



**WEST  
HARTFORD**



# Energy Plan

West Hartford Clean Energy Commission | 2020

We aspire for our **entire** community  
to use 100% clean energy by 2050.





# How will we achieve 100% clean energy by 2050?

## 2022 Goals

## Long-Term Goals

### Residential



- 30% of residents participate in EnergizeCT energy efficiency programs
- 10% of residents receive rebates for performing energy retrofits
- Drop in energy assistance applications (potential short-term increase)
- At least 6% drop in residential energy use
- Low-to-moderate income campaign and heat pump campaign

- 50% or more drop in residential energy use
- Wide-spread culture of conservation, use of programs
- No barriers to program participation
- Limited need for energy assistance

### Commercial & Industrial



- 40% business participation in EnergizeCT programs
- 20% reduction in municipal energy use from FY13
- At least 6% drop in commercial energy use
- 2 new C-PACE projects
- Lead by Example town-business campaign

- 50% or more drop in commercial and industrial energy use, including municipal
- Wide-spread culture of conservation, use of programs
- No barriers to participation
- Multiple C-PACE projects
- Green, high-performing or zero-energy buildings

### Transportation



- EV strategy in municipal vehicle fleet plan and school bus contract RFP
- 1 more municipal EV charger
- 10% reduction in municipal fuel use from FY16
- 2% of registered vehicles are EV; at least 1 municipal EV
- Identify public transit champion; review related municipal employee policies
- EV educational event

- Fewer vehicle-miles travelled
- Integrated and accessible people-centric, multi-modal transportation system (e.g., walk, bike, mass transit, ride share, etc.)
- 100% of vehicles EV or powered by clean energy; including municipal fleet and school busses

### Clean Energy



- 1,000 West Hartford homes have solar, including low-to-moderate income
- 100% municipal electricity supplied by clean, renewable sources;
- Assess rest of municipal sites for solar; investigate possible microgrid in town
- Explore development of a greenhouse gas inventory and Climate Action Plan
- Advocate for policy and legislation to encourage clean, distributed local generation

- 100% of West Hartford's energy supplied by clean, renewable sources
- Well-developed clean, distributed local generation
- Multiple microgrids in town

# Scope of Energy Plan

This Energy Plan was developed by the Town of West Hartford’s Clean Energy Commission (WH-CEC), a group of volunteer residents and town staff.

We welcome future opportunities to include the content of this Energy Plan into broader town planning efforts.

What this plan IS	What this plan IS NOT
<ul style="list-style-type: none"><li>• A successor to the Town’s 2009 Energy Plan (See Appendix 1)</li><li>• An update on efforts undertaken since the initial Energy Plan was implemented</li><li>• A framework to guide future efforts of the WH-CEC and description of actions that must be taken to make progress</li><li>• Focused on the entire West Hartford community</li><li>• Focused on the topic of energy efficiency and <b>clean energy</b></li></ul>	<ul style="list-style-type: none"><li>• A comprehensive Sustainability, Climate Action, or Resiliency Plan</li><li>• A technical reference document</li><li>• An inventory of the Town’s green house gas emissions</li><li>• Focused on waste management, recycling, food sustainability, open space management, forest management, bicycle or pedestrian infrastructure or safety, water, etc.</li></ul>

*Note that additional examples and suggestions are included as [endnotes](#) to enhance the readability of this document.*

## What does Clean Energy mean to West Hartford?

For the purposes of this plan and the WH-CEC, clean energy is defined as the **generation of energy** for consumption within West Hartford that **causes zero emissions of greenhouse gases and low or zero emissions of criteria pollutants.**

In general terms, clean energy is related to energy generation without the use of fossil fuels. The WH-CEC recognizes that there a variety of “cleaner” energy sources (e.g., natural gas fuel cells, nuclear, anaerobic digestion, liquid biofuels) which may warrant consideration on a case-by-case basis or as more immediate alternatives. Actions which lead to a reduction in net energy consumption (i.e., energy conservation & efficiency) are considered “cleanest,” as they require no energy generation.

# 2020 Perspective

This Energy Plan was largely written before the COVID-19 outbreak, the death of George Floyd, and other tragic events which have catalyzed widespread social unrest and a national conversation on the topics of racism and inequality.

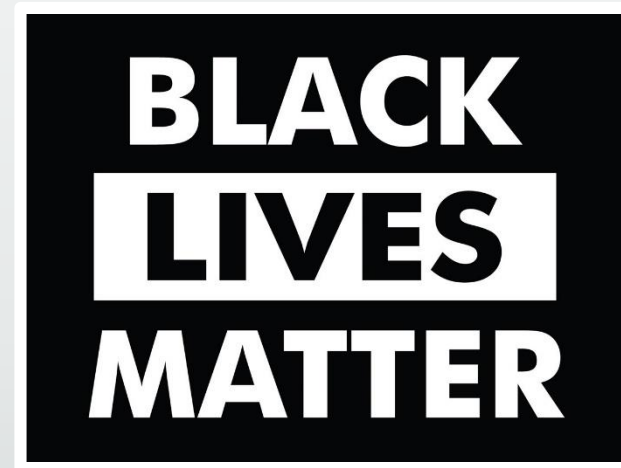
We felt it necessary to acknowledge that these events have changed the way we look at the world, even in the context of this plan.

We must move forward on energy in a meaningful, inclusive way. To do so, we must focus on equity and environmental justice. This includes seeking out multiple perspectives and looking for intersectional solutions. It involves acknowledging and calling out individual and systemic racism. And it means committing to work actively and deliberately to dismantle barriers and transform our institutions, polices, and practices so that they work for everyone.

Disruption affords us an opportunity: to recover and rebuild in a deliberate way, not back to “normal,” but back to better. To choose a different path, a different energy path – a clean, equitable, and just path. A path that is sustainable for the future. **The choice is ours.**

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The Governor’s Council on Climate Change (GC3) has established a Equity and Environmental Justice Working Group which issued a [report](#) and held a series of [webinars](#) in 2020. Sustainable CT also offers an [Equity Toolkit, training, and support](#). These organizations can serve as valuable references to provide frameworks as we move forward.



# Commitments

The leadership of West Hartford have already made formal commitments to many of the ideas contained in this plan by:

- Establishing a Clean Energy Commission
- Signing the [U.S. Conference of Mayors Climate Protection Agreement](#) to reduce greenhouse gas emissions below 1990 levels in accordance with the Kyoto Protocol
- Participating in Energize CT's [Clean Energy Communities](#) program
- Being a [U.S. EPA Green Power Partner](#)
- Signing onto the [Climate Mayors](#) open letter in response to the U.S. withdrawal from the Paris Agreement.
- Becoming certified under [Sustainable CT](#)'s voluntary municipal certification program



THE UNITED STATES  
CONFERENCE OF MAYORS



# Introduction

**Energy is essential.** It is the lifeblood of West Hartford. It heats and cools our buildings, powers our lights and appliances, and allows us to travel to work and play. Yet, most of our energy still comes from the burning of fossil fuels, by far the largest contributor to greenhouse gas (GHG) emissions and global climate change.

Energy use comes with an intrinsic **responsibility** to consume and produce it sustainably. Recognizing and **acting** on this responsibility today is necessary to ensure that West Hartford continues to thrive and prosper. It protects our future and our children’s future. It also offers opportunities to shape what that future looks like **for everyone**.

As a community, we have the power to effect change. The West Hartford Clean Energy Commission has prepared this 2020 Energy Plan to build on the work of its 2009 Energy Plan and to guide the Town toward greater energy efficiency and use of clean energy.

Implementing this plan will yield many benefits to our residents and businesses:

- **Economic and financial:** Saving energy saves money: money that can be spent for other basic needs, or to support our local economy and create new jobs.
- **Environmental, health, comfort:** By saving energy and reducing fossil fuel use, we will lower emissions, improve air quality, and improve health, especially for vulnerable populations like children, seniors, and environmental justice communities. By making our homes and businesses more energy efficient, they will also be more comfortable.
- **Equity and inclusion:** By focusing on inclusive solutions to save energy and provide assistance, we will make a difference in the lives of all our residents, including marginalized or at-risk communities and those who bear the largest energy burdens.
- **Security and resiliency:** By reducing overall energy needs, modernizing our grid and increasing local generation, we will make our energy supply more secure and be in a better position to weather storms, outages, economic fluctuations, and other natural or man-made disasters.



*Mayor Cantor and Council Members Sweeney and Kerrigan activate Town Hall's solar array, October 2019.*

The State of Connecticut is committed to reducing its greenhouse gas emissions 45% from 2001 levels by 2030. Governor Lamont’s Executive Order No. 3 commits Connecticut to 100% carbon neutral electricity by 2040. This Energy Plan aims to achieve similar goals for West Hartford: **We aspire for West Hartford to achieve 100% clean energy by 2050.**

While it will be difficult to realize this vision, it is both **achievable** – even with today’s technology – and **realistic** – as other cities and states have set similar goals and timelines. There is general consensus that “business as usual” is no longer an option. Recently, more voices – for youth and environmental justice – are demanding action.

By fostering a **culture of conservation** throughout our community and by making the right choices, West Hartford can address energy and climate change challenges in a meaningful way. Over the last decade, the Town has led by example. With the adoption of this plan, we will move our community forward into an efficient, clean, inclusive, and sustainable future.

West Hartford Clean Energy Commission, 2020



# West Hartford's Energy by Numbers

With approximately 64,000 residents, West Hartford is the 9<sup>th</sup> largest municipality in Connecticut; we also rank 9<sup>th</sup> in energy use.

The West Hartford Clean Energy Commission worked with Connecticut-based, nonprofit PACE (People's Action for Clean Energy) to compile data from local utilities and the Town's grand list to estimate total community energy use. This use includes 3 sectors: **Residential**<sup>1</sup>; **Commercial & Industrial (C&I)**<sup>2</sup>; and **Transportation**<sup>3</sup>. Details on these estimates can be found in Appendix 2. In this analysis, all fuel types are converted to electricity (GWh) equivalent.

We estimate that in 2019, West Hartford:

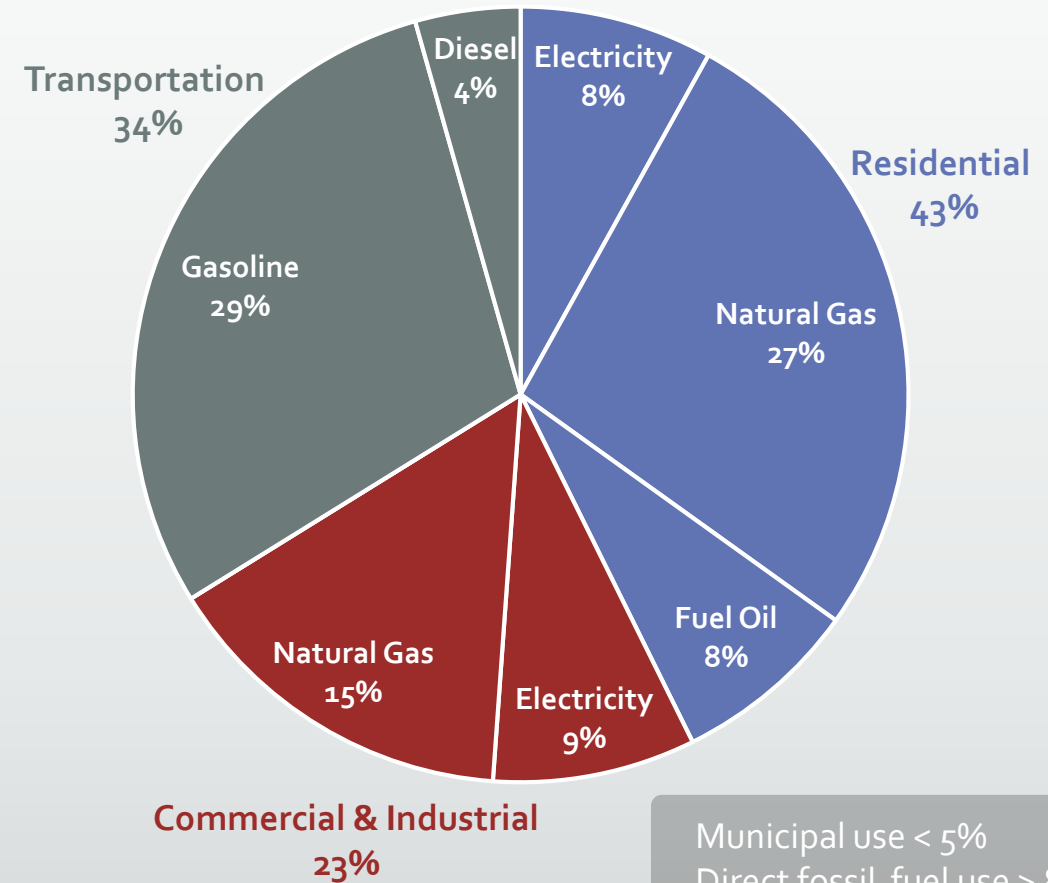
- Spent \$176.1 million on energy, or \$2,783 per person.
- Consumed the energy equivalent of 2,227 Gigawatt-hours, or approximately 35,000 kilowatt-hours (kWh) per person.
- Generated 563,063 tons of greenhouse gases (GHG), or ~9 tons per person.

As shown in the figure at the right, 2/3 of West Hartford's energy use is Residential, Commercial, & Industrial (primarily building use), while 1/3 is Transportation. **Municipal operations**, which are included in Commercial, **account for less than 5% of the total.**

**Direct fossil fuel use**, which is the largest contributor to green house gas emissions and climate change, **accounts for over 80% of West Hartford's total energy use.** Residential and Commercial & Industrial buildings largely rely on natural gas and fuel oil for heating. Our Transportation is almost exclusively comprised of gasoline and diesel vehicles.

Electricity represents 17% of total energy use. Today, in Connecticut, most of our electricity still comes from natural gas (a fossil-fuel) and nuclear generation. However, there is increasing activity aimed at reducing emissions and transitioning to clean energy sources in this sector.

2019 Total Energy Use = 2,227 GWh



Municipal use < 5%  
Direct fossil fuel use > 80%



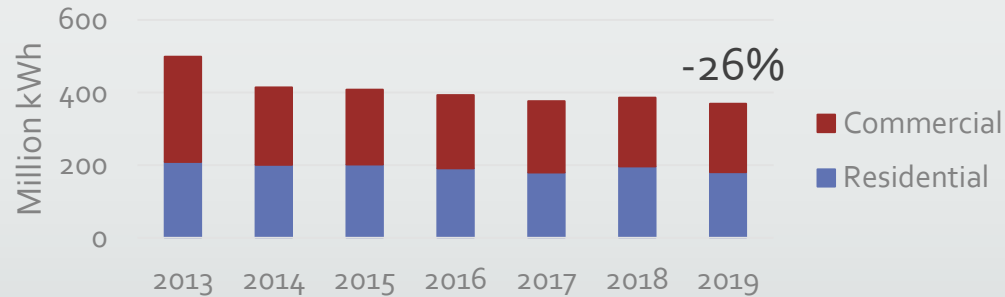
# West Hartford's Energy Trends

West Hartford's total energy use is up 1% from 2017, the first time the Clean Energy Commission compiled these numbers. This could be due to increased reliance on energy in our daily lives or an increase in economic growth. West Hartford's population has remained fairly stable over the last 30 years.

Year	Total Energy Use (GWh)	% Change
2017	2,181 GWh	-
2019	2,227 GWh	+1%

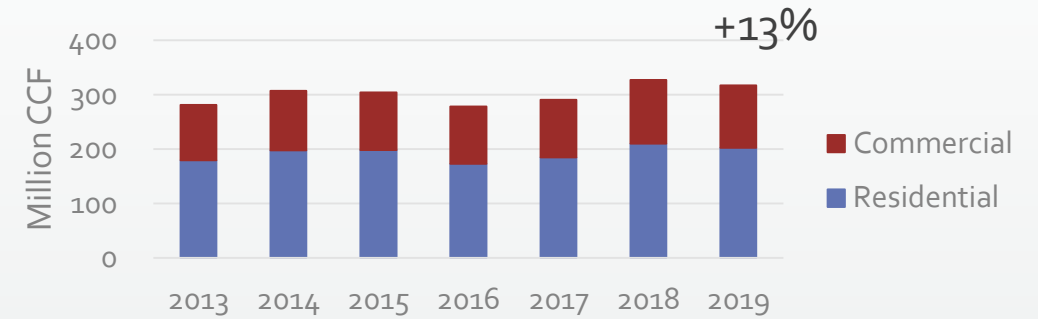
As reported by local utilities, West Hartford's electricity use has declined 26% since 2013 to 369 Million kWh in 2019. The Commercial sector has seen a bigger drop than Residential. Energy efficiency and solar energy, generated and consumed on site, or behind the meter, are likely reasons for this drop.

## Electricity Use



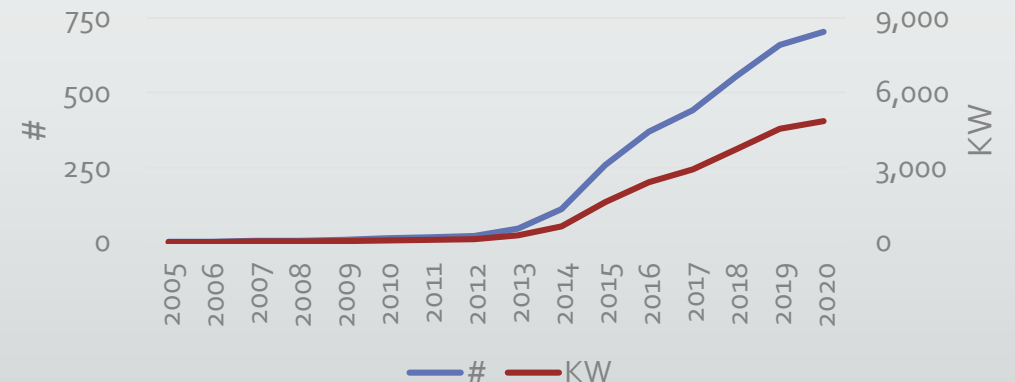
In contrast to electricity, natural gas use has increased 13% since 2013 to 31.7 Million CCF in 2019. Conversions to natural gas are likely one of the drivers behind this increase. Weather can also impact the annual use of natural gas for heating.

## Natural Gas Use



Another notable trend in the last decade is the increase in solar photovoltaic (PV) installations. Over 700 West Hartford homes have gone solar, with a total generation capacity of nearly 5 MW, or 6 Million kWh annually. Since 2014, West Hartford has added about 100 residential installations a year. Twelve municipal buildings, including 7 schools, also have solar.

## Residential Solar PV Installations (Cumulative #, KW)



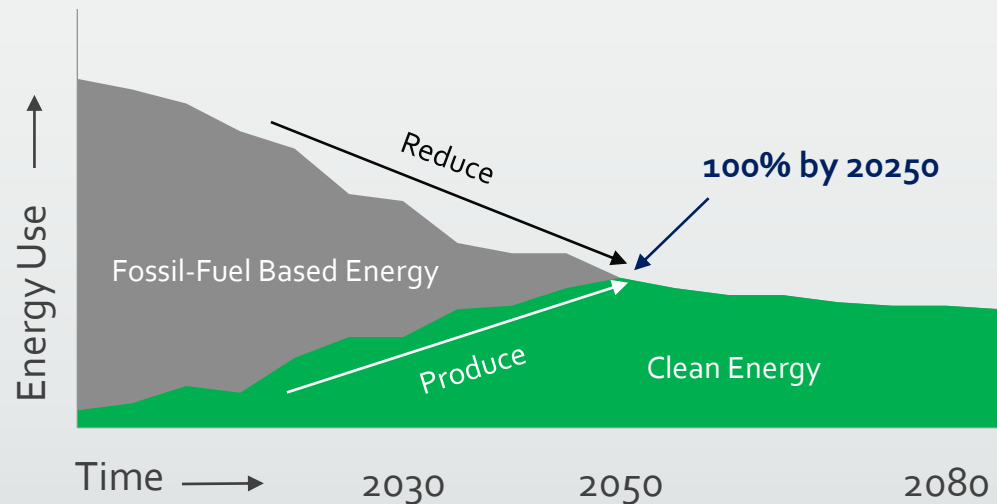
# 100% by 2050

West Hartford aspires for our entire community to use 100% clean energy by 2050.

The path to 100% by 2050 comprises two complementary actions as shown in the chart below:

1. **Reduce:** We must reduce our overall energy consumption dramatically.
2. **Produce:** We must increase the amount of energy that comes from clean sources.

The goal is to reach a point – 100% by 2050 – where our new efficient level of consumption is supplied entirely by clean energy sources.



**Reducing energy use must be a priority.** We estimate that in order to reach 100% by 2050, West Hartford will need to reduce energy consumption by about 50-60% in roughly 30 years. This may seem like an impossible task, but it only requires a **2.5 - 3% drop per year**.

There are many ways to reduce energy use: from implementing behaviors or practices that use less or no energy<sup>4</sup>, to installing proven energy efficiency measures<sup>5</sup>, to investing in new technologies<sup>6</sup>. Many experts believe that if we are to achieve both significant reductions in energy use and end reliance on fossil fuels, we must strategically electrify our energy demands. Long-term, we might even expect the amount of electricity we use to increase, even as GHG emissions go down. It will require integrated policy and planning to ensure reliable infrastructure and capacity is available to support these changes<sup>7</sup>.

**As we strive to Reduce, we must also Produce.** Producing, or satisfying, all of our energy needs with clean energy will not happen overnight. It will involve a range of near-term solutions to replace the use of fossil fuels and long-term solutions to improve the reliability of electricity generation and distribution<sup>7</sup>.

The path to 100% by 2050 will be an evolving journey, but one we must take. Some key elements of this Energy Plan are:

1. Reduce energy use by improving the efficiency of all categories of existing and new buildings.
2. Transition heating and cooling in buildings to more efficient technologies with reduced reliance on fossil fuels.
3. Reduce energy use and emissions from transportation by supporting alternative mobility (e.g., bike, walk, public transit) and the transition to biodiesel or electric vehicles, including planning for infrastructure<sup>8</sup>.
4. Promote the responsible development of renewable energy generation in town.
5. Explore and advocate for other clean energy options both locally and regionally, including collaboration with utilities to transition to a cleaner generation mix and to modernize our electric grid to enable higher levels of renewables and reliability.
6. Ensure that our solutions are inclusive and equitable, serving and protecting the interests of all our residents.

# Approach

The cheapest, cleanest energy is the energy you don't use. Efficiency offers the possibility of saving money and reducing energy consumption before turning to the more complex, often more expensive, question of energy generation.

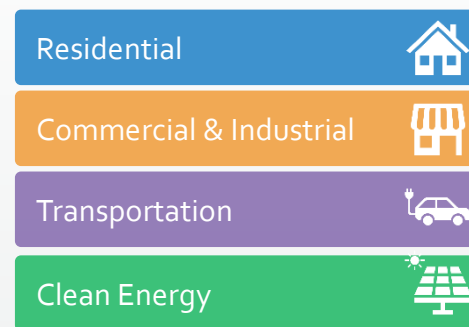
We seek to "Reduce" or drive down energy use in the **Residential**, **Commercial & Industrial**, and **Transportation** sectors and to "Produce" or increase the supply of **Clean Energy** using 4 strategies that are within our power, as a Commission and a Town, to accomplish. These strategies are:

1. Seek out community **input** and multiple perspectives at all stages of planning and implementation to ensure **equitable** solutions.
2. Provide **education** and **outreach** to foster a culture of conservation and engage the community to make responsible energy choices.
3. Facilitate and support **participation** in energy programs and services and the **adoption** of energy efficient behaviors, practices, technologies, and capital improvements.
4. Develop and support **policy** and **planning** to ensure a sustainable clean energy future and the infrastructure to support it.

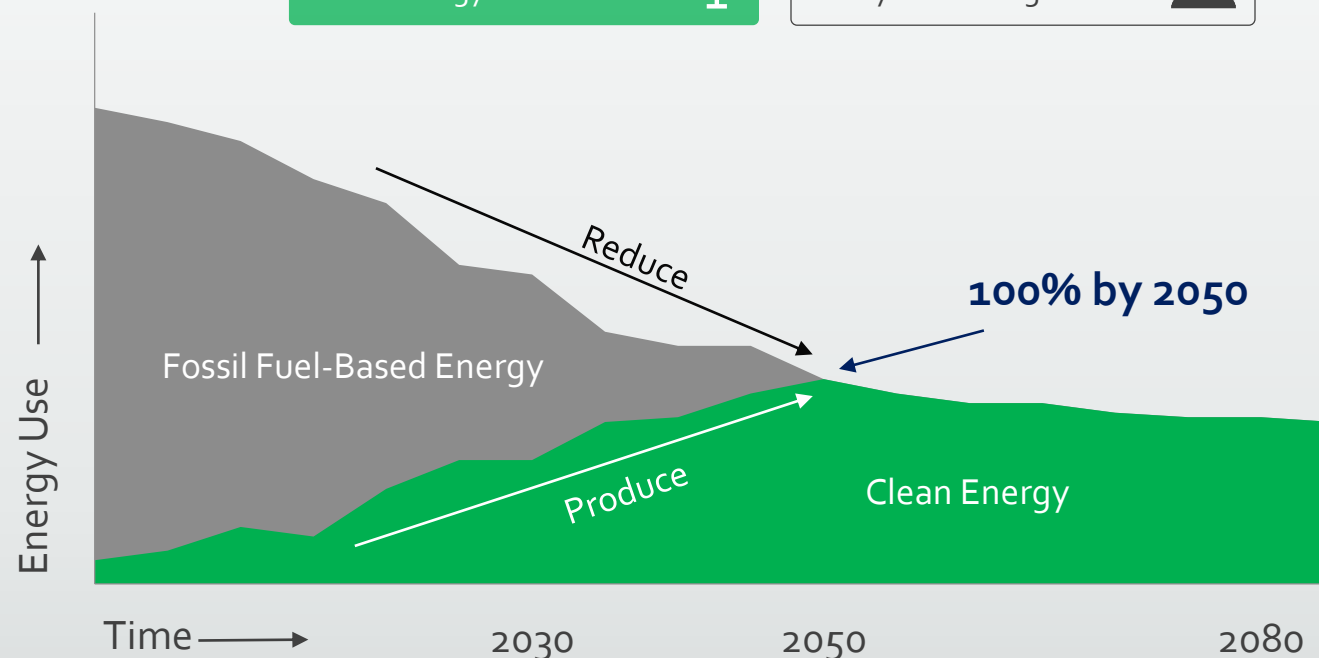
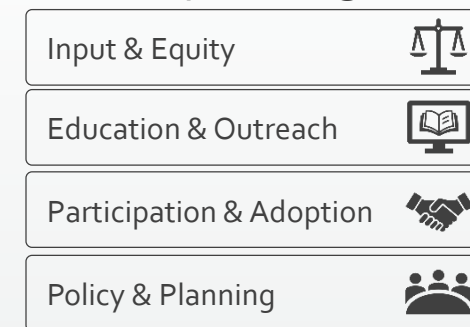
Our approach centers on giving people – residents, staff, and elected leaders alike – the knowledge, tools, and support to make responsible energy choices for themselves and to move West Hartford towards 100% by 2050.

We have also selected a handful of indicators for each sector that we believe will provide insight into our progress towards 100% by 2050. While not perfect or comprehensive by any means; these metrics are readily available. Additional metrics may be developed or substituted in the future.

## 4 Key Sectors



## 4 Key Strategies





# Residential

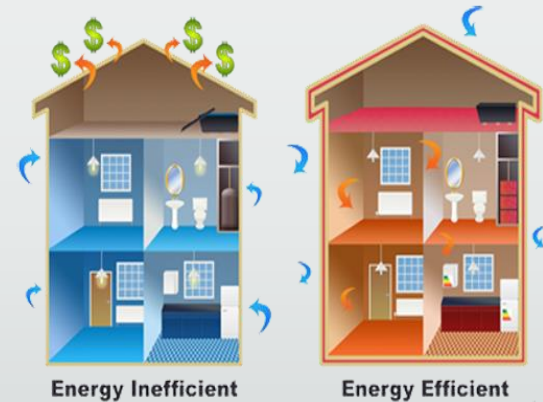
Over 40% of West Hartford's energy use is Residential. About 50% of a household's annual energy use is for space heating and cooling. In West Hartford, most homes heat with fossil fuels – natural gas (66%) or fuel oil (31%). Our state also has some of the highest electric rates in the country. Some members of our community struggle to pay their utility bills.

Often, people can save energy and money at home by implementing simple no-cost or low-cost practices<sup>4,5</sup>. However, significantly reducing a home's energy use requires more work. A large majority (over 80%) of West Hartford homes were built before 1970. Weatherization and efficiency projects<sup>5</sup> can have an immediate impact by reducing energy bills and delivering savings year after year to pay for other critical needs or to pay off an investment. Many improvements have additional benefits of making a home more comfortable or increasing property value.

A wide range of programs, incentives, and financing options exist for residents to make their homes more efficient or to purchase energy-efficient equipment. Additional assistance is available for residents who meet income eligibility criteria and for new residential construction.

Mere existence of programs does not always mean that people are able use or benefit from them. In some cases, programs are complicated or slow. Barriers, such as language or environmental health, or safety issues also prevent access to services<sup>10</sup>. In West Hartford, nearly 30% of housing units are rentals, which depend on landlords for significant energy upgrades. A greater number of renters are people of color, minorities, or elderly. Nearly 50% of West Hartford renters are also cost-burdened (where rent > 30% of income) leaving little money left over for basic necessities. There are also low-to-moderate income families who make too much money to qualify for assistance programs, but still cannot afford major upgrades or access financing.

By seeking community input and addressing specific needs and inequities, we can be more effective in helping all residents take control of their own energy use and mitigate the need for increased fossil-fuel based energy generation.







# Residential Progress & Goals

## Progress-to-Date

- 20% of households participate in EnergizeCT energy efficiency programs
- LED lightbulb swaps held at libraries and Elmwood CC
- Occasional community presentations and WH-CPTV programming
- Community Renewal Team energy assistance case officer located on-site at Town Hall



*We are very happy with our decision to install an electric heat pump to replace our loud, inefficient window A/C units. Our house is more comfortable now, in both the summer and winter. We only need to rely on our gas furnace on very cold days.*

*- Max DuBuisson, Ballard Dr.*

## Approach



**1. Input & Equity.** Seek out multiple perspectives and public participation to ensure all members of the community have a voice. Work with partners like Social Services, Housing Authority of WH, WH Public Schools, houses of worship, neighborhood groups, EnergizeCT, Efficiency for All, Sustainable CT, utilities, contractors, etc.



**2. Education & Outreach.** Increase behavioral and energy efficiency awareness via multi-touch, multi-channel messaging. Use website, social media, email, tax inserts, video, events, networking, door-to-door, etc. Consider using multiple languages. Leverage partner publications, events, and communication channels.



**3. Participation & Adoption.** Promote Home Energy Solutions and other energy programs. Host giveaways or sign-up events. Educate about energy efficiency<sup>4,5,6</sup>. Showcase positive examples and stories. Target specific groups such as multi-family, landlords, low-to-moderate income residents, oil-heated homes, new homeowners, etc. Identify and address barriers<sup>10</sup>.



**4. Policy & Planning.** Investigate use of municipal building tax codes to accelerate efficiency and equity. Support implementation of Plan of Conservation and Development (POCD). Work towards no fossil fuel or zero-energy new construction policy. Build political power to support and advocate for legislation, including increased funding and wise, equitable use of Connecticut Energy Efficiency Funds and more stringent energy codes.

## Benefits

- Lower energy bills
- More comfortable, healthy living environments
- Reduced need for energy generation
- Lower CO<sub>2</sub> and greenhouse gas emissions
- Greater security
- Greater resiliency during extreme weather
- Local job creation

## 2022 Goals

- 30% of residents participate in EnergizeCT energy efficiency programs
- 10% of residents receive rebates for performing energy retrofits
- Drop in energy assistance applications (potential short-term increase to reflect people getting help they need)
- At least 6% drop in residential energy use
- Low-to-moderate income efficiency campaign
- Heat pump education campaign

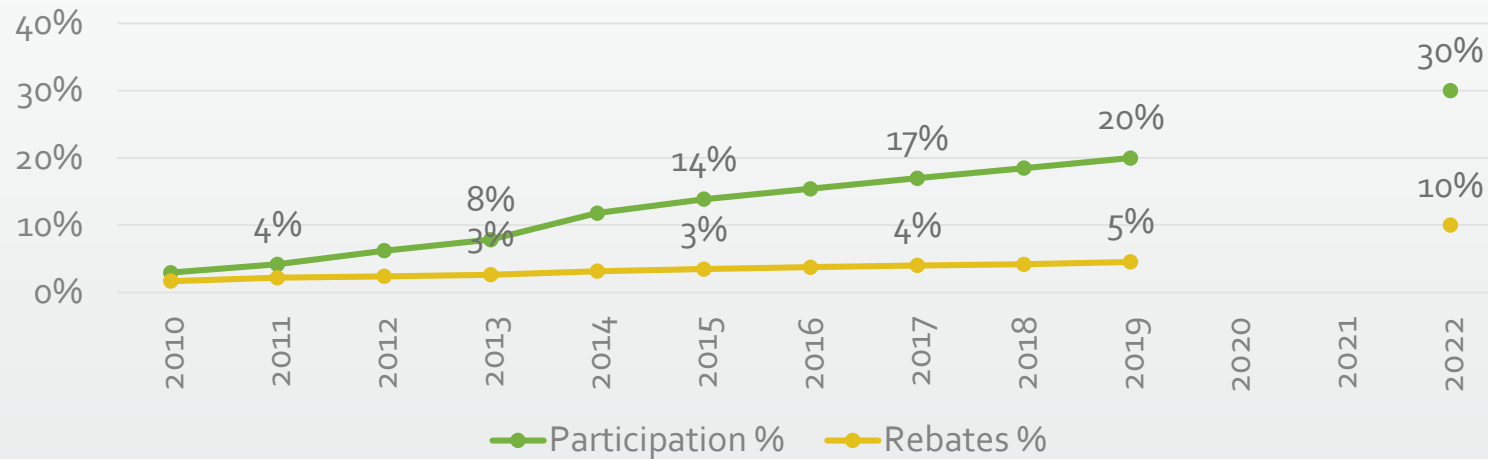
## Long-Term Goals

- 50% or more drop in residential energy use
- Wide-spread culture of conservation, use of programs
- No barriers to participation
- No need for energy assistance

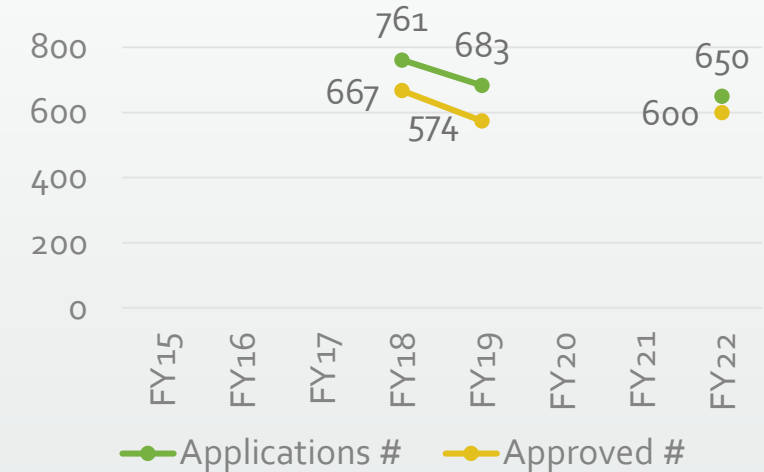


# Residential Indicators

Residential Participation & Rebates (%)



Energy Assistance (#)



1. **Residential Participation** is the % of West Hartford’s households that have participated in EnergizeCT energy efficiency programs like Home Energy Solutions, Home Energy Solutions-Income Eligible and Residential New Construction. Source: EnergizeCT.

2. **Residential Rebates** is the % of West Hartford’s households that have received an energy rebate for installing a qualifying project or equipment. This % is lower than Residential Participation, meaning that not all households that participate in an initial home assessment do follow-on energy efficiency projects. Source: EnergizeCT.

3. **Energy Assistance** is the number of applications received from West Hartford residents and the number of those applications received that are approved for energy assistance. Source: Community Renewal Team and Town of West Hartford, Social Services. #s back to FY15 coming.



# Commercial & Industrial

28% of West Hartford's energy use is Commercial & Industrial (C&I)<sup>2</sup>. The C&I sector differs from Residential: there are fewer – often larger – properties and fewer owners, both private and municipal. Building energy systems may be centralized and have high demand at certain times of the day. Space heating is typically natural gas and represents about 25% of building energy use. Leases or other contractual arrangements can make it complicated to align the energy and capital improvement interests of owners and tenants.

Like Residential, there are a wide range of energy incentives and financing programs available to C&I property owners. Available programs target existing buildings and new construction, as well as private businesses, non-profits, institutional, and municipal customers. Some projects<sup>5</sup> can reduce energy use by over 50% and pay for themselves quickly, yielding a high return on investment. These shorter-payback measures can be “packaged” with more expensive capital items<sup>6</sup> for comprehensive energy upgrades.

The Town of West Hartford has led by example, using utility programs to implement over \$5M of energy efficiency projects across the portfolio of municipal properties in the last 5 years. These projects, which include building control system upgrades and LED interior, exterior, and street lights, have helped reduce municipal electricity use by 25%. In 2016, Charter Oak International Academy was rebuilt to LEED Gold green building standards with rooftop solar PV and a geothermal / electric heat pump system for heating and cooling. This school is the district's top energy performer. Passive design which focuses on climate-based techniques to minimize energy use combined with renewables to achieve net zero – is becoming increasingly popular and cost-effective in new construction, especially with the public sector and educational institutions.

Establishing green team or regular messaging and reporting to emphasize a culture of conservation and efficient practices can also be effective in organizations, as can corporate or employee workplace policies.

Today's environment makes it increasingly difficult for local businesses to survive, and even harder for minority-owned businesses. Energy efficiency – done right – can improve the bottom line for everyone.

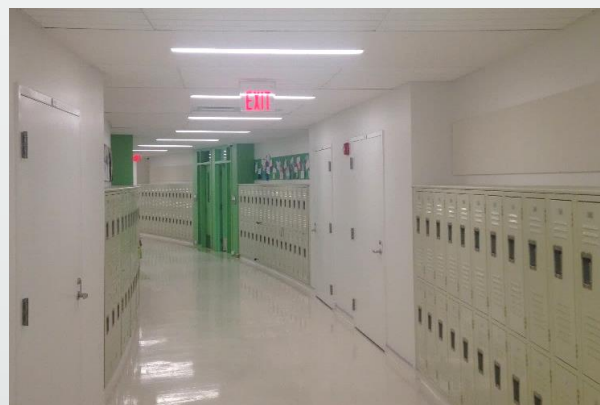




# Commercial & Industrial Progress & Goals

## Progress To Date

- 28% of businesses participate in EnergizeCT energy efficiency programs
- 2 C-PACE projects
- Over \$5 Million of energy efficiency projects implemented in municipal buildings with savings over \$1 Million annually.
- 15% decrease in municipal energy use since FY13
- Direct mail efforts in partnership with vendors and CT Green Bank



All of our schools and municipal buildings have been retrofitted to LED lights. Electricity use (kWh) is down 25% since 2015; there is also a noticeable drop in demand (KW). Our classrooms have brighter, more consistent light and maintenance costs have virtually disappeared. It's a win-win.

–Catherine Diviney, Energy Specialist

## Approach



**1. Input & Equity.** Seek out multiple perspectives and public participation to ensure all members of the community have a voice. Work with partners like Chamber of Commerce, Community Development, neighborhood business associations, CT Green Bank, design professionals, contractors, utilities, building occupants, maintenance, and custodial staff, etc.



**2. Outreach & Engagement.** Increase awareness of behavioral strategies<sup>4</sup>, programs, and benefits. Share results. Use word of mouth and business-to-business networks. Leverage partner publications, events, and communication channels.



**3. Participation & Adoption.** Promote Small Business Energy Advantage, C-PACE, LEED, Energy Star, and other commercial energy efficiency or certification programs. Encourage the formation of green teams in buildings and tracking of energy use. Meet with individual property owners and companies. Identify and address barriers to be overcome. Have the Town and local businesses share their success stories, projects, and experience.



**4. Policy & Planning.** Investigate use of municipal building, tax codes, procurement, standards and recognition programs to accelerate efficiency. Support implementation of the Plan of Conservation and Development (POCD). Consolidate municipal facilities and programs into newer or renovated facilities that are more energy efficient. Work towards no fossil fuel or zero-energy new construction policy. Build political power to support and advocate for applicable legislation and oversight<sup>11</sup>.

## Benefits

- Lower energy bills
- More comfortable, healthy working, educational environments
- Reduced need for energy generation
- Lower CO<sub>2</sub> and greenhouse gas emissions
- Greater security
- Greater resiliency during extreme weather
- Local job creation
- Enhanced public image

## 2022 Goals

- 40% of businesses participate in EnergizeCT energy efficiency programs
- 20% decrease in municipal energy use since FY13
- 6% drop in C&I energy use
- 2 new C-PACE projects
- Lead by Example Town-business campaign

## Long-Term Goals

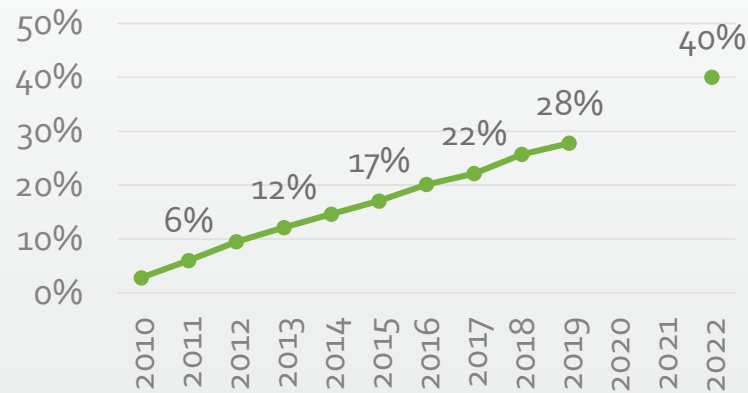
- 50% or more drop in C&I energy use, including municipal
- Wide-spread culture of conservation, use of programs
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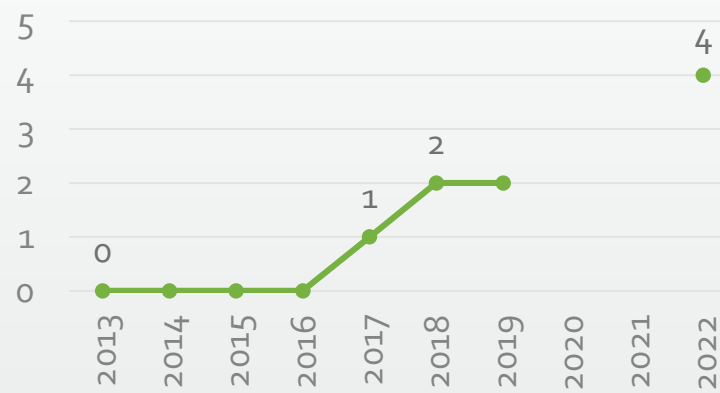


# Commercial & Industrial Indicators

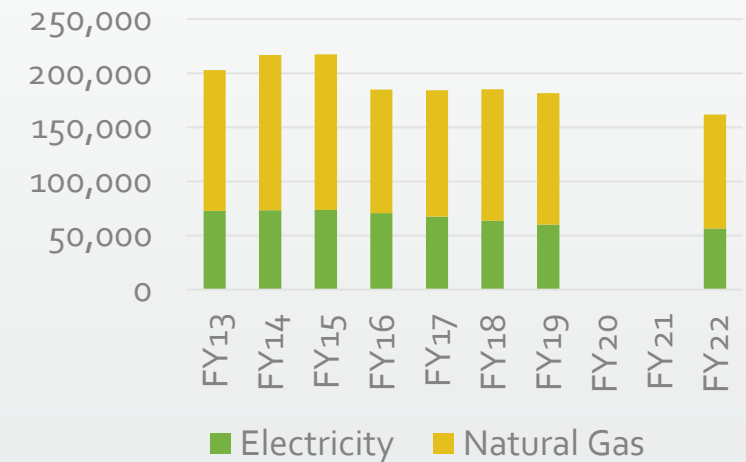
C&I Participation (%)



C-PACE Projects (Cumulative #)



Municipal Energy Use (MMBtu)



- C&I Participation** is the % of West Hartford’s businesses (including municipal) that have participated in any energy efficiency programs.

Source: EnergizeCT

- C-PACE Projects** is the cumulative number of C-PACE projects reported by the CT Green Bank. C-PACE (Commercial Property Assessed Clean Energy) is a financing program available to businesses and non-profits to finance energy efficiency and clean energy projects to be repaid through a voluntary benefit assessment placed on their property by the municipality.

Source: CT Green Bank

- Municipal Energy Use** is the annual energy use of all municipal operations, including Town and school buildings, parks & pools, parking lots, and street & traffic lighting. All fuel types are converted to a common unit, MMBtu.

Source: Town of West Hartford, Plant & Facilities Services



# Transportation

West Hartford's Transportation sector accounts for about 25% of our community's energy use. It relies almost entirely on fossil fuels. According to the US EPA, in the last 2 decades, the emissions coming from transportation has grown more than any other greenhouse gas source and is now the largest source of greenhouse gas emissions in the United States.

There about 47,000 registered vehicles in West Hartford. Less than 1% of those are electric vehicles (EVs). The Town itself does not own any EVs in the municipal fleet.

The State of CT's *EV Roadmap* cites the widespread deployment of EVs in the state as "a key tool in the state's effort to improve air quality for residents while also addressing the climate crisis." It is widely believed that by 2022, EVs will cost the same as conventional vehicles. In addition, studies show that the total cost of ownership, including fuel and maintenance costs, is lower. Limited-range municipal vehicles (e.g., parking, building inspectors, school buses) are ideal candidates for electrification. Nonetheless, the deployment of EVs and charging infrastructure will take time and money; it is clear we will continue to use internal combustion engine (ICE) vehicles for some years to come. Alternative fuels (e.g., biodiesel) and emissions reducing policy strategies, like fuel economy standards, route mapping, and anti-idling, should be considered for immediate emissions reductions.

**EVs are not the whole answer**, especially considering that not everyone can afford a personal vehicle. We must look beyond vehicles to design transportation systems around people – providing a variety of accessible, affordable, safe mobility options<sup>12</sup>. The Town has an active Pedestrian & Bicycle Commission, a model Complete Streets policy, and a new Plan of Conversation and Development which directly support these efforts.

Decreasing transportation-related energy use (and emissions) can have immediate positive effects. During the initial COVID-19 "stay safe-stay home" phase, CT DEEP reported a 40% drop in emissions due to reduced vehicular traffic. By supporting active (human-powered) transportation, we can improve air quality, health, noise, and traffic congestion. Long-term transformation of this sector will provide clean, integrated and balanced transportation networks, which contribute directly to the equity, health, safety, economic vitality, and quality of life of everyone in our community.





# Transportation Progress & Goals

## Progress-to-Date

- EV Day in 2016 and w/ Kingswood Oxford School in 2018
- 8 registered public EV chargers; 4 municipal-owned.
- 234 registered EVs
- 4% reduction in municipal fuel use since FY16
- Active Complete Streets program
- Bronze level Bicycle Friendly Community
- Mutli-town RFP for ride-share (scooter) program



*My EV is my everyday commuting car. I use it for as many trips as I can, because it's clean and low-cost. It's also safe – my toddler sometimes plugs and unplugs my car. I don't need solar power to save, but because I do have solar, I'm making my own cheap fuel to drive on!*

*- Matt Macunas, Grove St.*

## Approach



**1. Input & Equity.** Seek out multiple perspectives and public participation to ensure all members of the community have a voice. Work with partners like Pedestrian & Bicycle Commission, Bike West Hartford, Greater Hartford Transport District, CTRides, Center for Latino Progress, schools, car dealerships, neighboring communities, etc.



**2. Outreach & Engagement.** Increase awareness via multi-touch, multi-channel messaging. Use website, social media, email, tax inserts, videos, events, networking, etc. Provide information on benefits (e.g., health, cost of ownership). Consider using multiple languages. Leverage partner publications, events, and communication channels.



**3. Participation & Adoption.** Promote energy-free transportation alternatives. Promote programs and financial incentives (e.g., CHEAPR, federal tax credits). Leverage grant funds (e.g., VW, DERA) or collective buying opportunities. Host EV demo days and Q&A with owners. Target specific groups like commuters, employers, people looking to replace vehicle, WHPS Board of Ed. Identify and address barriers (e.g., access, technology, fear, cost, charging infrastructure)



**4. Policy & Planning.** Investigate use of workplace policies (e.g., bus pass, telecommuting) or municipal code to support sustainable mobility options and accelerate adoption of EVs. Support Pedestrian & Bicycle Commission and active transportation. Identify infrastructure needs<sup>8</sup>. Incorporate emissions reductions into municipal RFPs and policy<sup>11</sup>. Build local political power. Focus on short-term and long-term strategies.

## Benefits

- Lower CO<sub>2</sub> and greenhouse gas emissions
- Increased security, less dependence on foreign oil
- Improved air quality and health (e.g., asthma)
- Less noise, traffic congestion, fuel spills
- Better fuel economy and financial savings
- Improved safety, equity
- Connected, livable, walk-bike friendly communities

## 2022 Goals

- EV strategy in municipal vehicle fleet plan and school bus contract RFP
- 1 more municipal EV charger
- 10% reduction in municipal fuel use from FY16
- 2% of registered vehicles are EV; at least 1 municipal EV
- Review related municipal employee policies
- Identify public transit champion
- Implement community ride share program

## Long-Term Goals

- Fewer vehicle-miles travelled
- Integrated and accessible people-centric, multi-modal transportation system (e.g., walk, bike, mass transit, ride share, etc.)
- 100% of vehicles EV or powered by clean energy; including municipal fleet and school busses

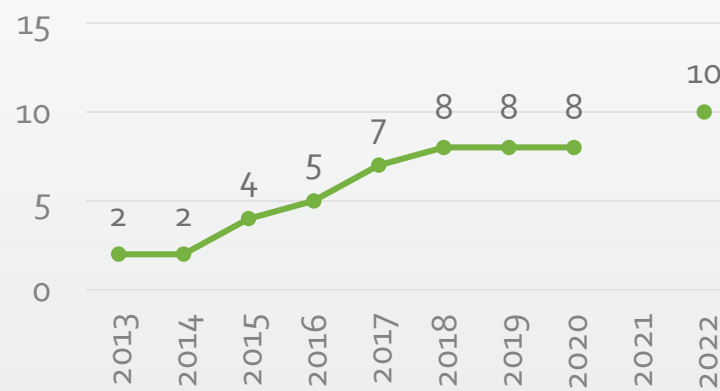


# Transportation Indicators

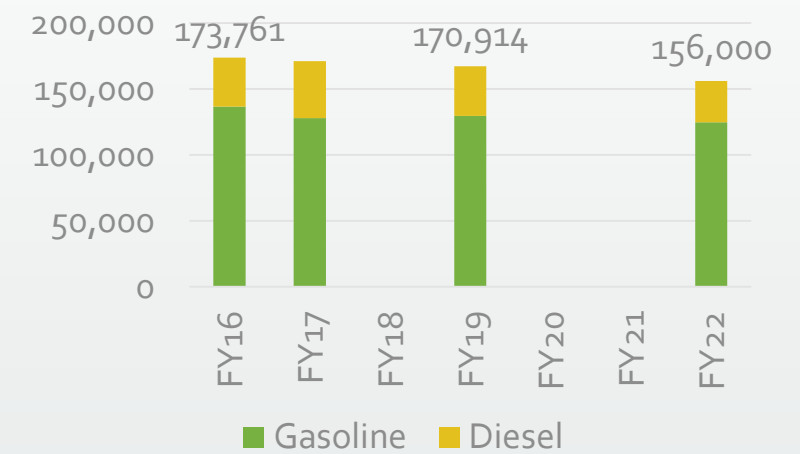
Electric Vehicles (#)



Public EV Chargers (#)



Municipal Fuel Use (Gallons)



- Electric Vehicles** is the total number of electric vehicles in West Hartford, including BEV – battery electric vehicles – and PHEV – plug-in hybrid vehicles as reported by VIN on the West Hartford Grand List.

Source: Town of West Hartford, Assessor’s Office  
Data for 2015 are forthcoming

- Public EV Chargers** is the total number of public electric vehicle charging stations that are listed on the US DOE’s Alternative Fuel Data Center [website](#). This includes municipal-owned chargers. Details on charger type, fees, and accessibility are available on the website.

Source: US Department of Energy, ADFC

- Municipal Fuel Use** is the fuel (gas and diesel) used in municipal fleet, including all municipal and public safety vehicles, that is purchased via gas procurement card. This is the primary method that the Town uses to purchase fuel for vehicles. This does not include fuel for school buses, which are under third-party contract.

Source: Town of West Hartford, Department of Public Works



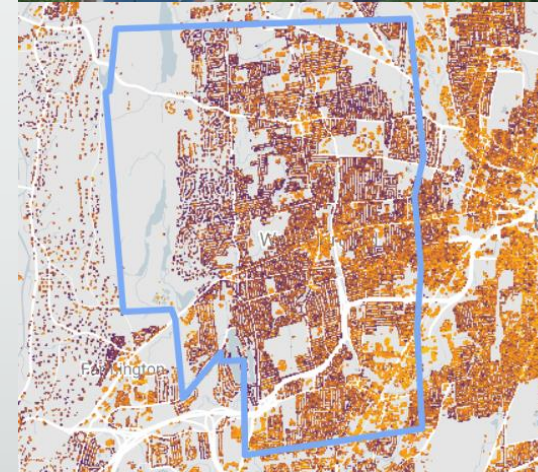


# Clean Energy Production

The Town of West Hartford has been a US EPA Green Power Partner since 2014. Over 20% of municipal electricity use in FY19 was renewable via the purchase of Green-E® certified Renewable Energy Credits (RECs). 12 municipal buildings have solar PV systems, including Charter Oak International Academy which was rebuilt in 2016 with geothermal and rooftop solar PV. More than 700 West Hartford homes have installed solar PV. As the price continues to decline, solar – packaged with efficiency – may be an affordable option for many households and businesses to stabilize or reduce energy costs and go green. Google’s Project Sunroof estimates that West Hartford could support 205 MW of solar, producing 228 million kWh per year. Shared solar or on-bill green power are available as alternatives to on-site generation.

While the main focus is certainly on solar, we cannot forget other strategies and technologies. Passive building design uses climate-based solutions (e.g., solar orientation, thermal mass, etc.) to maintain building temperature, comfort, and air quality; this approach minimizes the need for mechanical heating and cooling before turning to renewables. Passive design is becoming increasingly popular and cost-effective with universities and the public sector. Immediate steps to use cleaner energy alternatives, like fuel cells or biodiesel, in existing equipment and vehicles, should also be considered. A life-cycle cost approach should be employed to evaluate different technologies.

This industry continues to evolve. Changes in technology, pricing, market conditions, political and public support all contribute to how – and when – we will get to 100% clean energy. We must build local political power to accelerate the use of clean energy in ways that support local economic development goals, create jobs, and enhance equity, environmental justice, and resiliency in our community. Net metering, distributed generation, community choice aggregation, building codes, off-shore wind, renewable energy credits, and renewable portfolio standards are some of the key policies decisions that will shape our path. An important building block of the future will be microgrids, consisting of smaller subsets of distributed power sources and storage, users, wires and controls. Microgrids are capable of operating while connected to the wider grid, or they can “island” to operate separately in the event of an outage. An example of a microgrid could be several key town facilities, a solar array, battery storage and a backup generator.





# Clean Energy Progress & Goals

## Progress To Date

- Solarize West Hartford campaign in 2013
- Solar for All campaign in 2018
- 718 West Hartford homes have solar
- 14 municipal solar projects
- Renewable energy credit (REC) purchase in Fy19 = 20% of municipal electricity use
- Charter Oak International Academy built in 2016 with geothermal and solar



*I installed my panels in May of 2013. While my site is not ideal there are months when the panels offset all my home's electricity consumption, including the power used by my electric vehicle.*

*- Bernie Pelletier, Northcliff Dr*

## Approach



**1. Input & Equity.** Seek out multiple perspectives and public participation to ensure all members of the community have a voice. Work with partners like CT Green Bank, Clean Water Action, CT Energy Network, Sierra Club, contractors, neighborhood groups. Build local political power to grow voice and influence at state level and with utilities.



**2. Outreach & Engagement.** Increase awareness via multi-touch, multi-channel messaging. Use website, social media, email, tax inserts, videos, events, networking, etc. Consider using multiple languages. Leverage partner publications, events, and communication channels.



**3. Participation & Adoption.** Promote residential solar, and C-PACE programs. Educate about financing options and technology, including life-cycle costs. Showcase positive examples and stories, both residents and businesses. Target specific groups, such as properties with good exposure, EV-owners, etc. Identify and address barriers (e.g., income, perceptions, safety, zoning).



**4. Policy & Planning.** Investigate use of municipal building, tax codes to accelerate adoption of clean energy. Analyze and present local opportunities for local distributed generation and microgrids (e.g., brownfield sites, rooftops, etc.). Support distributed generation, community choice aggregation, off-shore wind, community shared solar and efforts to modernize the local and regional grid. Increase use of biofuels in municipal fleet and equipment. Build local requirements into RFPs and purchasing policies.

## Benefits

- Improved air quality and public health due to decrease in pollution from burning fossil fuels.
- Lower CO2 and greenhouse gas emissions
- Savings or stability on energy bills
- Improved energy self-sufficiency
- Greater resiliency during power outages
- Creates jobs and economic growth
- Positive community image

## 2022 Goals

- 1,000 West Hartford homes have solar, including low-to-moderate income
- 100% municipal electricity supplied by clean, renewable sources
- Investigate possible microgrid in town
- Assess remaining municipal sites for solar rooftop or carports
- Advocate for sensible policies and legislation to encourage clean, distributed local generation

## Long-Term Goals

- 100% of West Hartford's energy supplied by clean, renewable sources
- Well-developed clean, distributed local generation
- Multiple microgrids in town



# Clean Energy Indicators

Solar PV Installations  
(Cumulative #, KW)

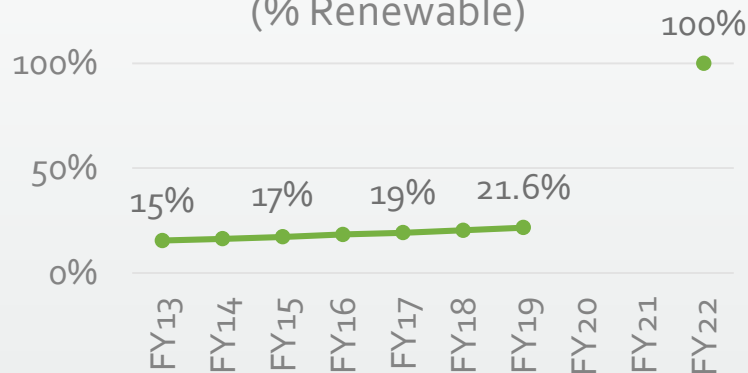


1. **Solar PV Installations** is the cumulative number of solar photovoltaic installations and their production capacity based on utility interconnection agreements (KW AC) – both residential and commercial – reported since 2014.

Source: EnergizeCT

Data prior to 2014 is estimated. Actuals have been requested.

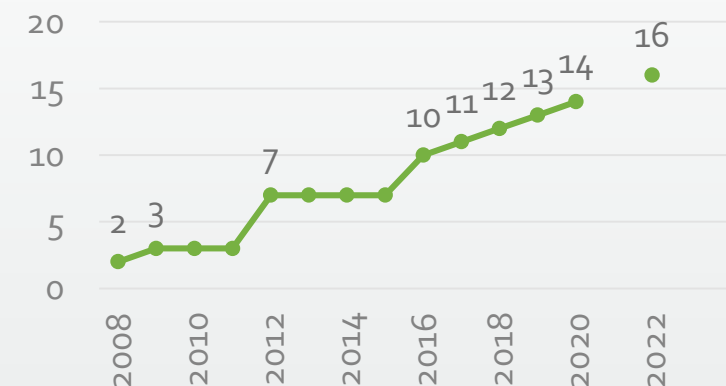
Municipal Electricity Use  
(% Renewable)



2. **Municipal Electricity Use (% Renewable)** is the % of total municipal electricity use that is supplied by clean, renewable sources. The Town makes an annual Green-E® certified renewable energy credit (REC) purchase, which supports this official claim.

Source: Town of West Hartford, Plant & Facilities Services

Municipal Solar Projects (#)



3. **Municipal Solar Projects** is the number of total projects on-site (installed on municipal properties and schools) and off-site (virtual net metering). Most of these projects are under power purchase agreements (PPAs) and the Town does not own the renewable energy credits (RECs). As of 2020, these 14 projects total 4.1 MW and produce about 5 Million kWh annually. A list of projects is included in Appendix 2.

Source: Town of West Hartford, Plant & Facilities Services



# Next Steps

## General

2021-2022	Beyond 2022
<ol style="list-style-type: none"> <li>1. Adopt resolution to support 100% by 2050 and new Energy Plan</li> <li>2. Give regular updates to Town Council, Public Works &amp; Facilities subcommittee</li> <li>3. Develop effective network or means of reaching community on energy issues</li> <li>4. Re-think connection with Sustainable West Hartford</li> <li>5. Revamp Town’s clean energy website</li> <li>6. Invite youth/high school representatives to join WH Clean Energy Commission</li> <li>7. Conduct heat pump education campaign</li> <li>8. Work with Social Services, to design and implement an energy outreach campaign focused on equity (e.g., LMI residents, renters)</li> <li>9. Conduct outreach for Sierra Club’s Ready for 100 campaign – goal of 2021 adoption</li> <li>10. Hold or partner on an electric vehicle event</li> <li>11. Identify public transit champions</li> <li>12. Recruit more community involvement in Sustainable CT</li> <li>13. Explore desire to create a broader Sustainability Plan, Climate Action Plan, or Climate Resiliency Plan (to include a greenhouse gas inventory, transportation and waste/materials management, open space, etc.) with Town Council, and other appropriate Commissions; identify greenhouse gas inventory tool</li> <li>14. Update Energy Plan in 2022</li> </ol>	<ol style="list-style-type: none"> <li>1. Join Sierra Club’s Ready for 100 campaign</li> <li>2. Investigate potential for a microgrid in town</li> <li>3. Adopt policy to enable community choice aggregation</li> <li>4. Conduct energy saving tips or Energy Star appliance campaign</li> <li>5. Work with Town staff and zoning and planning commissions to explore how efficiency and clean energy adoption could be accelerated through municipal policy, building and/or tax codes</li> <li>6. Adopt policy or promote zero-energy or no fossil fuel use in new construction</li> <li>7. Inventory brownfields for alternate use</li> <li>8. Restart Small Business Energy Advantage (SBEA)</li> <li>9. Promote C-PACE financing of commercial projects</li> <li>10. Promote a top 10 sustainable things-to-do list</li> <li>11. Conduct a solarize campaign, including a community discussion of responsible and sustainable solar development in town and options for all</li> <li>12. Promote alternative mobility options to reduce vehicle-miles travelled</li> <li>13. Collaborate with other commissions to complete a greenhouse gas inventory and/or develop a municipal Climate Resiliency Plan</li> <li>14. Support focus on energy efficiency and clean energy industry and jobs as part of economic stimulus and growth</li> </ol>

## Municipal

<ol style="list-style-type: none"> <li>1. Disseminate quarterly communication on building performance.</li> <li>2. Work with Recycling Coordinator; hold quarterly meetings with schools.</li> <li>3. Review schedule of upcoming municipal capital improvement projects in conjunction with energy data; implement additional energy efficiency projects</li> <li>4. Analyze interval data for municipal buildings; develop plan to reduce peak demand</li> <li>5. Update municipal fleet plans to include strategy for fuel reduction, fuel switching (e.g., biodiesel) and/or electrification.</li> <li>6. Achieve Sustainable CT silver certification</li> </ol>	<ol style="list-style-type: none"> <li>1. Consolidate municipal facilities and programs into newer or renovated facilities that are more energy efficient</li> <li>2. Reinstate WHPS Energy Challenge or explore additional ways to reduce municipal energy use (e.g., treasure hunts, night audits, town vs. town energy competition, project fund)</li> <li>3. Develop a sustainable purchasing policy</li> <li>4. Expand policies to reduce miles travelled and fuel use in municipal fleet</li> <li>5. Additional municipal solar or virtual net metering projects</li> <li>6. Complete assessment of EV charging infrastructure and needs</li> </ol>
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# Resources to Get Started

## Residential

- [EnergizeCT](#) (Home)
- [CTGreenBank](#) (Homeowners)
- [Energy Saving Tips for Your Home](#) (Eversource)
- [CT Energy Assistance Program \(CEAP\)](#)
- [Housing Data Profiles](#) (Partnership for Strong Communities)

## Commercial

- [EnergizeCT](#) (Business)
- [CTGreenBank](#)
- [Commercial Property Assessed Clean Energy \(C-PACE\)](#)
- [Energy Savings Tip for Your Business](#) (Eversource)

## Transportation

- [Climate Change & Transportation](#) (CT DEEP)
- [EVConnecticut](#)
- [EV Roadmap for Connecticut](#)
- [Electric School Bus Toolkit](#) (Live Green)

## Clean Energy / Renewables

- [GoSolarCT](#)
- [Residential Solar Investment Program](#)
- [Project SunRoof](#) (Google)

## State of Connecticut

- [Executive Order No 3](#)
- [Connecticut's Comprehensive Energy Strategy](#) (CT DEEP)
- [Governor's Council on Climate Change](#) (GC3, includes Equity and Environmental Working Group)

## Town of West Hartford

- [Clean Energy Commission](#)
- [Energy Assistance](#) (Social Services, under Financial Resources)
- [Complete Streets](#)
- [Plan of Conservation and Development](#)

## Other

- [American Council for an Energy-Efficient Economy \(ACEEE\)](#)
- [US DOE Office of Energy Efficiency & Renewables](#)
- [US Energy Information Administration](#)
- [Energy Star](#)
- [People's Action for Clean Energy \(PACE\)](#)
- [Sustainable CT](#)

# Endnotes

1. The residential sector includes both single family homes, multi-family homes, and apartment buildings.
2. The commercial sector includes schools, institutions, houses of worship, shops, health care, restaurants, lodging, manufacturing, industrial operations, and municipal operations.
3. The transportation sector encompasses vehicles *registered* in West Hartford, including municipal fleet vehicles and school buses.
4. Effective behavior changes to reduce energy consumption include turning off lights when not needed, taking shorter showers, walking or biking in lieu of driving
5. Effective energy efficiency measures include home weatherization, adding insulation to walls, basements, and attics, replacing incandescent, halogen, and fluorescent bulbs with LED bulbs,
6. Larger technology investments that can significantly lower energy use include vehicle electrification, replacing fossil fuel HVAC systems with efficient heat pump systems, ductless mini-split heat pump systems, EnergyStar-certified appliances, intelligent building control systems, LED streetlighting retrofits, and sourcing biofuels to replace traditional heating oil.
7. Infrastructure changes necessary to enable the transition to a clean energy economy include expansion of commercial scale renewable electricity generation (solar, onshore wind, offshore wind, geothermal, tidal, small hydro, and others), modernization and hardening of the electrical grid, replacing fossil-derived fuels with waste-derived biofuels (where possible), incorporating distributed energy generation, and developing microgrids, battery storage, adoption of green building standards, use of “passive house” construction methods, enhancing the ambition of electrical and building codes, and other significant reliability improvements.
8. Infrastructure changes necessary to enable the transition to a cleaner transportation system include widespread availability of EV charging stations, replacing fossil-derived fuels with waste-derived biofuels (where possible), expanding and streamlining public transit options; expanding and improving bicycle-only lanes; and improving amenities for pedestrians and cyclists (racks, crosswalks, shelters, benches, sidewalk maintenance, etc.).
9. Specific renewable electricity generation technologies recommended for installation in West Hartford include rooftop solar PV, community shared solar, solar carports, solar thermal hot water, and geothermal.
10. Barriers to energy efficiency measures in West Hartford buildings include difficulty connecting with a trusted service provider, long wait times for delivery, installation, or service, presence of asbestos, knob and tube wiring, inadequate electrical service panels, overfilled and inaccessible storage areas, landlord permission in multifamily dwellings, and access to financing.
11. Public policy measures which should be evaluated include wise use of Connecticut Energy Efficiency Funds, support for the CT Green Bank, increased funding for energy efficiency and clean energy programs, support of high performance building standards and codes, assessment and mitigation of methane leaks, anti-idling policies, municipal and public transit electrification, increased funding for clean energy infrastructure, tax incentives for clean energy and energy efficiency, collaboration with neighboring towns and states, and streamlined permitting for clean projects.
12. Alternative transportation solutions should consider pedestrians, bicycles, electric bicycles, local public transit, regional public transit, ride sharing services, and other options.

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- Page 1 Clockwise from lower left: Kingswood Oxford School; Solar City; Perkins Eastmann; Ronnie Newton/WeHa
- Page 2 National Oceanic and Atmospheric Administration
- Page 5 Centers for Disease Control and Prevention (CDC); SignsofJustice.com:
- Page 6 Ronnie Newtown/WeHa.
- Page 11 Clockwise from lower left: Realtor.com; Billings Gazette; Realtor.com; Realtor.com
- Page 12 Max Dubuisson
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- Page 15 Catherine Diviney
- Page 17 Clockwise from lower left: Ronnie Newton/WeHa; U.S DOE Alternative Fuels Data Center; Bikewesthartford.org; Ronnie Newton/WeHa
- Page 18 Matt Macunas
- Page 20 Clockwise from lower left: Project Sunroof - Google; Perkins Eastmann; Realtor.com; Earthlight Technologies
- Page 21 Bernie Pelletier
- Appendix 3 Catherine Diviney

# Appendix 1 2009 Energy Plan – Progress Update on Key Actions listed in Executive Summary

Key Action	✓	Comments
Energy benchmarking for municipal buildings	✓	Ongoing
LEED Gold new construction	✓	Charter Oak International Academy 2016
Town-wide building efficiency strategy	✓	\$5 Million in projects completed 2016-19; ongoing
Short-term renewable energy strategy	✓	14 municipal solar projects; ongoing
Explore clean energy technologies in new construction and renovations, prioritize combined heat and power (CHP)	✓	Charter Oak International Academy is geothermal/solar; CHP investigated for Cornerstone Aquatics but not pursued
Increase efficiency of street lighting through removal or retrofit	✓	Street lighting converted to LED 2016-18; handful of decorative fixtures left
Establish energy management and green teams in buildings		Various school environmental clubs; <b>2020 Action to create network in partnership with Recycling Coordinator</b>
Continue WHPS energy competition		Continued to 2015; <b>2020 Action to seek new format to re-energize participation.</b>
Raise awareness and encourage volunteerism	✓	Clean Energy Commission focused more on community after hiring Energy Specialist; <b>2020 Action to better engage community on energy</b>
Hire Energy Manager	✓	Part-time Energy Specialist staff position created 2011
Create hierarchy and utilize multiple energy financing options	✓	Projects funded by variety of methods: on-bill financing, capital budget, bond, incentives, grants; ongoing
Reinvest energy savings in further improvements	✓	Operational savings remain in utility services fund to cover volatility in future budget years; energy rebates reinvested in additional projects
Reduce vehicle fuel use 10%, set goals for fleet fuel-efficiency		<b>2020 Action to update municipal Fleet Management Plan</b>
Increase use of lower carbon fuel		<b>2020 Action to update municipal Fleet Management Plan</b>
Establish culture of conservation for vehicle use / fleet management		<b>2020 Action to update municipal Fleet Management Plan</b>
Standardize purchase and procurement, including energy management systems	✓	Energy management systems upgraded 2018-19; <b>2020 Action to create Sustainable Purchasing Policy</b>
Purchase energy saving appliances	✓	Energy Star-recommended; <b>2020 Action to create Sustainable Purchasing Policy</b>
Give preference to clean, renewable electricity purchase	✓	Annual Renewable Energy Credit purchase; support solar on municipal buildings and solar Virtual Net Metering projects
Lease/purchase most fuel-efficient vehicles, utilize car-sharing or carpooling	✓	As budget allows; <b>2020 Action to update municipal Fleet Management Plan</b>
Preference to contractors who use emissions controls on equipment		<b>2020 Action to create Sustainable Purchasing Policy</b>
Revise energy plan annually		<b>2020 Action to revise every 2 years</b>
Expand plan to residents, institutions, and businesses	✓	2020 Energy Plan focuses on entire community
Consider broader sustainability or greenhouse gas plans		<b>2020 Action with input from other town Commissions and departments</b>



# Appendix 2 Town of West Hartford 2019 Energy Benchmark

		Unit	Commercial	Residential	Total
Current Energy Used	Natural Gas	CCF	11,459,204	20,234,385	31,693,589
	Transport	Gallons	2,939,694	19,700,172	22,639,866
	Oil Heat	Gallons	0	4,278,769	4,278,769
	Electricity	kWh	188,529,992	180,193,525	368,723,517
Current Energy in Gigawatt- Hours	Natural Gas	GWh	336	593	929
	Transport	GWh	98	658	756
	Oil Heat	GWh	0	174	174
	Electricity	GWh	189	180	369
	Total	GWh	623	1,605	2,227
Current Greenhouse Gas Emissions	Natural Gas	GHG - tons	67,094	118,472	185,566
	Transport	GHG - tons	28,809	193,062	221,871
	Oil Heat	GHG - tons	-	47,922	47,922
	Electricity	GHG - tons	55,070	52,635	107,704
	Total	GHG - tons	150,972	412,091	563,063

## Notes

Natural gas and electricity data provided by Energize CT.. Oil Heat and Transport is estimated using data from the West Hartford Grand List and U.S. Census Bureau American Community Survey.

Conversion factors for each fuel type to MWh are:

- 1 CCF Natural Gas = 0.0293 MWh
- 1 Gallon Heating Oil = 0.04059 MWh
- 1 Gallon Propane = 0.02677 MWh
- 1 Gallon Gasoline = 0.03341 MWh

Greenhouse gas emission rates are:

- 1 CCF Natural Gas = 0.005855 tons GHG
- 1 Gallon Heating Oil = 0.01120 tons GHG
- 1 Gallon Propane = 0.006348 tons GHG
- 1 Gallon Gasoline = 0.00980 tons GHG
- 1 MWh Electricity = 0.0000292 tons GHG

Costs per unit of fuel are:

- \$1.25 per CCF natural gas
- \$2.80 per gallon heating fuel
- \$3.00 per gallon propane
- \$2.80 per gallon gasoline
- \$0.18 per kWh electricity

Prepared by:  
Bernard Pelletier, WH Clean Energy Commission and PACE.

# Appendix 3 Town of West Hartford Solar Projects

Year	Site	Size (KW DC)
2006	Town Hall	3 KW (removed)
2008	Hall HS	3 KW
	Conard HS	3 KW
2009	Bristow MS	95 KW
2012	Department of Public Works	102 KW
	Bishops Corner Library	58 KW
	Wolcott ES	11 KW
	Conard Community Green Energy Lab	Demonstration solar and wind
2016	Westmoor Park	5 KW
	Charter Oak International Academy	100 KW (also 64 geothermal wells)
	Conard HS	357 KW
2017	Aiken ES	238 KW
2018	Off-Site (Thompson, CT) – Virtual Net Metering	2,400 KW
2019	Town Hall	129 KW
2020	King Philip MS	527 KW



14 projects  
4 MW capacity  
5 Million kWh

DRAFT – Nov 23, 2020