Attached are documents, reports and links which outline my ideas and comments on how DEEP could better support and engage LMI and POC communities. Additionally, here are my notes on workforce- which I have heard nothing about in sometime. I also want to note that DEEP should make an effort to diversify the people they hire as consultants, and appoint to boards, as this would ensure inclusion and diversity in the planning process. There should be an international effort to raise awareness on the people of color who do this work, and who have been historically asked to provide feedback with no compensation and no recognition by DEEP.

When talking about energy- there is a difference between generation and procurement and it is critical that DEEP in its role be honest with residents about the difference. Because generation occurs locally the pollution will impact us. Therefore 100% procurement will NOT solve the local air pollution issue. Only 100% clean energy generation will help that goal. As a POC and as a state leader I note the power plants in Hartford where my kids attend school, and the ones in Bridgeport and ones being planned in Killingly. If we make more energy than we use in CT- which we do, should we expand infrastructure which will likely become stranded as we convert to a clean energy economy? Is this a good investment if CT dollars?

Exclusion by process: To create a diverse plan you need a diverse set of people writing the plan.
Climate and Energy Education should be provided to ALL students in our state and not only provided to affluent communities who are already engaged and have access to resources which will help them prepare for impacts and already help them to be more resilient.

1. How can POC's meaningfully engage in an issue they are not informed on.
2. How can renters access the Green Bank funds?
3. How can CT hold all funds which are ratepayer funds accountable to ensure that there is equity based distribution of funds which our state collects on all energy bills.
4. How can CT ensure that ALL students regardless of race or socioeconomic status have access to engaging, diverse, accessible climate and energy education?
5. How can DEEP ensure the people who work on these plans and are not compensated by the state are acknowledged ?

https://efficiencyforall.org/wordpress/2020/02/25/governors-council-on-climate-change-gc3-equity-lens/

Workforce Development Lifting our Communities Together
Energy Efficiency and Clean Energy jobs needs in Connecticut and the Nation
Building an inclusive path to our clean energy future

www.efficiencyforall.org

Connecticut and our nation as a whole are facing a lack of qualified workers for available energy efficiency jobs and clean energy jobs. These Energy Efficiency (EE) career paths include entry level and building science certified insulation, Energy auditors, EE support techs, Insulation installers and insulation support techs, office administrators, window installers, electricians, heat pump installers, ALM/ mold remediators, customer service representatives, and office billers. This lack of qualified workers is exacerbated by the need to develop certified efficiency for workers to support the expanded federal and local investments in efficiency and clean energy jobs to meet our new state and federal climate and energy goals. As the nation begins to reinvest in the energy efficiency industry and clean energy industry, this workforce gap continues to widen both locally and nationally. Energy efficiency is the most cost effective way to lower energy costs, and energy related energy pollution, while closing the energy affordability gap, and addressing the connections between health and housing.

Fossil fuel combustion in US residential and commercial buildings accounts for nearly 30 percent of all climate pollution (Leung 2018), one of the best ways to begin confronting the challenge of climate change is through a broadened commitment to reduce energy usage, and costs, in US homes and buildings.

Advancing energy efficiency in buildings across the US will cut climate change pollution, while providing an engine for job growth, new career ladders, and sustained economic opportunity (Rinaldi 2019). Federal Policies aimed at retrofitting the nearly 140 million housing units across the country neatly meet in a manner that is both immediate and cost-effective (E2 and E4TheFuture 2019). This will help reduce carbon emissions from the nation's residential building stock and save homeowners and renters money on their monthly utility bills, while improving comfort, health, safety, and resilience.

Energy efficiency has also proven effective in instigating job creation. In 2017, the sector added jobs at two times the national rate; it had reached 2.38 million jobs by the end of 2019, and it is projected to have grown by another 3 percent in 2020. In this way, such a program of reconstruction and reinvestment in American homes offers ready, job-creating stimulus, and should be a centerpiece of any economic recovery package focusing on infrastructure (E2 and E4TheFuture 2019).

With the assurance that Connecticut and the nation is invested in expanded efficiency in the residential, small business, municipal, and commercial demand reduction work, this proposal seeks to create shovel ready solutions and a fast track to green jobs and energy careers. We seek to ensure a just and equitable plan that will focus on engaging communities of color, and other underrepresented populations.

Many job seekers are unaware of the growing energy efficiency and clean energy career industries. While others lack the proper skill sets needed to apply for the local and growing energy efficiency roles in our great state. This has been a long standing problem which is compounded by the need to expand efficiency and renewable resources

to draw down energy demands and meet our energy needs with additional renewable resources and expanded energy efficiency.

To be successful DEEP, the DOL, local WIBs, contractors, and utilities should be involved in our state's energy efficiency and clean energy economic development and workforce training plans. These are real jobs that employ local people in our state, and have continued to strengthen our economy and our energy grid.

Proposed solution: Short term:

Create a fast track (Boot camp style training) that provides immersion in critical workforce skills which would prepare local residents to work in the energy efficiency sectors, and connects trainees to OJT hands on experience at a local contractor. This project would connect incoming applicants with the required certifications such as: BPI, DOE, Lead RRP, and Healthy Homes, as well as core soft skills required for any customer service career. Programs should directly connect the trainees to Connecticut jobs and track the entire process to demonstrate success and track any attrition. Core skills would also include an overview of the Connecticut energy programs, roles in these programs, how to prepare for the roles, overview and preparation for certificate training, interview practice, field training, and job placement for those who complete the courses. These programs would leverage workforce funds, WIOA, and OJT funds. If the programs include a pre apprenticeship or apprenticeship pathway we can further connect to national funding opportunities. It is critical to ensure training covers basic soft skills, and the basics of energy efficiency and building science, as well as hands-on tool instruction.

Notes from Connecticut Technical Contractors (employer notes):

- These careers should be marketed on facebook and other social media platforms to inform the general population of these extensive career opportunities in a growing industry.
- Videos showing the types of roles, and noting pay scales and where to apply should be created as quickly as possible.
- It is critical that we begin to connect with younger students as young as Pre-k to build the science foundations which will make these careers accessible to historically underrepresented populations such as communities of color and low income communities.
- We should be working with highschools, and engaging youth who want a hands on career, which does NOT require a college degree, but is both challenging and rewarding
- These career paths literally open doors to careers which provide opportunities for continued development and even entrepreneurship opportunities.
- To help remove barriers to moving incumbent staff into higher level jobs, staffing requirements for lead technicians (crew chiefs) OJT hours should be lowered and allow for a shorter time period of OJT training under a lead technician. We suggest that after 6 months of training entry level techs should be sent for BPI certification to solidify their OJT training and begin to obtain certifications. This will create a fast

track path to leadership roles for staff who are eager to learn and grow beyond entry level roles.

- Small businesses/ small contractors need support on the cost of obtaining certifications and providing on the job training. These programs should be aligned with OJT and WIB funding for cost share on the first 6 months of employment while staff are training.

Diversity, Inclusion, Equity

Communities of color are under-represented in these careers. Reports indicate the root cause of this comes from lack of access to critical science based developmental skills in public schools. Schools with more than 50% minority students spend 5k-7k less per student, which leads to a lack of hands-on science opportunities and a lack of focus on science topics. These missing lessons include but are not limited to: where energy comes from, how electricity is generated and transmitted, as well as climate change and environmental justice education. Additionally, these communities have less access to information on energy careers leading to a national lack of representation in these roles. The longstanding lack of access to science in urban schools, and schools with more than 50% minority student population must be addressed by the state to create a path to equity and opportunity for these youth and their respective communities. Science is a key skill which opens doors to careers with higher annual earnings. If we do not take the time to provide equal access to the basic information on energy and climate, we will not create an equitable path forward. This proposal seeks to lift communities of color through supportive education and workforce development supports that lead to careers in energy efficiency and clean energy jobs.

If our state and our nation desires to be inclusive then the state must make space at the table for communities of color to participate meaningfully in planning, budgeting, and developing our collective path forward. Without access to information and education we can not engage meaningfully and are thus excluded from these critical steps. This inclusion and education needs to begin at the public school pre-K level and build on these skills until graduation.

Suggested Planning participants:
Leticia Colon de Mejias, CT CWCESO, Chair of Latino Affairs, Board member of state of CT MIB, BPA Policy co-chair,
Rep Robyn Porter - Chair Workforce Development
Ron Aurjuio Eversource, and Ruth Georges, **ruth.georges@eversource.com**
Lawerence Rush, Avangrid, and Sheri Borelli
Alex Johnson, James Boucher, Yolanda Rivera, Capital Workforce Partners, CWP
jboucher@capitalworkforce.org
Kellia Marie Vallerie "Vallieres, Kelli-Marie" Kelli-Marie.Vallieres@ct.gov
Don Venditto "Venditto, Don" don.venditto@ct.gov
Rep Robyn Porter Robyn.Porter@cga.ct.gov
Senator Doug McCroy MIB chair Minority Initiate board state of CT
David Lehman DECD David.Lehman@ct.gov

Senator Kushner
Julio Mendoza SAMA
NAACP - need a contact
Urban League - Need a contact

Additional information on the value and importance of Energy Efficiency to Connecticut's Economic Growth:

https://efficiencyforall.org/wordpress/wp-content/uploads/2017/04/Energy-Efficiency-Economy.pdf

https://efficiencyforall.org/wordpress/wp-content/uploads/2017/04/EE-2_13-Slides-2.pdf

https://efficiencyforall.org/wordpress/wp-content/uploads/2017/04/Diversion-Impacts-2018.pdf

https://efficiencyforall.org/wordpress/wp-content/uploads/2017/03/Efficiency-First.pdf

2017 Workforce study in CT

Why EE is important to Equity:

https://efficiencyforall.org/wordpress/2019/01/23/home-energy-affordability-in-connecticut-the-affordability-gap-2017/

https://efficiencyforall.org/wordpress/2020/02/25/governors-council-on-climate-change-gc3-equity-lens/

https://efficiencyforall.org/wordpress/2020/04/30/a-goal-is-just-a-wish-without-a-plan/

https://efficiencyforall.org/wordpress/2020/04/07/an-affordable-way-forward-energy-efficiency/

CT EE Success Stories: How our work impacts People, Places, the Planet, and our Economic stability in CT.

https://efficiencyforall.org/wordpress/wp-content/uploads/2017/04/88-Oak-Street.pdf

https://efficiencyforall.org/wordpress/wp-content/uploads/2017/04/Uconn-2.pdf

http://eesgogreen.com/working-mom-to-save-energy-and-health/

http://eesgogreen.com/customer-feels-the-savings/

http://eesgogreen.com/140-units-get-energy-upgrades/

http://eesgogreen.com/had-a-great-experience-with-this-company/

https://efficiencyforall.org/wordpress/2020/04/30/a-goal-is-just-a-wish-without-a-plan/

https://efficiencyforall.org/wordpress/2020/11/22/addressing-health-safety-barriers-in-ct/

RE: Support for Bill SB 356

EFFICIENCY FOR ALL

March 3, 2021

On behalf of Efficiency For All, we write today to express our strong support for SB-356 An Act Establishing An Energy Efficiency Retrofit Grant Program for Affordable Housing.

Efficiency For All is a local nonprofit working to lift communities through the expansion of energy efficiency and clean energy expansion. Energy Saved is the Cleanest Energy of All Energy and should be viewed as a low cost/high return option to reducing the strain on our energy grid while lowering carbon emissions, and reducing air and water pollution. Additionally the energy efficiency programs help to educate residents across the State of Connecticut on the importance of saving energy to meet our State's goals. This information is provided as a broad overview of the importance of Energy Efficiency as a first step in any energy plan. Residential and commercial building energy efficiency is the critical first step to any energy plan which intends to battle climate change and its negative and far reaching environmental and health impacts.

Our work is created by a diverse minority staff and is distributed for use by key stakeholders and decision makers. The intent is to provide current studies and data to EE program administration, board members, and legislators with the intent that they may better comprehend the importance of assessing a residence through the use of proven building-science based BPI assessments prior to installing any upgrades or providing any state-subsidized financing tools.

As we move forward to progressing the EE/Building Science industry and many professional EE services State-wide, we intend to keep our focus on providing National data and reports to support the broad education of our goal to educate and protect the best interest of the ratepayers and residents of this State. Our contractor base has continued to raise the bar on the level of training required to assess and install direct upgrades and weatherization such as insulation, lighting retrofits, HVAC, windows, and renewable energy in homes across CT.

Improving the energy efficiency of Connecticut's housing stock is critical for meeting the State's greenhouse gas emission reduction goals and to create a healthier more resilient Connecticut. We believe that the massive investment required to address the climate crisis should first benefit the most vulnerable, and this legislation squarely addresses equity and environmental justice.

Connecticut has one of the highest rates of energy poverty in the nation with those at or below the poverty line paying up to 25% of their income on energy bills. Data from the DOE Office of Energy Efficiency and Renewable Energy.[1]

This bill also addresses a critically unmet need. Connecticut's LMI housing stock includes older, inefficient housing stock, and in LMI communities over 30% of the housing has one or more barriers to efficiency and clean energy access. These barriers literally cut LMI households off from lowering energy burdens or accessing Green Bank and EnergizeCT programs which they support through payments on their energy bills. Through unintentional but consistent exclusion of support for LMI housing upgrades, these LMI communities have consistently been left behind.[2]

[1] 2019, 6 Maps That Show How Bad Energy Poverty Is and Reveal 2 Ways to Make it Better, Union of Concerned Scientists [2] 2020, Addressing Health & Safety Barriers in CT, Energy Efficiency for All

We have the following recommendations to make the bill stronger and more effective:

1. Please consider having DEEP and DSS work together to implement and administer this program. 2. Align the income eligibility with the state's low- and moderate-income (LMI) guidelines. Breaking long standing silos will help this work progress in the most effective and efficient way.

3Coordinate with existing state programs such as The Connecticut Weatherization Assistance Program (WAP) and the Energize CT Home Energy Solutions- Income Eligible (HES-IE) Program.

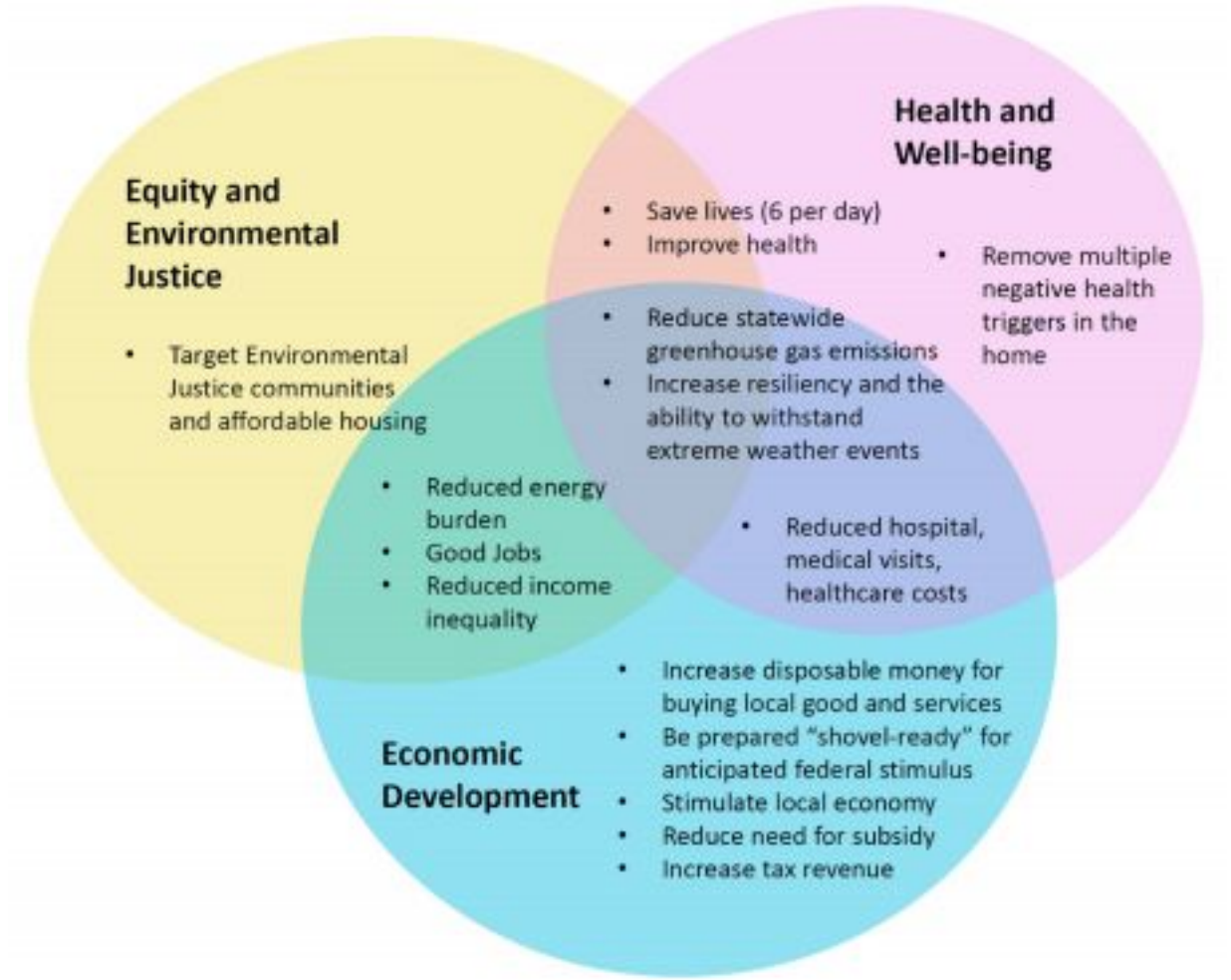
4. Find ways to apply federal funds from the Weatherization Assistance Program and LIHEAP toward addressing health and safety barriers to weatherization.

5. Implement a process for commissioning and verification of the quality of the energy efficiency work before full award of the grant.

6. Coordinate across state agencies and with neighboring states. For instance NYSERDA (New York State Energy Research and Development Authority) is willing to collaborate with CT on a program they have called RetrofitNY which can help implement these energy efficient retrofits cost effectively at scale.

MULTI-SECTOR BENEFITS

Energy efficiency has health, equity, and economic benefits that benefit all State residents. Below are some of the benefits that are possible with greater levels of energy efficiency.



REDUCE STATEWIDE GREENHOUSE GAS EMISSIONS
CT has committed to a 45% reduction in greenhouse gas emissions by 2030 and an 80% reduction by 2050. In order to achieve these goals, our existing housing stock needs to be transformed to be more energy efficient, and energy efficiency is the lowest cost energy resource.[3]

TARGET ENVIRONMENTAL JUSTICE COMMUNITIES AND AFFORDABLE HOUSING This bill focuses our state's efforts of reducing greenhouse gases to those that have most suffered the negative effects of environmental degradation.

INCREASE RESILIENCY AND THE ABILITY TO WITHSTAND EXTREME WEATHER EVENTS The increased thermal comfort associated with a weatherized building envelope allows residents to shelter in place in extreme hot and cold
temperatures even during power outages.

REMOVE MULTIPLE NEGATIVE HEALTH TRIGGERS IN THE HOME
Up to 30% of LMI homes in Connecticut have one or more safety concerns, which are barriers to full weatherization and lowered energy bills.

SAVE LIVES (6 PER DAY)
Reducing fossil fuel powered electricity by 15% nationally would save more than six lives every day.[4]

IMPROVE HEALTH
Energy efficiency prevents the 4 largest

health killers by reducing air pollution: cancer, chronic lower respiratory diseases, heart disease, and stroke. It is estimated that 40% of diagnosed asthma is associated with home exposures.[2]

REDUCED HOSPITAL, MEDICAL VISITS, HEALTHCARE COSTS

For example, in Hartford, a 15% reduction in energy use could reduce health impacts by $73 per capita annually.[2]

[3] 2020 Energy Efficiency Board 2020 Programs and Operations Report, Energize CT

[4] 2018 Saving Energy, Saving Lives, American Council for an Energy-Efficient Economy

[5] 2020, Global Status Report for Buildings and Construction, Global Alliance for Buildings and Construction.

REDUCED ENERGY BURDENS

300,000 households in CT cannot afford their energy. At-risk populations spend up to 25% of their income on energy costs.

INCREASE DISPOSABLE MONEY FOR BUYING LOCAL GOODS AND SERVICES

Reducing energy costs allows for spending on critical items like food, medicine, and education.

GOOD JOBS

In 2016, energy efficiency programs supported 34,000 clean energy jobs in Connecticut. Investments in the energy efficiency workforce bring the highest return on investment of any green job - $1M = 18 job years.[5]

INCREASE TAX REVENUE AND REDUCE SUBSIDY NEEDS

Good green jobs will increase the state's income tax revenue while reducing the need for subsidies for unemployment and energy assistance. Investing in energy efficiency will pay dividends for years to come.

REDUCED INCOME INEQUALITY

Connecticut has one of the highest rates of income inequality in the nation, which leads to many factors such as social unrest, volatility, lower health levels, lower education attainment, and reduced economic growth. Reducing income inequality can increase the quality of life for all in our state.[6]

BE PREPARED "SHOVEL READY" FOR ANTICIPATED FEDERAL STIMULUS

States should be preparing for the upcoming stimulus package by identifying opportunities to increase resilience, efficiency, and invest to realize long term savings on utility bills.[7]

STIMULATE THE LOCAL ECONOMY

Increased spending on retrofits, good jobs, energy savings, and better health outcomes causing reduced absenteeism all have the benefit of improving the local economy.

[6] 2015, "How does income inequality affect our lives?", in Income Inequality: The Gap between Rich and Poor, OECD Publishing [7] 2021, COVID-19 Recovery: Ensuring States are 'Ready to Go', US Green

Each day that passes without addressing the need to close the gaps, literally and figuratively, are days we cannot relive or reclaim. Therefore, the time for action is now. It is time to plan and budget for these basic necessities. A decent place to live is key to any family's stability and prosperity, yet many Connecticut LMI communities do not have the dignity of living in a healthy, efficient home or apartment.

It is worth noting that ***Connecticut Renews*** is a part of a regional effort, and the Massachusetts Renews coalition is also working on a comprehensive housing retrofit bill in the Massachusetts legislature. Their bill aims to retrofit 1 million homes within 10 years. Connecticut should also be a leader in the work to improve energy efficiency, reduce energy costs, and create good, local jobs by investing in retrofits in low-income communities.

Given the benefits of the legislation, we urge swift action in support of SB-356 An Act Establishing An Energy Efficiency Retrofit Grant Program for Affordable Housing.

Sincerely,
Leticia Colon de Mejias

Efficiency for All Policy Co-chair
Advocacy Committee
www.efficiencyforall.org

Efficiency is Efficient

An Equitable Path Forward to 100% Clean Energy Economy

The Unsung Story of a Champion

V. 4.7.2020 .L. Colon de Mejias .Solve Climate by 2030 http://www.solveclimateby2030.org/

The Spin on Energy……

Many of us are focused on “Climate talk”, “Carbon Talk”, “Clean Energy”, “Green Energy” , EV policy, EV infrastructure build outs, Wind, Solar, Geothermal, Transportation, workforce, Ratepayer Funds, Green Bank Finance Programs, Outreach needs, highest carbon emitters, where to start, who should pay for all of what we want as goals, who should be allowed to use incentives, who can’t use the incentives and programs, what they can be used for, cost effective testing, what is the best plan to lower carbon, protect health, mitigate climate change, grow our economy, lower energy burdens, close affordability gaps, protect people, water and air, educate people, ensure Equity for all. **What steps do we need to take to lay the foundation for our success. Because without a plan a goal is just a wish…..**

Whether or not you believe humans are the cause of climate change will not matter to our common goals on reducing energy waste, lowering energy costs, and creating a stable sustainable energy future.

We likely agree that **pollution is bad.** We likely think **wasting any resource is not the best approach for people or the economy.**

Most of us agree that creating jobs, enhancing economic growth, lowering energy prices, lowering pollution, closing affordability gaps, supporting positive health outcomes, and increasing equity are GOOD choices.

Conservation is a conservative approach to being efficient with our resources. Energy Efficiency results in doing MORE with LESS…….

Today we use more energy than ever before!

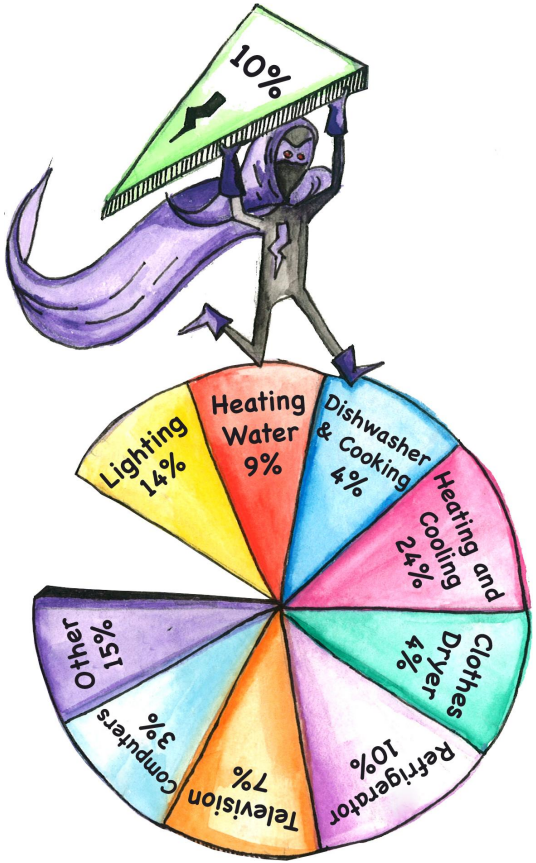
Problem:

From morning till night, and even while we sleep, our human demand for energy is ever increasing.

As a society we have never been this connected or dependant on electronics for our daily needs.

We have never had to make changes as rapidly as we need to make them now.

Today we use more energy than ever before!



Credit Defeating the Phantom Draw www.greenecowarriors.org

But…Where Does our Electricity Come From?

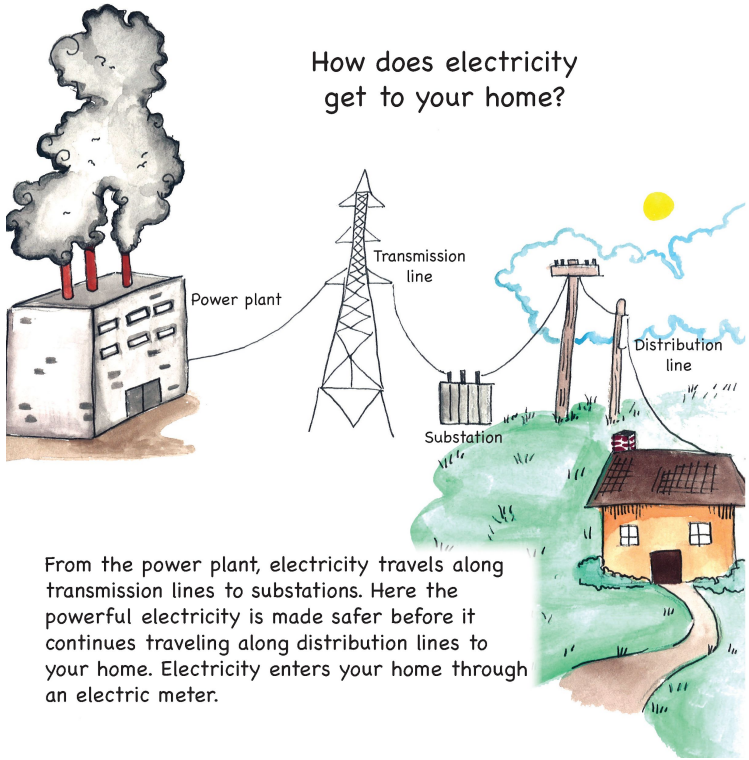
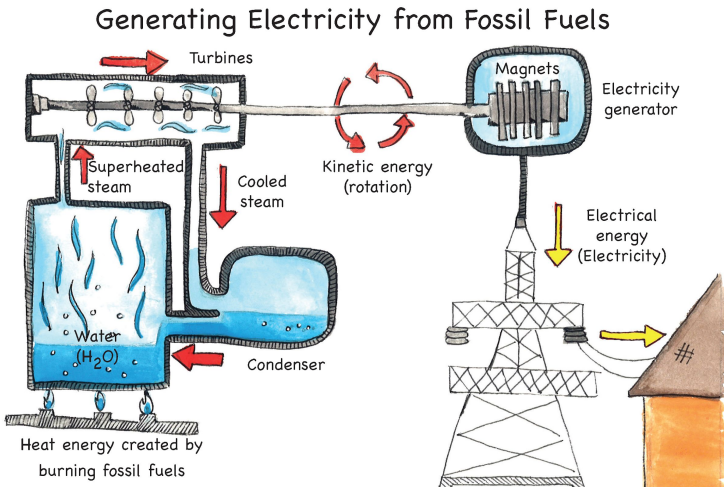


Image: Dinero Defeats the Phantom Draw https://www.gewportal.org/store/

- Unless you work in the energy You probably are not thinking about where your electricity comes from or how it got to your home or business.
- **Very little has changed in the world of electric generation.**
- <u>We keep creating new ways to use energy but spend very little time thinking about where the energy will come from or how it will impact us.</u>

But…Where Does our Electricity Come From?



Fossil fuels must travel far on boats, trains and trucks to get to power plants. Fossil fuels are burned to heat tanks of water (H_2O). The hot water turns to steam, spinning a turbine attached to a generator. Coils of metal wire are wrapped around the generator's powerful magnets. As the magnets spin around the wire, the metal's electrons jump from atom to atom. This movement of electrons is called electricity.

Image: Dinero Defeats the Phantom Draw https://www.gewportal.org/store/

- Unless you work in the energy You probably are not thinking about where your electricity comes from or how it got to your home or business.
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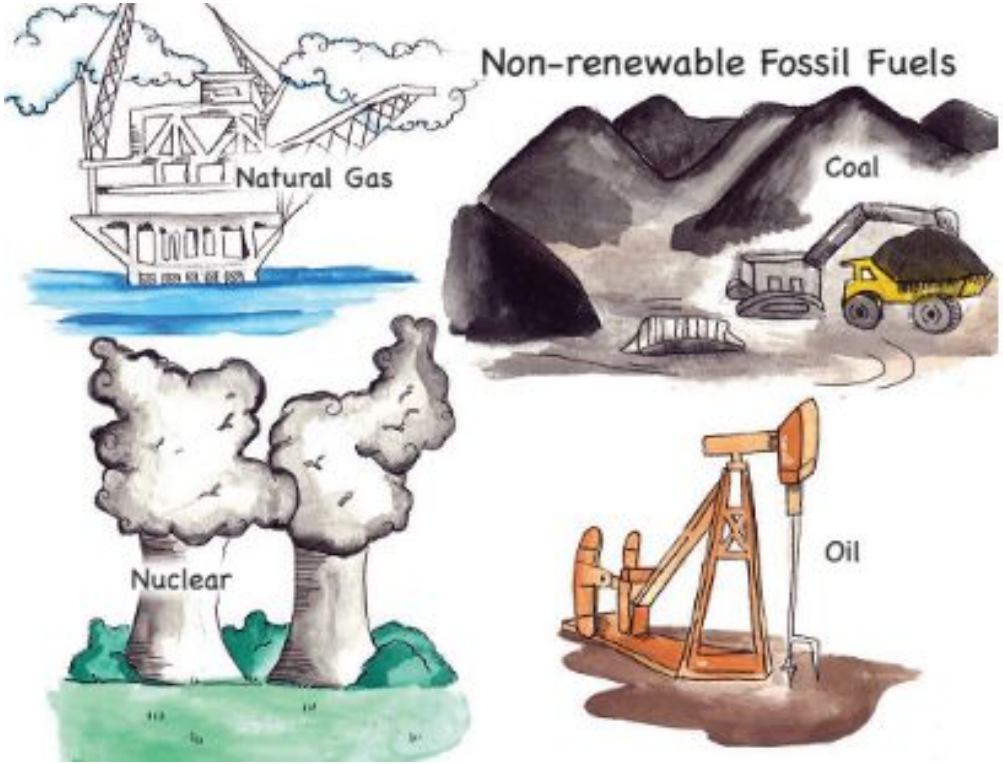
95% of Connecticut's electricity is Non-renewable



- **ONLY 5% of CT electric generation energy was Renewable in 2017**
- **Nuclear power 48% and Natural Gas 47% supplied the vast majority of electricity generated in Connecticut 2017.**
- Natural gas power has been on the rise accounting for nearly half of the state's electricity generation last year.
- Using less of ANY resource to do the same amount of work is a good thing…..

www.EIA.gov

https://yearbook.enerdata.net/electricity/world-electricity-production-statistics.html

World Carbon Emissions by Demand 2019

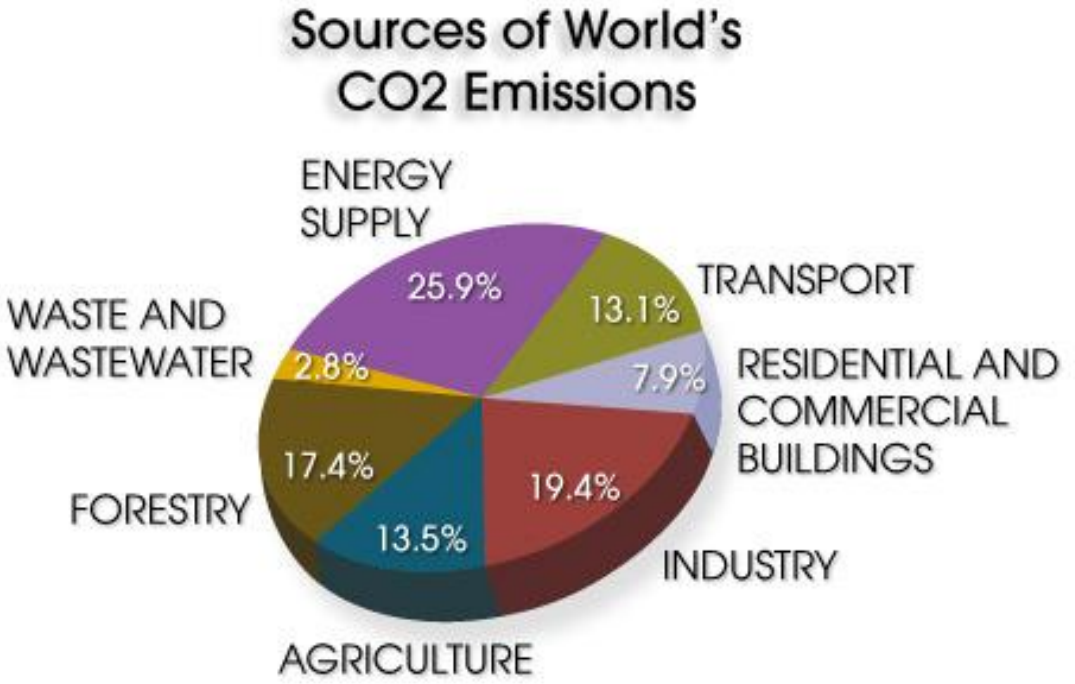
Energy Generation 25%

Buildings 7.9%

265.9+ 7.9 =

34 %

Buildings & Electricity



https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data

Global Power Consumption Accelerated in 2018 (+3.5%)

Electricity consumption in the United States, which dipped by 1% in 2017, recovered in 2018 (+2.2%).

Most of this U.S. increase came from the residential sector (+6.2%), mainly due to an increased electricity consumption for appliances (representing around half of the electricity consumption) and air-conditioning (nearly 90% of US homes use centralised or house individual air conditioners).

Economic growth and industrial demand also raised power consumption in Canada, Brazil and in Russia. It also increased in Africa, especially in Egypt, and in the Middle East, spurred by Iran.

As in 2017, electricity consumption remained stable in Europe in 2018: it declined in France and Germany, stagnated in other large countries (UK, Italy, Spain) and it increased in the Netherlands, Poland and Turkey.

72%

Contribution BRICS to the global increase in power consumption between 2010 and 2018. BRICS is the acronym coined for an association of five major emerging national economies: Brazil, Russia, India, China and South Africa. Originally the first four were grouped as "BRIC" (or "the BRICs"), before the induction of South Africa in 2010.

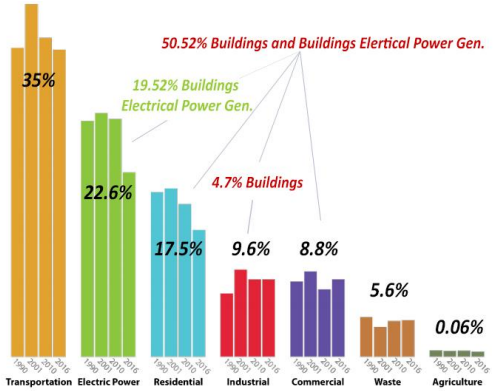
https://yearbook.enerdata.net/co2-fuel-combustion/CO2-emissions-data-from-fuel-combustion.html

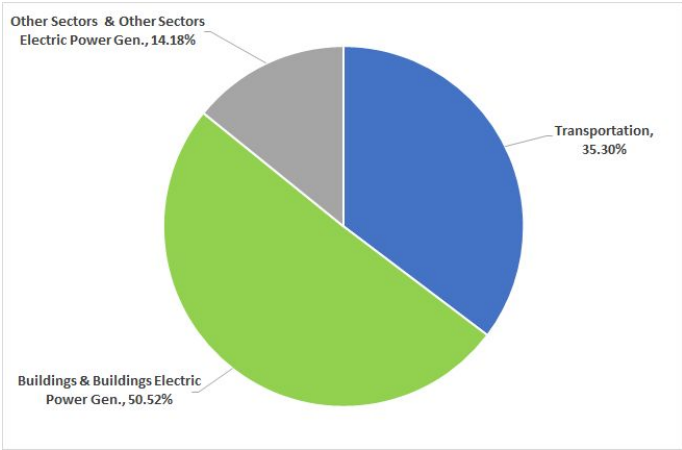
What is Demanding the Energy?

Humans- Energy demands are connected to everything we do: working, smartphones, TV, food safety, cooking, washing, showers, heating, cooling, driving,

Buildings and the energy we demand in them represent a collectively one of the largest sources of carbon emissions.

Like Air, we don't often think about electricity or heat until they are not available.





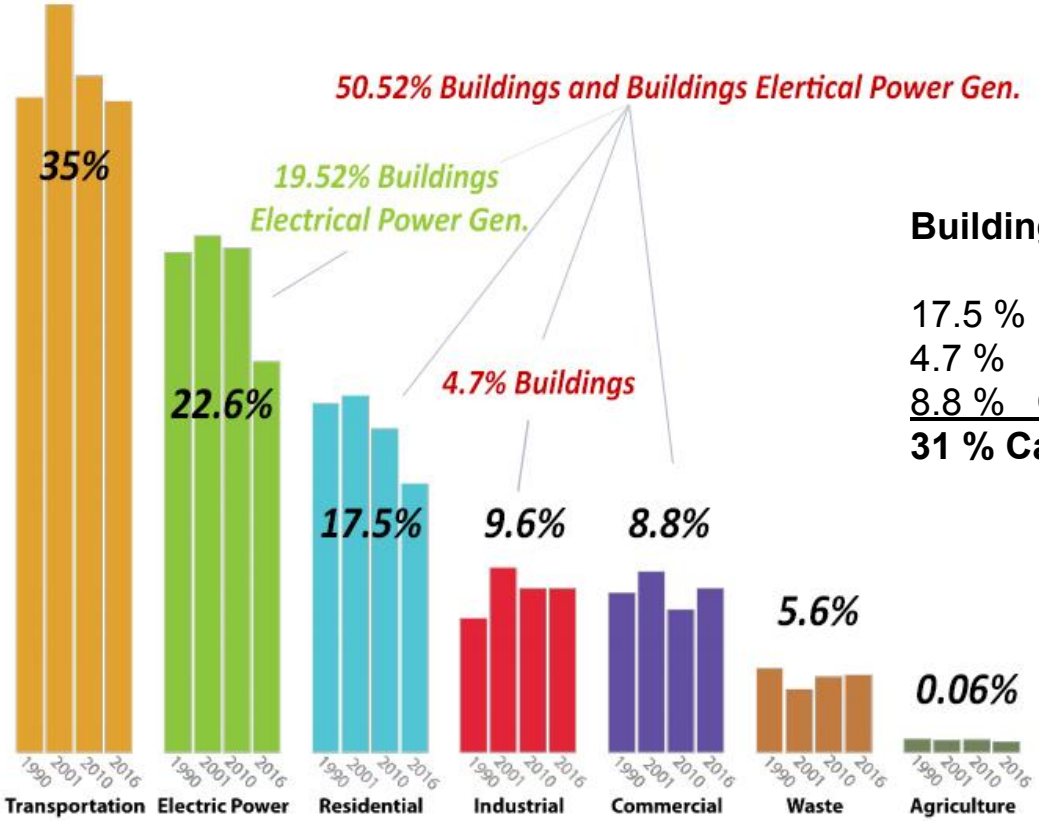
2014 CT data CT DEEP.gov
GHG GC3 report - CT DEEP

Local Carbon Emissions by Sector - Historical

CT GC3 findings

Bar graph of Carbon Emissions

With labels and percents on the bar graph



Buildings & Carbon

17.5 % Residential
4.7 % Industrial
8.8 % Commercial
31 % Carbon from Buildings

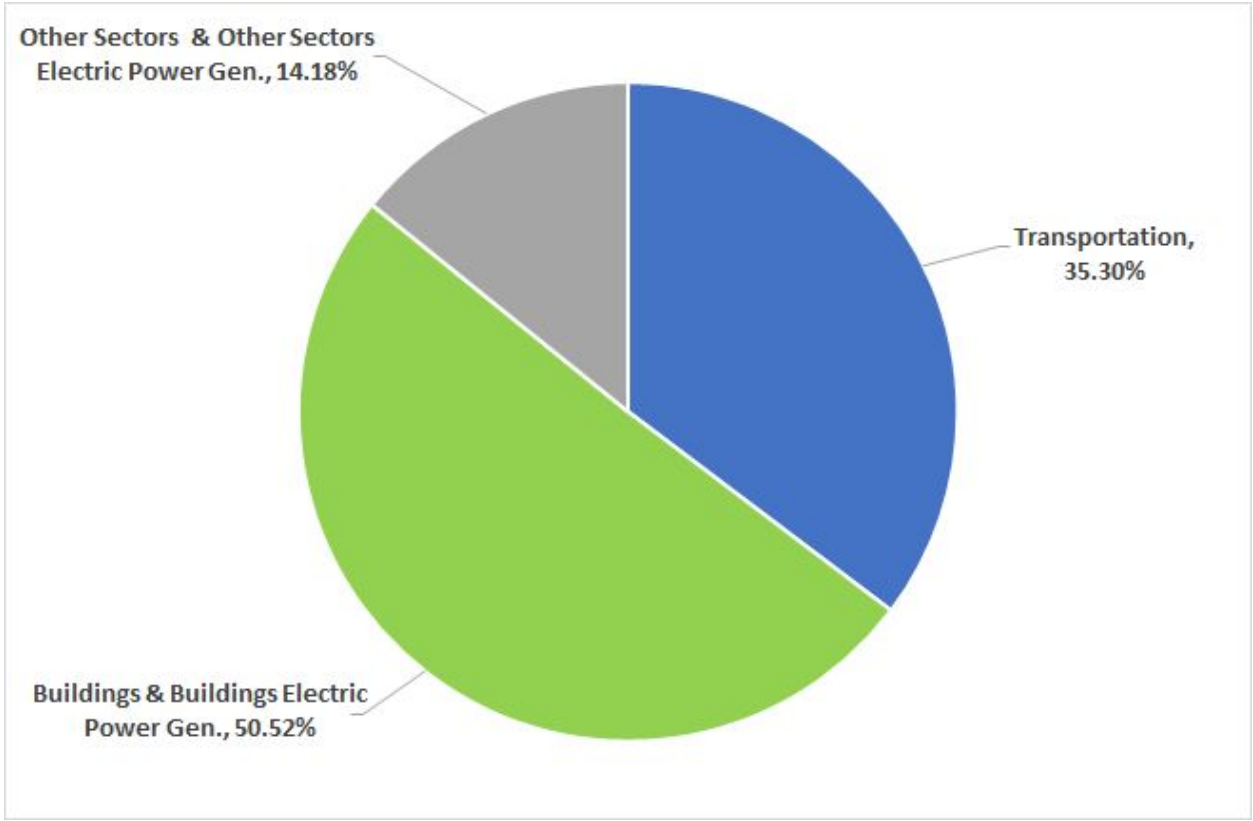
Source : https://www.ct.gov/deep/lib/deep/climatechange/publications/building_a_low_carbon_future_for_ct_gc3_recommendations.pdf

CT Carbon Emissions by Sector 2014 - Summary

Nonrenewable Energy Consumption = Carbon Emissions

Electricity that is generated with nonrenewable resources creates carbon emissions

95% of Electricity is generated with nonrenewable energy



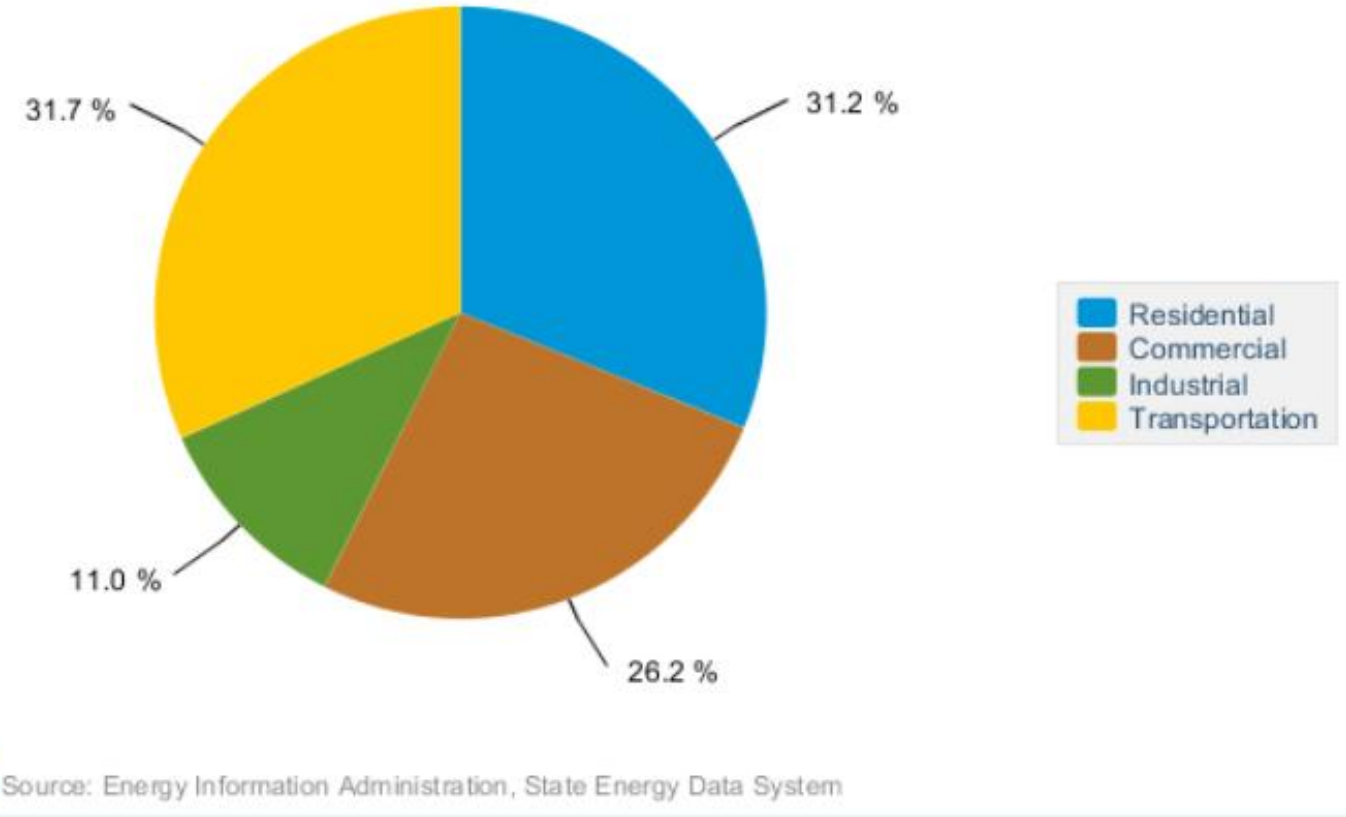
Source : https://www.ct.gov/deep/lib/deep/climatechange/publications/building_a_low_carbon_future_for_ct_gc3_recommendations.pdf https://www.eia.gov/state/?sid=CT#tabs-2

Connecticut Energy Consumption by End-Use Sector, 2016

Less Energy Waste =

Less Carbon Emissions =

Less Energy Waste Closes the Gap that we need to ramp up to 100% clean energy

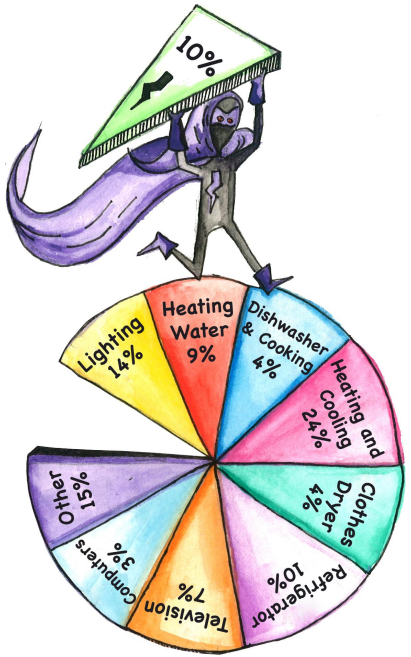


What does this mean to solving Climate Change

Buildings and Transportation use energy and emit harmful pollution and carbon.

Electricity generation results in emissions at the site of the energy production, and through combustion processes, and we also have losses in transmission processes.

Many buildings and homes are old and inefficient. It is time to address the root issues that are causing the waste of energy and wasting our resources while they are polluting.



Plans to lower carbon emissions ....

- **Goals** need **Plans** that **work implement specific steps to reach the goals.**
- **Policies & Laws** are directed by leaders such as governors and legislators. Policy is voted into law and guides our plans, directs funding collection and distribution of resources, and distribution of these resources to support the Plans.
- It is a benefit to all of us if the plans work together to meet both energy and carbon goals.
- We should diversify the parties writing and implementing the plans to ensure an equity lens and start with options that help the most people.

Learn more at https://efficiencyforall.org/wordpress/wp-content/uploads/2017/04/EE-2_13-Slides-2.pdf

Equity in Planning or Lack of Equity

There is a clear need to continue to view issues through the Equity Lens.

- **Energy is connected to EVERYTHING.** It impacts our quality of life, ability to work, be warm, have access to information, use our phones, cook food at home, keep food cold and safe, use medical equipment.

- **Some people have problems related to energy affordability, housing, and even, our health outcomes are impacted by our collective energy choices.**

The Energy **Affordability Gap will also continue to impact energy choices.**

*Please see OCC and Operation Fuel reports

Increase Energy Savings to lower Carbon Emissions

Reduced energy waste outcomes help close the affordability gap, while protecting the planet and people by lowering pollution and waste.

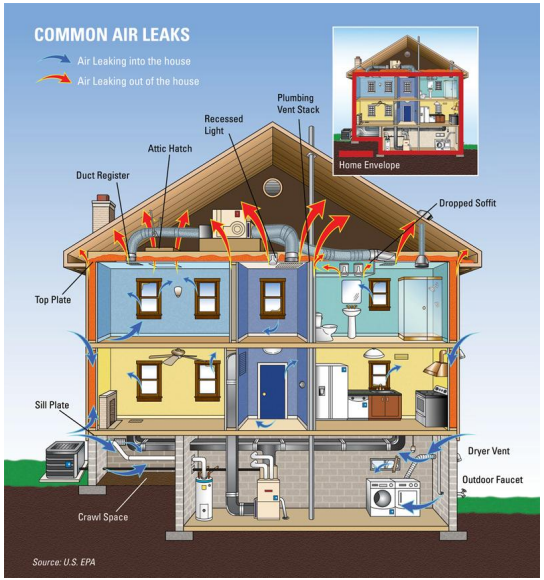
Expanded building efficiency such as: Air sealing, insulation, window upgrades, improved HVAC controls will address thermal boundary and heat loss issues.

Our energy costs are dependant on supply and demand. Lowered waste = Lowered cost per KWH.

https://efficiencyforall.org/wordpress/wp-content/uploads/2017/04/EE-2_13-Slides-2.pdf

Climate Change impacts Heating/Cooling demands

Thermal Improvements Lower Heating & Cooling Demand



Thermal improvements in Buildings can lower energy waste by 30%

Carbon emissions from this sector arise from on-site burning of fuels for heat in buildings, hot water, or cooking in homes.

(Note: Emissions from electricity use in buildings are excluded and are instead covered in the Electricity and Heat Production sector)

Source: www.eia.gov

There is an answer which we Can Afford. Expand Efficiency!

Energy Efficiency is cost effective

Lowers Energy costs

Lowers Carbon Emissions

Increases positive Health outcomes

Lowers water waste

Closes the affordability Gap in multiple ways: reduces Peak Demand and onsite costs of energy

Heating & Cooling Loads - Yes Efficiency can help!

Heating and cooling buildings are a source of energy demand, thus air pollution, and carbon emissions. We have both a high winter heating demand, and a high summer cooling demand. **High use times are called Peak Demand.** Seasonal daylight hours and the need for increased indoor activities correlate with heating demands summer and winter exacerbate our state's energy capacity problems.

Almost half of CT's Electric Generation comes from Natural Gas. Expanded Natural Gas heating infrastructure, has created a LNG supply concern in our region. (ISO_NE 2017)

Building Performance and Conservation Load Management programs - Include Thermal Improvements, and lighting upgrades, and lower our demand for heating, cooling, electricity, and water. Efficiency helps most during Peak Demand when we need the help.

Pg 46 of the CT CES http://www.ct.gov/deep/lib/deep/energy/ces/2018_comprehensive_energy_strategy.pdf

Why Expand EE & Building Performance programs

Efficiency programs have been working so well that we did not notice them.

Like our parents who get up early and stay up late.. **Efficiency programs, and the people who work in them, are the unsung Champions of Clean Energy Progress.**

The Economic, Energy, and Health Impacts of Energy Efficiency Programs are well documented and excellent.

www.efficiencyforall.org

Efficiency benefits to Connecticut - One Year Stats

GSP $1.4B

Gross State Product Increase

2016 Energy efficiency programs brought $1.4 billion to Connecticut's economy

NET TAX BENEFIT $140M

Tax Revenue Increase

Estimated Net Tax Revenue increase of $140 million

LIFETIME SAVINGS $962M

Lifetime Energy Savings

Ratepayers will save $962 million over the lifetime of energy efficiency measures installed in 2016

ENERGY JOBS 34,000

Energy Efficiency Workforce

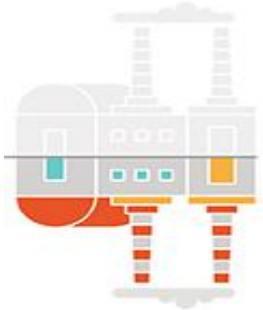
Connecticut's clean energy workforce is 34,000 strong, local, good-paying jobs.

BETTER HEALTH $814M

Avoided Health Costs

A 2008-2014 RGGI program study found that RGGI decreased healthcare related costs by $5.7 billion

https://www.ct.gov/deep/lib/deep/energy/conserloadmgmt/final-2019-2021-clm-plan-11-19-18.pdf



Expanding Efficiency Makes Sense

What ratepayer funded EE has accomplished 10 Years of EE in CT

RATEPAYER SAVINGS

CARS OFF THE ROAD

1. Residential and business customers experienced a decreased energy burden, allowing them to remain competitive with $3.7Billion dollars in savings.
2. **The 11.4 million tons of reduced emissions is the equivalent of removing 2.4 million cars off the road 2.4M**
3. Decreased need for new power generation means fewer emissions, lower energy prices, and greater energy security with over **2,625 MEGAWATTS SAVED in CT**

https://www.ct.gov/deep/lib/deep/energy/conserloadmgmt/final-2019-2021-clm-plan-11-19-18.pdf

Saving Energy Saves Lives and Improves Them…

30,000
Fewer Asthma Attacks

$20 BILLION
Avoided Health Harms

6 LIVES
Saved Every Day

HARTFORD

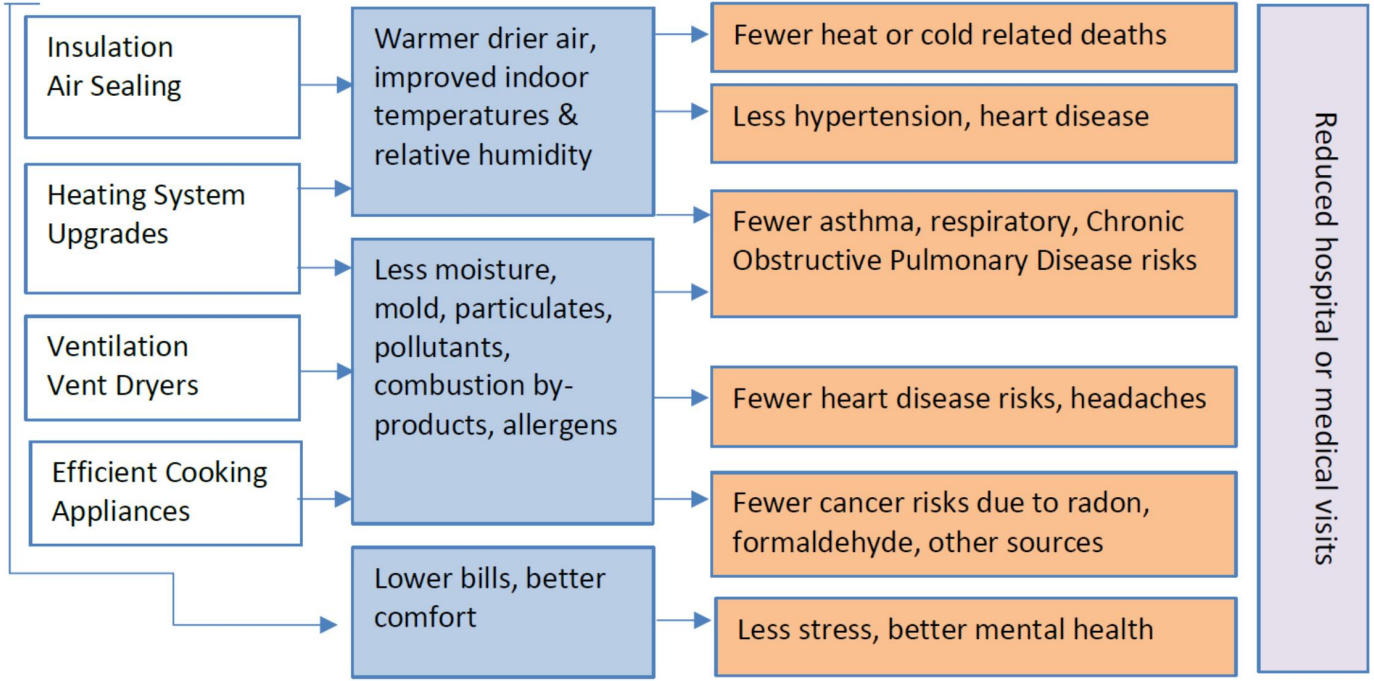
A **15% reduction** in energy use could **reduce health impacts by $73 per capita annually**

15th highest in the nation among large metro areas

Source : E4 the Future Occupant Health Benefits of EE- 2016

How does efficiency Save and Improve Lives?

Figure ES1: Occupant Health and Indoor Environmental Benefits of Residential EE



Source : E4 the Future Occupant Health Benefits of EE- 2016- ACEEE Physicians for Health

Clean Energy Policy is like making Rice and Beans

Energy Efficiency, Conservation are to Renewables as Rice is to Beans ..You can eat Rice and Beans independently from one another and they will quiet your hunger .. but...

When eaten together (efficiency and renewables) can sustain us, end our hunger for cleaner energy, and **provide both short and long term benefits to our economic and environmental systems**. Together they form part of sustainable healthy planning.

Like rice and beans Energy Plans require : planning, timing, and the right ingredients, (ingredient choices based are on accessibility, cost, taste, regional influences and **“the who is at the table” also influences the outcome.**

Listen at https://btlonline.org/energy-efficiency-critical-to-reducing-carbon-emissions-reducing-costs/

Can Rice and Beans (Energy Plans) have diversity?

Energy Conservation and Renewables are like Rice and Beans Continued..

Many regions in the world eat rice and beans as part of their cultural diets…. each region has its own flair on the dish. This is also true for regional energy plans.

Ingredients in (Rice and Beans) and in our **(Fuel mix or energy policy and plans,) are dependant on available resources and associated costs.**

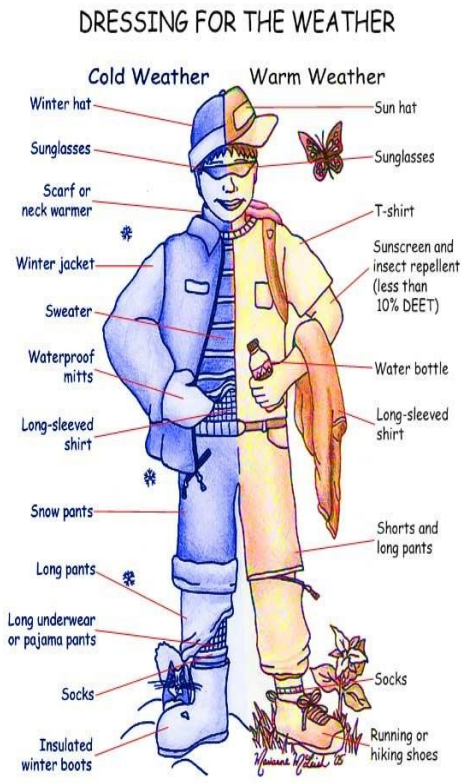
National, Regional and even local energy plans are meant to keep our energy supply stable healthy and safe.

Everything from our Belief System, knowledge base, associations, self interests, influences, and access to information or case studies, as well as our real life experiences help shape and define what we each think the energy plan should consist of.

<u>But no matter how we make the plan… We should consider equity. We must be sure that everyone has access to affordable safe energy. Energy is a necessity.</u>

Our Energy plans must be based on availability, affordability, as well as socioeconomic and health and safety concerns. Health and safety must account for Climate change Impacts and the need for people to have heat and lights at home.

Baby it's Cold outside… or Hot or Wet or Windy

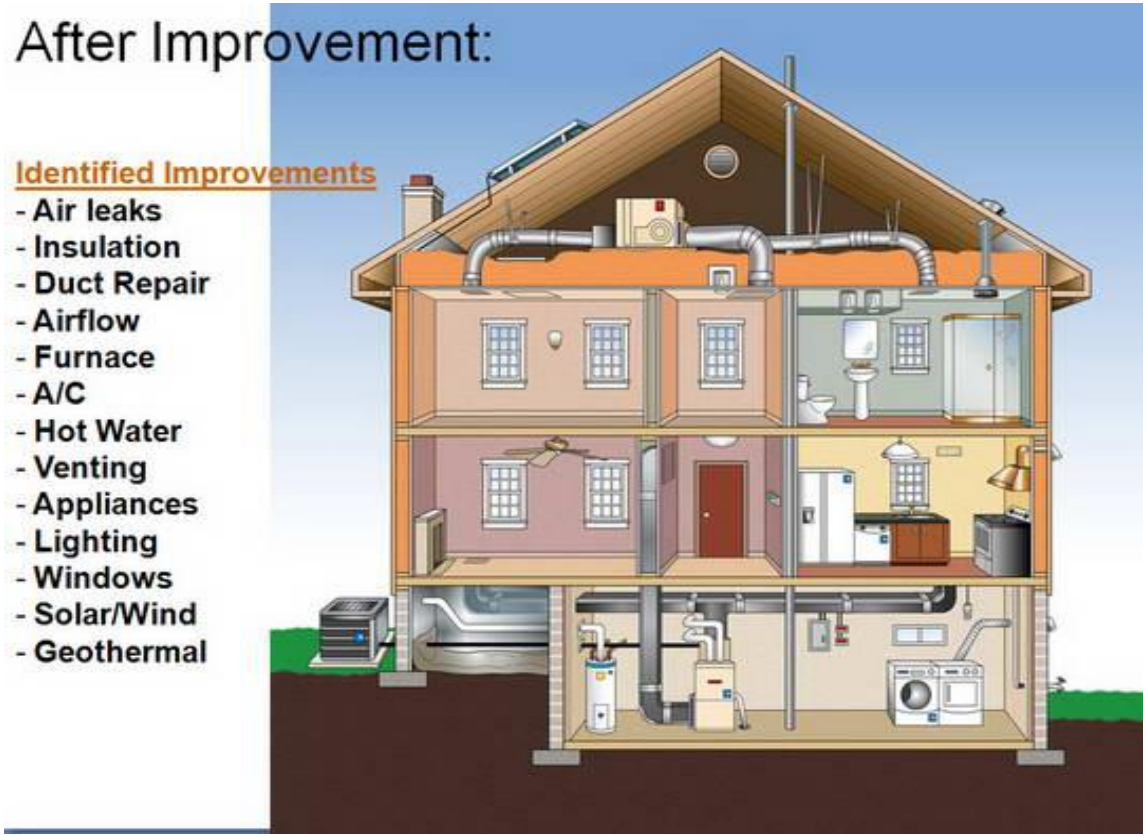


Humans require shelter and protection from the elements. No matter the weather we like to be comfortable, safe, dry, warm, and use energy to power our lives.

Similar to how we **"dress for the weather"** our buildings must be prepared for the changing weather. **Buildings are the "Shells" we live, work, play and learn in.**

Building Performance comprehensive approaches to efficiency view our Buildings as systems. Buildings breathe, use fuel and water, and require climate control. When buildings are healthy and well tuned they are safe, sustainable, climate controlled to support our housing, business and other needs.

Thermal Improvements - lower energy waste

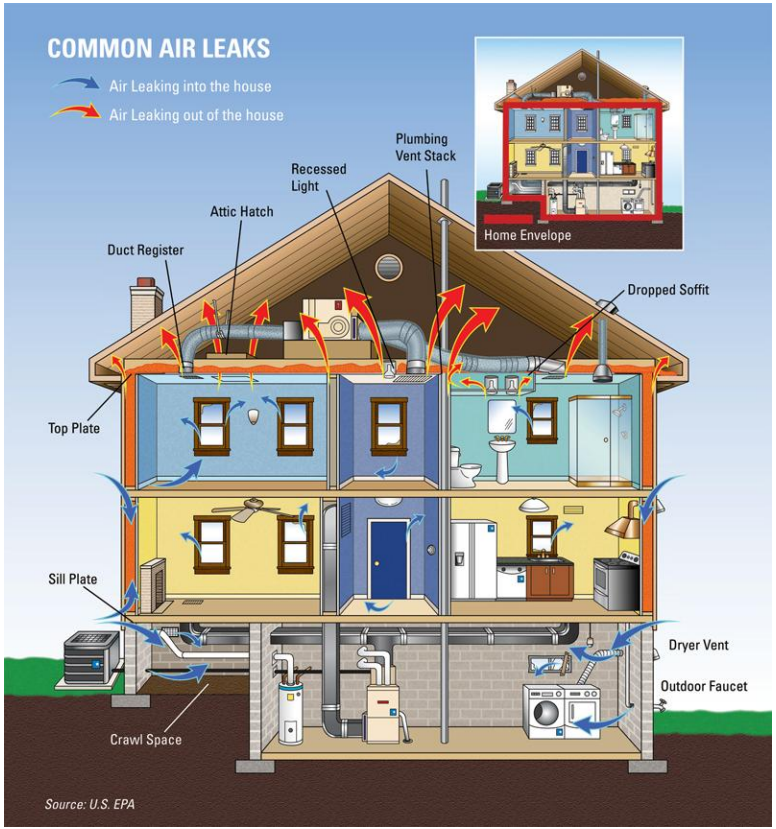


Thermal improvements are your buildings hat and boots, gloves and coat.

Insulation and air sealing lower demand for heating and cooling fuels by ensuring the building and your heating/cooling system is the right size.

Using less energy to heat and cool will lower our Peak Demand and cost of energy over all.

Heat Rises - like a balloon and we can stop that..



Building science implements tools and techniques to address health & safety, energy loss, and address the entire structure from the frost line to the ridge line.

Building science is a comprehensive approach to making buildings and homes safe, healthy, efficient, and environmentally sound.

The Loomis Chaffee School (ENERGIZECT HOME ENERGY SOLUTIONS SUCCESS STORY)

The Pilot: Prof. Dyreson's personal residence on campus, called "Mills House" was selected to serve as a pilot for energy efficiency upgrades. The students collected data from past energy use and closely monitored energy use following the phases of work completed.

After evaluating more than four years of heating oil use, before and after upgrades, the data showed that **Core Weatherization Services, Insulation, and Window replacements led to a 32% decrease in heating oil use.**

To date: 19 properties on the Loomis Chaffee campus received energy assessments, with thirteen properties receiving window and insulation upgrades, for projected savings of $21,000 annually.

For the students, it wasn't just about saving money. They learned about carbon emissions reductions, and increased home comfort through building science and conservation. The students noted outcomes included a better quality of life through more efficiency and comfortable buildings, and most importantly they noted the real-world EE experience that the project brought.

The school's next focus is a large-scale one megawatt solar installation and electrified heating and cooling.

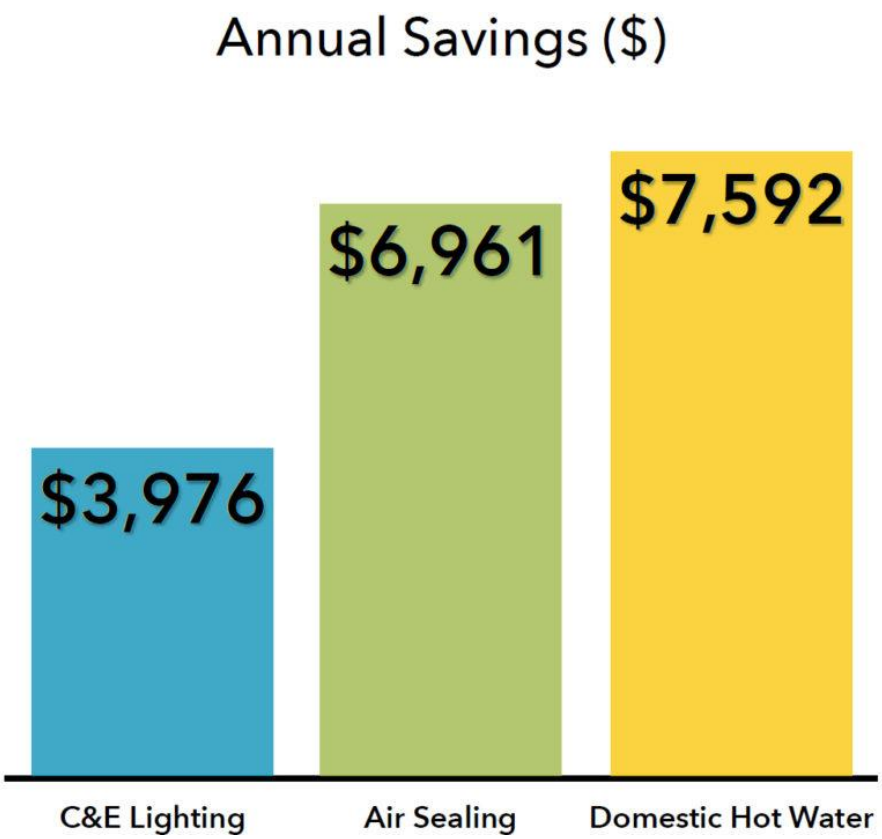
Customer Feels the Savings - Plainville, CT

"I was really surprised at the amount of work that they did in my home. They changed our lights to LEDs, they caulked and foamed, they checked my heating system, and they gave us information on more ways to save money. I decided to take their advice and get insulation, and I was so happy when I found out my copay was affordable. That was awesome because with my kids, work, and life I didn't have a lot to spend on insulation.

After they insulated my house in March of 2017 we started to notice that our heat came on less frequently, but we still felt warm. My kids' room is next to the attic, so we noticed a difference immediately.

I feel very appreciative to the program for helping us stay warmer and saving us money. People should use this program because it helps with asthma too, because it reduces air pollution. That is important to all kids and our future."

Multi-Family Success Story – Lakewood Apartments



This 250-unit apartment building in Bristol, CT received a comprehensive energy efficiency upgrade through the EnergizeCT Multifamily Initiative. The residents of Lakewood are enjoying monthly savings on their energy bills along with the cozy feeling that comes with energy efficiency.

The property is expected to yield significant lifetime savings of oil and electricity due to these upgrades, and is projected to save over $18,000 per year in energy costs.

Goals require Plans CAMBIO = CHANGE

Engage + Educate + Advocate + Collaborate
= Positive Lasting Change

- ❏ Daily Actions Influence the outcome
- ❏ Behavior Choices = Our Survival/Success
- ❏ Share Information = Motivated People Make Change
- ❏ We must increase equity and inclusion in our energy planning processes
- ❏ The problem is not too Big -Together we can!

Questions?

Creating a Culture of Sustainable Thinkers ™

Leticia Colon de Mejias is a motivational speaker and entrepreneur. Ms Colon de Mejias is the CEO and founder of the Nationally awarded company Energy Efficiencies Solutions, Chair of the nonprofit Efficiency For All, Policy Co-Chair of the National Building Performance Association, a Commissioner for the state of Connecticut Commission on Women Children Elderly Latino & Puerto Rican Affairs, and Founder and President of Green Eco Warriors, a nonprofit which works to "Create a Culture of Sustainable Thinkers". She is an awarded published children's book author with several books on environmental leadership, sustainability, as well as a line of educational science based graphic texts (comic books) which feature a cast of diverse superheroes and align with national science standards. She is the recipient of many national awards, including the **United States of America's** Department of Energy Award for work with at risk and minority populations, National Award Building Scientist Hall of Fame , Minority Small Business of the year award, National Department of Education award, and she is a two time Capital Workforce Partners Employer of the Year Award. Her companies have provided energy efficiency assessments and upgrades to over 12,000 CT households and completed full energy efficiency retrofits in over 10 million square feet of multifamily housing. Through her nonprofit Green Eco Warriors, she has provided climate and energy education to over 30,000 youth and families. She actively advocates while mentoring youth on energy plans and policy. In 2019 Leticia was called to congress to testify on an energy workforce plan THE BLUE COLLAR TO GREEN COLLAR JOBS DEVELOPMENT ACT OF 2019. Prior to working in building science, she was a manager at Hartford Healthcare and developed several nationally awarded workforce models. Her businesses are located in Connecticut.

Efficiency For All

Engage + Educate + Advocate + Collaborate + Innovate = Positive Equitable Energy Policy Outcomes

About Efficiency For All (EFA) Efficiency For All is a non-profit 501(c)(3) clean energy policy advocacy group.

Our goals are to educate the public and leaders on the importance and benefits of sound, sustainable energy policy. EFA is a stakeholder association which works to keep stakeholders informed, collect and reflect energy-related data, advocate for the stabilization and expansion of energy efficiency programs, which protect human health, support local jobs, increase positive economic outcomes, reduce long-term energy costs, and educate the public on smart energy choices. Our work supports clean energy policy, building performance, green economies, local jobs, and a healthier cleaner environment.

www.efficiencyforall.org = https://efficiencyforall.org/wordpress/2018/12/18/efficiency-is-efficient/

HOUSE SELECT COMMITTEE ON THE CLIMATE CRISIS

MEMORANDUM

April 16, 2021

To: **Members and Staff, Select Committee on the Climate Crisis**

From: **Select Committee Staff**

Re: **Hearing on "Making the Case for Climate Action: Creating New Jobs and Catalyzing Economic Growth"**

At 12:00 pm ET on Tuesday, April 20, 2021, the Select Committee on the Climate Crisis will hold a hearing titled "Making the Case for Climate Action: Creating New Jobs and Catalyzing Economic Growth." This hearing will take place remotely via Zoom video conferencing. This proceeding will be streamed live on https://climatecrisis.house.gov. This hearing will explore the ways that addressing the climate crisis can create new jobs and drive economic growth.

WITNESSES

The following witnesses have been invited to testify.

Hon. Philip N. Bredesen
Executive Chairman of the Board
Clearloop Corporation, and
Former Governor,
State of Tennessee

Leticia Colon de Mejias
Founder, Energy Efficiencies Solutions,
Policy Co-Chair, Building Performance
Association, and
President, Green Eco Warriors

Paul Lau
CEO and General Manager
Sacramento Municipal Utility District

Heather Reams
Executive Director
Citizens for Responsible Energy Solutions

BENEFITS OF CLIMATE ACTION

Increasingly, businesses, scientists, environmental groups, and environmental justice leaders are working with policymakers to analyze and maximize the economic and jobs benefits of climate action. A number of recent studies describe the economic and public health benefits of climate action. In February 2021, the National Academies of Sciences, Engineering, and Medicine concluded that reaching net-zero carbon emissions economy-wide in the United States by 2050 is

feasible, could create 2 million net new jobs, and could help position the United States well in the competitive global economy.[1] The study recommended a $2 trillion investment in infrastructure over the next decade. Similarly, a December 2020 report by Princeton University found that the United States can achieve net-zero emissions economy-wide by 2050 and create 500,000 – 1 million net new jobs by 2030 and 2-3 million net new jobs by 2050, all while spending roughly the same amount on energy as a percentage of Gross Domestic Product as we do now.[2]

Additional studies provide support for the economic benefits of more specific policies and investments to deploy clean energy, clean vehicles, and other climate solutions. For example:

- An April 2021 report by Energy Innovation and the University of California Berkeley's Grid Lab concluded it is technically feasible for all new U.S. cars and trucks sold in 2035 to be powered by electricity.[3] Doing so would save U.S. households $1,000 annually for 30 years (totaling $2.7 trillion by 2050) and would support more than 2 million net new jobs in 2035. If these vehicles were powered by a 90% clean electric grid in 2035, that would translate to significantly reduced air pollution, preventing 150,000 premature deaths and avoiding $1.3 trillion in environment and health damages through 2050.
- An April 2021 report by Evergreen Action found that a Civilian Climate Corps (CCC) could create 1.5 million jobs over the next five years restoring and planting new forests in rural and urban areas, engaging in regenerative agriculture, and restoring ecosystems and other natural spaces.[4] This new CCC initiative could also center equity, environmental justice and inclusive hiring practices.
- A March 2021 report by the Rhodium Group found that a combination of $200 billion in Federal investments (10-year extension of clean energy tax credits and incentives to maintain existing nuclear energy and accelerate retirement of coal plants operated by rural non-profit electric cooperatives) and regulation under existing law would reduce power sector emissions 76% below 2005 levels in 2031, reduce conventional air pollutants by 84% by 2026, all without increasing household energy costs.[5]
- A December 2020 study by Vibrant Clean Energy concluded that a clean electric grid maximizing local storage and solar could reduce energy costs by $88 billion and create 2 million jobs by 2050 compared to a business-as-usual scenario without new policies.[6]

[1] The National Academies of Sciences, Engineering, and Medicine, Accelerating Decarbonization of the U.S. Energy System (2021).
[2] Princeton University, Net Zero America: Potential Pathways, Infrastructure, and Impacts (2020).
[3] Grid Lab, 2035 Report 2.0: Plummeting Costs and Dramatic Improvements in Batteries Can Accelerate our Clean Transportation Future (University of California, Berkeley, 2021); Sara Baldwin et al, Accelerating Clean, Electrified Transportation by 2035: Policy Priorities (Energy Innovation, 2021).
[4] Evergreen Action, Building the Civilian Climate Corps: How New Deal Ambition Can Mobilize Workers for America's Clean Economy (2021).
[5] John Larsen et al, Pathways to Build Back Better: Investing in 100% Clean Electricity (Rhodium Group, 2021).
[6] Vibrant Clean Energy, Why Local Solar for All Costs Less: A New Roadmap for the Lowest Cost Grid (Dec. 2020).

- A July 2020 report by Rewiring America found that a national electrification strategy of transportation and buildings would create 25 million jobs by 2035 and save U.S. households $2,000 annually on energy costs.[7]
- A June 2020 report by the Goldman School of Public Policy at the University of California Berkeley concluded that strong clean energy and transmission policies can dependably deliver 90% carbon-free electricity nationwide by 2035, without increasing consumer electricity bills from today's levels.[8] The infrastructure build-out needed to achieve a 90% carbon-free grid would support approximately 530,000 jobs each year and avoid at least $1.2 trillion in cumulative health and environmental damages.[9]
- A July 2020 report from the Columbia Center on Global Energy Policy found that investing in plugging abandoned oil and gas wells could create 120,000 jobs and reduce local air pollution.[10]

U.S. Greenhouse Gas Emissions

According to the most recent EPA *Inventory of U.S. Greenhouse Gases and Sinks*, the United States emitted 6,558 million metric tons (MMT) of carbon dioxide equivalent (CO_2e) economy-wide leading to net emissions (after accounting for carbon sinks) of 5,769 MMT CO_2e in 2019, a 1.7% decline from 2018 levels.[11] The emissions decrease is due to the ongoing shift from coal to renewable energy and natural gas in the power sector and due to an overall decline in total energy use.[12] The 2019 GHG emissions levels represent a 13% decline from 2005 levels.[13] In 2019, the transportation sector remained the largest source of emissions at 29%, followed by electricity at 25%, industry at 23%, commercial and residential buildings at 13%, and agriculture at 10%.[14]

According to the Energy Information Administration (EIA), CO_2 emissions from coal are generally declining:

- Between 2007 – 2019, CO_2 emissions from coal decreased by more than 50%.[15]
- Between 2018 – 2019, they decreased by 15%.[16]
- Between 2019 – 2020, they decreased by 20%.[17]

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[7] Saul Griffith and Sam Calisch, Mobilizing for a Zero Carbon America: Jobs, Jobs, Jobs, and More Jobs (Rewiring America, 2020).
[8] University of California Berkeley, Goldman School of Public Policy, Plummeting Solar, Wind, and Battery Costs Can Accelerate our Clean Electricity Future (June 2020).
[9] Ibid.
[10] Daniel Raimi et al, Green Stimulus for Oil and Gas Workers: Considering a Major Federal Effort to Plug Orphaned and Abandoned Wells (Columbia Center on Global Energy Policy, 2020).
[11] EPA, Inventory of U.S. Greenhouse Gases and Sinks (2021).
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] U.S. Energy Information Administration, U.S. Energy-Related Carbon Dioxide Emissions, 2019 (September 2020).
[16] Ibid.
[17] U.S. Energy Information Administration, U.S. Energy-Related Carbon Dioxide Declined by 11% in 2020, Today in Energy (April 12, 2021).

In contrast, natural gas CO_2 emissions are generally increasing:

- Between 2007 – 2019, CO_2 emissions from natural gas went up by more than 35%.[18]
- Between 2018 – 2019, they increased by 3.3%.[19]
- Between 2019 – 2020, they increased by 3%.[20]

According to EIA, energy sector CO_2 emissions declined in 2020 by 11% from 2019 levels.[21] Largely because of the Covid-19 pandemic, CO_2 emissions dropped in all of the end-uses (transportation, commercial, residential, and industrial), as energy demand from these end-uses declined to 90% of 2019 levels.[22] As greater progress is made against the pandemic, EIA predicts energy demand and energy sector CO_2 emissions are likely to rise in 2021 and 2022.[23]

Despite the economic impact of the Covid-19 pandemic, global concentrations of carbon dioxide and methane increased in 2020.[24] NOAA scientists calculated the global surface average for CO_2 was 412.5 parts per million (ppm) in 2020, rising by 2.6 ppm during the year, which is the 5th largest annual increase in the 63-year record.[25] Global concentrations of methane in the atmosphere increased from 1874.6 ppb in Dec. 2019 to 1892.3 ppb in Dec. 2020,[26] which is the largest increase on record since NOAA's measurements began in 1984.

ENERGY EMPLOYMENT

In 2019, traditional energy (including fuels, power generation, transmission, distribution, and storage) and energy efficiency sectors employed about 6.8 million Americans or 4.6% of the total workforce.[27] Clean energy jobs (including energy efficiency, renewable energy, clean vehicles, energy storage, and grid modernization) accounted for nearly 3.36 million jobs, with roughly 2.38 million from energy efficiency and 523,000 from renewables.[28] The nuclear industry employed more than 70,000 workers.[29] The fossil fuel industry employed about 1.65 million Americans, roughly 636,000 in natural gas, 824,000 in oil, and 186,000 in coal.[30]

[18] U.S. Energy Information Administration, U.S. Energy-Related Carbon Dioxide Emissions, 2019 (September 2020).
[19] Ibid.
[20] U.S. Energy Information Administration, U.S. Energy-Related Carbon Dioxide Declined by 11% in 2020, Today in Energy (April 12, 2021).
[21] Ibid.
[22] U.S. Energy Information Administration, Annual Energy Outlook 2021 (February 2021).
[23] U.S. Energy Information Administration, After 2020 Decline, EIA Expects Energy-Related CO2 Emissions to Increase in 2021 and 2022, Today in Energy (January 26, 2021).
[24] CIRES, "Despite Pandemic Shutdowns, Carbon Dioxide and Methane Surged in 2020" (April 2021).
[25] Ibid.
[26] NOAA Earth System Research Laboratories, Trends in Atmospheric Methane (2021).
[27] National Association of State Energy Officials and Energy Futures Initiative, 2020 U.S. Energy and Employment Report (2020).
[28] Environmental Entrepreneurs, Clean Jobs America 2020 (2020).
[29] National Association of State Energy Officials and Energy Futures Initiative, 2020 U.S. Energy and Employment Report (2020).
[30] Ibid.

Economic Impact of the COVID-19 Pandemic

Several economic indicators have improved since the beginning of the pandemic, but they have not returned to their pre-COVID levels:

- Initial weekly unemployment insurance claims were at 744,000 in early April 2021 compared to about 200,000 weekly claims pre-COVID. Initial weekly unemployment claims peaked at 6.1 million during early April 2020.[31]
- The U.S. unemployment rate was at 6% at the end of March 2021 compared to 3.5% pre-COVID. It peaked at 14.8% in April 2020.[32] Unemployment is not evenly affecting all demographics - the unemployment rate is higher for Black and Hispanic workers.[33]
- 9.7 million Americans are unemployed as of March 2021; more than 43% have been unemployed for more than 6 months. Pre-COVID, the total number was 5.7 million.[34]
- U.S. real GDP fell more than 32% in the second quarter of 2020, rose 33.4% in the third quarter, and rose again 4.3% in the fourth quarter - it is still not at pre-COVID levels.[35]

Energy Sector Job Losses Due to the COVID-19 Pandemic

At the end of December 2020, growth in the U.S. clean energy sector was limited to 0.4% and clean energy sector employment increased by 13,300 jobs.[36] An estimated 338,500 clean energy workers remained unemployed, representing a 10% decline compared to pre-COVID-19 numbers.[37] Between March and May 2020, more than 620,000 clean energy workers, or 18.5% of the industry's workforce, filed for unemployment benefits.[38]

Currently, energy efficiency has a net loss of 238,400 jobs (10% of its workforce), renewable electricity generation has a net loss of 53,200 jobs (9% of its workforce), clean vehicles have a net loss of 24,800 jobs (9% of the sector's workforce), grid and storage have a net loss of 15,200 jobs, and clean fuels have a net loss of 7,000 jobs.[39]

Between March and October 2020, the fossil fuel industry lost 117,600 jobs (almost 16% of its workforce), with 96% of losses related to fuel extraction, mining, and processing.[40] The oil sector accounted for the largest losses, shedding more than 69,400 jobs (17% of its workforce),

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[31] U.S. Employment and Training Administration, Initial Claims [ICSA], retrieved from FRED, retrieved from FRED, Federal Reserve Bank of St. Louis. Accessed Apr. 14, 2021.
[32] FRED, Federal Reserve Bank of St. Louis, "COVID-19 Economic Data Tracking." Accessed Apr. 14, 2021.
[33] U.S. Bureau of Labor Statistics, "The Unemployment Situation – March 2021" (2021).
[34] Ibid.
[35] Ibid.
[36] BW Research, Clean Energy Employment Initial Impacts from the COVID-19 Economic Crisis, December 2020, Revised (Feb. 8, 2021).
[37] Ibid.
[38] Environmental Entrepreneurs, "Clean Energy & COVID-19 Crisis | May 2020 Unemployment Analysis," (June 15, 2020).
[39] BW Research, Clean Energy Employment Initial Impacts from the COVID-19 Economic Crisis, December 2020, Revised, (Feb. 8, 2021).
[40] BW Research, Fossil Fuel Employment Initial Impacts from the COVID-19 Economic Crisis, March - October 2020, (Nov. 23, 2020).

while natural gas and coal lost 35,900 (13% of its workforce) and 12,300 jobs (13% of its workforce), respectively, since March 2020.

High Road Labor Standards

Energy sector employment is changing as the energy sector changes. There is increasing interest in policies that will help expand labor standards in the energy sector. An April 2021 study by Princeton University examines some of these issues. It provides support for including high road labor standards in clean energy policies by showing that high road labor standards lead to only "relatively modest" increases in total clean energy capital and operating costs.[41] High road labor standards include prevailing wage and local hiring requirements, unionization, domestic content requirements, workforce development and training, and gender and racial equity hiring requirements. In the study, high road labor standards led to increased manufacturing and installation labor costs and increased use of domestic content. The study suggested that these capital and operating cost increases could be offset by increased labor productivity. The study also concluded that high road labor standards have only a "minimal effect" on the speed of renewable energy deployment and the overall costs of the transition to a net-zero economy.[42]

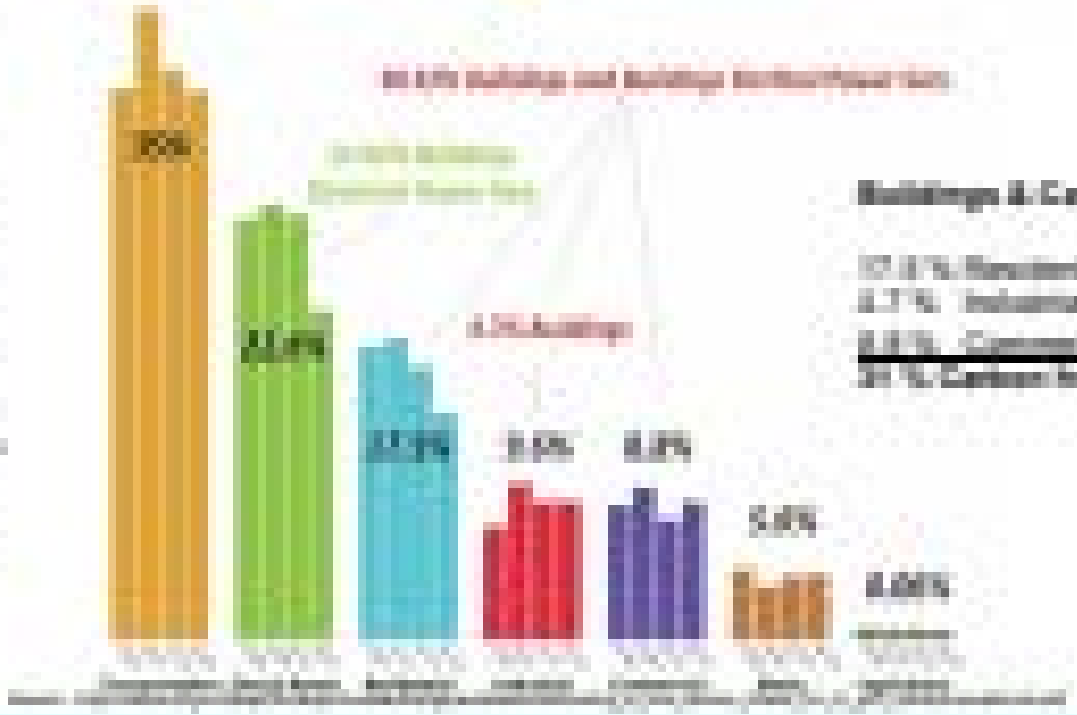
The study found that increasing domestic content requirements would create roughly 45,000 good jobs annually and lead to a $5 billion increase in aggregate annual wages in the 2020s. Finally, the study pointed to tax credits and workforce development support as policies that could reduce the impact of any increased costs from the use of high road labor standards.

KEY QUESTIONS

1. How can federal policymakers help create good-paying, high-quality jobs in clean energy, zero-emission, and deep decarbonization technologies?
2. What new models of economic development, investment, and governance should federal policymakers consider to ensure environmental justice communities and other underserved populations benefit from clean energy technologies and infrastructure?
3. How can federal policymakers develop smart and targeted workforce and economic development strategies that provide both immediate and long-term support to workers and communities during economic and energy transitions?
4. What Federal policies would help leverage private capital to help create new jobs and spur economic development?

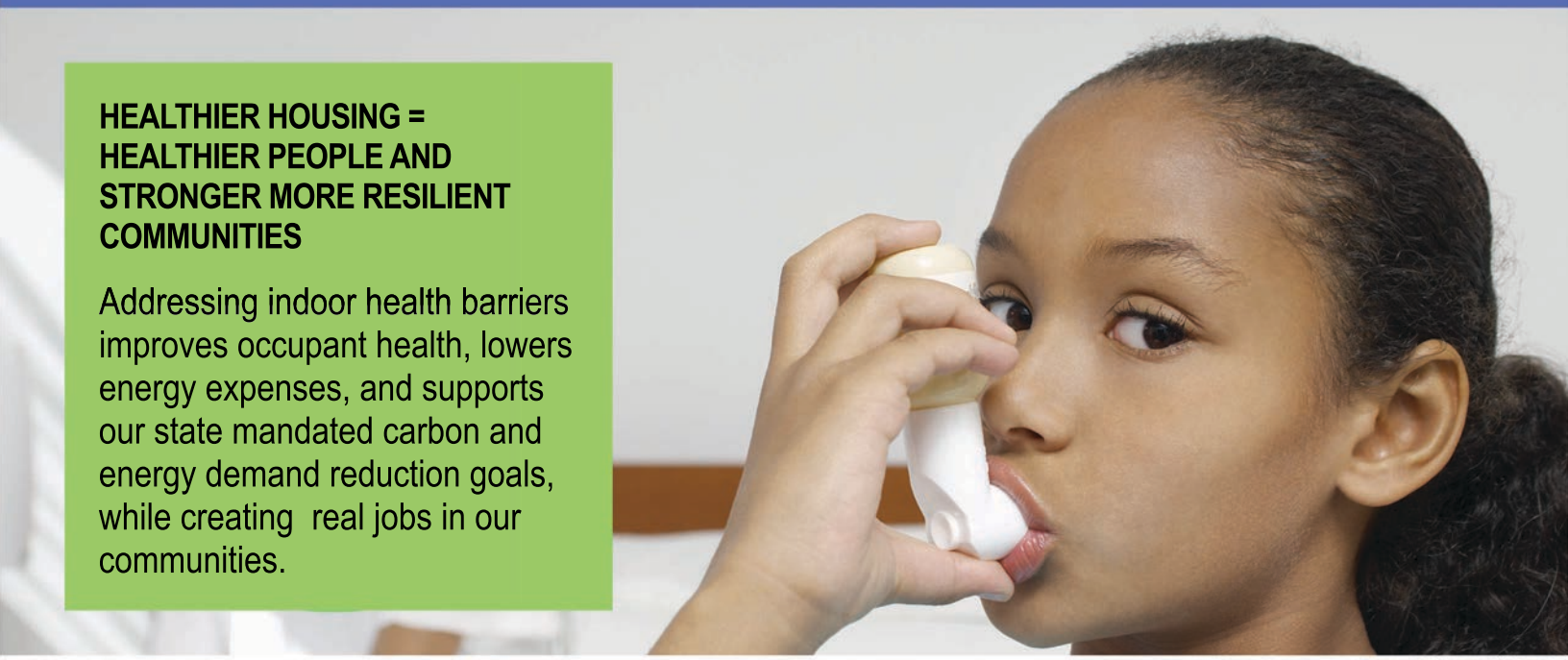
[41] Erin Mayfield and Jesse Jenkins, Working Paper: Influence of High Road Labor Policies and Practices on Renewable Energy Costs, Decarbonization Pathways, and Labor Outcomes (Princeton University, 2021).
[42] Ibid.

Local Carbon Emissions by Sector - Historical



Addressing Health and Affordability Challenges for Low-Income Families

How energy efficiency can lower statewide health expenses, close the affordability gap and put people to work



HEALTHIER HOUSING = HEALTHIER PEOPLE AND STRONGER MORE RESILIENT COMMUNITIES

Addressing indoor health barriers improves occupant health, lowers energy expenses, and supports our state mandated carbon and energy demand reduction goals, while creating real jobs in our communities.

Problem: Up to 30% of homes in Connecticut (CT) have one or more safety concerns

Up to 30% of LMI homes have one or more health concerns such as asbestos, mold, mildew, knob-and-tube electrical wiring, and pests, which are barriers to full weatherization and lowered energy bills. Energy Assessments provided by EnergizeCT and WAP locate and identify hazardous conditions in LMI housing[1].

Solving for weatherization barrier funding in CT is a critical issue. These barriers limit ratepayers' access to energy-saving services that their utility bill payments help fund.

The increased thermal comfort associated with a weatherized building envelope, allows residents to shelter in place in extreme hot and cold temperatures even during power outages.

[1] Based on Energize CT data on homes barriered from Wx in CT (2017- 2019)

[2] Save Energy, Saving Lives by ACEEE & PSR, https://www.aceee.org/research-report/h1801

READ MORE: Yale Center on Climate Change and Health (https://publichealth.yale.edu/climate/YCCCH_CCHC2020Report_395366_5_v1.pdf)

Reducing Energy Use Leads to Better Health

Energy efficiency and weatherization lead to better health outcomes for residents. A 2014 study found a 12% decrease in emergency department asthma-related visits and a 48% decline in poor health among adults who received home weatherization services[2].

What is LIHEAP?

LIHEAP is a flexible federal funding source with the potential to close the affordability gap and help CT reach our GC3 goals. Weatherization and energy-related home repair directly contribute to reducing energy burdens and improving home health and safety, both of which are LIHEAP goals.

Energy efficiency provides a pathway to positive health outcomes

Presented by E4 the Future, Efficiency For All, and The Building Performance Association 2021

Simple Solution to Indoor Health Barriers

Breaking siloed approaches and removing health barriers ensures households are served comprehensively, resulting in lowered energy expenses, lower energy demands on our grid, lowered pollution, and lowered carbon emissions. This will ultimately expand the number of LMI served in our state. Additional benefits include creating local jobs and addressing long standing affordable safe housing issues, and permanently lowering energy expenses.

An allocation of LIHEAP funds towards weatherization and barrier remediation would open the door for a comprehensive weatherization barriers remediation program, providing a solution to the 23-30%[3] of income-eligible households in CT with home weatherization barriers preventing access to energy-saving services. This would also prepare CT for upcoming federal stimulus packages.

Connecticut boasts strong energy efficiency programs (EnergizeCT). These programs include comprehensive energy efficiency upgrades which support low-income resident's ability to effectively manage home energy demands and lower energy burdens. DEEP coordinates the state's existing energy efficiency programs (HESIE and WAP.) DEEP could establish an official Weatherization Barrier Committee inclusive of community action agencies, the utilities, contractors, advocates, and DSS to ensure proper coordination among entities.

[3] Based on Energize CT data on homes barriered from Wx in CT (2017- 2019)

Crosscutting Benefits

Job Creation - The use of LIHEAP funds to remediate barriers increases workforce opportunities. Expanding the capacity of the CT's network of weatherization contractors will help CT reach our carbon and energy goals.

Energy Efficiency Saves Lives

A study by the ACEEE and Physicians for Social Responsibility found that reducing energy consumption in the United States by 15% could have enormous annual impacts on public health, while lowering energy burdens[4].

[4] Save Energy, Saving Lives by ACEEE & PSR, https://www.aceee.org/research-report/h1801

30,000	$20 BILLION	6 LIVES
Fewer Asthma Attacks	Avoided Health Harms	Saved Every Day

Job Creation

Investments in the energy efficient workforce bring the highest return on investment of any green job - $1M = 18 job years[5]

$1 MILLION Investment =

[5] 2020, Global Status Report for Buildings and Construction, Global Alliance for Buildings and Construction.

Goals for LIHEAP

To address the remediation of home weatherization barriers for low-income customers, we recommend a higher level of LIHEAP weatherization funds be allocated to reduce energy burdens and improve home health and safety in CT.

We are recommending that up to 8 million dollars of LIHEAP be allocated to weatherization and removing health and safety conditions.

SCHOOL + STATE FINANCE PROJECT

RACIAL DISPARITIES IN CONNECTICUT EDUCATION FUNDING

An examination of the funding gaps and racial segregation that exist across Connecticut's public school districts

September 2020

www.schoolstatefinance.org

Contents

Key Findings

The following report and analysis contain a number of key findings about the racial disparities that exist in Connecticut education funding. This section summarizes these findings and provides a quick glance at the report's biggest takeaways.

Significant funding gaps exist between Connecticut districts that predominantly serve BIPOC[A] students and districts that largely serve White student populations. (pp. 5-7)

- Districts with a BIPOC student population that is greater than 75 percent of the district's total enrollment spend roughly $2,300 less per student than districts that serve student populations consisting of over 75 percent White students. (pp. 6-7)
- When this per-student difference is aggregated across the entire Connecticut public school student population, it translates to a $312 million funding gap between districts with high populations of BIPOC students and districts with the highest percentages of White students. (p. 14)
- A $327 million funding gap also exists between districts where the BIPOC student population is between 25 percent and 75 percent of the district's total enrollment and districts consisting of student populations that are over 75 percent White. (p. 14)
- Combined, this amounts to a total funding gap of $639 million between all districts with BIPOC student populations of at least 25 percent and districts with White student populations greater than 75 percent. To close this gap would take an increase in total education spending of approximately 6.6 percent. (p. 14)

Connecticut's public school districts are highly segregated with most students attending a district where more than 75 percent of the students are White, or a district where more than 75 percent of the students are BIPOC. (p. 5)

- While the racial demographic makeup of the state's student population is roughly 50 percent White and 50 percent BIPOC, most students attend a school district where the enrollment difference between White and BIPOC students is at least 50 percentage points. (p. 5)
- Approximately 60 percent of all Black students attend a district where the White student population is less than 25 percent of the district's total enrollment. (p. 10)
- A majority of the state's BIPOC students are concentrated in less than 10 districts, and over 40 percent of Connecticut's BIPOC students who attend a local public school district attend one where the total student population is over 75 percent BIPOC. (p. 11)

[A] BIPOC is an acronym that stands for "Black, Indigenous, People of Color." In this report, BIPOC is used to represent students who, according to Connecticut State Department of Education data, identify as: American Indian or Alaska Native; Asian; Black or African American; Hispanic/Latino of any race; Native Hawaiian or other Pacific Islander; or two or more races.

Districts with higher percentages of BIPOC students generally serve students with greater learning needs but spend less per student. (p. 12)

- Oppositely, Connecticut public school districts with higher percentages of White students serve students with less learning needs but spend more per student. (p. 12)
- Student poverty rates are also inversely proportional to per-student spending, regardless of the low-income metric used. (pp. 12-13)
- Despite tending to have the highest poverty rates, per-student spending is lowest in districts with enrollments made up of more than 75 percent BIPOC students. (p. 12)

Introduction

Connecticut's public school districts serve a wide range of student needs and student populations. They also have significant differences in per-student spending.[1] The State of Connecticut has one of the largest opportunity gaps[B] in the nation,[2] which is exacerbated by unequal and inequitable fiscal resources that allow wealthier and Whiter school districts to spend more per student.

These disparities are further revealed by the facts that a majority of Connecticut's BIPOC students are concentrated in less than 10 districts,[3] and that the average per-student spending for Connecticut districts with high populations of BIPOC students is roughly $2,300 less than the per-student spending for districts with the lowest percentages of BIPOC students.[4,5] When this per-student difference is aggregated across the entire Connecticut public school student population, it translates to a $312 million funding gap between districts with high populations of BIPOC students and districts with the highest percentages of White students.

This report explores these disparities by examining the student racial demographics of Connecticut's public school districts, detailing the current state of integration among public school districts in Connecticut, and observing the relationship between district student populations and per-student spending.

Connecticut's Segregated School Districts

Connecticut's public school districts are segregated. Although the racial demographic makeup of the state's public school student population is roughly 50 percent White and 50 percent BIPOC, most students attend school districts where the enrollment difference between White and BIPOC students is at least 50 percentage points. This means the majority of Connecticut students attend school districts with student populations that are either more than 75 percent BIPOC students or more than 75 percent White students.[6]

Moreover, there is a significant funding gap between districts that predominately serve students who are BIPOC and districts that largely serve White student populations. Districts with higher percentages of White students have significantly higher spending levels than other districts, while districts with higher percentages of BIPOC students have significantly lower spending per student.[7,8]

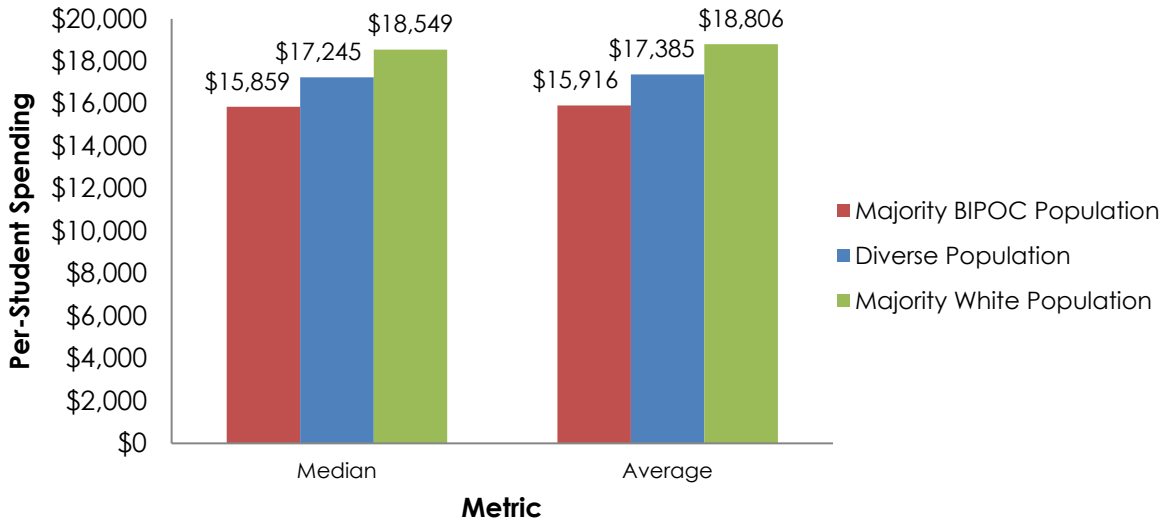
[B] "Opportunity gap" is often used interchangeably with "achievement gap." Connecticut General Statutes defines achievement gap as "the existence of a significant disparity in the academic performance of students among and between (A) racial groups, (B) ethnic groups, (C) socioeconomic groups, (D) genders, and (6) English language learners (ELL) and students whose primary language is English."
Conn. Gen. Statutes ch. 164, § 10-16mm.

To examine these disparities, we have grouped Connecticut's public school districts into three different demographic classifications:

- **Majority BIPOC Population:** Districts with a BIPOC student population that is greater than 75 percent of the district's total enrollment;
- **Majority White Population:** Districts with a White student population that is greater than 75 percent of the district's total enrollment; and
- **Diverse Population:** Districts with a BIPOC student population between 25 percent and 75 percent of the district's total enrollment.[C]

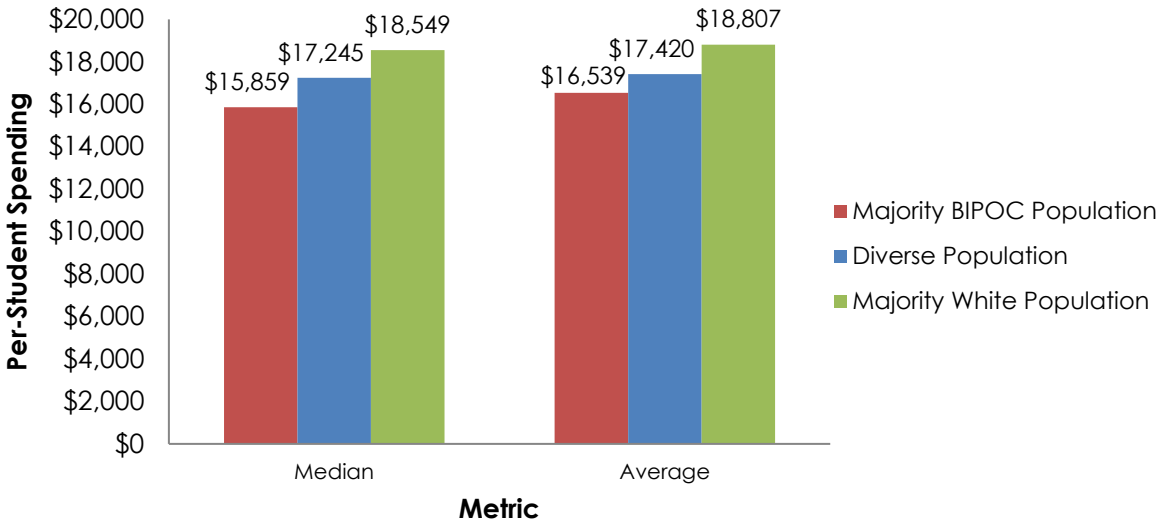
As shown in Figures 1 and 2, districts with a Majority White Population spend significantly more per student than both Majority BIPOC Population and Diverse Population districts, with students in Majority BIPOC Population districts receiving even lower per-student spending.[9,10] This pattern is consistent whether examining only local and regional public school districts or all public school districts in Connecticut, including schools of choice.

Figure 1: Per-student Spending by District Demographic Classification, Local and Regional Public School Districts (2018-19 School Year)[11,12]



[C] Because the most recent data for per-student spending is from the 2018-19 school year, school districts have been classified using 2018-19 enrollment data. Likewise, all calculations that follow are for the 2018-19 school year.

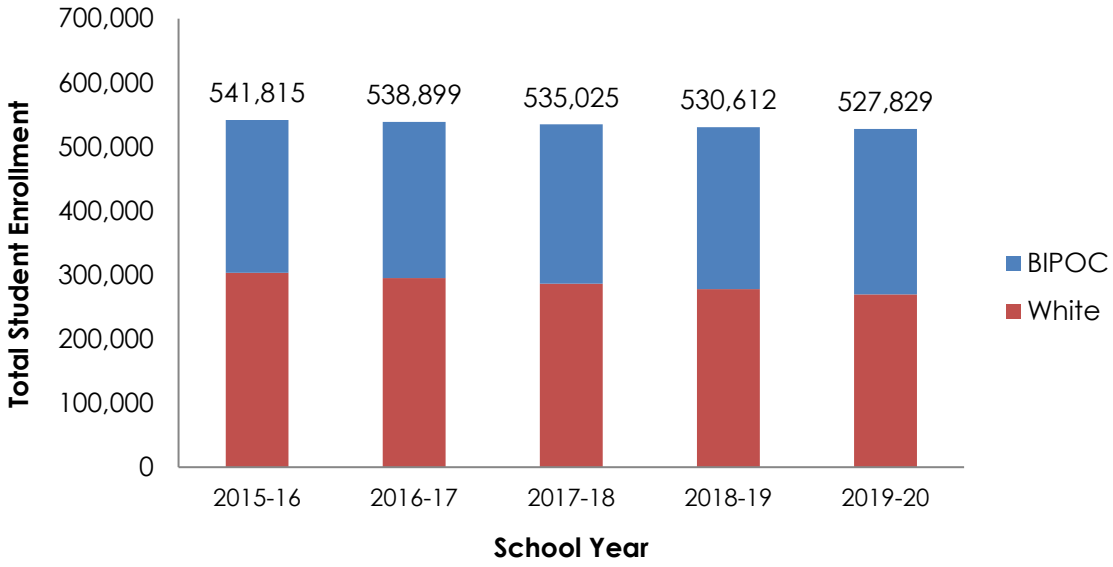
Figure 2: Per-student Spending by District Demographic Classification, All Public School Districts (2018-19 School Year)[13,14]



Student Population in Connecticut

This section examines the student population of Connecticut's public schools, demographic trends, and demographics of individual school districts. As Figure 3 below demonstrates, Connecticut's total public school enrollment has been trending downward over the past several years.

Figure 3: Total Connecticut Public School Student Enrollment, 2016-2020[15]



This decline is primarily attributable to a large decrease in the number of White students. While White students make up just over half of all enrolled students in Connecticut, the number of White students enrolled in the state's public schools has decreased roughly 11 percent over the past five years.[16]

Comprising approximately 40 percent of the state's total student enrollment, Hispanic/Latino students of any race and Black or African American students are, respectively, the second and third largest student racial demographic groups in Connecticut public schools. The number of Black or African American students has declined by nearly four percent over the past five years, while Hispanic/Latino student enrollment has increased by 13.5 percent over the same time period.[17]

Table 1 below details these demographic changes by comparing total student enrollment by race for the 2019-20 school year (the most recent year of data available) to enrollment data from the 2015-16 school year.

Table 1: Connecticut Enrollment Data Comparison, 2015-16 to 2019-20[18]

Race/Ethnicity	Enrollment, 2015-2016	Enrollment, 2019-2020	Percent Change
BIPOC	238,449	258,074	8.2%
American Indian or Alaska Native	1,492	1,322	-11.4%
Asian	26,857	27,365	1.9%
Black or African American	69,658	67,067	-3.7%
Hispanic/Latino of any race	125,110	141,981	13.5%
Native Hawaiian or Other Pacific Islander	529	533	0.8%
Two or More Races	14,803	19,806	33.8%
White	303,366	269,755	-11.1%
Total	**541,815**	**527,829**	**-2.6%**

Although the statewide public school student population is approaching approximately equal White and BIPOC enrollment, racial segregation is still prevalent across school districts. Table 2 below details the number of local and regional public school districts that fall under each classification (Majority BIPOC Population, Majority White Population, or Diverse Population) based on the racial demographics of the district's student population. Also included in the table is the percentage of total student enrollment for local and regional public school districts that the districts in each classification represent. Table 3 contains the same information but includes all[D] of Connecticut's public school districts — not just local and regional public school districts.

Table 2: District Classification Based on Student Racial Demographics, Local and Regional Public School Districts (2018-19 School Year)

Classification	Number of Districts	Percent of Student Population for Local and Regional Public School Districts
Majority BIPOC Population (>75% BIPOC Students)	9	22%
Diverse Population (25% - 75% BIPOC Students)	48	44%
Majority White Population (>75% White Students)	107	34%

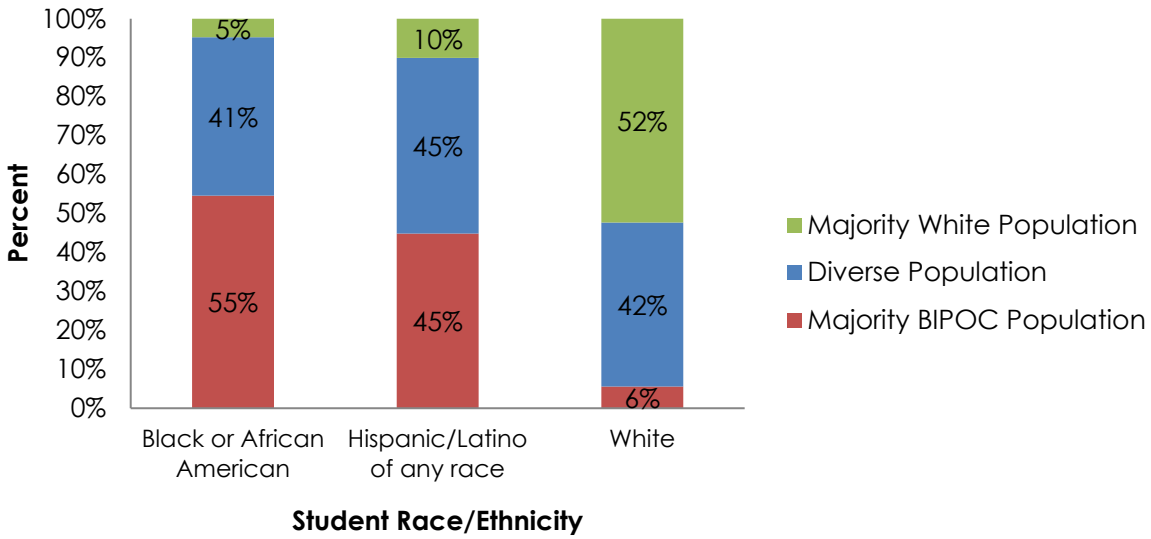
[D] In addition to local and regional public school districts, "all districts" includes state and local charter schools and interdistrict magnet schools operated by Regional Educational Service Centers (RESCs).

Table 3: District Classification Based on Student Racial Demographics, All Public School Districts (2018-19 School Year)

Classification	Number of Districts	Percent of Student Population for All Public School Districts
Majority BIPOC Population (>75% BIPOC Students)	30	25%
Diverse Population (25% - 75% BIPOC Students)	55	43%
Majority White Population (>75% White Students)	108	33%

A minority of Connecticut's total student population attends a school in a Diverse Population district where the percentage of BIPOC students falls between 25 percent and 75 percent of the district's total student population. There is a large number of Majority White Population districts, while BIPOC students tend to be clustered in only a handful of districts. Although the relative size of the Majority BIPOC Population group is small compared to the other two classifications, it contains a disproportionate amount of Black and Hispanic/Latino students. Approximately 60 percent of all Black or African American students attend a district where the White student population is less than 25 percent of the district's total enrollment.[19]

Figure 4: Percentage of Total State Student Enrollment by Race/Ethnicity Represented in Each District Demographic Classification, Local and Regional Public School Districts (2018-19 School Year)[20]



Initially, these findings might appear to make sense. After all, Majority BIPOC Population districts are, by definition, districts in which there are a disproportionately large number of BIPOC students, and therefore, these districts also contain a disproportionately large percentage of total BIPOC students. However, the ratio between Majority White Population and Majority BIPOC Population districts and Diverse Population districts is drastically skewed. Even though White students and BIPOC students are present statewide at about a 1:1 ratio, roughly 57 percent of Connecticut public school students attend districts in which the White student population is either below 25 percent or above 75 percent. Currently, there are only nine Majority BIPOC Population local public school districts, but over 40 percent of the BIPOC students who attend a local public school district attend a school in one of these districts.[21]

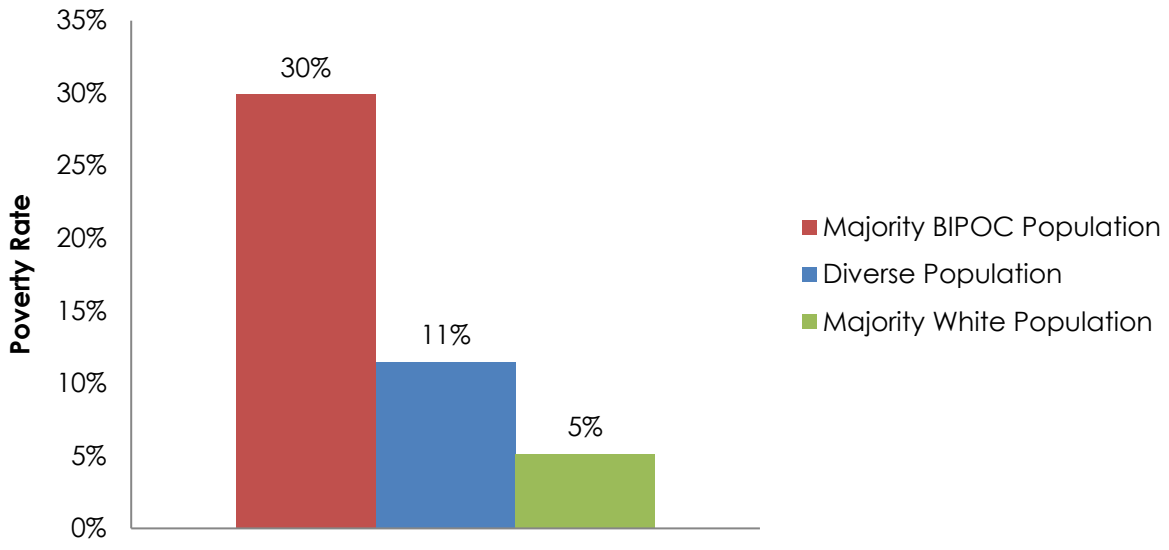
This supports the idea that district student enrollment does not follow a normal distribution in Connecticut. Districts rarely match the demographic population of the state. Instead, most students fall into two broad categories: those who attend Majority White Population districts or those who attend Majority BIPOC Population districts. Comparatively, few students attend schools in Diverse Population districts where the district student population is more reflective of statewide student racial demographics.

Spending and Student Need

Generally, Connecticut public school districts with higher percentages of White students serve students with less learning needs and spend more per student. Conversely, districts with higher percentages of BIPOC students generally serve students with greater learning needs and spend less per student than Majority White Population or Diverse Population districts.[22,23] This trend is even more pronounced when examining the relative need of the students in each of these district classifications. This is despite the fact that research has shown students with certain learning needs, such as students from low-income families[24] or who are English Learners,[25] require greater funding than their non-need peers to achieve at similar levels.

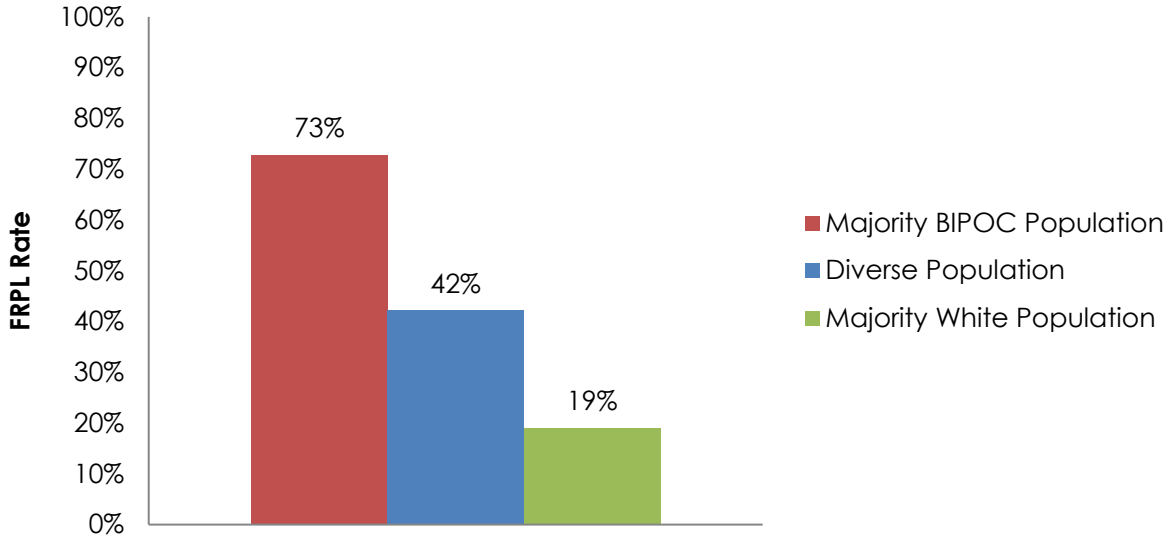
When examining the three district demographic classifications, student poverty rates[E] are inversely proportional to per-student spending. Per-student spending is lowest in Majority BIPOC Population districts, where students tend to have the highest poverty rates.[26,27] Regardless of the low-income metric used, this pattern is consistent. The rates of students who qualify for free or reduced-price lunch is significantly higher in Majority BIPOC Population districts than in Majority White districts.[28]

Figure 5: Poverty Rate by District Demographic Classification, Local and Regional Public School Districts (2018)[29]



[E] Poverty rate figures for school districts are lower than district rates for students eligible for free or reduced-price lunch (FRPL). This is because FRPL-eligibility figures include not only students who live at or below the federal poverty line but also those whose household incomes are up to 185 percent of the federal poverty line.

Figure 6: Free or Reduced-Price Lunch Eligibility Rate by District Demographic Classification, Local and Regional Public School Districts (2018-19 School Year)[30]

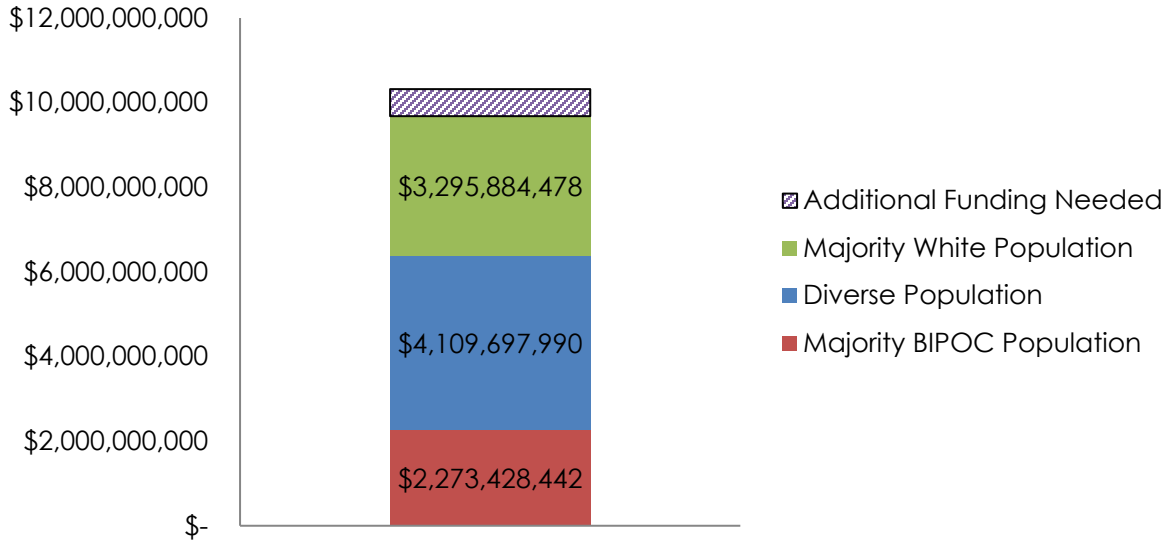


Total Funding Gap

As shown previously, Majority BIPOC Population districts spend about $2,300 less per student than Majority White Population districts.[31,32] When this per-student difference is aggregated across the entire Connecticut public school student population, it translates to a $312 million funding gap between Majority BIPOC Population districts and Majority White Population districts. In other words, providing the same amount of funding per student to students in Majority BIPOC Population districts as students who attend schools in Majority White Population districts would cost approximately $312 million.

Students attending Diverse Population districts also experience a per-student funding gap. Providing students in Diverse Population districts with the same level of funding as students who attend Majority White Population districts would cost an additional $327 million. This means there is a total funding gap of $639 million if all students in Majority BIPOC Population and Diverse Population districts were to receive the same level of funding as students in Majority White Population districts. This would account for an increase in spending of approximately 6.6 percent, as visualized on the chart below.

Figure 7: Total Spending by District Demographic Classification, All Public School Districts (2018-19 School Year)



Appendix

Table 4: Individual District Classification by Racial Demographics

Majority BIPOC Population Districts (>75% BIPOC Students)	Diverse Population Districts (25%-75% BIPOC Students)	Majority White Population Districts (>75% White Students)
Bloomfield	Ansonia	Andover
Bridgeport	Avon	Ashford
East Hartford	Bethel	Barkhamsted
Hartford	Branford	Berlin
New Britain	Bristol	Bethany
New Haven	Cromwell	Bolton
New London	Danbury	Bozrah
Waterbury	Derby	Brookfield
Windham	East Haven	Brooklyn
	East Windsor	Canterbury
Area Cooperative Educational Services (ACES)	Enfield	Canton
Capitol Region Education Council (CREC)	Farmington	Chaplin
	Glastonbury	Cheshire
Achievement First Bridgeport Academy	Greenwich	Chester
Achievement First Hartford Academy	Groton	Clinton
Amistad Academy	Hamden	Colchester
Booker T. Washington Academy	Ledyard	Colebrook
Brass City Charter School	Manchester	Columbia
The Bridge Academy	Mansfield	Cornwall
Capital Preparatory Harbor School	Meriden	Coventry
Common Ground High School	Middletown	Darien
Elm City College Preparatory School	Milford	Deep River
Great Oaks Charter School	Montville	East Granby
Highville Charter School	Naugatuck	East Haddam
Interdistrict School for Arts and Communication	Newington	East Hampton
Jumoke Academy	Norwalk	East Lyme
New Beginnings Family Academy	Norwich	Eastford
Park City Prep Charter School	Orange	Easton
Side By Side Charter School	Plainville	Ellington
Stamford Academy	Regional School District 19	Essex
Stamford Charter School for Excellence	Rocky Hill	Fairfield
	Seymour	Franklin
	Shelton	Granby
	Simsbury	Griswold
	South Windsor	Guilford
	Sprague	Hampton
	Stamford	Hartland
	Stratford	Hebron
	Torrington	Kent
	Trumbull	Killingly
	Vernon	Lebanon
	Wallingford	Lisbon

Majority BIPOC Population Districts (>75% BIPOC Students)	Diverse Population Districts (25%-75% BIPOC Students)	Majority White Population Districts (>75% White Students)
Trailblazers	West Hartford West Haven Wethersfield Windsor Windsor Locks Woodbridge Cooperative Educational Services (C.E.S.) Eastern Connecticut Regional Educational Service Center (EASTCONN) EdAdvance LEARN Elm City Montessori School Integrated Day Charter School Odyssey Community School	Litchfield Madison Marlborough Monroe New Canaan New Fairfield New Hartford New Milford Newtown Norfolk North Branford North Canaan North Haven North Stonington Old Saybrook Oxford Plainfield Plymouth Pomfret Portland Preston Putnam Redding Regional School District 01 Regional School District 04 Regional School District 05 Regional School District 06 Regional School District 07 Regional School District 08 Regional School District 09 Regional School District 10 Regional School District 11 Regional School District 12 Regional School District 13 Regional School District 14 Regional School District 15 Regional School District 16 Regional School District 17 Regional School District 18 Ridgefield Salem Salisbury Scotland Sharon Sherman

Majority BIPOC Population Districts (>75% BIPOC Students)	Diverse Population Districts (25%-75% BIPOC Students)	Majority White Population Districts (>75% White Students)
		Somers Southington Stafford Sterling Stonington Suffield Thomaston Thompson Tolland Voluntown Waterford Watertown Westbrook Weston Westport Willington Wilton Winchester Wolcott Woodstock Explorations

Table Notes

1. Due to suppressed student data, Canaan and Union are excluded from the table.
2. Districts in red are charter schools and districts in green are Regional Educational Service Centers (RESCs). All other districts are local and regional public school districts.

Endnotes

[1] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[2] Connecticut Legislative Achievement Gap Task Force. (2014). *For the Children of Connecticut: A Master Plan to Eliminate the Achievement Gap in Connecticut*. Hartford, CT: Author. Retrieved from https://portal.ct.gov/-/media/SDE/Interagency-Council/April-2014-Taskforce-Final-Report-002.pdf.
[3] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[4] Ibid.
[5] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[6] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[7] Ibid.
[8] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[9] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[10] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[11] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[12] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[13] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[14] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[15] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Ibid.
[20] Ibid.
[21] Ibid.
[22] Ibid.
[23] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[24] Duncombe, W.D., & Yinger, J. (2005). How Much More Does a Disadvantaged Student Cost? *Economics of Education Review, 24*(5), 513-532.
[25] Gándara, P., & Rumberger, R.W. (2008). Defining an Adequate Education for English Learners. *Education Finance and Policy, 3*(1), 130-148.

[26] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.
[27] U.S. Census Bureau. (2019). *Small Area Income and Poverty Estimates Program (SAIPE): 2018 Poverty Estimates for School Districts*. Available from https://www.census.gov/data/datasets/2018/demo/saipe/2018-school-districts.html.
[28] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[29] U.S. Census Bureau. (2019). *Small Area Income and Poverty Estimates Program (SAIPE): 2018 Poverty Estimates for School Districts*. Available from https://www.census.gov/data/datasets/2018/demo/saipe/2018-school-districts.html.
[30] Connecticut State Department of Education. (n.d.). EdSight: Public School Enrollment. Available from http://edsight.ct.gov/SASPortal/main.do.
[31] Ibid.
[32] Connecticut State Department of Education. (n.d.). Connecticut Public School Expenditures Report 2018-2019. Retrieved from https://portal.ct.gov/SDE/Fiscal-Services/Connecticut-Public-School-Expenditures-Report-2018-2019.

Testimony in Support of
Bill SB 882, AN ACT CONCERNING CLIMATE CHANGE MITIGATION AND HOME ENERGY AFFORDABILITY.

Name: Leticia Colon de Mejias, Green Eco Warriors
Town: Windsor, CT

Dear Joint Committee on Energy and Technology, Governor Lamont, and DEEP,

We write in Support of Governor's Bill 882, An Act Concerning Climate Change Mitigation and Home Energy Affordability, **pending five necessary amendments to Section 1 and noting issues of equity and inclusion which must be addressed as part of this legislation**.

Bold equity based climate action would include taking steps to use proven techniques to draw down energy demand by addressing residential, commercial, and municipal uses of energy for the *highest demands which include: heating, cooling, hot water, and electric generation demands, and connecting LMI communities to resources to address barriers to efficiency and clean energy upgrades which they can not currently access in an equitable manner in our state.

Buildings and Climate Change- The buildings sector is responsible for about one third of all U.S. greenhouse gas emissions.[1] And in 2019, the residential sector represented approximately 16% of total U.S. end-use energy consumption.[2] Any path to rapid decarbonization must address these emission sources and the most cost-effective way to accomplish this is through building improvements that achieve energy efficiency, electrification and conversion to renewable energy.

While we agree that labels will have some value to home buyers, and renters, this does not move us towards the deeper goals of 100% carbon free energy use in our state. We all know that to properly meet the climate and energy goals that already exist in our state, we need to take sweeping action to invest in demand reduction, and ramp up access to clean energy. The GC3 report notes that to do this equitably we must remove barriers to the low income communities in our state. These communities already can not afford their energy bills and are overburdened with EJ issues. While our state continues to collect funds on our energy bills that are meant to help us draw down demands and connect to clean energy, we do NOT see these benefits being distributed equitably in LMI communities. Furthermore, our communities are suffering extreme heat indexes in summer, and are living with the highest electric rates in the nation. These LMI households will not be able to address the issues and fix them without proper support. Therefore labeling these LMI homes could harm LMI communities.

There are equitable ways to address these issues which are in the reach of our state leadership. For example, by investing in efficiency in all buildings and residential housing we can draw down electric and heating demands by 30%. * *Climate Change and Health in Connecticut: 2020 Report,*

This approach has cross cutting benefits such as local job creation, and health improvements, as well as strengthening our statewide resilience to both heat and cold extremes. With Climate change at our door steps, we are hopeful, eager to participate in and support Bold, Innovate, Equitable climate action. This includes an

[1] https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf
[2] https://www.eia.gov/totalenergy/data/monthly/pdf/flow/css_2019_energy.pdf
3 https://www.census.gov/quickfacts/fact/table/US/VET605218
4 https://www.eia.gov/consumption/residential/data/2015/hc/php/hc2.3.php)

honest approach to defossilize our electric grid. While we know this request is bold, we also know that it will take bold action and true leadership to lift our communities and protect our future. This approach will create local jobs, and address long standing socioeconomic disparities.

Section 1: Greenhouse Gas Reduction

This bill codifies Governor Lamont's Executive Order 3 to achieve a 100% zero-carbon electric grid by 2040 and offers an aggressive path to decarbonization. I have several concerns with provisions of this section, as outlined below.

1. 1.a.3: As written, this bill requires that only electricity *supplied* to electricity customers in the state achieve 100% zero-carbon electricity. To mitigate climate change, **this bill must require all electricity supply and generation within the entire state to be 100% zero-carbon by 2040**. By only covering the electricity supplied to electricity customers, Connecticut could technically achieve the 100% goal in 2040 while still having 54 fossil fuel power plants running in the state, a case that is unacceptable for a state taking climate change seriously. This is a bit of a bait and switch approach to a problem that is very real.

2. 1.a.4: I support the decarbonization plan targets outlined in 1.a.1 and 1.a.2, but believe there needs to be a more aggressive timeline and a clear end goal. According to the Intergovernmental Panel on Climate Change, a program of the United Nations, to achieve a global target of 1.5°C of global warming, the planet must decrease net CO_2e (carbon dioxide equivalent) emissions 45% by 2030, "reaching net zero around 2050" (ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Headline-statements.pdf). Therefore, reaching only an 80% reduction in greenhouse gas emissions by 2050, as established in 1.a.4, is insufficient to halt the worst effects of global climate change. We propose that the state must **set a target of net zero carbon dioxide equivalent emissions by 2050** to protect our health, land, air, water, and future. This target is possible through deep decarbonization, efficiency expansion, community education, expansion of clean energy, and procurement of carbon offsets, which could be generated within our state for additional economic development benefits.

3. SB 718:We urge you to amend this bill to **include a moratorium on the construction of new fossil fuel power plants statewide** (currently a separate bill, SB 718). Connecticut already has more than its fair share of power generation facilities in Connecticut. This number has the potential to grow if the Killingly power plant and new gas turbines at the NRG Middletown plant move forward. These plants will set Connecticut back further with climate change mitigation and add to the pollution already affecting our state. Connecticut already has excess power (which we sell) and we should be looking toward renewable energy.

4. 1.a.4: The provision to give the DEEP Commissioner sole authority to set greenhouse gas reduction and electricity supply and generation targets holds potential for abuse. This subsection should be amended to **clarify with more specificity what powers the DEEP Commissioner shall have proper checks and balances in place including a DIVERSE oversight board,** to ensure that a current or future commissioner does not arbitrarily change targets without sufficient public input. Our future and health are at stake.

Section 2: Support for Demand Response and Energy Efficiency

This section would allow DEEP to procure demand response and energy efficiency, which improves grid stability as we procure more electricity from wind and solar. This is essential for a clean energy future.

Sections 3/4: Home Energy Affordability

Transparency is essential to energy affordability. Requiring twelve months of energy bills or a Home Energy Label would help to achieve that goal. This section would encourage building owners, whether residents or landlords, to make necessary energy efficiency upgrades before selling or renting a home. However, it does not address the current issue of LMI housing having one or more barriers to efficiency upgrades. The state has no formal plan to address this issue, and without a plan, this bill will harm LMI households who can not fix their home's without support.

This report from YALE and the attached factsheet explain this issue in detail. We have run into many obstacles as we work to bring efficiency and clean energy to low and moderate-income residents of CT, especially for renters. Renters must pay their home energy bills, but do not have the power to make efficiency upgrades; building owners have no incentive to make upgrades because they do not pay the energy bills. This vicious cycle results in inefficient, uncomfortable, and sometimes unsafe housing conditions. By making energy bills available, prospective renters would have full information on the (in)efficiency of a residence. It is essential that both electricity AND heating fuels are included in this provision, as is currently specified in this bill.

In closing, we urge you to support Governor's Bill 882 after amending Section 1:

1. Require all supply AND generation to be 100% zero-carbon by 2040,
2. Develop an aggressive final target for greenhouse gas emissions of net zero by 2050,
3. Establish a moratorium on new fossil fuel plants, and
4. Clarify DEEP Commissioner oversight role, including checks and balances and oversight by a Diverse board of community representatives.
5. Ensure the state of CT is inclusive of communities of color and LMI communities in planning and budgeting processes, by appointing members of the community to oversight roles.

Thank you for the opportunity to submit written testimony.

***Please find a plan of action from Yale and the IPC report attached, we have included some short videos to aid in the work. These documents outline thoughtful paths forward on the issues of climate change.**

Extreme Heat in Connecticut:
A Yale Center on Climate Change and Health Issue Brief

Introduction

In Summer 2020, the Hartford area broke a 37-year-old record for the most days in a year reaching temperatures of 90 ºF or above.[3] In the last 125 years, six of the hottest years in Connecticut have been since 2005.[4] It is clear that climate change is no longer a distant threat; its impacts are visible now, here in Connecticut, and its adverse impacts on human health are of increasing concern.

Many people do not realize how deadly heat can be; for this reason, heat is often called a 'silent killer.' Importantly, however, heat-related illness and death is preventable. The Connecticut General Assembly, the Connecticut Department of Public Health, municipalities, and other decision-makers have an important role to

[3]Endnotes

Hartford Breaks Record for Most Days at 90 Degrees or Higher. *Associated Press News*. 2020; online at https://apnews.com/article/bfbe58a5e83e689d920bb18438071412.

[4] *Climate Change and Health in Connecticut: 2020 Report*, based on data from: NOAA National Centers for Environmental Information. *Climate at a Glance: Statewide Time Series*. 2020; online at https://www.ncdc.noaa.gov/cag/.

play in preventing heat-related illness in Connecticut. The Governor's Council on Climate Change (GC3) *Phase 1 Report*[5] identifies recommendations to address these risks. The Yale Center on Climate Change and Health underscores and amplifies those proposed actions by recommending the following:

- **Expand the Connecticut Energy Assistance Program to include cooling assistance**
- **Implement strategies to overcome the health, safety, and legal issues in homes that are barriers to efficiency upgrades, so that homes are better insulated to keep cool air inside**
- **Support urban tree planting and maintenance in Connecticut's cities to help counteract the urban heat island effect**
- **Protect against heat-related illnesses at outdoor and indoor worksites**
- **Protect children's health by enacting policies to address exposure to extreme heat events while at school and playing outdoor sports**
- **Develop and maintain local heat response plans at the municipal level**

In *Climate Change and Health in Connecticut: 2020 Report*, the Yale Center on Climate Change and Health evaluated how climate change affects human health in Connecticut by tracking 19 indicators related to changes to the environment and to our health.[6] We summarize below our findings to explain what we know about how temperatures have changed – and are expected to change – in Connecticut and how this impacts our health.

How has the environment changed?

Average annual temperature in Connecticut has increased by 3.2 ºF since 1895.[2] This impacts our health because of a number of environmental changes, including:

· Hotter nights

Warmer nighttime temperatures can be especially dangerous, particularly for people living in urban areas and for those without access to air conditioning. This is because cool nights are typically an opportunity for the body to cool down; without this cooling-off time, heat waves can be even more perilous.

· More heat waves

While there has not been an observed change in the number of extreme heat days (days with maximum temperature over 90 ºF) since the mid-1900's,[7] under climate change extreme heat days are expected to increase significantly.

· Bad ground-level ozone days

The hottest days often are associated with the highest concentrations of air pollutants, particularly ground-level ozone, or smog. Ground-level ozone pollution is a problem across all of Connecticut.[4] In fact, the American Lung Association gave all eight Connecticut counties "F" grades for ozone pollution in its 2020 *State of the Air Report*.[8] Looking to the future, higher temperatures caused by climate change are expected to bring about higher ground-level ozone concentrations, especially in already polluted areas.[9] Ozone is dangerous to health, worsening conditions including chronic obstructive pulmonary disease and asthma.[10] Children are at higher risk from ozone exposure, especially for asthma exacerbations, since their lungs are still developing and they are likely to be active outdoors when ozone levels are high.

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[5] Governor's Council on Climate Change. *Taking Action on Climate Change and Building a More Resilient Connecticut for All, Phase 1 Report: Near-Term Actions*. 2021; online at https://portal.ct.gov/-/media/DEEP/climatechange/GC3/GC3_Phase1_Report_Jan2021.pdf.

[6] Bozzi L and Dubrow R. *Climate Change and Health in Connecticut: 2020 Report*. New Haven, Connecticut, Yale Center on Climate Change and Health. 2020; online at https://publichealth.yale.edu/climate/YCCCH_CCHC2020Report_395366_5_v1.pdf.

[7] *Climate Change and Health in Connecticut: 2020 Report*, based on data from: Eggleston K. *SC ACIS Version 2*. NOAA Northeast Regional Climate Center, editor. 2020; online at http://scacis.rcc-acis.org.

[8] Report Card: Connecticut. American Lung Association: *State of the Air*. 2020; online at https://www.stateoftheair.org/city-rankings/states/connecticut/.

[9] Nolte CG, Dolwick PD, Fann N, Horowitz LW, Naik V, Pinder RW, et al. Air quality. In: Reidmiller DR, Avery CW, Easterling DR, Kunkel KE, Lewis KLM, Maycock TK, et al., editors. *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. Washington, DC: US Global Change Research Program; 2018.

[10] US Environmental Protection Agency. *Health Effects of Ozone Pollution*. n.d.; online at https://www.epa.gov/ground-level-ozonepollution/health-effects-ozone-pollution.

What does this mean for our health?

Heat-related illnesses, such as heat exhaustion or heat stroke, happen when the body is not able to properly cool itself. While the body normally cools itself by increasing blood flow to the skin (which then transfers heat from the skin to the surrounding air) and by sweating, during extreme heat, this might not be enough, especially during physical activity. In these cases, a person's body temperature rises faster than it can cool itself down. In heat stroke, this can cause damage to the brain and other vital organs, or even death. ***From 2007 to 2016 in Connecticut, there were on average 422 emergency department visits and 45 hospitalizations per year for heat stress.***[11] This is surely an underestimate of heat-related illness, however. One reason is that in addition to causing heat exhaustion and heat stroke, heat also can worsen kidney, heart, lung, and other chronic diseases, resulting in emergency department visits and hospitalizations. Physicians rarely document these as heat-related admissions.

Who is most at risk?

Extreme heat can affect everyone; however, some people are more vulnerable than others. Population groups most at risk include:

- Outdoor workers: Even when it's very hot, outdoor workers must exert themselves physically outside, putting them at risk for heat-related illness. Outdoor workers also often lack control over their work environment and important behavioral adaptation decisions like taking breaks or seeking shade.[12]
- Older adults: In Connecticut, individuals aged 75 and older are most at risk for hospitalization due to heat-related illness.[13] Older adults are more sensitive to heat, are less likely to perceive being overheated and to respond accordingly, and are more likely to have a chronic medical condition that can be exacerbated by heat stress or take medication that may affect their body's ability to regulate its temperature.[14] Finally, social isolation is another factor that can greatly increase vulnerability among the elderly.[15]
- Urban residents: Cities can be much warmer than the surrounding areas due to the "urban heat island effect," in which a city's infrastructure—largely made up of dark-colored asphalt, concrete, and metal—traps and absorbs the sun's energy and re-emits it as heat, increasing the air temperature. Connecticut's urban heat islands coincide with low-income communities and communities of color where housing more frequently lacks insulation, good ventilation, and air conditioning.[16]
- People experiencing homelessness are likely to be exposed to outdoor temperatures and to live in urban areas, where their exposure is amplified through the urban heat island effect. They are likely to have high sensitivity to extreme heat effects due to risk factors such as psychiatric illness, heart or lung disease, substance use, and social isolation.[17] Finally, people experiencing homelessness have less access to important adaptive capacity measures, including shade from trees, air conditioning, and medical services.

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[11] *Climate Change and Health in Connecticut: 2020 Report*, based on data from: Connecticut Department of Public Health Environmental Public Health Tracking Program. *Connecticut Public Health Data Explorer*. 2020; online at https://stateofhealth.ct.gov.

[12] Gubernot DM, Anderson GB, Hunting KL. The epidemiology of occupational heat exposure in the United States: a review of the literature and assessment of research needs in a changing climate. *International Journal of Biometeorology*. 2014;58(8):1779-88.

[13] Hayes LE, Przysiecki P and Bozzi L. Submitted. A profile of heat-related mortality and hospital utilization for heat-related illness in Connecticut 1999-2018.

[14] Millyard A, Layden JD, Pyne DB, Edwards AM, Bloxham SR. Impairments to thermoregulation in the elderly during heat exposure events. *Gerontology and Geriatric Medicine*. 2020; https://doi.org/10.1177/2333721420932432. Waldock KAM, Hayes M, Watt PW, Maxwell NS. Physiological and perceptual responses in the elderly to simulated daily living activities in UK summer climatic conditions. Public Health. 2018;161:163-70.

[15] Gronlund CJ, Berrocal VJ, White-Newsome JL, Conlon KC, O'Neill MS. Vulnerability to extreme heat by socio-demographic characteristics and area green space among the elderly in Michigan, 1990–2007. *Environmental Research*. 2015;136:449-61. Naughton MP, Henderson A, Mirabelli MC, Kaiser R, Wilhelm JL, Kieszak SM, et al. Heat-related mortality during a 1999 heat wave in Chicago. *American Journal of Preventive Medicine*. 2002;22(4):221-7.

[16] To access a map visualizing Connecticut's urban heat islands, visit the Global Surface UHI Explorer, based on data from: Chakraborty, T and Lee X. A simplified urban-extent algorithm to characterize surface urban heat islands on a global scale and examine vegetation control on their spatiotemporal variability. *International Journal of Applied Earth Observation and Geoinformation*. 2019;74, 269-280.

[17] Ramin B, Svoboda T. Health of the homeless and climate change. *Journal of Urban Health*. 2009;86(4):654-64.

- Low-income populations have limited resources to adapt during heat events. In particular, people with low wealth are more likely to live in inadequately insulated housing and to not be able to afford or use air conditioning.[18] They may be more exposed to high temperatures at their workplaces or while using public transportation. They may also have inadequate access to cooling centers and to routine and emergency health care.
- Pregnant women are more vulnerable to heat-related illness. In addition, preterm birth, low birth weight, and infant mortality have been associated with extreme heat. Importantly, factors affecting vulnerability and adaptive capacity are cumulative. For instance, black mothers are three times more likely to die from pregnancy-related problems than white women[19] and are at greater risk for preterm birth and for having a low-birth-weight baby.[20]
- Young children are vulnerable because they must rely on others to help keep them safe and cool, because of their immature physiology and metabolism, and because they are often physically active outside. Outdoor youth athletes, particularly football players, are vulnerable to heat-related illness when not properly acclimatized.

What can we expect in the future?

There is high confidence in the temperature projections that scientists have developed through mid-century (or about 2050). Under these projections, in Connecticut we can expect to experience an approximately 5 ºF increase in average temperature by 2050, compared to the 1970-1999 reference period. ***This means that we can expect extreme heat events to become more common and severe, and to last longer.*** In particular, researchers project that the number of warm spell days (similar to a measure of the number of heat wave days per year) are expected to increase from less than three per year in the 1950s to approximately 44 per year by 2050.[21]

The projected changes after 2050, however, are critically dependent on how quickly we stop emitting greenhouse gases. As the GC3 *Phase 1 Report* states, ***"Coordinated mitigation now means it is more likely that the temperature will stabilize after 2050. If not, warming is likely to accelerate."***[3]

Recommendations

1. **Expand the Connecticut Energy Assistance Program to include cooling assistance.** ***(Aligns with GC3 Recommendation 51.d)***

During a heatwave, indoor temperatures can become dangerously hot. Air conditioning provides substantial protection against heat-related illness and death for at-risk groups,[22] though it can be prohibitively expensive for low-income households,[23] particularly in Connecticut where energy costs are among the highest in the country. **To avoid contributing to greater greenhouse gas emissions, actions to increase air conditioning should be combined with improved home energy efficiency and weatherization (see *Recommendation 2*), as well as a rapid transition to renewable energy. Additionally, the air conditioners should be the most energy efficient models, including ENERGY STAR certified window units and heat pumps.**

[18] Jessel S, Sawyer S, Hernández D. Energy, Poverty, and Health in Climate Change: A Comprehensive Review of an Emerging Literature. *Frontiers in Public Health*. 2019;7:357-357.

[19] Petersen EE, Davis NL, Goodman D, et al. Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016. *MMWR Morb Mortal Wkly Rep*. 2019;68:762–765.

[20] Bekkar B, Pacheco S, Basu R, DeNicola N, Association of Air Pollution and Heat Exposure With Preterm Birth, Low Birth Weight, and Stillbirth in the US: A Systematic Review. *JAMA Network Open*. 2020;3(6):e208243.

[21] Seth A, Wang G, Kirchhoff C, Lombardo K, Stephenson S, Anyah R, et al. *Connecticut Physical Climate Science Assessment Report (PCSAR): Observed Trends and Projections of Temperature and Precipitation*. Connecticut Institute for Resilience and Climate Adaptation; 2019.

[22] Abbinett J, Schramm PJ, Widerynski S, Saha S, Beavers S, Eaglin M, et al., *Heat Response Plans: Summary of Evidence and Strategies for Collaboration and Implementation*. Climate and Health Program, Centers for Disease Control and Prevention; n.d.; online at https://www.cdc.gov/climateandhealth/docs/HeatResponsePlans_508.pdf.

[23] Rosenthal K, Kinney PL, Metzger KB. Intra-Urban Vulnerability to Heat-Related Mortality in New York City, 1997-2006. *Health Place*. 2014;30:45-60.

The Low-Income Home Energy Assistance Program (LIHEAP) is a federally-funded program that provides financial assistance to low-income households to help them pay energy bills. While the program allows coverage of both heating and cooling, Connecticut currently only covers heating. **For the 2022 program plan, we recommend that the Low-Income Energy Advisory Board (LIEAB) elect to expand the program to include cooling assistance, and that the state legislature approve this program change. Since Connecticut in recent years has not fully utilized its federal program funds – for instance, from FY 2014 to FY 2018, the program carried over, on average, $6.7 million each year from the prior year[24]** – there is room to expand the program's reach to address the growing health risks from climate change. Other states in the region, including New York and New Jersey, offer cooling assistance through utility bill support or by providing new air conditioner units.[25] We also recommend that LIEAB and its state partners consider creative, multi-solving solutions. For instance, the Maine State Housing Authority uses LIHEAP funds to pay for heat pumps and their installation for eligible homeowners;[26] these heat pumps provide state-of-the-art energy efficient heating and cooling.

2. Implement strategies to overcome the health, safety, and legal issues in homes that are barriers to efficiency upgrades, so that homes are better insulated to keep cool air inside. ***(Aligns with GC3 Recommendation 7)***

Households receiving energy assistance should be priority recipients of weatherization and energy efficiency measures. Doing so would reduce household energy costs, including summertime electricity costs from running air conditioning. B**y making the homes more energy efficient, weatherization also lowers greenhouse gas emissions, aligning with the state's climate goals. In addition, weatherization produces health benefits: in a national study of weatherized households, researchers found that residents experienced fewer bad physical or mental health days; suffered fewer persistent colds; experienced fewer doctor and emergency room visits and hospitalizations, including for heat stress and asthma; and were better able to pay their energy, medical, and food costs.[27]**

However, health, safety, and legal barriers – such as asbestos, lead, mold, and knob-and-tube wiring – prevent homeowners from being allowed to complete home energy audits and pursue weatherization.[28] For example, a home with asbestos insulation is required to perform expensive asbestos abatement before being permitted to have an energy audit. We recommend that the Department of Energy and Environmental Protection (DEEP) and the Department of Social Services (DSS) find ways to apply federal funds from the Weatherization Assistance Program and LIHEAP toward addressing these barriers. We also encourage DEEP and DSS to continue working together to create a more comprehensive approach to energy efficiency, weatherization, and utility assistance programs in order to maximize their reach and impact.

3. Support urban tree planting and maintenance in Connecticut's cities to help counteract the urban heat island effect. ***(Aligns with GC3 Recommendations 29 & 35.c)***

Greenspace, including parks and street trees, provides a cooling effect in urban areas. Urban trees can provide other benefits, as well, including neighborhood beautification, air purification, absorption of carbon dioxide,

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[24] Public Utilities Regulatory Authority Prosecutorial. Prosecutorial Team Report on Docket No. 17-12-03RE01 Sprint Track 1. 2020; online at http://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e852576190052b64d/9bd04d365e16c534852586110047c1fe/$FILE/Appendix%20A%20-%20Sprint%20Track%201%20Report.pdf

[25] Low Income Heat Energy Assistance Program (LIHEAP). State of New Jersey Department of Community Affairs. 2021; online at https://www.nj.gov/dca/divisions/dhcr/offices/hea.html. Home Energy Assistance Program (HEAP). New York State Office of Temporary and Disability Assistance. 2021; online at https://otda.ny.gov/programs/heap/#cooling-assistance.

[26] Main Housing. *Heat Pump Program*. n.d.; online at https://www.mainehousing.org/programs-services/energy/energydetails/heat-pump-program.

[27] Tonn B, Rose E, Hawkins B, Conlon B. *Health and Household-Related Benefits Attributable to the Weatherization Assistance Program*. Oak Ridge National Laboratory; 2014; online at https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_345.pdf

[28] Efficiency For All. *Health and Safety Barriers to Weatherization Study*. 2017; online at https://efficiencyforall.org/wordpress/wp-content/uploads/2020/08/Health-and-Safety-Barriers-study-final-report3-17-17.pdf.

and wildlife habitat. Planting new trees is important, particularly to introduce trees to neighborhoods with few existing ones. For new trees to meet community goals, tree plantings should be done in partnership with neighborhood residents and community organizations. In New Haven, the Urban Resources Initiative provides a nationally respected example of urban forestry and ecosystem restoration through community participation.[29] In addition to planting new trees, preventive maintenance and protection of existing larger and older trees is a key component of a municipal tree program, particularly since larger trees provide more cooling effect. Policies to consider include shade tree ordinances, which set standards for the protection and management of public (and sometimes private) trees in a municipality,[30] and dedicated funds for urban tree maintenance.

4. Protect against heat-related illnesses at outdoor and indoor worksites. ***(Aligns with GC3 Recommendation 51.b)***

Currently, there is no federal heat stress standard to protect workers against hazardous heat.[31] In Connecticut, private sector employers must comply with federal OSHA standards, which are enforced by the US Department of Labor. Public sector employers must comply with the Connecticut State Plan, enforced by the Connecticut Department of Labor's Division of Occupational Safety and Health (CONNOSHA); Connecticut adopts the federal standards as its state plan. Therefore, to protect workers in Connecticut and across the country, federal OSHA needs to adopt a federal standard that specifically protects outdoor and indoor US workers from occupational exposure to excessive heat. A comprehensive federal standard should include a heat acclimatization plan for new and returning employees; temperature and humidity exposure limits that trigger protective measures, including rest and shade; hydration; and protection for workers from punitive action for exercising their rights under the standard.[32]

Additionally, each Connecticut occupational health and safety entity – CONNOSHA, Connecticut offices of the Department of Labor, and the Connecticut OSHA Consultation Program – should continue to provide education and training about preventing heat health risks. Finally, we recommend that in circumstances of excessive heat, the entities with enforcement responsibilities fully enforce the Occupational Safety and Health Act's General Duty Clause (requiring employers to provide a workplace "free from recognizable hazards that are causing or are likely to cause death or serious harm to employees").

5. Protect children's health by enacting policies to address exposure to extreme heat events while at school and playing outdoor sports. ***(Aligns with GC3 Recommendation 51.a)***

In past years, Connecticut school districts have been forced to cancel school or declare early dismissals because of the dangerous combination of high heat days and school buildings that lack air conditioning. Elevated temperatures, as well as high humidity, in the classroom have been found to negatively impact both test-taking and long-term learning outcomes.[33] Currently, however, Connecticut lacks laws or public health codes to protect students and staff from excessive indoor heat in school buildings, including mandating indoor temperature limits. To address these health concerns, we recommend that the Connecticut legislature set a standard for air temperature in school buildings, which includes an acceptable temperature range. We also recommend that Connecticut pursue school campus design standards, such as those in the *Northeast*

[29] For more information, visit the Urban Resources Initiative online at https://uri.yale.edu.

[30] Swiecki TJ and Bernhardt EA. *Guidelines for Developing and Evaluating Tree Ordinances.* International Society of Arboriculture. 2001; online at https://conservationtools-production.s3.amazonaws.com/library_item_files/597/544/treeord.pdf?AWSAccessKeyId=AKIAIQFJLILYGVDR4AMQ&Expires=1613486856&Signature=PcdLJo8TYFlSx3WvnRA1t%2FnTED0%3D

[31] Occupational Safety and Health Administration. *Heat Standards*. n.d.; online at https://www.osha.gov/SLTC/heatstress/standards.html.

[32] *Asuncion Valdivia Heat Illness and Fatality Prevention Act of 2019* (USA). online at https://www.congress.gov/bill/116th-congress/house-bill/3668. Jacklitsch B, Williams WJ, Musolin K, Coca A, Kim J-H, Turner N. *Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments*. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. DHHS (NIOSH) Publication 2016-106. online at https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf?id=10.26616/NIOSHPUB2016106

[33] Einstein M. *How Extreme Heat Affects Learning*. 2020; online at https://fsi.stanford.edu/news/how-extreme-heat-affects-learning

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Students also are exposed to health-threatening heat while playing scholastic outdoor sports. Importantly, the Connecticut Interscholastic Athletic Conference has already instituted heat acclimatization policies and provides important guidance on practices and precautions to reduce athletes' risk of heat-related illness. However, more can be done. Coaches, parents, and athletes would benefit from greater education around preventing, recognizing, and properly treating heat-related illness. Additionally, Connecticut lacks heat modification policies for youth sports, which would specify when to make practice and game modifications, based on the combination of heat and humidity.[35]

6. **Develop and maintain local heat response plans at the municipal level.** ***(Aligns with GC3 Recommendation 51.c)***

A heat response plan establishes and coordinates activities to protect against heat-related illness and death within a jurisdiction; it can be a stand-alone plan or included with a municipality's all-hazards plan.[20] We recommend that all Connecticut municipalities develop and maintain a heat response plan. Importantly, the planning process should actively involve representation from the jurisdiction's vulnerable populations.

The Connecticut Department of Public Health and the Connecticut Division of Emergency Management and Homeland Security can support municipalities by developing evidence-based standards for heat response plans. Important plan components may include: identification of vulnerable populations and geographies; thresholds for activation; delineation of roles and identification of partnerships; preparedness and response actions, including heat health messaging, communications tools, and operation of cooling centers; and longer-term adaptation measures, such as changes to the built environment.[20]

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https://publichealth.yale.edu/climate/policy_practice/connecticut/

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The Yale Center on Climate Change and Health is supported by a generous grant from the High Tide Foundation. We also gratefully acknowledge a generous gift from The Patrick and Catherine Weldon Donaghue Medical Research Foundation to support the design of this report.

Solve Climate 2020 An Equity Based path forward

Leticia Colon de Mejias is a nationally awarded building scientist, workforce development leader, and environmental equity speaker. She is the founder of the Nationally awarded company Energy Efficiencies Solutions, Chair of the nonprofit Efficiency For All, Policy Co-Chair of the National Building

[34] NEEP. *Northeast Collaborative For High Performance Schools Criteria (NE-CHPS) Version 3.2*. 2019; online at https://neep.org/sites/default/files/resources/NE%20CHPS%20v3.2%20FINAL%204.3.19.pdf

[35] Korey Stringer Institute, *Wet Globe Bulb Monitoring*, online at https://ksi.uconn.edu/prevention/wet-bulb-globe-temperature-monitoring/. Grundstein A, Williams C, Phan M, Cooper E. Regional heat safety thresholds for athletics in the contiguous United States. *Applied Geography*. 2015 Jan 1;56:55-60. online at https://ksi.uconn.edu/wp-content/uploads/sites/1222/2018/08/RegionalWBGT_2015_AppliedGeography.pdf.

Performance Association, a Commissioner for the state of Connecticut Commission on Women Children Elderly Latino & Puerto Rican Affairs, and Founder and President of Green Eco Warriors. She is an awarded published children's book author with several books on environmental leadership, sustainability, as well as a line of educational science based graphic texts (comic books) which feature a cast of diverse superheroes and align with national science standards. She is the recipient of many national awards, including the **United States of America's** Department of Energy Award for work with at risk and minority populations, National Award Building Scientist Hall of Fame , Minority Small Business of the year award, National Department of Education award, and she is a two time Capital Workforce Partners Employer of the Year Award. Her companies have provided energy efficiency assessments and upgrades to over 20,000 CT households and completed full energy efficiency retrofits in over 10 million square feet of multifamily housing. Through the nonprofit Green Eco Warriors, she has provided climate and energy education to over 40,000 youth and families.

The Energy–Water **NEXUS**:

$E = H_2O$

Whiskey is for drinking, water is for fighting over.
—**Mark Twain**

by JOHN TOOLEY

When anything is very inexpensive and not at the forefront in our minds, it can go undervalued and be misunderstood. Water falls into this dark hole. It's not that we are running out of water; we are not. The problem is that the water isn't always where we need it. The United Nations Environment Program reports that 97.5% of all water on earth is saltwater and 2.5% is freshwater. Of the 2.5% of freshwater, 0.3% is in lakes and rivers, and 30.8% is groundwater, including soil moisture, swamp water, and permafrost. A robust 68.9% of the 2.5% is in glaciers and permanent snow cover.

Oh, don't forget; some of that water is in you and your dog. Stephen Leahy says that a good way to visualize these numbers is that if the world's water filled a 5-gallon water cooler bottle, the available freshwater would be equivalent to only 3 teaspoons of drinkable water (see Figure 1).

Figure 1. If the world's water filled a 5-gallon water-cooler bottle, the available freshwater would be equivalent to only 3 teaspoons of drinkable water.

"If we're starting with the wrong questions," says Simon Sinek, "if we don't understand the cause, then even the right answers will always steer us wrong . . . eventually. The truth, you see, is always revealed . . . eventually." So let's focus on just a few "whys" for what we do.

Freshwater resources are fundamental for maintaining human health, agricultural production, economic activity, and power production, as well as critical ecosystem functions. Population growth, urbanization, and climate change add new stress to our access to water. The availability—or unavailability—of water is illustrated in the nation's drought footprint maps, published by the New York Times from 1899 to 2010. These maps plainly show that sooner or later, no matter where we live, drought will visit us. Benjamin Franklin was right in 1746 when he said, "When the well's dry, we know the worth of water."

It's like the story of the frog in the pan of boiling water. When a negative change occurs slowly enough, we are not conscious of it and most of the time, it doesn't trigger any reaction. This is exactly what is happening in much of our nation regarding running out of water.

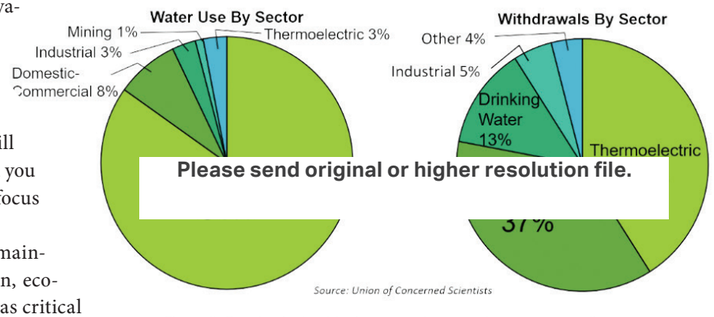

Figure 2. Farming is the thirstiest user of our precious water supplies.

Our withdrawal and use of water have increased dramatically over the last 50 years. The result of this increase has given us numerous reasons to reduce our water use. Following Simon Sinek's lead, let's start with why educing water use is so important, and why what we do is more valuable than we may have thought. We in home performance need to add water efficiency to the valuable things we do. We often say that we do what we do in order to make homes healthy and safe, durable, comfortable, energy (and water) efficient, and environmentally responsible. I think it's important to point out that we are helping to reduce water use by the work that we do.

The demand for water is humongous, the technical word for colossal. First, there's irrigation—farming is the thirstiest user of our precious water supplies—but power production and other sectors are competing for our freshwater as well (see Figure 2).

There is a major difference between use and withdrawal. Water use, is defined as use that permanently withdraws water from its source. This water is no longer available, because it has evaporated; been transpired by plants, incorporated into products or crops, or consumed by people or livestock; or has otherwise been removed from the immediate water environment. The steam that pours out of the cooling towers of thermal electric power plants is water that has been used. Agriculture accounts for 84% of water use, as shown in Figure 2. Water withdrawal is defined as diversion of water from surface water or a groundwater source. Thermoelectric power plants withdraw the most water at 42%, and irrigation is not far behind at 37%.

Thermoelectric power plants are the largest users of water withdrawn from surface water or a groundwater source. This could be seen as an engineering challenge. Why not capture the steam, cool it enough to condense it, and inject the water into the ground or a cooling pond? Then reuse that water, so the need for cooling water is minimized? Also, greenhouse growing cuts water use by about half when compared to open farming. There is a lot we could do to use water more efficiently. Looking forward, it could make sense to phase out thermoelectric power plants and replace them, primarily with efficiency, and then with PV and hydroelectric.

Our work in home performance can reduce both water use and withdrawal by thermoelectric power plants. There is a movement afoot for electrification of all homes. I agree with this movement to drastically reduce our dependence on oil. We are learning more about how to air seal and insulate homes. "Airtight, insulate right, and ventilated" is taking root.

We need to recognize the full value of what we do and then help those who work with us to see how useful the work we do is. The National Renewable Energy Laboratory (NREL) reports that direct household water use is way less than water use to produce household electricity (see Figure 3). This is where we come in. The national average water used to produce 1 kWh of electricity at thermoelectric power plants is 50 gallons of cooling water (see Figure 4). (By comparison, a study conducted 2003 by NREL determined that the national-level water consumption for hydropower in the United States is 18.2 gal/kWh. That study ag-

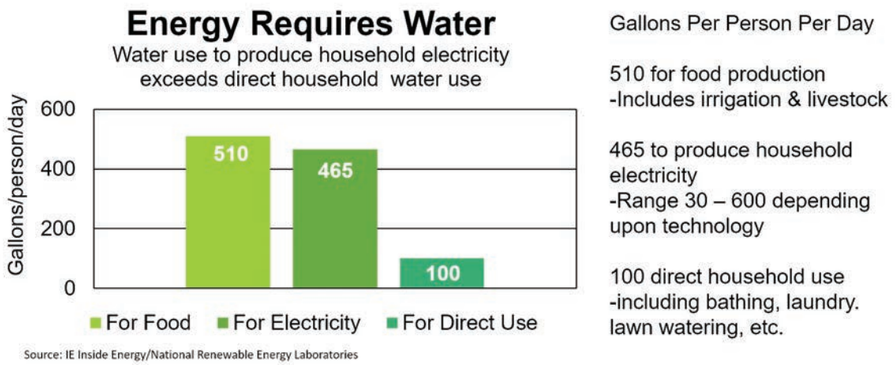

Figure 3. Direct household water use (for bathing, laundry, washing cars, watering lawns, and so on) is way less than water use to produce household electricity.

Figure 4. One kWh of electricity generation at thermonuclear power plants requires 50 gallons of cooling water.

gregated the water evaporation from individual reservoirs using yearly averaged pan evaporation data.)

Think about that. A home performance company that achieves a reduction of 30% household electricity for a family of four could reduce the need for 16,740 gallons of cooling water a month needed to produce that electricity. This equals 200,880 gallons per year. The fact that energy efficiency in homes reduces water use is a great public relations message for our companies and utilities.

What More Can We Do to Reduce Our Personal Water Use?

Assuming that we have our house in order, there are a few other things we might consider. We may never completely do either of the following two things, but even a small change can make a big difference.

If we look at transportation's thirst for ethanol, we see that producing 1 gallon of ethanol takes, on average, about 100 gallons of water. In some regions, however, ethanol production can take 3 or more times that amount—mostly depending on the amount of rain and the need for irrigation. Then there is the production of biofuels, which has increased sharply in recent years, with a significant impact on water demand. Between 264 and 1,068 gallons of water are needed to produce a single gallon of biofuel. We often gauge our work by its payback. We might want to consider some of Cornell University's research. According to Cornell University ecologist David Pimentel, growing corn and processing it into 1 gallon of ethanol requires 131,000 Btu of energy, but the resulting ethanol contains only 77,000 Btu. And since fossil-fuel-powered equipment is used to plant, harvest and process the corn and distribute the ethanol, the numbers only get worse. There are several suppliers of ethanol-free gas in your area. Mr. Google can help you locate them.

The Water We Eat

We need energy to power our daily lives. The energy water–nexus and food are unavoidably connected. Absolute numbers of people don't influence water demand as much as does our diet. The total amount of water embedded in the food we eat is beyond humongous. We eat no less than 924 gallons a day. But this number greatly varies depending on what we eat.

Looking forward, it could make sense to phase out thermoelectric power plants and replace them, primarily with efficiency, and then with PV and hydroelectric.

Consider meat. The animals we eat may live years before being slaughtered for our consumption. The feed they eat was grown, watered, and harvested. All this takes water. The meat from those animals was transported to market, transported home, refrigerated, and then prepared for us to eat. That takes more water.

Meat is the most water-intensive thing we eat. It takes 15,400 gallons of water to produce a pound of beef. It takes 643 gallons to produce one cheeseburger. Two pounds of pork chops, 1,582 gallons. Two pounds of chicken, 1,136 gallons. We could really reduce our water intake by avoiding meat one day a week. Meatless Monday is an informative site to consider. The less meat we eat, the less water we are eating.

And it's not just meat. Other examples might be a cup of coffee, 37 gallons; a cup of tea, 9 gallons; one apple, 33 gallons; 2 pounds of tomatoes, 56.5 gallons; 2 pounds of wheat flour, 488 gallons—and the list goes on (see Table 1).

Clean energy is often defined as energy produced with low amounts of carbon. Clean energy is the value proposition that we have attached to our energy efficiency work. We can provide that value by reducing water use as well as energy use. I thank each and every one of you in this industry for your commitment to such a transcendent purpose.

John Tooley *recently retired from Advanced Energy and now owns and operates John Tooley, LLC, where he consults, coaches, and does trainings on Business and Building Science.*

>> learn more

UNESCO, "The Properties and Availability of Water: A Fundamental Consideration for Life", Venice, Water Civilization International Centre, 2009. The report is available at www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Venice/pdf/special_events/bozza_scheda_DOW02_1.0.pdf.

Leahy, Stephen. Your Water Footprint. Ontario, Canada: Firefly Books, 2014. Find it online at yourwaterfootprint.me.

Synec, Simon. Start with Why: How Great Leaders Inspire Everyone to Take Action. New York: Penguin Group, 2009. To purchase, go to www.amazon.com/Start-Why-Leaders-Inspire-Everyone/dp/1591846447.

New York Times. "Drought's Footprint." July 19, 2012. See it online at archive.nytimes.com/www.nytimes.com/interactive/2012/07/20/us/drought-footprint.html?_r=0

Torcellini, P., N. Long, and R. Judkoff. "Consumptive Water Use for U.S. Power Production", NREL/TP-550-33905. Golden Colorado: NREL, December 2003. The report is is available for download at www.nrel.gov/docs/fy04osti/33905.pdf.

The statistic about the water used to make I liter of ethanol can be found here: www.worldometers.info/water.

Pimentel, David and Marcia Pimentel. "Corn and Cellulosic Ethanol Cause Major Problems." Energies 1, 2008, 35-37.

The statistic about how much water we "eat" is available at thewaterweeat.com.

The Meatless Monday site is www.meatlessmonday.com.

Extreme Heat in Connecticut: A Yale Center on Climate Change and Health Issue Brief

YALE CENTER ON CLIMATE CHANGE AND HEALTH

Introduction

In Summer 2020, the Hartford area broke a 37-year-old record for the most days in a year reaching temperatures of 90 °F or above.[1] In the last 125 years, six of the hottest years in Connecticut have been since 2005.[2] It is clear that climate change is no longer a distant threat; its impacts are visible now, here in Connecticut, and its adverse impacts on human health are of increasing concern.

Many people do not realize how deadly heat can be; for this reason, heat is often called a 'silent killer.' Importantly, however, heat-related illness and death is preventable. The Connecticut General Assembly, the Connecticut Department of Public Health, municipalities, and other decision-makers have an important role to play in preventing heat-related illness in Connecticut. The Governor's Council on Climate Change (GC3) *Phase 1 Report*[3] identifies recommendations to address these risks. The Yale Center on Climate Change and Health underscores and amplifies those proposed actions by recommending the following:

- **Expand the Connecticut Energy Assistance Program to include cooling assistance**
- **Implement strategies to overcome the health, safety, and legal issues in homes that are barriers to efficiency upgrades, so that homes are better insulated to keep cool air inside**
- **Support urban tree planting and maintenance in Connecticut's cities to help counteract the urban heat island effect**
- **Protect against heat-related illnesses at outdoor and indoor worksites**
- **Protect children's health by enacting policies to address exposure to extreme heat events while at school and playing outdoor sports**
- **Develop and maintain local heat response plans at the municipal level**

In *Climate Change and Health in Connecticut: 2020 Report*, the Yale Center on Climate Change and Health evaluated how climate change affects human health in Connecticut by tracking 19 indicators related to changes to the environment and to our health.[4] We summarize below our findings to explain what we know about how temperatures have changed—and are expected to change—in Connecticut and how this impacts our health.

How has the environment changed?

Average annual temperature in Connecticut has increased by 3.2 °F since 1895.[2] This impacts our health because of a number of environmental changes, including:

- **HOTTER NIGHTS**
  Warmer nighttime temperatures can be especially dangerous, particularly for people living in urban areas and for those without access to air conditioning. This is because cool nights are typically an opportunity for the body to cool down; without this cooling-off time, heat waves can be even more perilous.
- **MORE HEAT WAVES**
  While there has not been an observed change in the number of extreme heat days (days with maximum temperature over 90 °F) since the mid-1900's,[5] under climate change extreme heat days are expected to increase significantly.
- **BAD GROUND-LEVEL OZONE DAYS**
  The hottest days often are associated with the highest concentrations of air pollutants, particularly ground-level ozone, or smog. Ground-level ozone pollution is a problem across all of Connecticut.[4] In fact, the American Lung Association gave all eight Connecticut counties "F" grades for ozone pollution in its 2020 *State of the Air Report*.[6] Looking to the future, higher temperatures caused by climate change are expected to bring about higher ground-level ozone concentrations, especially in already polluted areas.[7] Ozone is dangerous to health, worsening conditions including chronic obstructive pulmonary disease and asthma.[8] Children are at higher risk from ozone exposure, especially for asthma exacerbations, since their lungs are still developing and they are likely to be active outdoors when ozone levels are high.

What does this mean for our health?

Heat-related illnesses, such as heat exhaustion or heat stroke, happen when the body is not able to properly cool itself. While the body normally cools itself by increasing blood flow to the skin (which then transfers heat from the skin to the surrounding air) and by sweating, during extreme heat, this might not be enough, especially during physical activity. In these cases, a person's body temperature rises faster than it can cool itself down. In heat stroke, this can cause damage to the brain and other vital organs, or even death. **From 2007 to 2016 in Connecticut, there were on average 422 emergency department visits and 45 hospitalizations per year for heat stress**.[9] This is surely an underestimate of heat-related illness, however. One reason is that in addition to causing heat exhaustion and heat stroke, heat also can worsen kidney, heart, lung, and other chronic diseases, resulting in emergency department visits and hospitalizations. Physicians rarely document these as heat-related admissions.

Who is most at risk?

Extreme heat can affect everyone; however, some people are more vulnerable than others. Population groups most at risk include:

- **Outdoor workers:** Even when it's very hot, outdoor workers must exert themselves physically outside, putting them at risk for heat-related illness. Outdoor workers also often lack control over their work environment and important behavioral adaptation decisions like taking breaks or seeking shade.[10]
- **Older adults:** In Connecticut, individuals aged 75 and older are most at risk for hospitalization due to heat-related illness.[11] Older adults are more sensitive to heat, are less likely to perceive being overheated and to respond accordingly, and are more likely to have a chronic medical condition that can be exacerbated by heat stress or take medication that may affect their body's ability to regulate its temperature.[12] Finally, social isolation is another factor that can greatly increase vulnerability among the elderly.[13]
- **Urban residents:** Cities can be much warmer than the surrounding areas due to the "urban heat island effect," in which a city's infrastructure—largely made up of dark-colored asphalt, concrete, and metal—traps and absorbs the sun's energy and re-emits it as heat, increasing the air temperature. Connecticut's urban heat islands coincide with low-income communities and communities of color where housing more frequently lacks insulation, good ventilation, and air conditioning.[14]
- **People experiencing homelessness** are likely to be exposed to outdoor temperatures and to live in urban areas, where their exposure is amplified through the urban heat island effect. They are likely to have high sensitivity to extreme heat effects due to risk factors such as psychiatric illness, heart or lung disease, substance use, and social isolation.[15] Finally, people experiencing homelessness have less access to important adaptive capacity measures, including shade from trees, air conditioning, and medical services.
- **Low-income populations** have limited resources to adapt during heat events. In particular, people with low wealth are more likely to live in inadequately insulated housing and to not be able to afford or use air conditioning.[16] They may be more exposed to high temperatures at their workplaces or while using public transportation. They may also have inadequate access to cooling centers and to routine and emergency health care.
- **Pregnant women** are more vulnerable to heat-related illness. In addition, preterm birth, low birth weight, and infant mortality have been associated with extreme heat. Importantly, factors affecting vulnerability and adaptive capacity are cumulative. For instance, black mothers are three times more likely to die from pregnancy-related problems than white women[17] and are at greater risk for preterm birth and for having a low-birth-weight baby.[18]
- **Young children** are vulnerable because they must rely on others to help keep them safe and cool, because of their immature physiology and metabolism, and because they are often physically active outside. Outdoor youth athletes, particularly foot-

ball players, are vulnerable to heat-related illness when not properly acclimatized.

What can we expect in the future?

There is high confidence in the temperature projections that scientists have developed through mid-century (or about 2050). Under these projections, in Connecticut we can expect to experience an approximately 5 °F increase in average temperature by 2050, compared to the 1970–1999 reference period.[19] **This means that we can expect extreme heat events to become more common and severe, and to last longer**. In particular, researchers project that the number of warm spell days (similar to a measure of the number of heat wave days per year) are expected to increase from less than three per year in the 1950s to approximately 44 per year by 2050.[19]

The projected changes after 2050, however, are critically dependent on how quickly we stop emitting greenhouse gases. As the *GC3 Phase 1 Report* states, **"Coordinated mitigation now means it is more likely that the temperature will stabilize after 2050. If not, warming is likely to accelerate."**[3]

Recommendations

1 Expand the Connecticut Energy Assistance Program to include cooling assistance. (Aligns with GC3 Recommendation 51.d)

During a heatwave, indoor temperatures can become dangerously hot. Air conditioning provides substantial protection against heat-related illness and death for at-risk groups,[20] though it can be prohibitively expensive for low-income households,[21] particularly in Connecticut where energy costs are among the highest in the country. To avoid contributing to greater greenhouse gas emissions, actions to increase air conditioning should be combined with improved home energy efficiency and weatherization (see **Recommendation 2**), as well as a rapid transition to renewable energy. Additionally, the air conditioners should be the most energy efficient models, including ENERGY STAR certified window units and heat pumps.

The Low-Income Home Energy Assistance Program (LIHEAP) is a federally-funded program that provides financial assistance to low-income households to help them pay energy bills. While the program allows coverage of both heating and cooling, Connecticut currently only covers heating. For the 2022 program plan, we recommend that the Low-Income Energy Advisory Board (LIEAB) elect to expand the program to include cooling assistance, and that the state legislature approve this program change. Since Connecticut in recent years has not fully utilized its federal program funds—for instance, from FY 2014 to FY 2018, the program carried over, on average, $6.7 million each year from the prior year[22]—there is room to expand the program's reach to address the growing health risks from climate change. Other states in the region, including New York and New Jersey, offer cooling assistance through utility bill support or by providing new air conditioner units.[23] We also recommend that LIEAB and its state partners consider creative, multi-solving solutions. For instance, the Maine State Housing Authority uses LIHEAP funds to pay for heat pumps and their installation for eligible homeowners;[24] these heat pumps provide state-of-the-art energy efficient heating and cooling.

2 Implement strategies to overcome the health, safety, and legal issues in homes that are barriers to efficiency upgrades, so that homes are better insulated to keep cool air inside. (Aligns with GC3 Recommendation 7)

Households receiving energy assistance should be priority recipients of weatherization and energy efficiency measures. Doing so would reduce household energy costs, including summertime electricity costs from running air conditioning. By making the homes more energy efficient, weatherization also lowers greenhouse gas emissions, aligning with the state's climate goals. In addition, weatherization produces health benefits: in a national study of weatherized households, researchers found that residents experienced fewer bad physical or mental health days; suffered fewer persistent colds; experienced fewer doctor and emergency room visits and hospitalizations, including for heat stress and asthma; and were better able to pay their energy, medical, and food costs.[25]

However, health, safety, and legal barriers—such as asbestos, lead, mold, and knob-and-tube wiring—prevent homeowners from being allowed to complete home energy audits and pursue weatherization.[26] For example, a home with asbestos insulation is required to perform expensive asbestos abatement before being permitted to have an energy audit. We recommend that the Department of Energy and Environmental Protection (DEEP) and the Department of Social Services (DSS) find ways to apply federal funds from the Weatherization Assistance Program and LIHEAP toward addressing these barriers. We also urge DEEP and DSS to continue working together to create a more comprehensive approach to energy efficiency, weatherization, and utility assistance programs in order to maximize their reach and impact.

3 **Support urban tree planting and maintenance in Connecticut's cities to help counteract the urban heat island effect. (Aligns with GC3 Recommendations 29 & 35.c)**

Greenspace, including parks and street trees, provides a cooling effect in urban areas. Urban trees can provide other benefits, as well, including neighborhood beautification, air purification, absorption of carbon dioxide, and wildlife habitat. Planting new trees is important, particularly to introduce trees to neighborhoods with few existing ones. For new trees to meet community goals, tree plantings should be done in partnership with neighborhood residents and community organizations. In New Haven, the Urban Resources Initiative provides a nationally respected example of urban forestry and ecosystem restoration through community participation.[27] In addition to planting new trees, preventive maintenance and protection of existing larger and older trees is a key component of a municipal tree program, particularly since larger trees provide more cooling effect. Policies to consider include shade tree ordinances, which set standards for the protection and management of public (and sometimes private) trees in a munipality,[28] and dedicated funds for urban tree maintenance.

4 **Protect against heat-related illnesses at outdoor and indoor worksites. (Aligns with GC3 Recommendation 51.b)**

Currently, there is no federal heat stress standard to protect workers against hazardous heat.[29] In Connecticut, private sector employers must comply with federal OSHA standards, which are enforced by the US Department of Labor. Public sector employers must comply with the Connecticut State Plan, enforced by the Connecticut Department of Labor's Division of Occupational Safety and Health (CONNOSHA); Connecticut adopts the federal standards as its state plan. Therefore, to protect workers in Connecticut and across the country, federal OSHA needs to adopt a federal standard that specifically protects outdoor and indoor US workers from occupational exposure to excessive heat. A comprehensive federal standard should include a heat acclimatization plan for new and returning employees; temperature and humidity exposure limits that trigger protective measures, including rest and shade; hydration; and protection for workers from punitive action for exercising their rights under the standard.[30]

Additionally, each Connecticut occupational health and safety entity—CONNOSHA, Connecticut offices of the Department of Labor, and the Connecticut OSHA Consultation Program—should continue to provide education and training about preventing heat health risks. Finally, we recommend that in circumstances of excessive heat, the entities with enforcement responsibilities fully enforce the Occupational Safety and Health Act's General Duty Clause (requiring employers to provide a workplace "free from recognizable hazards that are causing or are likely to cause death or serious harm to employees").

5 **Protect children's health by enacting policies to address exposure to extreme heat events while at school and playing outdoor sports. (Aligns with GC3 Recommendation 51.a)**

In past years, Connecticut school districts have been forced to cancel school or declare early dismissals be-

cause of the dangerous combination of high heat days and school buildings that lack air conditioning. Elevated temperatures, as well as high humidity, in the classroom have been found to negatively impact both test-taking and long-term learning outcomes.[31] Currently, however, Connecticut lacks laws or public health codes to protect students and staff from excessive indoor heat in school buildings, including mandating indoor temperature limits. To address these health concerns, we recommend that the Connecticut legislature set a standard for air temperature in school buildings, which includes an acceptable temperature range. We also recommend that Connecticut pursue school campus design standards, such as those in the *Northeast Collaborative for High Performance Schools Criteria*,[32] that keep schools cool in an energy efficient and sustainable manner.

Students also are exposed to health-threatening heat while playing scholastic outdoor sports. Importantly, the Connecticut Interscholastic Athletic Conference has already instituted heat acclimatization policies and provides guidance on practices and precautions to reduce athletes' risk of heat-related illness. However, more can be done. Coaches, parents, and athletes would benefit from greater education around preventing, recognizing, and properly treating heat-related illness. Additionally, Connecticut lacks heat modification policies for youth sports, which would specify when to make practice and game modifications, based on the combination of heat and humidity.[33]

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The Yale Center on Climate Change and Health is supported by a generous grant from the High Tide Foundation. We also gratefully acknowledge a generous gift from The Patrick and Catherine Weldon Donaghue Medical Research Foundation to support the design of this report.

ENDNOTES: NEXT PAGE

1
Hartford Breaks Record for Most Days at 90 Degrees or Higher. *Associated Press News*. 2020; online at https://apnews.com/article/bfbe58a5e83e689d920bb18438071412.

2
Climate Change and Health in Connecticut: 2020 Report, based on data from: NOAA National Centers for Environmental Information. *Climate at a Glance: Statewide Time Series*. 2020; online at https://www.ncdc.noaa.gov/cag/.

3
Governor's Council on Climate Change. *Taking Action on Climate Change and Building a More Resilient Connecticut for All, Phase 1 Report: Near-Term Actions*. 2021; online at https://portal.ct.gov/-/media/DEEP/climatechange/GC3/GC3_Phase1_Report_Jan2021.pdf.

4
Bozzi L and Dubrow R. *Climate Change and Health in Connecticut: 2020 Report*. New Haven, Connecticut, Yale Center on Climate Change and Health. 2020; online at https://publichealth.yale.edu/climate/YCCCH_CCHC2020Report_395366_5_v1.pdf.

5
Climate Change and Health in Connecticut: 2020 Report, based on data from: Eggleston K. SC ACIS Version 2. NOAA Northeast Regional Climate Center, editor. 2020; online at http://scacis.rcc-acis.org.

6
Report Card: Connecticut. American Lung Association: *State of the Air*. 2020; online at https://www.stateoftheair.org/city-rankings/states/connecticut/.

7
Nolte CG, Dolwick PD, Fann N, Horowitz LW, Naik V, Pinder RW, et al. Air quality. In: Reidmiller DR, Avery CW, Easterling DR, Kunkel KE, Lewis KLM, Maycock TK, et al., editors. *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*. Washington, DC: US Global Change Research Program; 2018.

8
US Environmental Protection Agency. *Health Effects of Ozone Pollution*. n.d.; online at https://www.epa.gov/ground-level-ozonepollution/health-effects-ozone-pollution.

9
Climate Change and Health in Connecticut: 2020 Report, based on data from: Connecticut Department of Public Health Environmental Public Health Tracking Program. *Connecticut Public Health Data Explorer*. 2020; online at https://stateofhealth.ct.gov.

10
Gubernot DM, Anderson GB, Hunting KL. The epidemiology of occupational heat exposure in the United States: a review of the literature and assessment of research needs in a changing climate. *International Journal of Biometeorology*. 2014;58(8):1779-88.

11
Hayes LE, Przysiecki P and Bozzi L. Submitted. A profile of heat-related mortality and hospital utilization for heat-related illness in Connecticut 1999-2018.

12
Millyard A, Layden JD, Pyne DB, Edwards AM, Bloxham SR. Impairments to thermoregulation in the elderly during heat exposure events. *Gerontology and Geriatric Medicine*. 2020; https://doi.org/10.1177/2333721420932432. Waldock KAM, Hayes M, Watt PW, Maxwell NS. Physiological and perceptual responses in the elderly to simulated daily living activities in UK summer climatic conditions. *Public Health*. 2018;161:163-70.

13
Gronlund CJ, Berrocal VJ, White-Newsome JL, Conlon KC, O'Neill MS. Vulnerability to extreme heat by socio-demographic characteristics and area green space among the elderly in Michigan, 1990–2007. *Environmental Research*. 2015;136:449-61. Naughton MP, Henderson A, Mirabelli MC, Kaiser R, Wilhelm JL, Kieszak SM, et al. Heat-related mortality during a 1999 heat wave in Chicago. *American Journal of Preventive Medicine*. 2002;22(4):221-7.

14
To access a map visualizing Connecticut's urban heat islands, visit the Global Surface UHI Explorer, based on data from: Chakraborty, T and Lee X. A simplified urban-extent algorithm to characterize surface urban heat islands on a global scale and examine vegetation control on their spatiotemporal variability. *International Journal of Applied Earth Observation and Geoinformation*. 2019;74, 269-280.

15
Ramin B, Svoboda T. Health of the homeless and climate change. *Journal of Urban Health*. 2009;86(4):654-64.

16
Jessel S, Sawyer S, Hernández D. Energy, Poverty, and Health in Climate Change: A Comprehensive Review of an Emerging Literature. *Frontiers in Public Health*. 2019;7:357-357.

17
Petersen EE, Davis NL, Goodman D, et al. Racial/Ethnic Disparities in Pregnancy-Related Deaths — United States, 2007–2016. *MMWR Morb Mortal Wkly Rep*. 2019;68:762–765.

18
Bekkar B, Pacheco S, Basu R, DeNicola N, Association of Air Pollution and Heat Exposure With Preterm Birth, Low Birth Weight, and Stillbirth in the US: A Systematic Review. *JAMA Network Open*. 2020;3(6):e208243.

19
Seth A, Wang G, Kirchhoff C, Lombardo K, Stephenson S, Anyah R, et al. *Connecticut Physical Climate Science Assessment Report (PCSAR): Observed Trends and Projections of Temperature and Precipitation*. Connecticut Institute for Resilience and Climate Adaptation; 2019.

20
Abbinett J, Schramm PJ, Widerynski S, Saha S, Beavers S, Eaglin M, et al., *Heat Response Plans: Summary of Evidence and Strategies for Collaboration and Implementation*. Climate and Health Program, Centers for Disease Control and Prevention; n.d.; online at https://www.cdc.gov/climateandhealth/docs/HeatResponsePlans_508.pdf.

21
Rosenthal K, Kinney PL, Metzger KB. Intra-Urban Vulnerability to Heat-Related Mortality in New York City, 1997-2006. *Health Place*. 2014;30:45-60.

22
Public Utilities Regulatory Authority Prosecutorial. Prosecutorial Team Report on Docket No. 17-12-03RE01 Sprint Track 1. 2020; online at http://www.dpuc.state.ct.us/dockcurr.nsf/8e6fc37a54110e3e8525761900052b64d/9bd04d365e16c534852586110047c1fe/ $FILE/Appendix%20A%20-%20Sprint%20Track%201%20Report.pdf.

23
Low Income Heat Energy Assistance Program (LIHEAP). State of New Jersey Department of Community Affairs. 2021; online at https://www.nj.gov/dca/divisions/dhcr/offices/hea.html. Home Energy Assistance Program (HEAP). New York State Office of Temporary and Disability Assistance. 2021; online at https://otda.ny.gov/programs/heap/#cooling-assistance.

24
Maine State Housing Authority. *Heat Pump Program*. n.d.; online at https://www.mainehousing.org/programs-services/energy/energydetails/heat-pump-program.

25
Tonn B, Rose E, Hawkins B, Conlon B. *Health and Household-Related Benefits Attributable to the Weatherization Assistance Program*. Oak Ridge National Laboratory; 2014; online at https://weatherization.ornl.gov/wp-content/uploads/pdf/WAPRetroEvalFinalReports/ORNL_TM-2014_345.pdf

26
Efficiency For All. *Health and Safety Barriers to Weatherization Study*. 2017; online at https://efficiencyforall.org/wordpress/wp-content/uploads/2020/08/Health-and-Safety-Barriers-study-final-report3-17-17.pdf.

27
For more information, visit the Urban Resources Initiative online at https://uri.yale.edu.

28
Swiecki TJ and Bernhardt EA. *Guidelines for Developing and Evaluating Tree Ordinances*. International Society of Arboriculture. 2001; online at https://wwv.isa-arbor.com/education/resources/educ_TreeOrdinanceGuidelines.pdf.

29
Occupational Safety and Health Administration. *Heat Standards*. n.d.; online at https://www.osha.gov/SLTC/heatstress/standards.html.

30
Asuncion Valdivia Heat Illness and Fatality Prevention Act of 2019 (USA). online at https://www.congress.gov/bill/116th-congress/house-bill/3668. Jacklitsch B, Williams WJ, Musolin K, Coca A, Kim J-H, Turner N. *Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments*. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. DHHS (NIOSH) Publication 2016-106. online at https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf?id=10.26616/NIOSHPUB2016106

31
Einstein M. *How Extreme Heat Affects Learning*. 2020; online at https://fsi.stanford.edu/news/how-extreme-heat-affects-learning

32
NEEP. *Northeast Collaborative For High Performance Schools Criteria* (NE-CHPS) Version 3.2. 2019; online at https://neep.org/sites/default/files/resources/NE%20CHPS%20v3.2%20FINAL%204.3.19.pdf

33
Korey Stringer Institute, *Wet Globe Bulb Monitoring*, online at https://ksi.uconn.edu/prevention/wet-bulb-globe-temperature-monitoring/. Grundstein A, Williams C, Phan M, Cooper E. Regional heat safety thresholds for athletics in the contiguous United States. *Applied Geography*. 2015 Jan 1;56:55-60. online at https://ksi.uconn.edu/wp-content/uploads/sites/1222/2018/08/RegionalWBGT_2015_AppliedGeography.pdf.