Via electronic submission: DEEP.EnergyBureau@ct.gov

September 25, 2017

Debra Morrell, Administrative Coordinator
Department of Energy and Environmental Protection
Bureau of Energy and Technology Policy
Ten Franklin Square
New Britain, CT 06051

Re: 2017 Draft Comprehensive Energy Strategy

Dear Ms. Morrell,

On behalf of Northeast Energy Efficiency Partnerships (NEEP)[1], I am pleased to submit comments relative to the draft 2017 Comprehensive Energy Strategy (CES) for the State of Connecticut. NEEP is a non-profit with a mission to serve the Northeast and Mid-Atlantic to accelerate energy efficiency as an essential part of demand-side solutions that enable a sustainable regional energy system. Our vision is that the region will fully embrace next generation energy efficiency as a strategy to meet energy needs in a carbon-constrained world.

NEEP thanks the Department of Energy and Environmental Protection (DEEP) for the opportunity to provide input on the CES. Connecticut has been a continued leader in energy efficiency and recognizes energy efficiency as a least cost carbon reduction resource. Connecticut has much to be proud of in terms of policies and programs offered. NEEP recognizes Connecticut's commitment to working regionally on programs and policies. The following comments address primarily energy-efficiency related plans posed by DEEP at the technical meeting, August 28th, and within the draft CES.

Introduction

First, NEEP is pleased to see Connecticut's commitment to a cheaper, cleaner, and more resilient energy future. NEEP is very much in agreement with these driving principles. The CES aligns well with NEEP's own strategic direction, namely through the focus on energy efficiency and strategic electrification. NEEP encourages the use of energy efficiency as a least cost resource for carbon reduction and support's Connecticut's annual monitoring of greenhouse gas (GHG) emissions proposed in the strategy.

Connecticut's acknowledgement of the need to have energy efficiency and renewable energy work together is an exciting comment worth noting. In order to reach the carbon reduction goal of 80 percent by 2050 and achieve a clean energy economy, energy efficiency and renewable energy must come together in a joint effort. Energy efficiency reduces energy procurement levels, therefore making renewable energy goals more attainable. For instance, if a homeowner goes through deep home energy retrofits and then adds solar PV to the home, the homeowner may not need as large a system, or may generate excess that can be stored, with energy storage, for future needs.

[1] These comments are offered by NEEP staff and do not necessarily represent the view of the NEEP Board of Directors, sponsors or partners. NEEP is a 501 (c)(3) non-profit organization that does not lobby or litigate.

Still, as acknowledged by DEEP staff at the technical session, there is room for improvement — particularly in terms of the level of investments in efficiency. Per Public Act No. 07-242, An Act Concerning Electricity and Energy Efficiency (2009), Section 51: "Resource needs shall first be met through all available energy efficiency and demand reduction resources that are cost-effective, reliable and feasible." In addition, the draft CES cites Connecticut procuring energy efficiency to the level of large power plant procurements:

> *Procurement of energy efficiency as a resource moves the energy efficiency resource standard to a level on par with other generation sources, truly exemplifying the value of efficiency as a resource equivalent to supply.*

Connecticut's commitment to 1.51 percent of retail electric sales and 0.6 percent for retail gas sales trails behind most of the neighboring states' savings goals[2]. Connecticut may benefit from increasing the saving level goals to be more in par with surrounding states to uphold the commitment to procure energy efficiency at the level of other generation sources. On average it costs about two to three time less to meet demand with energy efficiency as opposed to new energy resource. [3] NEEP's Regional Energy Efficiency Database[4] is a useful tool that Connecticut may consider using as a resource to help document the state's position regarding delivering energy efficiency in the ISO New England region.

Cost-Effectiveness Testing

NEEP was very pleased to work with Connecticut this June to coordinate the EM&V workshop[5] on cost-effectiveness screening for next generation energy efficiency. NEEP provided an overview of the different cost-effectiveness test used across the nation[6], as well as an overview of the National Standard Practice Manual[7] (NSPM) and the Rhode Island test[8].

Connecticut may benefit from adopting the principles in the NSPM, particularly including transparency and symmetry, when evaluating energy efficiency and renewable energy programs. The NSPM, while developed for energy efficiency, can be applied to other types of programs, including renewable energy and transportation. Connecticut currently uses the utility cost test (UCT) as its primary test. It may be worthwhile developing a roadmap to move beyond this current framework to include participant and/or societal benefits. While the Connecticut may not be ready to completely move to another cost-effectiveness test, adopting modified version of the total resource cost test or societal cost test as the primary test may help Connecticut reach the goal of procuring all cost-effective energy efficiency.

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[2] See NEEP's Policy Snapshot, pg. 6: http://www.neep.org/sites/default/files/resources/EE%20Snapshot%20Spring%202017.pdf

[3] See ACEEE Study: http://aceee.org/research-report/u1402

[4] REED available at: https://reed.neep.org/

[5] See workshop details: http://www.neep.org/events/emv-forum-summer-workshop-cost-effectiveness-testing-next-generation-energy-efficiency

[6] NEEP, *Non-Energy Impacts Approaches and Values: An Examination of the Northeast, Mid-Atlantic, and Beyond*, (June 2017), Available at:: http://neep.org/non-energy-impacts-approaches-and-values-examination-northeast-mid-atlantic-and-beyond

[7] National Standard Practice Manual (2017): https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_May-2017_final.pdf

[8] An overview is available here: http://www.neep.org/sites/default/files/RI%20OER%20NEEP%20EMV%20Summer%20Workshop%20Presentation%202017.06.14.pdf

In the draft CES, DEEP comments on its intent to "continue assessing the various approaches other states have developed and will provide direction to the Energy Efficiency Board and the utility companies prior to the development of the next three–year C&LM Plan."[9] While NEEP commends DEEP for considering best practices in other jurisdictions, DEEP may want to consider the NEEP report on non-energy impacts that provides the most up-to-date overview of cost-effectiveness tests used across the nation and instead of 'monitoring', it may be more beneficial for DEEP to being planning for the evolution of the state's cost-effectiveness test.

Connecticut may benefit from going through a similar process that Rhode Island went through by opening a stakeholder process[10] to develop a cost-effectiveness test specific to the state's policies and goals. Since the stakeholder process began in Rhode Island, the state has developed a guidance document for using the state test that helps with the transition from the previously used method. The NSPM provides an overview of how to go through such a process.

Grid Modernization

The future of Connecticut's electric grid must deliver cheaper, cleaner, and more reliable energy while addressing increased electricity demand. NEEP is supportive of Connecticut's proposed grid modernization strategies. In order to effectively integrate distributed energy resources (demand response, energy storage, distributed generation, etc.) and strategic electrification technologies, technology advancements will need to be made on both the grid and building side of the meter.

Connecticut may consider piloting smart home/ home energy management (HEMS) technologies[11] to explore a range of beneficial capability, including energy efficiency, demand response, distributed energy resources management, etc. This may help achieve goals B.3.2, increase and standardize two-way advanced meter communication, and B.3.3, optimizing economic signals and incentives for demand response.[12]

NEEP also supports DEEP recommendation that PURA reopen the docket on advanced metering infrastructure and conduct an updated cost-effectiveness screening. It may be beneficial to use the modified total resource cost test in this situation because a majority of the benefits accrue to customers and the UTC does not account for participants. Connecticut may also want to consider this an opportunity to work through the NSPM. NEEP released a report analyzing the different cost-benefit analyses done throughout the region on AMI that DEEP may find useful in this endeavor.[13] This report looks to what has and has not worked in the region when evaluating the cost-effectiveness of AMI. When CL&P conducted the analysis, a customer outreach plan was included and Connecticut may want

[9] CT Comprehensive Energy Strategy, Pg. 117
[10] Docket 4600: Stakeholder Working Group Process: Report to the RI PUC, (April 2017), available at: http://www.raabassociates.org/Articles/RI%204600%20Final%20WG%20Report%204-5-17.pdf
[11] NEEP, *The Smart Energy Home: Strategies to Transform the Region*, (2016), Available at: http://neep.org/smart-energy-home-strategies-transform-region
[12] For more on HEM, see: http://neep.org/initiatives/high-efficiency-products/home-energy-management-systems
[13] NEEP, *Advanced Metering Infrastructure: Utility Trends and Cost-Benefit Analyses in the NEEP Region*, (February 2017), Available at: http://www.neep.org/sites/default/files/resources/AMI%20FINAL%20DRAFT%20report%20-%20CT%20format.pdf

to consider including this again to ensure maximum benefits are achieved by educating and engaging with customers.

Energy storage will be an important piece connecting energy efficiency and renewable energy by encouraging the growth of renewable energy with the possibility to alleviate peak demand with off peak production. Storage may also provide grid management and can help account for intermittency of renewable energy. Storage can have variable carbon impacts depending on how it is integrated with other grid resources, therefore Connecticut may benefit from assessing carbon and resiliency benefits as part of its analysis of lowest cost integrated generation.

Through grid modernization, Connecticut will also be able to explore non-wires alternatives (NWA) as a solution to increased electricity demand. NWA defers the need for capital investment in transmission and distribution projects by deploying distributed energy resources. NEEP published a brief on NWA policies and programs in the region that DEEP may find useful when considering NWA solutions by looking to best practices throughout the region.[14] Strengthening resiliency is a priority and investing in grid modernization is a key step in developing a resilient and reliable electric grid.

Strategic Electrification

NEEP is pleased to see Connecticut's inclusion of strategic electrification throughout the entire strategy and agrees with the state's recognition of its importance as a decarbonization strategy. In order to strengthen strategic electrification strategies, Connecticut may consider integrating electrification programs into the existing energy efficiency program infrastructure. Connecticut's review of NEEP's Regional Assessment of Strategic Electrification[15] may provide addition perspective on the existing state of strategic electrification policies, programs, and technologies. In addition, NEEP's forthcoming Regional Action Plan report will lay out a number of key regional actions to accelerate strategic electrification. NEEP hopes to continue to work collaboratively with Connecticut through NEEP's Strategic Electrification Committee.

Connecticut's perspective on the need to marry strategic electrification with deep energy efficiency is a critical piece to emphasize throughout the CES. This will be essential in ensuring electrification is in fact beneficial to the grid and customers. For instance, in 2014, residential CO2 emissions accounted for 21 percent of total emissions, of which 63 percent came from petroleum products.[16] This is a major opportunity for Connecticut to reduce emissions through deep energy retrofits and fuel switching. Connecticut may consider expanding the purview of the initial targets for air source heat pumps (ASHPs) beyond focusing on buildings current heated by electric-resistance heating systems and on new construction. Retrofits that involve partial heating displacement should also be prioritized, including situations where fuel oil and propane are being displaced. This will bring the state a step closer to reaching its carbon reduction goal.

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[14] NEEP, *EM&V Forum and Policy Brief: State Leadership Driving Non-Wires Alternative Projects and Policies*, (January 2017), Available at: http://www.neep.org/sites/default/files/resources/NWA%20brief%20final%20draft%20-%20CT%20FORMAT.pdf

[15] NEEP, *Regional Assessment of Strategic Electrification*, (2017), Available at: http://www.neep.org/reports/strategic-electrification-assessment

[16] EIA State Carbon Dioxide Data, Available at: https://www.eia.gov/environment/emissions/state/

Renewable Thermal Technologies

NEEP supports the concept of a pilot to explore the opportunities and challenges of retrofitting homes with whole home ASHP systems. As mentioned above, this provides an opportunity to substantially reduce carbon emissions. There is far less experience in the market in these types of installations/retrofits and much learning could be gained through a pilot program. This may provide Connecticut the opportunity to be a leader in market transformation by exploring ASHPs in deep home energy retrofits and provide best practices learned from a pilot to other states in the region. In addition Connecticut may benefit from the investigation of how to most effectively and equitable incorporate renewable thermal technologies into existing energy efficiency programs.

NEEP maintains a cold climate ASHP (ccASHP) specification[17] that may be used for program promotion of ASHPs and may also align the state with several other Northeast programs. NEEP will soon begin the search for partners to fund/conduct in-filed research to confirm the effectiveness of "integrated controls" to increase usage/savings of ductless ASHP. NEEP welcomes DEEP and the Connecticut energy efficiency programs to consider jointly funding this work in collaboration with other regional stakeholders. This may provide Connecticut an opportunity to better understand the potential for ASHP market transformation within the state.

In order to position the state as a leader in this area, Connecticut may wish to engage the regional ASHP market transformation initiative and working group to accelerate the adoption of ASHPs. This group provides opportunities to leverage best practices from other states in the region, as well as collaborate on future market opportunities. Connecticut may also benefit from NEEP's regional ASHP Market Transformation Strategy Report[18] for additional concepts to accelerate adoption of ASHPs.

One of the challenges states are facing in acceleration the adoption of ASHPs is workforce development. NEEP has developed ASHP installer guides[19] that Connecticut may benefit from disseminating to the appropriate workforce. These guides provide information on installing, sizing, and selecting ASHPs. This will provide job opportunities, economic growth, and fuel the transition from fuel oil to renewable thermal technologies. Connecticut uses fuel oil for 44 percent of homes[20]. This market opportunity should be leveraged as an opportunity to strategically electrify home heating systems and encourage local job growth.

Strategic Energy Management (C&I Sector)

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[17] The specification list is continuously updated. For the most recent, please visit: http://www.neep.org/initiatives/high-efficiency-products/emerging-technologies/ashp/cold-climate-air-source-heat-pump

[18] NEEP, *Northeast/Mid-Atlantic Air-Source Heat Pump Market Strategies Report 2016 Update*, (January 2017), Available at: http://www.neep.org/sites/default/files/NEEP_ASHP_2016MTStrategy_Report_FINAL.pdf

[19] NEEP, *Guide to Installing ASHP in Cold Climates*, and, *Guide to Sizing and Selecting ASHP in Cold Climates*, (2017), Both available at: http://www.neep.org/initiatives/high-efficiency-products/air-source-heat-pumps/air-source-heat-pump-installer-resources

[20] CT DEEP, *Supra note 9*, Pg. 120

Connecticut may benefit from highlighting Strategic Energy Management (SEM)[21] programs for the C&I sectors in the CES. SEM programs implemented through existing energy efficiency programs can be used as a means to achieve deep energy savings in buildings and manufacturing facilities. NEEP has identified SEM as an emerging opportunity for energy efficiency programs to achieve significant energy savings as well as customer satisfaction. In particular, SEM practices should be considered for municipal water and wastewater treatment facilities. SEM program designs focus on achieving energy savings from continuous improvement of operational control of equipment, processes and systems as a practice to help customers and program administrators realize the savings potential.[22]

In addition to the strategies listed for deeper efficiency in commercial projects, such as customized incentives and financing[23], Connecticut may consider addressing non-energy motivators for commercial customers to move forward with efficiency. Many customers are not fully embracing efficiency even if the financing and offerings are financially compelling because they are unable to prioritize moving forward with efficiency projects.

The commercial sector is considerably diverse with hospitals, schools, offices, religious institutions, lodging, and the retail sector. Each of these sub-sectors is unique in the market structure, types of decision-makers, and energy usage involved. Therefore, each may have different non-energy motivators to do efficiency projects, such as health and safety, comfort, environmental, and education, to mention a few. Connecticut may benefit from considering these impacts and the different needs when developing C&I energy efficiency programs. NEEP is working on a report with recommendations and considerations to assist with this effort (due out in late 2017). NEEP encourages Connecticut to break the mold to get scale to its commercial efficiency efforts.

Appliance Standards

NEEP greatly appreciates Connecticut's continued interest and dedication to the appliance standards efforts NEEP is involved in. NEEP recognizes the potential for Connecticut to be a leader in state standards. This is due to the rather unique situation the state is in with the ability to set new efficiency standards through regulation, without having to get passed though the state legislature. Connecticut may benefit from expediting the process to adopt standards to ensure the greatest savings for the state. A 2017 report from the Appliance Standards Awareness Project (ASAP)[24] identifies 429 GWh of electricity, 1,018 BBtu of Gas, and 130 million metric tons of carbon savings from a model package of 21 new efficiency standards.[25] These would not be subject to federal preemption and in general offer great consumer benefits.

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[21] NEEP, *Strategic Energy Management: Emerging opportunity for EE Programs to achieve savings in the C&I Sector*, Available at: http://www.neep.org/sites/default/files/SEM-%20Program%20Opportunity%202-pager.pdf

[22] NEEP, *EM&V Best Practices & Recommendations for Industrial SEM Programs*, (2017), Available at: http://www.neep.org/emv-best-practices-recommendations-industrial-sem-programs

[23] CT DEEP, *Supra note 9*. at 111

[24] Appliance Standards Awareness Project: https://appliance-standards.org/document/states-go-first

[25] ASAP, *States Go First: How States Can Save Consumers Money, Reduce Energy and Water Waste, and Protect the Environment with New Appliance Standards: Connecticut Savings Estimates*, (2017), Available at: https://appliance-standards.org/sites/default/files/state_savings_state_standards/Connecticut.pdf

NEEP and other stakeholders such as ASAP can work with DEEP to understand the package opportunity, the products, and work to help with the logistics of regulation, but ultimately it is DEEP's role to set and promulgate new standards regulations. Many states in the region are looking into this strategy. Connecticut recently attended the in-person appliance standards workshop hosted by NEEP where participants from VT, NH, RI, MA, NY, and CT came together to discuss the potential for state standards and began developing individual action plans. Connecticut is unique in the region in that they do not need new enabling legislation passed, therefore, appliance standard may be prioritized highly as a cost-effective efficiency strategy.

Additionally, as utilities search for new cost effective savings opportunities, if Connecticut utilities are able to help with the research, analysis, or implementation of new state standards, there may be a case to make to give the utilities some attribution for their efforts. The state utilities have also been considering joining the ENERGY STAR Retail Products Platform since its inception in 2014. By working to join this effort, the state will be able to leverage smaller incentives for retailers who make a concerted effort to increase stocking, assortment, and sales of highly efficient units. This provides a long-term strategy for products programs in the state, and combined with appliance standards, will establish Connecticut as a state leader.

Building Codes and Compliance

Building codes are an important factor in helping achieve the state's carbon reduction goal, in addition to establishing a building's quality, safety and energy performance for years to come. The initial design and construction decisions determine operational and maintenance costs for the life of the building. Therefore, NEEP supports Connecticut in the decision to update the state building energy code. Updated building codes benefit the communities that use them and jurisdictions enforcing current codes demonstrate a forward thinking perspective.

When updating the building code, Connecticut may benefit from adopting a model energy code.[26] Building codes offer enhanced protection against the threats of natural disasters and make communities more resilient, sustainable and livable for generations to come. The model code will help ensure the state adopt and achieve compliance with progressively more efficient building energy codes as a means of achieving large scale energy and GHG emissions savings.

In addition, the state may gain from implementing a voluntary stretch code and focusing on code compliance. A voluntary stretch code will provide communities with the opportunity to go beyond the state adopted building energy code. Furthermore, establishing a code collaborative to bring together diverse stakeholders may help ensure code compliance. The collaborative may present an opportunity to focus on adoption[27], enforcement, and compliance[28] of the energy code. This helps achieve energy goals in regards to codes. Rigorous compliance will allow the state to accurately claim energy saving based on building energy code attribution. U.S. DOE has also completed a code compliance

[26] NEEP, *Model Progressive Building Energy Codes Policy*, (2017), available at: http://www.neep.org/model-progressive-building-energy-codes-policy-2012-updates
[27] NEEP, *Code Adoption Tool Kit*, Available at: http://neep.org/toolkits/CodeAdoption.php
[28] NEEP, *Code Compliance Tool Kit*, Available at: http://neep.org/toolkits/CodeAdoption.php

methodology study that may be useful.[29] NEEP encourages Connecticut to consider the prospect of a code collaborative and the benefits it may bring to the state, and NEEP is happy to assist the state on this endeavor.

Building Energy Rating and Labeling

Improving energy efficiency in buildings is one of the most cost-effective ways across all sectors to reduce energy consumption and hence greenhouse gas emissions. Energy labeling increases awareness of energy consumption and enables consumers to compare buildings, thereby providing an incentive to improve energy efficiency in buildings.

Connecticut has been a leader in home energy labeling with the roll out of the Home Energy Score with EnergizeCT's Home Energy Solutions Program. The CES outlines the progress made on empowering building owners to market their energy efficiency improvements with 21,000 Home Energy Scores completed.[30] With the achievements made since the 2013 CES, there is an opportunity for Connecticut to push home energy labeling information into the real estate market by adding opt-in/out language to the program. This will ensure transparency in benchmarking home energy information and enable Connecticut to funnel the scores through HELIX[31] to the multiple listing service. The CES acknowledges that homes with a home energy label sell at 3 percent to 20 percent faster than comparable homes without a label. By adding this language to the program, Connecticut will enhance the real estate market for consumers and professionals. Through HELIX, NEEP is working to educate real estate professionals on the value of energy elements a home has in the market, as well as developing a course curriculum for real estate professionals. Energy efficiency improvements are cost-saving and value adding.

Schools and Communities

NEEP commends Connecticut's ultimate goal of zero energy buildings.[32] Connecticut's Zero Energy Challenge is a great path forward for the residential market. However, the state needs to build upon this initiative and begin a similar program for commercial and public buildings.[33] To work towards this goal, Connecticut may want to consider including Northeast Collaborative for High Performance Schools (NE-CHPS)[34] in the building energy and sustainability and resiliency standards. In addition, the state may want to consider adding a recommendation to the strategy to update the Building Standard Guidelines Compliance Manual for High Performance Buildings.

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[29] U.S. DOE*, Energy Codes Field Study*, Available at: https://www.energycodes.gov/compliance/energy-code-field-studies

[30] CT DEEP, *Supra note 9*, at 103

[31] For the latest on HELIX: http://www.neep.org/initiatives/energy-efficient-buildings/green-real-estate-resources/helix

[32] In the draft CES, the phrase zero net energy is used, DEEP may want to consider adopting DOE's definition and phase zero energy: https://energy.gov/eere/buildings/downloads/common-definition-zero-energy-buildings

[33]NEEP, *Roadmap To Zero Energy Public Buildings: Progress Report,* (June 2016), Available at: http://www.neep.org/sites/default/files/resources/ZE%20Report%20August%202016_0.pdf

[34] NE-CHPS, http://www.chps.net/dev/Drupal/NE-CHPS

NEEP recognizes Connecticut's workforce development strategies for technical high schools and professional trainings in the 2016-2018 C&LM Plan. Training building operators is a key component to ensuring the optimal performance of building systems. Without a well trained workforce, investments in energy efficiency and renewable energy technologies become less advantageous and more costly due to a lack of expertise on how to properly operate these systems. Additionally, providing workforce development opportunities to building operators in existing buildings allows them to make operational or behavioral changes without significant capital investments. NEEP's Operations and Maintenance Guide[35] will prove to be a useful guide for Connecticut as the state begins to look comprehensively at developing a pathway to zero energy. This guide contains O&M procedures that will help buildings reduce their operating costs, as well as lead to healthier indoor air, improved student and staff comfort, reduced water consumption, improved environmental stewardship, and overall improvements in the learning environment.

Conclusion

NEEP acclaims Connecticut DEEP for its continued leadership and the development of the 2017 Comprehensive Energy Strategy. The CES seeks to shape the ongoing transformation of the state's energy strategy and NEEP hopes to continue to provide resources that can assist Connecticut in doing so. This strategy is a leap in the right direction and Connecticut should take this strategy and develop a clear, transparent plan for implementation. There is an extensive list of goals in the strategy and Connecticut may benefit from identifying priority goals and establishing a plan for achieving such goals. NEEP would be pleased to provide further technical assistance to assist in the development and implementation of the Comprehensive Energy Strategy.

Sincerely,

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Northeast Energy Efficiency Partnerships

[35] NEEP, Operations and Maintenance Guide, (January 2017), Available at: http://www.neep.org/regional-operations-maintenance-guide-high-performance-schools-and-public-buildings-northeast-and