AVON CLEAN ENERGY COMMISSION
AVON ROOM BLDG. #1 TOWN HALL
MINUTES
April 17, 2019

I. CALL MEETING TO ORDER

The meeting was called to order at 7:07 p.m. by Chairman Bernard Zahren in the Avon Room, Building 1, Town Hall. Members present: Chairman Bernard Zahren, Venkata Anupoju, Don Phelan, William Shea, and Christine Winter. Members absent: Richard Kretz and Jeffrey Macel. Advisory member absent: Jonathan Craig. Staff members present: Grace Tiezzi, Assistant to the Town Manager, and Hiram Peck, Director of Planning & Community Development.

II. APPROVAL OF THE PRECEDING MEETING MINUTES – December 19, 2018

Mr. Shea made a motion to approve the December 19, 2018 minutes as written. Mr. Phelan seconded the motion, which was unanimously approved.

Mr. Zahren stated that staff has proposed simplifying the recording of minutes. The Commission agreed with the recommendation.

III. COMMUNICATIONS FROM THE AUDIENCE – None.

IV. OLD BUSINESS

Avon Village Center Update

Mr. Peck reviewed the current status of the Avon Village Center project with the Commission. He shared that the development has plenty of opportunities for energy efficiency and sustainability measures.

The Commission discussed a draft of a letter that it plans to send to Mr. Peck containing recommendations for energy efficiency and sustainability measures for the development. The Commission suggested edits for Ms. Tiezzi to work into the draft. Ms. Tiezzi will update the letter and share a new draft with the Commission.

Goal Setting

There was no discussion on this item.

Legislative Updates

Ms. Tiezzi shared that at Mr. Macel's request a letter was sent to the co-chairs of the Energy & Technology Committee expressing the Town's support of HB 7115 "An Act Concerning Virtual Net Metering."

V. NEW BUSINESS

100PercentCT project of People's Action for Clean Energy (PACE)

Mr. Mark Scully of PACE reviewed the presentation that has been attached and made a part of these minutes. Mr. Scully shared that the 100Percent CT project is a coalition of volunteers that will help Towns to create plans to move to 100% renewable energy over the next several decades.

The Commission asked Ms. Tiezzi and Ms. Winter to work with Mr. Scully to provide him with the data needed to complete step one of the analysis which is a benchmarking of energy use town-wide including residential, commercial, municipal, and automobile.

Sustainable CT

Ms. Tiezzi gave the Commission a brief overview of the Sustainable CT program. The Commission asked Ms. Tiezzi to invite a staff member from Sustainable CT to attend the June meeting to provide the Commission with an overview of the program.

Meeting Minutes

This item was discussed earlier in the meeting.

VI. DO ANY BUSINESS TO COME BEFORE THIS MEETING

Carrie Firestone, 36 Cambridge Crossing, shared that in honor of Earth Day, she and a group of friends are planning to launch a contest on social media to see who can create the best anti-idling PSA. The prize will be $1,000. Mr. Phelan suggested that anti-idling might be a good topic for the next ACEC article in the October Town Newsletter. Ms. Firestone agreed to share her anti-idling bullet points with Ms. Tiezzi for the article.

VII. ADJOURN

Mr. Shea made a motion to adjourn the meeting at 8:57 p.m. Mr. Phelan seconded the motion, which was unanimously approved.

Respectfully submitted:
Chairman Bernard Zahren

Attest: Grace Tiezzi, Acting Clerk

100PercentCT

Forging a Pathway to a 100% Renewable Energy Future

Avon Clean Energy Commission

17 April 2019

PACE
People's Action for Clean Energy

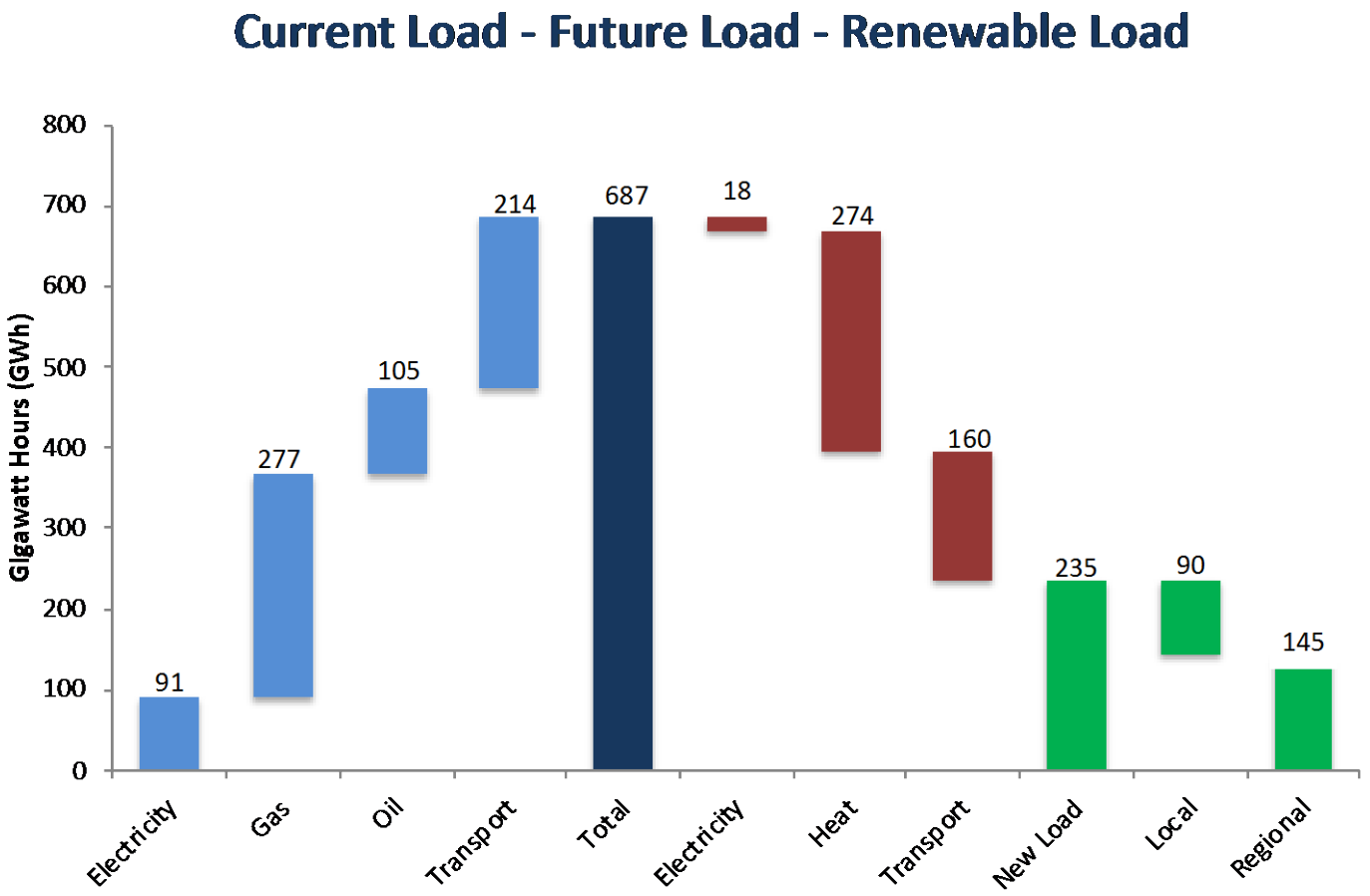
Project Vision

Produce viable, replicable plans for individual towns to transition to 100% renewable energy by 2050. Key steps include:

Take Stock	• Benchmark current energy use for *entire* town • Electricity, heating/cooling, transportation
Reduce	• Investments in efficiency and conservation • Electrification of heating, cooling and transport
Siting Survey	• Granular analysis of potential for renewables (solar PV) • Sensitivity to preserving town's character and farmlands
Rethink Grid	• Design of local microgrid(s) with generation & storage • Engage with utilities to test "utility of the future"
City Action	• Thermalize Campaigns, RF100, Solar for All, Electric Buses • EV Adoption

If towns and cities create a path to a 100% renewable energy, we will form a grassroots movement and change state and federal energy policy. Let's do the math!

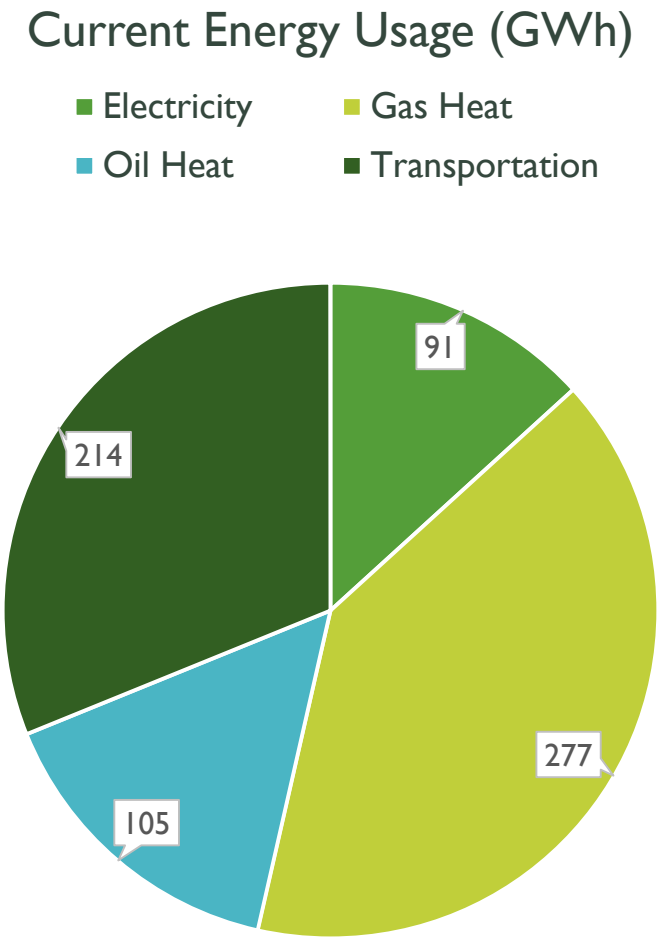
The Journey to 100%



Benchmark current usage ➔ Reduce ➔ Then Produce

We start by estimating current energy usage

- We include the **whole town**: residential, commercial and municipal.
- Electricity and natural gas usage was provided by Eversource and CNG.
- We estimate heating oil use from the local building (grand) list.
- We estimate transportation use from the local vehicle list.
- We convert all figures to a common unit: Gigawatt-Hours (GWh).
- Detailed calculations shown in Appendix.



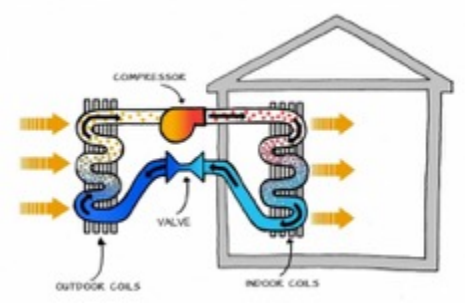
Total Usage = 686 GWh

Current Energy Usage

		Units	Commercial	Residential	Total
Current Usage	Natural Gas	CCF	9,134,085	400,610	9,534,695
	Transport	Gallons	627,958	5,717,303	6,345,261
	Oil Heat	Gallons	73,603	2,496,824	2,570,427
	Electricity	KWh	46,610,212	44,079,023	90,689,235
Current Usage in GWh	Natural Gas	GWh	265	12	277
	Transport	GWh	21	193	214
	Oil Heat	GWh	3	102	105
	Electricity	GWh	47	44	91
	Total	GWh	336	350	686
Current Greenhouse Gas Emissions	Natural Gas	GHG - tons	53,480	2,346	55,826
	Transport	GHG - tons	5,934	54,029	59,963
	Oil Heat	GHG - tons	824	27,964	28,789
	Electricity	GHG - tons	14,866	14,059	29,145
	Total	GHG - tons	75,105	98,398	173,722
	Population				26,543
	Green House Gas (Tons) Per Capita				6.5
	KWh per person				25,831

What is the impact of efficiency and electrification

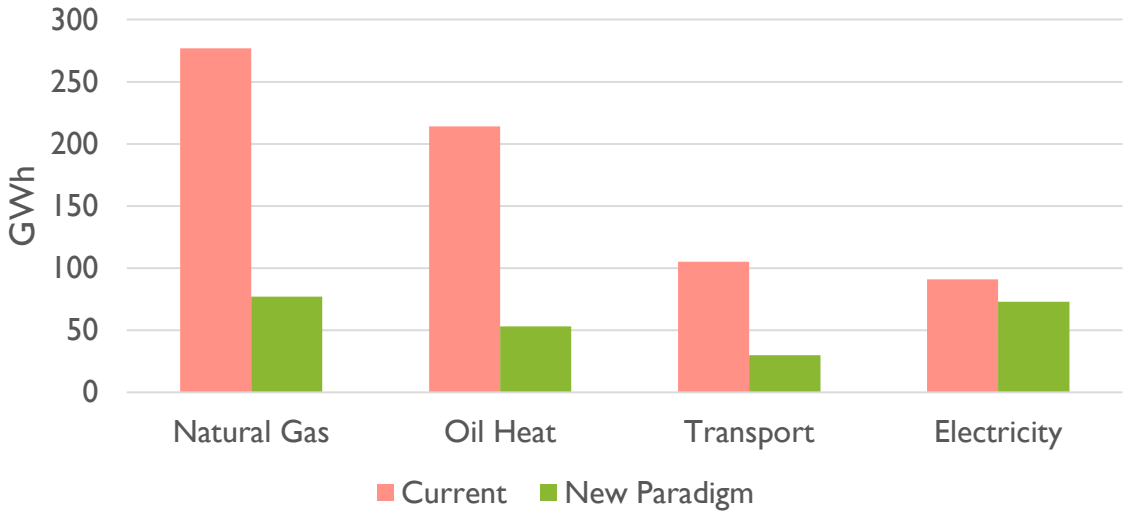
- Energy-efficient appliances and devices.
- Modern design techniques and technology on new buildings and energy retrofits.
- Adoption of renewable thermal technology (i.e., heat pumps) for heating and cooling.
- Adoption of electric vehicles.



Radical Energy Reduction is Possible

All figures in Gigawatt-hours (GWh)

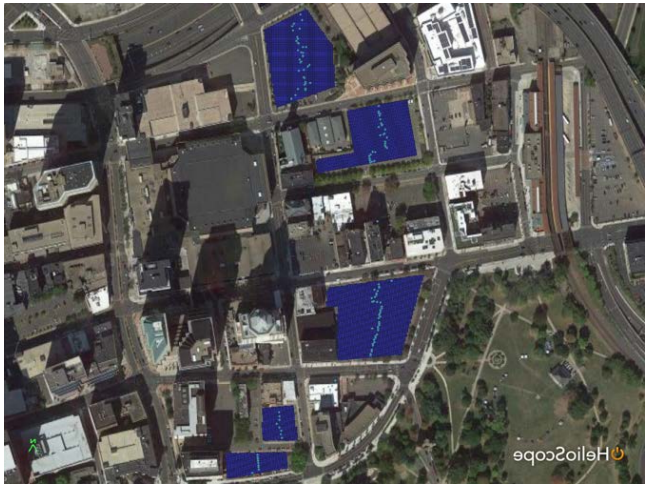
	Current	New Paradigm	Reduction
Natural Gas	**277**	**77**	**199**
Transport	**214**	**53**	**160**
Oil Heat	**105**	**30**	**75**
Electricity	**91**	**73**	**18**
Total	**686**	**233**	**453**



How much generation could we site locally?

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

Locally grown, artisanal electrons

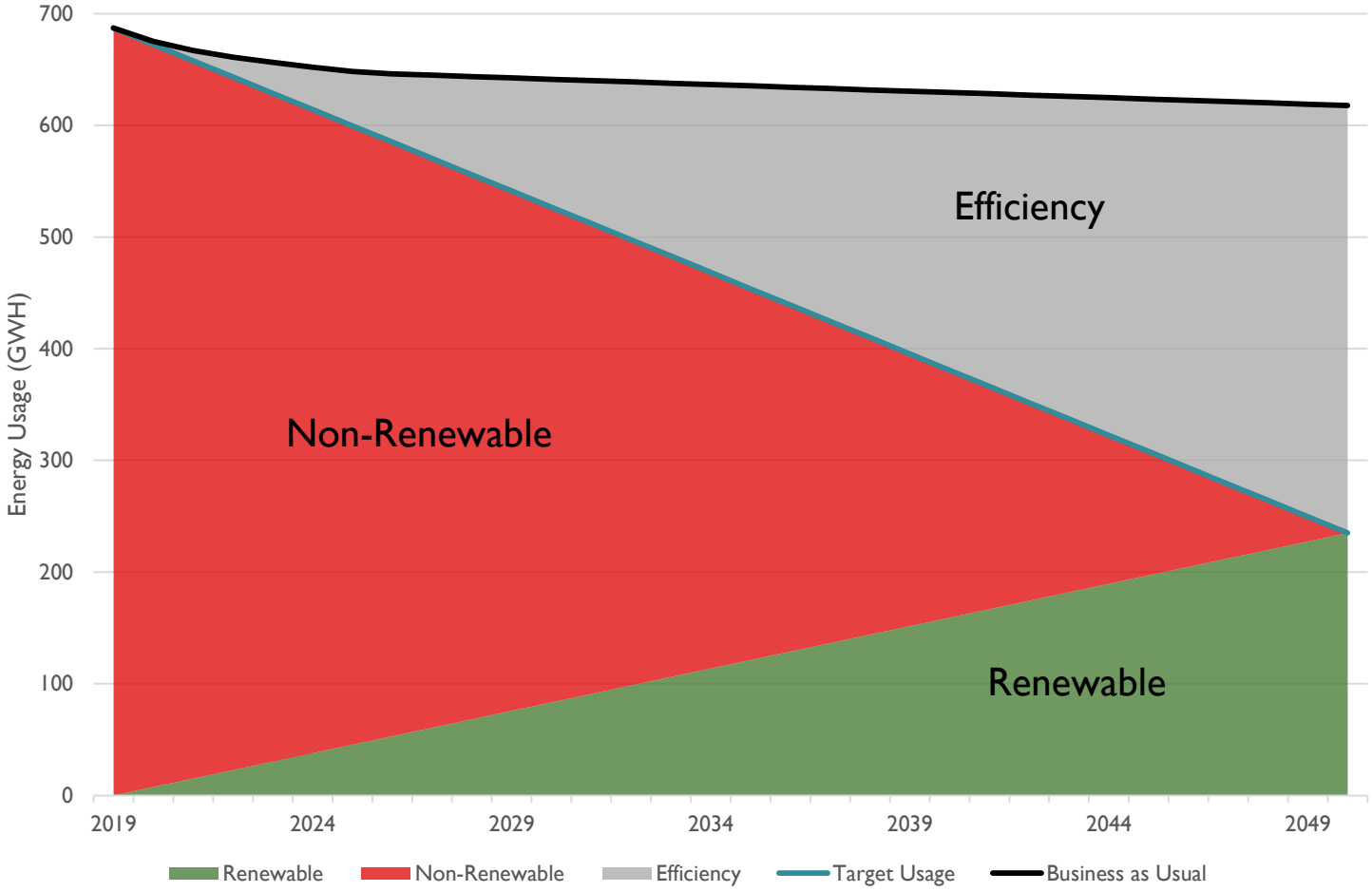


High-Level Estimate of Local Generation Potential

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

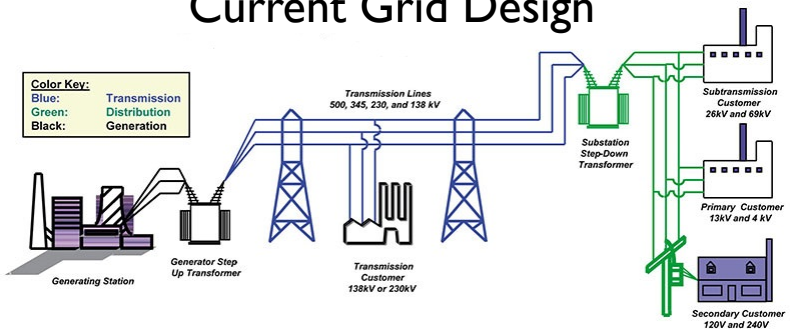
Over time, efficiency and renewable energy replace non-renewables.



We need to re-think the electric grid

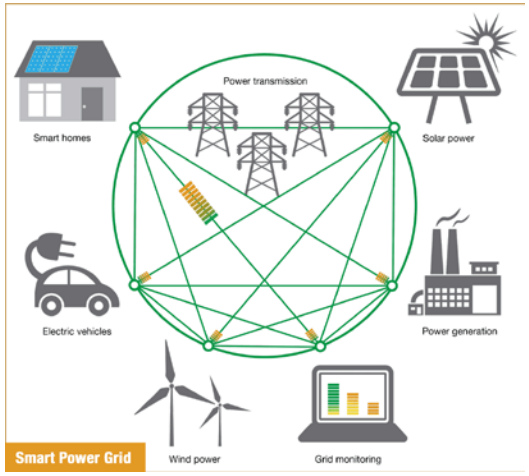
- Current grid was designed for large, centralized power plants sending electricity in one direction to consumers

Current Grid Design



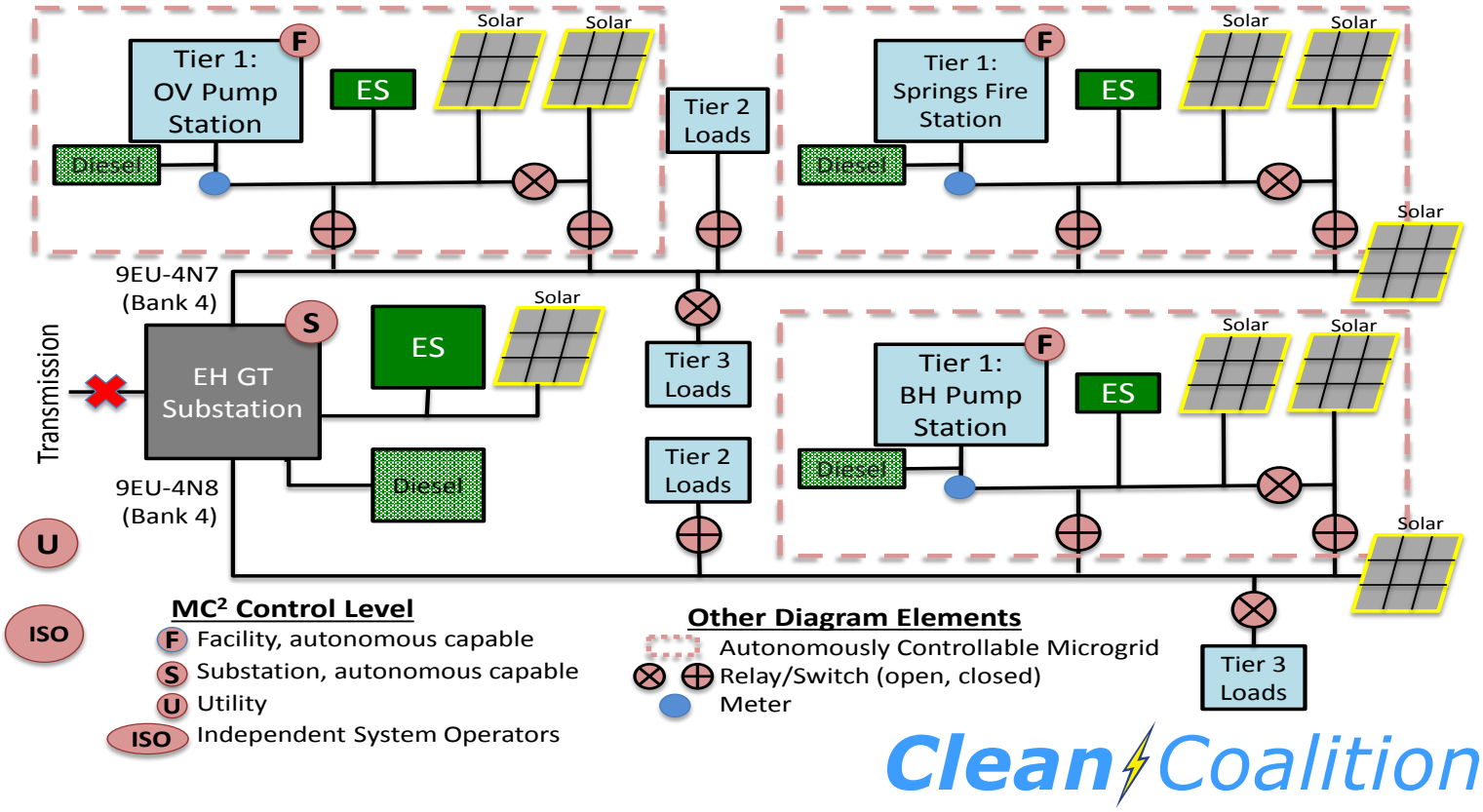
- Future grid must handle:
  - Distributed generation
  - Multi-directional flows
  - Intermittency of renewables
  - Storage
  - Demand response
  - Resiliency & security

Future Grid Design



We are working collaboratively with Eversource and the non-profit Clean Coalition to develop a Community Microgrid pilot project.

Overview of a Community Microgrid



Clean Coalition

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Planning the Path to 100%

Community Engagement

Efficiency

Heating & Cooling

Transport-ation

Renewables

Community Aggregation

Electric Grid

Monitoring & Course Correction

Moving to 100% will significantly reduce energy costs

Current	Units	Consumption	Price Per Unit	Annual Cost
Natural Gas	CCF	9,534,695	$1.09	$10,392,818
Transport	Gallons	6,345,261	2.79	17,703,278
Oil Heat	Gallons	2,570,427	2.80	7,197,196
Electricity	KWh	90,689,235	0.18	16,324,062
Current Annual Energy Costs				**$51,617,354**

New Paradigm		
1. Cost of Solar Arrays (@ $2 per Watt)	$	388,333,333
2. Electrify 11,314 vehicles ($5,000 per)		56,570,000
3. Electrify 4,451 homes and condos (@ $10,000 per		44,510,000
4. Electrify 467 commercial buildings (@ $20,000 pe		9,340,000
5. 20 year cost of conversion		498,753,333
6. Annualized Energy Cost		**$24,937,667**
Percentage Reduction in Energy Costs		**52%**

The Power of a Visionary Plan

- The Erie Canal – proposed in 1808 and finished in 1825 – 363 miles Albany to Buffalo
- 40 feet wide – 4 feet deep
- Not supported by the President (James Madison)

Peoples Action for Clean Energy

- PACE is a public health and environmental organization formed in 1973 by a group of concerned Connecticut citizens to:
  - promote the development of alternative, renewable sources of energy,
  - encourage the efficient use of energy
  - develop a spirit of conservation among Connecticut residents
  - challenge Connecticut's commitment to nuclear power and nuclear weapons
- Through its house tours, publications, radiation monitoring and recognition of environmental leaders, PACE has educated countless members of the public on energy issues. PACE is the largest all volunteer organization in the state engaged with these issues.
- Learn more about PACE's 100PercentCt Project at:
  http://www.pace-cleanenergy.org/site/percent100
- Contact us at:
  Mark Scully mwscully29@gmail.com
  Bernie Pelletier Bernard.Pelletier@icloud.com

APPENDIX

Questions this project seeks to answer

- How much energy does my town use? How is it used?
- What fuels and energy sources make up my town's consumption?
- Can I reduce my consumption? How?
- How much do I spend on energy in my town?
- How much of our energy need can we produce locally? Can we produce enough regionally to make up the difference?
- How many buildings are in my town – when were they built?
- How many people heat with electricity? Oil? Gas?
- How much greenhouse gas (GHG) is produced by my town?
- How can my Clean Energy Task Force make an impact?

Getting Organized

Initial Project Organization

1. Establish project team
2. Procure municipal commission or endorsement
3. Identify and contact key project partners, influencers
4. Reach out to inform and engage the public, community groups, business organizations
5. Establish initial project goals, timetable, priorities
6. Set project team meeting schedule

Baseline Assessment

1. Employ PACE model of assessing total energy usage
2. Assess building stock
3. Assess transportation landscape (vehicles, public transit)
4. Quantify existing renewable energy generation
5. Map key features of local grid
6. Track energy use in municipal buildings using Portfolio Manager (or equivalent)

Project Plan

1. Identify and prioritize key project workstreams
2. Establish timetable of campaigns and initiatives
3. Set energy targets: total load, renewable generation
4. Produce town Energy Plan

Action Steps on the Path

Efficiency

1. Municipal Lead by Example (e.g., streetlights)
2. Residential outreach (e.g., Home Energy Solutions Audit campaign)
3. Commercial outreach (e.g., Small Business Energy Advantage)

Heating/Cooling

1. Municipal Lead by Example
2. Residential outreach (e.g., Heatsmart/Thermalize campaign)
3. Commercial outreach

Transportation

1. Promote charging infrastructure and EV ownership through building codes and zoning ordinances
2. Create local incentives to EV ownership for residents and businesses
3. Municipal Lead by Example
4. Conduct educational EV campaigns, events
5. Promote alternatives to personal transport

Renewables

1. Conduct solar siting survey
2. Review and streamline solar permitting regulations
3. Municipal Lead by Example
4. Residential Campaigns
5. Commercial Campaigns
6. Other renewables

Comm. Agg.

1. CT Council of Municipalities (CCM) Energy Purchasing Program
2. Community Choice Aggregation

Grid

1. Assessment of local hosting capacities
2. Identification of prospective upgrades
3. Microgrid feasibility analysis
4. Storage feasibility analysis

How do we get there? Examples of local actions to promote renewable energy, energy efficiency and microgrids

- Reverse Solarize campaigns – 20 residential units agree ahead of time and do a block bid
- Commercial Solarize – 5 businesses – model their usage – and go to market
- Lead by example: solar on municipal properties
- Alliance with utilities (joint ownership of large assets)
- Buy green power campaigns
- Source power in less densely populated areas
- Support offshore wind
- "Thermalize" campaigns to promote heat pumps
- Targeted efficiency by age of building
- Energy-efficient design competitions
- Pilot microgrid project(s) sited around critical facilities

Land Use Considerations

Prefer low Value Lands

- Parking lots
- Landfills
- Brownfields
- Highway rights-of-way
- Reservoirs
- Commercial rooftops
- Other infrastructure

Avoid:

- Core Forest
- Sensitive ecological areas
- Prime Farmland

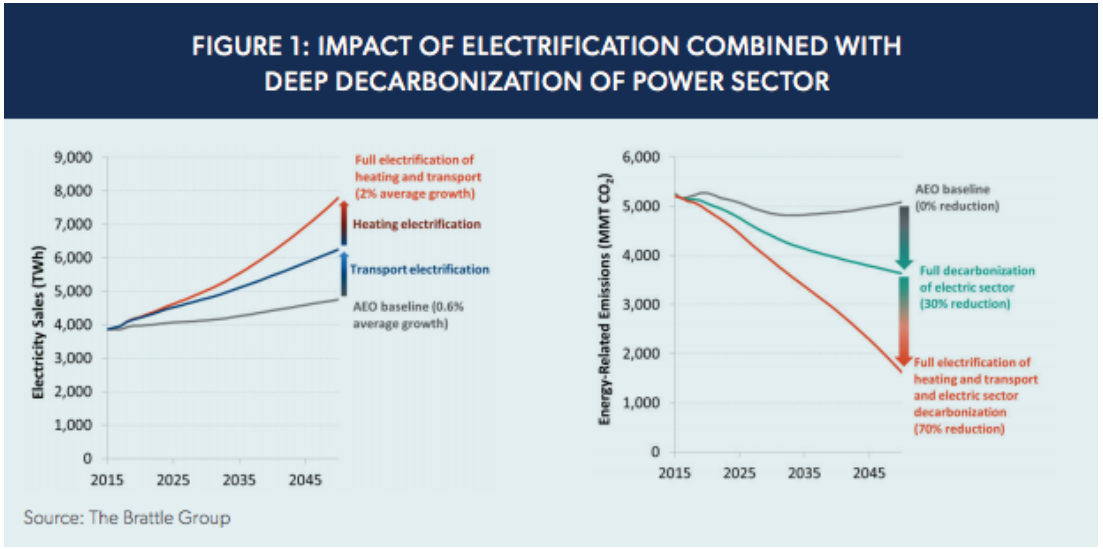
How do we get there? Examples of local policies to promote EVs

- Rebates, tax credits, sales tax exemptions
- HOV lane access
- Electrifying vehicle fleets
- Using VW Settlement Funds to purchase electric buses
- Require new residential construction to EV-ready
- Require a percentage of parking spaces to be equipped with charging infrastructure
  - Impose fines for internal combustion engine (ICE) cars using EV parking spaces
- Proclamation/resolution in support of EVs
- Ride and drive events

Source: *AchiEVe: Model State and Local Policies to Accelerate Electric Vehicle Adoption* (https://www.sierraclub.org/sites/www.sierraclub.org/files/blog/EV%20Policy%20Toolkit.pdf)

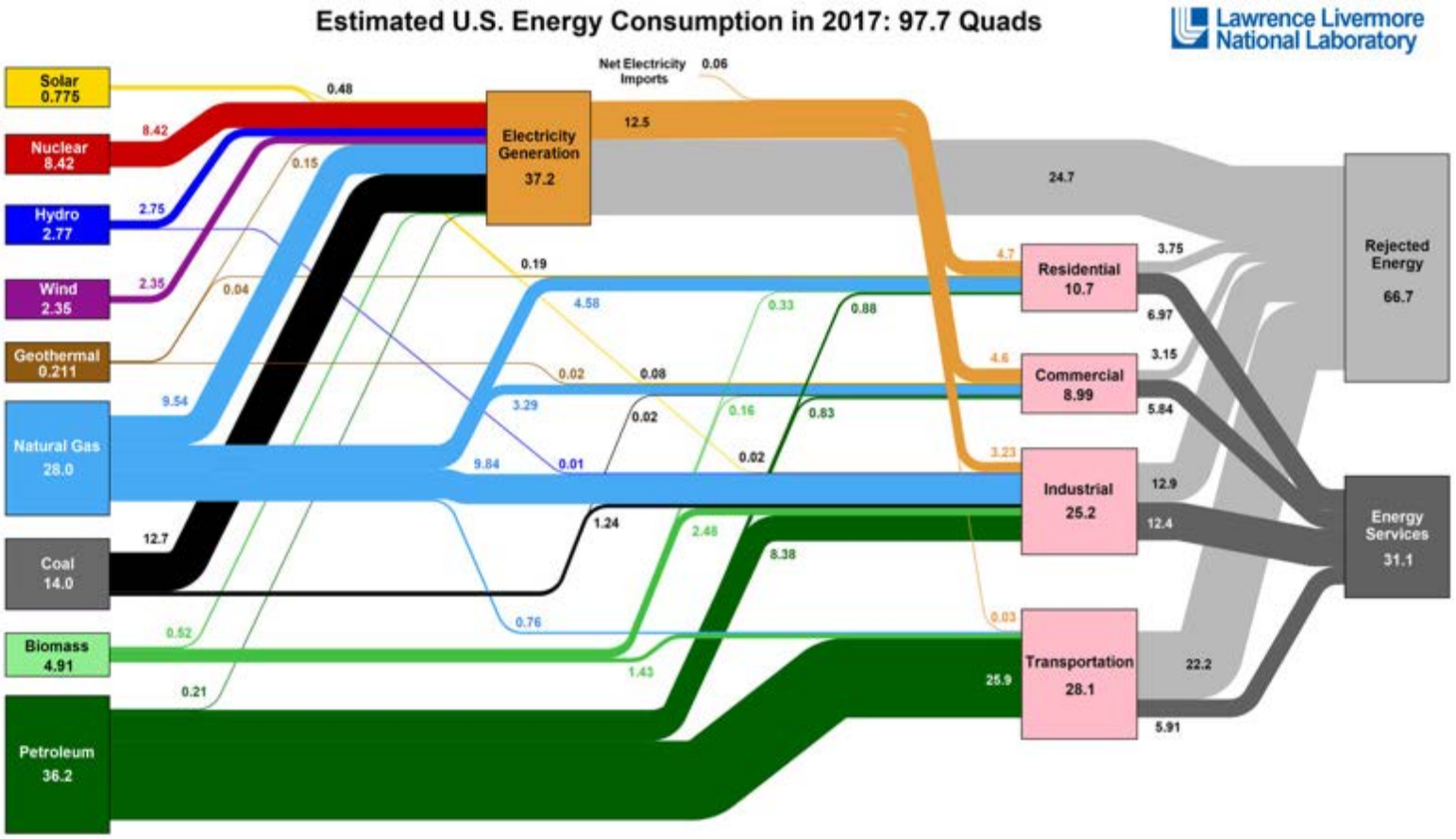
Strategic Electrification: A Solution to the Utility Death Spiral?

- Electricity sales are projected to grow by only 0.6% per year between 2015 and 2040. (Historical average was 1.3%.)
- Full electrification of heating and transport could increase this growth rate to 2%, adding 3,000 TWh to demand by 2050.
- Together with efforts to de-carbonize electricity generation, electrifying heating and transport could reduce greenhouse gas emissions by 70% by 2050.
- Strategic electrification offers other benefits to the grid (e.g., shifting loads).



Source: *New Sources of Utility Growth: Electrification Opportunities and Challenges*, The Brattle Group (http://files.brattle.com/files/13526_new_sources_of_utility_growth_-_electrification_opportunities_and_challenges.pdf?utm_source=InsideClimate+News&utm_campaign=1025fdd8c5-Clean+Economy+Weekly+Newsletter&utm_medium=email&utm_term=0_29c928ffb5-1025fdd8c5-326455697)

We Reject More Than We Use!!



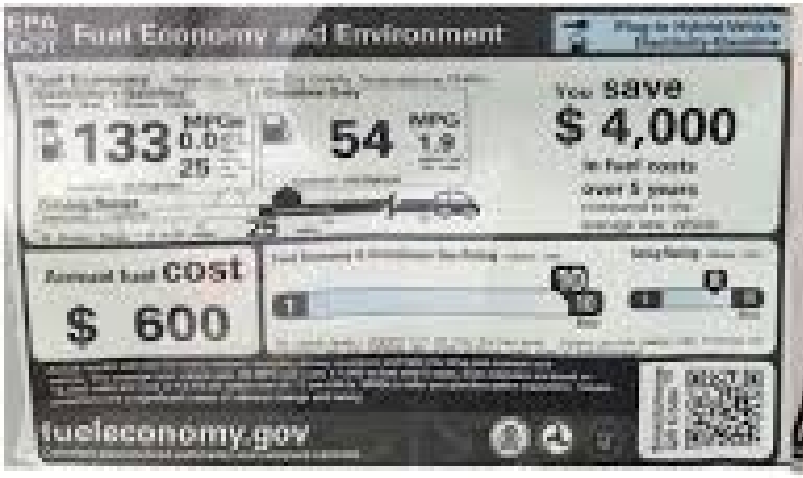
Source: LLNL April, 2019. Data is based on DOE/EIA MER (2017). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. This chart was revised in 2017 to reflect changes made in mid-2016 to the Energy Information Administration's analysis methodology and reporting. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 21% for the transportation sector, and 49% for the industrial sector which was updated in 2017 to reflect DOE's analysis of manufacturing. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

Equity:
Clean energy must be available to all

Estimating Energy Benefit of EVs
The Hybrid Approach

	MPG Gas	MPG Electric	Reduction
Prime	**54**	**133**	**59%**
Volt	**42**	**106**	**60%**

2017 Prius Prime Plus



2017 Chevy Volt