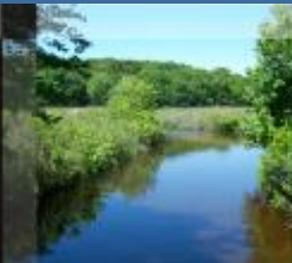




# Connecticut Department of Energy and Environmental Protection



Connecticut Department of  
**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

# ADM Meeting

June 20, 2017  
1:00 — 3:00 p.m.



Connecticut Department of Energy and Environmental  
Protection

# Agenda

**1:00**

Welcome & Announcements  
*DEEP Commissioner Klee*

**1:05**

Review REMI inputs, assumptions, and analysis of the transportation and building sectors to date  
*Stanley McMillen, Consultant*

**1:35**

Discuss and provide guidance on REMI inputs and assumptions

**2:30**

Public Comments

# Review REMI inputs, assumptions, and analysis of the transportation and building sectors to date



Connecticut Department of Energy and Environmental  
Protection

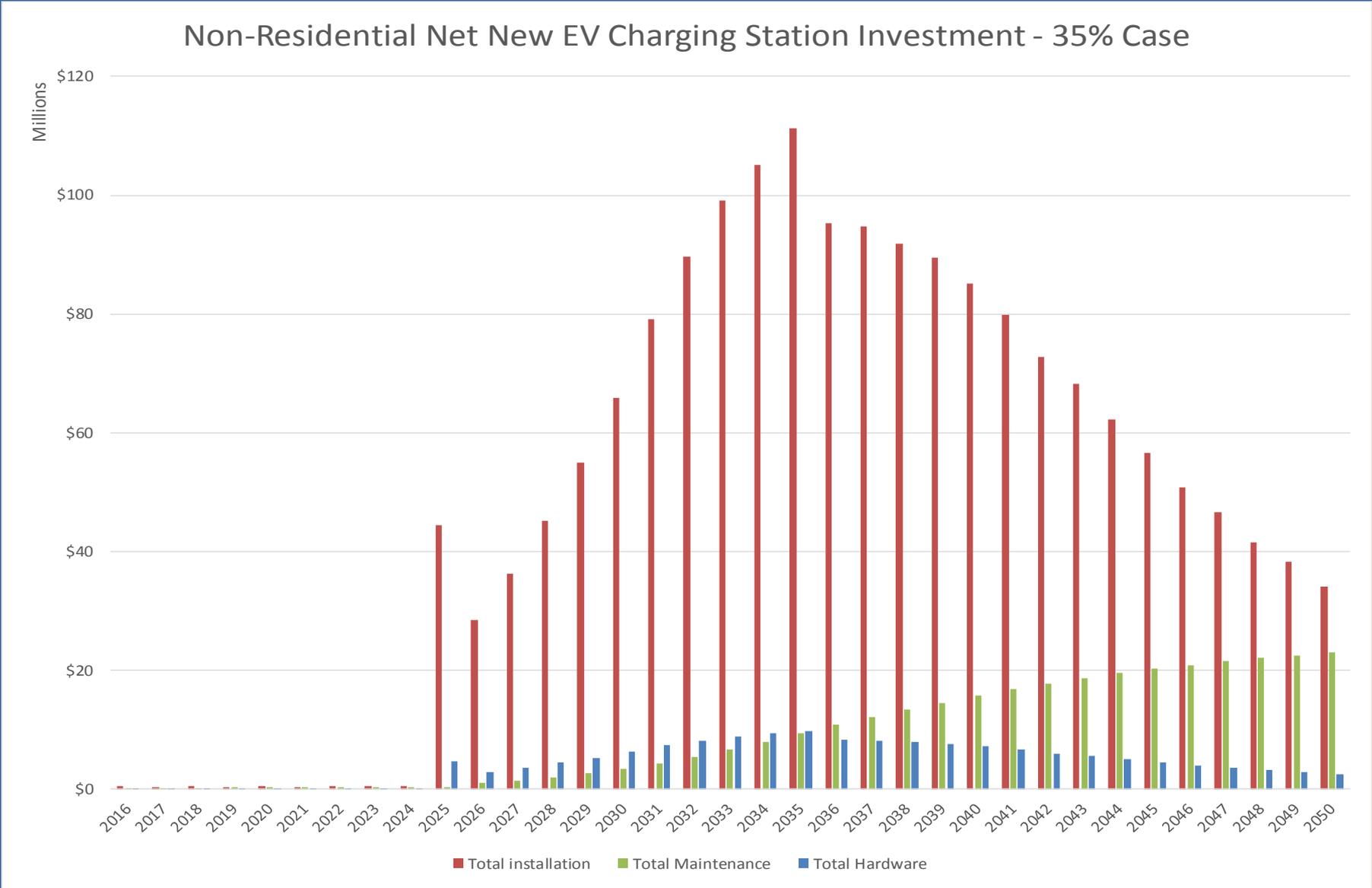
# Summary of Scenarios Modeled in REMI

- Compare relative costs of 35% and 45% GHG mid-term reduction targets in 2030 on the way to 80% by 2050
- The current REMI analysis focuses on transportation and buildings

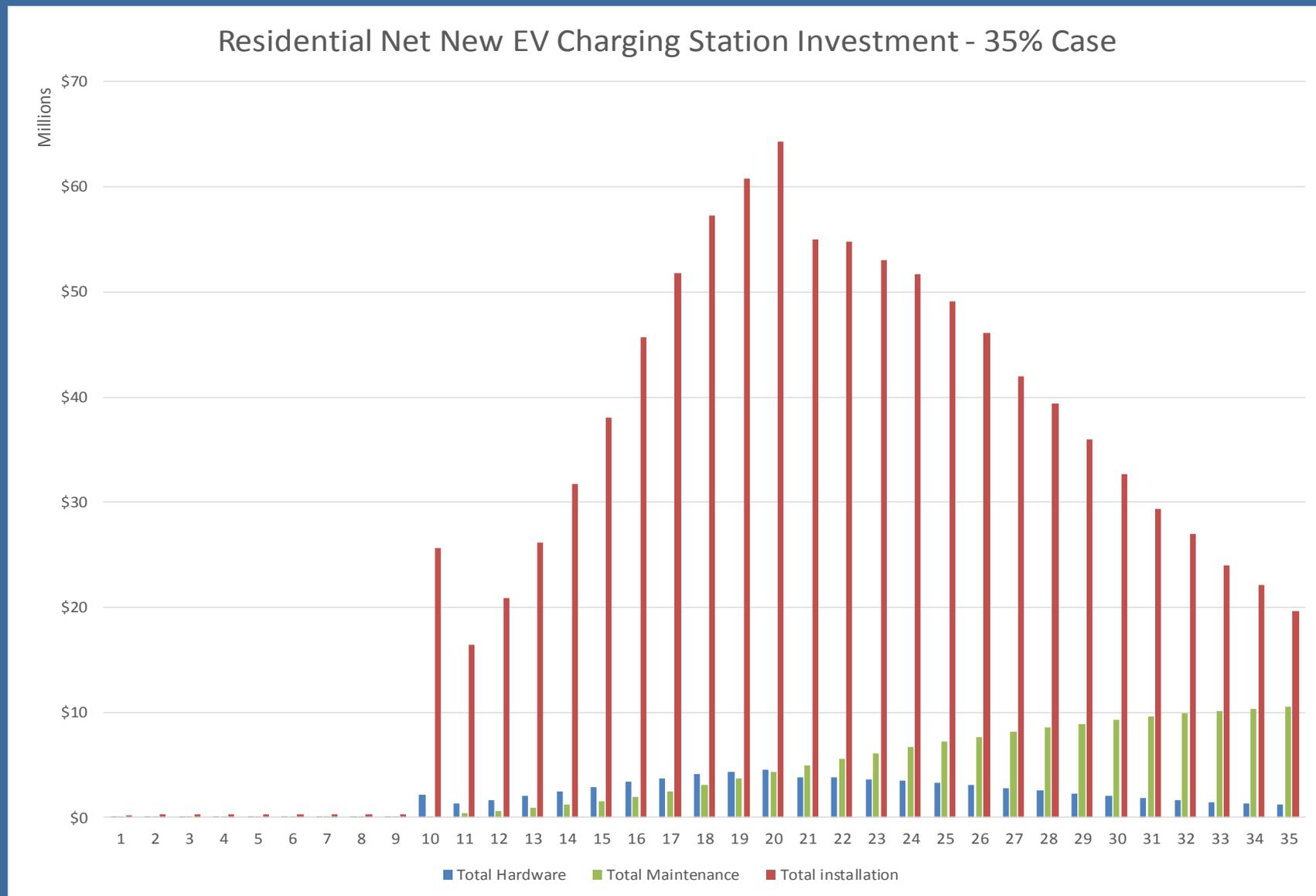
# LEAP Outputs Used in the Transportation Sector REMI Analysis

- Changes in vehicle purchases relative to the reference case
- Changes in transportation fuel consumption relative to the reference case
- Changes in criteria pollutant emissions relative to the reference case
  - Used to monetize the health benefits of improved air quality (LATER)

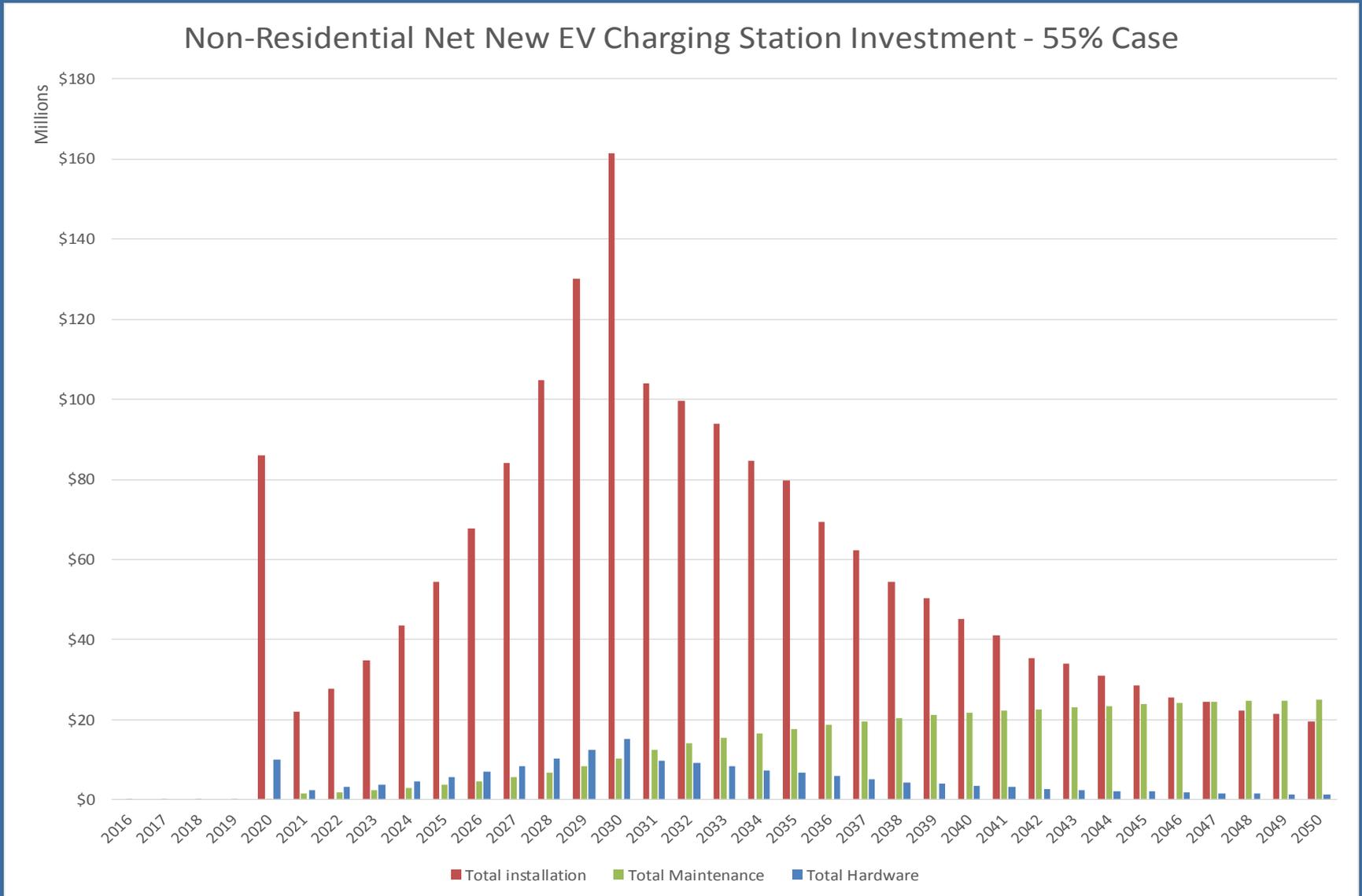
# Non-residential EV Charging Station Investment, 35% Case



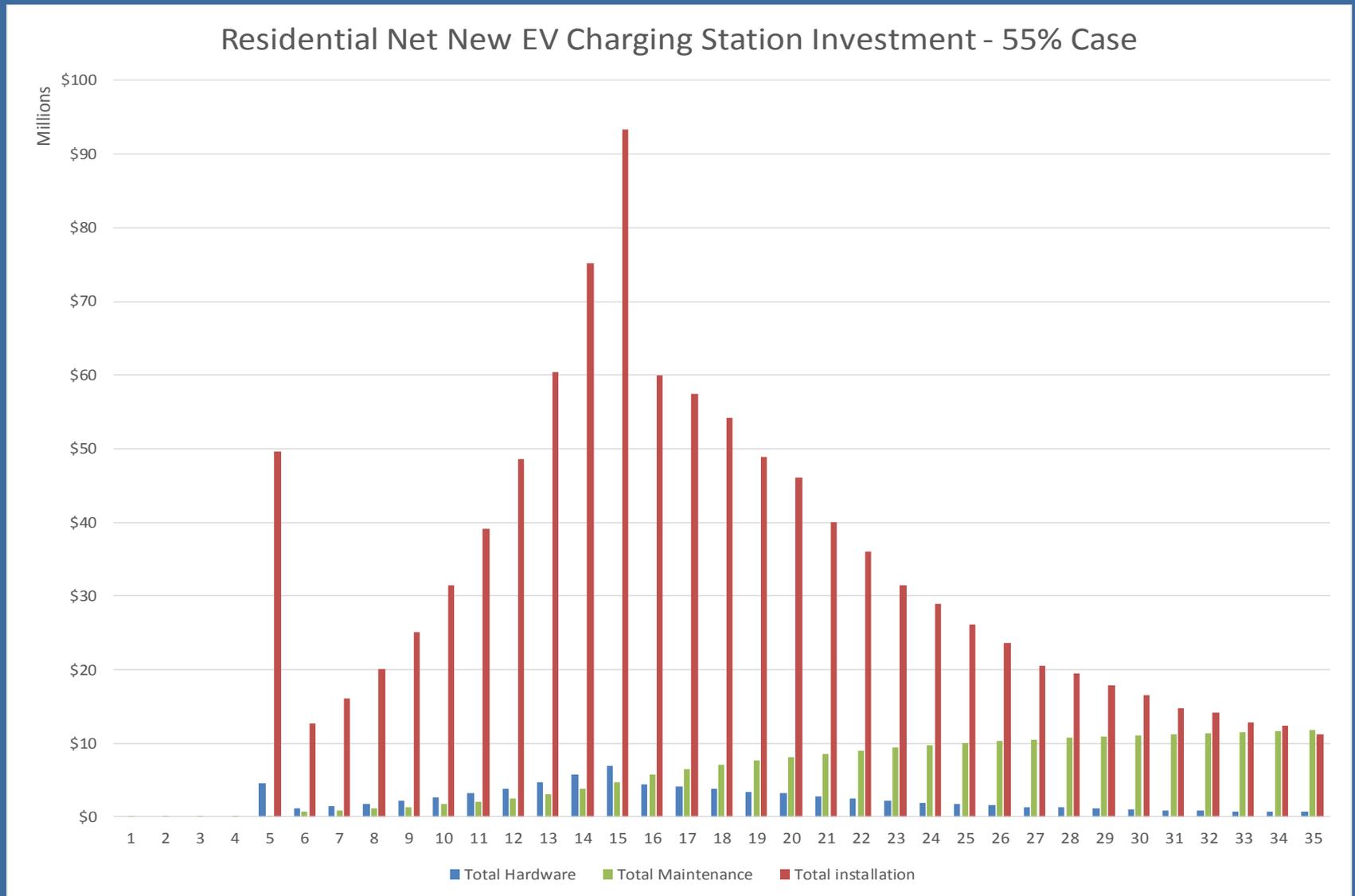
# Residential EV Charging Station Investment, 35% Case



# Non-residential EV Charging Station Investment, 55% Case

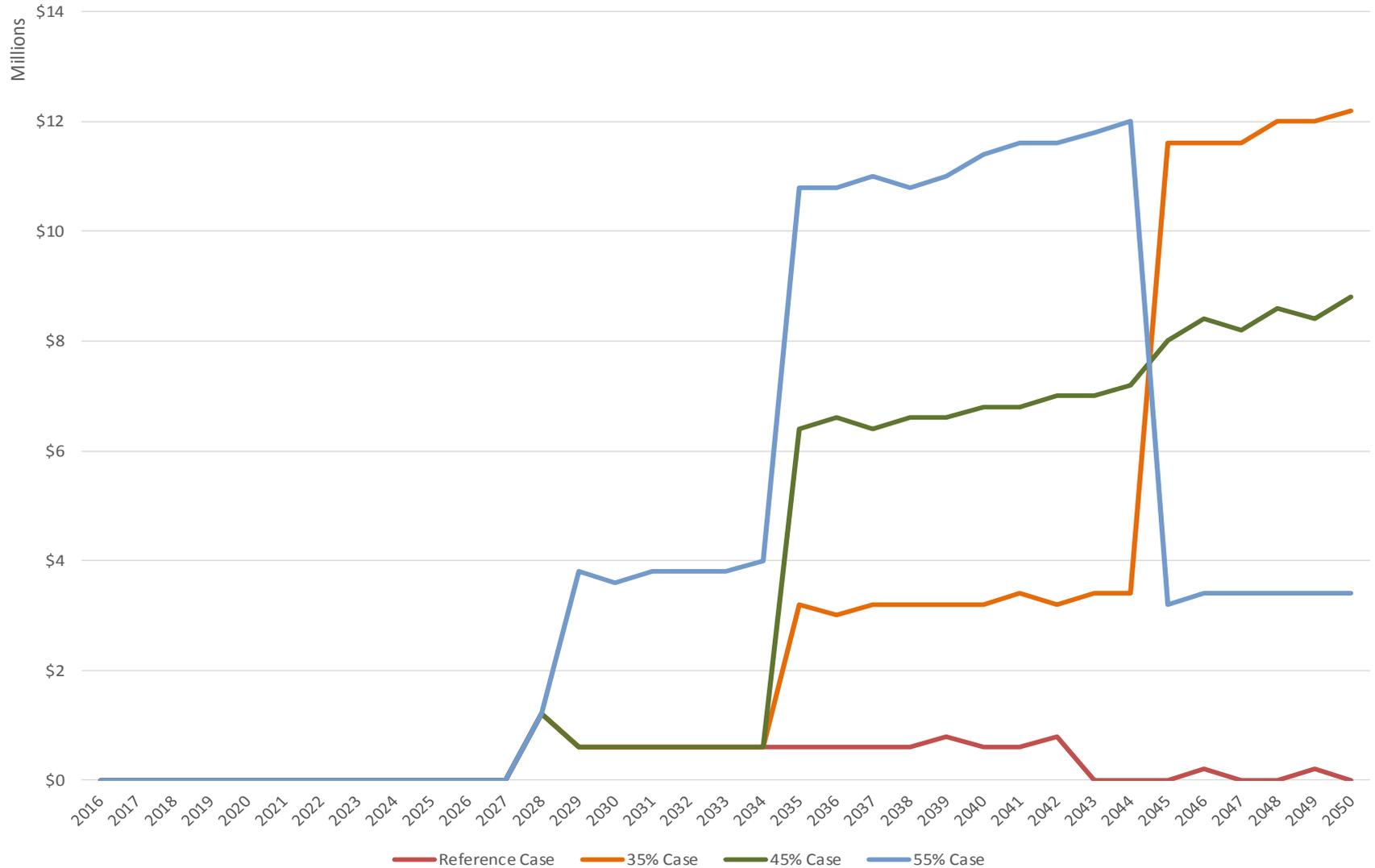


# Residential EV Charging Station Investment, 55% Case



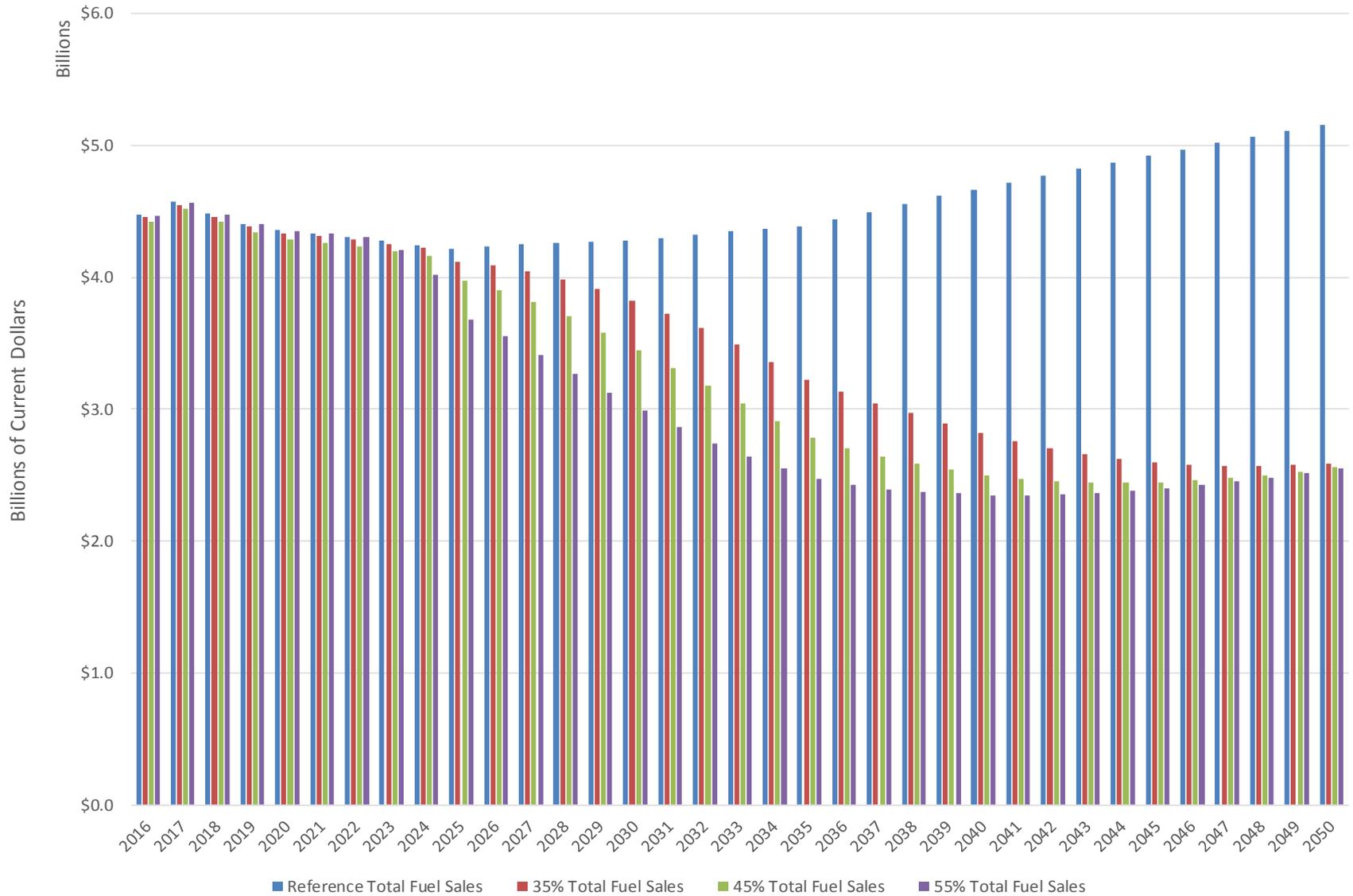
# Hydrogen Filling Station Investment, All Cases

H2 Filling Station Net New Investment in Current Dollars



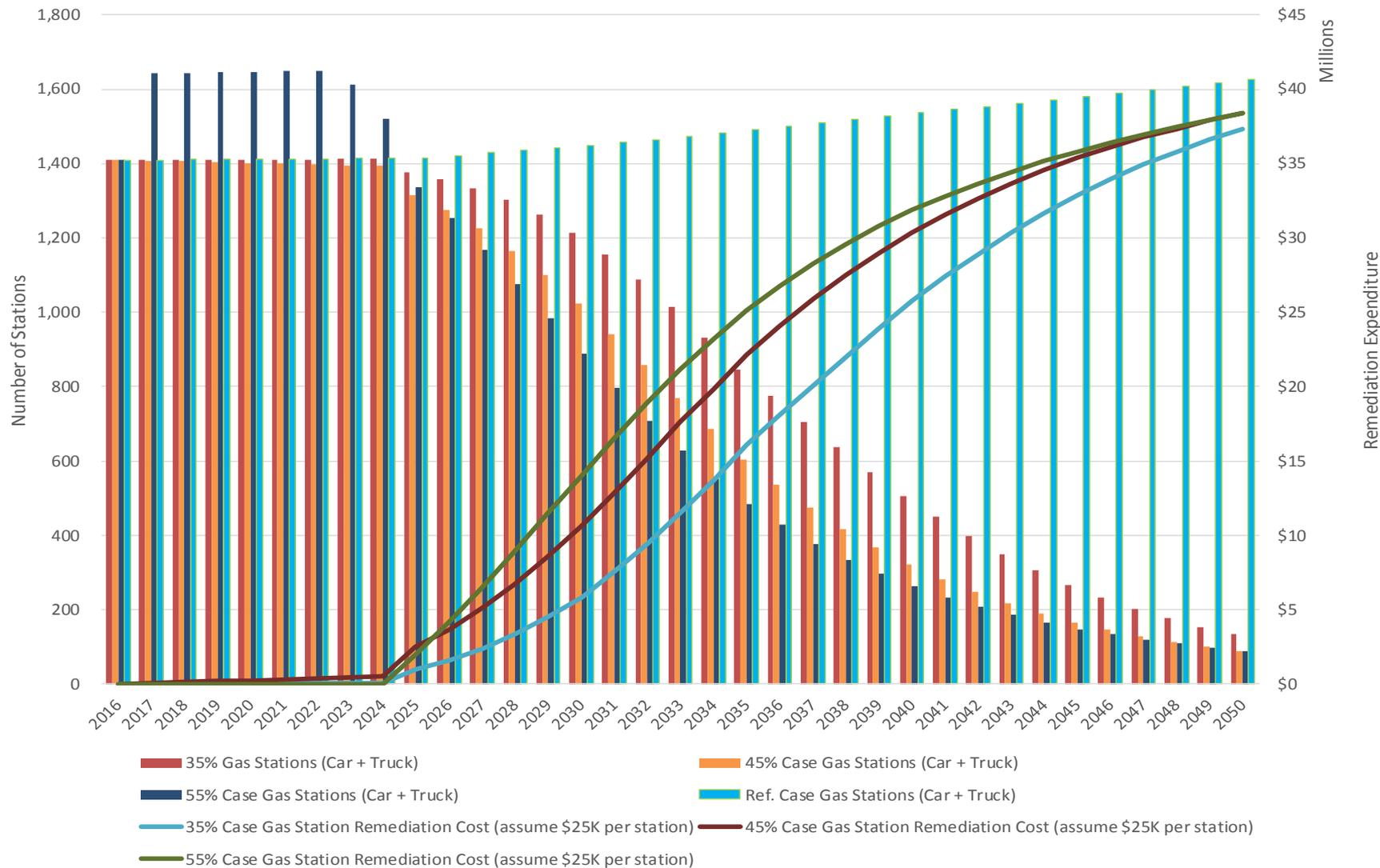
# Total Retail Fuel Sales, All Cases

Total Fuel Sales for Reference, 35%, 45% and 55% Cases

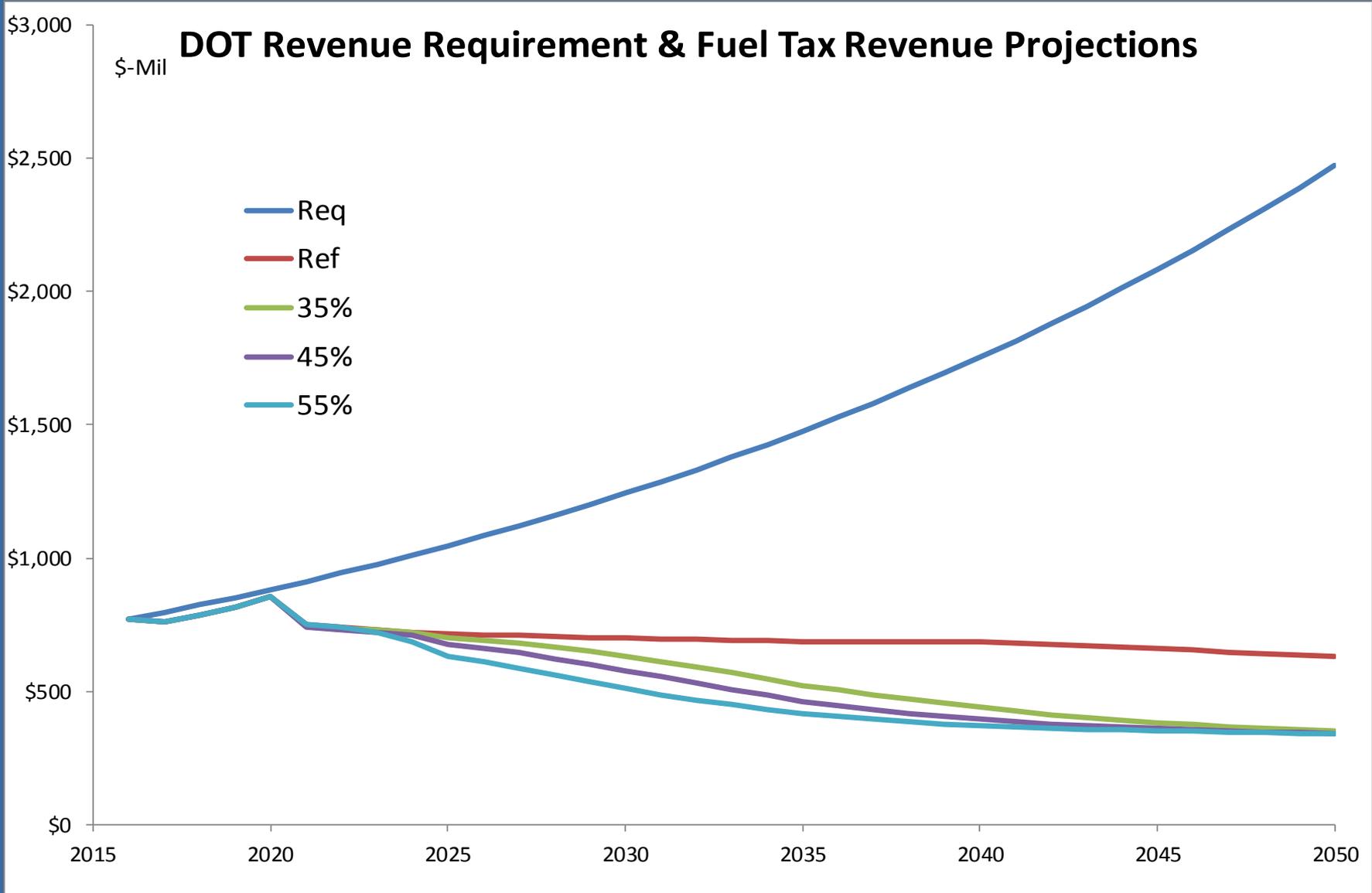


# Gas Station Market Exit & Remediation Costs, All Cases

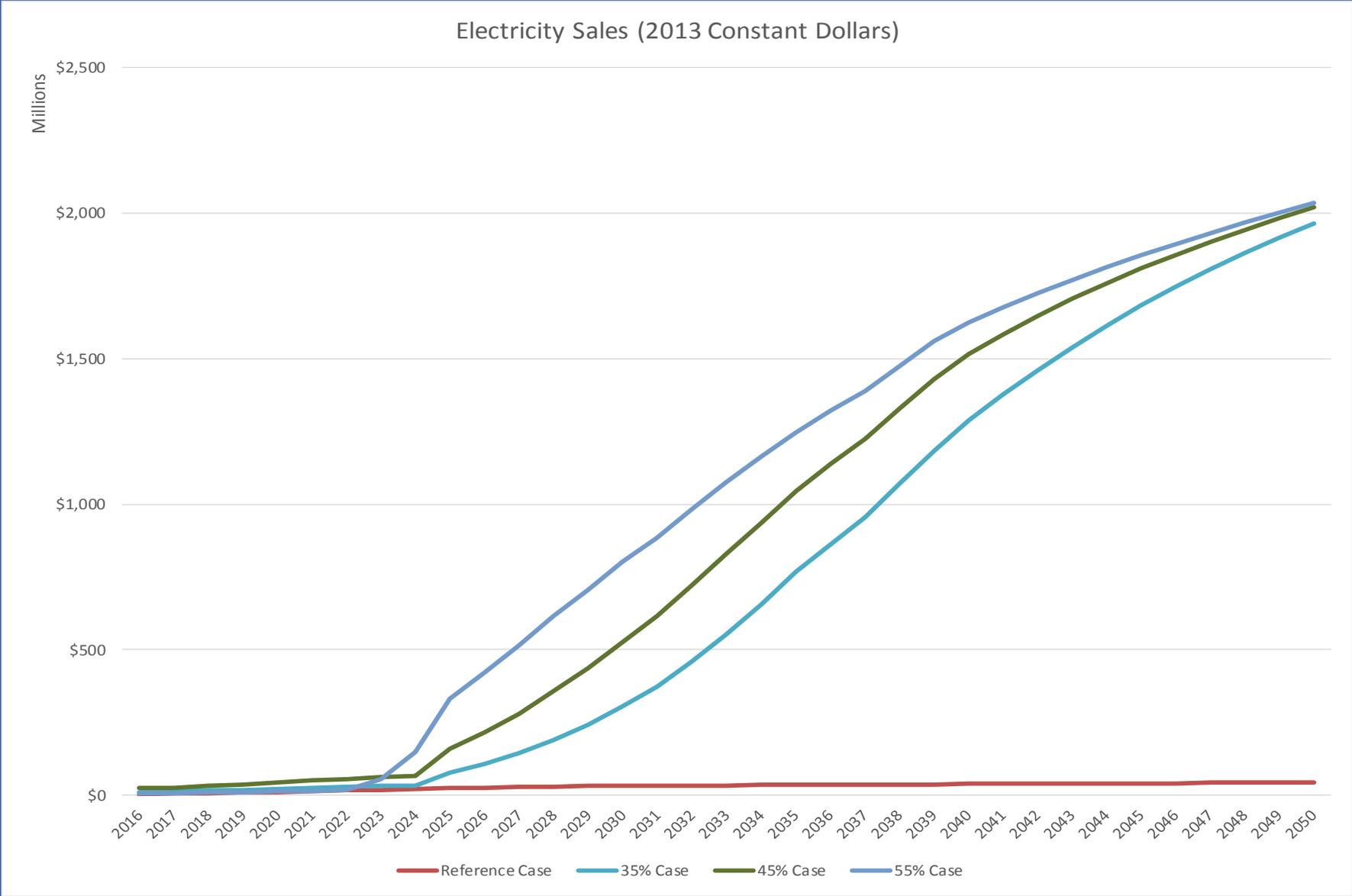
Gas Station Decline & Remediation Expenditure in Current Dollars



# Gas Tax Shortfall, All Cases (Not included in REMI analysis)



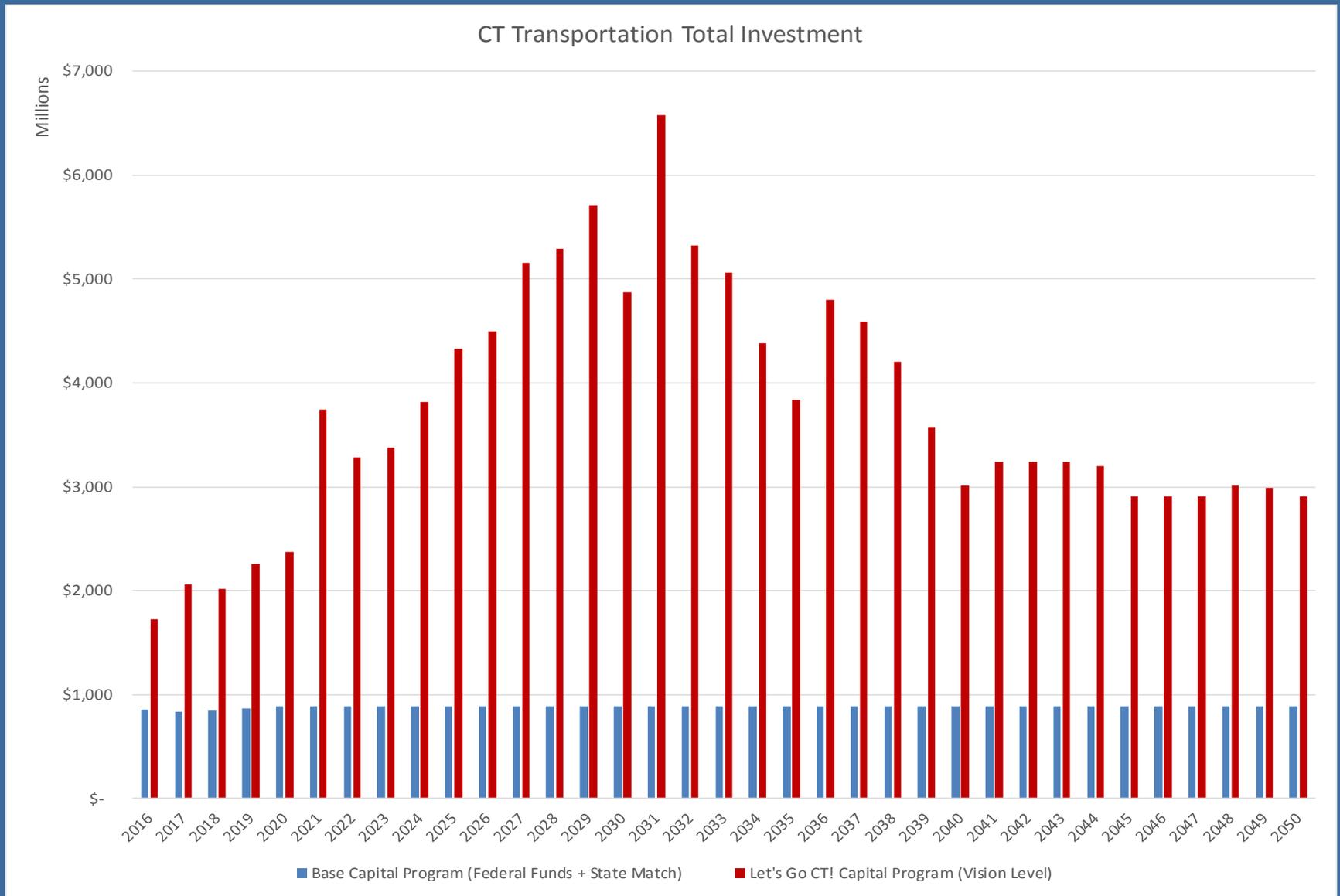
# Electricity Demand, All Cases



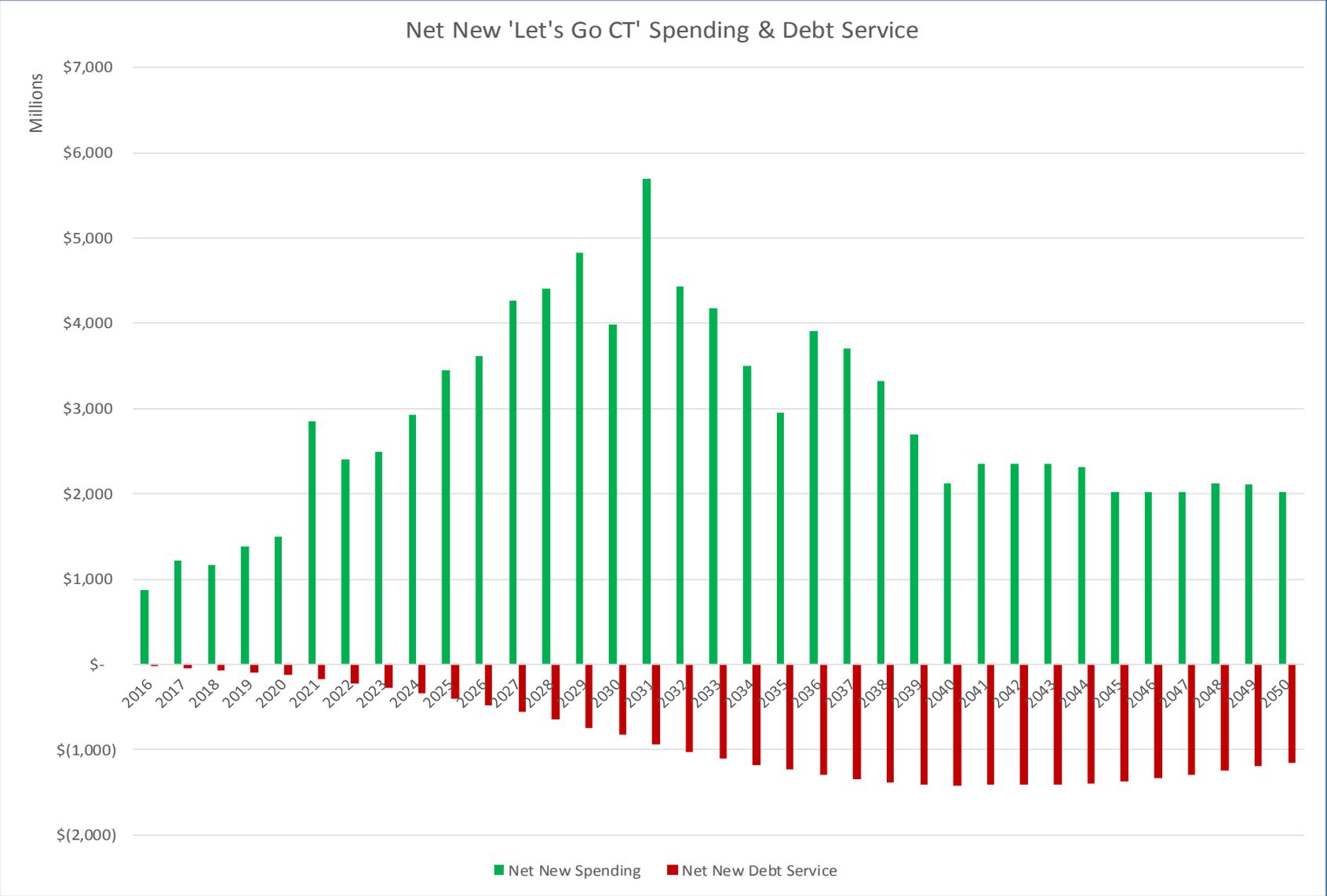
# CHEAPR Incentive & Health Benefits, All Cases

- CHEAPR continues at an average of \$1.5 million per year through 2021 and induces a switch to EVs (about 600 vehicles per year).
- We assume consumers buy replacement vehicles that cost more.
- Health benefits will be incorporated after each wedge is complete and will be the sum of emissions reductions from each wedge translated into a combined health benefit.

# Let's Go CT Total Investment, All Cases



# Let's Go CT Net New Investment & Debt Service, All Cases



# Let's Go CT Productivity Improvement, All Cases

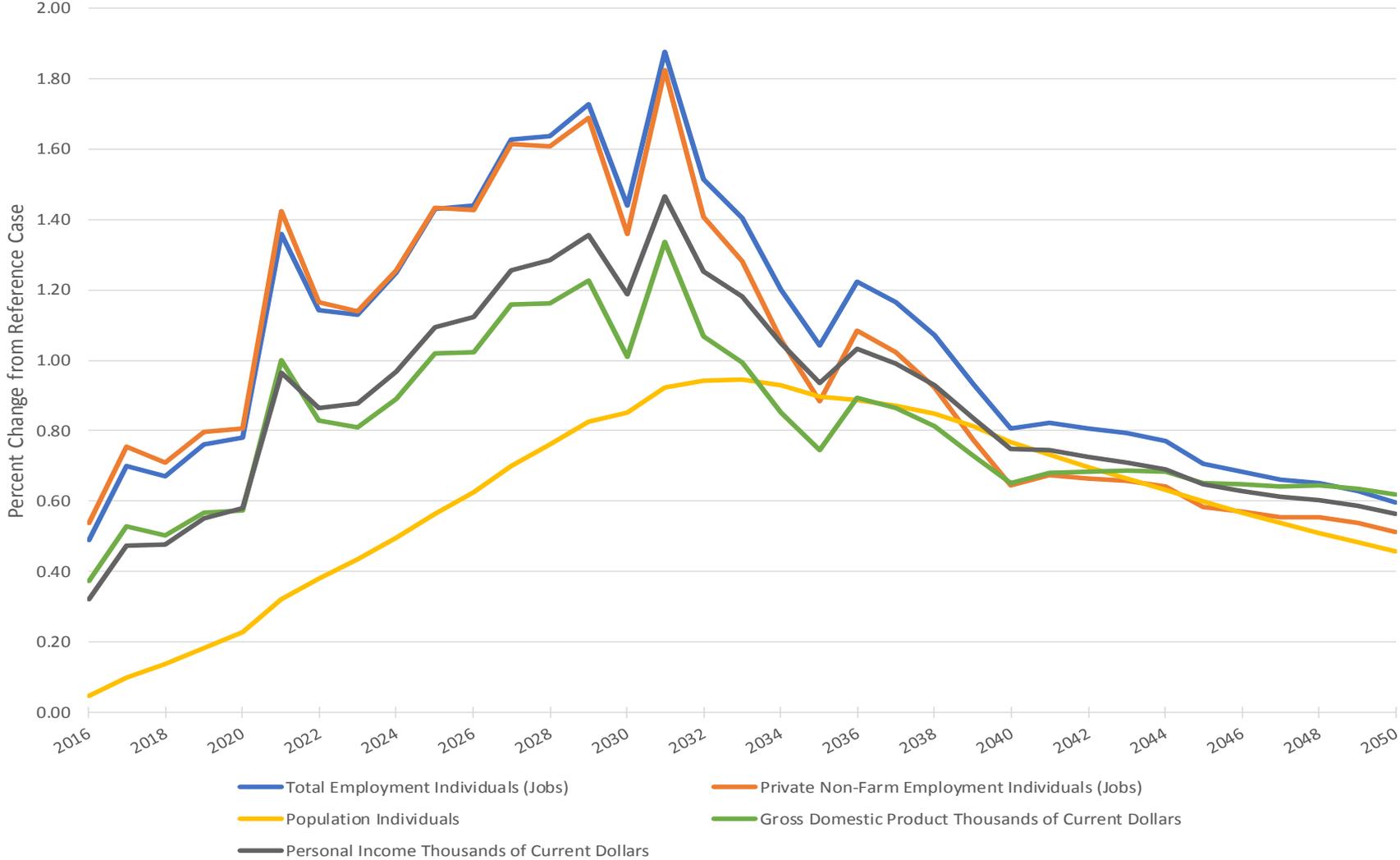
- There is a large literature on the enhancement of private sector productivity following public sector investment. Such investments increase the efficiency of the movement of goods and people through and throughout the state and improve the productivity of the private sector. We capture this effect by increasing total factor productivity (TFP) by a small increment starting with a lag.
- The Let's Go CT 5 Year Ramp Up Plan suggests that the lag might be five years before productivity improvement is realized. Estimates in the literature suggest that TFP could be increased by a few tenths of a percent each year.
- A conservative estimate might be an initial 0.1% improvement in 2021 in overall (all industries') productivity. We assume this initial improvement grows at 1% per year through 2050 at which time total factor productivity improves by 0.133%.

# Let's Go CT Complementary Improvements, All Cases

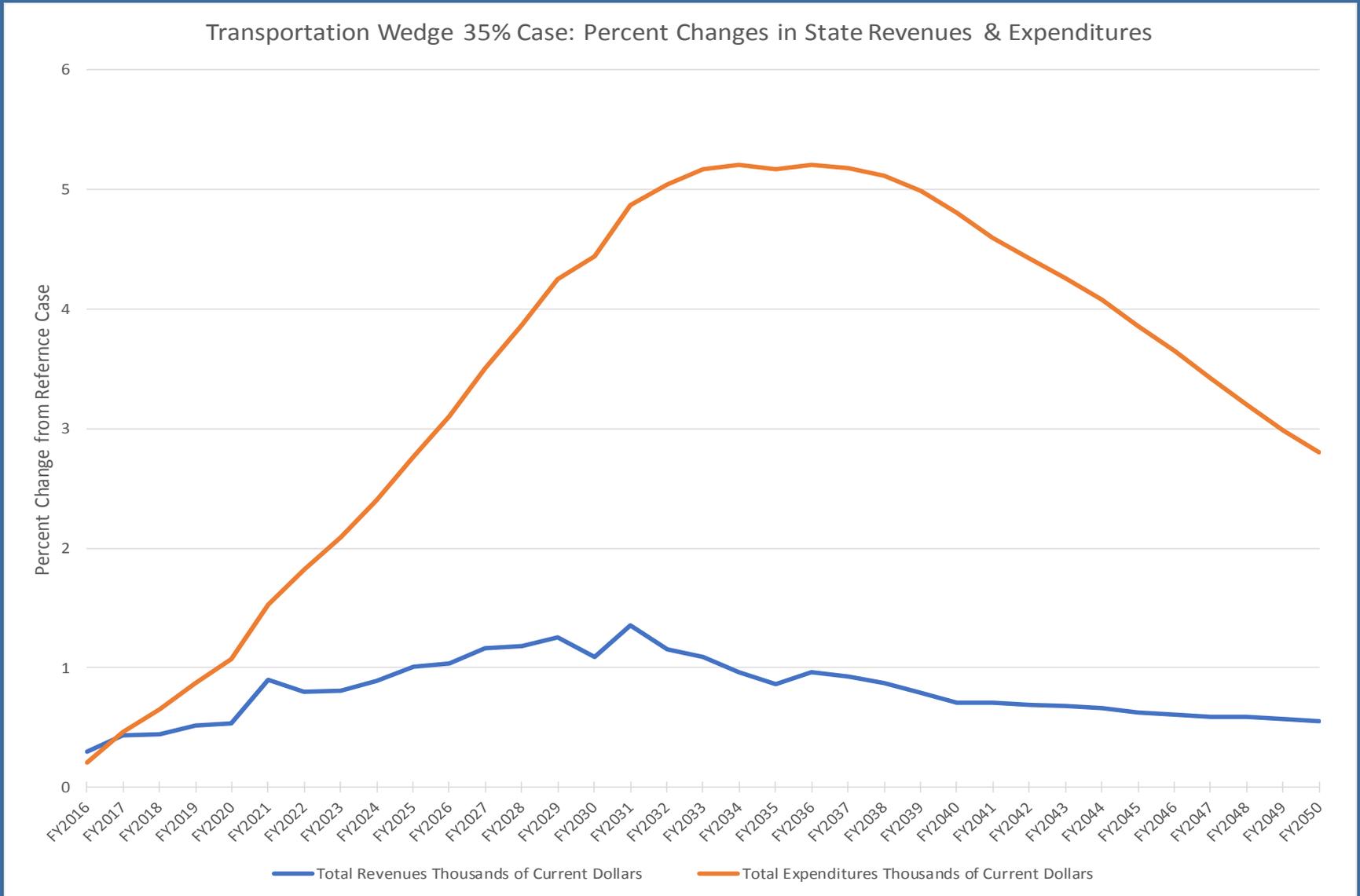
- The improvements to the state's transportation network not only improve overall productivity by increasing access to commodities, labor and output markets, they also increase safety and reduce vehicle hours traveled (VHT) that in turn reduce GHGs.
- We do not account for these co-benefits of the Let's Go CT program and to this extent, our estimates of its benefits are conservative. In addition, because we do not account for the decline in gas-powered automobile complementary retail parts and services, our analysis is conservative.

# Transportation Sector REMI Results, 35% Case

Transportation Wedge 35% Case: Percent Changes in Macroeconomic Variables

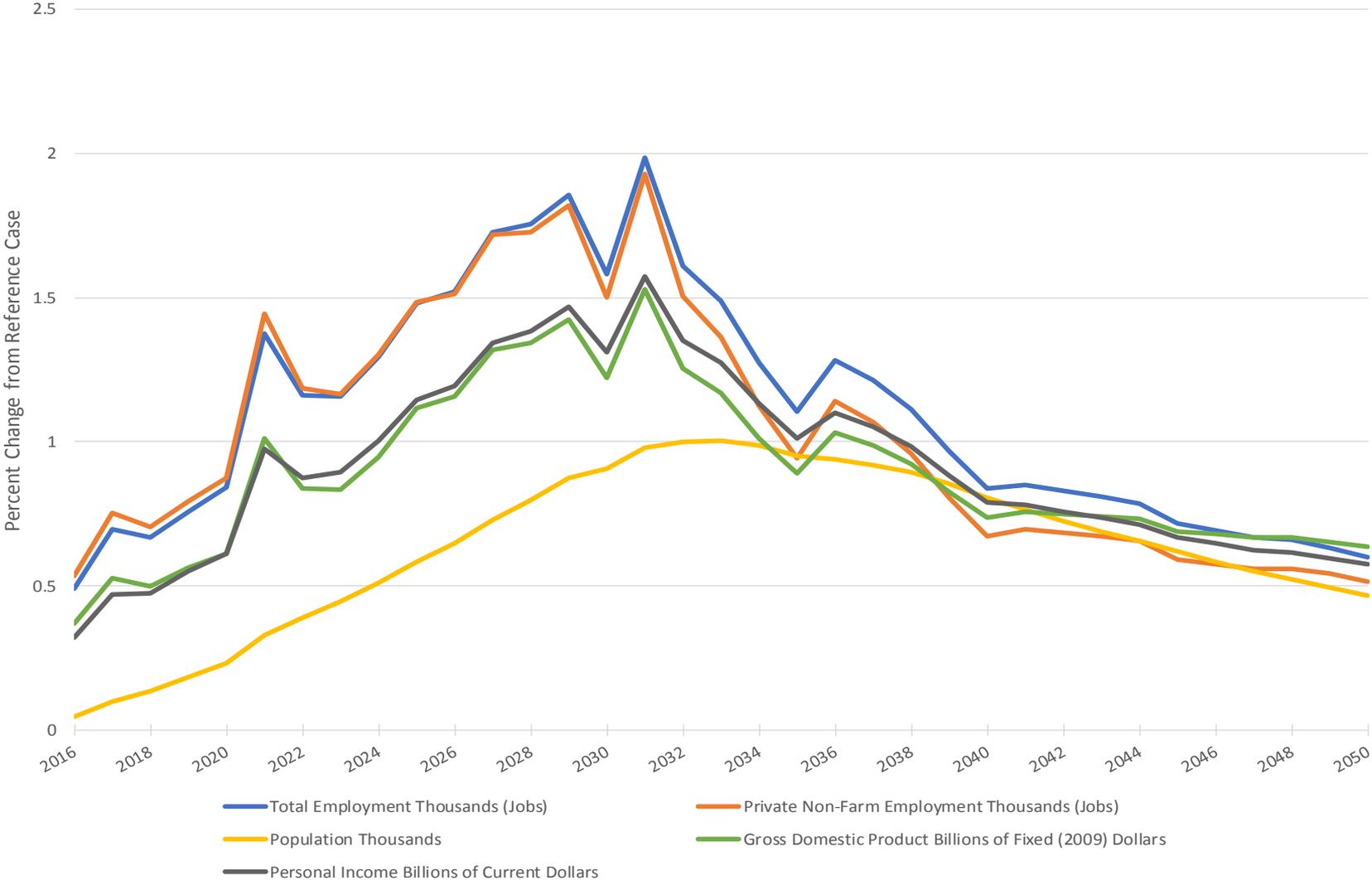


# Transportation Sector REMI Results, 35% Case

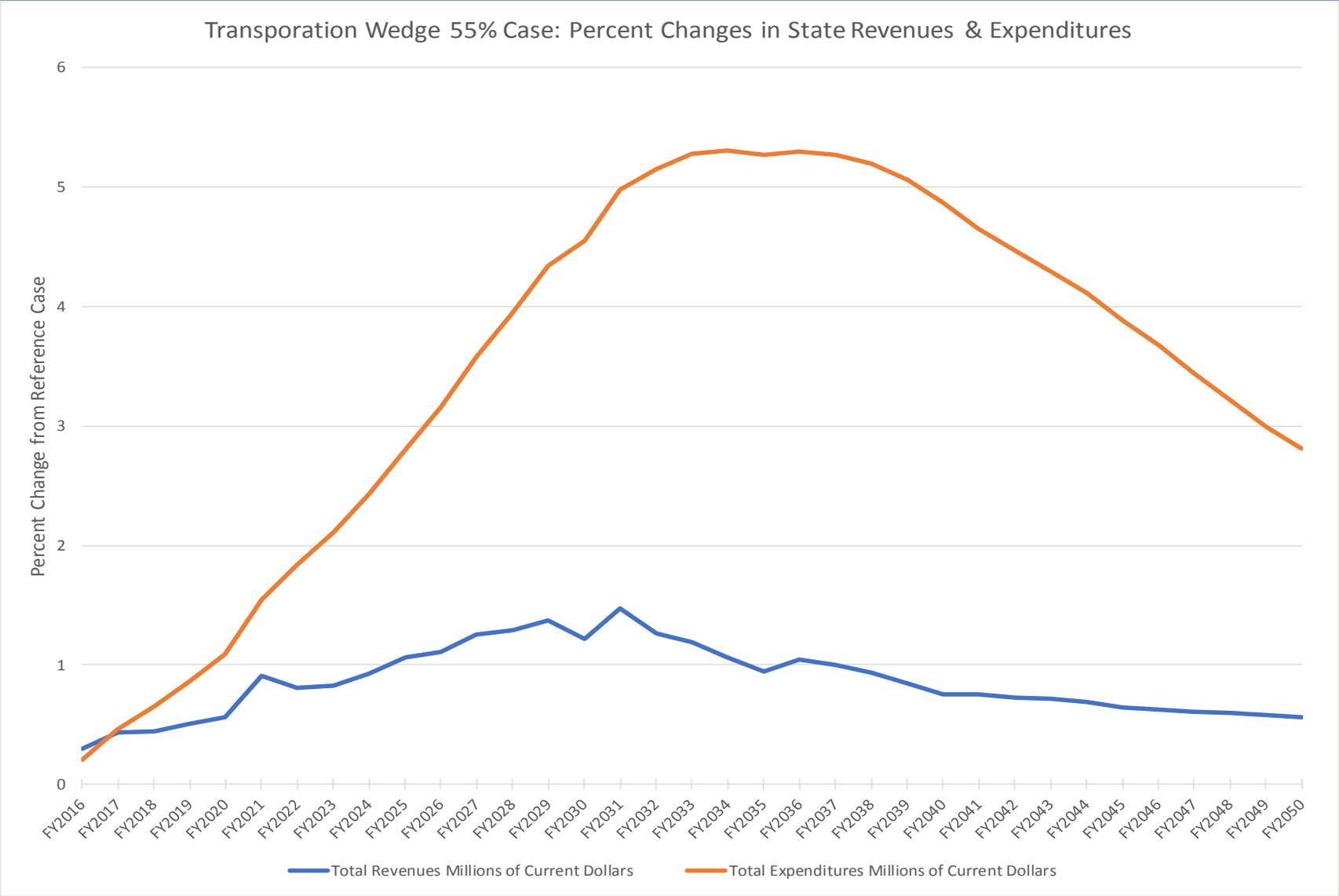


# Transportation Sector REMI Results, 55% Case

Transportation Wedge 55% Case: Percent Change in Macroeconomic Variables



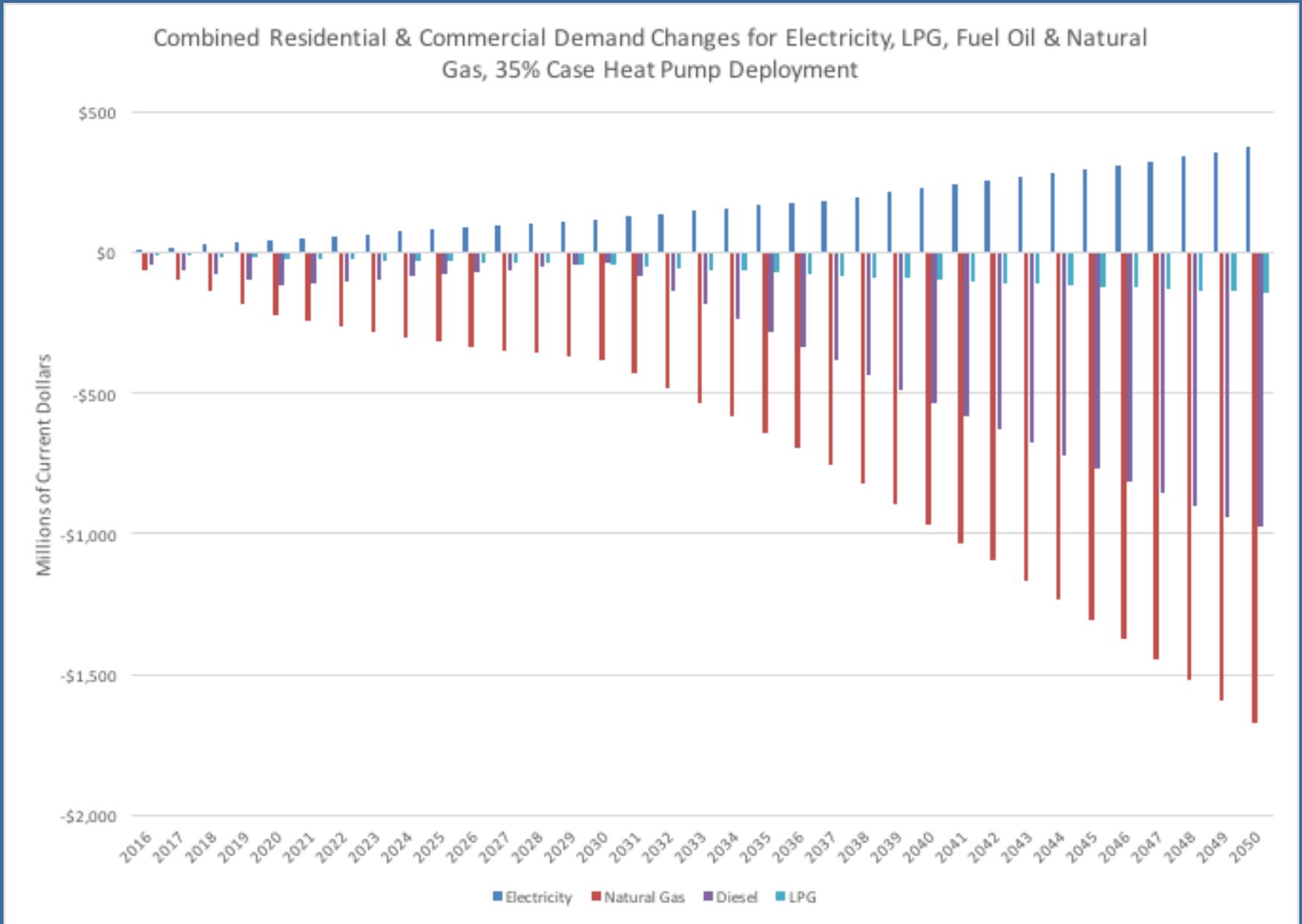
# Transportation Sector REMI Results, 55% Case



# LEAP Outputs Used in the Building Sector REMI Analysis

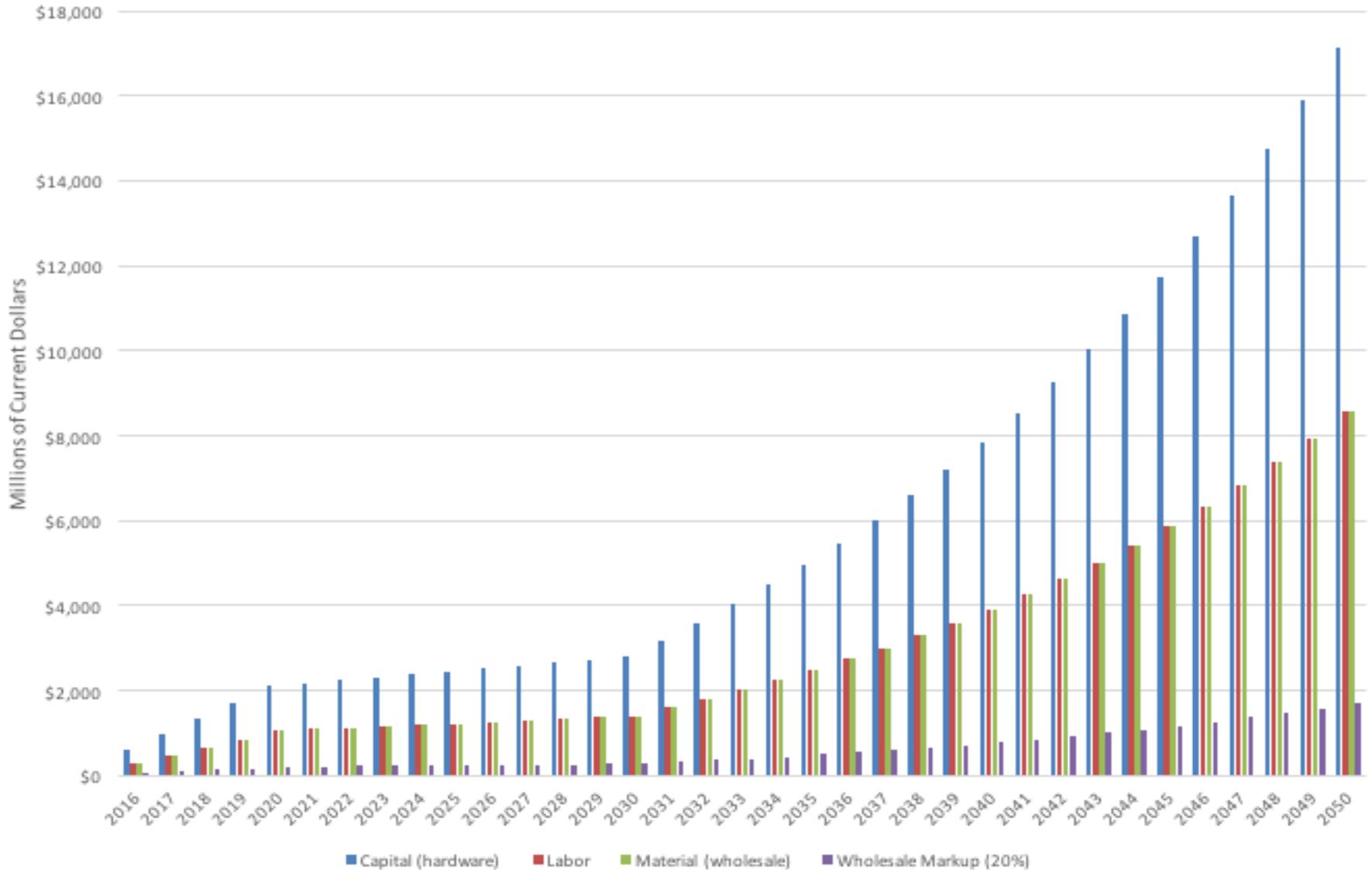
- Changes in electric demand relative to the reference case
- Changes in the adoption of heat pumps relative to the reference case
- Changes in energy efficiency relative to the reference case
- Changes in criteria pollutant emissions relative to the reference case
  - Used to monetize the health benefits of improved air quality (LATER)

# Building Sector Heat Pump Deployment, 35% Case



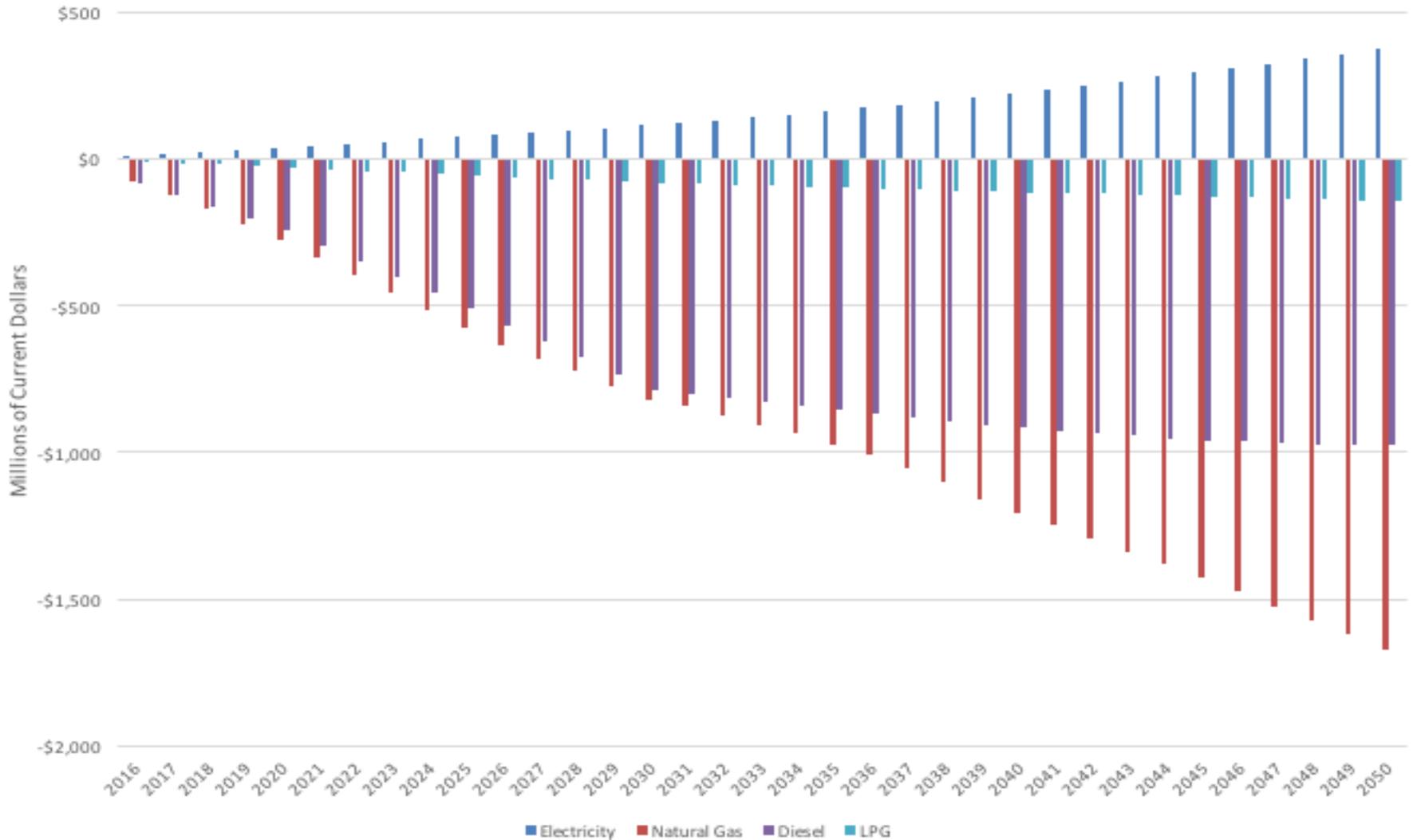
# Building Sector Heat Pump Deployment, 35% Case

## Residential & Commercial Heat Pump Investment, 35% Case



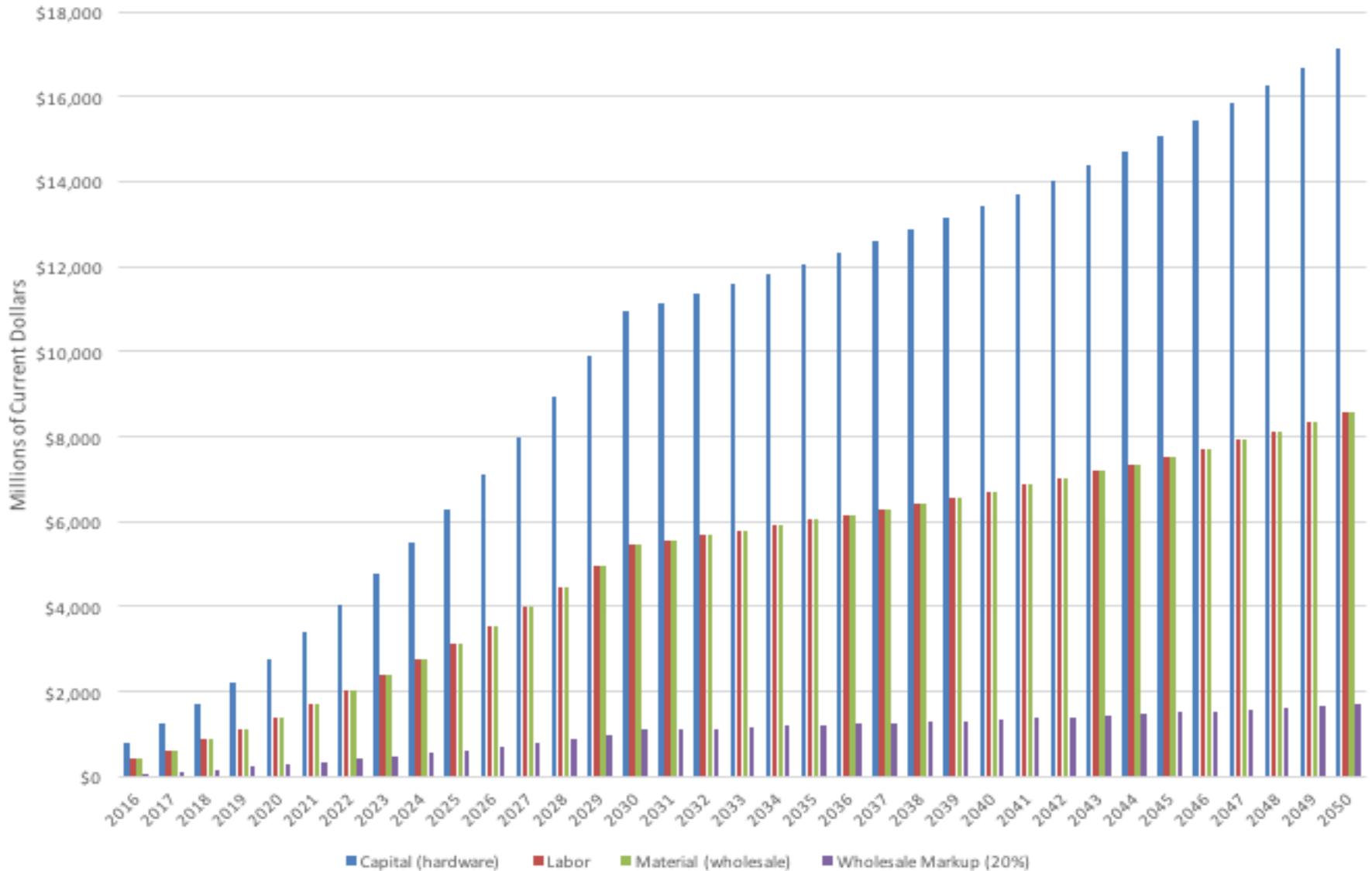
# Building Sector Heat Pump Deployment, 55% Case

Combined Residential & Commercial Demand Changes for Electricity, LPG, Fuel Oil & Natural Gas, 55% Case Heat Pump Deployment



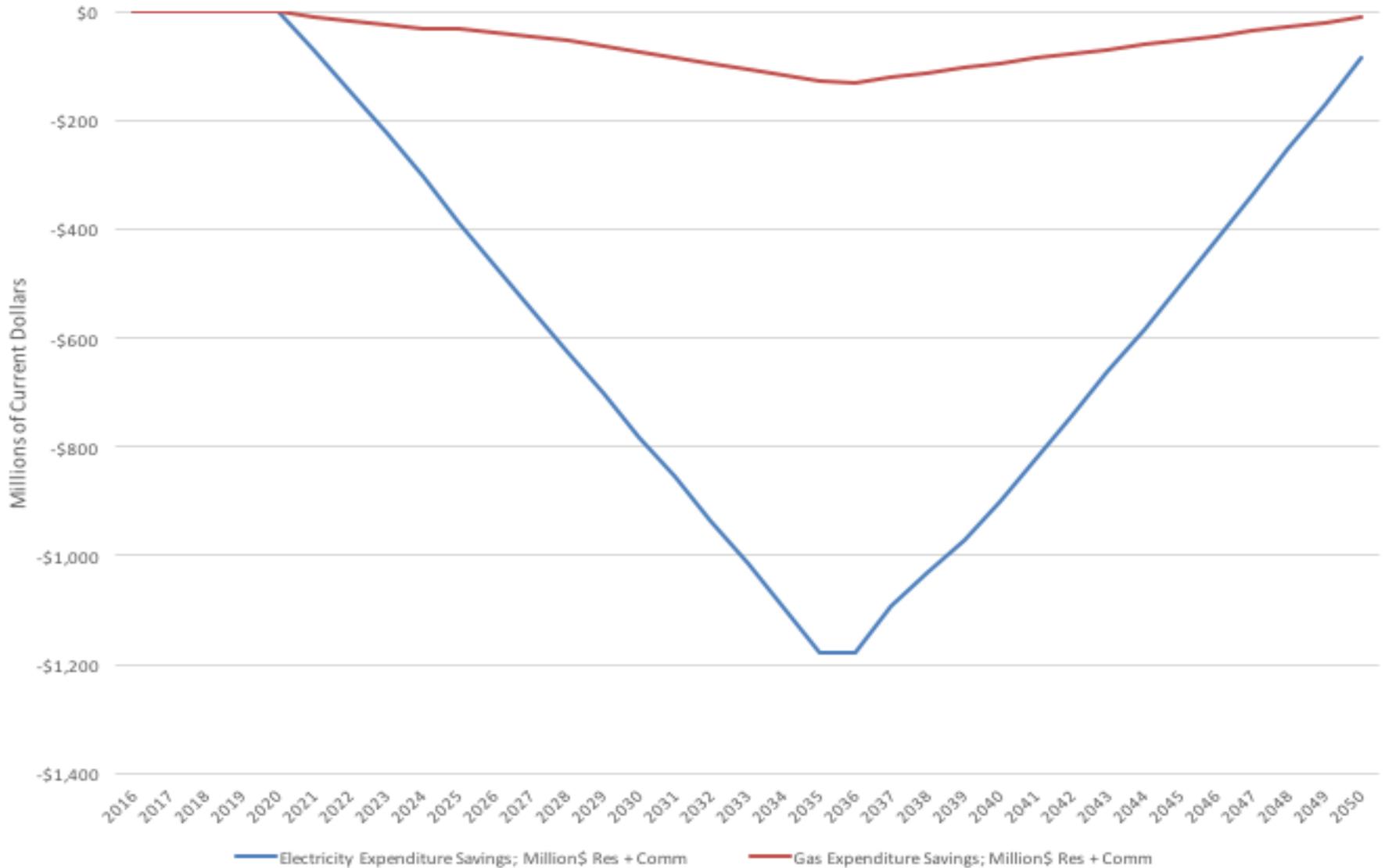
# Building Sector Heat Pump Deployment, 55% Case

## Residential & Commercial Heat Pump Investment, 55% Case



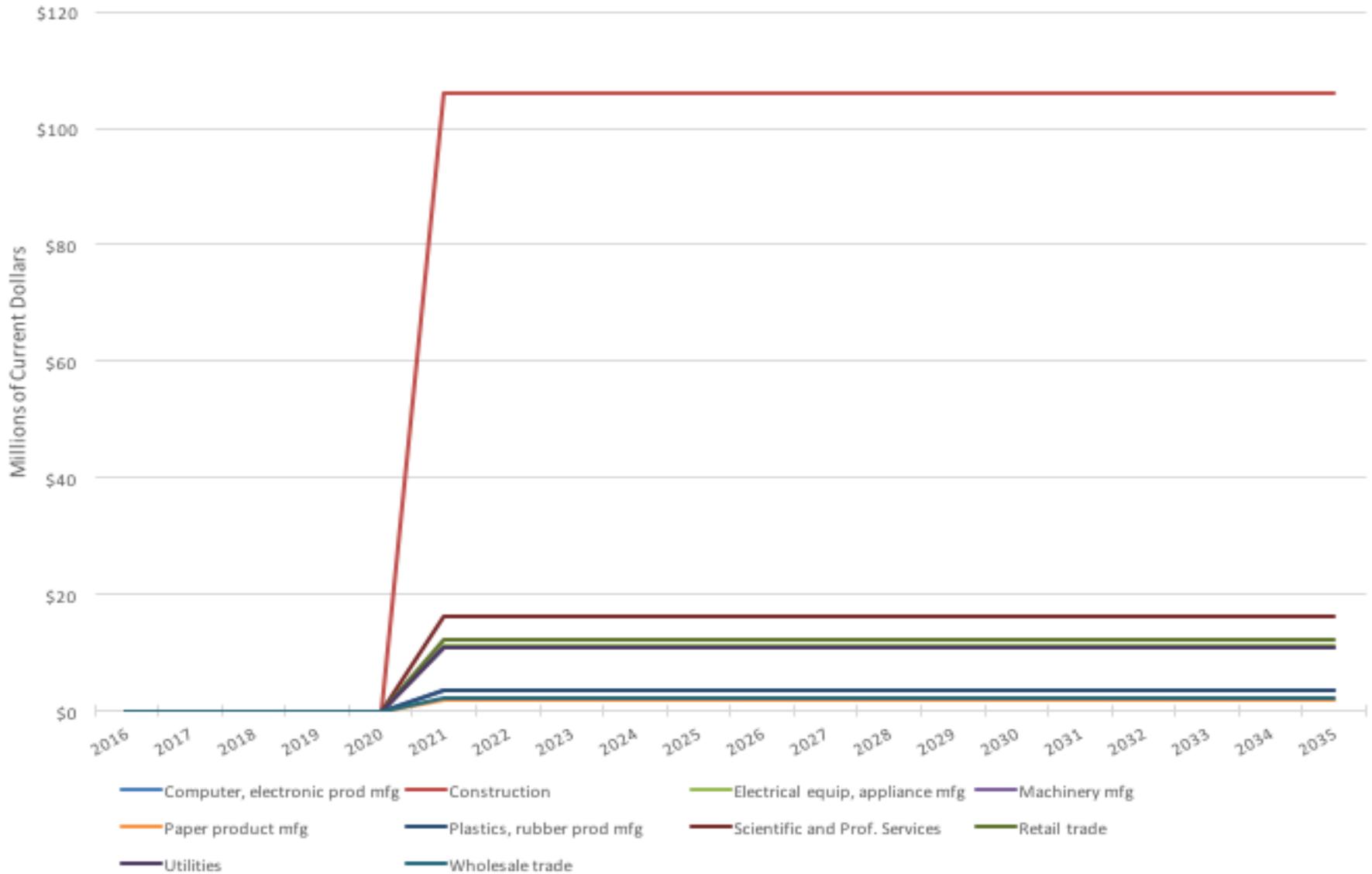
# Building Sector Savings from Energy Efficiency

Natural Gas & Electricity Savings (Reduced Demand via Energy Efficiency)

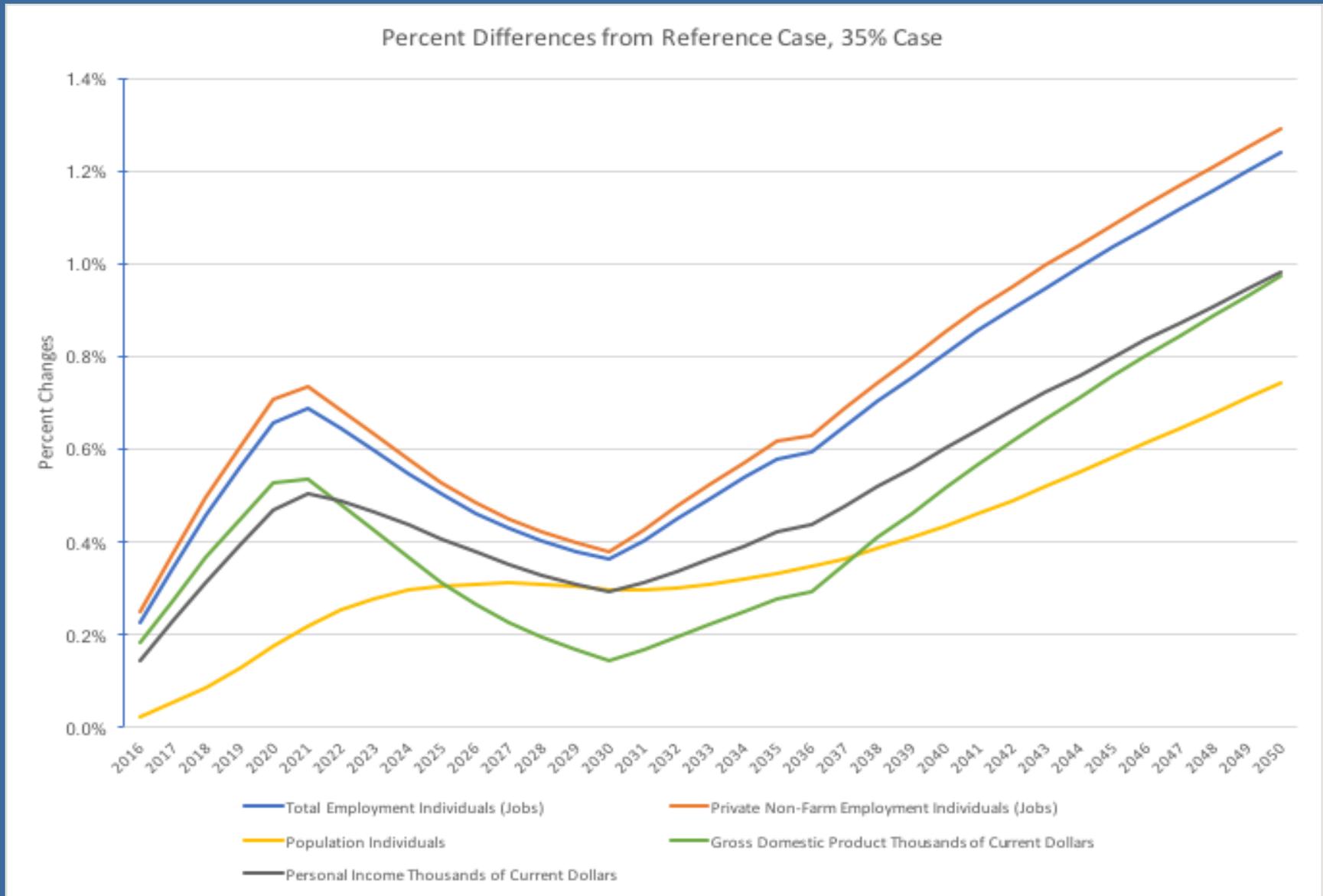


# Building Sector EE Expenditure

Combined Residential, Commercial & Institutional Energy Efficiency Spending

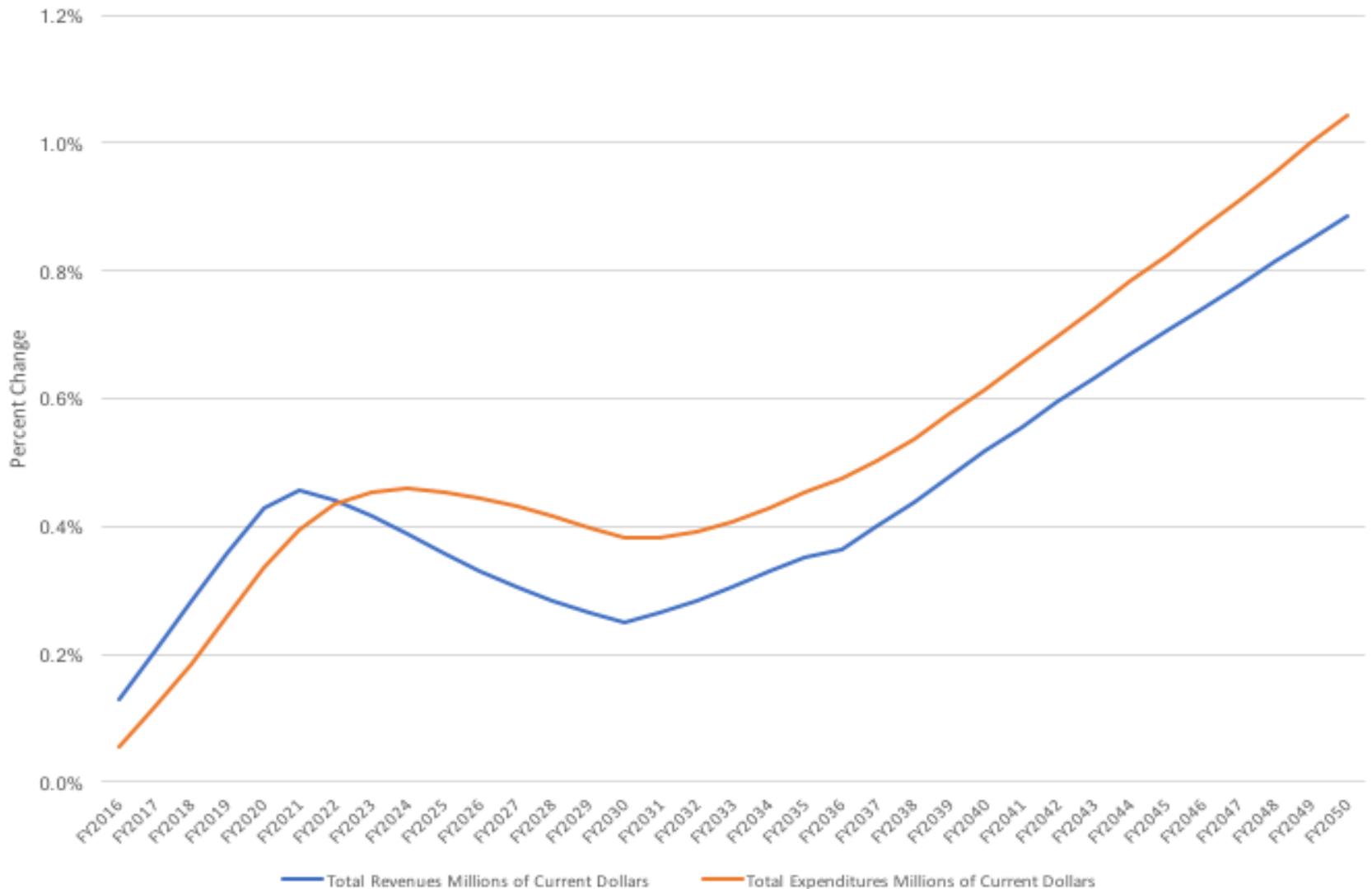


# REMI Results Building Sector, 35% Case

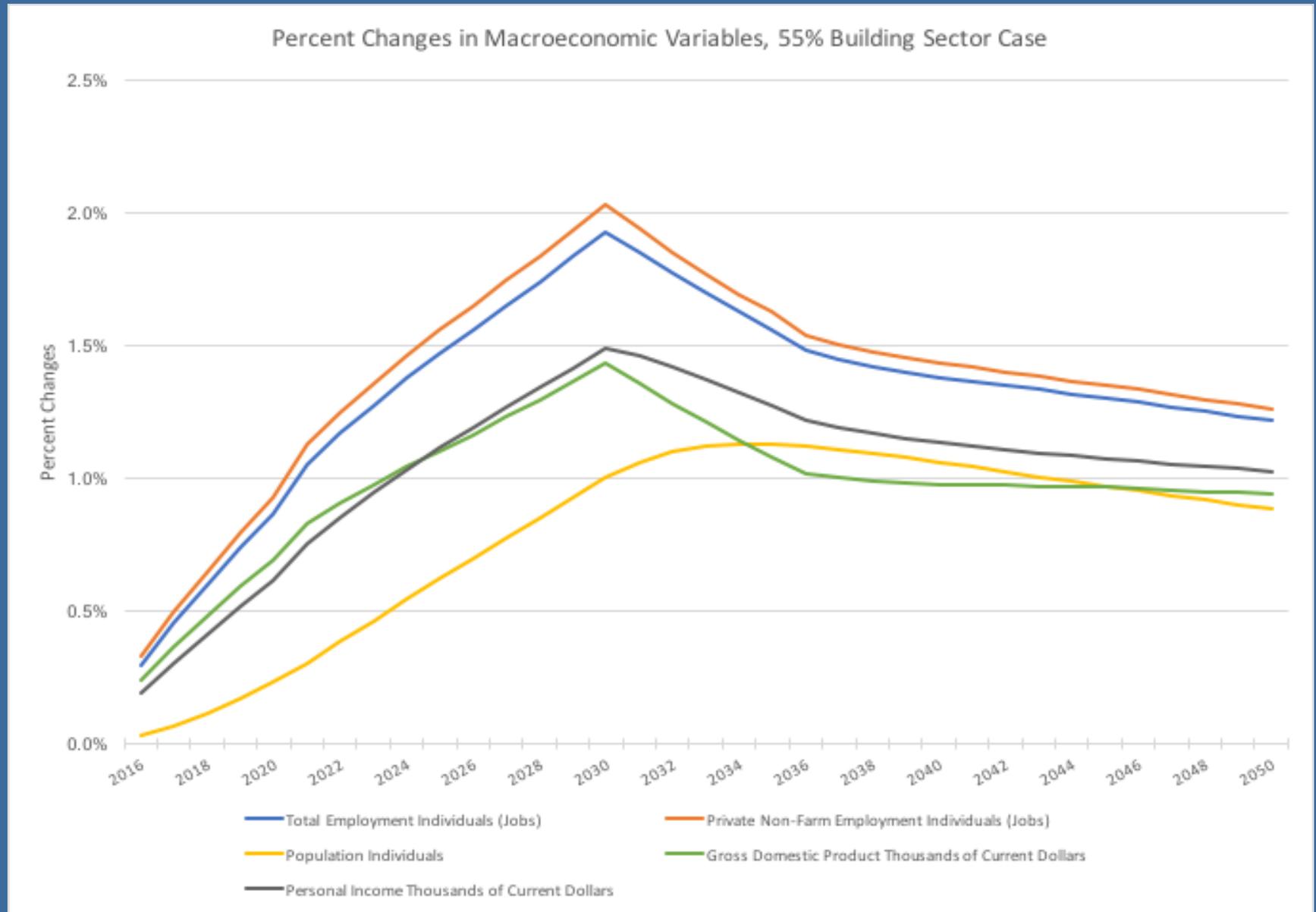


# REMI Results Building Sector, 35% Case

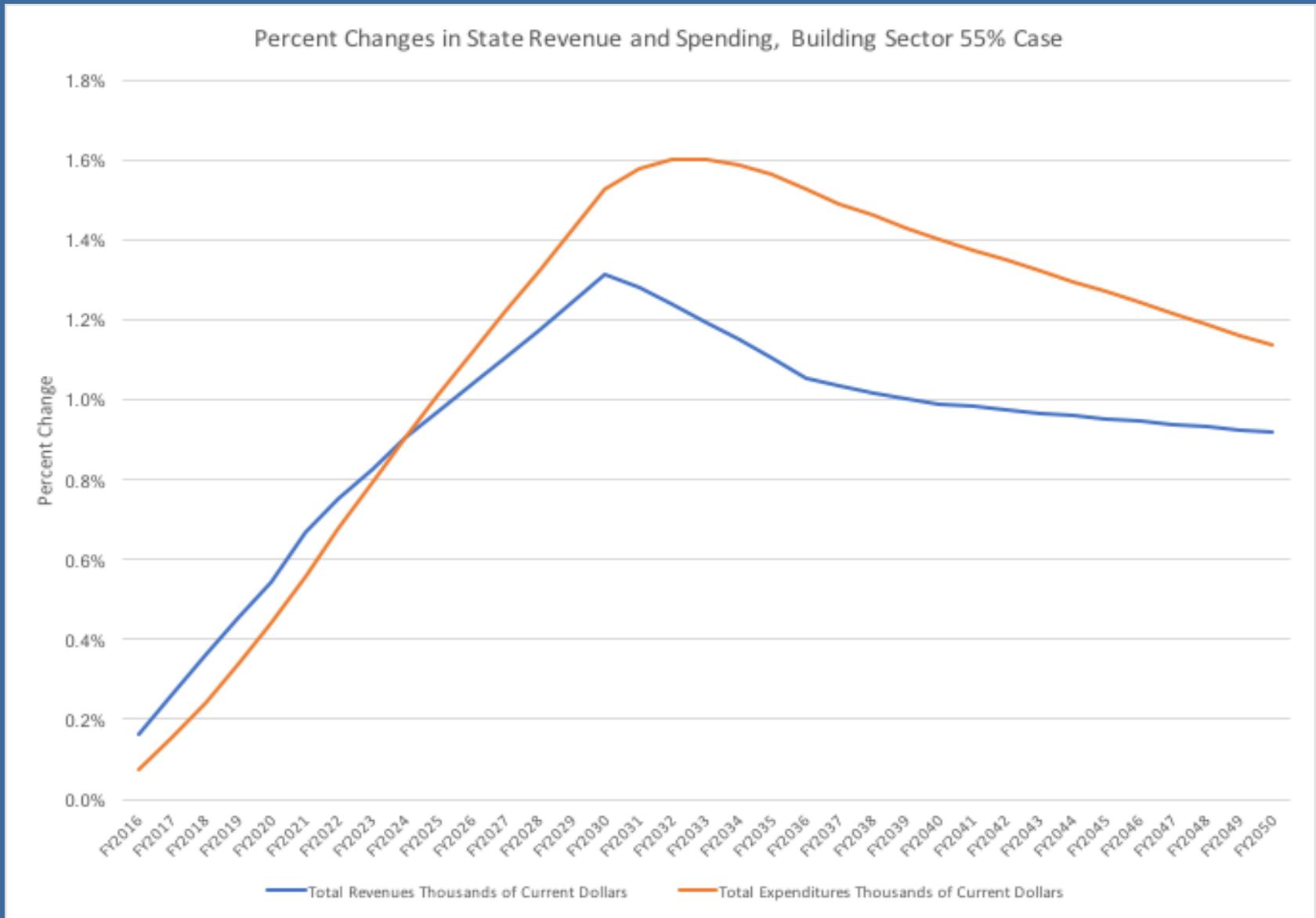
State Spending and Revenue Percent Differences from Reference Case, 35% Case



# REMI Results Building Sector, 55% Case



# REMI Results Building Sector, 55% Case



Discuss and provide guidance on  
REMI inputs and assumptions



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# Public Comments



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