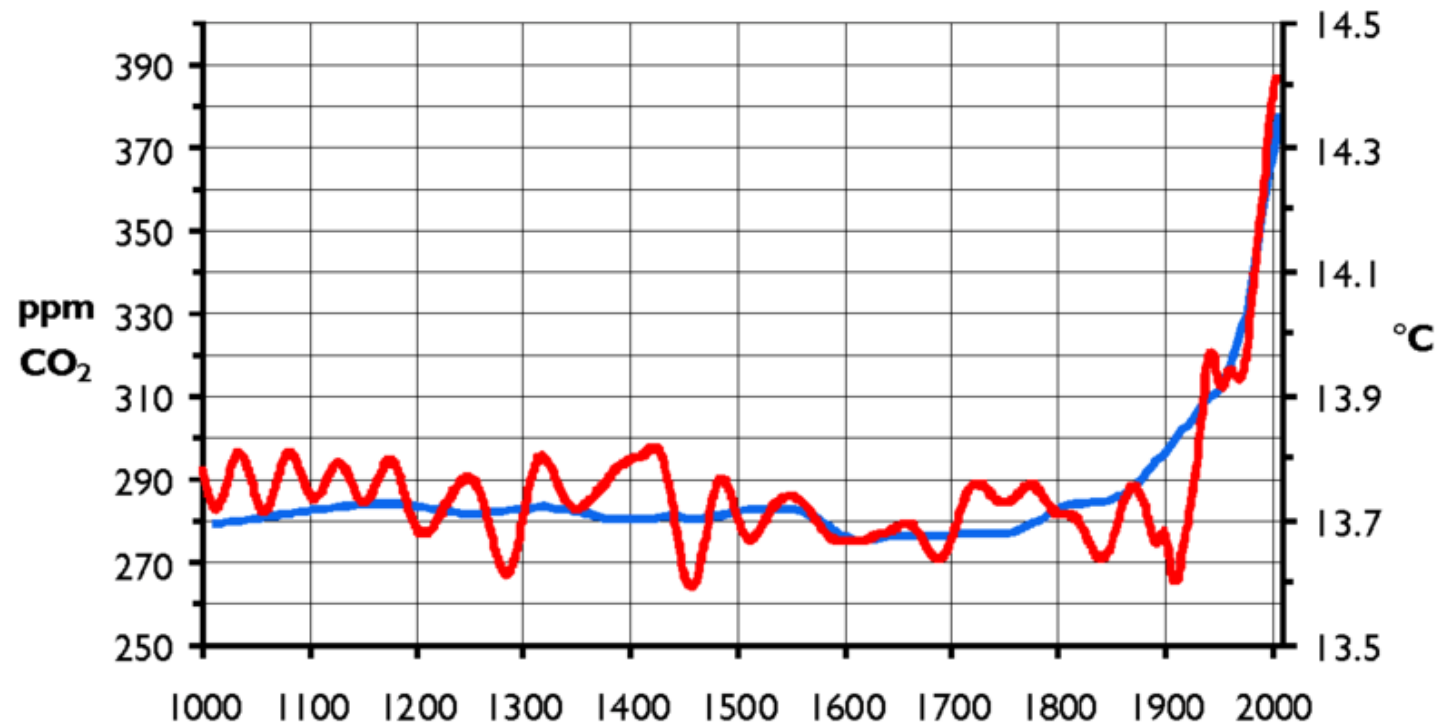


Making Branford a "Renewable Energy Community" by 2050

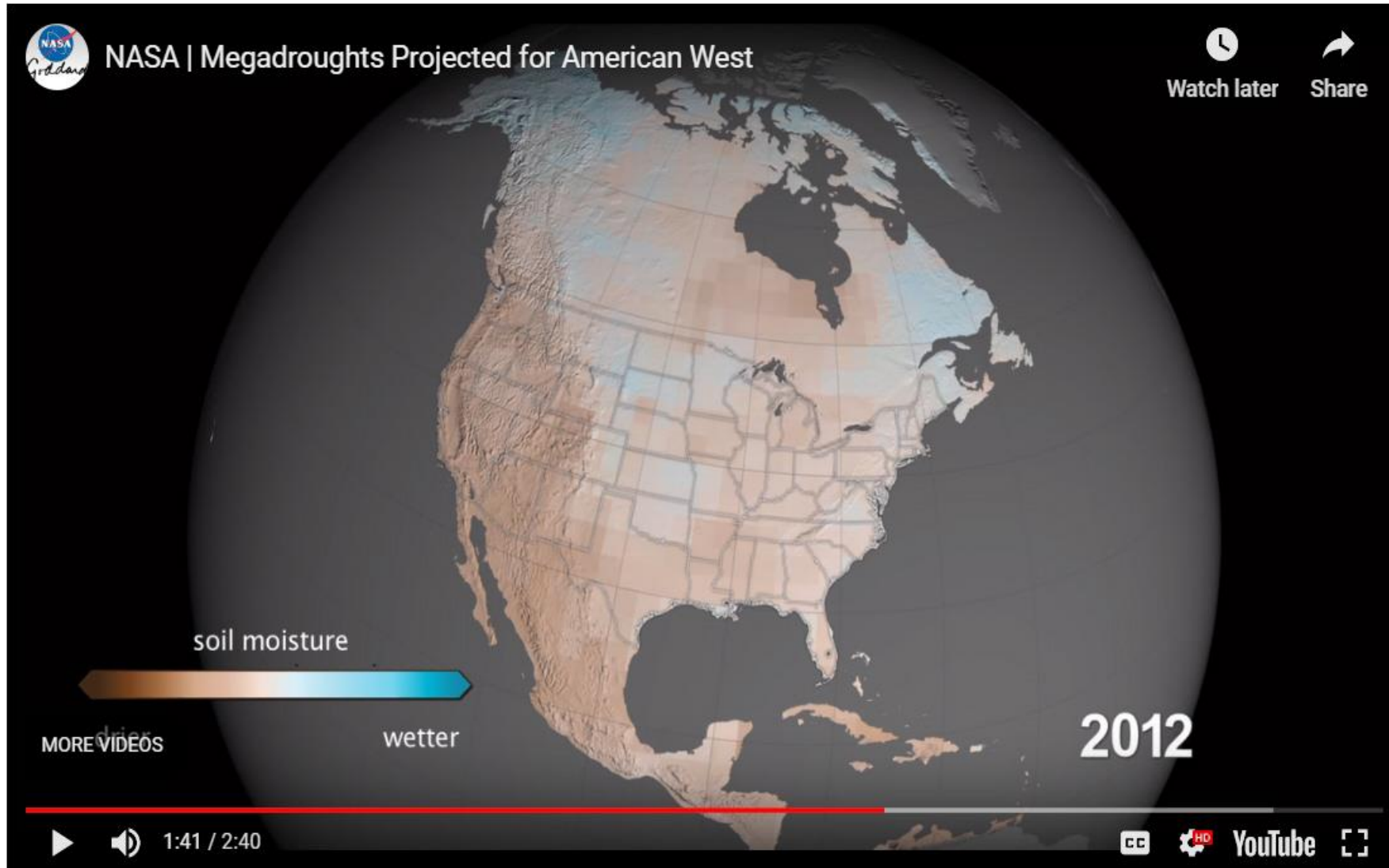


The Tabor Solar Field produces an average of 283 Kilo Watts

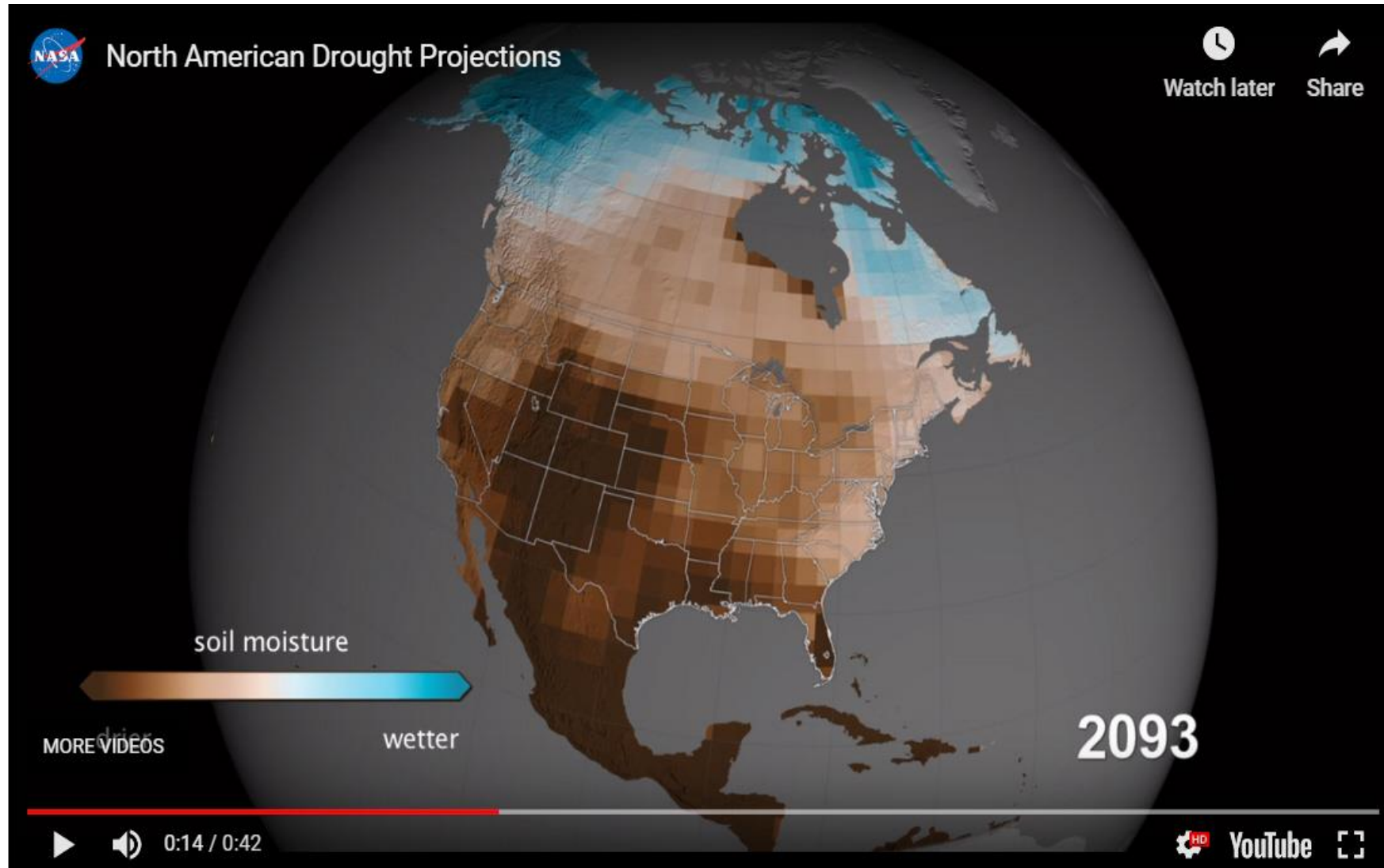
CO₂ and Temperature Since 1000



Global Warming Impact on Soil Moisture



Global Warming Impact on Soil Moisture



America's Bread Basket

Today



2093



Why is fighting Global Warming Important?

13,000 Scientists Recently Warned That:

“The climate crisis has arrived and is accelerating faster than most scientists expected. It is more severe than anticipated, threatening natural ecosystems and the fate of humanity.”

Alliance of World Scientists

Conclusion

► We must fight climate change

The Clean Energy Committee is leading the effort in Branford

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the left and right sides of the page, framing the central white area.

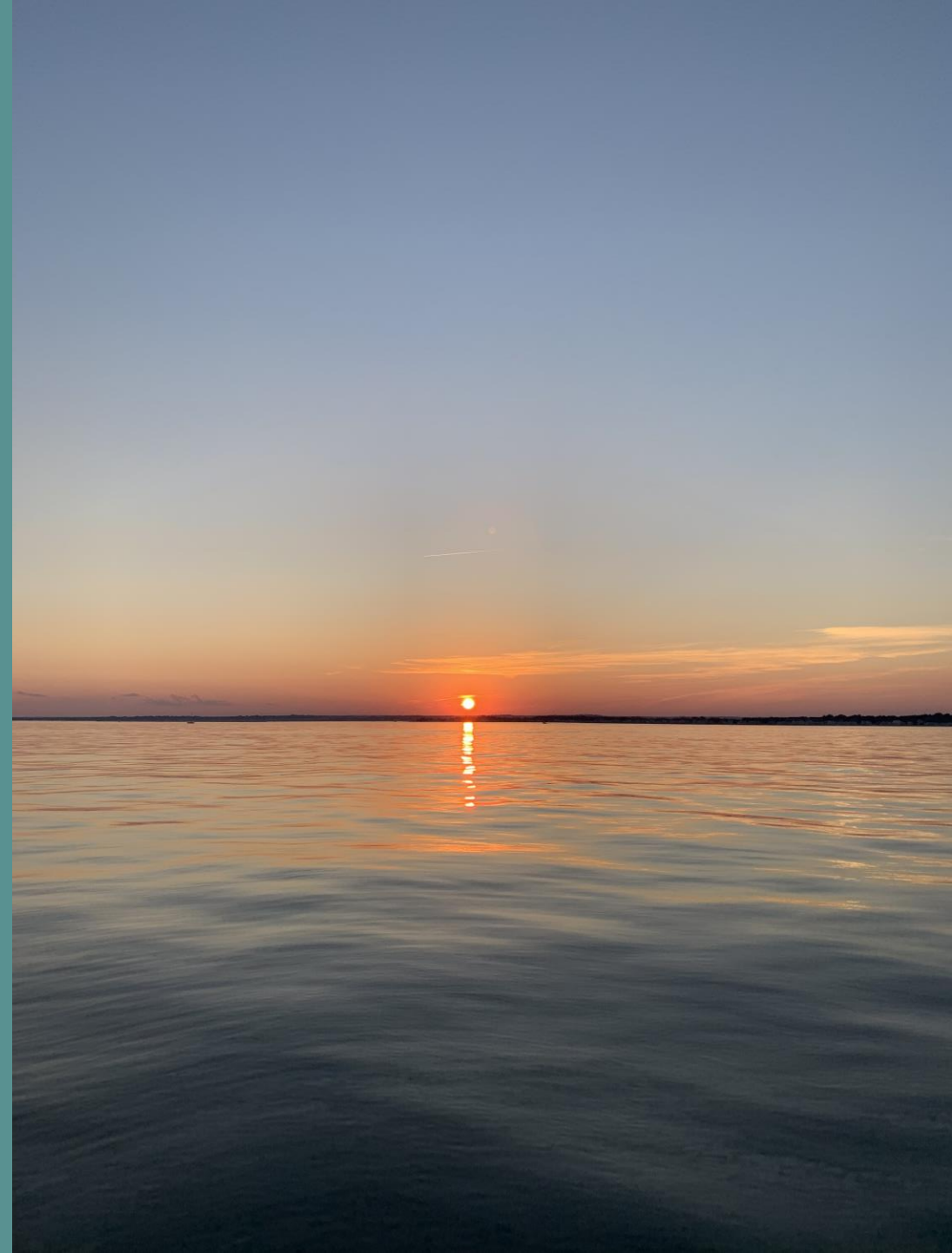
Greg Ames

2020 BRANFORD Energy Plan



2020 BRANFORD Energy Plan 2/19/2020 A FIRST LOOK

Clean Energy Ad hoc Committee



A FIRST LOOK at

The plan we are developing for the Town, which will serve as guidebook of information for the entire community.

The **BIG** goal: Move to 100% renewable energy and significantly reduce greenhouse gas emissions as soon as possible.



TABOR SOLAR FIELD

A YEAR OF LEARNING

Committee formed January 2019

A year of learning about :

How Branford uses energy

Energy science and technology

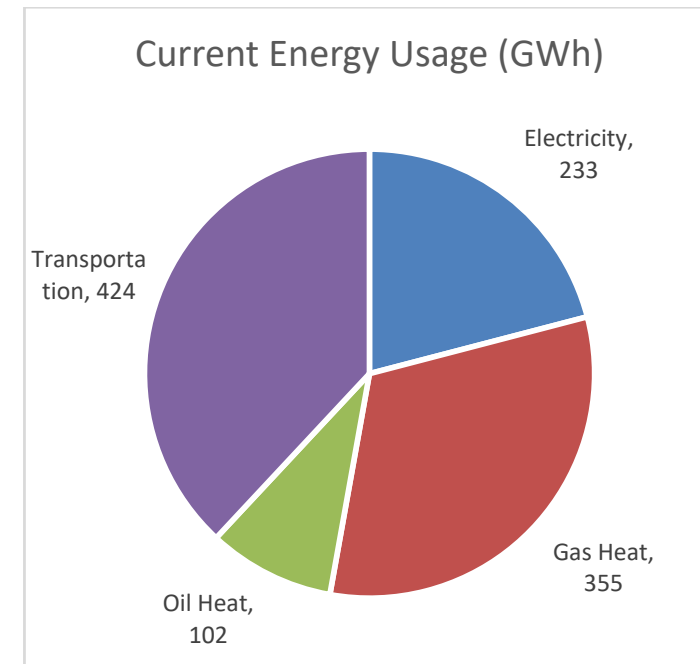
What's happening elsewhere

Sources of information

Drafting the plan

Setting goals, targets & milestones

For example, understanding how we use energy:



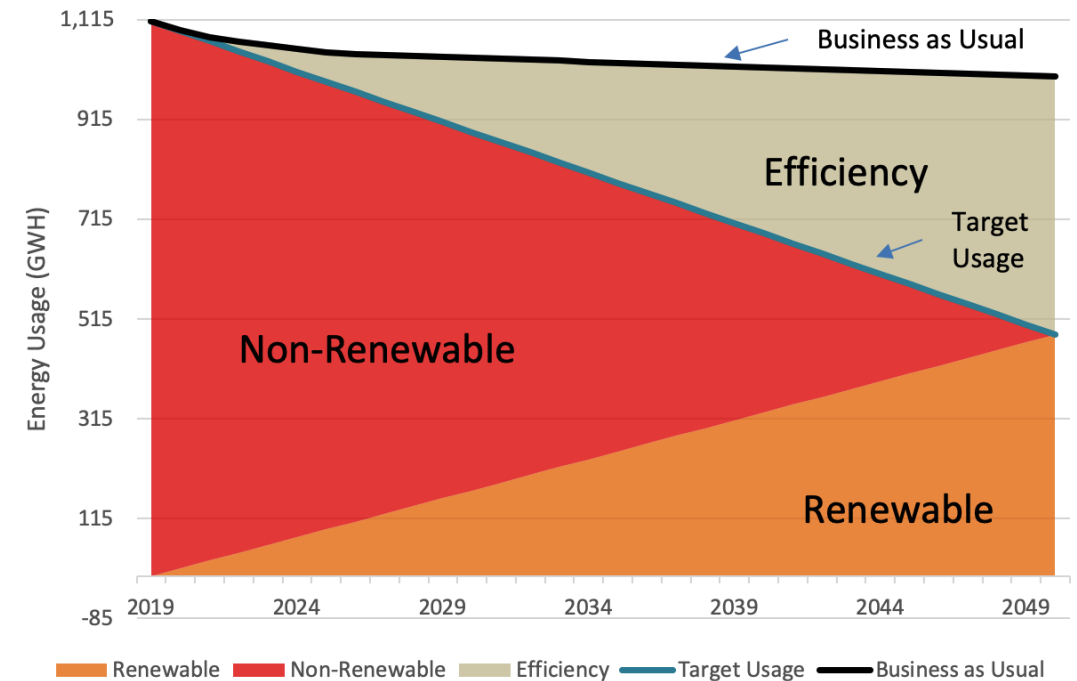
THE BIG GOAL-

100% clean renewable energy by ~~2050~~ **2040** (things are changing)

How do we do it?

1- Decrease overall energy consumption first energy efficiency then electrification

2- Develop clean, renewable electricity sources. (stop burning stuff)

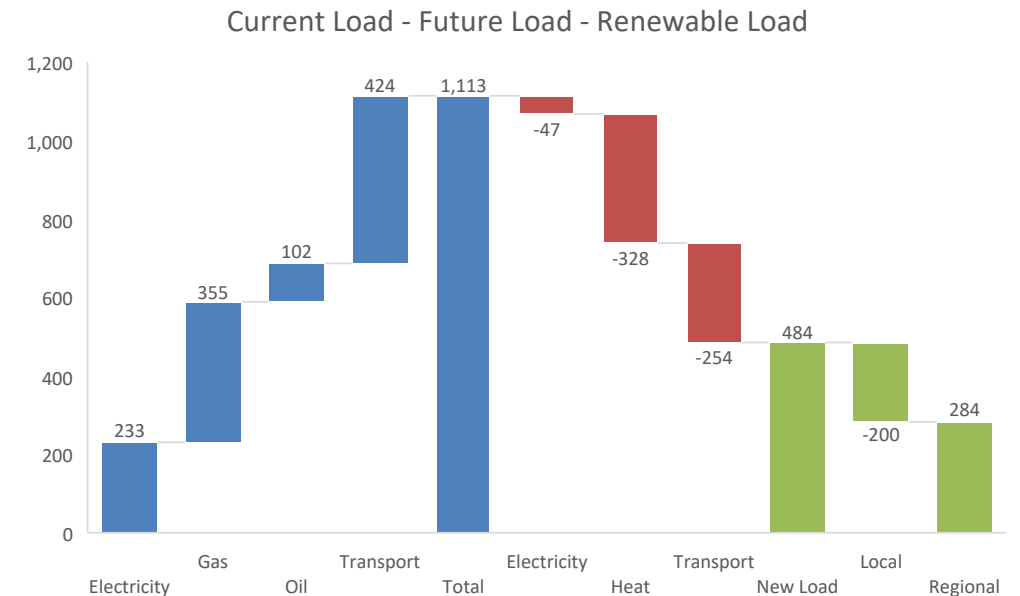


100% clean, renewable energy by 2040

We can do this!

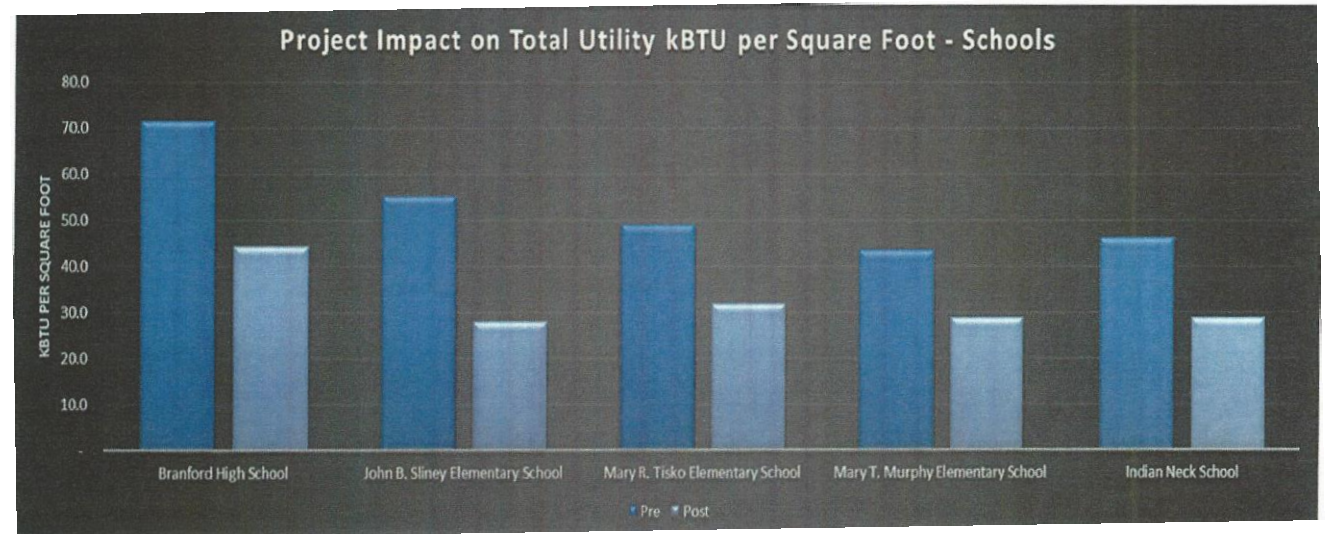
Key steps in this energy plan are:

- 1- Reduce energy use by improving the efficiency of our buildings
- 2- Transition heating and cooling to high-efficiency heat pumps.
- 3- Transition to electric vehicles .
- 4- Accelerate the development of renewable energy in the town and region.



STEP 1

Reduce energy use by improving the efficiency of our buildings, public and private.



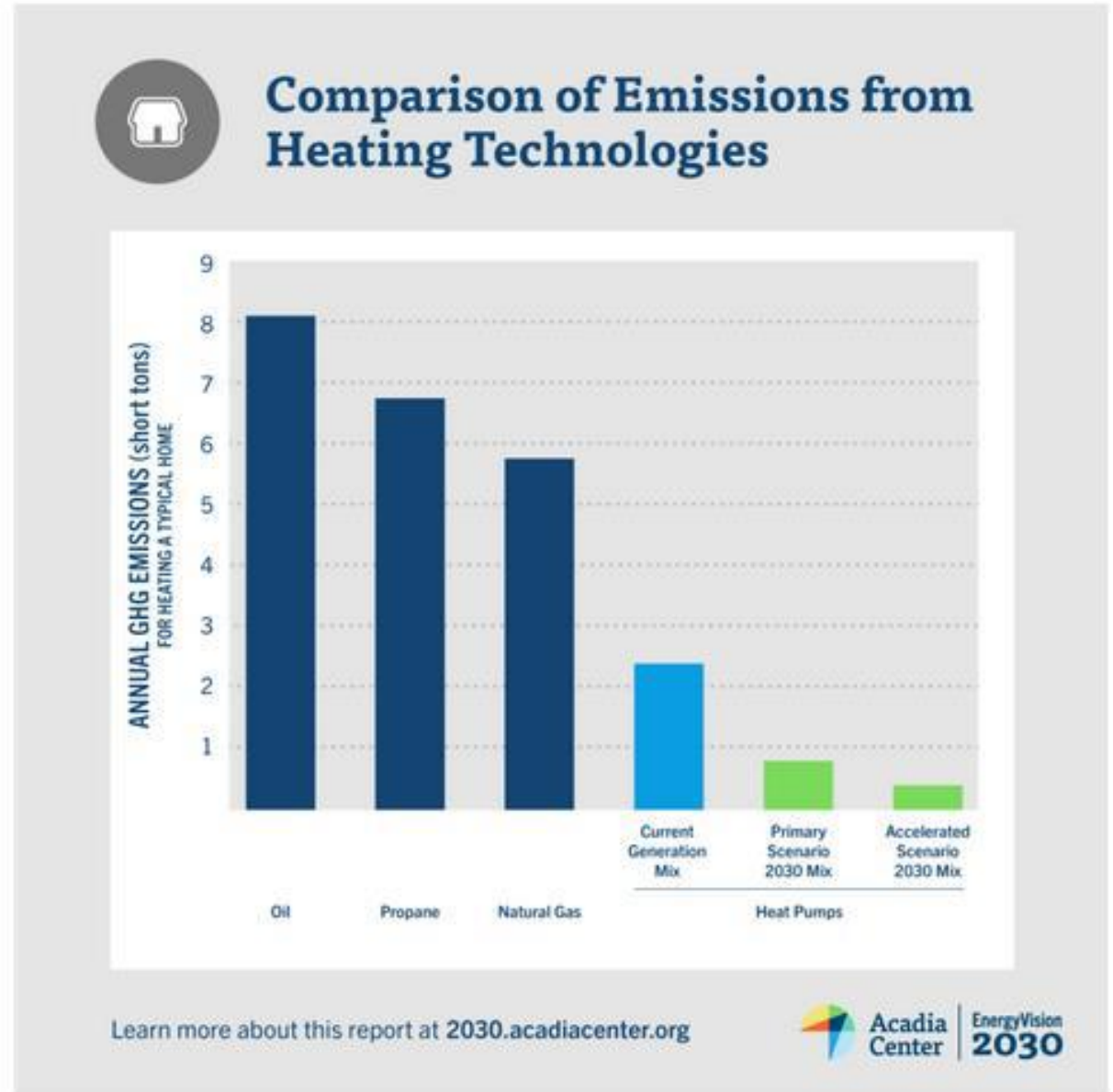
STEP 2

Transition heating and cooling to clean, high efficiency heat pumps

Less expensive than oil or propane

Powered by electricity, not by burning stuff-

Use much less energy, less GHG emissions



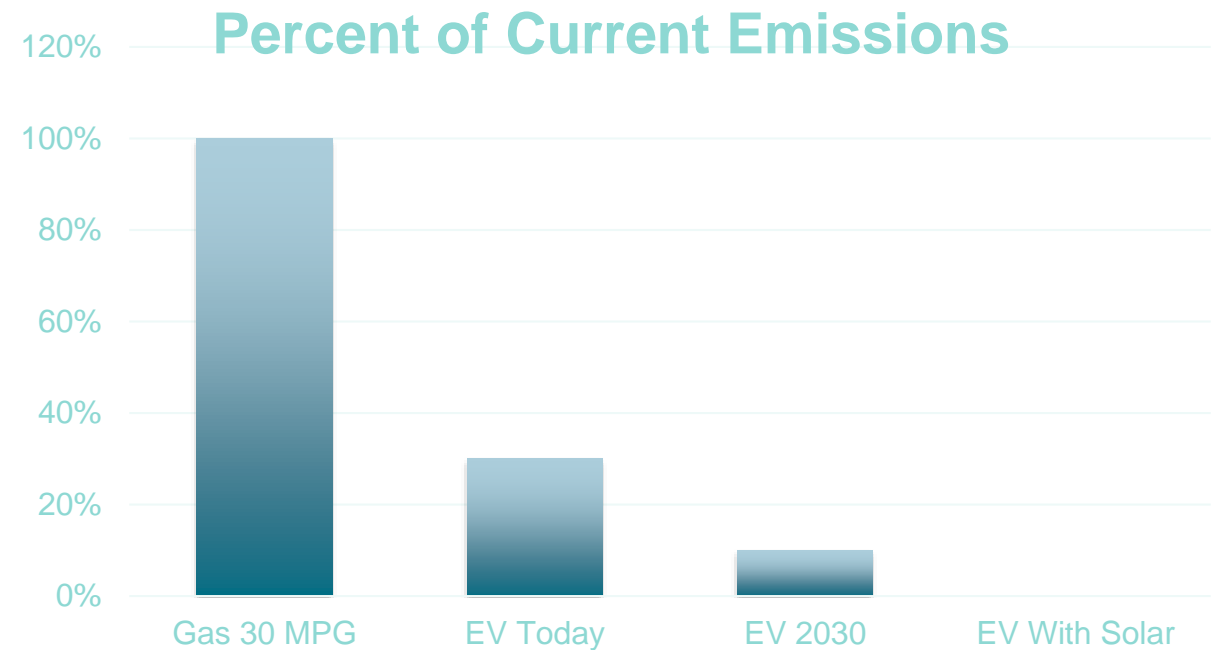
STEP 3

Transition to electric vehicles

More efficient and less expensive to own- lifetime cost is less than a Gasoline powered car

Powered by electricity, not by burning stuff-

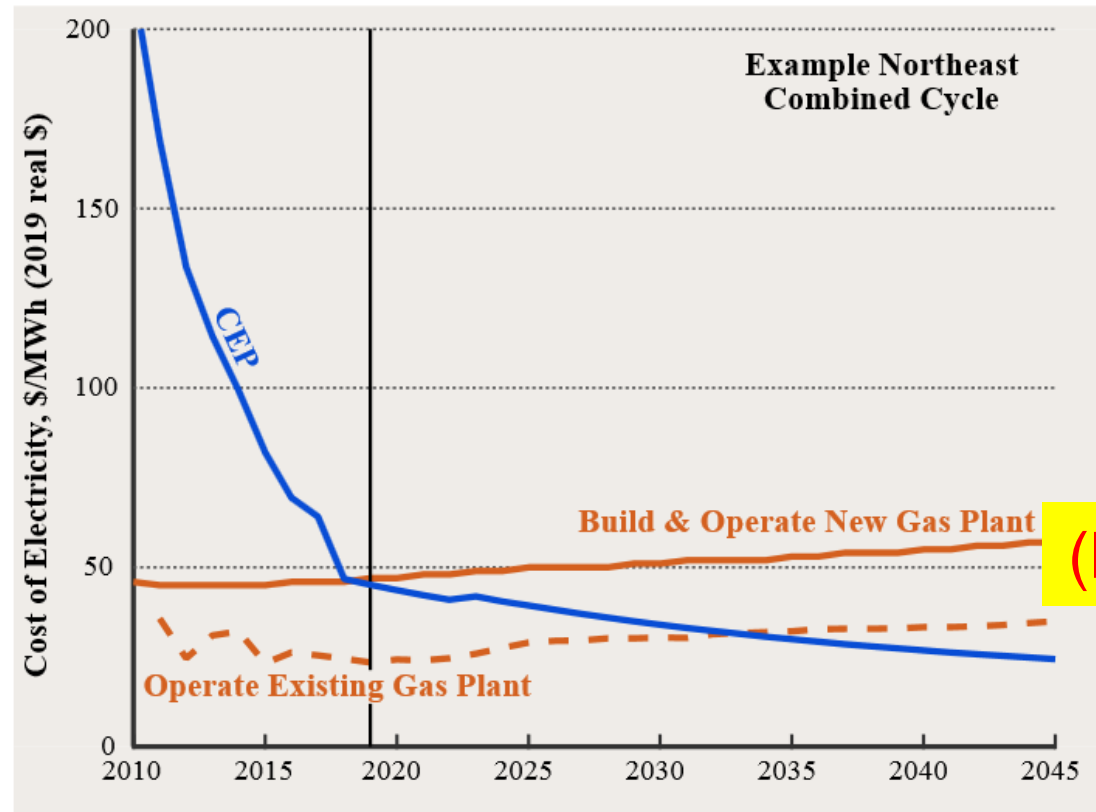
Use much less energy, less GHG emissions



STEP 4

Accelerate the development of renewable energy in the town and region- stop burning stuff

Renewable energy electricity is much less expensive than oil fired generation and is now becoming less than gas fired



(Killingly!)

So we are discovering all sorts of interesting things,
The most exciting of which is:

We can do this!

And because technology, economics and attitudes
are changing so rapidly,
We can do this without pain and suffering, deprivation, or going without

In fact, we have already started-

TO START,
Branford has already begun
to move toward these goals with:

The 2017 Tabor Solar Field

A tri-generation system at the high school



The “Honeywell contract”, a 5 million dollar
energy efficiency project completed in 2018, that achieved major savings
(25%?) and
improvements at our schools and municipal buildings at no out of pocket
cost to the Town

The incorporation of advanced energy features including the use of heat
pump systems
at the new firehouse and community center



TESLA



Driving on Sunshine

HOTEL

TESLA

TESLA

TESLA

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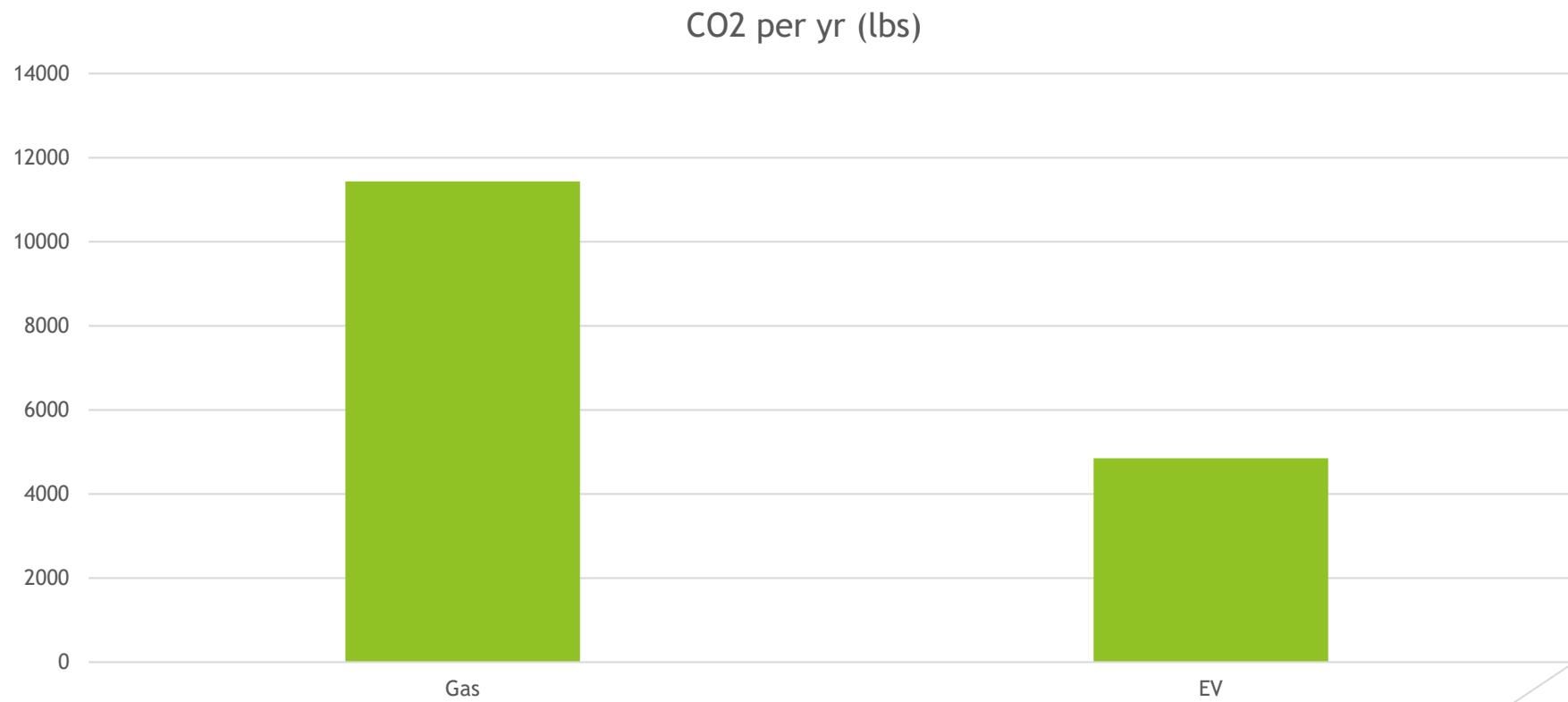
TESLA

TESLA

Electric Vehicles in Branford

Bob Babcock

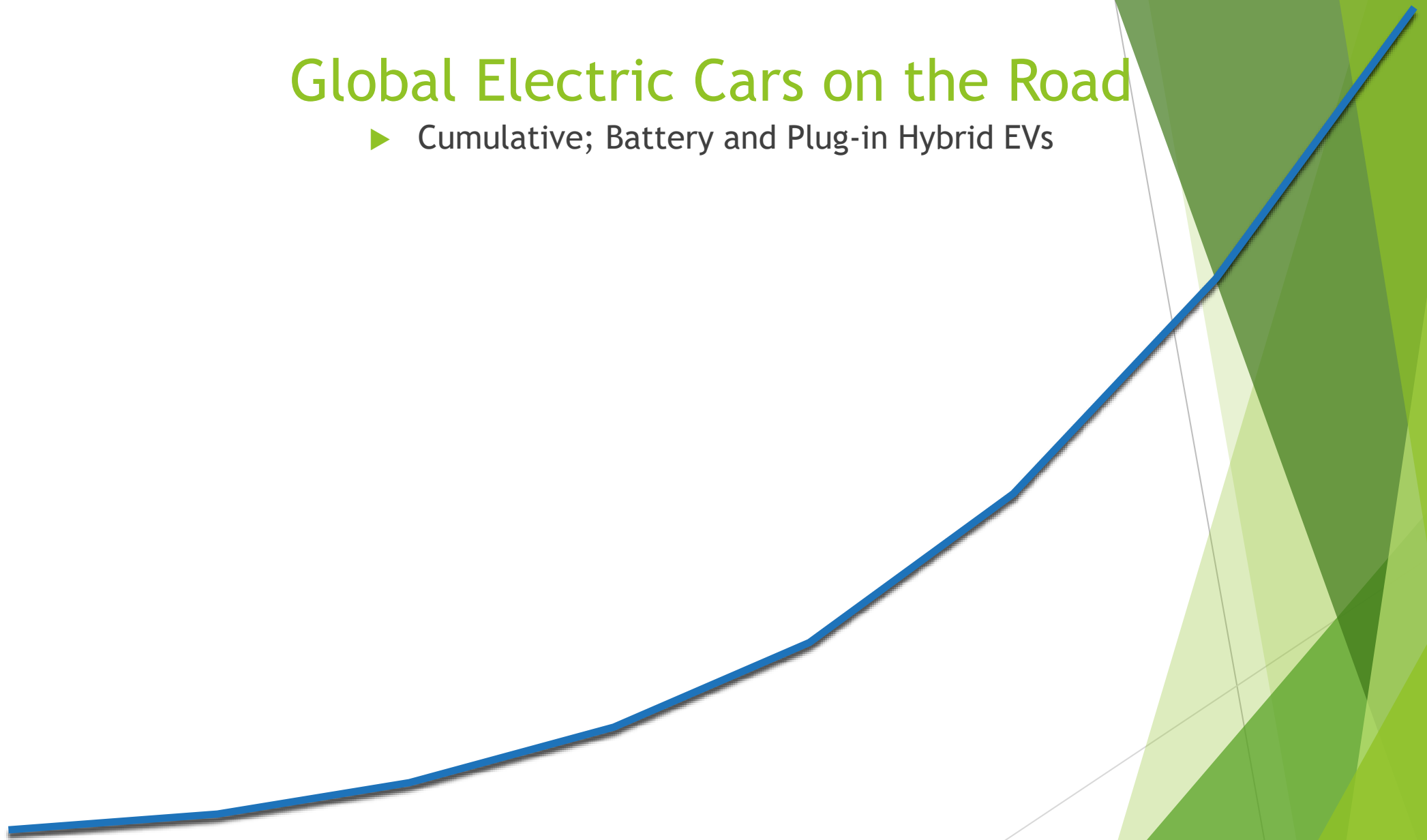
Gas vs Electric Vehicle Emission Today



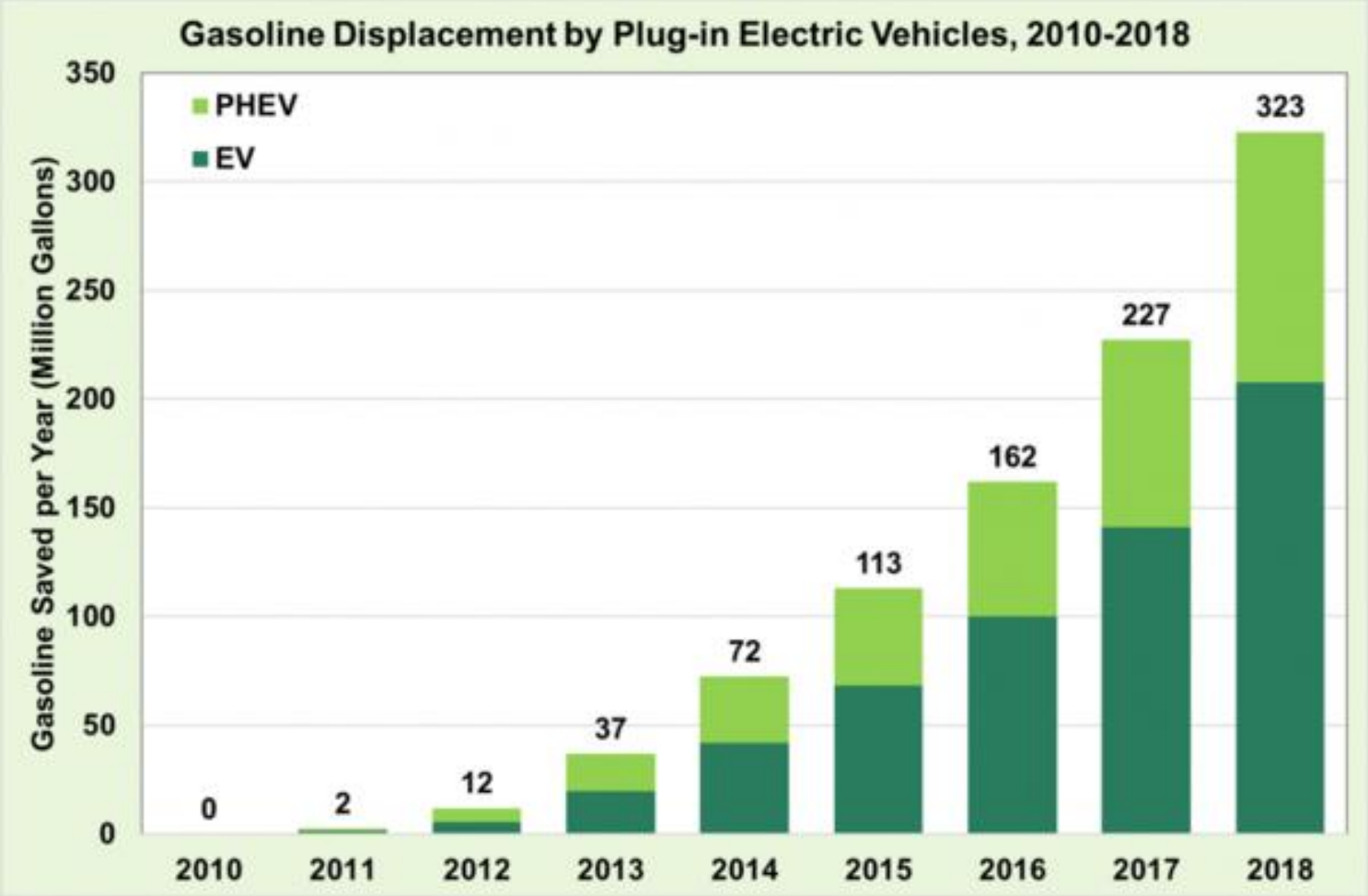
Global Electric Cars on the Road

► Cumulative; Battery and Plug-in Hybrid EVs

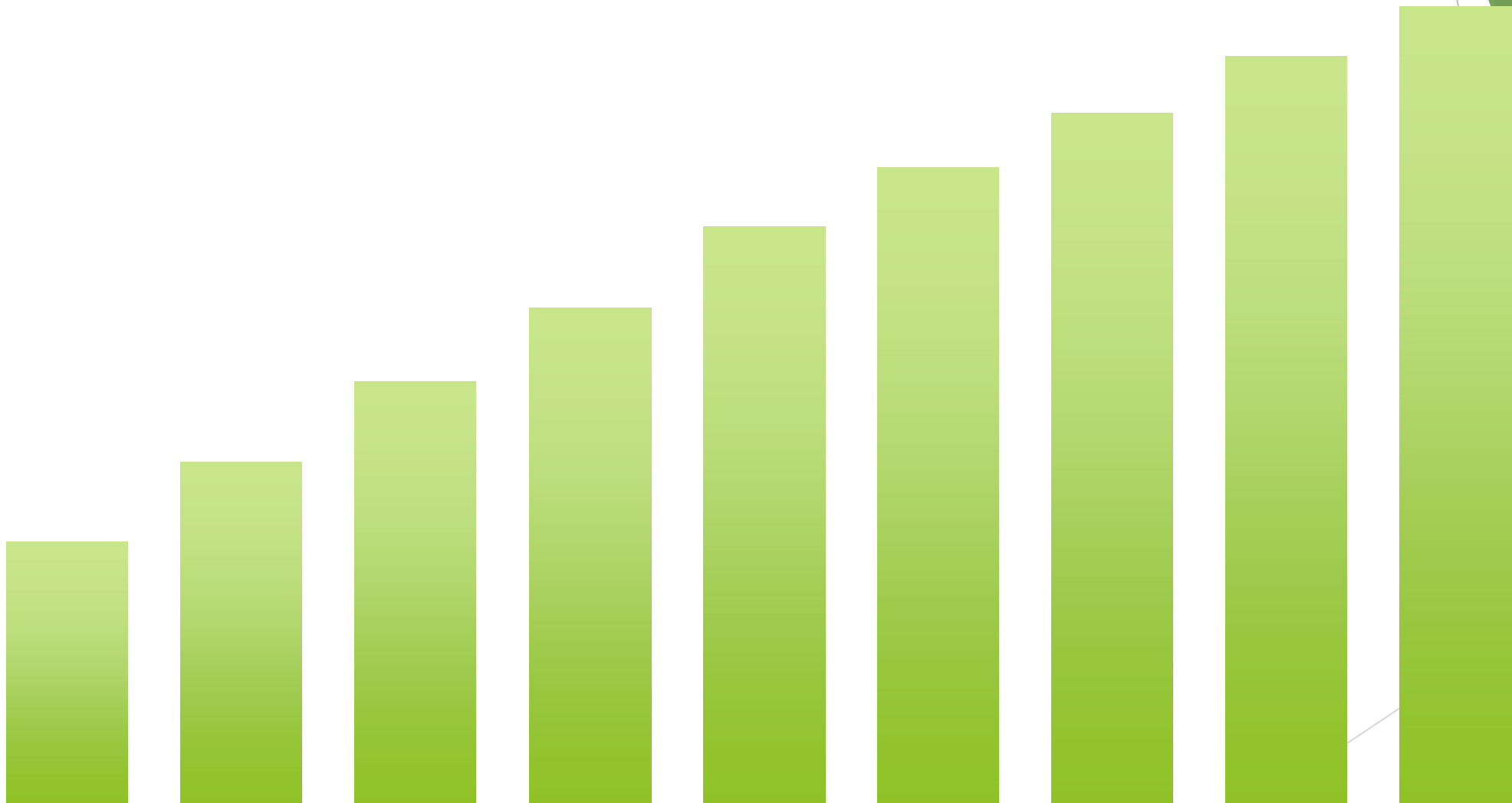
Electric Car Stock (Millions)



EV growth faster than hybrids



Half of the World's Buses Will be Electric by 2025



Auto Manufacturers Are Moving to Electric Vehicles

Companies with Electric Models in Production

Aixam	Chevy	GM	Mercedes-Benz	Smart
Aston Martin	Citroën	Goupil	Mitsubishi	Subaru
Audi	Citydom GmbH	Honda	Mullen	Tata
BAIC	CODA	Hyundai	NIO	Tesla
BMW	Daimler	JAC	Nissan	Toyota
Bolloré	Exagon	Kandi	Opel	Trumpchi
Buddy Electric	Fiat	Kantanka	Peugeot	Venturi
BYD	Fisker	Kia	Qiantu	Volkswagen
ChangAn	Ford	Kyburz	Rayttle	Zotye
Chery	Geely	Mahindra	Renault	

Countries Planning a Fossil Fuel Vehicle Phase-Out:

<u>Country/State</u>	<u>Phase-Out Begins</u>
Norway	2025
Netherlands	
Ireland	2030
Israel	2030
Slovenia	2030
India	2030 ?
China	“In the near future”
Scotland	2032
France	2040
Britain	2040
Germany	Date of phase-out pending. Merkel: “The approach is right.”

Sri Lanka will be completely fossil fuel vehicle-free by 2040, and Sweden by 2045.

Town of Branford EV Program

1. Specification written for RFP to dealerships
2. Charging stations planned



Elena Cahill

Clean, Renewable Electric Energy for Branford

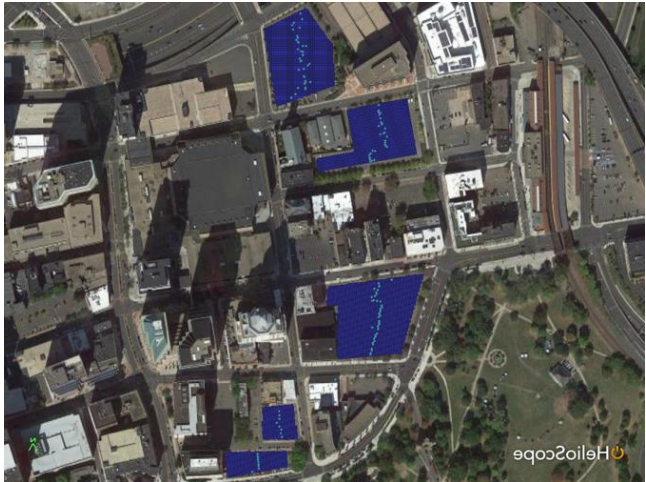
How much generation could we site locally?



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



Locally grown, artisanal electrons



High-Level Estimate of Local Generation Potential

1. Residential

a. # Homes & Condos	4,451
b. Percent Suitable for Solar	20%
c. Average. Size Solar Array (KW)	7.0
d. Estimated Annual Production (GWh)	7.5

2. Commercial

a. Estimated total available roof area (SF)	2,765,466
b. Percent Suitable for Solar	20%
c. Estimated Production per Square Foot (KWh/SF)	21.3
d. Estimated Annual Production (GWh)	11.8

3. Individual Larger Arrays

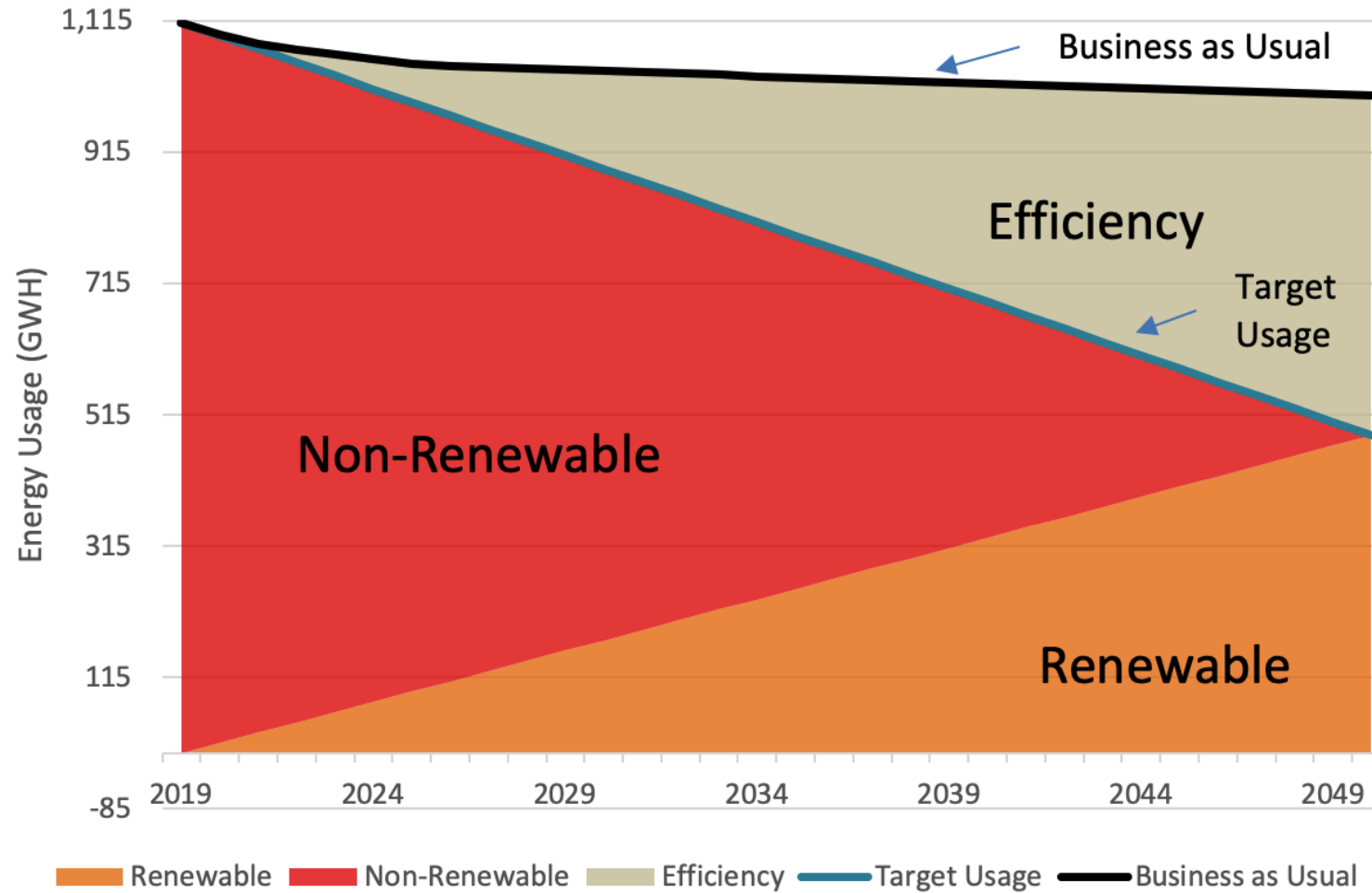
a. Dog Lane Parking	1.0
b. Nine Additional Similar Arrays	9
c. Right-of-Way Mega-Project	60.0
d. Subtotal Larger Arrays (GWh)	70.0

4. Grand Total

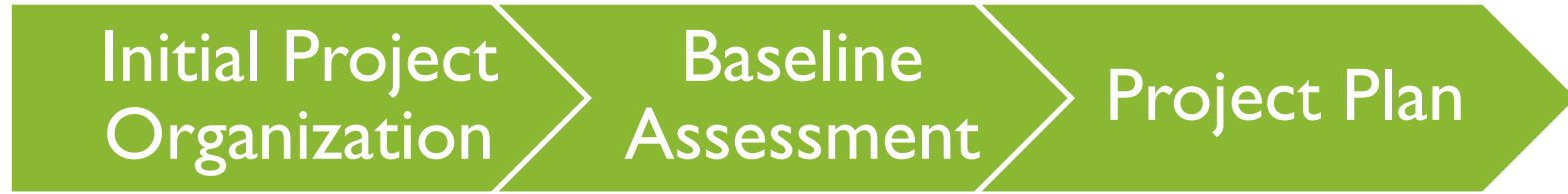
89.3

The Transition to 100% Renewables

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



Planning the Path to 100%



Community Engagement



Monitoring & Course Correction

HeatSmart Branford

Peoples Action for Clean Energy (PACE) Bringing Heat Pumps to
Branford

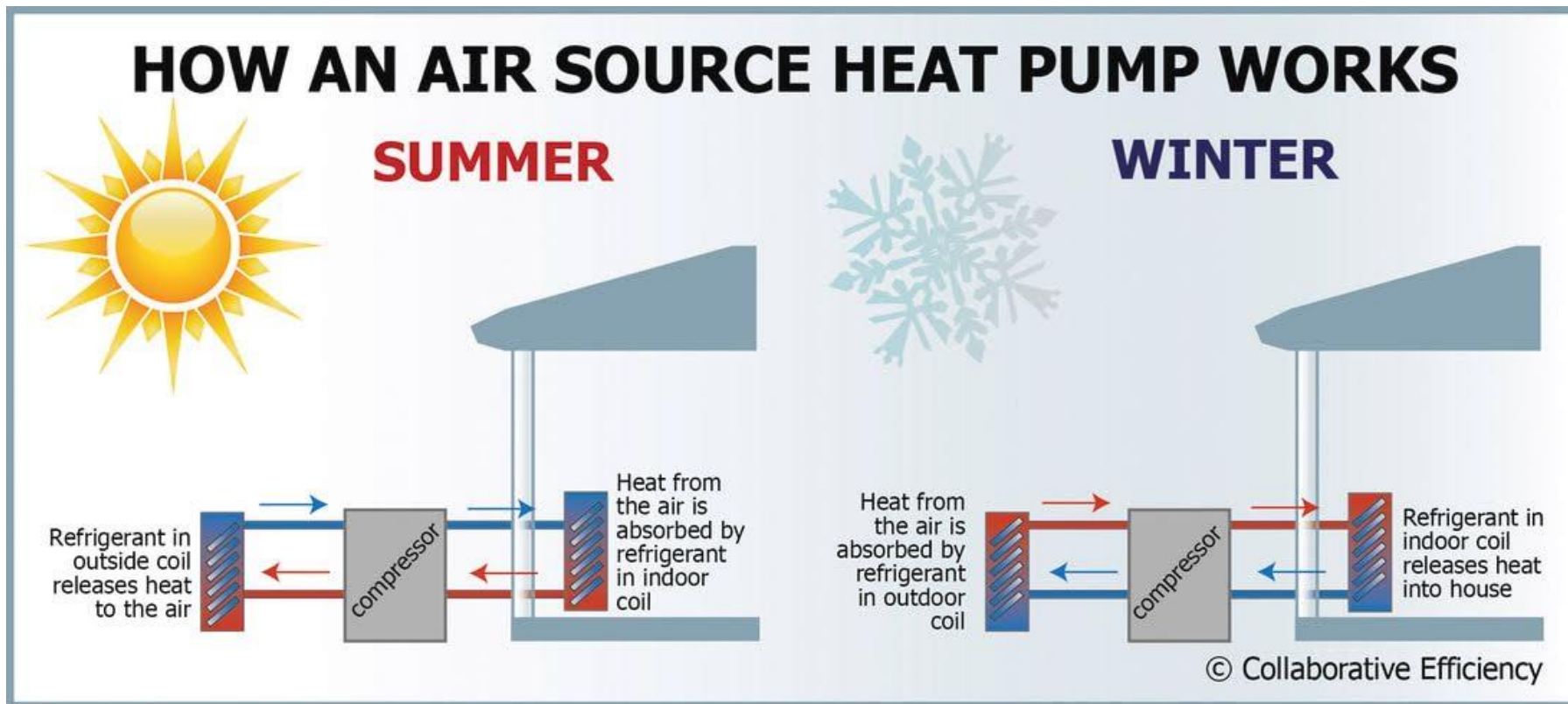
Michael Cohen

Goals of Branford HeatSmart

- ▶ Promote knowledge and awareness of Heat Pumps
- ▶ Facilitate installation and use of Heat Pumps

What is a heat pump?

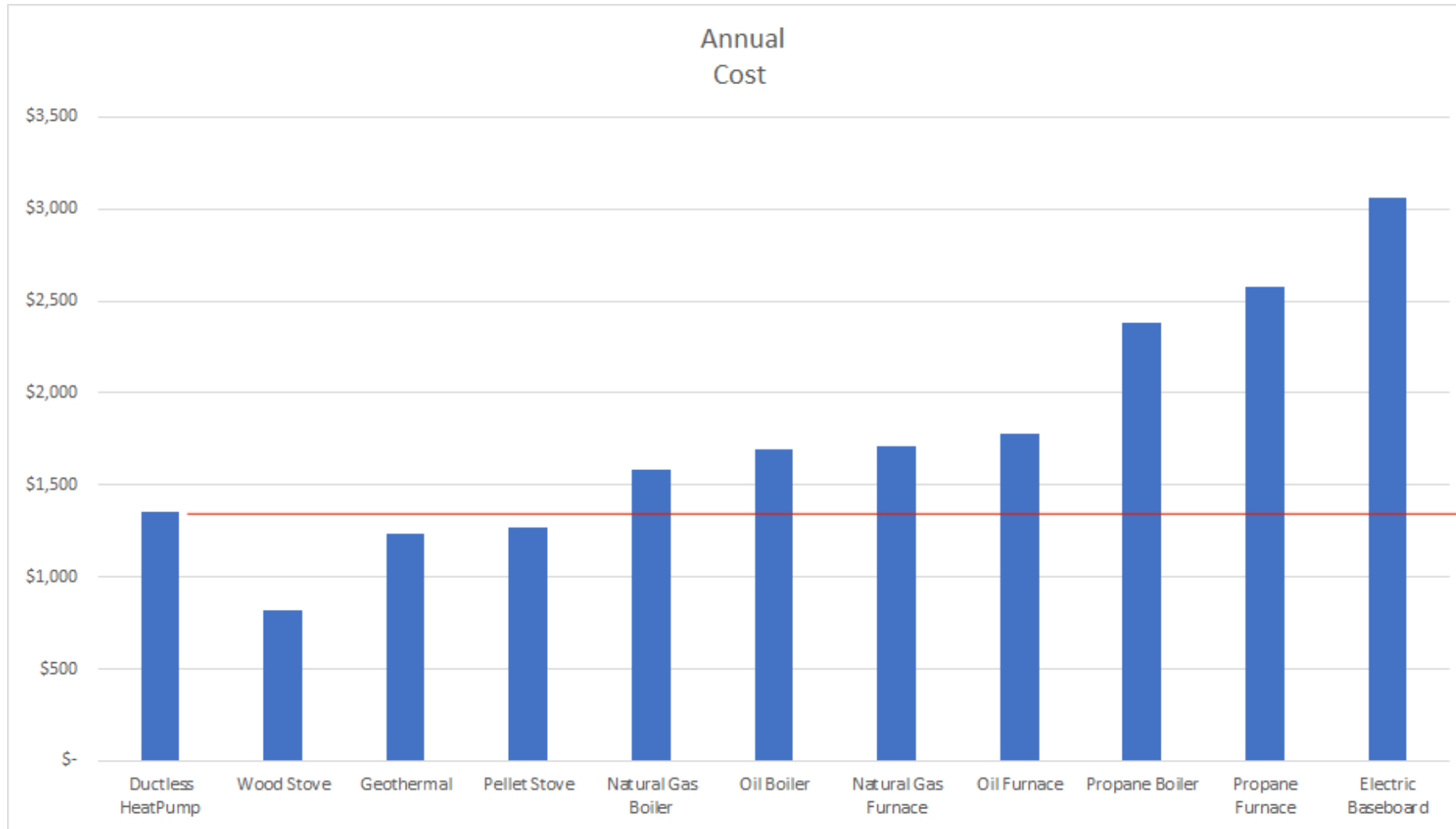
A heat pump is like an air conditioner that you can run backwards in Winter



Why Heat Pumps?

- ▶ They can save money
- ▶ They help fight global warming
- ▶ They provide efficient heating and air conditioning

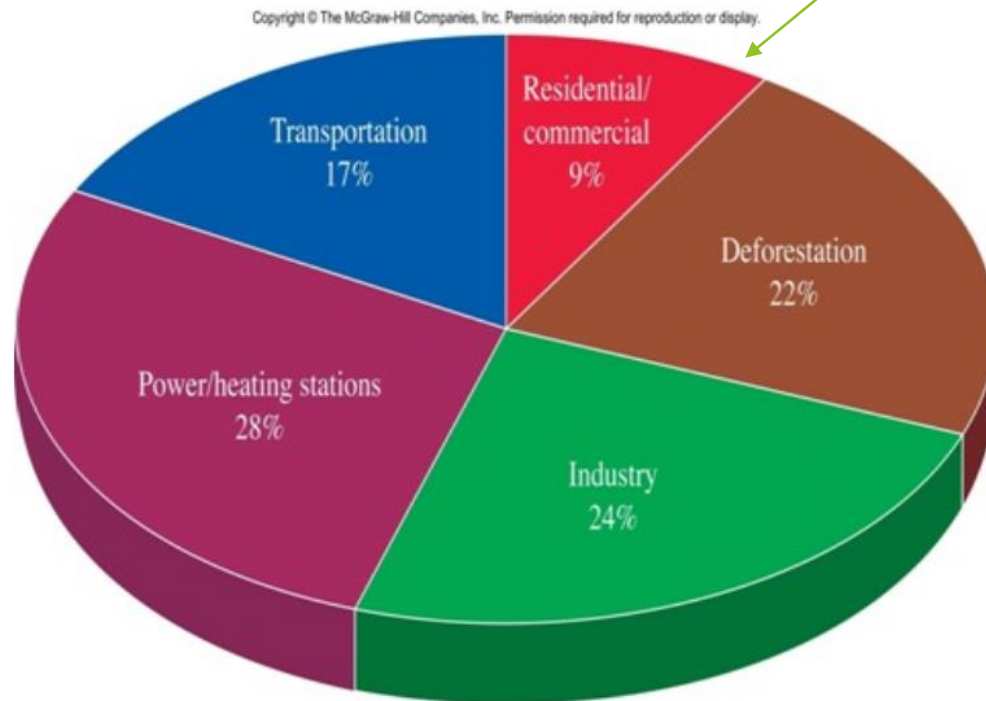
They Save Money



They Help Fight Global Warming and Air Pollution

CO₂ emission sources by end use:

Heating 9% of Total CO₂



Heat pumps will reduce CO2 Emissions and Global Warming.

You are a prime candidate for a Heat Pump if:

- ▶ You heat with Electrical Baseboard, Propane, or Oil
- ▶ You need a new furnace or have an old inefficient one
- ▶ You are looking to add air conditioning
- ▶ You are adding an addition
- ▶ You are constructing a new home
- ▶ You want to make a contribution to the fight against Global Warming

How does the HeatSmart program work?

1. Have Home Energy Solutions (HES) team visit your home:
 - Home energy Audit
 - Evaluate home leakage rate
 - Install LED lights and water saving faucets
 - Do basic air sealing
 - Determine needed additional insulation requirements
 - Cost \$79 or free for low income (a bargain!)
2. If needed add additional insulation and sealing
 - Such as: attic insulation, basement insulation and sealing
3. Contract with Heat Pump installer
4. Finance installation using low interest options (as low as 0.99%)

Why Now During HeatSmart Campaign?

- ▶ Vetted installer choice available
- ▶ Negotiated Discount (Planned)
- ▶ Access to reduced rate financing
- ▶ Start Saving on Energy right away

For More Information

- ▶ Go to:
www.HeatSmartBranfordCT.org
- ▶ Or fill out the mail-in form

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the left and right sides of the frame, creating a modern, organic feel. The central area is a plain white space where the text is placed.

Bill Horne

Blue Earth Compost and renewable energy

Renewable Energy from Food Scraps

Addressing Two Problems

Better Waste Disposal

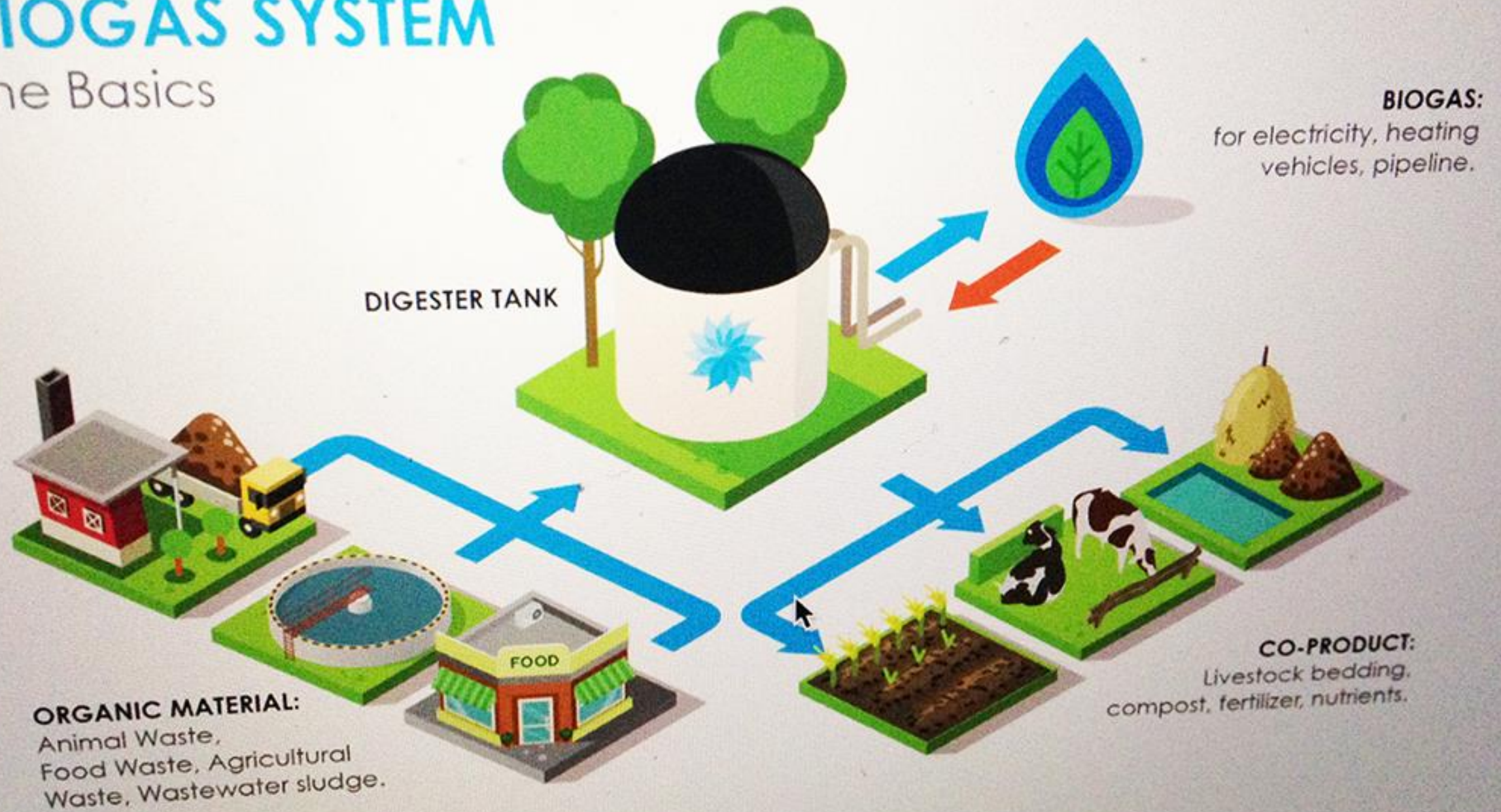
- We need to reduce the amount of waste processed by Connecticut's aging waste-to-energy incineration plants.
- Food waste reduces the efficiency of energy recovery from waste incineration.

Make More Renewable Energy

- Generate biogas (two-thirds methane) by anaerobic digestion of food waste and other compostable materials.
- The biogas can be used to generate electricity or used to fuel vehicles designed to burn natural gas.

BIOGAS SYSTEM

The Basics



Quantum Biopower

Connecticut's Only Industrial-scale Anaerobic Digestion Facility

In 2018, processed / produced:

- 40,000 tons of food waste
- 10,000 tons of compost
- 5,000 tons of fossil CO₂ displaced

Branford Food Scraps to Biogas

- 35 Residential subscribers
- Branford High School
- Community Dining Room
- G-Zen Restaurant

Food scraps are picked up by Blue Earth Compost and hauled to the Quantum Biopower digestion facility in Southington for processing.