

October 7, 2022

Sent via email to: DEEP.EnergyBureau@ct.gov

Connecticut Department of Energy and Environmental Protection
Bureau of Energy and Technology Policy
10 Franklin Square
New Britain, CT 06051

**Re: Environmental Advocates' Written Comments for 2022 CES Technical Session 2:
Building Thermal Decarbonization — Heat Pump Barriers and Market Strategies**

Dear Bureau of Energy and Technology Policy,

Thank you for the opportunity to submit comments for the 2022 Comprehensive Energy Strategy (CES) Technical Session 2. Conservation Law Foundation, Save the Sound, Sierra Club, Acadia Center, the Nature Conservancy in Connecticut, People's Action for Clean Energy, and Eastern Connecticut Green Action are public interest organizations that are working to align Connecticut's energy policies with the state's statutory climate commitments and decarbonize the electric sector, transportation sector, and buildings sector, which are the three major sources of Connecticut's greenhouse gas (GHG) emissions. We appreciate the opportunity to provide these joint comments and look forward to engaging further in development of the 2022 CES.

- 1. What regulatory or legislative changes would be helpful or critical to accelerate heat pump adoption in Connecticut? Policy examples from other jurisdictions include, but are not limited to, bans on fossil fuel heating in new construction, building code changes, and dedicated funding for electrification programs or incentives. In your response, please note jurisdictions where recommended policies have been successfully implemented.**

Building Code Electrification Standard for New Construction

While heat pumps are a cost-effective retrofit solution for many use cases, requiring the use of heat pumps for new construction represents a least-cost opportunity to begin the systematic and deliberate transition of building heating from fossil fuels to clean renewable energy. Heat pumps have been found to be the lowest cost option for new home construction projects,¹ and new zero energy commercial buildings have been built around the Northeast with minimal or no upfront costs.²

A growing number of cities across the country have implemented bans on gas heating in new construction. At the federal level, agencies are required to design all large new construction

¹ Sherri Billimoria, et al., RMI, *The Economics of Electrifying Buildings*, 20 (2018), <https://rmi.org/insight/the-economics-of-electrifying-buildings/>.

² USGBC Massachusetts, *Zero Energy Buildings in Massachusetts: Saving Money from the Start* (2019), <https://builtenvironmentplus.org/wp-content/uploads/2019/09/ZeroEnergyBldgMA2019.pdf>.

and retrofit projects to be net-zero emissions by installing all-electric equipment and appliances, paired with other energy efficiency measures.³ Recently, New York City mandated that buildings of all sizes must be constructed fully electric by 2027.⁴ Washington, D.C. has similarly moved to ensure that by 2026 all new buildings and substantial renovations will be net-zero construction.⁵ In addition, Massachusetts' most recent climate law will allow ten municipalities to prohibit the installation of new fossil fuel infrastructure in new construction and major renovations.⁶ Over fifty California municipalities have prohibited fossil fuel heating in new construction,⁷ while Quebec has passed a regulation that ends the use of fuel oil for residential heating.⁸

Following the lead of local jurisdictions, state-level approaches are beginning to be adopted with Washington requiring the installation of heat pumps in most new commercial and large multi-family buildings.⁹ New York has also considered moving forward with a statewide ban on gas and other fossil fuel heating in new construction.¹⁰ Connecticut must work toward implementing a statewide net zero building code that requires all-electric and non-combustion appliances. An important first step in pursuing this policy is the introduction of a stretch code that allows cities and towns to opt in to these requirements. Massachusetts has begun this process with a specialized stretch code that allows municipalities to severely restrict the use of fossil fuels in new residential and commercial buildings.¹¹

Installing new gas infrastructure in buildings will only prolong Connecticut's dependence on fossil fuels and will hinder the state's efforts to achieve its Global Warming Solutions Act

³ EEI, *Update: Energy Codes for Buildings & Equipment Efficiency Standards*, 1 (July 2022), <https://www.eei.org/-/media/Project/EEI/Documents/Issues-and-Policy/Custom Solutions Codes and Standards Newsletter.pdf>.

⁴ NYC Office of the Mayor, *Mayor de Blasio Signs Landmark Bill to Ban Combustion of Fossil Fuels in New Buildings* (Dec. 22, 2021), <https://www1.nyc.gov/office-of-the-mayor/news/852-21/mayor-de-blasio-signs-landmark-bill-ban-combustion-fossil-fuels-new-buildings>.

⁵ B24-0420 - Clean Energy DC Building Code Amendment Act of 2021, <https://lims.dccouncil.gov/Legislation/B24-0420>; <https://www.npr.org/local/305/2022/07/14/1111541753/d-c-moves-to-ban-natural-gas-in-most-new-buildings-aiming-for-carbon-neutrality>.

⁶ An Act Driving Clean Energy and Offshore Wind, <https://malegislature.gov/Laws/SessionLaws/Acts/2022/Chapter179>; Clean Technica, *Massachusetts Legislature Legalizes Gas Bans* (July 26, 2022), <https://cleantechnica.com/2022/07/26/massachusetts-legislature-legalizes-gas-bans/>.

⁷ See, e.g., Sammy Roth, Los Angeles Times, *L.A. is banning most gas appliances in new homes* (May 27, 2022), <https://www.latimes.com/business/story/2022-05-27/get-ready-for-electric-stoves-los-angeles-bans-natural-gas-in-most-new-homes> ("More than 50 California cities and counties have adopted similar rules banning or discouraging gas hookups in new homes and other buildings.").

⁸ Quebec Ministry of the Environment and the Fight Against Climate Change, *Quebec adopts a regulation to eliminate the use of fuel oil for residential heating* (Nov. 17, 2021), <https://www.environnement.gouv.qc.ca/Infuseur/communiqué.asp?no=4687>.

⁹ Emily Pontecorvo, Grist, *First all-electric heating mandate for buildings passes in Washington state*, (Apr. 26, 2022), <https://grist.org/buildings/washington-state-requires-electric-heat-pumps-buildings/>.

¹⁰ Reuters, *New York set to ban natural gas in new buildings - environmental groups* (Apr. 4, 2022), [https://www.reuters.com/business/environment/new-york-set-ban-natural-gas-new-buildings-environmental-groups-2022-04-04/#:~:text=April%204%20\(Reuters\)%20%2D%20New,Watch%20and%20other%20environmental%20groups](https://www.reuters.com/business/environment/new-york-set-ban-natural-gas-new-buildings-environmental-groups-2022-04-04/#:~:text=April%204%20(Reuters)%20%2D%20New,Watch%20and%20other%20environmental%20groups).

¹¹ 225 CMR 22.00 and 225 CMR 23.00 amendments, effective December 2022, <https://www.mass.gov/info-details/stretch-energy-code-development-2022#new!-release-of-final-code-language-for-stretch-code-update-and-new-specialized-stretch-code>.

(GWSA) decarbonization mandates.¹² Any building built today with fossil fuel heating will need to be retrofitted at greater cost and complexity before the end of its useful life, which wastes money, burdens energy infrastructure, and impedes the state's ability to meet its emissions reduction goals. It is therefore critical that Connecticut update its building code to be as effective as possible at reducing dependence on fossil fuels and allowing towns to opt in to a net zero, all-electric building code.

Zero Emission Appliance Standards

In recognition of the need to stop prolonging dependence on fossil fuel appliances, California has taken the important step of developing regulations to ban the sale of natural gas powered heating and hot water systems beginning in 2030.¹³ When the ban takes effect, consumers looking to replace their appliances will only be able to purchase zero-emission appliances. Connecticut should follow California's lead to ensure that new appliances installed in the state are consistent with Connecticut's decarbonization mandates. Connecticut should require that only zero emission appliances are installed after 2030 to ensure that reliance on the gas system is reduced.

Electrify Existing Buildings

In addition to electrifying new construction, Connecticut must take steps to electrify existing buildings. Ithaca, New York has adopted a municipal plan, the Efficiency Retrofit and Thermal Load Electrification Program, to become a carbon-neutral city by 2030 through electrification of all buildings.¹⁴ The program seeks to gradually improve the overall energy performance of the city's buildings by assessing each building and determining potential energy efficiency improvements, through energy retrofitting and the substitution of non-electric thermal loads and air conditioning systems, with air-source and ground-source heat pumps, and the installation of efficient lighting, photovoltaic and solar thermal systems, onsite storage, smart thermostats and smart meters.¹⁵ Connecticut must similarly chart a path forward to electrify existing buildings.

A pilot program from Pacific Gas and Electric (PG&E) in California explores another innovative way to electrify existing buildings and to fund that transition. At California State University Monterey Bay, PG&E has proposed to electrify part of the campus rather than upgrade the existing gas pipelines because electrification was found to be a far more cost-effective option than maintaining the gas system. Since a pipeline replacement would be a capital

¹² Conn. Gen. Stat. § 22a-200a. Connecticut's Global Warming Solutions Act requires the state to reduce greenhouse gas emissions 10% below 1990 levels by 2020, 45% below 2001 levels by 2030, and 80% below 2001 levels by 2050.

¹³ See e.g. Emily Pontecorvo, Grist, *California's 2030 ban on gas heaters opens a new front in the war on fossil fuels* (Sept. 26, 2022), <https://grist.org/buildings/californias-2030-ban-on-gas-heaters-opens-a-new-front-in-the-war-on-fossil-fuels/>.

¹⁴ Tik Root, Washington Post, *This U.S. city just voted to decarbonize every single building* (Nov. 3, 2021), <https://www.washingtonpost.com/climate-solutions/2021/11/03/ithaca-new-york-decarbonize-electrify/>.

¹⁵ LPDD, *Ithaca's Energy Efficiency Retrofit and Thermal Load Electrification Program*, <https://lpdd.org/resources/ithacas-energy-efficiency-retrofit-and-thermal-load-electrification-program/#:~:text=The%20city's%20Energy%20Efficiency%20Retrofit.and%20the%20substitution%20of%20non%2D>.

expenditure on which PG&E would earn a rate of return, the utility has proposed that the California Public Utilities Commission treat the electrification expenses as capital expenditures rather than operational expenses. Connecticut utilities could use a similar structure to target certain areas of the gas distribution system for decommissioning and electrification.

Leverage Federal Funding

The recently passed Inflation Reduction Act contains several provisions providing funding for building electrification. Section 25C extends the nonbusiness energy tax credit through 2032 and increases it from 10% to 30%, providing up to \$2,000 for heat pumps. Section 45L extends the New Energy Efficient Home Credit through 2032 and increases credits for housing units built or remodeled to reach certain Energy Star and DOE Zero Energy Ready Home standards. Connecticut must ensure residents are able to leverage these funding streams to electrify and weatherize their homes, as this funding provides the state with an important opportunity to make progress on its building decarbonization goals.

2. What are the most significant overall barriers to heat pump adoption in Connecticut? What are the primary challenges to heat pump deployment in the following contexts? Are there unique challenges in any of these contexts? a. Large commercial and industrial operations b. Small businesses c. Multifamily housing d. Single-family housing

Significant barriers to more widespread heat pump adoption in Connecticut include: lack of public knowledge about heat pumps, a lack of experienced contractors to install heat pumps, and the high upfront cost of the technology. Additional barriers exist for residents who live in rental housing, particularly low-income renters.

First, there remains a major gap between the public's knowledge and understanding of heat pumps, which is very limited, and the increasing consensus among energy experts that heat pumps are critical to decarbonizing the building sector. Many people have never heard of heat pumps, and those who have may have outdated knowledge. For example, they may believe that heat pumps cannot operate effectively in cold climates, even though cold-weather heat pumps are now widely available and perform well in Connecticut and other northeastern states without any backup source of heating. Educating the public about the availability, effectiveness, efficiency, climate benefits, and upfront and operating costs of heat pumps, including state and federal financial incentives, is crucial to accelerate adoption of this technology.

Second, a related problem is a lack of contractors who understand heat pump technology, can install heat pumps, and can educate potentially interested customers about the technology. Additionally, those contractors who have prior experience with heat pumps may only be familiar with older, outdated technology. During the technical sessions, several individuals expressed skepticism of the ability of heat pumps to adequately perform in colder temperatures. While earlier models may have struggled in cold climates, the latest generation of heat pumps have proven to perform well in sub-zero temperatures.¹⁶ It is promising that DEEP is moving forward

¹⁶ Michael Gartman & Amar Shah, RMI, *Heat Pumps: A Practical Solution for Cold Climates* (Dec. 10, 2020), <https://rmi.org/heat-pumps-a-practical-solution-for-cold-climates/>.

with contractor training programs, which will be key to ensure that Connecticut has a skilled workforce ready to deploy this technology. Among other things, the training programs should create opportunities for low-income, minority, and female workers who historically have had fewer opportunities to participate in the workforce.

Third, the high upfront cost of ASHPs remains a steep barrier, despite the existence of financial incentives. New federal support for heat pumps under the Inflation Reduction Act should significantly mitigate this barrier, but increased support at the state level is also needed. Currently, many families and individuals who are or may be interested in converting to a heat pump are unable to do so because of the high upfront cost, regardless of how cost-effective the switch may be over a longer time period. Low-income and many moderate-income Connecticut families and individuals are already struggling financially due to high energy costs and inflation. The upfront cost of ASHPs remains prohibitive for many. To mitigate these financial barriers, Connecticut should increase financial incentives for heat pumps and consider a tiered incentive structure based on income, as well as higher incentives for installing heat pumps in already weatherized buildings. People with very high incomes should not be eligible for financial incentives, merely education and technological support. DEEP should provide an opportunity for the public to comment on the incentive structure and appropriate income thresholds.

Moreover, significant time and resources are needed for people to research heat pumps, incentives, and qualified contractors, and to meet with contractors, obtain quotes, and select an installer. A concierge-type service could help streamline this process and make it easier for both families and businesses to get the support they need in converting their buildings to heat pumps.

There are additional barriers specific to people who live in rental housing. As DEEP has observed in the context of the Equitable Energy Efficiency proceeding and the Conservation and Load Management Plan, split landlord-tenant incentives remain a persistent barrier to energy efficiency improvements in rental properties. This is a serious equity issue because renters are more likely to be low-income and/or minority, whereas homeowners are wealthier and whiter. Renters cannot be left behind as Connecticut decarbonizes the buildings sector. DEEP should build on existing efforts to bridge these gaps and incentivize landlords to adopt energy efficiency improvements and convert to more efficient technologies like ASHPs to ensure that tenants across the state can access the benefits of cleaner and more efficient buildings.

Challenges specific to multi-family housing include split incentives, landlords who are unwilling to make upgrades, and tenants' inability to install heat pumps on their own absent landlord approval. In addition, centralized heating systems in older multifamily buildings may rely on central hot water or steam distribution systems that are not compatible with existing heat pump technologies, requiring a shift to a more decentralized system, such as individual heat pumps.¹⁷ This may require upgrading the building's existing electrical service, as well as unbundling heating costs if such costs are included in the rent.

¹⁷ ACEEE, *Building Decarbonization Solutions for the Affordable Housing Sector*, 15 (2022), <https://www.aceee.org/sites/default/files/pdfs/u2204.pdf>.

3. How effective is Connecticut's public messaging on heat pump adoption? What public outreach, engagement, or messaging strategies employed in other jurisdictions should Connecticut consider adopting?

Connecticut's current public messaging on heat pump adoption is minimal and has not been very effective. While there are some online resources on heat pumps and some individual organizations like People's Action for Clean Energy (PACE) are working to educate the public, it does not appear that DEEP or other state entities have engaged in much, if any, public outreach at the state level. As a result, many if not most Connecticut residents remain uninformed or misinformed about heat pumps and unaware of current incentives.

Active and sustained public outreach, including targeted outreach to certain priority populations, is critical to educate residents about heat pumps and accelerate adoption of this technology.¹⁸ State involvement is needed to ensure consistent and accurate messaging and to coordinate participating entities, including state agencies and advisory bodies, municipalities, regional councils of government, housing authorities, businesses, nonprofits, and community groups. The 2022 CES should include a robust public outreach strategy, including an implementation timeframe and accountability metrics.

Accurate and up-to-date online resources are fundamental to ensure that interested residents can quickly and easily locate information about heat pumps and available incentives. However, this is only a starting point. If most residents are unaware of these resources, which currently seems to be true, they will have limited impact.

The Energize CT website is probably the most well-known resource on heat pumps in Connecticut. This website includes information about how heat pumps work and state-level incentives.¹⁹ Eversource and Avangrid also mention heat pumps on their websites and note that incentives are available for qualifying customers.²⁰ These online resources should be updated to include information about *federal* incentives, in addition to the state incentives. Visitors to the websites may not be aware of federal support for heat pumps.

Active and sustained public outreach is critical to educate Connecticut residents about heat pumps, and a robust outreach plan and implementation timeframe should be developed in the 2022 CES. DEEP should hire a new staff person or a qualified consultant to oversee public outreach and ensure that the state stays on track. Because the hiring process can be lengthy and additional sources of funding may be needed to fund this consultant or new hire, DEEP should

¹⁸ Executive Director's Summary Report to the Board of Trustees of the Efficiency Maine Trust (Mar. 23, 2022), https://www.efficiencymaine.com/docs/ED-Report-2022-03-23_FINAL.pdf (provides details of media coverage and outreach including heat pump messaging); Mass Save, Heat Pump Market Strategies (Mar. 16, 2022), https://ma-eeac.org/wp-content/uploads/EEAC_2022-03-16-Heat-Pump-Market-Strategy-Revised.pdf;

NYS Clean Heat, Compare Your Options, <https://cleanheat.ny.gov/compare-your-options/> (heat pump planner tool).

¹⁹ Energize CT, *Air Source Heat Pumps*, <https://www.energizect.com/your-home/solutions-list/air-source-heat-pumps>.

²⁰ Avangrid, *Heating and Cooling System Rebates*, https://www.uinet.com/smartenergy/rebatesandprograms/high_efficiency_furnace_gas_boiler; Eversource, *Heating, Cooling and Water Heating*, <https://www.eversource.com/content/ct-c/residential/save-money-energy/efficient-products/heating-cooling>.

assign this responsibility to an existing staff person in the interim so implementation can move forward as quickly as possible.

The details of the outreach plan should be developed with public input in the 2022 CES. Best practices in public outreach should be utilized, such as providing information in multiple languages, utilizing existing social networks and channels of communication, partnering with community groups and other trusted messengers, meeting communities where they are (*e.g.* in community centers, churches, schools, libraries, shops, festivals, etc.), providing information in easily understood “plain language”, using various methods of communication to reach a wider range of people (*e.g.* QR codes, links to websites, social media, print media, op-eds, radio or online ads, billboards, flyers, utility bill inserts), and using data to identify the most effective ways to reach the public, especially high-priority target populations.

Outreach should build on related efforts to strengthen public engagement on energy, climate, and environmental issues, such as the Equitable Energy Efficiency (E3) proceeding, the Connecticut Equity and Environmental Justice Advisory Council (CEEJAC), and the Governor’s Council on Climate Change. Community partners and organizations can play a key role in reaching the public, including low-income households and environmental justice populations, and should be involved in the outreach process. A source of funding should be identified to compensate community partners that assist in outreach efforts.

Data should be used to target outreach to high priority households and businesses. The Green Bank and PACE have substantial data, discussed in Technical Session 2, that should be utilized for this purpose. The utility companies (both gas and electric) are another important source of data that should be collected and used for outreach. This data should be publicly available (with appropriate privacy protections for customer data) to the extent possible.

In the 2022 CES, DEEP should identify high-priority outreach categories in both the residential and C&I sectors. These could include, for example, people who are eligible for the greatest incentives and those who would benefit the most economically by converting to a heat pump (such as current heating oil and propane customers).

Marketing of gas to new customers must come to an end, as Connecticut must stop expansion of the gas distribution system in order to decarbonize the buildings sector consistent with the GWSA. Utilities should cease marketing gas to new customers and should instead be required to provide educational resources about energy efficiency and heat pumps so that customers are directed toward heating solutions that are consistent with Connecticut’s decarbonization policies. New York utilities provide a model for this shift in communication to customers—a joint proposal by New York State Electric & Gas Corporation and Rochester Gas and Electric Corporation states that “the Companies will modify their websites, customer mailings, emails, and marketing material to remove promotion of natural gas.”²¹ Such modifications include replacement of a link encouraging conversion to gas with a link that “describes programs and incentives available to customers for opportunities to reduce gas use or

²¹ Case 19-E-0378, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of New York State Electric & Gas Corporation for Electric Service, Joint Proposal Appendix M, New York State Electric & Gas Corporation – Gas, Rochester Gas and Electric Corporation – Gas, pg. 3.

consider alternate forms of energy consumption.” Connecticut utilities should similarly modify their marketing practices to remove promotion of gas and encourage a shift toward energy efficiency and electrification.

4. In light of the availability of new national specifications for air-source heat pumps (including the Energy Star v. 6 specification; the DOE Cold-Climate Heat Pump Challenge specification; the revised Northeast Energy Efficiency Partnerships cold climate specification; and EXP07 Load-based Test Procedure), what technical specifications should be adopted for air-source heat pumps incentive programs through the Conservation and Load Management (C&LM) Plan?

Heat pump incentives offered through the C&LM plan must be for cold-climate heat pump models, which are critical to ensure homes do not need to maintain fossil fuel backup systems. Cold climate heat pump models can provide heat on the coldest days of the year in Connecticut without a gas (or oil) furnace as backup, which will avoid the need to spend billions of dollars to maintain the gas system over the next thirty years. Eliminating the need for fossil fuel backup heating will accelerate Connecticut’s transition to electrification and reduce emissions from the buildings sector.

5. What should DEEP regard as best practices for deployment of heat pumps in affordable housing?

To encourage more widespread adoption of heat pumps in affordable housing, DEEP should segment its analysis and customize messaging when addressing different audiences. For instance, an apartment developer may be receptive to incentives different from those that appeal to a small neighborhood property owner. Similarly, customers currently using electric resistance heat may be receptive to different outreach strategies than customers of oil, propane, or gas.

This segmented approach would be facilitated by the adoption of a detailed and comprehensive inventory of heat systems and building typologies across the state. As mentioned in the response to Question 3 above and during Technical Session 2, PACE has gathered building and energy data from towns across Connecticut. DEEP should build off this work and leverage this data to conduct more effective outreach.

DEEP should also consider requiring heat pump installers to assume some of the risk of conversion. If a heat pump is incorrectly installed, the company should be required to correct their error without any additional expense to the customer. Minimizing the risk of converting to heat pumps by distributing the risk more evenly would protect consumers, especially vulnerable low-income residents who are least able to bear increased costs.

6. How can Connecticut better support deployment of heat pumps in the commercial and industrial (C&I) sector?

We have no specific comments in response to this question at this time. We note, however, that with respect to commercial buildings many of the issues and solutions will be similar to those in the residential sector. As with the residential sector, the Connecticut Energy

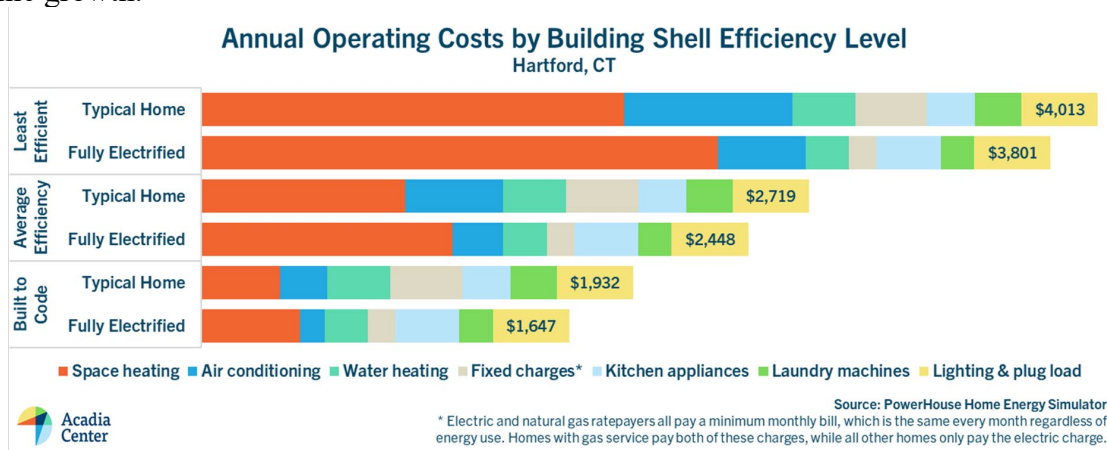
Efficiency Board has found that replacing oil and propane heating and hot water systems with heat pumps is a cost-effective measure for the commercial and industrial sector, while the economics of replacing existing gas equipment is less positive.²² Accordingly, our comments regarding customer incentives in response to question 10, below, are equally applicable to both the residential and commercial sectors.

7. How can Connecticut effectively incentivize co-delivery of heat pumps with other supportive measures, including weatherization, integrated controls, solar photovoltaic, electricity storage, and demand response?

Several presenters in the CES technical sessions mentioned the benefits of having a “one-stop-shop” for building electrification measures to streamline things for customers. We agree that the state should pursue this approach by making it easier for customers converting to heat pumps to adopt complementary measures that facilitate whole-building electrification such as weatherization, integrated controls, solar photovoltaics, battery storage, and demand response programs. Customers who convert to a heat pump should be informed about these options, including potential cost savings and resilience benefits, and their eligibility for any available incentives.

a. To what extent should weatherization be deployed in conjunction with heat pumps? What load reduction, comfort, or other benefits do advanced weatherization techniques, including insulation and advanced duct sealing, provide when installed with a heat pump?

Numerous presenters at Technical Session 2 emphasized that weatherization is a key first step that should be taken prior to heat pump installation. Heat pump costs are typically higher for a non-weatherized building because a larger heat pump system is needed to effectively heat and cool the space. In addition to load reduction and cost savings, weatherization offers benefits to building occupants such as improved indoor air quality and improved health outcomes. Robust weatherization programs also support development of a skilled workforce and contribute to economic growth.



²² Connecticut Department of Energy and Environmental Protection, *Final Determination: Approval with Conditions of the 2022-2024 Conservation and Load Management Plan 15* (June 1, 2022).

Connecticut should prioritize the rapid deployment of heat pumps in conjunction with weatherization. The state should align heat pump deployment targets with the state's existing statutory goal of 80% residential weatherization by 2030.²³ The state should also coordinate its efforts to address weatherization barriers, focusing on low-income and minority households in which such barriers are more common, with heat pump and weatherization deployment.

8. How can we prepare Connecticut's workforce for increased heat pump deployment?

a. What are the specific workforce needs of geothermal heat pump developers?

DEEP should coordinate with the Department of Consumer Protection to facilitate the adoption of a new, streamlined heat pump licensing process for HVAC installers. Currently, all HVAC licenses require training in fossil fuel systems. This requirement is outdated and conflicts with Connecticut's focus on building electrification. Connecticut should have heat pump specific licensing that does not require contractors to be trained in fossil fuel equipment.

As a result of the current licensing requirements, companies that focus solely on non-fossil fuel systems such as geothermal heat pumps cannot offer full apprenticeships. A heat pump specific license category—which could potentially be an interim step towards a traditional license—would reduce training costs and allow HVAC companies to get new hires to work on heat pumps sooner.

b. How can Connecticut leverage training programs to encourage proper heat pump system design, installation, and maintenance?

Additional funding should be directed to Green STEP and other workforce programs to increase the number of skilled workers. This is particularly important given (1) the quantity of the work that will be required to facilitate a widespread transition to heat pumps, (2) the current limited number of licensed technicians, many of whom are aging out of the field, and (3) the cost, in both money and time, required to add new technicians to the workforce.

One presenter in Technical Session 3, Carl Orio, emphasized how challenging it is to get contractors to attend training sessions. He suggested that the state incentivize participation in training sessions and make training free or low cost. We agree that such incentives should be considered to boost participation in training programs.

9. What support does the heat pump manufacturing sector need to meet increased demand?

The Biden administration has established policies to support increased domestic heat pump manufacturing.²⁴ Less directly, the federal Inflation Reduction Act should also boost heat pump manufacturing by increasing demand for this technology. It is not yet clear whether more

²³ Conn. Gen. Stat. § 16-245m.

²⁴ Adam Aton, *Biden Order Will Boost Heat Pumps and Building Insulation* (June 7, 2022), <https://www.scientificamerican.com/article/biden-order-will-boost-heat-pumps-and-building-insulation/>.

policies to support heat pump manufacturing are needed to meet climate goals, but the federal government is best positioned to provide such support. It is uncertain how much an individual state like Connecticut could facilitate growth in this sector, and whether additional state-level support is needed.

10. Should Connecticut consider adding or modifying customer incentives for heat pump technologies, including air-to-water heat pumps and heat pump water heaters?

Customer incentives for heat pumps should be increased and a tiered incentive structure should be adopted that provides the greatest incentives for the greatest GHG reductions. People with gas heating should be eligible for heat pump incentives, as Eversource suggested in their presentation for Technical Session 2.²⁵

Heat pump conversions should be prioritized based on GHG reductions in the home energy solutions (HES) program for residential customers and for commercial and industrial customers. This would not significantly change the current prioritization (based on cost savings) because the greatest emissions reductions largely align with the greatest cost savings—both are greatest for customers converting from oil or propane to heat pumps. The HES income-eligible program (HES-IE) should give greater weight to cost savings, though emissions reductions should also be considered in determining priority targets for conversion under HES-IE.

Deprioritizing gas customers from converting to heat pumps is a mistake because this will prolong these customers' reliance on fossil fuel heating, which contributes to a significant amount of emissions in the buildings sector. Gas customers are currently ineligible for state air source heat pump rebates.²⁶ A tiered incentive structure for heat pumps is warranted to maximize GHG reductions and cost savings, but gas customers should be eligible for heat pump incentives so this segment of customers does not get left behind in the transition to building electrification.

While a focus on converting oil and propane customers to heat pumps is appropriate at this time given the substantial number of customers who still rely on these costly and emissions intensive heating sources, this focus will no longer be appropriate once a certain percentage of these customers have converted to heat pumps. (This saturation point should be determined by DEEP and the Energy Efficiency Board with input from the public.) At that time, the state's focus should shift to converting gas customers to heat pumps. Increased heat pump incentives for existing gas customers may be necessary to encourage adoption if electrification remains less cost-effective relative to furnace replacement for these customers. Connecticut should start planning now for how it will accelerate heat pump adoption among gas customers and what incentives are needed, including opportunities to bundle heat pump retrofits with rooftop solar and battery storage.

²⁵ CES Technical Session 2, Remarks of Eversource representative Natalia Sudyka, [https://ctdeep.zoom.us/rec/play/Afng2DfyBv4yR4isxxQiILgMsplRoMNH7dyffa494mjs6WXGGZNNOY09vfA9jDGid2wCvtE5i9BRHrZs4m.qch9KOLefkiHve?startTime=1663938079000](https://ctdeep.zoom.us/join/Afng2DfyBv4yR4isxxQiILgMsplRoMNH7dyffa494mjs6WXGGZNNOY09vfA9jDGid2wCvtE5i9BRHrZs4m.qch9KOLefkiHve?startTime=1663938079000) (“we are also proposing to expand [heat pump] rebate eligibility to include customers with natural gas”).

²⁶ Energize CT, *Air Source Heat Pumps*, <https://energizect.com/your-home/solutions-list/air-source-heat-pumps>.

11. How can Connecticut maximize the potential positive reliability and resilience impacts of heat pumps while minimizing any potential negative impacts (e.g., greater dependence on one energy system – the electric grid)?

New England's reliance on natural gas currently threatens the reliability of our regional electric grid, particularly in the winter months as gas contends with the competing demands of providing electricity and heating our buildings.²⁷ This is yet one more reason why a deliberate plan to transition away from fossil space heating for the building sector should be established in the 2022 CES. This is a necessary step to align the CES with the GWSA and the state's broader decarbonization and public health goals, as well as helping to ease current system risks due to natural gas.

Recognizing that this transition will take time, Connecticut must ensure that during this period of transition fossil fuel heating produces the least possible emissions. Accordingly, stringent emissions standards for heating oil and enhanced efficiency standards for appliances using fossil fuels should be adopted and enforced. These measures should provide the baseline foundation for performance. Rather than providing incentives for the replacement of fossil fuel heating equipment, minimum performance standards for these items should be raised while incentives are directed towards encouraging adoption of the most efficient alternative—heat pumps.

The Public Utilities Regulatory Authority recently terminated the state's incentive program for new natural gas hookups,²⁸ and the most recent Conservation and Load Management Plan recognizes the need to phase out program incentives for natural gas equipment and to instead direct resources to supporting increased adoption of heat pumps.²⁹ The U.S. Department of Energy has estimated that simply eliminating the least-efficient furnaces from the market would induce 10 percent of households looking to replace a furnace to choose a heat pump as the replacement.³⁰ The federal government is currently working to establish new enhanced efficiency standards for furnaces,³¹ while California has recently approved phasing out the sale of gas furnaces and water heaters entirely by 2030.³² At the same time, recognizing their adverse health and climate impacts, jurisdictions are also working to eliminate the use of oil furnaces. Quebec, for example, prohibits the installation of oil furnaces in new construction, and

²⁷ See e.g., NRDC, *New England's Dependence on Gas Threatens Winter Reliability*, <https://www.nrdc.org/experts/bruce-ho/new-englands-dependence-gas-threatens-winter-reliability>; *New England's Winter Electricity Challenges Call for a Clean Energy Solution*, https://www.sierraclub.org/sites/default/files/2563%20NE%20Winter%20Reliability%20WP%2003_web.pdf.

²⁸ Public Utilities Regulatory Authority, Docket No. 21-08-24, Final Decision (April 22, 2022), [https://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e852576190052b64d/b09c5c63c09c2a25852588310054086c/\\$FILE/210824-042722.pdf](https://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e852576190052b64d/b09c5c63c09c2a25852588310054086c/$FILE/210824-042722.pdf).

²⁹ Connecticut Department of Energy and Environmental Protection, *Final Determination: Approval with Conditions of the 2022-2024 Conservation and Load Management Plan 5* (June 1, 2022).

³⁰ Appliance Standards Awareness Project, *High Costs, High Emissions: Why It's Time To Phase Out Energy-Wasting Furnaces* (Apr. 25, 2022), https://appliance-standards.org/sites/default/files/Furnace_Fact_Sheet.pdf.

³¹ Press Release, U.S. Department of Energy, *Biden Administration Proposes New Cost-Saving Energy Efficiency Standards for Home Furnaces* (June 13, 2022), <https://www.energy.gov/articles/biden-administration-proposes-new-cost-saving-energy-efficiency-standards-home-furnaces>.

³² Caleigh Wells, NPR, *California plans to phase out new gas heaters by 2030* (Sept. 23, 2022), <https://www.npr.org/2022/09/23/1124511549/california-plans-to-phase-out-new-gas-heaters-by-2030#:~:text=In%20its%20ongoing%20effort%20to,emissions%20alternatives%2C%20like%20electric%20heaters>.

will prohibit the new installation of fossil fuel heating equipment in existing buildings beginning in 2024.³³

We should not, however, equate the increased electrification of our economy with the threat of electric grid failure. On the contrary, the efficient buildout of building and transportation electrification provides significant opportunities to enhance the resilience of the electric grid while lowering household energy costs. For example, because they are more efficient than stand-alone air conditioners, increased adoption of heat pumps can *reduce* peak demand in the summer, the season when the grid is most burdened, and help to relieve pressure on the grid during increasingly frequent high-heat days. Assuming that the increased adoption of heat pump technology is accompanied by necessary and prudent investments in our transmission and distribution systems, investments that are already necessary as the current infrastructure ages, we will end up with a stronger and less fragile electric grid.

With respect to equitably enhancing the resiliency of the state's electricity grid, the CES should prioritize the continued expansion of distributed energy resources and battery storage, increasing access to clean renewable energy for low-and-moderate income households, and deliberately planning out a network of clean energy microgrids that can maintain their performance and integrity in the face of potential grid disruptions.³⁴ "Virtual power plants" consisting of resources like battery storage, electric vehicles, thermostats, and water heaters can improve the reliability of the electric system by providing enhanced demand responsiveness and load balancing.³⁵ Recognizing that these distributed resources provide value to grid reliability, the Federal Energy Regulatory Commission has already determined that these resources must be allowed to participate in regional power markets.³⁶

12. How should Connecticut incorporate equity considerations into its heat pump deployment strategy? In particular, how can Connecticut better ensure that low-income customers and customers who live in affordable housing can access heat pumps?

Messaging should be focused on the assistance that state and federal subsidies can provide to low-income and historically disadvantaged residents seeking to convert their homes, rather than focused on numbers like average cost or total possible cost which could mislead some consumers into believing that heat pumps are entirely inaccessible to them. As outlined in the

³³ Press Release, Quebec Ministry of the Environment and the Fight against Climate Change, *Quebec adopts a regulation to eliminate the use of fuel oil for residential heating* (Nov. 17, 2021), <https://www.environnement.gouv.qc.ca/Infuseur/communiqué.asp?no=4687>.

³⁴ See, e.g., Steve Hanley, Clean Technica, *Babcock Ranch Was Designed To Be Sustainable & Resilient. Hurricane Ian Was Its First Real Test* (Oct. 3, 2022), <https://cleantechnica.com/2022/10/03/babcock-ranch-was-designed-to-be-sustainable-resilient-hurricane-ian-was-its-first-real-test/>.

³⁵ Joe Daniel, RMI, *The Solution to Grid Reliability? Go Bigger and Bolder on Renewables and Energy Storage* (July 13, 2022), <https://rmi.org/the-solution-to-grid-reliability-go-bigger-and-bolder-on-renewables-and-energy-storage/>.

³⁶ Federal Energy Regulatory Commission, FERC Order No. 2222: Fact Sheet (Sept. 17, 2020), <https://www.ferc.gov/media/ferc-order-no-2222-fact-sheet>; Press Release, Federal Energy Regulatory Commission, *FERC Opens Wholesale Markets to Distributed Resources: Landmark Action Breaks Down Barriers to Emerging Technologies, Boosts Competition* (Sept. 17, 2020), <https://www.ferc.gov/news-events/news/ferc-opens-wholesale-markets-distributed-resources-landmark-action-breaks-down>.

response to Question 3 above, clearly articulating the subsidies and incentives that can make heat pumps more affordable to overburdened communities is a key part of making sure they benefit from such policies.

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