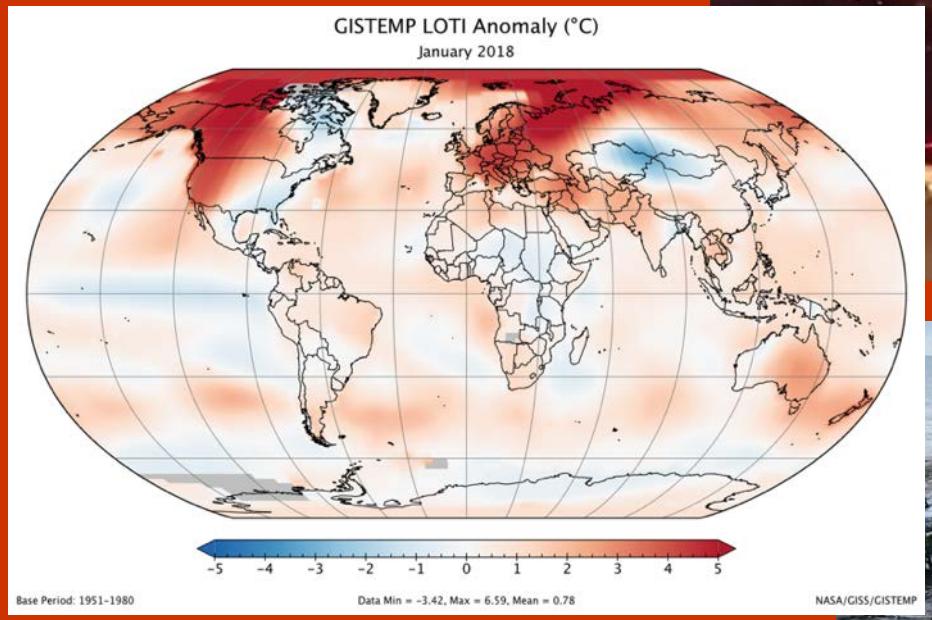
GMP Focus on Carbon
December 1, 2018

DRIVING URGENCY



IMAGINE, IF YOU WILL…

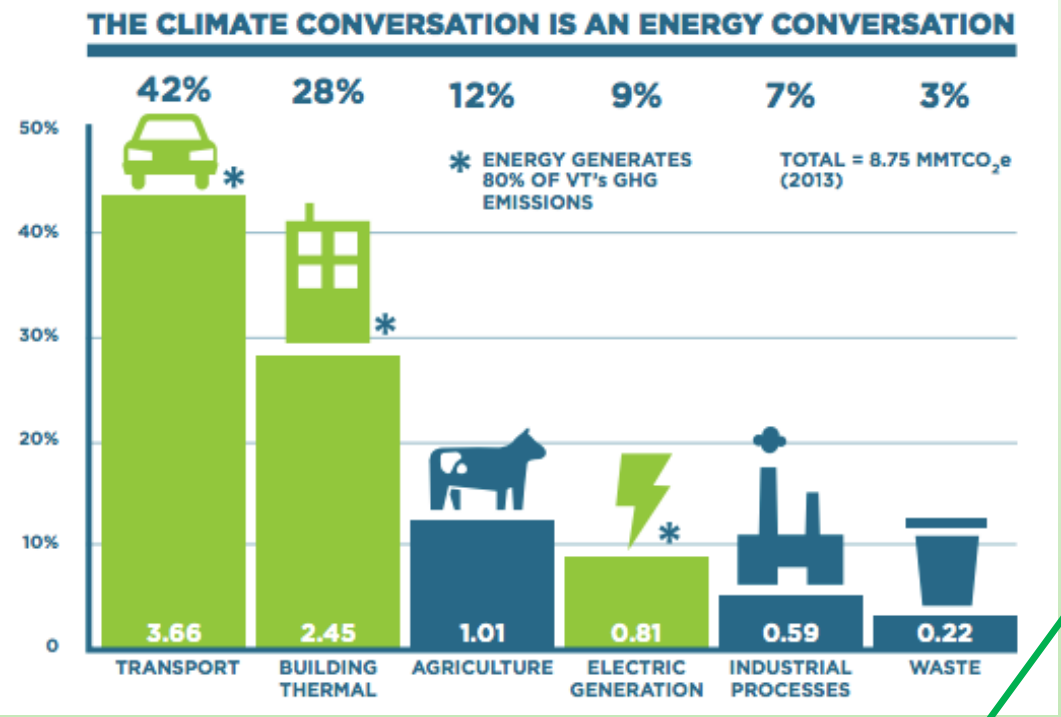
VERMONT COMPREHENSIVE ENERGY PLAN

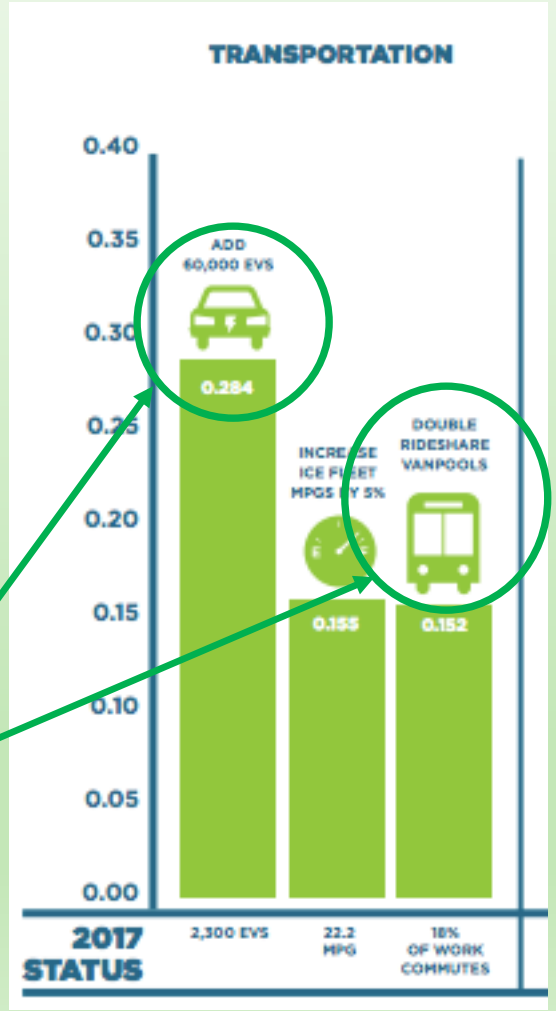
"The goal of achieving 90% of Vermont's total energy needs from renewable sources by 2050 was visionary, but just that — a goal. Since then, Vermont has shown not only the worthiness of that goal for our energy security and environmental benefit but also its achievability and affordability. Not only can Vermont be a leader in global climate change efforts, but we can do so while increasing our energy security, improving our economy, protecting ratepayers, and reducing our total energy costs."

2032 GOALS

- Tier I – Total Renewable Goal - 75%
  - Total energy portfolio increases by 4% every 3 years –from 55% in 2017
- Tier II – Distributed Renewable – 10%
  - Increases by 3/5% each year - 1.6% in 2017
- Tier III – Energy Transformation – 12%
  - Engage with customers to transform fossil fuel consumption – starting at 2% of portfolio increase by 2/3% each year

HOW MANY?





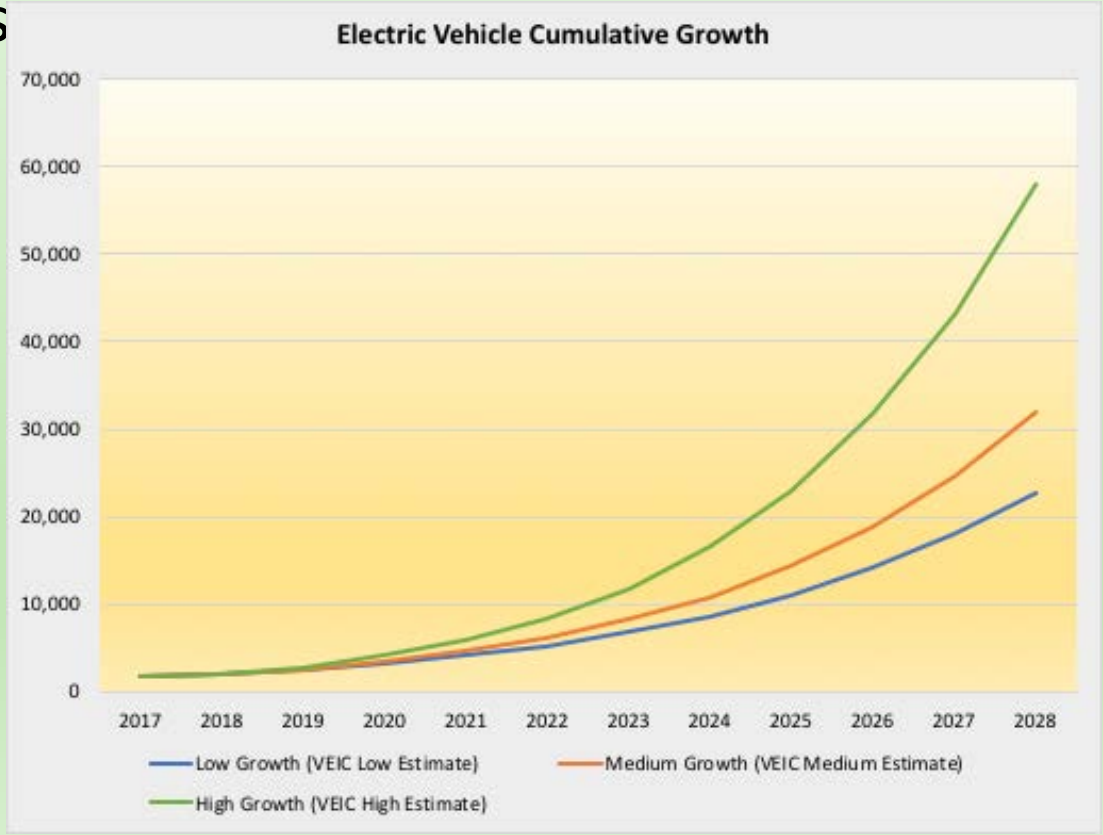
EVs and Ride Sharing

Each ICE car creates 4.7MT of atmospheric carbon each year

*Illustrations from Energy Action Network

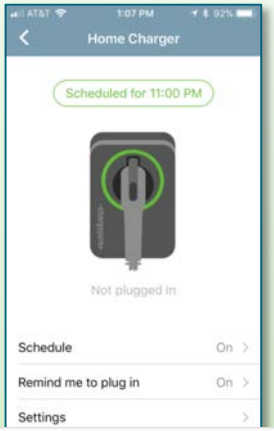
CRITICAL TO 2050 GOALS

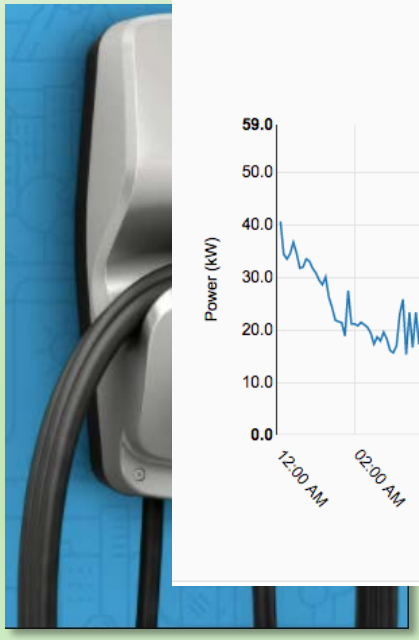
- Clean Energy Plan Goal: 90% by 2050
- Current VT fleet ~300,000 vehicles
- Current VT EVs ~2,300
- Supports and Barriers to EV adoption

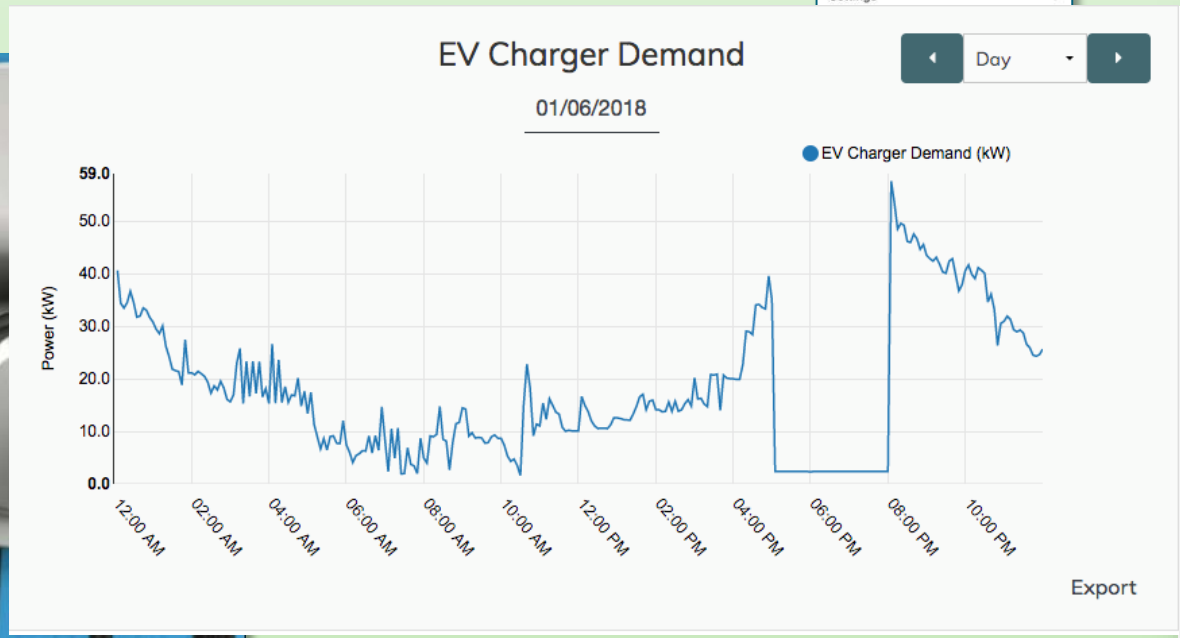


‘GMP ECHARGER’ HOME CHARGING PROGRAM

- Free charger for new EV owners
- Unlimited charging option
- Manageable by GMP to respond to peaks

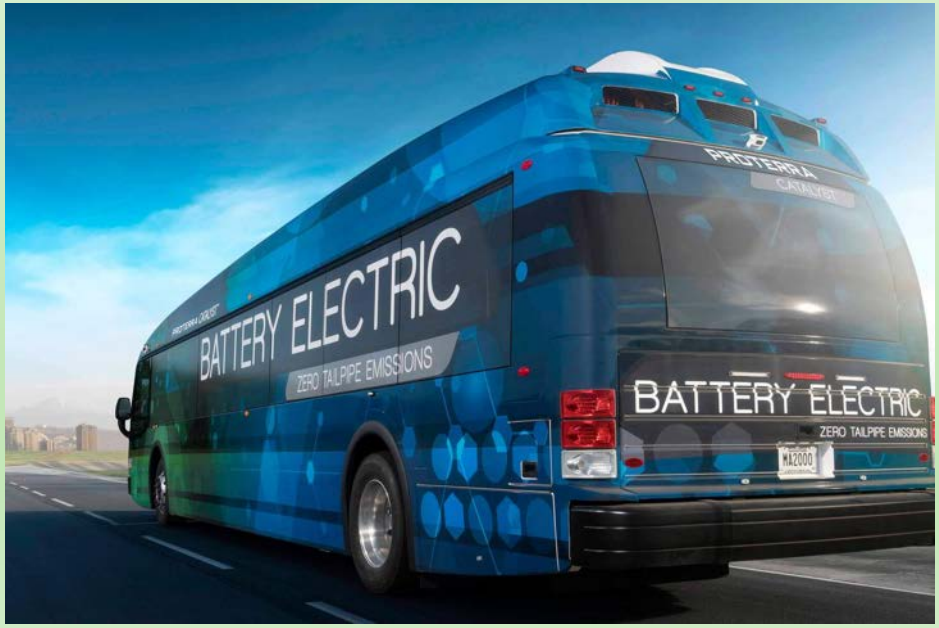






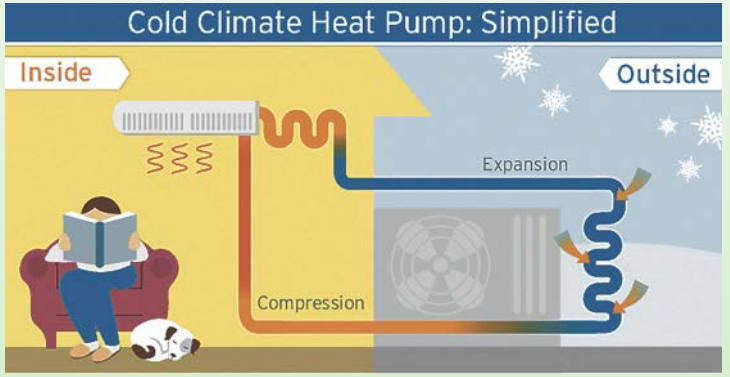
E-BUSES ARE PART OF THE SOLUTION

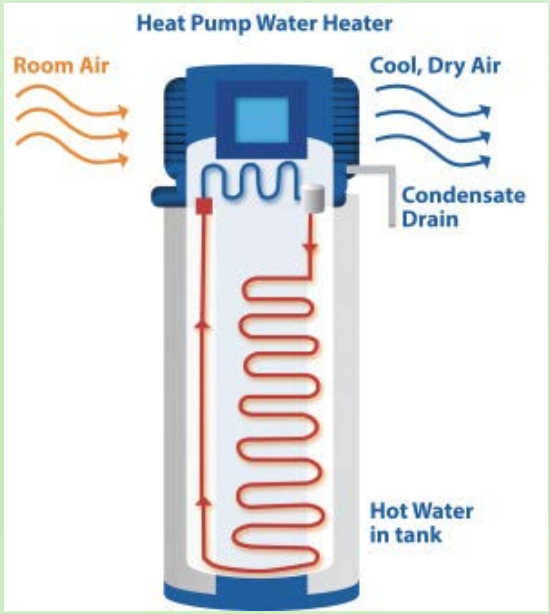
- Buses help reduce carbon
- Ride sharing magnifies the carbon reduction benefit
- Add a new bus route – each rider = 1 less car on the road
- Buses build electrical system load – good for everyone
- Buses as batteries
- Excellent opportunity for Demand Response
- Could work well with microgrid



AIR AND WATER HEATING

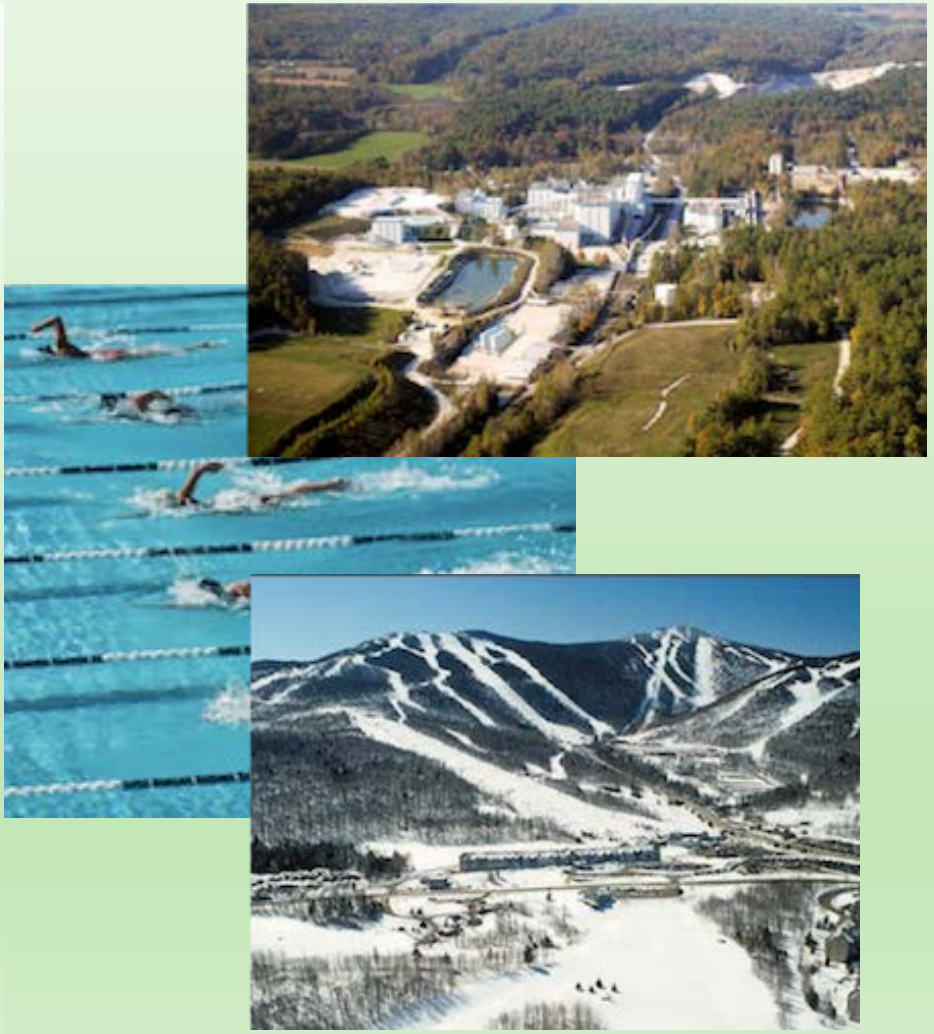
- Cold Climate Heat Pumps
  - High efficiency year-round heating and cooling
  - Cost effective
  - Flexible solutions for retrofit and new construction
  - Innovation is driving ever improving performance in extreme climates
- Heat Pump Hot Water Heaters
  - Leverages heat pump technology to heat domestic water
  - Replaces fossil fuel-based water heating
  - Also an efficiency improvement over traditional electric hot water heaters





BIG CARBON OFFSET OPPORTUNITIES

- Custom: Commercial & Industrial Customers
  - Custom projects through customer engagement
  - Fuel switching & fuel elimination of industrial process
  - Lumber yards, manufacturing operations, ski areas, sugaring operations, greenhouses, large retailers, office buildings, hospitals, etc.
  - Generation, compression, air/water heating and cooling, heat recapture, transportation
  - Electric forklifts and lawn mowers



LONG WIND FARM

- *Long Wind Farms is a greenhouse in Thetford, Vermont. They grow organic tomatoes year-round in a greenhouse that covers approximately 2 acres.*

***Before**:*

➢Heating the greenhouse, particularly in the winter uses a large amount of propane in hydronic heating loops

➢~200,000 gallons of propane per year

***Opportunity**:*

➢ Collaborate with GMP, Efficiency Vermont, and engineering firm

➢ Opportunity:

- ➢ HPS lighting generates both light and heat
- ➢ Light- and heat-insulating curtain amplifies efficiency

After (forecasted):

- ✓ GMP contributed to the cost of lighting
- ✓ Efficiency Vermont contributed to the cost of the curtain
- ✓ Combined project will offset 42,500 gallons of propane each year
  - ✓ 22,500 gallons for the lighting and 20,000 for the curtain
- ✓ Increase greenhouse productivity by 20%
- ✓ Lifetime Carbon Offset: 8.2 million lbs.
- ✓ GMP Cost Per MWH: ~$10.00
- ✓ Tier 3 claim: 2,410 MWH

IT TAKES A VILLAGE

- Efficiency Vermont
- ANR, DPS, PUC
- Consultants
- Architects
- Engineers
- Manufacturers, vendors, and integrators
- Federal and state incentives

RESULTS

- Over the life of projects completed in 2017, approximately 250,000,000 pounds of carbon from fossil fuels will be removed from the atmosphere
- That is the equivalent of offsetting 1.5 million gallons of diesel fuel


THANK YOU!