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# Marbletown: The Path to 100% Renewable Energy

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— Tom Konrad, Ph.D. CFA —  
Marbletown Environmental  
Conservation Commission Chair

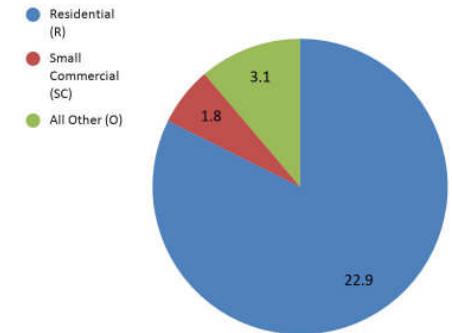
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MARBLETOWN, NY  
*Established 1703*

- Population: 5,514 (2017)
- 55 square miles.
- 3,684 Vehicle registrations (2018)
- 2,756 Buildings, over 400 historic
- No natural gas pipelines
- 13% of population at or below poverty line
- Climate Smart Community Bronze certified
- Completed 8 of 10 Clean Energy Community "High Impact" Actions.

Annual electricity use (GWh - 2016-18 avg)



## About Sustainable Hudson Valley

- Regional 501c3 nonprofit
- Mission to speed up, scale up, jazz up and leverage progress in fighting climate change
- Community engagement programs
  - Solarize
  - Drive Electric
  - HeatSmart
- "Climate Solutions Lab" for innovative program design



## Purpose

An Investigation into possibilities and strategies through

- Community Engagement
- Voluntary actions
- Cost-effectiveness
- Economic growth



Local policies when they save people money (CCA, Stretch Code)

## Timeline

- Spring 2018 - Sustainable Hudson Valley approached ECC about creating a 100% Renewable Energy plan
  - Modeled on planning in Connecticut.
  - Intended to start a trend in the HV
- Summer/Fall 2018
  - Data collection, strategy analysis
  - First community forum, UC EMC briefing
- 2019
  - Report writing;
  - Refine engagement strategies
  - CCA, Fossil Fuel Zoning Ban, Group Purchases
- Winter/Spring 2020:
  - 10 Money Saving Steps Launch, Group Purchases
  - Scenario modeling, Finalizing Report

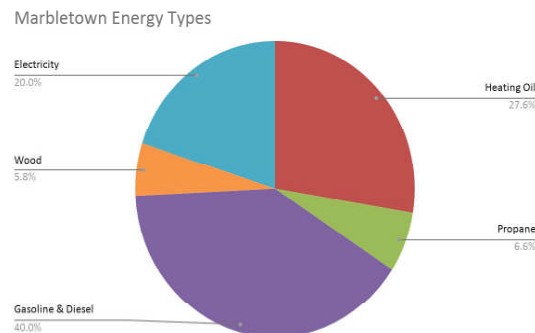


## Transition Pathway: Efficiency & Electrification

- Buildings
  - Air sealing and insulation
  - Heat pumps
  - Upgrade wood stoves
- Vehicles
  - Home (Stretch Code) & Public charging
  - Education
- Electricity - Community Choice Aggregation
  - Encourage local solar, low impact hydro

## Energy Usage In Marbletown (2017)

- \$16,000,000 annual cost
  - 40% Transport
  - 40% Heat
  - 20% Electric



## Why Electrification is Key

### Vehicles: g CO<sub>2</sub> / mile

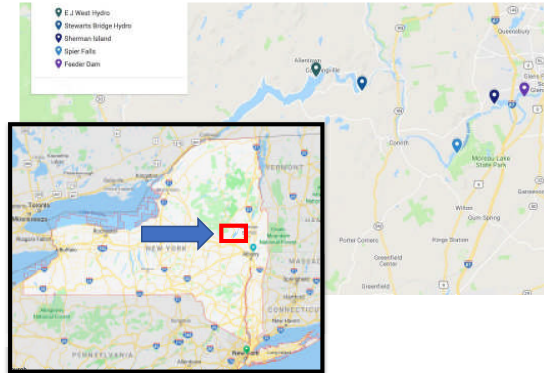
- Electric vehicle using electricity generated from natural gas: 101g/mi. (0g/mi when powered by renewable electricity.)
- Similar gas vehicle: 250g/mi

### Home Heating

- Percent of heat energy in natural gas heating home with efficient furnace: 96%
- Heat from cold climate air source heat pump using electricity from natural gas: 140%
- Even better when compared to fuel oil/ renewable electricity.

## Hudson Valley Community Power CCA

- Joined July 2019
- Default option 100% Renewable
  - NY State RECs, mostly hydro.
- Covers approx 85% of meters
- Slow trickle of additions as people switch from other ESCOs



## Local Renewable Resources

- High Falls Hydro (3.1MW)
- Rooftop and community scale solar (sufficient sites for all our needs, potential export)
- Wood, Forestry, Agricultural Waste
- No commercial wind potential
- Energy efficiency

**More than sufficient for all local needs plus export if grid constraints removed.**

**Local elec production = Economic oppty**

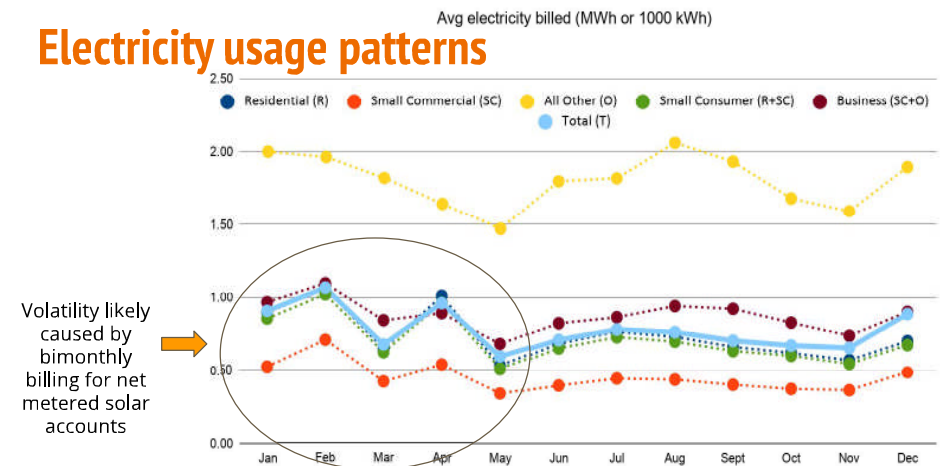


## Town Actions Already Taken

### Already Taken

- CCA
- Revised solar permit fees
- Zoning Code
  - Remove Fossil Fuel
  - Expand solar zoning
  - Add storage
- EV Charging
- Expand walk/bike network

## Electricity usage patterns



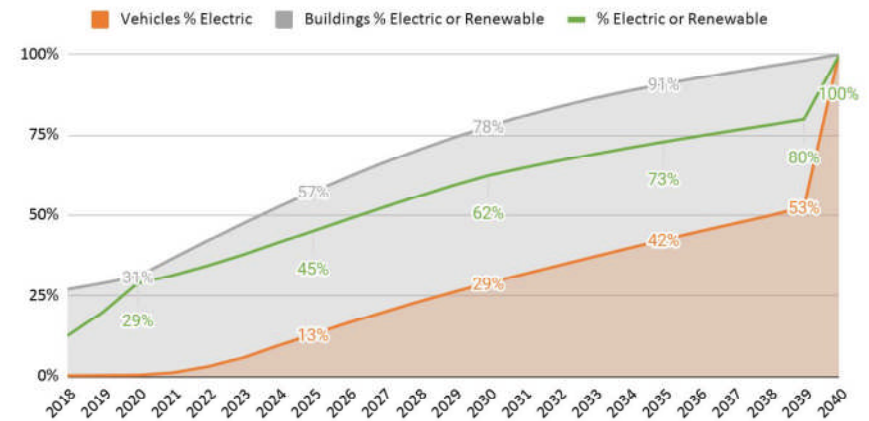
## Wood, pollution, and the coming winter peak.



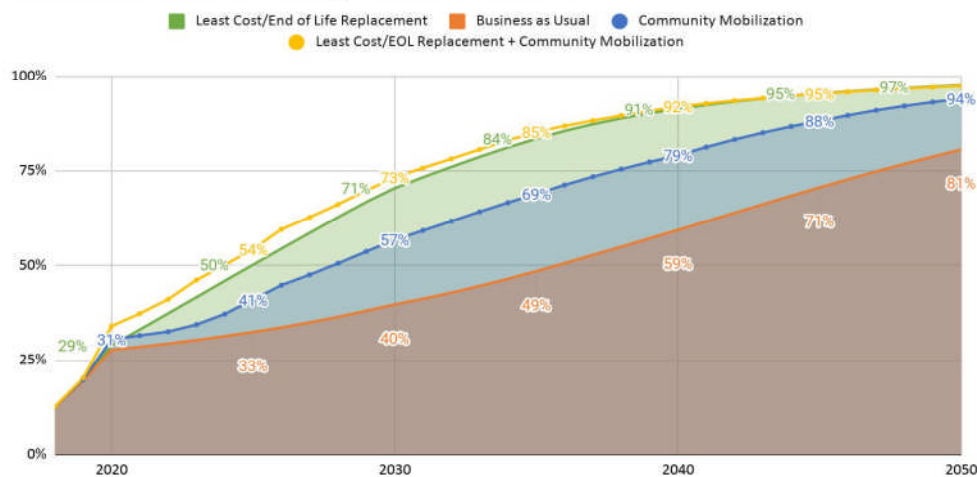
- Wood used widely for heat in Marbletown
- New EPA rules improve stove efficiency and reduce smoke
  - 1/2 to 1/40 as much particulate pollution
  - Up to 2x more heat
- Potential to **increase heat** from same wood **while reducing pollution.**
- Helps with winter peak

## 100% by 2040?

All new vehicles & building systems electric/renewable by 2024, complete replacement of rest



## Marbletown Renewable Energy Adoption Scenarios



## Savings Potential

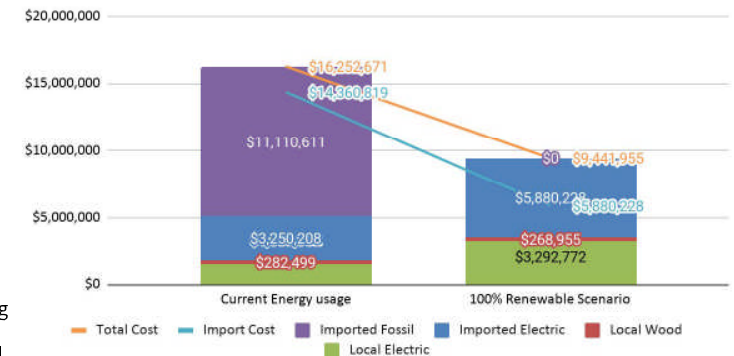
\$7,000,000/year  
\$2500/ household

Enough to pay for all envisioned end of life upgrades over 5-10 years (varies by household)

Problems financing and human factors, not overall cost.

## Marbletown Annual Energy Costs

2019 prices



## Strategic Framework: End of life replacement

By focusing on replacing heating systems and vehicles when at end of life, transition can be cost-effective and an economic driver

- Maximize state and utility incentives at low cost
- Upgrades pay for themselves quickly
- Savings can be re-invested

*Those who can invest are encouraged to go faster.*

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## Potential Local Policies

- Energy Stretch Code
  - Discourage new fossil fuel appliances
  - Help/financing for low income
  - Anti-idling law
  - Trail expansion
  - Better broadband (reduce commuting)
  - Promoting a green group purchase
  - Wood heat upgrades
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## Strategy: Create Conditions for Success

Ensure well trained contractors for energy efficiency, heat pump conversions

Ensure EV supply chain and dealer preparedness

Document early adopter successes

Local policy innovations

Develop special programs where useful, e.g. support for woodstove upgrades, identification of in-town carbon sinks to offset any remaining fossil fuel use at end of campaign

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## Strategy: Commitment and Support

### The Marbletown Pledge

*"I pledge to shift my energy use to 100% Renewable Energy as completely as possible, as quickly as possible. I will take the opportunity to save money right away with community solar and energy conservation. I will learn about electric and renewable technologies so that I am prepared to replace a fossil fueled vehicle, appliance, or tool with a renewable alternative. I will keep at it and share what I learn with my neighbors and friends."*

To be combined with abundant technical assistance

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## Support: 10 Cost Effective Steps to 100% Renewable Energy

- Help residents and businesses form a **plan** for replacing fossil fuel using devices with electric/renewable at or before end of life.
  - Have given “10 Steps” presentation 4 times in partnership with other organizations. Actively looking for more opportunities.
1. Community Choice Aggregation
  2. Home Solar or Community Solar
  3. Insulation & Air Sealing
  4. Efficient appliances
  5. EV Ready / Electric Vehicles
  6. Building Heating and Cooling
  7. Hot Water
  8. Cooking & Clothes Drying
  9. Yard and Power equipment
  10. Thinking beyond energy & helping others

## Group Purchase Round 2- Led by SHV

- Round 2 (Led by SHV)
  - Air source heat pumps
  - Heat pump water heaters
  - Insulation & air sealing
  - Rooftop & Comm solar
  - EV plugs and home energy storage
- Discounts of 5% + incentive donations to covid related charities
- All Ulster/Dutchess residents
- Access to sophisticated tools for identifying motivated customers

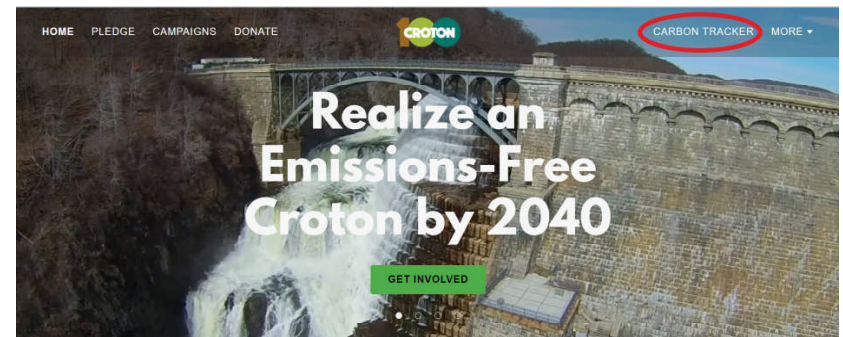


<https://sustainhv.org/green-group-purchase-program/>

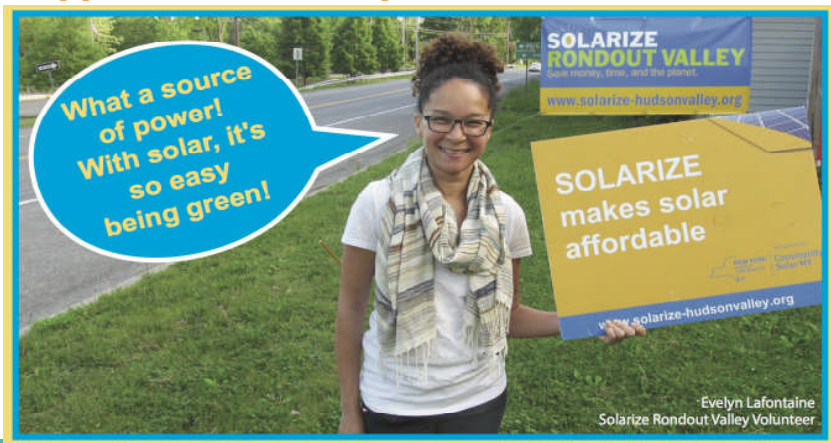
## Support: Group Purchases

- Round 1 (Led by Marbletown ECC)
  - July 2019-Dec 2019.
  - 10+ solar installs
  - 10+ heat pump installs
  - 5+ Heat Pump Water heaters
  - 3+ Air sealing and insulation
  - 3+ EV Chargers
- Lessons Learned
  - Needed better tracking of leads/installs.
  - Discount levels were unnecessarily confusing
  - A call from an energy guide often led to the adoption of multiple green building upgrades.

## Support: Working with Croton100 to add carbon tracking



## Support: local champions



## Local Environmental Benefits it's not just about Climate



- Building upgrades
  - Less indoor & outdoor pollution from combustion
  - No leaking oil tanks
- Electric Transport & Yard Equipment
  - Reduce Noise
  - Reduce Local Air Pollution
- Local Solar
  - Air pollution (by displacing nearby fracked gas generation)
  - Improve soil, water, odor vs. farming
  - Pollinator habitat (Leading to economic benefits for local farms)

## Local Economic Benefits



- Building upgrades
  - Lower cost of living
  - Higher property values
  - Higher tax revenue
  - Utility, state & federal incentives
- Electric Transport & Yard Equipment
  - Lower fuel costs
  - Lower maintenance costs
- Local jobs
  - Building trades
  - Sustainable forestry
  - Local spending power
  - Lower business expenses
  - Tourism

“A plan is nothing unless it degenerates into work.”

-- Peter Drucker

Questions?

