october 2022

GREEN ENERGY INITIATIVE

A Model for Northwest CT Communities

Town of Kent
CONNECTICUT

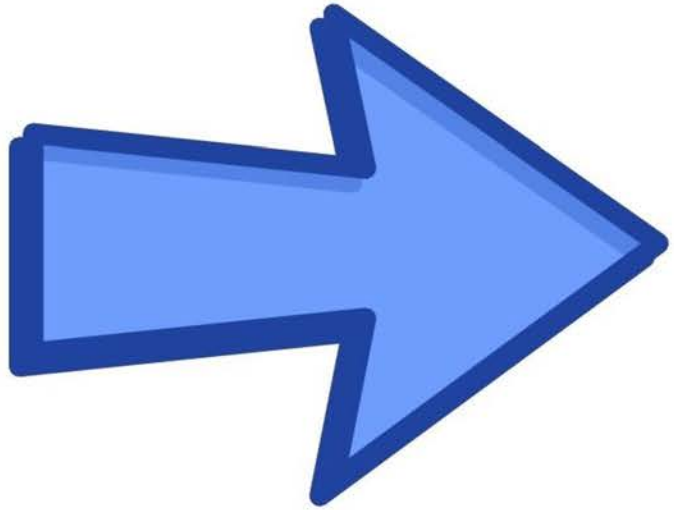
OCTOBER 15, 2022

Today we'll discuss

- **The Importance of Local Action**
- **Kent Energy Use Today – A Case Study**
  - How we use it
  - How much it costs
  - Our local GHG impact
- **Reducing Energy Consumption**
  - Conservation
  - Efficiency and Electrication
- **Creating Energy Locally**
- **Next Steps**
  - Home efficiency
  - Business efficiency
  - Vehicle efficiency
  - How to get renewable energy
- **The Importance of Local Action**

Our Goal

To provide all of our energy using clean, carbon neutral sources

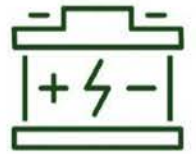


Our Goal

To provide all of our energy using clean, carbon neutral sources

SOLAR PANEL

ELECTRICITY TOWER



BATTERY

WIND ENERGY

WATER ENERGY

ELECTRIC CAR

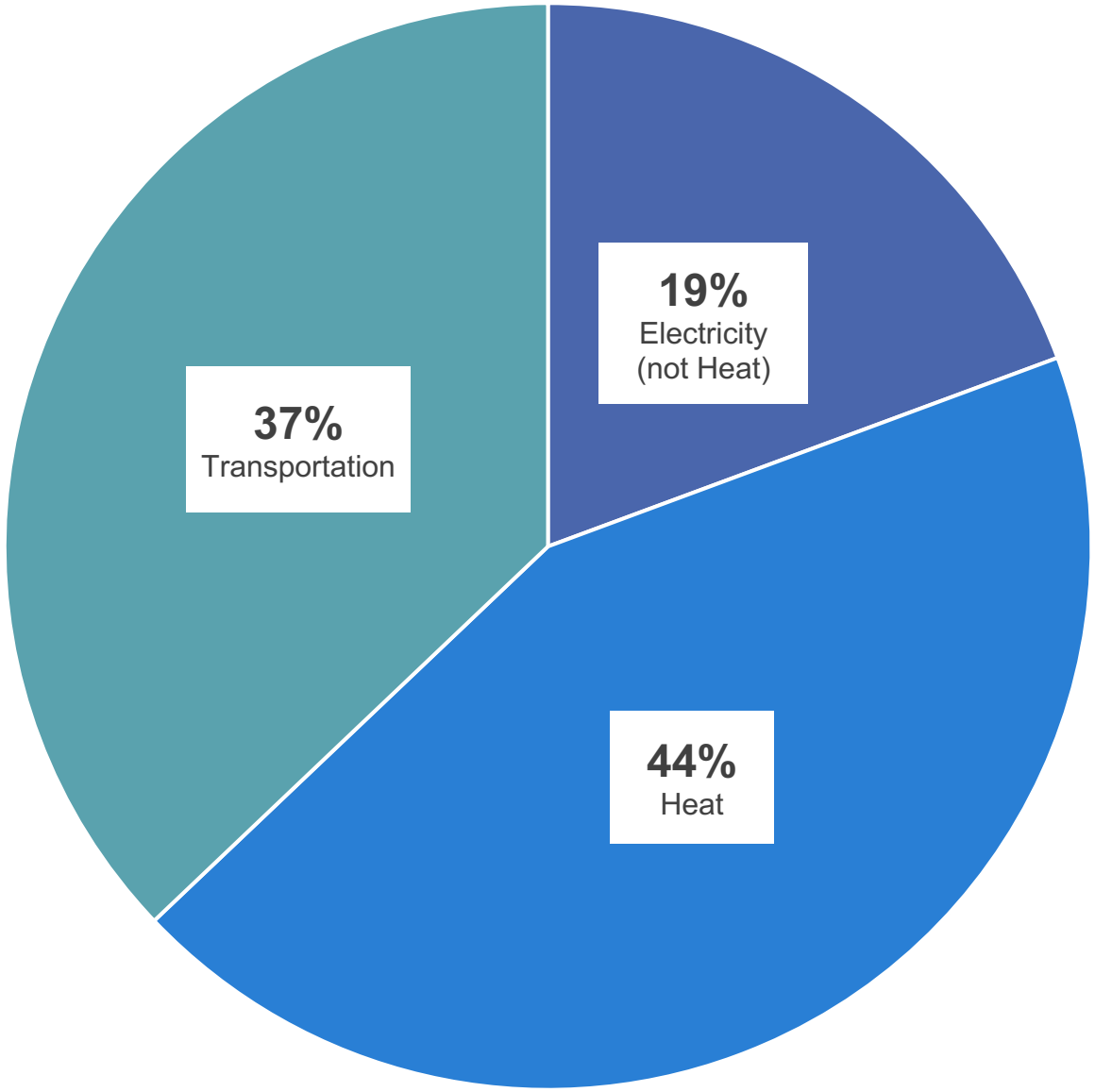
The Path to 100% Clean Energy Using Kent as the Example

Determine Current Use & Make a Plan

Efficiency & Electrification

Invest in Renewables

Energy Today in Kent



Current Load is 124 GWH

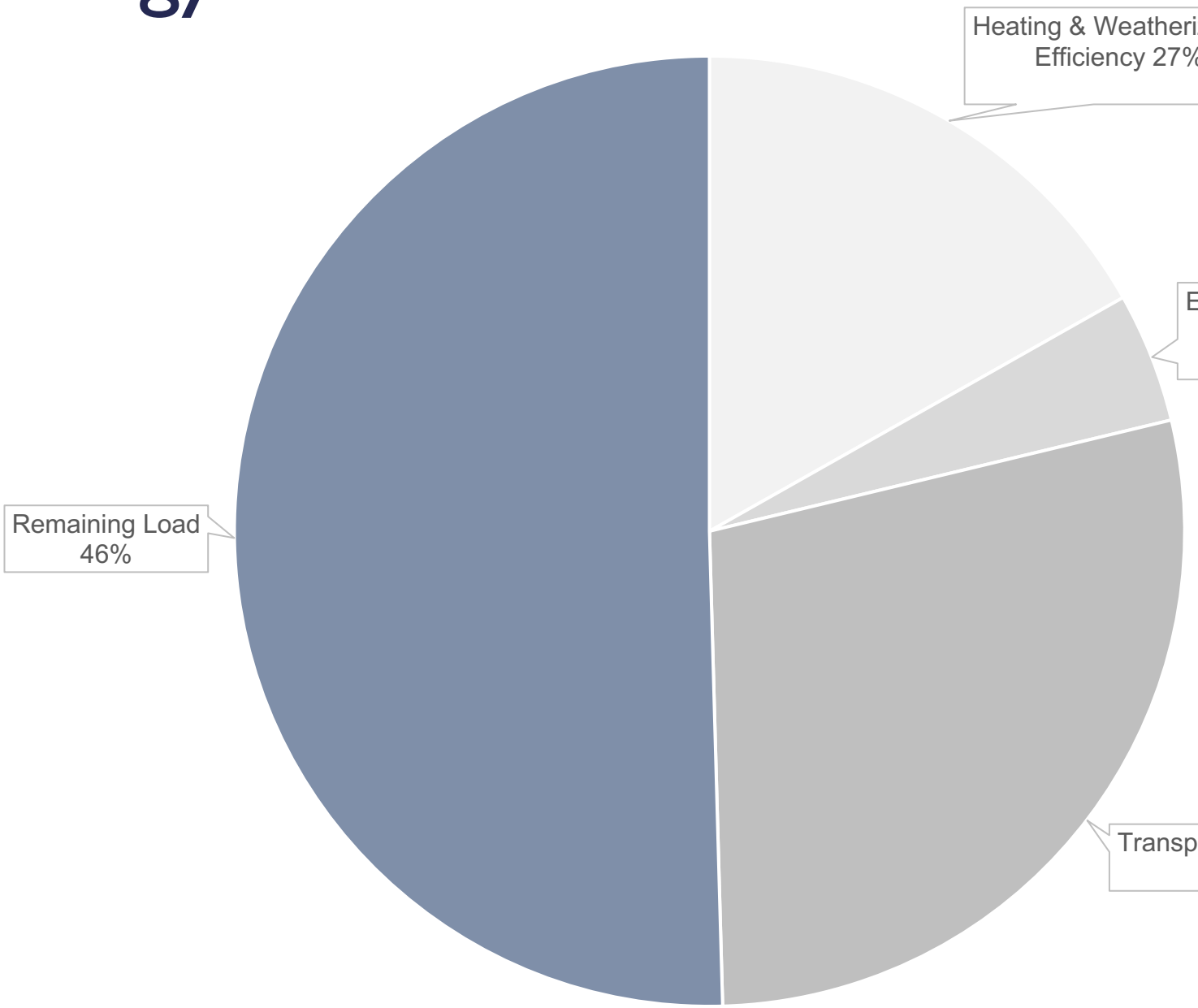
The Cost of Doing Business as Usual

	Gigawatt-Hour (GWh)	Cost ($ millions)	Greenhouse Gas Emissions (Tons CO2)
Electricity (not heat)	24	5.1	7,057
Heat	54	4.8	12,896
Transportation	46	5.3	13,496
TOTAL	124	15.2	33,449

$5422 per resident!

12 tons per person!

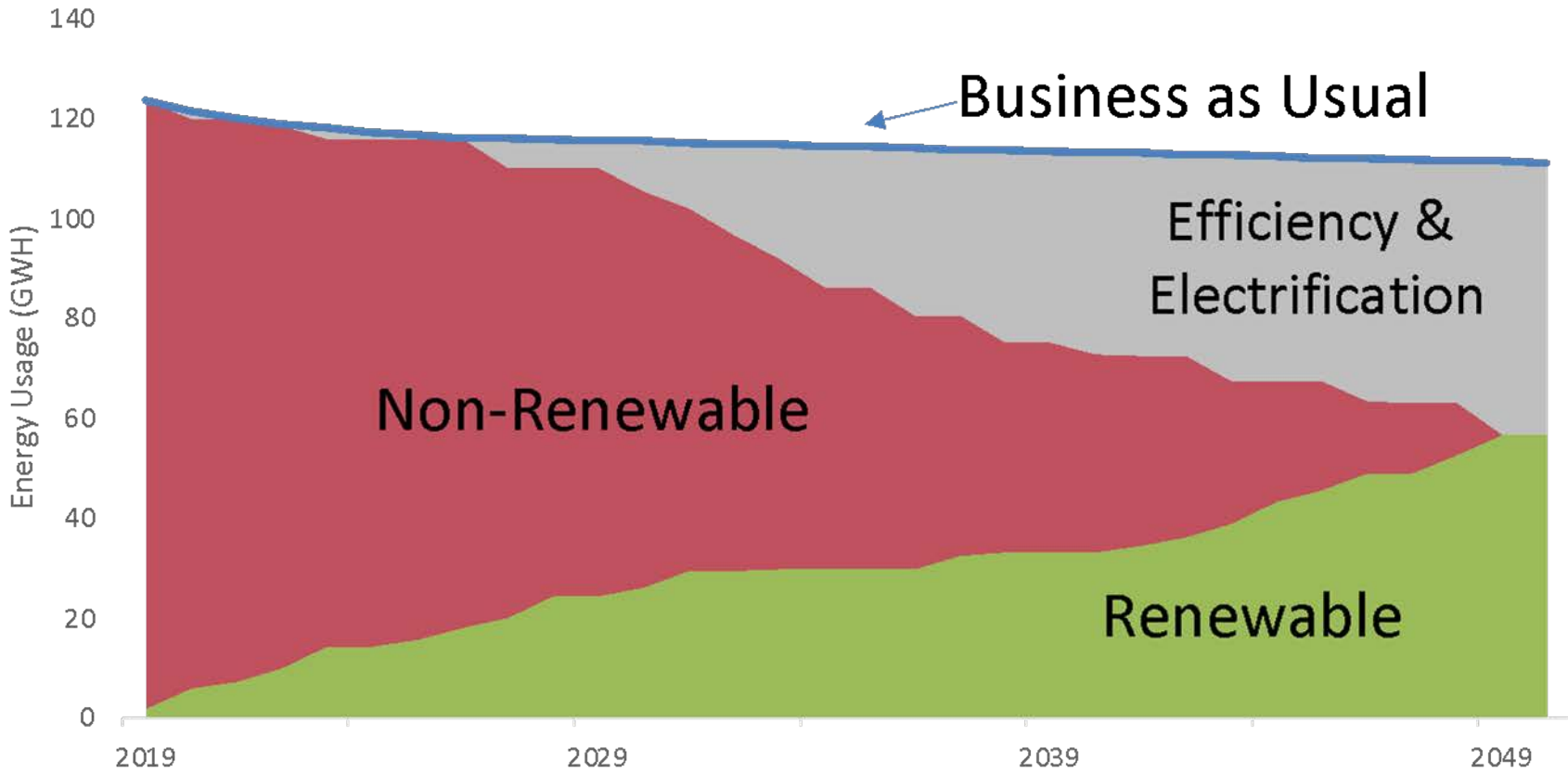
Energy Tomorrow in Kent



Current Load (124 GWH)
Reduced to 57 GWH
Through Efficiency

How this looks over time

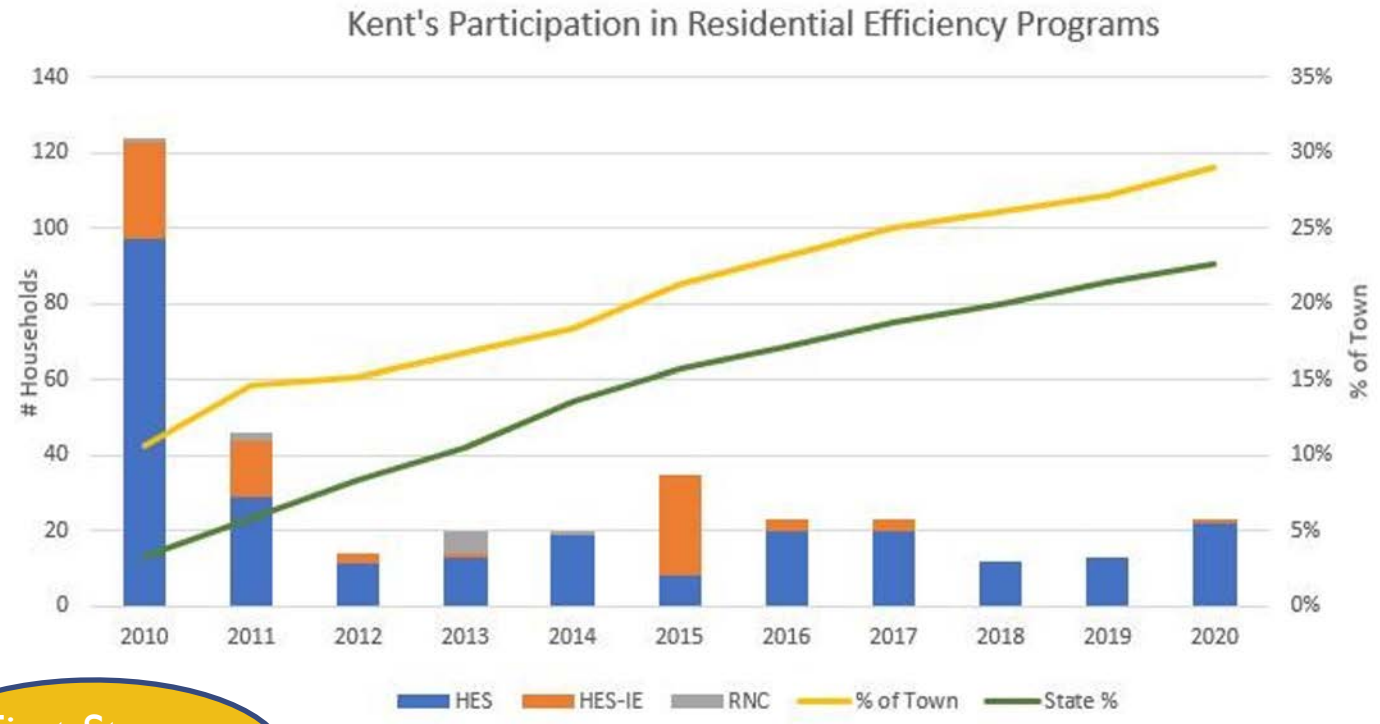
Over time, efficiency and renewable energy replace non-renewables.



So How Do We Do This?

The Green Energy Initiative

Home Efficiency

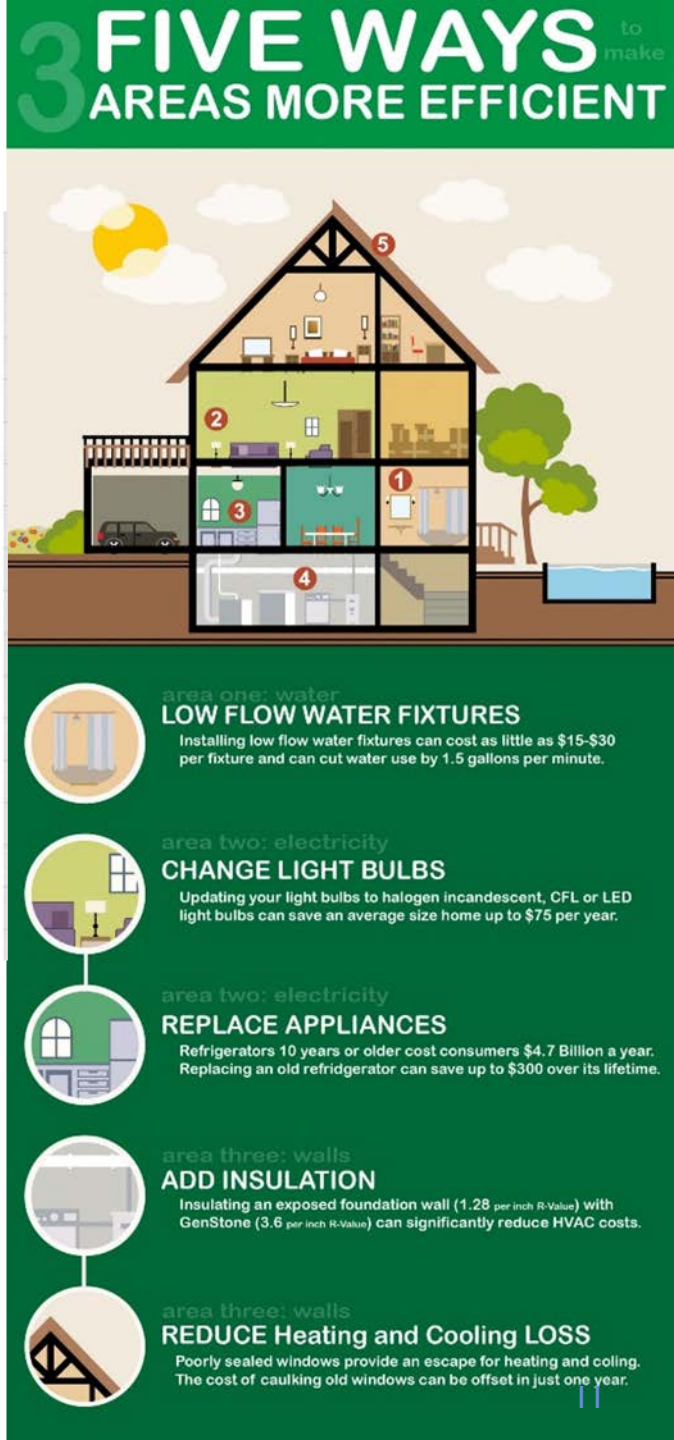


First Step – Get a HES!

Home Energy Solutions (HES)

Weatherization

Heat Pump



What Kind of Difference Can We Make?

If all of the households in Kent just took the first step — HES — that translates to reduced emissions of …

1,528,800

pounds of CO_2

1,300 lbs x1,176 HH

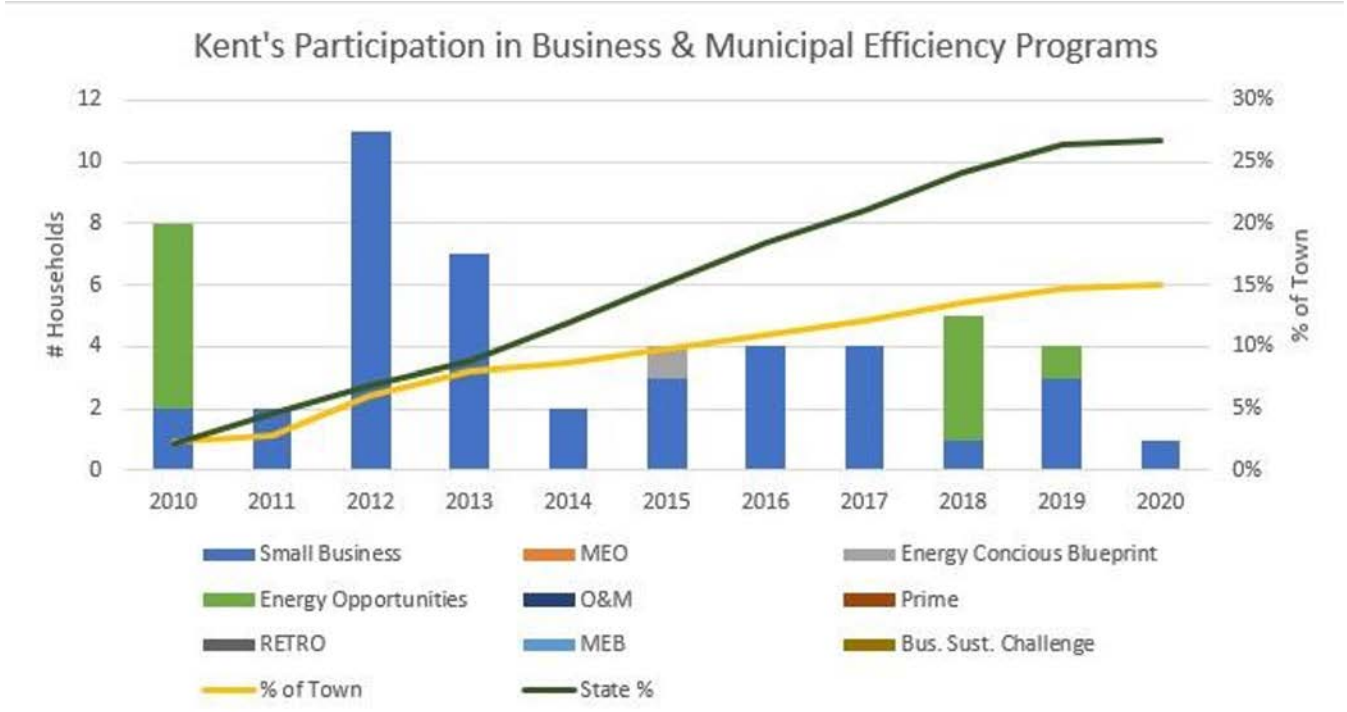
Electrify Your Heating and Cooling System with a Heat Pump

A heat pump can heat and cool your home.

It's called a heat pump because it redistributes heat that is already in the air or ground with a refrigerant. Redistributing heat uses less energy than producing it. And the energy used is electricity which can be generated without fossil fuels!

$$COP = \frac{\text{Power Output}}{\text{Power Input}}$$

Business Efficiency



The Small Business Energy Advantage (SBEA) program has its rewards …

CASE STUDY

White Flower Farm
Litchfield

Business Energy Solutions

$85,000 annual electricity savings

$16,000 annual natural gas savings

$242,589 incentive to defray costs

Transportation Efficiency

INCENTIVES FOR EVS

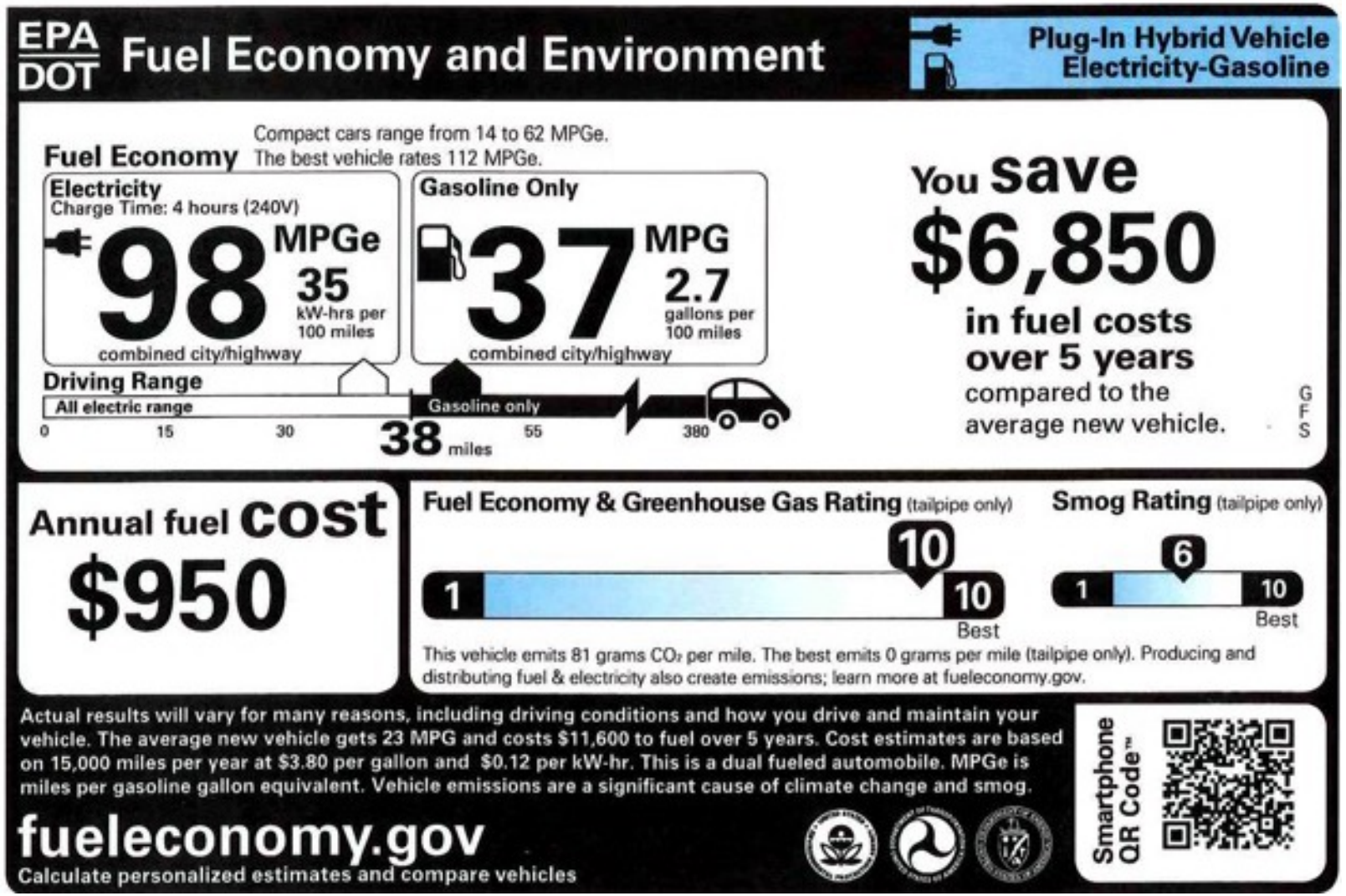
Connecticut Hydrogen and Electric Automobile Purchase Rebate - CHEAPR

- Up to $7500 for purchase or lease
- Supplemental possible for income-qualified

Inflation Reduction Act (IRA) EV Incentives, Explained - (pluginamerica.org)

- Federal Tax Credits Available up to $7500 for new autos and up to $4000 for used vehicles

98MPGe V. 37MPG > 63% Energy Reduction

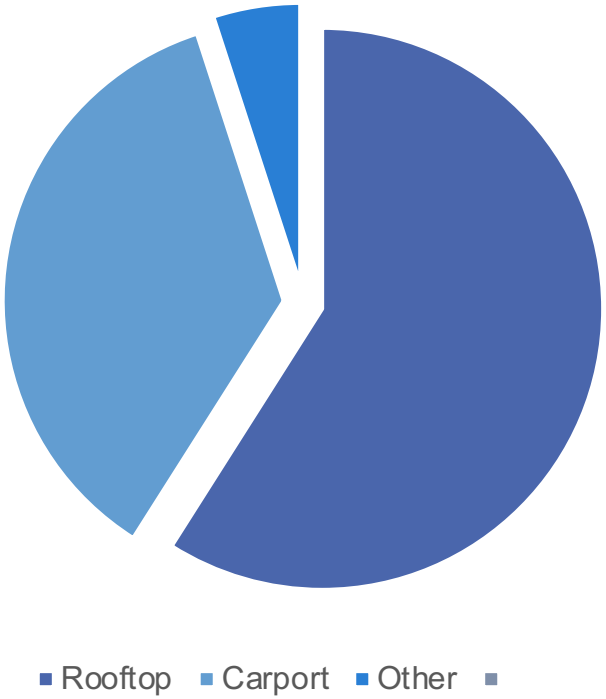


Starting Estimate of Kent Solar Potential

Energy Report pro forma estimate: 15.9MW local producing 22.8GWH annually or 40% of Kent's "future load"

Roof top 1403 homes and condos at 7Kw each + solar on 20% of 500,000 sq feet of commercial buildings for 3.4 MW

Solar Canopies on parking lots:
2.5 MW (½ of technical potential)

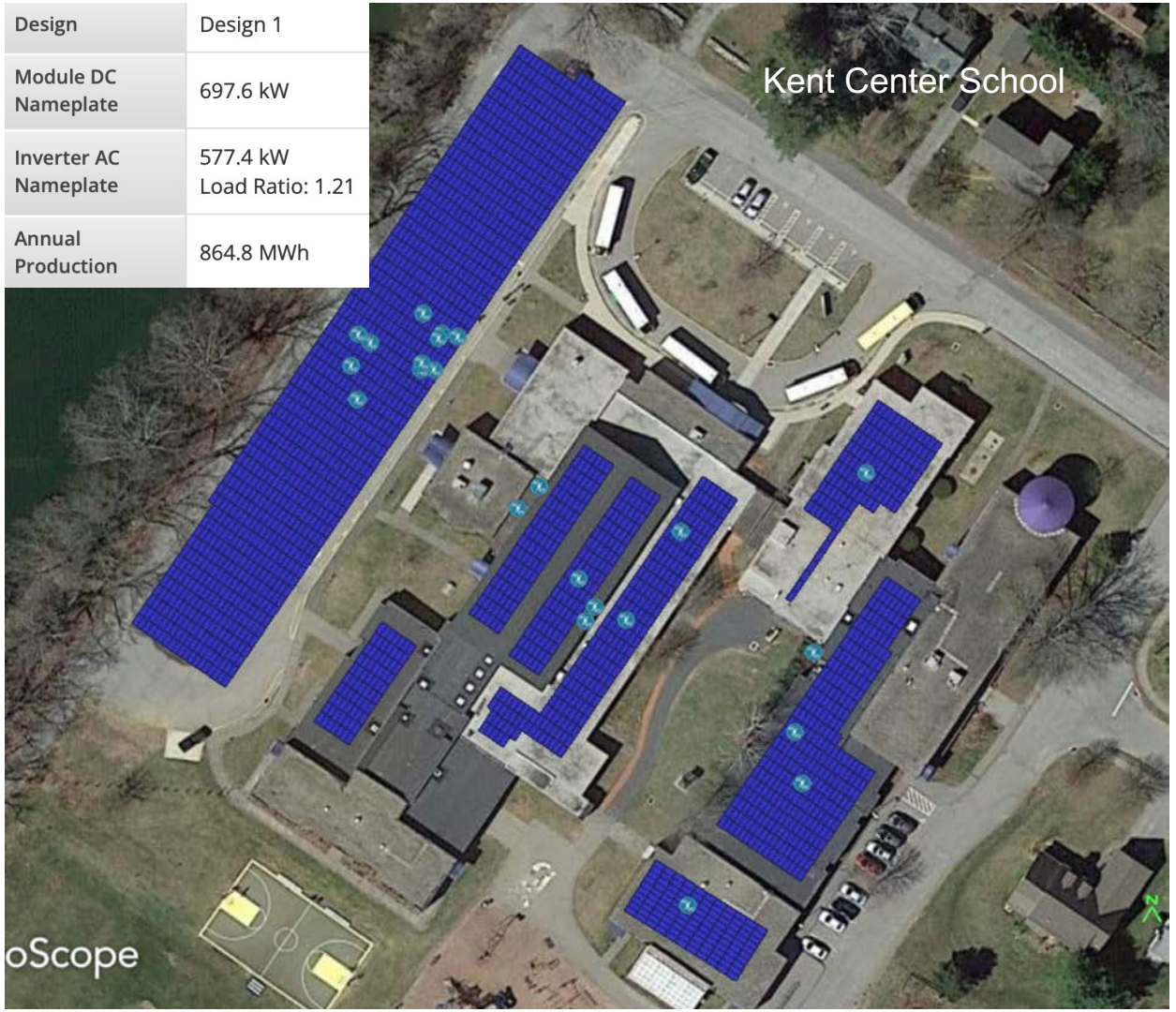


"Big Project" 10MW – would require 50 acres of land …e.g. Sewage Treatment plant

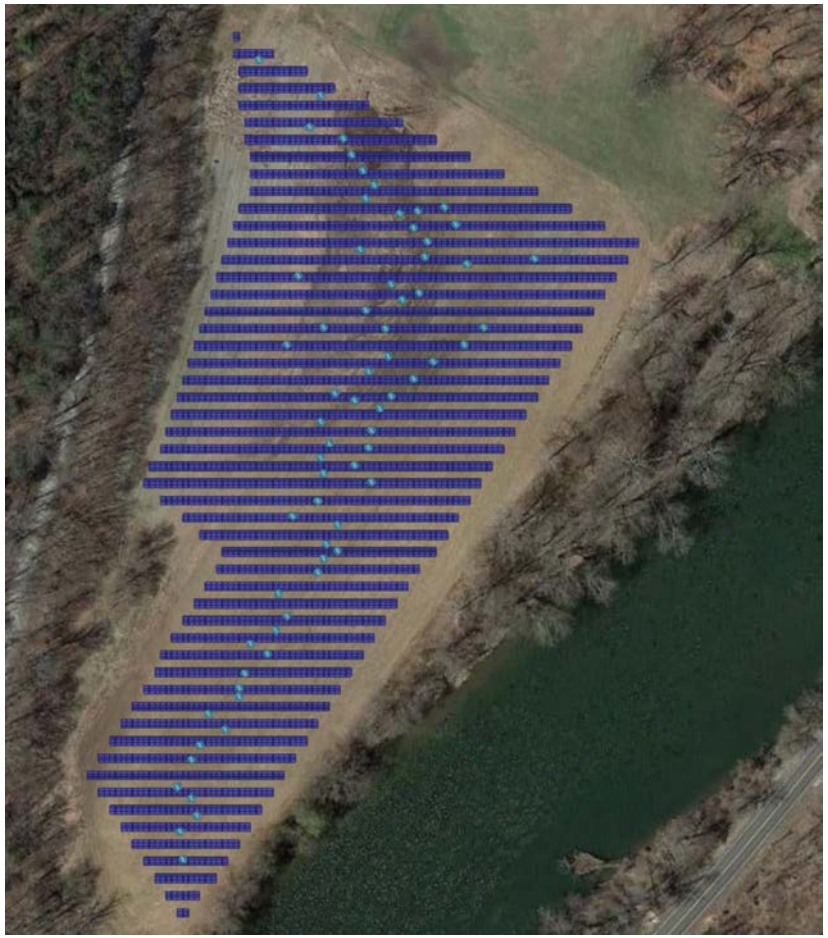
Potential for solar

- Roofs
- Parking Lots
- Rights of Way
- Brownfields
- Highways
- Enhanced Agriculture
- Others?

Design	Design 1
Module DC Nameplate	697.6 kW
Inverter AC Nameplate	577.4 kW Load Ratio: 1.21
Annual Production	864.8 MWh



Example “Big Project”



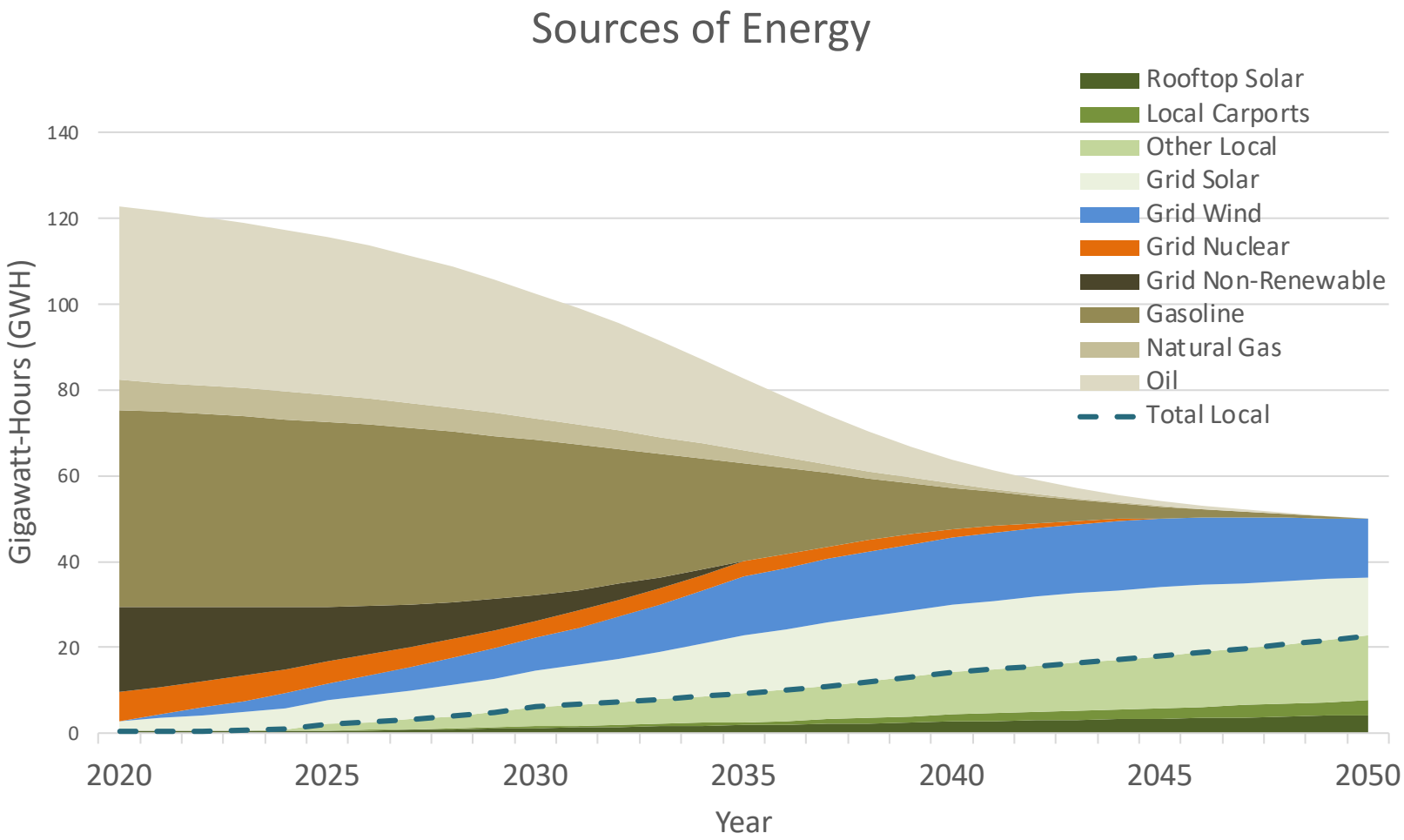
125 E Schaghticoke Rd Kent CT

System Metrics	PDF	CSV
Design	Design 2	
Module DC Nameplate	2.07 MW	
Inverter AC Nameplate	1.66 MW Load Ratio: 1.25	
Annual Production	2.743 GWh	
Performance Ratio	86.9%	
kWh/kWp	1,325.9	
Weather Dataset	TMY, 10km Grid (41.75,-73.45), NREL (prospector)	
Simulator Version	4f68be5c10-26ea6e3732-0ef6147842-e9e5c96c73	
Shade Report	View Shade Report	

Solar Canopy Study

We will use only clean energy, and less of it

We will continue to source our energy both locally and from the regional grid.



Action Steps

Install rooftop or ground-mounted solar

Replace old stove with induction stove. Replace refrigerator and dishwasher with energy efficient ones.

Replace drafty windows and doors

Switch to a heat pump when old AC needs replacing

Visit our informational tables to find out more …

Insulate the attic, walls, and basement

Replace inefficient dryer with heat pump dryer

Get a HES service to seal air leaks

Consider installing a battery backup

Make your next car an EV

Electrify your home heating and hot water with heat pumps

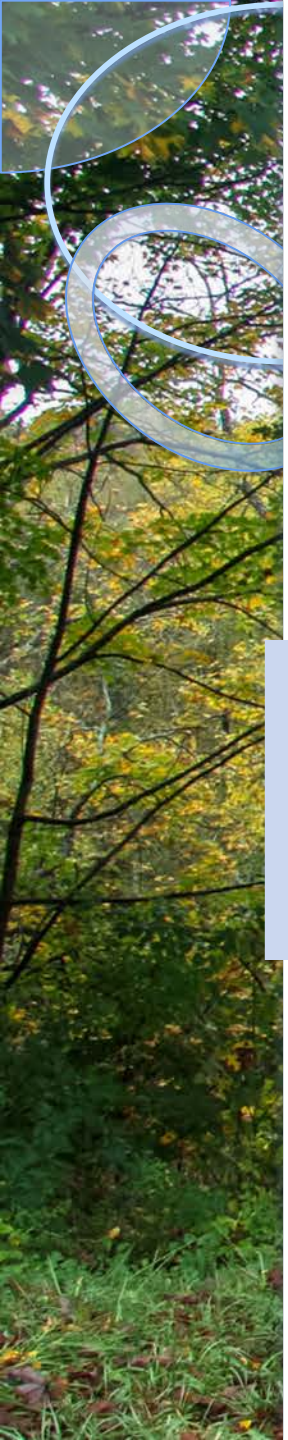
IRA

ITEM	INCENTIVE	CONDITIONS
Electric Vehicles	Tax Credits Up to $7500 new Up to $4000 used	Cost of vehicle, manufacturing and mineral sourcing location, manufacturer caps, income of purchaser
Electric Charging Stations	Tax Credit Up to $1000 for residential/individual	Location in low-income or non-urban area
Solar - Rooftop	Tax Credit Up to 30% of installation	May be stand alone system or paired with battery
Efficiency (insulation, windows, etc.)	Tax Credit Up to $1200	TBD
Home Energy Audit	Tax Credit $150	TBD
Heat Pumps	Tax Credit Up to 30% of installation	TBD
Efficient Electric Appliances	Rebates Through State Up to 100% for LMI	TBD
Electric Upgrades	TBD	TBD

- We don't know all the impacts yet! But….
- https://www.whitehouse.gov/cleanenergy/?utm_source=cleanenergy.gov

Here to help today

1. Green Bank: Ralph Mesite - Smart E loans and Ed Kranich – Battery Storage
2. Eversource: Devan Willemsen - Utility Efficiency Programs
3. GM solar: Glenn Martin – Tracking Systems for Solar
4. EV Club of CT: Barry Kresch – All things EV
5. 20 / 20 Air Mechanical:Tom Jones – Heat Pumps
6. Paragon Heating and Cooling :William Stremski – Heat Pumps
7. PACE: Deb Roe and Mark Scully: Town Energy Models
8. Wendy Murphy: Kent Conservation Commission



Ready, Set, Go!

MY ENERGY INVENTORY

DATE: _____

HOUSE/APT

ITEM	RESPONSE
Age of Home	
Type of Heat (Oil, Electric, Other)	
Annual Energy Use for Heating	
Weatherization Barriers (mold, asbestos, knob & tube)	
Year of Last HES service	
Windows (single pane or double pane)	
Insulation (attic, walls, basement)	
Type of AC (central, window)	
What next step will help reduce energy use?	
What next step will help reduce energy use?	
Consider an air source or ground source heat pump	

ELECTRICITY USE

ITEM	RESPONSE
When will your water heater need replacement?	
Is your water heater set at 120 degree F ?	
Age of refrigerator	
Age of clothes dryer	
LED bulbs throughout?	
Computer shut off when idle for 2 hours or more?	
Do you have a schedule to clean or replace filters in your furnace, air conditioner, and heat pump?	
Review electricity use and target largest user for measures	
Is your home a good fit for solar?	

NOTES

TRANSPORTATION

Which of the following might work for you?

- [ ] Reducing driving by working from home or through other measures
- [ ] Biking or walking more
- [ ] Making your next car an EV
- [ ] Ride sharing

Questions & Answers

Connect with PACE …

People's Action for Clean Energy

Mark Scully, President - mwscully29@gmail.com

Bernie Pelletier, Vice President - ReitellepB@gmail.com

Deb Roe, Program Manager – deb@PACEcleanenergy.org