CCRPC Energy Planning

October 18th, 2016

Dave Roberts
Kate Desrochers

Vermont Energy Investment Corporation

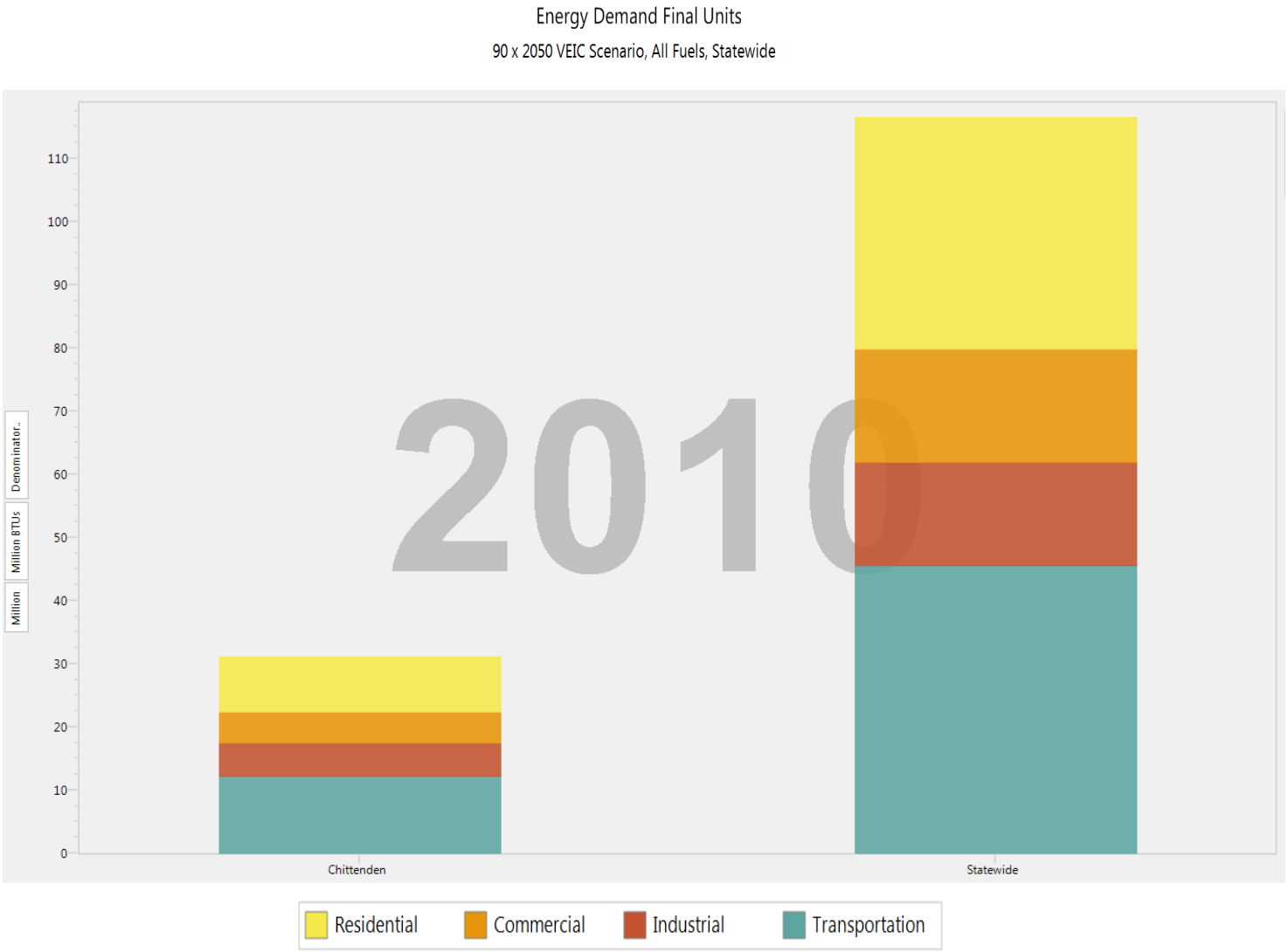
Agenda

- LEAP tool
- Our process
- Results to date

LEAP Methodology and Regionalization

- **L**ong-range **E**nergy **A**lternatives **P**lanning System
- LEAP is an *accounting framework* that aggregates existing data and modeling efforts
- Well suited for creating "self-consistent story lines of how an energy system might evolve over time".
- Strong tool for scenario modeling and regionalization

Baseline Energy Consumption by Sector

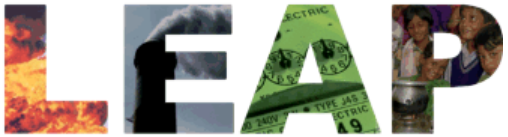


How might we get to 90% Renewable by 2050?

Total Energy Study Results

Statewide fuel type, generation, consumption scenarios

Statewide totals



Aggregate and Balance Data

Regional data

Population, employment, fuel availability and expected changes over time

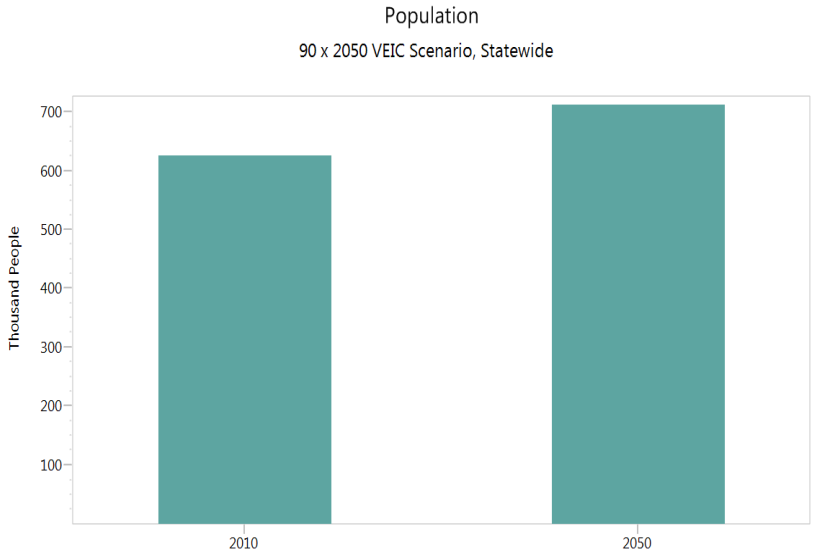
- Demo-graphic data
- Average home heating needs and fuel types
- Average water heating use
- State-wide commercial floor area
- Vehicle miles traveled
- Expected efficiency upgrades
- Statewide renewable potential and grid needs

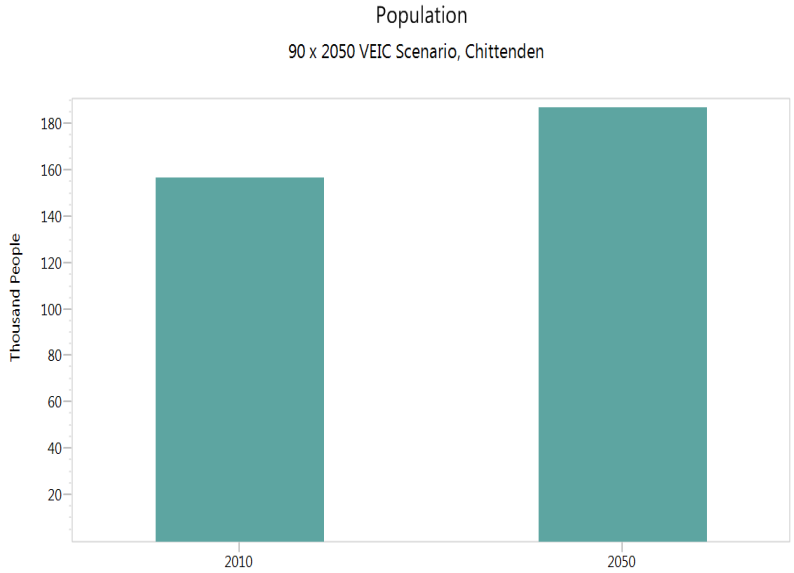
Key LEAP Parameters

- Transportation
  - Population, Per capita VMT, Vehicle efficiency/fuel
- Residential
  - Number of units, type of heating, electric efficiency
- Commercial
  - Based on TES estimates apportioned by an estimate of square footage based on employees in the commercial sector in the region

Population

- Statewide expected growth: 86,400
- Chittenden expected growth: 30,400
- Based on average annual growth expected in 2013 state-commissioned study (Jones and Schwarz)





Solar Market Pathways LEAP Scenarios

Reference

Business as usual, expanding natural gas and cars becoming more efficient because of CAFE standards

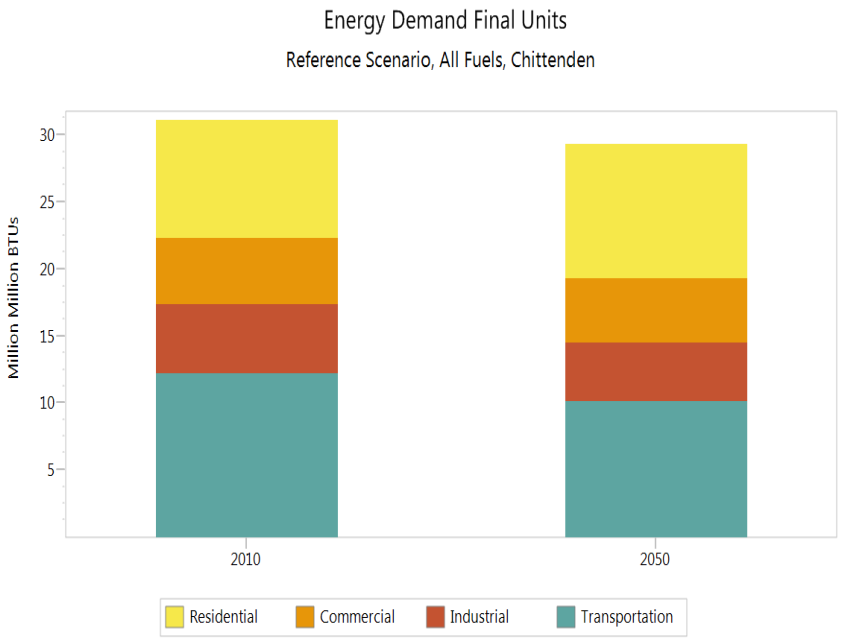
90% x 2050_{VEIC}

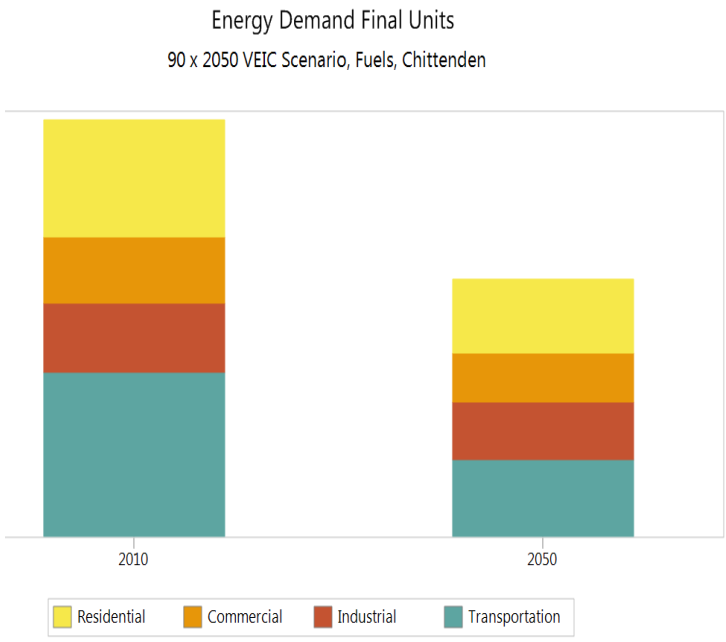
Meets the state's 90% renewable energy goal, based on economic modeling in their Total Energy Study[1]

Vermont Energy Investment Corporation

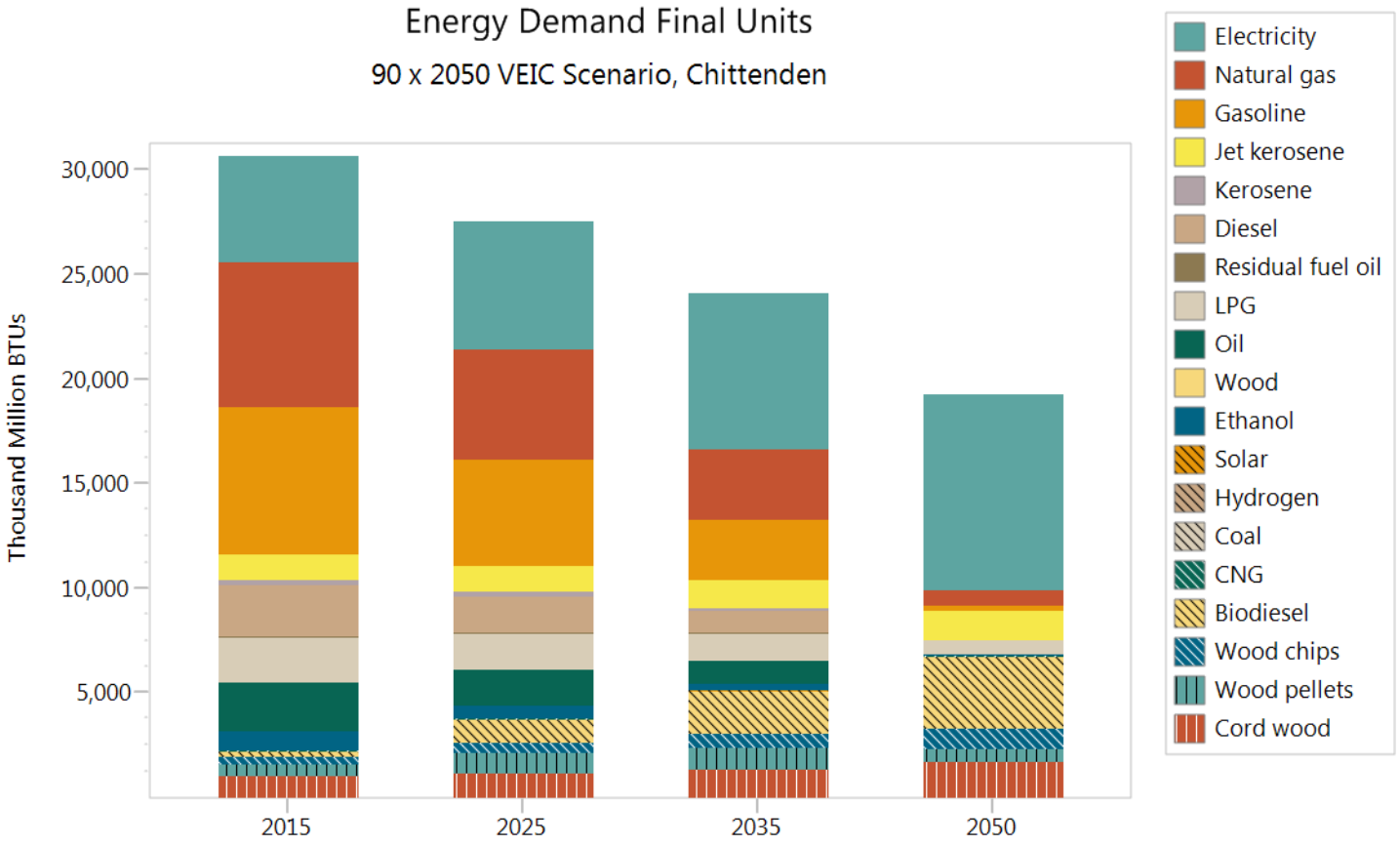
1. Vermont Department of Public Service, Total Energy Study, 2014
http://publicservice.vermont.gov/publications-resources/publications/total_energy_study

2050 Reference vs 90x2050 Scenario



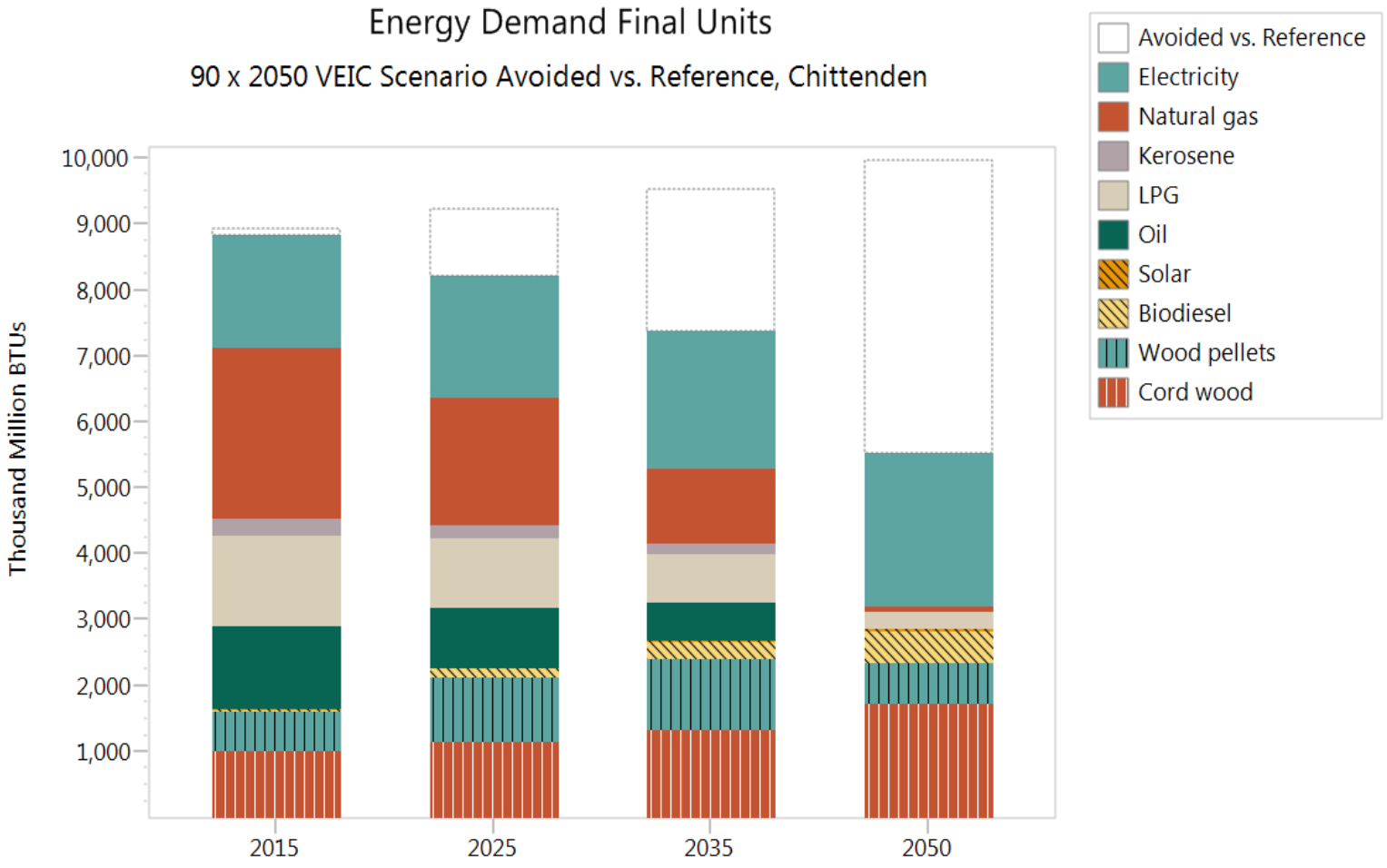


CCRPC 90x2050 Scenario Overall Results

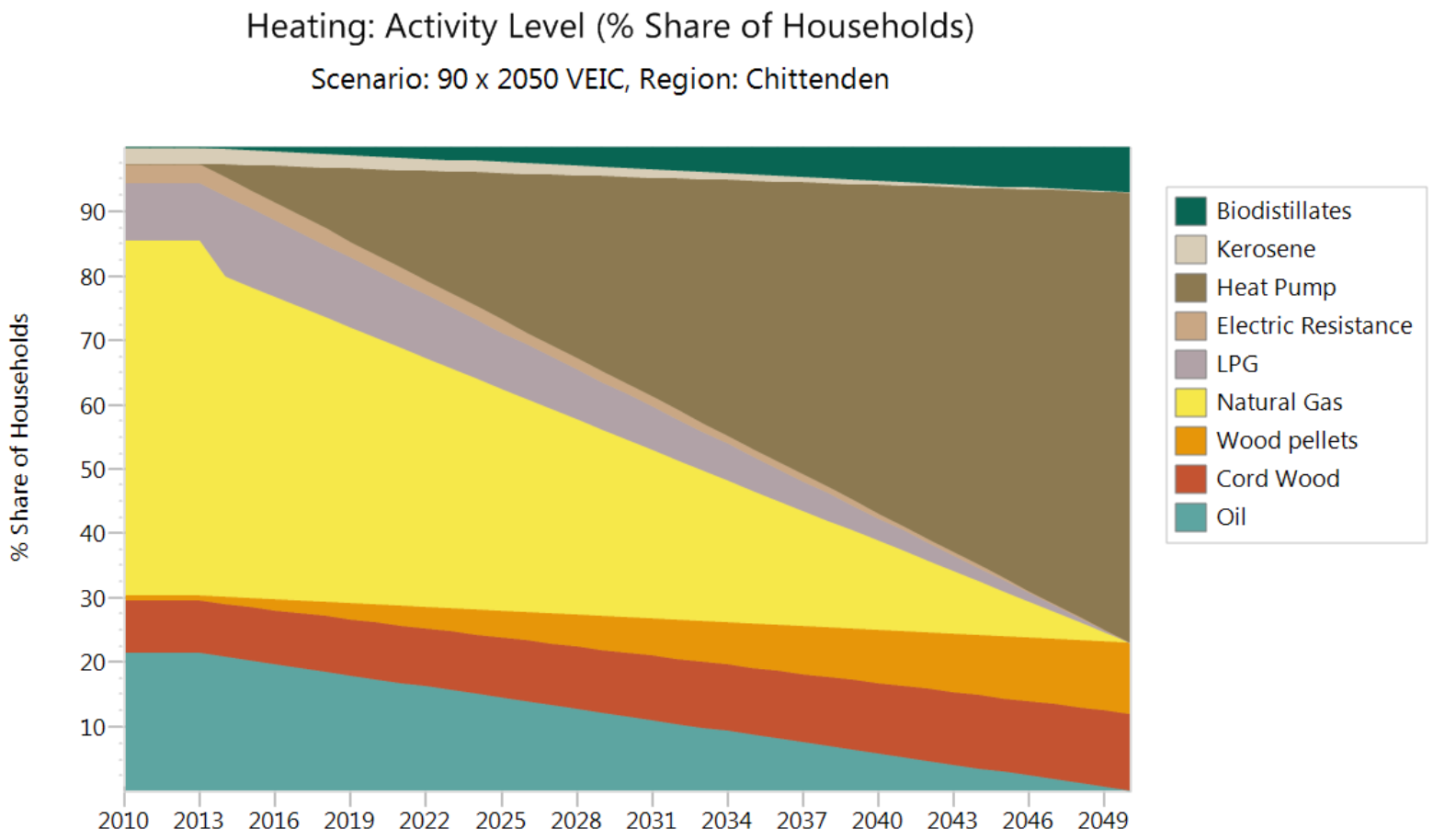


Regional energy consumption by fuel

90x2050 Residential Energy Consumption by Fuel

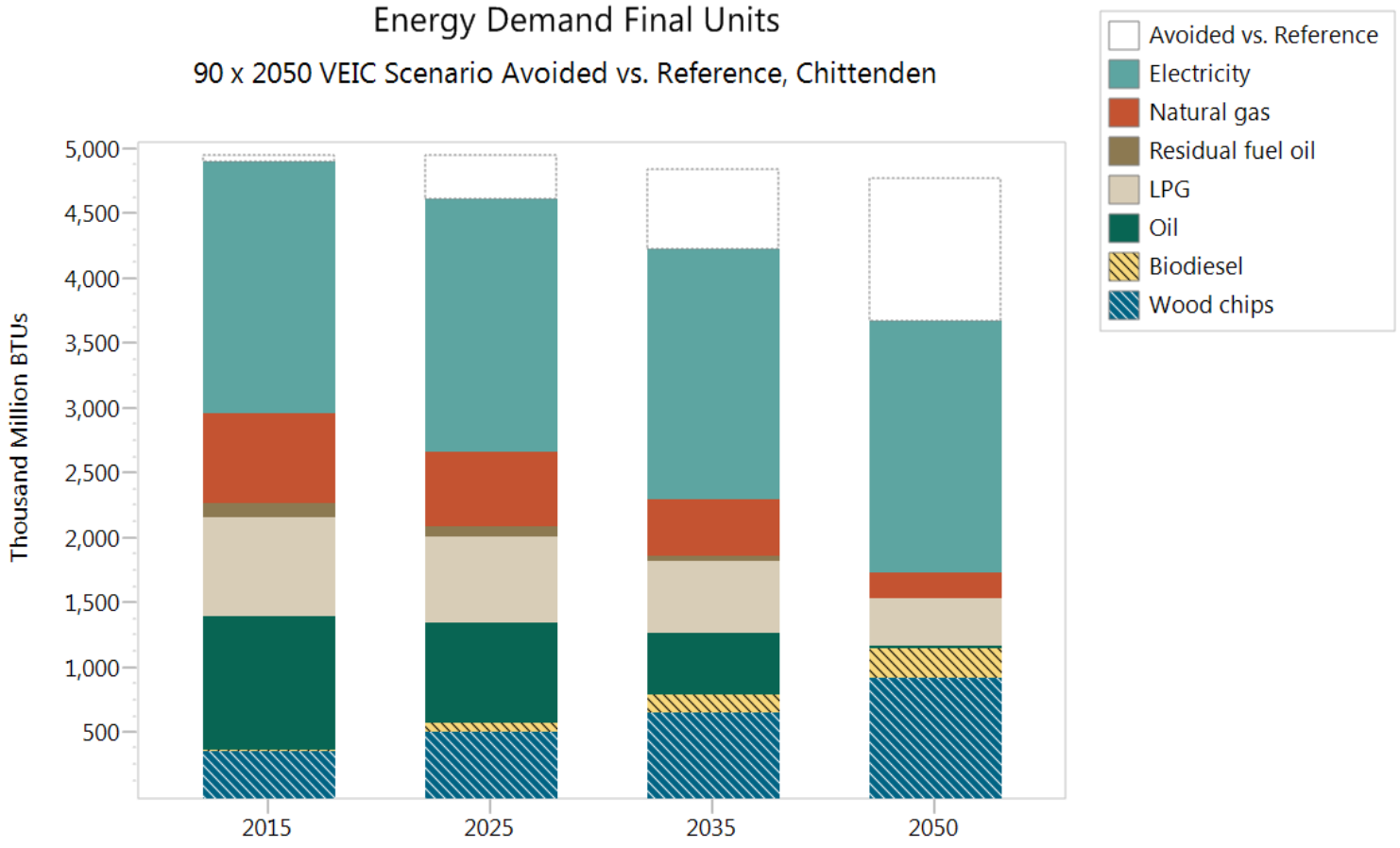


90x2050 Residential Heating Fuels Shares

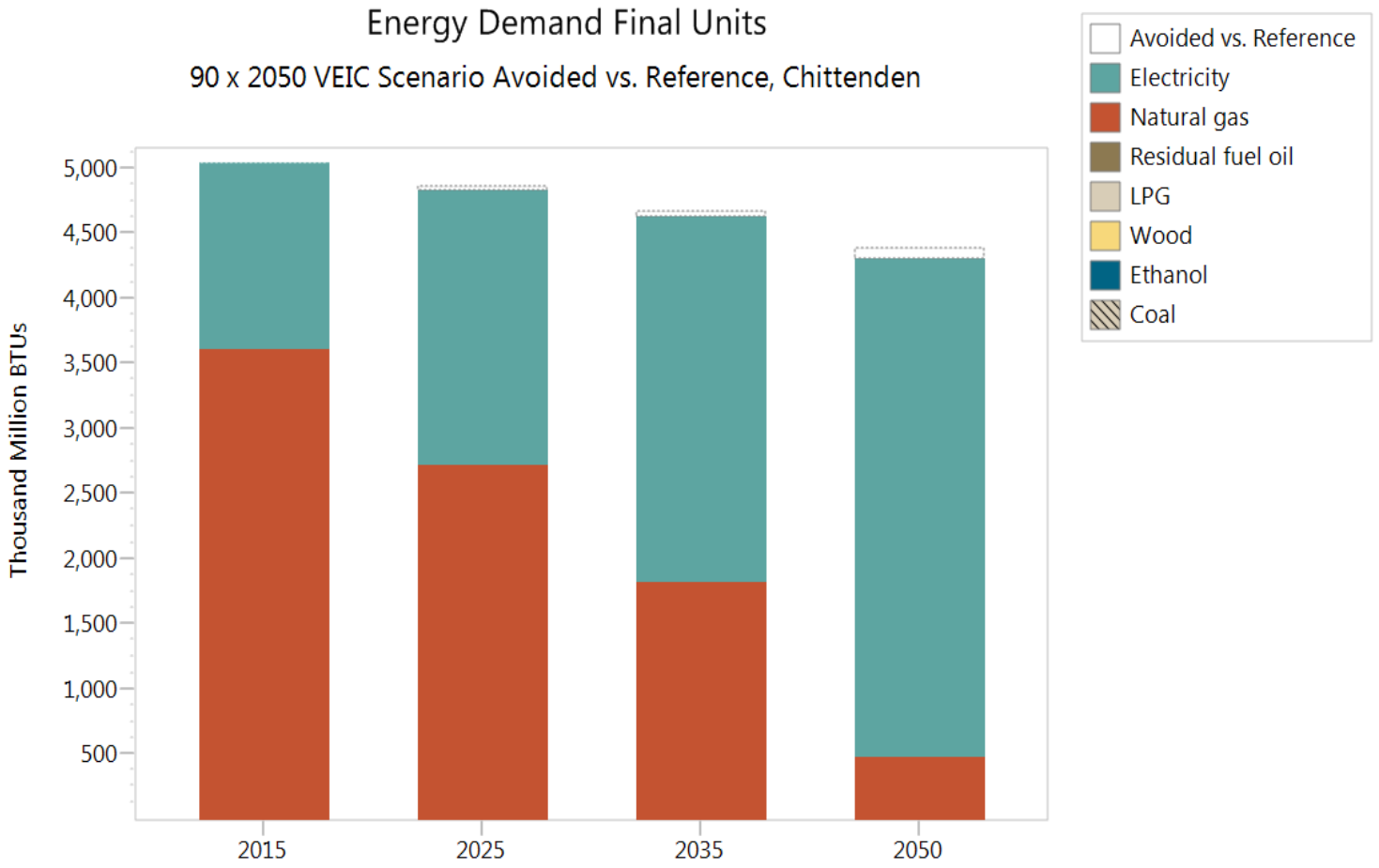


Share of heating energy in single family homes, by fuel, with electricity and biofuels growing to displace fossil fuels.

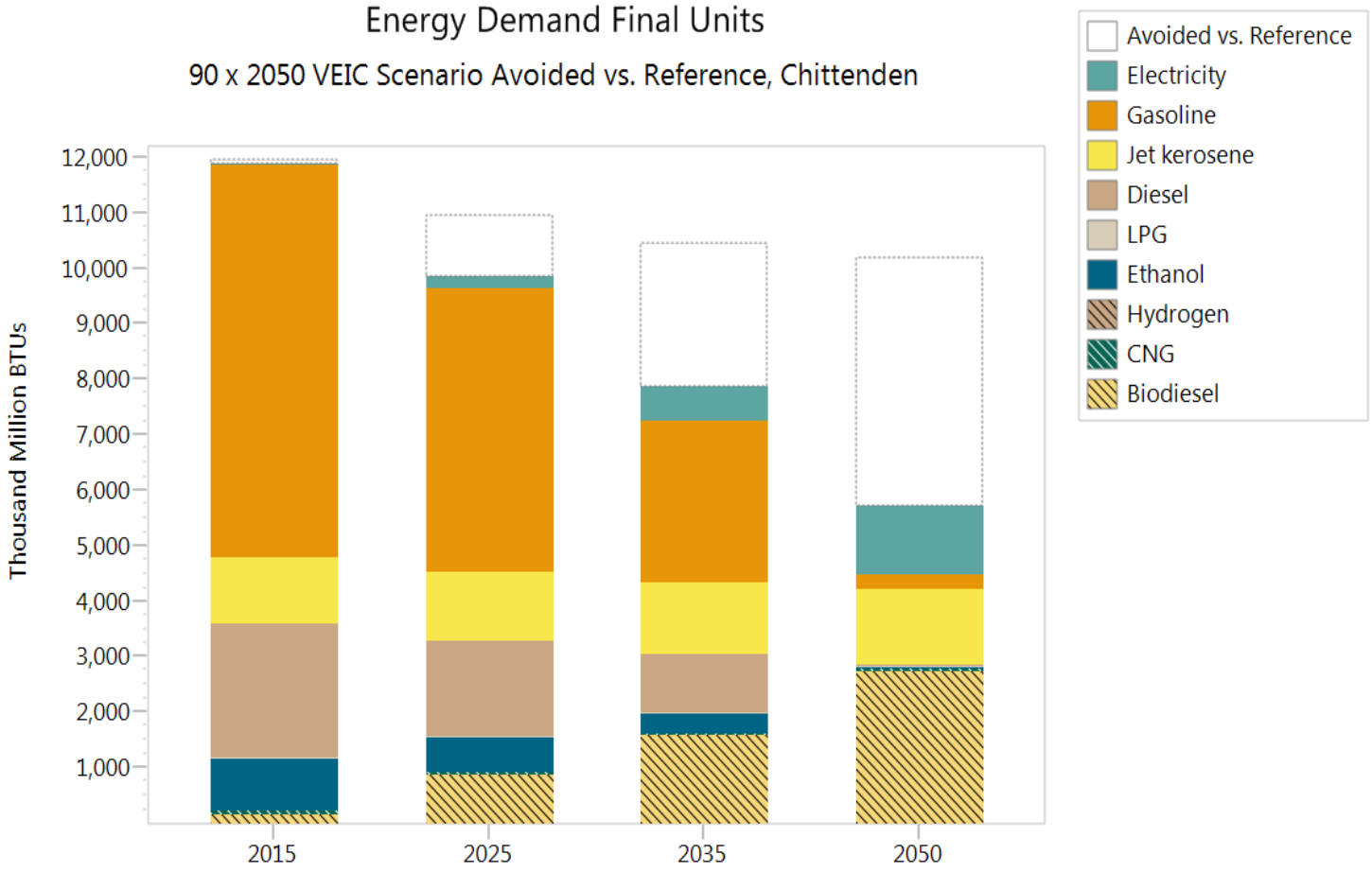
90x2050 Commercial Energy Consumption



90x2050 Industrial Energy Consumption by Fuel



90x2050 Transportation Energy Consumption

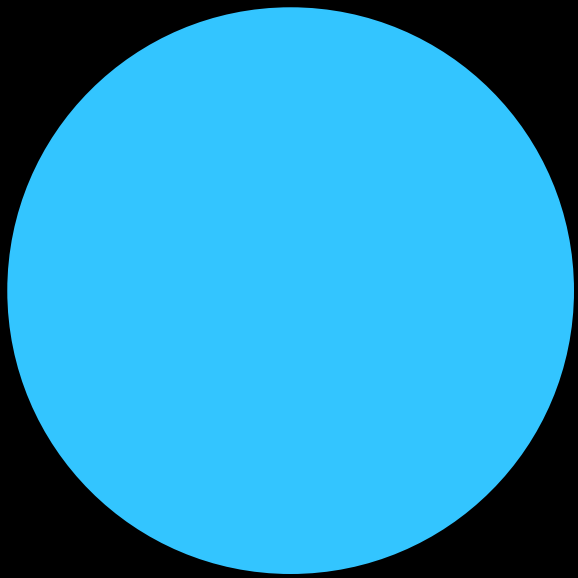


CCRPC Scenario Refinement

- Transportation
  - Adjust per capita VMT to reflect decreased vehicle use
    - Land use / location efficiency benefits
    - Multimodal transportation
    - Autonomous vehicle technology
  - Accelerate transition to plug-in electric vehicles
  - Accelerate transition to biofuels
- Other Sectors
  - Heating
  - Demographic assumptions

Dave Roberts
droberts@veic.org

Kate Desrochers
kdesrochers@veic.org



Vermont Energy Investment Corporation