% of Poverty Level) to determine income for these households, income is instead now set somewhat higher (40% of Poverty). By setting income for that Poverty Level higher, both the average and aggregate Affordability Gap results not only for that Poverty range, but also for the state as a whole, will be lower. The Affordability Gap results for other Poverty ranges remain unaffected by this change.

Another change affecting both the aggregate and average Affordability Gap is a change in the definition of “low-income.” The Home Energy Affordability Gap (2nd Series) has increased the definition of “low-income” to 200% of the Federal Poverty Level (an increase from the previously-used 185% of Poverty). While this change may increase the *aggregate* Affordability Gap for the State, it is likely to decrease the *average* Affordability Gap. Since more households are added to the analysis, the aggregate is likely to increase. However, since the contribution of each additional household is less (given their higher incomes) than the contributions of households with lower incomes, the overall average will decrease.

In light of these introductory comments, the discussion below considers home energy affordability in Connecticut in the following sections:

- Part 1 considers statewide home energy affordability in 2017;
- Part 2 considers home energy affordability by income range;
- Part 3 considers home energy affordability by geographic area;
- Part 4 examines self-sufficiency incomes in Connecticut.

In addition to these sections, this report presents individual appendices consisting of “fact sheets” presenting the 2017 Affordability Gap for each state legislative district (both House and Senate), as well as for each of Connecticut’s Congressional districts.

Part 1: Home Energy Affordability in Connecticut in 2017

The Home Energy Affordability Gap in Connecticut in 2017 is roughly \$450 million. As is shown by this increasing Affordability Gap in Connecticut relative to 2016, home energy in Connecticut became less affordable (more *un*affordable) for the low-income population. In this Part, we focus on the statewide data setting forth the Home Energy Affordability Gap for Connecticut in 2017.

An Overview of the Statewide Affordability Gap

The State of Connecticut has a large Home Energy Affordability Gap facing its low-income households, with available resources grossly insufficient to address the problem.⁷ As a result of this mismatch between energy bills and the resources needed to pay them, low-income households incur unpaid bills and experience the termination of service associated with those arrears. In addition, the paid-but-unaffordable bill is a real phenomenon in Connecticut. Even when low-income households pay their bills in a full and timely manner, they often suffer significant ad-

⁷ While the Home Energy Affordability Gap analysis presents a statewide examination of unaffordable energy bills, specific sub-segments of the population have been examined in various years. The “working poor” were examined as part of the 2010 Affordability Gap analysis. The problems of residents of public and assisted housing were examined in the 2012 report. The implications by age (for both children and the aged) were examined in the 2014 Affordability Gap analysis. In addition to the affordability of home energy bills, the 2015 Affordability Gap analysis examined the affordability of water bills in Connecticut. The 2016 Affordability Gap analysis examined Connecticut low-income residents living in multi-family dwellings.

verse hunger, education, employment, health and housing consequences in order to make such payments.⁸

Energy prices have placed a substantial burden on the public and private energy assistance agencies in Connecticut. Home heating, cooling and electric bills in Connecticut have driven the average per-household Home Energy Affordability Gap for households living with incomes at or below 200% of the Federal Poverty Level (FPL) to crushing levels. The average annual shortfall between actual and affordable home energy bills for households at or below 200% of FPL now reaches \$1,404 per household. The aggregate Home Energy Affordability Gap in Connecticut now reaches more than \$450 million statewide.

This \$450 million is *not* the total low-income home energy bill in Connecticut. Rather, the \$450 million is the dollar amount by which actual home energy bills exceed affordable home energy bills for Connecticut households with income at or below 200% of the Federal Poverty Level. The population of households facing this Affordability Gap is substantial. According to the American Community Survey, Connecticut had roughly 320,000 households with income at or below 200% of the Federal Poverty Level.

The Home Energy Affordability Gap in Connecticut increased in 2017. This increase reflects rising home heating prices in particular.⁹ According to the Connecticut Department of Energy and Environmental Protection (“DEEP”), March 2017 natural gas heating prices for residential customers had increased 12% over March 2016 (from \$11.00/MCF to \$12.31/MCF). In addition, DEEP reported that Connecticut fuel oil prices had increased from \$2.121/gallon for the 2015/2016 heating season (October – March) to \$2.436/gallon for the 2016/2017 heating season, an increase of nearly 15%. In Connecticut, roughly 31% of homeowners and 44% of tenants heat with natural gas; roughly 52% of homeowners and 21% of tenants heat with fuel oil.

Given the magnitude of Connecticut’s Home Energy Affordability Gap, existing sources of energy assistance do not adequately address the Home Energy Affordability Gap in Connecticut. While the primary source of energy assistance in Connecticut is the federal Low-Income Home Energy Assistance Program (LIHEAP), LIHEAP is insufficient to address the state’s affordability need. LIHEAP continues to cover only a fraction of the Home Energy Affordability Gap for a fraction of income-eligible households. Connecticut’s LIHEAP allocation for the 2016 – 2017 heating season was only \$78.7 million, roughly 17.5% of the total Affordability Gap in the state for 2017.

⁸ The 2011 Connecticut Home Energy Affordability Gap presented an extensive discussion of these impacts. See, Colton (December 2011). Home Energy Affordability Gap: 2011, Connecticut Legislative Districts, at 14 – 31, prepared for Operation Fuel, Bloomfield (CT).

⁹ Remember, the Home Energy Affordability Gap does not take actual weather conditions into account. To keep the Affordability Gap comparable from one year to the next, it is calculated based on “normal” heating and cooling conditions.

The appendices attached to this report present Connecticut’s 2017 Home Energy Affordability Gap from three perspectives:

- Appendix A presents the Home Energy Affordability Gap for each state legislative district (House) in Connecticut;
- Appendix B presents the Home Energy Affordability Gap for each state legislative district (Senate) in Connecticut; and
- Appendix C presents the Home Energy Affordability Gap for each Congressional district in Connecticut.

In contrast to these detailed statistics, the narrative discussion below highlights different aspects of the Home Energy Affordability Gap. The detailed statistics for each legislative district, however, can be obtained from the relevant appendices.

Five Important Findings

1. The Home Energy Affordability Gap in Connecticut is substantial on an aggregate basis. In 2017, the aggregate Home Energy Affordability Gap for households with income at or below 200% of the Federal Poverty Level was \$449,647,715.
2. The Home Energy Affordability Gap on an individual household basis is crushing in Connecticut. On average, actual home energy bills exceeded affordable home energy bills for households with income at or below 200% of Federal Poverty Level by \$1,404.
3. This aggregate Affordability Gap in 2017 increased by nearly 13% relative to 2016. The *average* per-household 2017 Home Energy Affordability Gap increased by more than \$160 relative to 2016.
4. The low-income population in Connecticut facing these unaffordable bills is substantial. More than 320,000 Connecticut households live with income at or below 200% of the Federal Poverty Level.
5. The primary source of energy affordability assistance, the Federal Low-Income Home Energy Assistance Program (LIHEAP), is insufficient to fill the state’s Home Energy Affordability Gap. The LIHEAP allocation to Connecticut for the 2016 – 2017 heating season (\$78.7 million) covered only 17% of the state’s total Home Energy Affordability Gap. This coverage is not of *total* home energy bills, but rather only of the *unaffordable portion* of low-income home energy bills.

To: Lamont Administration Transition Team Energy Policy Committee

From: Anne George, Vice President, External Affairs & Corporate Communications

Date: December 5, 2018

Subject: ISO New England Overview and Regional Energy Challenges and Opportunities

Thank you for the opportunity to discuss the role of ISO New England (ISO-NE) and the energy challenges and opportunities facing the New England region. ISO-NE is the independent, not-for-profit company authorized by the Federal Energy Regulatory Commission to oversee the day-to-day operation of New England's electric power system, administer the region's competitive wholesale electricity markets, and manage comprehensive regional system planning.

Connecticut makes up a significant share of the grid and market operations in New England. With approximately 25 percent of the load in the region, energy decisions in Connecticut can have a large impact on regional grid operations and wholesale markets.

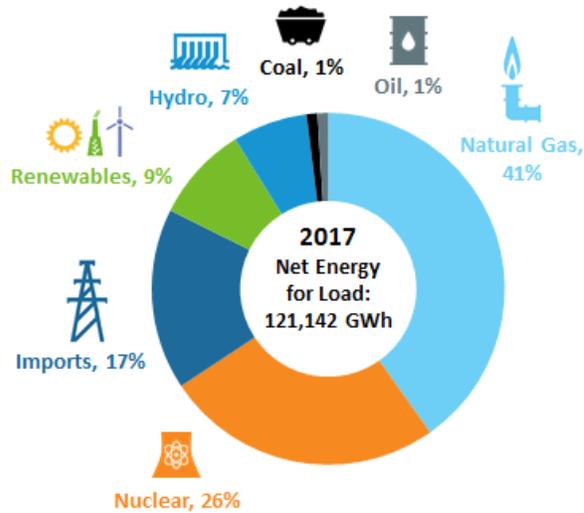
ISO-NE has longstanding relationships with the Connecticut Department of Energy and Environmental Protection (DEEP) and Public Utilities Regulatory Authority (PURA), interacting with these agencies at the state level and at the regional level through the New England Conference of Public Utilities Commissioners (NECPUC) and New England States Committee on Electricity (NESCOE). The Connecticut Office of Consumer Counsel (OCC) is also active in regional discussions, and ISO staff routinely communicates with Governor's office staff and key legislators on energy policy and regional energy issues. We look forward to Connecticut's continued involvement in regional energy discussions.

Connecticut is also home to the ISO's backup control center in Windsor. The backup control center (BCC) is a critical asset for all of New England – enabling the continued management of the regional grid in the unlikely event that the master control center located in Holyoke, MA is rendered inoperable. The BCC also serves as the location for conducting training and exercises intended to test the energy industry's response to physical and cyber threats and other potential energy emergencies. We invite Governor-elect Lamont and members of his team to visit either the BCC or our Holyoke, MA control room to learn more about the regional electricity system.

Connecticut can help shape solutions to New England's energy challenges. New England's resource mix has shifted dramatically over the last 17 years with more efficient, lower-emitting sources replacing older oil and coal resources (see attached [New England Power Grid 2017-2018 Profile](#), "Sources of Energy Production"). In 2017, most of the region's energy needs were met by natural gas, nuclear, imported

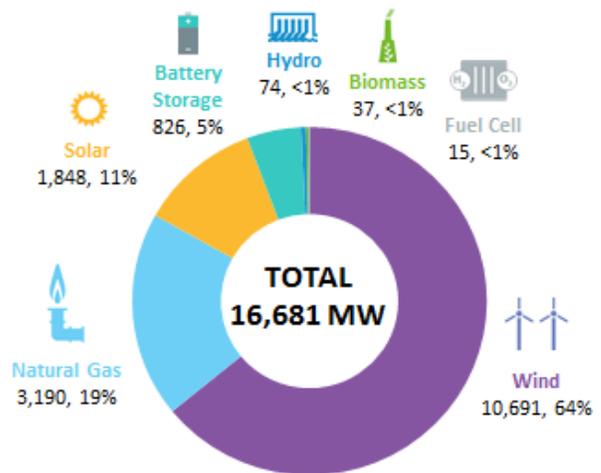
electricity (mostly hydropower from eastern Canada), renewables, and other low- or non-carbon-emitting resources. Looking ahead, wind power and other forms of clean energy dominate the ISO's Interconnection Queue, which is a listing of projects that are being evaluated for potential development in the region (see Figures 1 and 2 below).

Figure 1. ISO New England Energy Sources



Source: ISO New England. Renewables include landfill gas, biomass, other biomass gas, wind, grid-scale solar, municipal solid waste, and miscellaneous fuels.

Figure 2. ISO New England Queue Proposals By Type



Source: ISO New England (last updated Oct. 2018). Some natural gas proposals include dual-fuel units (oil); some natural gas, wind, and solar proposals include battery storage; megawatts represent nameplate capacity ratings; megawatts have been rounded.

As this transition continues, new challenges are emerging with regard to energy security, the competitive markets and infrastructure. Energy security, while initially driven by fuel limitations during the winter, is a challenge that will need to be resolved not only because of those limitations, but also as the region moves toward an energy system with greater penetration of variable or limited-energy resources, such as wind and solar generation. The ISO and regional stakeholders are currently discussing new market mechanisms to provide incentives to drive resources, regardless of technology, to assure that they can provide energy when needed. Connecticut's insight on the states' energy priorities and activities will be helpful in the regional discussions.

While the competitive wholesale markets have brought forward cleaner, more efficient generation, they have not resulted in the renewable energy development sought by certain New England states, primarily because there are lower-priced resources available. In recent years, Connecticut and other New England states have sought renewable energy outside of the wholesale markets, typically through clean energy procurements. Given this activity, the ISO and regional stakeholders developed a way to accommodate these state policy resources while ensuring that the wholesale markets continue to reflect accurate, competitive pricing for other resources. These market changes aim to ensure that the region does not

overbuild the generating capacity necessary to meet the region’s reliability needs (see attached [Putting Markets to Work for New England](#)).

As the states pursue their individual goals, there is benefit in considering a collaborative approach to regional planning to achieve emissions reductions and clean energy deployment. Regional solutions may offer a more efficient method than those pursued by individual states through out-of-market procurements of clean energy resources. To collectively achieve energy and climate change goals while working within the wholesale market structure, states could explore regional mechanisms or policies that quantify the characteristics of clean energy resources that the states are looking to incentivize, such as a price on carbon or zero-emission credits (ZECs). Building on similar successful collaborations – like the Regional Greenhouse Gas Initiative (RGGI) and the Transportation and Climate Initiative – and the partnership and structure of NESCOE, the New England states could identify opportunities for collaboration. Development of transmission infrastructure necessary to meet clean energy deployment goals is another area with potential for state collaboration, such as when the procurement of resources by one states requires siting of transmission through another state.

The New England power system is undergoing dramatic changes and Connecticut can play an important role in regional discussions. The ISO looks forward to working with the Lamont Administration on its energy priorities and on the challenges presented in the greater New England region.

New England Power Grid 2017–2018 Profile

The region's wholesale electricity marketplace is securing reliable electricity at competitive prices and helping usher in a cleaner, greener grid.

ISO new england

Sources of Electricity Production

Major shift from oil and coal to natural gas over the past 17 years



Region's growing reliance on natural gas has multiple impacts:

Reliability

The timely availability of fuel is critical to reliability, but existing natural gas pipelines are inadequate to serve growing peak demand for heating and power generation needs in winter.

Gas-fired generators may become increasingly dependent on liquefied natural gas (LNG), but LNG deliveries vary, regional LNG storage is limited, and prices are tied to global markets.

Gas-fired generators that can switch to oil (dual-fuel) may also be key to ensuring reliability, but permitting for both construction and emissions is challenging.

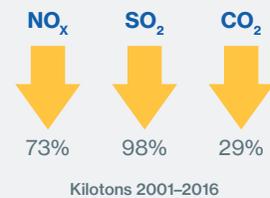
Coal, oil, and nuclear resources are essential during the winter, but the rapid retirement of these resources will increase the region's dependence on natural gas.

Fuel security is the foremost challenge to a reliable power grid in New England. The ISO has quantified these risks in its 2018 *Operational Fuel-Security Analysis*, see www.iso-ne.com/fuel-security.

Environmental

The transition from coal and oil to natural gas has reduced emissions.

However, when natural gas supply is constrained, oil- and coal-fired electricity production rises, driving up emissions.



Pricing

Wholesale electricity prices track the price of power plant fuel, which in New England is typically natural gas.

Natural gas pipeline constraints in the winter tend to increase natural gas prices and, in turn, wholesale electricity prices.

Wholesale Energy Market Value

\$12 BILLION 2008	\$7 BILLION 2010	\$5 BILLION 2012	\$9 BILLION 2014	\$4 BILLION 2016	\$4.5 BILLION 2017
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Electricity Demand

Demand for electricity peaks in the summer; a smaller peak occurs in the winter. Records: 28,100 MW in summer and 22,800 MW in winter.

State-sponsored energy-efficiency (EE) and behind-the-meter solar photovoltaic (PV) programs are slowing growth in peak demand, and overall demand growth is flat; states are projected to spend \$7.2 billion on EE between 2021 and 2026.

Forecasted annual growth rates for New England through 2026 →	PEAK DEMAND:	1%	0.1%
	OVERALL DEMAND:	0.9%	-0.6%
		Without EE & PV	With EE & PV

Demand Resources

In 2017, energy-efficiency projects provided 2,300 MW, and active demand response (load management, distributed generation) provided 400 MW of the region's total capacity needs.

New England's demand resources have the largest peak demand impact – 10% reduction capability – among all US ISOs and RTOs.

New England has approximately 29,200 megawatts (MW) of installed electricity generating capacity

The power generation resource mix is transitioning from coal, oil, and nuclear power to natural gas and renewable energy.

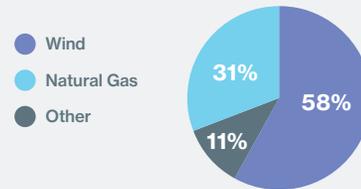
Generation Retirements

Coal- and oil-fired power plants make up nearly 30% of the region's electricity generating capacity but tend to be used only during peak demand periods and are retiring rapidly.

- Since 2013, more than 4,600 MW of primarily coal, oil, and nuclear generating capacity have retired or announced retirement by mid-2020
- Another 5,000 MW of coal- and oil-fired generators are at risk for retirement in coming years

Proposed Generation

Developers have proposed 14,800 MW of new generating resources as of January 2018.



About 9,000 miles of high-voltage transmission lines span the six states. Transmission projects completed and underway are strengthening the grid and enabling its transformation. Since 2002, about 750 projects have been put into service; roughly 120 additional projects are anticipated over the next 10 years that will ensure electricity continues to move reliably and efficiently across the region.

Imported Power

On an annual basis, New England is generally a net importer of electricity via interconnections to neighboring power systems in New York, Quebec, and New Brunswick.

Percentage of net energy from imports

16% 2014	16% 2015	17% 2016	17% 2017
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Merchant transmission companies, electric utilities, and renewable energy developers are proposing several projects to deliver low- or non-carbon-emitting resources into the New England market, which would help mitigate fuel security risk.

Wind Power

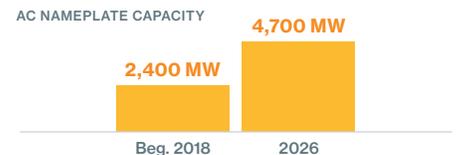
More than 1,300 MW of wind power is operational in the region. Developers are proposing nearly 8,600 MW of additional wind power, primarily in northern New England and offshore in southern New England.

Additional transmission will be needed to integrate these large-scale wind resources.

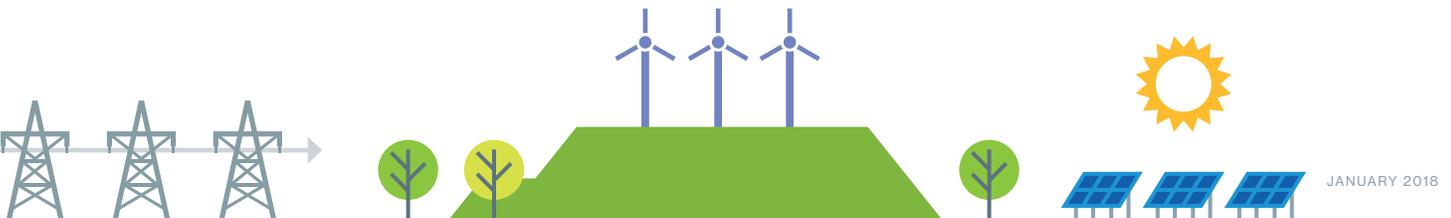
Solar Power

State policies are promoting development of behind-the-meter distributed resources, specifically solar PV resources.

ISO-NE 2017 Solar PV Forecast



More renewable resources would enhance fuel security but would not eliminate reliance on LNG and would likely lead to more non-gas-fired resource retirements.



About ISO New England

Created in 1997, ISO New England is the independent, not-for-profit corporation responsible for the reliable operation of New England's electric power generation and transmission system, overseeing and ensuring the fair administration of the region's wholesale electricity markets, and managing comprehensive regional electric power planning.



Putting Markets to Work for New England



The region's wholesale electricity marketplace is securing reliable electricity at competitive prices and helping usher in a cleaner, greener grid.

Why Markets?

New England restructured its power industry and launched wholesale electricity markets in the late 1990s based on several key principles:

Competition among wholesale electricity buyers and sellers yields prices that accurately reflect a resource's operating costs

Efficiency and transparency spur innovation and investment in new power resources and technologies to ensure power system reliability

Investment risk shifts from consumers to private investors

Markets Select the Most Cost-Effective Resources to Meet Current and Future Electricity Needs

Close to 500 generators, importers, demand resources, and others compete to sell three types of wholesale electricity products and services through New England's markets. The markets select the lowest-priced offers that can meet real-time demand and ensure system reliability; they are neutral to resource type.

- Electric energy:** The Day-Ahead and Real-Time Energy Markets are forward and spot markets for trading electric energy. The energy price fluctuates throughout the day and at the different locations in New England, reflecting the amount of consumer demand, constraints on the system, and the price of fuel that power plants use to generate electricity.
- Short-term reliability services:** Resources compete in the ancillary markets to provide backup electricity as well as services needed to support the physical operation of the system, such as frequency regulation and voltage support. These services are critical during periods of heavy demand or system emergencies.
- Long-term reliability service:** Power resources compete in the Forward Capacity Market (FCM) to take on a commitment to be available to meet projected demand for electricity three years out. The FCM works in tandem with the energy markets to attract and sustain needed power resources today and into the future.

The prices established for these three products and services together make up the overall price of wholesale electricity. Buyers and sellers may also contract separately to trade wholesale electricity.

To ensure fairness, ISO New England has no financial stake in any companies doing business in the markets.

Markets Are Transforming the Power Plant Fleet



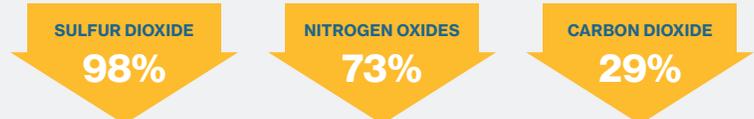
Roughly 16,000 megawatts (MW) of new generation have come on line since 1999 – most are lower-emitting natural-gas-fired plants – giving the region one of the most efficient generation fleets in the country. Additions also include growing amounts of wind, solar, and other renewable resources – and as of January 2017, grid-scale battery storage.

Coal, oil, and nuclear generators are more expensive to operate than gas-fired resources, and some are retiring; the remaining coal and oil resources face stricter environmental requirements and run infrequently.



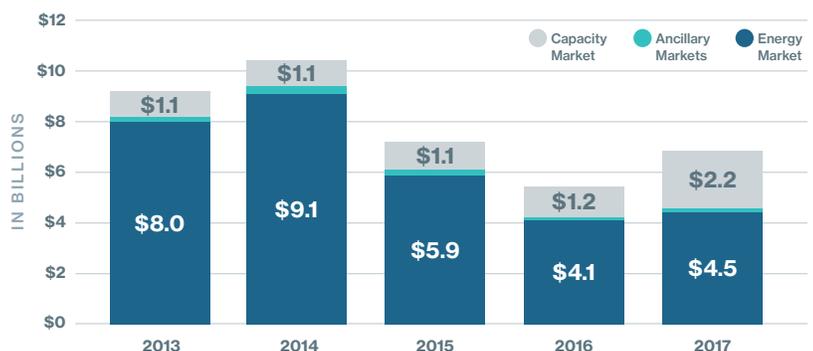
Over 2,700 MW of demand resources, such as energy efficiency, are registered in New England. These resources can help minimize the need for new power plants and transmission lines.

Emissions from regional generators have fallen significantly since 2001 as a result.



See www.iso-ne.com/air-emissions for additional statistics.

Annual Value of Wholesale Electricity Markets in 2017 Among Lowest in a Decade
Despite December price spikes, 2017 had the second-lowest average annual energy market prices since 2003 because of lower prices and demand through most of the year; capacity market prices were higher to replace retiring generation.



Wholesale Electricity Prices Are Competitive Nationally When Natural Gas Is Unconstrained

With over 50% of the region's generators able to run on natural gas, the price of this single fuel sets the energy price most of the time. This linkage shows markets are working as designed, producing competitive prices that reflect generators' real-time fuel costs.

When the region's gas-fired generators have unconstrained access to low-cost natural gas from the nearby Marcellus shale (which emerged as a resource in 2008), New England's wholesale electricity prices are competitive nationally. The high efficiency of natural-gas-fired generators, coupled with typically low-priced shale gas, is largely responsible for a 35% decrease in the average price of New England's wholesale electricity between 2004 and 2017. These lower wholesale prices translate into lower power-supply charges for consumers.

Low Natural Gas Prices Have Helped Drive Down the Average Annual Wholesale Electricity Price



Working to Accommodate State Clean-Energy Goals and Competitive Markets

Even with low to no fuel costs, most renewable resources are still expensive to build and connect to the grid, so they aren't competitive in the wholesale marketplace. To meet clean-energy goals, New England states are pursuing long-term contracts and other types of incentives to spur the development of these resources.

But by offsetting construction and operating costs, resources that receive public financial backing gain a competitive market advantage over other resources needed to satisfy regional electricity needs, balance intermittent renewable generation, and provide grid stability services. Markets only work well when prices accurately reflect the costs of building and operating power resources. Accurate, transparent, competitive prices are essential to attracting and retaining cost-effective investment in all types of resources needed for reliability.

To help usher in more clean energy while protecting a robust market framework, the ISO is adding a substitution auction to the FCM so that new, sponsored renewable resources can take on the capacity commitment of (i.e. substitute) older, fossil fueled generators that want to retire, without undermining competitive pricing.



About ISO New England

Created in 1997, ISO New England is the independent, not-for-profit corporation responsible for the reliable operation of New England's electric power generation and transmission system, overseeing and ensuring the fair administration of the region's wholesale electricity markets, and managing comprehensive regional electric power planning.

Constrained Fuel Affects Price and Reliability

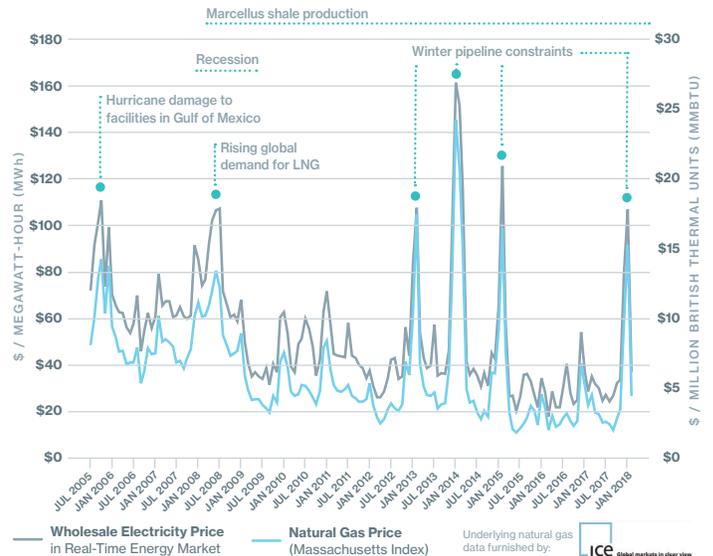


During very cold periods, the region's natural gas delivery infrastructure may not meet the heavy demand from both the electricity and heating sectors. When generators' access to gas supplies is limited, the region may face reliability concerns and price spikes (for example during winters 2013 and 2014 and the recent cold spell in December 2017–January 2018). The use of liquefied natural gas (LNG) can help fill the gap, but regional LNG storage is limited, international deliveries vary, and because it's traded globally, pricing can be expensive. Procurements of LNG and other stored fuels also often require advance arrangements.

These conditions, coupled with the region's ongoing loss of non-gas-fired generation, could threaten electric reliability during future severe cold spells. Oil-fired and nuclear generators, in particular, are still critical when natural gas is constrained or demand soars.

Ongoing regional discussions are focused on the complex question of how best to protect reliability in light of generator retirements and worsening regional fuel constraints. Market rule changes and other ISO interventions may help mitigate some of the reliability risk. However, effective long-term solutions will likely take concerted regional efforts that extend beyond the ISO's jurisdiction.

Price Volatility Becomes More Acute as Constraints Become More Severe



- ▶ See ISO New England's *2018 Regional Electricity Outlook* (iso-ne.com/reo) for more on the transformation of New England's wholesale electricity industry and the steps the region is taking to address challenges.
- ▶ Learn more about the ISO's role in designing and administering the region's markets at iso-ne.com/about/what-we-do.
- ▶ Follow the regional discussion around fuel constraints at iso-ne.com/fuel-security.



EVALUATION FRAMEWORK SOCIETAL PERSPECTIVE



Economic Development Overview

One of the indicators that the Connecticut Green Bank will be tracking in its programs and overall portfolio is the extent to which investments in clean energy create value from a societal perspective as it relates to the economic development of the state¹. For the Green Bank programs this will be measured as the relationship between investments and associated direct and indirect jobs created. In 2009, and updated in 2016, Navigant Consulting prepared a Connecticut Renewable Energy and Energy Efficiency Economy Baseline Study², which included a focus on the investments in those energy sectors and the resulting job creation. Since that report was prepared, the availability of new clean energy technologies that have emerged (e.g., DER resources, EVs, electric charging stations, etc.), and a variety of related economic factors (e.g., costs of labor, cost of resource acquisition, etc.) have changed. In coordination with the Connecticut Department of Economic and Community Development (DECD) and with assistance from Eversource Energy

and United Illuminating, The Connecticut Green Bank contracted Navigant Consulting to refresh the investment-jobs portion of its earlier study by providing an updated calculator tool to estimate the economic development benefits from clean energy investments in Connecticut, as reflected in job-years created. The updated study focused on jobs associated with the investment area of the Connecticut Green Bank: renewable energy (RE) and energy efficiency (EE) project development and deployment, and product development and manufacturing. The final value output in the jobs calculator is *job-years created per \$1 million invested in clean energy projects in Connecticut.*

The Connecticut Green Bank, through its Evaluation Framework, and specifically its Societal Perspective metrics, will use the findings of this study to estimate, analyze, and report on the economic development benefits of the investment activity in clean energy deployment in Connecticut that it is an integral part of.

Results of RE/EE job-years created to investment analysis

Below is a summary of the results of the analysis of direct, indirect, and induced job-years created by each million-dollar investment in clean energy deployment in Connecticut:

~5 job-years for storage tech installers	~9 job-years for residential solar installers	~14 job-years for commercial EE installers
~7 job-years for EV charging installers	~11 job-years for fuel cell manufacturers	~15 job-years for RTT installers
~7 job-years for commercial solar installers	~14 job-years for wind project installers	~18 job-years for residential EE installers

About the Connecticut Green Bank

The Connecticut Green Bank was established by the Connecticut General Assembly on July 1, 2011 as a part of Public Act 11-80. As the nation's first full-scale green bank, it is leading the clean energy finance movement by leveraging public and private funds to scale-up renewable energy deployment and energy efficiency projects across Connecticut. The Green Bank's success in accelerating private investment in clean energy is helping Connecticut create jobs, increase economic prosperity, promote energy security and address climate change. For more information about the Connecticut Green Bank, please visit www.ctgreenbank.com

About the Department of Economic and Community Development

The Department of Economic and Community Development is the state's lead agency responsible for strengthening Connecticut's competitive position in the rapidly changing knowledge-based global economy. The department administers the Manufacturing Innovation Fund that was created to support and strengthen Connecticut's manufacturing sector. For more information about the Department of Economic and Community Development, please visit www.decd.org

Methodology

1 Calculation of total jobs at top companies:

Interviewed top companies, 22 total (40 researched)

- 12 RE companies interviewed, 17 researched, 60% of market
- 10 EE companies interviewed, 17 researched, 30% of market
- Asked each company for current total number of RE/EE jobs in relevant job classifications and sections of the RE/EE value chain

2 Extrapolation to represent the total industry of CT:

Determined market share for companies in Connecticut RE/EE industry

- Calculated for non-interviewed companies
- If interviewed companies had **X** jobs, representing **Y%** of the market share, then all jobs = **X / Y%**

3 Estimated jobs created per \$1 Million invested using jobs calculator

This analysis mainly considers direct jobs³ in private companies that employ people who are based in Connecticut. A multiplier for calculating indirect jobs⁴ and induced jobs⁵ from the number of direct jobs was provided by DECD for the study.

Example of Jobs Calculator: Residential Solar

In the example below, the Connecticut Green Bank would apply the Societal Perspective to report the economic development results in its Comprehensive Annual Financial Report in the following manner: **“In FY 2016 there was a total investment of \$240 million in Residential Solar PV in Connecticut. Through the Connecticut Green Bank’s support, over 936 direct and 312 indirect and induced job-years were created in the state from installing nearly 60 MW of Residential Solar PV.”**

Occupation <i>Solar PV Installation – Residential</i>	Capital Invested	Company Overhead and Margin	Project Cost after Overhead and Margin	Labor (% of project cost)	Non-labor Costs (% of project costs)
	A	B	C=A×(1-B)	D	E=100%-D
	\$1,000,000	20%	\$800,000	35%	65%
Weighted Average Wage	Fully Burdened Employee Cost	Job-years Created per Million Dollars Invested	Indirect and Induced Job Multiplier	Indirect and Induced Jobs Created from Capital Invested	Total Job Years Created from Capital Invested
F	G=F×1.3	H=C×(D/G)	I	J=H×I	K=H+J
\$55,000	\$71,500	3.9	1.3	5.1	9.0

¹ See Section 7 of Connecticut Green Bank’s Evaluation Framework: Assessing, Monitoring, and Reporting of Program Impacts and Process (July 2016)

² Connecticut Renewable Energy and Energy Efficiency Economy Baseline study, Navigant Consulting, Inc. [Completed in March 2009 and subsequently updated in 2010]

³ These are existing jobs in the specified Connecticut industries.

⁴ Represents the response as supplying industries increase output in order to accommodate the initial change in final demand.

⁵ Generated by the spending of households who benefit from the additional wages and business income they earn through direct and indirect activity.

Key Findings

Renewable Energy: Employment in the solar industry has grown by approximately 30% since 2010 to become the largest RE industry for jobs in Connecticut.

- The majority of RE jobs are split between the solar and fuel cell industries, with other RE technologies making up the remaining 6% of RE industry jobs
- Installation and engineering jobs account for the largest job type at solar companies
- Manufacturing and engineering jobs account for the largest job types at fuel cell companies
- The majority of solar employees in Connecticut focus on the residential market

Energy Efficiency: Overall employment has remained relatively constant, experiencing most job growth in the residential customer market.

- EE technologies mainly include lighting, HVAC, and building envelope, with the majority of companies participating in multiple technologies
- Installation jobs account for the majority of roles
- Most jobs are focused on residential and C&I customer markets, with the remaining focused on retail and utility
- The average number of employees at C&I companies is 90-120, while it is 10-40 at residential companies

EVALUATION FRAMEWORK ECONOMIC DEVELOPMENT REVENUE GENERATION

Revenue Generation Impact Overview



Economic Development is a positive externality of the Green Bank's programs and activities. Directly, the capital deployed is used to buy the hardware for projects and pay for the labor needed to implement them. Indirectly, this economic activity creates jobs as those in the supply chain increase their operations in response to the implementation of projects. In 2009, the Connecticut Clean Energy Fund (CCFEF), the predecessor to the Green Bank, in partnership with the Department of Economic and Community Development (DECD) and the Connecticut Energy Efficiency Fund (CEEF),¹ engaged Navigant Consulting to complete a study to quantify the job years and their wages created as a result of the support from the CCEF and CEEF activities. This study was refreshed in 2016 by the Connecticut Green Bank (Green Bank) in coordination with DECD and with assistance from Eversource Energy and United Illuminating.



The resulting job factors are unique to the combination of project type (technology used) and the Green Bank Program leveraged for the project. The job factors estimate the number of direct, indirect, and induced job-years created per \$1 million of gross project costs deployed² in a given combination of project type and program. More on this can be found here:

- [Jobs Fact Sheet](#)
- [Job Study](#)

Methodology

The Green Bank has long recognized the economic benefits of its investments. Since inception, the Green Bank has stimulated the creation of more than 16,000 jobs-years. This economic activity also results in revenue for the state in the form of individual income, corporate, and sales taxes.

Working with Navigant in 2018, the Green Bank developed a methodology to estimate this revenue. This methodology, which has been reviewed with the Department of Revenue Services, and is explained on the pages that follow.

¹ CT Renewable Energy / Energy Efficiency Economy Baseline Study (March 27, 2009)

² Note that the Green Bank differentiates between Capital Deployed, Gross Project Cost, and Total Investment. The Capital Deployed and Total Investment metrics include financing costs but might exclude the portion of project costs borne by the building owners. For calculating job-years and taxes, the Green Bank uses Gross Actual project cost as that metric best reflects the cashflows going to lenders and installers.

Methodology

Individual Income Taxes

The Green Bank uses the methodology developed by Navigant to estimate individual income taxes. This method relies on the factors for job creation and estimated wages³ produced by both the 2009 and 2016 Job studies.⁴ Then the appropriate effective tax rate is applied based on the tax calculator that can be found on the Department of Revenue Services' [website](#).⁵

$$\text{Personal Income Tax Generated} = [\text{Number of job-years created}]^* \times [\text{weighted average wage}]^{**} \times [\text{income tax rate}]^{***}$$

* Source: 2009 and 2016 Jobs Studies

** Source: 2009 and 2016 Jobs Studies, and NREL JEDI Model

*** Source: Department of Revenue Services Tax Calculator

To operationalize this, the Green Bank has created individual income tax factors that too are a result of the combination of project type (technology used) and the Green Bank Program leveraged for the project, and estimate the taxes paid per \$1 million invested.

By applying this methodology⁶, for example, to the \$1.2 billion of costs of projects sparked by the Green Bank since its inception, the Green Bank estimates its activities have generated \$30.1 million in individual income tax revenues for the General Fund.

Corporate Income Taxes

The Green Bank uses the Navigant-developed method for estimating corporate income taxes. The method reviews all parties (installer, lender, investor, etc.) involved in a project, estimates their taxable income from their involvement with the project over its lifetime, and then applies the appropriate standard corporate tax rate. The estimations used for profitability come from an in-depth analysis prepared by Navigant based on a review of publicly traded companies and qualified CT Green Bank contractors (installers).

$$\text{Corporate Income Tax Generated} = [\text{Sum of taxable income}]^* \times [\text{corporate income tax rate}]^{**}$$

* Source: 2018 Tax Calculator models of corporate profitability

** Source: CT Department of Revenue Services

To operationalize this, the Green Bank has created corporate income tax factors that too are a result of the combination of project type (technology used) and the Green Bank Program leveraged for the project and estimate the taxes paid per \$1 million invested.

By applying this methodology⁷, for example, to the \$1.2 billion of costs of projects sparked by the Green Bank since its inception, the Green Bank estimates its activities have generated \$13.9 million in corporate income tax revenues for the General Fund.

³ Only the 2016 study included wages for indirect and induced job-years. Navigant identified a wage based off of NREL models for 2009 that is consistent with what was done for the 2016 study.

⁴ The Green Bank applies the wages and factors from the 2009 study to all projects closed prior to July 1, 2017. The Factors resulting from the 2016 study are applied to all projects closed after June 30, 2017.

⁵ For the purposes of this, it is assumed that all job-years created are located in Connecticut and everyone is filing taxes as a single filer.

⁶ This methodology has been presented to the CT Department of Revenue Services in January 2018. We expect to further review it with them in March 2018 and for it to be approved by the Green Bank Board of Directors subsequently.

⁷ This methodology has been presented to the CT Department of Revenue Services in January 2018. We expect to further review it with them in March 2018 and for it to be approved by the Green Bank Board of Directors subsequently.

Sales Tax

The Green Bank's programs also generate revenue for the state through sales and use tax. While solar thermal, solar photovoltaic, and geothermal generation equipment and activities (home installation work) are exempt from sales tax, the rest of the activities to sell and install the Green Bank's projects contribute to the general fund.



$$\text{Sales Tax Generated} = [\text{Gross Project Cost}]^* \times [\% \text{ of Project that is a taxable Service or Hardware}]^{**} \times [6.35\%]^{***}$$

* Source: CT Green Bank Data Warehouse

** Source: 2018 Navigant Tax Calculator

*** Source: CT Department of Revenue Services

As part of their 2018 analysis, Navigant identified what portion of a project's costs are from labor and what are from hardware. They also broke down the labor portion into what is engineering or design work and what is pure installation work as this distinction impacts whether or not the contracted labor is taxable. Applying the state's 6.35% sales tax rate to the taxable projects (i.e. excluding solar PV, solar thermal, and geothermal projects which are exempt from sales taxes) or portions of projects, the Green Bank estimates that projects stimulated by its programs have generated \$13.6 million in sales taxes for the state since inception.⁸

Overall

Across all of its projects, for FY 2012 through FY 2017, the Green Bank's activities have generated an estimated \$57.6 million for the state.

Table 1.

Market	Sum of ActualGrossCost			FYClosed			Grand Total
	2012	2013	2014	2015	2016	2017	
Capital Deployed	\$38,822,491	\$118,871,396	\$105,012,856	\$317,404,490	\$301,155,574	\$194,278,615	\$1,075,545,420
Capital Deployed - Labor	\$17,287,081	\$46,004,645	\$37,643,116	\$115,720,947	\$107,259,752	\$72,831,750	\$396,747,291
Capital Deployed - Hardware	\$21,535,410	\$72,866,751	\$67,369,740	\$201,683,542	\$193,895,822	\$121,446,864	\$678,798,129
Direct Jobs Created	259	636	635	1,859	1,880	806	6,075
Indirect and Induced Jobs Created	416	1,021	1,020	2,890	3,013	413	8,773
Total Jobs Created	675	1,656	1,656	4,749	4,892	1,219	14,848
Individual Income Taxes Generated	\$1,293,428	\$3,186,490	\$3,012,139	\$9,378,468	\$8,891,072	\$4,308,682	\$30,070,278
Corporate Taxes Generated	\$729,841	\$1,146,201	\$1,654,528	\$4,359,442	\$3,579,538	\$2,479,796	\$13,949,345
Sales Taxes Generated	\$182,457	\$4,165,296	\$856,421	\$4,016,435	\$2,291,750	\$2,079,636	\$13,591,996
Total Taxes Generated	\$2,205,725	\$8,497,987	\$5,523,088	\$17,754,345	\$14,762,360	\$8,868,114	\$57,611,618

⁸ Methodology was reviewed by the CT Department of Revenue Services in March 2018 and approved by the Green Bank Board of Directors subsequently.

About the Connecticut Green Bank

The Connecticut Green Bank was established by the Connecticut General Assembly on July 1, 2011 as a part of Public Act 11-80. As the nation's first full-scale green bank, it is leading the clean energy finance movement by leveraging public and private funds to scale-up renewable energy deployment and energy efficiency projects across Connecticut. The Green Bank's success in accelerating private investment in clean energy is helping Connecticut create jobs, increase economic prosperity, promote energy security and address climate change. In 2017, the Connecticut Green Bank received the Innovations in American Government Award from the Harvard Kennedy School Ash Center for Democratic Governance and innovation for their "Sparking the Green Bank Movement" entry. For more information about the Connecticut Green Bank, please visit www.ctgreenbank.com.



About the Department of Revenue Services

The Connecticut Department of Revenue Services is responsible for instilling public trust in the collection of and increasing the voluntary compliance with taxes in the state. To learn more about DRS, please visit <http://www.ct.gov/drs/site/default.asp>.



EVALUATION FRAMEWORK SOCIETAL PERFORMANCE



Environmental Impact Overview

An important measurement of success for the Connecticut Green Bank (Green Bank) and its programs is how our investment activity improves the air quality of the state. This will be measured by the decrease in the amount of nitrogen oxides (NO_x), sulfur dioxide (SO₂) and carbon dioxide (CO₂) and particulate matter emitted by the region's fossil fuel electric generation or transportation due to Green Bank projects.

The Green Bank will use the US Environmental Protection Agency's (EPA) Avoided Emissions and Generation Tool (AVERT) to calculate and report on the environmental benefits of the Green Bank's clean energy investment activity in Connecticut.

Estimated Generation/Savings for 2016 is calculated by using the Avert emissions factors in **Table 1**:

Table 1: AVERT Factors

Technology	CO ₂ tons / MWh	NO _x lbs / MWh	SO ₂ lbs / MWh
Solar PV	0.5621	0.5754	0.4107
Energy Efficiency	0.5432	0.4803	0.3397
Energy Efficiency/PV	0.5528	0.5285	0.3754
Wind	0.5372	0.4284	0.3333

Using this method, the following is an example of changes to emissions based on 60 MW additions of either clean generation or improved energy efficiency:

Table 2: AVERT Examples

Capacity:	60 MW			
Technology	Annual expected generation change (MWh)	CO ₂ savings (tons)	NO _x savings (lbs)	SO ₂ savings (lbs)
Solar PV	79,220	44,520	45,580	32,480
Energy Efficiency	63,090	34,260	30,300	21,430
Wind	104,930	56,370	44,920	34,980

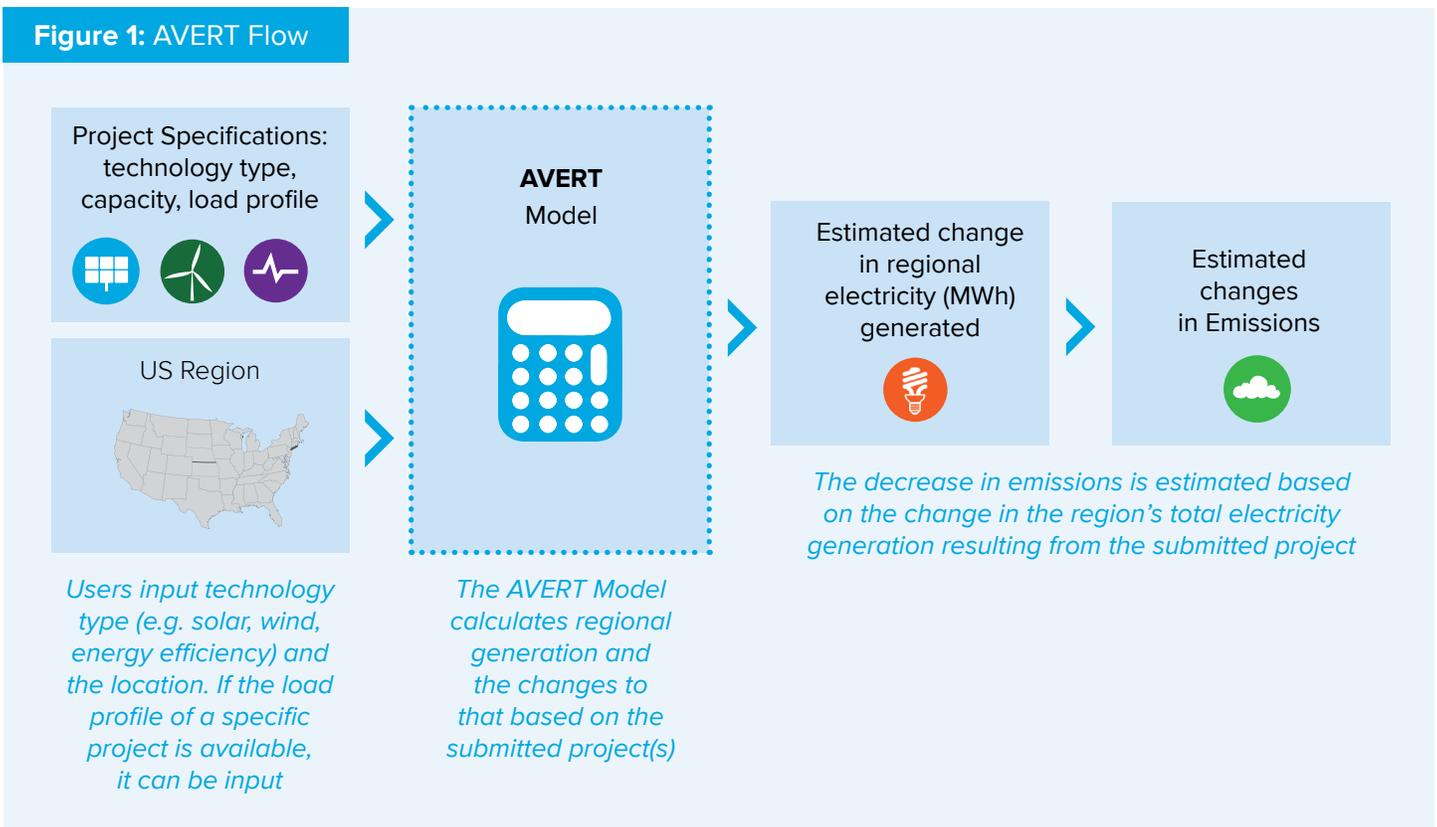
Using the type of calculation outlined above, the Green Bank will include Societal Perspective benefits as well as the environmental impact of its programs in its Comprehensive Annual Financial Report, green bonds issuances, and other communications. Further information about AVERT is available at:

https://www.epa.gov/sites/production/files/2015-08/documents/avert_decision_makers_fact_sheet_2-13-14_final_508.pdf

Methodology

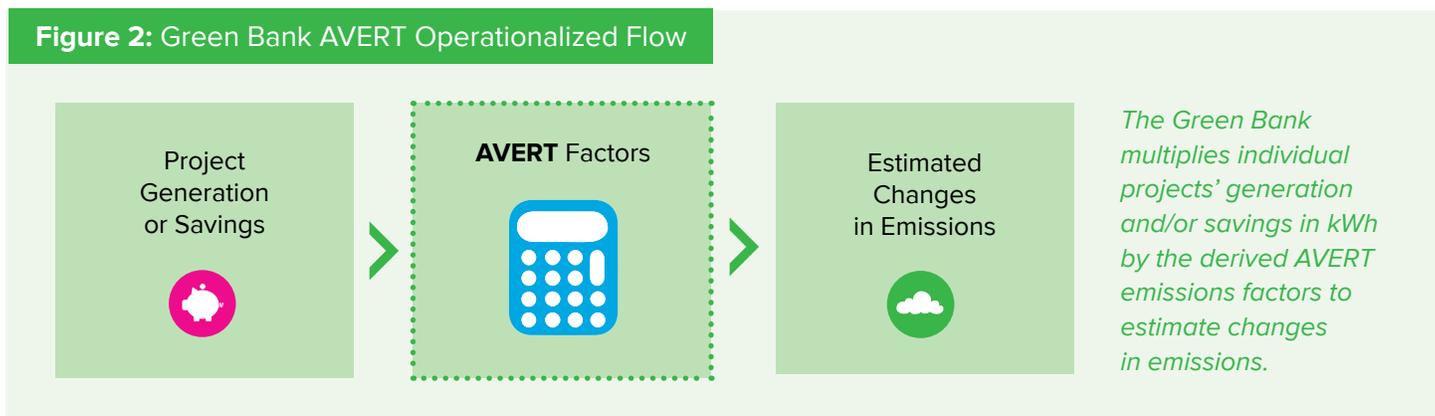
Previously, the Green Bank and its predecessor, the Connecticut Clean Energy Fund, estimated these impacts by using the results of the 2007 New England Marginal Emission Rate Analysis to calculate the expected annual and lifetime kWh savings of energy and production of clean energy. After working with the Connecticut Department of Energy and Environmental Protection (DEEP) and the US Environmental Protection Agency, the Green Bank has adopted the EPA's Avoided Emissions and Generation Tool (AVERT) to calculate the air quality benefits associated with Green Bank projects.

AVERT is a complex model that represents the dynamics of electricity dispatch based on the history of actual generation in a selected year for a specified region. For Green Bank purposes, the model generates the expected annual change to regional electricity generation based on a specific clean energy project or projects, then calculates the decline in emissions based on the reduction in resources required. The graphic below is a simplified representation of the model.



To maximize the model's accuracy, the Green Bank has derived average project emissions factors by technology (solar, wind, EE) from its completed projects. It then applies these factors to the annual projected generation for individual projects to calculate the estimates of the expected NO_x, SO₂, and CO₂ savings. The Green Bank will update these factors annually based on changes to the regional generation profile and typical project sizes.

Figure 2: Green Bank AVERT Operationalized Flow



Example of Environmental Equivalencies

The Green Bank uses the EPA's AVERT tool to translate the contributions made by Green Bank projects to the region's air quality. The decreases in CO₂ and NO_x in the example in **Table 2** above can also be demonstrated through common activities or environmental equivalencies as shown in **Table 3** below.

Table 3: Environmental Equivalencies

Capacity:	Equivalencies							
60 MW	Greenhouse gas emissions from:		CO ₂ emissions from:				Carbon sequestered by:	
Technology	Miles driven by an average passenger vehicle	Tons of waste recycled instead of landfilled	Gallons of gasoline consumed	Pounds of coal burned	Homes' energy use for one year	Incandescent lamps switched to	Tree seedlings grown for 10 years	Acres of U.S. forests in one year
Solar PV	96,795,798	12,817	4,544,600	43,097,690	4,265	1,431,686	1,046,698	38,231
Energy Efficiency	74,488,411	9,863	3,497,260	33,165,473	3,282	1,101,742	805,478	29,421
Wind	122,560,178	16,229	5,754,248	54,569,111	5,400	1,812,761	1,325,300	48,407

Further information about the EPA equivalency Calculator is available at: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

In the examples above, the Connecticut Green Bank would apply the Societal Perspective to report the environmental impact results in its Comprehensive Annual Financial Report in the following manner: "In FY 2016 there was a total deployment of nearly 60 MW of Residential Solar PV in Connecticut. Through the Connecticut Green Bank's support, about 44,520 tons of CO₂, 45,580 pounds of NO_x, and 32,480 pounds of SO₂ emissions were saved, which is equivalent to 4,544,600 gallons of gasoline consumed, 1,431,686 incandescent lamps switched to LEDs, or carbon sequestered from 38,231 acres of U.S. forests in a year."

About the Connecticut Green Bank

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About the Department of Energy and Environmental Protection

The Connecticut Department of Energy and Environmental Protection (DEEP) was established on July 1, 2011 with the consolidation of the Department of Environmental Protection, the Department of Public Utility Control, and energy policy staff from other areas of state government. It is charged with conserving, improving and protecting the natural resources and the environment of the state of Connecticut as well as making cheaper, cleaner and more reliable energy available for the people and businesses of the state. The agency is also committed to playing a positive role in rebuilding Connecticut's economy and creating jobs – and to fostering a sustainable and prosperous economic future for the state. For more information about the Connecticut Department of Energy and Environmental Protection, please visit www.ct.gov/deep.



About the United States Environmental Protection Agency

The mission of the EPA is to protect human health and the environment. For more information about the United States Environmental Protection Agency, please visit www.epa.gov.





EVALUATION FRAMEWORK SOCIETAL PERFORMANCE



Public Health Impact Overview

An important measurement of success for the Connecticut Green Bank (Green Bank) and its programs is how our investment activity improves the air quality of the state. This is measured by the decrease in the amount of nitrogen oxides (NO_x), sulfur dioxide (SO₂), and particulate matter (PM_{2.5}) emitted by the region's fossil fuel electric generation due to Green Bank projects

The changes in quantities of these emissions impacts the quality of health of those that breathe this air. Air pollution influences the prevalence and severity of asthma, bronchitis, coronary disease, and even death.

The Green Bank uses the US Environmental Protection Agency's (EPA) Co-Benefit Risk Assessment (CoBRA) model to calculate and report on the public health benefits of the Green Bank's clean energy investment activity in Connecticut.

The Green Bank will include public health impacts of its programs as part of the Societal Benefits in its Comprehensive Annual Financial Report, green bonds issuances, and other communications.

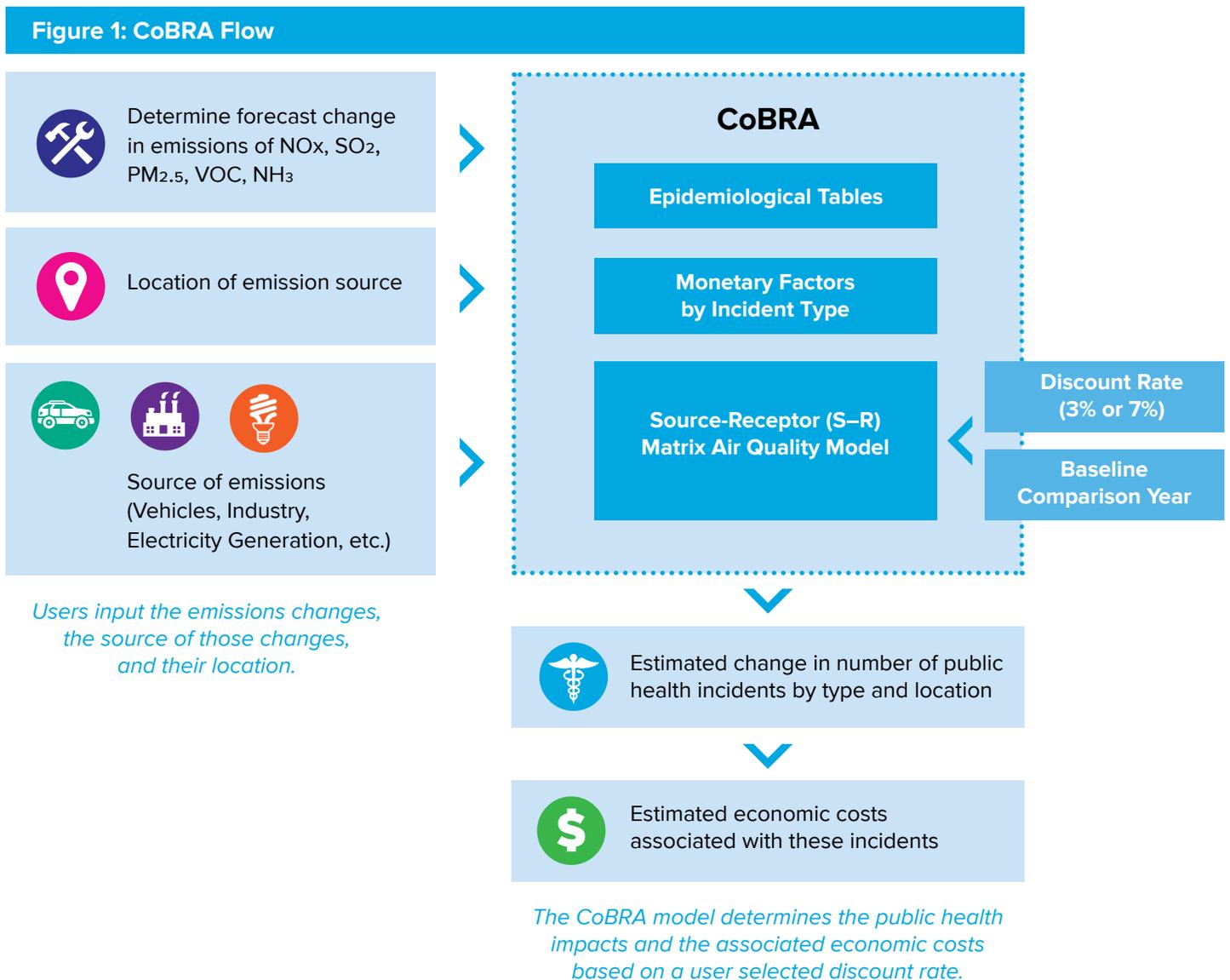
Methodology

The Green Bank has long recognized the environmental benefits of its investments. After working with the Connecticut Department of Energy and Environmental Protection (DEEP), Connecticut Department of Public Health (DPH) and the US Environmental Protection Agency (EPA), the Green Bank adopted the EPA's CoBRA to model the public health impacts of the air quality benefits associated with Green Bank projects.

CoBRA is a complex model that uses a baseline of emissions and models the increase or decrease in public health incidents and their costs based on the change in emissions of nitrogen oxides (NO_x), sulfur dioxide (SO₂), particulate matter (PM_{2.5}), volatile organic compounds (VOC) and ammonia (NH₃). The tool takes into account the method through which these are emitted (vehicles, energy production, type of industry, etc) and their location. It uses an air dispersion model (Source-Receptor (S-R) Matrix) and standard EPA epidemiological estimation methods to gauge the change in number of incidents, and then applies monetary factors to give an economic impact of these emissions changes.



The graphic below presents a simplified representation of the model.

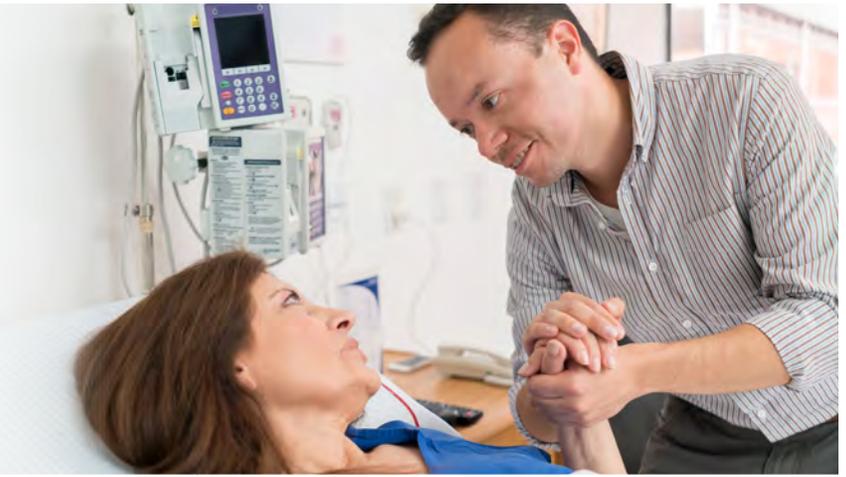


Further information about the CoBRA is available at:

https://www.epa.gov/sites/production/files/2017-10/documents/cobra_user_manual_september2017_508_v2.pdf



The Green Bank will directly run a project or projects' environmental impacts through the CoBRA model to obtain the associated public health benefits that its projects support. CoBRA will report back the low and high estimates of avoided incidents, locations, and associated costs of the following health outcomes:



Acute Bronchitis	Lower Respiratory Symptoms
Asthma Exacerbation	Minor Restricted Activity Days
Emergency Room Visits, Asthma	Mortality
Hospital Admits, All Respiratory	Nonfatal Heart Attacks
Hospital Admits, Cardiovascular (except heart attacks)	Upper Respiratory Symptoms
Infant Mortality	Work Loss Days

Example of Health Impacts

The following shows an example of public health impacts associated with the decrease of 155 tons of PM_{2.5}, 1,169 ton decrease in SO₂, and a 2,331 ton decrease in NO_x (the equivalent of what the Green Bank's projects avoid emitting in one year).

Table 1

CT Emissions Decrease (in tons)			Location of impact	Value of Total Health Benefits	
PM _{2.5}	SO ₂	NO _x		low estimate	high estimate
7	98	116	Connecticut	\$1,223,571	\$2,765,763
			Rest of US	\$2,746,739	\$6,208,563
			Nationwide	\$3,970,310	\$8,974,326

About the Connecticut Green Bank

The Connecticut Green Bank was established by the Connecticut General Assembly on July 1, 2011 as a part of Public Act 11-80. As the nation's first full-scale green bank, it is leading the clean energy finance movement by leveraging public and private funds to scale-up renewable energy deployment and energy efficiency projects across Connecticut. The Green Bank's success in accelerating private investment in clean energy is helping Connecticut create jobs, increase economic prosperity, promote energy security and address climate change. For more information about the Connecticut Green Bank, please visit www.ctgreenbank.com.



About the Department of Energy and Environmental Protection

The Connecticut Department of Energy and Environmental Protection (DEEP) was established on July 1, 2011 with the consolidation of the Department of Environmental Protection, the Department of Public Utility Control, and energy policy staff from other areas of state government. It is charged with conserving, improving and protecting the natural resources and the environment of the state of Connecticut as well as making cheaper, cleaner and more reliable energy available for the people and businesses of the state. The agency is also committed to playing a positive role in rebuilding Connecticut's economy and creating jobs – and to fostering a sustainable and prosperous economic future for the state. For more information about the Connecticut Department of Energy and Environmental Protection, please visit www.ct.gov/deep.



About the Department of Public Health

Established in 1878, the Department of Public Health (DPH) is the lead agency in protection of the public's health, and in providing health information, policy and advocacy. DPH is a central part of a comprehensive network of public health services, and is a partner to local health departments for which it provides advocacy, training and certification, technical assistance and consultation, and specialty services that are not available at the local level. The agency is responsible for providing accurate health information to the Governor, the Legislature, the federal government and local communities. This information is used to monitor the health status of Connecticut's residents, set health priorities and evaluate the effectiveness of health initiatives. The agency is also a regulator focused on health outcomes, maintaining a balance between assuring quality and administrative burden on the personnel, facilities and programs regulated. DPH is currently staffed by approximately 800 employees organized into fourteen branches, sections, and offices; each tasked with ensuring and/or providing services to help the agency achieve its mission. For more information about the Connecticut Department of Public Health, please visit www.ct.gov/dPh/site/default.asp.



About the United States Environmental Protection Agency

The mission of the EPA is to protect human health and the environment. For more information about the United States Environmental Protection Agency, please visit www.epa.gov.



ATTACHMENT W

CT STATE AND NORTHEAST REGIONAL INFRASTRUCTURE BANK – AN INNOVATIVE CROSS-CUTTING PROPOSAL

Cross-cutting proposal from the Transportation, Energy, Economy/Jobs and Environment Committees to: Establish a Connecticut State and Northeast Regional Infrastructure Bank to accelerate investment, create jobs and fuel economic activity.

A Connecticut Infrastructure Bank, owned and operated by the state, would leverage public investments by up to 10 times with private debt raised from institutional investors. Proceeds would be used to finance revenue-producing projects, including highway, bridge, railroad, port, and airport projects, along with environmental infrastructure like green energy, clean water, waste, zero emission vehicle charging (including electric buses), and resilience to climate change (including microgrids and property protection projects). This proposal would establish a funding platform to attract businesses, drive innovation, support the green economy and create jobs – making Connecticut and the Northeast a model for shared prosperity and regional partnership.

The Transportation Committee recommends that the Governor move expeditiously to establish a Connecticut Infrastructure Bank (CIB) with the aim of launching the entity in 2019, taking the following initial steps:

1. Appoint a task force to examine and progress the CIB model
 - Membership to include the CT DOT Commissioner, CGB CEO, Treasurer, Comptroller, etc.
2. Draft legislation for the creation of a CIB using the CT Green Bank as a template, while expanding additional investment areas beyond clean energy to other environmental markets (e.g., waste) for the CT Green Bank
3. Meet with stakeholders
 - Legislative committees, key legislators, business leaders, unions, rating agencies and target investors
 - Reach out to similar entities established in neighboring states to exchange best practices and discuss potential for regional cooperation
4. Create a plan to operationalize the model (leadership, staffing, core functions, etc.)

The Problem: Crumbling national infrastructure and congressional gridlock

According to the American Society of Civil Engineers, the US needs \$4.5 trillion in infrastructure investment by 2025 just to achieve a state of good repair. Despite warnings that America is falling dangerously behind other advanced economies in infrastructure competitiveness, we struggle to find the political will and resources to fund the necessary improvements. The result is that the US ranks 9th when it comes to quality of overall infrastructure in the World Economic Forum's Global Competitiveness Report, behind countries like France, Switzerland and Japan.

While there seems to be bi-partisan support for an infrastructure program in the US, Congressional gridlock has thus far failed to create a national funding plan. The political uncertainty caused by federal inaction has increased the pressure on states to tap new funding sources in a race to address decades of underinvestment. Since states account for 75% of all public infrastructure spending, it makes sense for them to take the lead.

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CT STATE AND NORTHEAST REGIONAL INFRASTRUCTURE BANK – AN INNOVATIVE CROSS-CUTTING PROPOSAL

The Gaps: State Fiscal Constraints and Limited Access to Institutional Capital

Historically, states have funded infrastructure through federal grants, dedicated fees (like tolls and state gas taxes), and municipal bonds. However, as Highway Trust Fund balances have dwindled, Congress has had to approve stop-gap funding measures, making federal appropriations less reliable. State gas tax revenues have also not kept pace, and while there is an increased need for ‘user fees,’ some states have found it politically difficult to implement them. Finally, the retail-targeted, tax-exempt municipal bond market represents only 9% of the total US bond market, ignoring a vast pool of institutional investors. With fewer sources of predictable revenue and a patchwork of fragmented federal funding programs, there is a pressing need for states to find innovative financing and structuring solutions to make the needed investments.

Like other states, Connecticut’s infrastructure is in dire need of repair with 57% of its public roads in poor condition and 338 bridges rated as structurally deficient. Chronic neglect and tight budgets have taken a toll on the state’s competitiveness with *US News and World Report* ranking the state near the bottom (#41) of all US states in infrastructure quality, making it even more difficult for us to attract companies and create jobs. Connecticut’s fiscal situation will likely remain constrained with recurring projected budget deficits mainly due to large pension and healthcare obligations. A 21st century infrastructure is one of the key pillars of an economic resurgence plan for the state, requiring a new paradigm to attract private capital.

A Proposed Solution: Creating a Connecticut State and Regional Infrastructure Bank

A logical solution is for Connecticut to establish a State Infrastructure Bank, modelled on successful development banks around the world. The Connecticut Infrastructure Bank (CIB) would be owned and operated by the State. The equity would be funded from the state’s annual budget or from other sources. It could leverage that equity up to 10 times with private debt raised from institutional investors—like pension and sovereign wealth funds—who need long-dated cash flows to match their actuarial liabilities. The proceeds would then be used to finance revenue-producing projects, like highways, bridges, railroads, airports, water and waste systems, and renewable energy.

The CIB would be economically self-sustaining, relying on project cash flows for debt service, like the \$18 billion in toll collections (over 20 years) estimated by the CT DOT. The equity would serve as a buffer for expected losses, using a risk methodology similar to other financial institutions. As a separately capitalized entity, the CIB would be excluded from the indebtedness of the state, reducing pressure on CT’s bond ratings. This approach would have several benefits: it would create a multiplier effect on state funds, consolidate expertise for negotiating complex projects with the private sector, unlock access to institutional investors that control over \$80 trillion in assets, and allow projects to be funded on a portfolio basis rather than piecemeal. The CIB could also be established as a parallel entity to the Connecticut Green Bank (CGB), with the CGB expanding into other environmental infrastructure sectors and the CIB focusing on mobility infrastructure. A shared services model, with common support functions, could deliver greater efficiency.

Achieving Scale: Partnering to Launch a Regional Infrastructure Bank

Over the past several years, a number of states have established state-sponsored enterprises to mobilize investment in infrastructure and green economy projects. Connecticut launched the nation’s first Green Bank in 2011, which quickly became a successful model for other states to emulate. New York also created a Green Bank (2013) and Infrastructure Bank (2012) to attract private investors. Rhode Island’s Infrastructure Bank, established in 1989, had its charter significantly expanded in 2015. Massachusetts filed legislation to create an infrastructure bank in 2017. And, New Jersey created a State

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CT STATE AND NORTHEAST REGIONAL INFRASTRUCTURE BANK – AN INNOVATIVE CROSS-CUTTING PROPOSAL

Infrastructure Bank in 2018 to complement existing entities for water systems, surface transportation and the environment.

A new approach is required—one that leverages best practices and pools resources across the region to mobilize investment in critical projects, especially those that cross state borders. The Northeast region represents 20% of US GDP and 50 million people. Its success is critically important for the US economy and our global competitiveness ranking. The tristate area is strategically positioned in the Northeast's Boston to Washington D.C. corridor. Modernizing the infrastructure in this nexus will have a catalytic and positive impact on the efficient movement of people and goods across the region and beyond. This will fuel productivity and enhance national competitiveness.

While each state and local community has specific projects that can and should be funded locally, there is great potential to coordinate on major, multi-state initiatives. Additionally, sharing of best practices and knowledge across the three states (NY-NJ-CT) could help create a unified approach. The ultimate goal would be to create a Northeast Regional Infrastructure Bank (NRIB) to fuel regional cooperation on projects. A similar approach could be taken for transforming the green economy with the creation of a Regional Green Bank. This would establish a holistic funding platform to attract businesses, fuel innovation and create jobs—making Connecticut and the northeast a model for shared prosperity and regional partnership.

ATTACHMENT X

GREEN AND HEALTHY HOMES – AN INNOVATIVE AND CROSS-CUTTING PROPOSAL

Proposal: *Connecticut Green and Healthy Homes Project – Establishing Sustainable, Scalable Model Addressing Housing Interventions that Reduce Energy Burdens, Improve Health Outcomes and Stabilize Housing in Low Income Communities*

Description

This is an [interagency initiative](#) that is working to secure health sector funds to pay for remediation of health and safety issues in housing that can be integrated into a model that includes community health workers for outreach and education and energy efficiency upgrades. The Partners have been working together on this initiative since 2017 and include Connecticut Green Bank and DPH as co-sponsors with DSS, DOH, DEEP, OEC, DCF, Office of Chief State’s Attorney, Eversource, Avangrid and technical assistance from GHHI. Additionally, a wide array of stakeholders has been engaged spanning hospitals and health systems, community-based providers philanthropy, municipalities, energy service providers, affordable housing providers, nonprofits, advocates and legislators. This work is premised on the notion that safe and healthy housing can be viewed as a vaccine – or health platform – that prevents poor health outcomes and significantly reduces medical costs, especially for vulnerable groups including young children and older adults seeking to age at home. A [needs justification](#) was completed in 2017 identifying several critical areas: 497,000 households are housing cost burdened, more than 30% of income spent on housing related costs; average energy burden for low-income households is 60% higher than the national average; over 30% of homes are deferred in energy efficiency programs due to health and safety issues, rates as high as 40-50% in low-income neighborhoods; 21,700 annual asthma-related hospitalizations and \$102 million in Medicaid claims related to asthma; falls resulted in 42,000 hospitalizations over 5 years and are the leading injury-related cause of mortality in older adults; 2,000 children under the age of six are diagnosed with elevated blood levels. An [asset and gap analysis](#) was completed this year, highlighting the right conditions in the state for this model. The team is currently analyzing state Medicaid data to build a business case for how addressing specific health and safety issues in housing related to asthma, lead poisoning, and home related injuries will reduce overall health costs for the state. Partners are currently engaged in conversations with state leaders to identify touchpoints with State innovations in Medicaid investment and healthcare delivery. Partners and stakeholders will design pilot models (building upon our nationally-recognized ratepayer-funded energy efficiency programs and the state’s leading healthy homes providers) and then implement them over three years to prove feasibility. This project is an excellent example of how government can use data to target populations to address and report on the progress towards goals serving vulnerable populations so many different agencies are touching – from public health issues like asthma, lead, trips/falls; to energy assistance and utility arrearages; to housing issues and more. The goal of this model is a sustainable, scalable statewide integrated service delivery model that significantly improves health outcomes and energy burdens for our most vulnerable citizens, reduces health costs and energy usage in the state, and will become an important and significant funding source for healthy housing in Connecticut, which suffers from many health and safety issues and needs significant capital improvements.

Presenter(s):

Kerry O’Neill,* CEO, Inclusive Prosperity Capital, on behalf of Connecticut Green Bank
Kristin Sullivan,* Manager, Public Health Systems Improvement, Connecticut Department of Public Health
Dave Wilkinson (Co-Chair of Digital Strategy Committee)
Bryan Garcia, Lonnie Reed, and Brenda Watson* (Co-Chairs and Member of Energy Committee)
Eric Hammerling and Frogard Ryan (Co-Chairs of Environment Committee)
Kiley Gosselin, Annette Sanderson, David Rich (Co-Chairs and Member of Housing Committee)

Cross-Cutting Areas Covered

Energy, Healthcare, Housing, Environment, Human Services, Jobs/Economy, Digital Strategy