

# Electrification: Past and Future

**Tom Wilson**  
Principal Technical Executive  
Energy and Environmental Analysis, EPRI

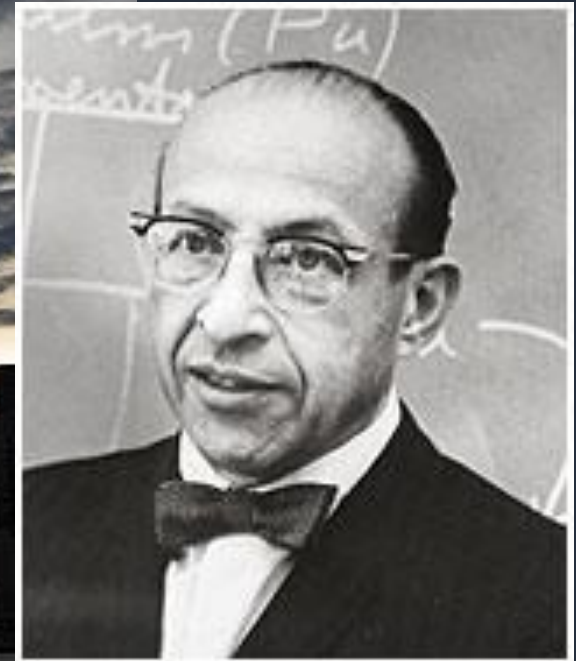
**4<sup>th</sup> Annual Expert Workshop: Challenges in Electricity  
Decarbonization**

**Paris, FR  
October 10, 2017**



# EPRI – Born in a Blackout

Founded in 1972 as an independent, nonprofit center for public interest energy and environmental research



**New York City, The Great Northeast Blackout, 1965**

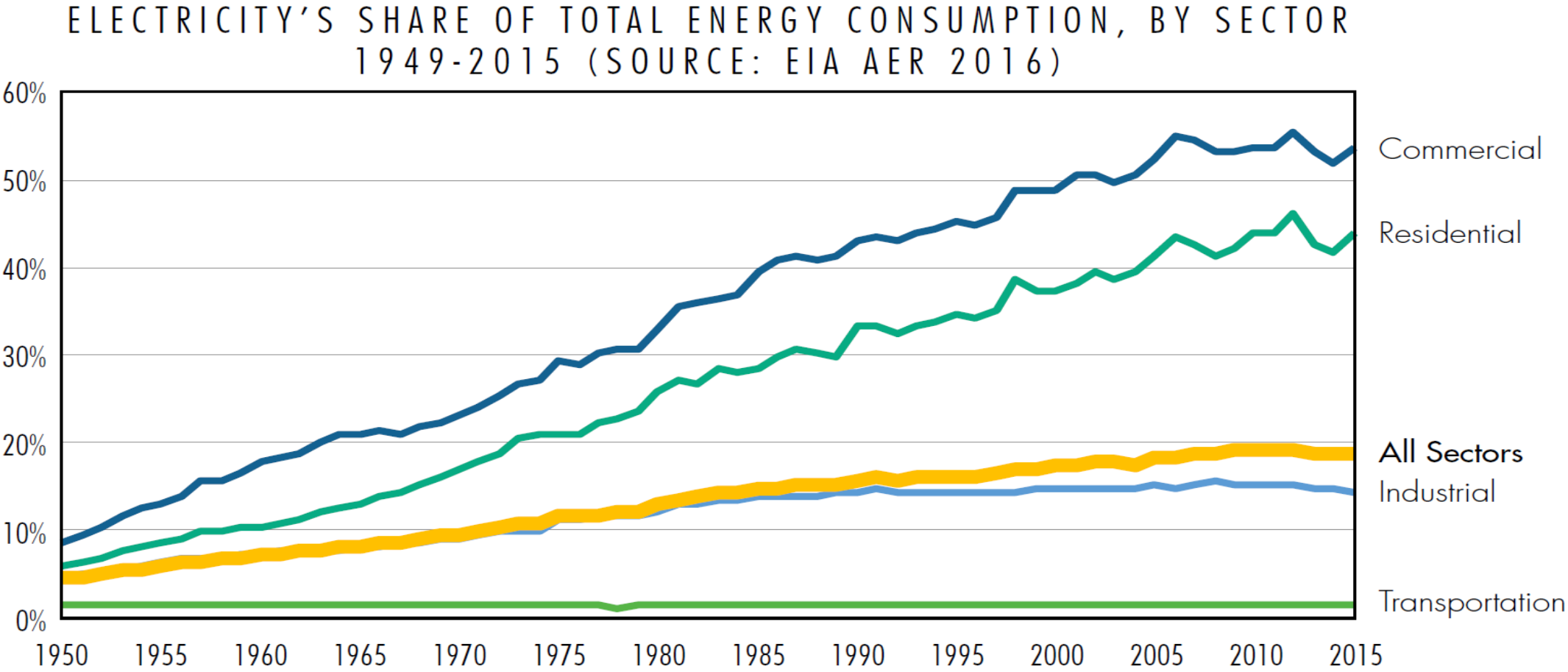


# Our Members...

- 450+ participants in more than 30 countries
- EPRI members generate approximately 90% of the electricity in the United States
- International funding – nearly 25% of EPRI's research, development, and demonstrations



# Electricity Use Has Grown Faster than Total Energy for More than A Century... What Will or Could Happen Next?



**Growth Driven By Efficiency, Convenience, Safety, and Low Cost**

# Two Fundamental Analysis Approaches

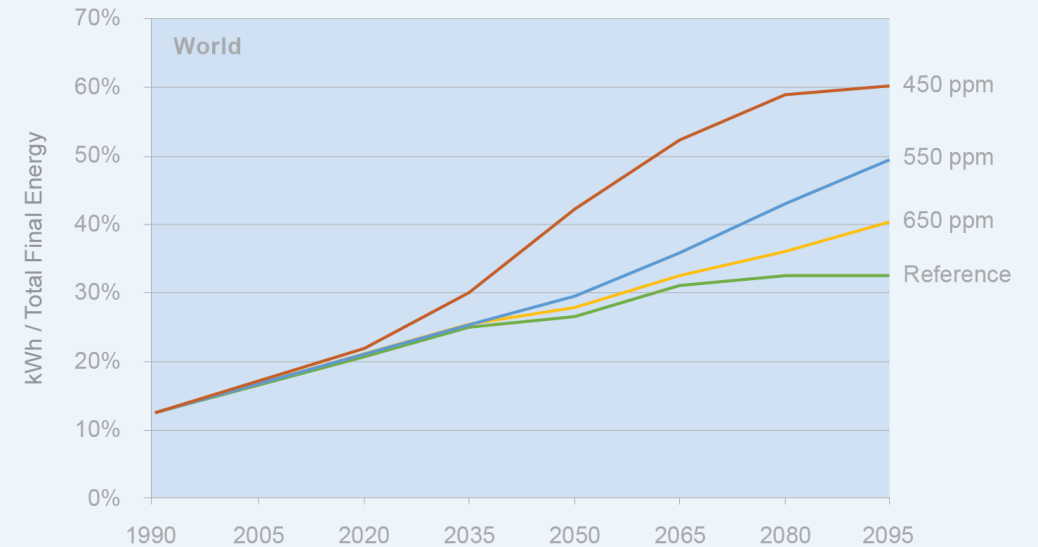
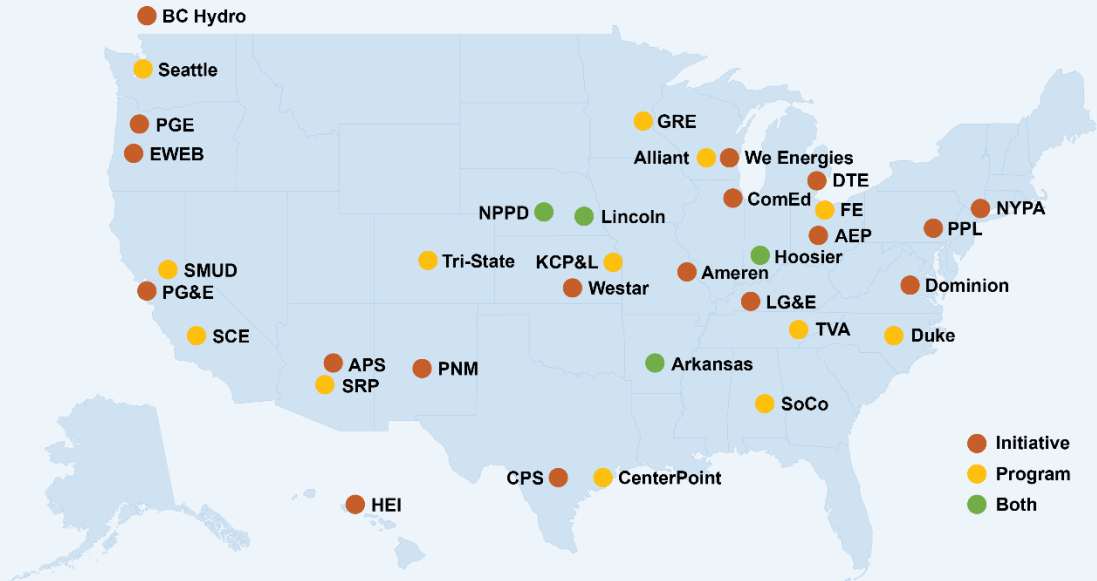
FOCUS ON TODAY  
PROSPECT-BY-PROSPECT



Mission accomplished: Promontory Point, Utah, May 10, 1869.

FORWARD LOOKING  
AGGREGATE POTENTIAL

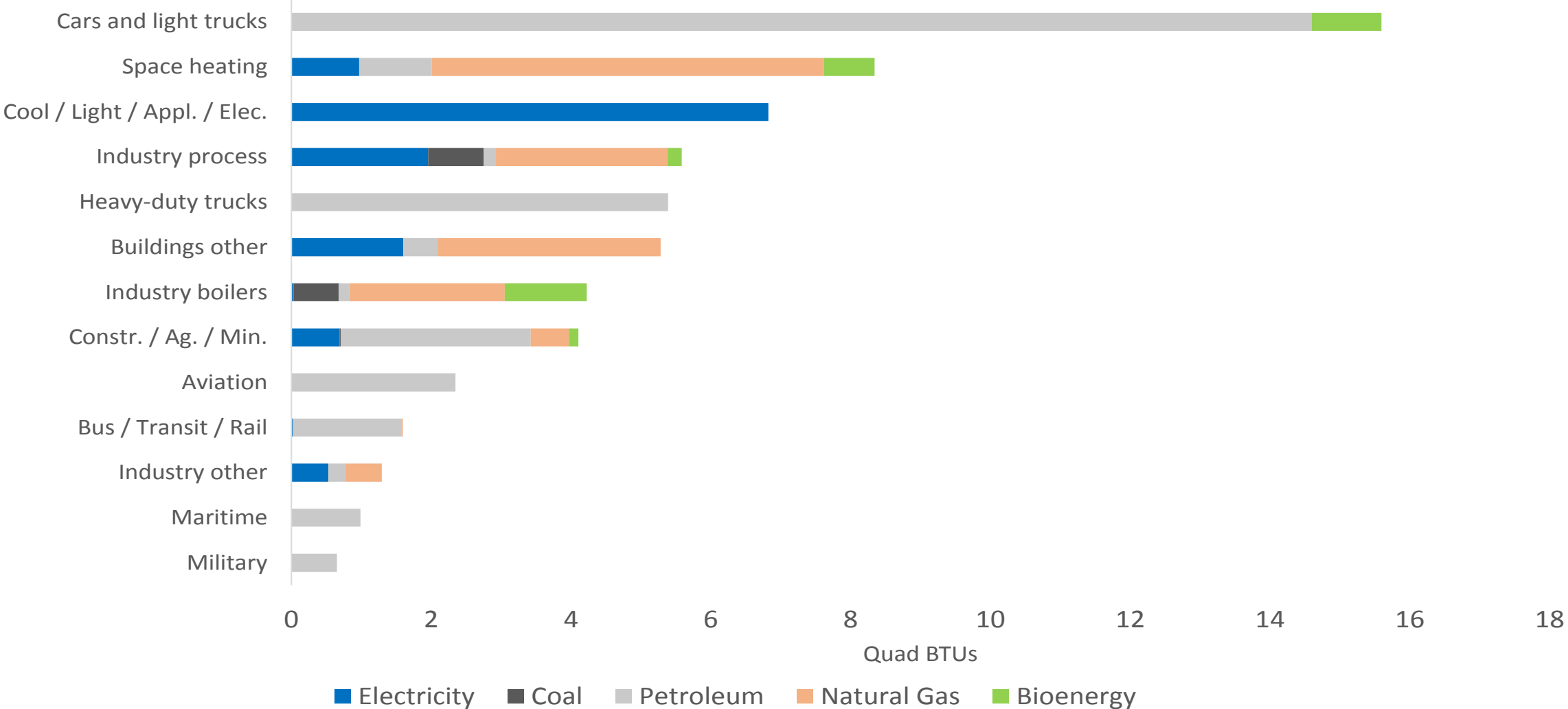
THE TIGHTER THE CO<sub>2</sub> CAP,  
THE GREATER THE ROLE ELECTRICITY PLAYS



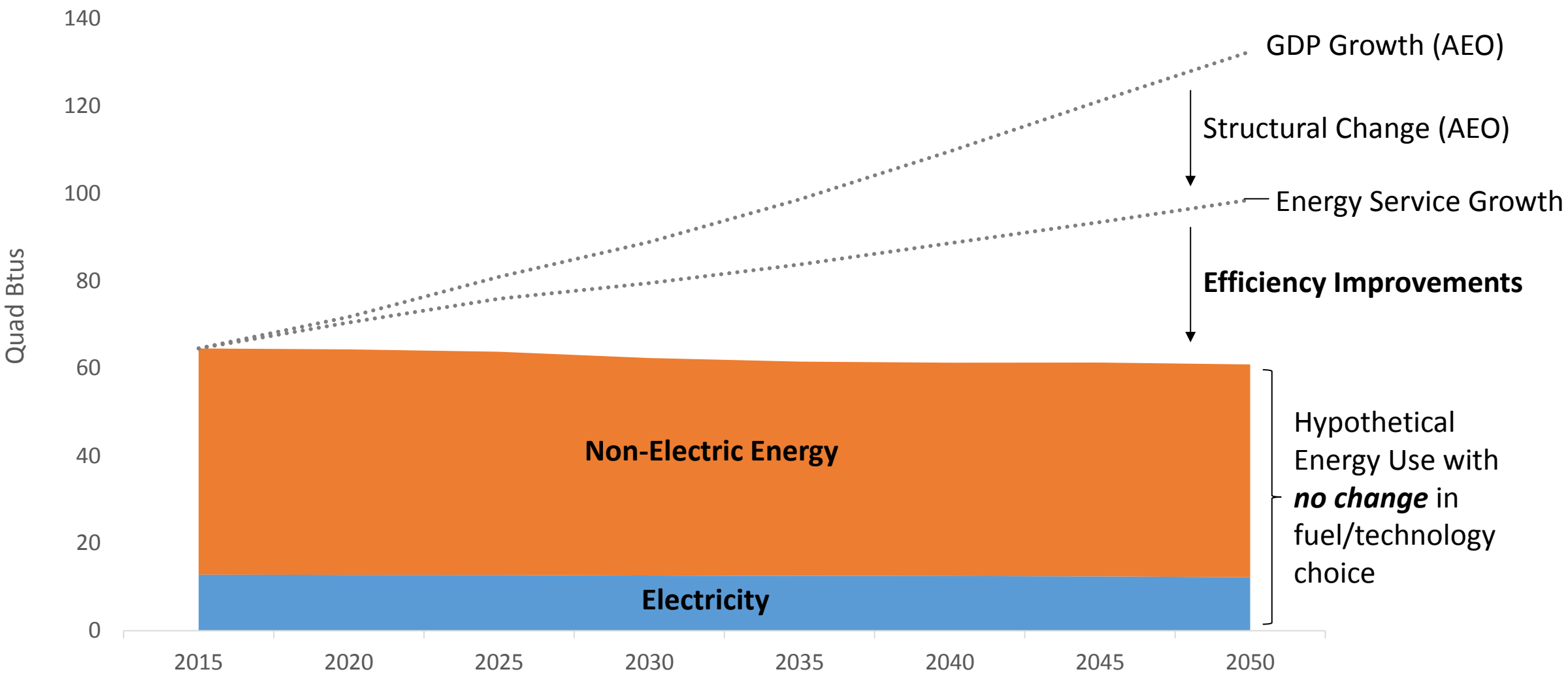
Edmonds, Wilson, Wise, Weyant. 2006 *Environmental Economics and Policy*.

# Electrification Potential – Depends on Fuel Use and Technology

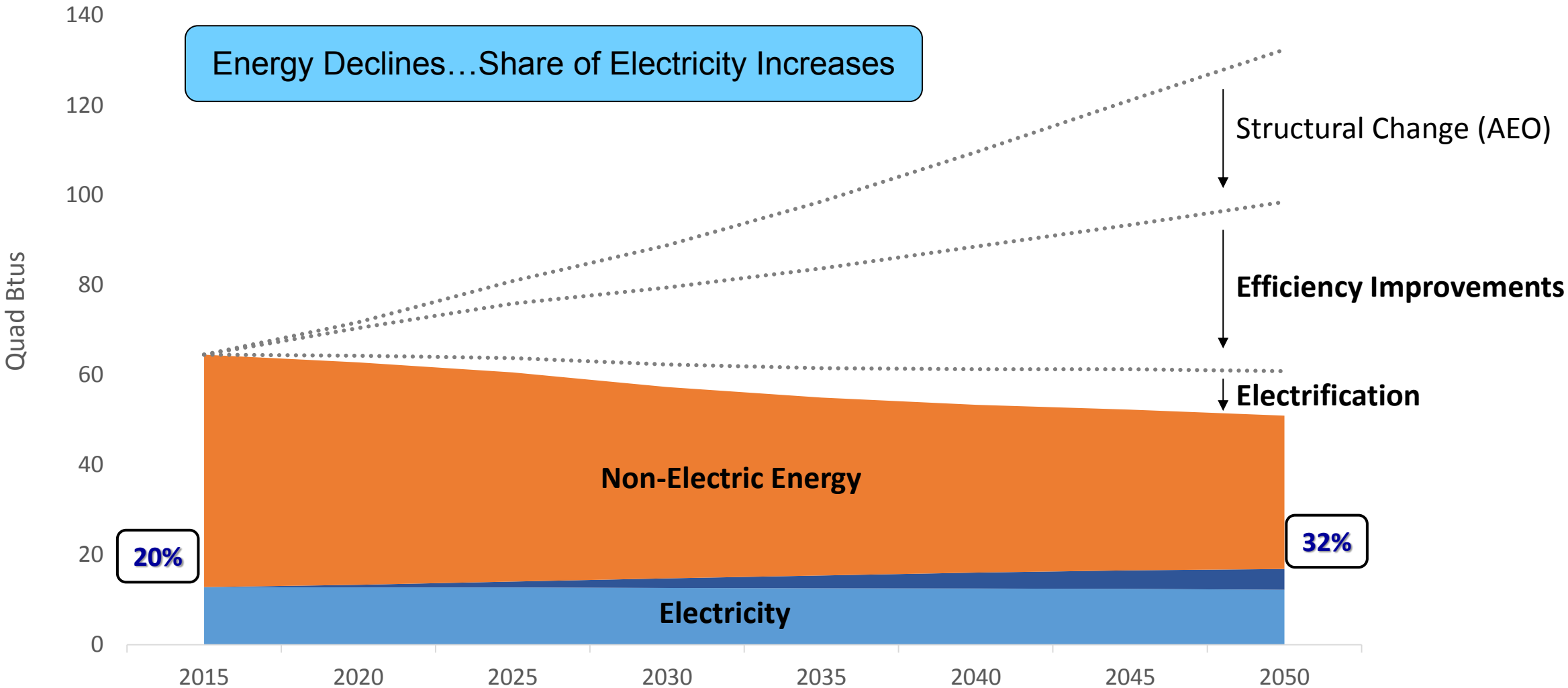
## (2014 US Energy Use, Quad Btus)



# U.S. Final Energy...Drivers of Growth – Based on DOE AEO 2017

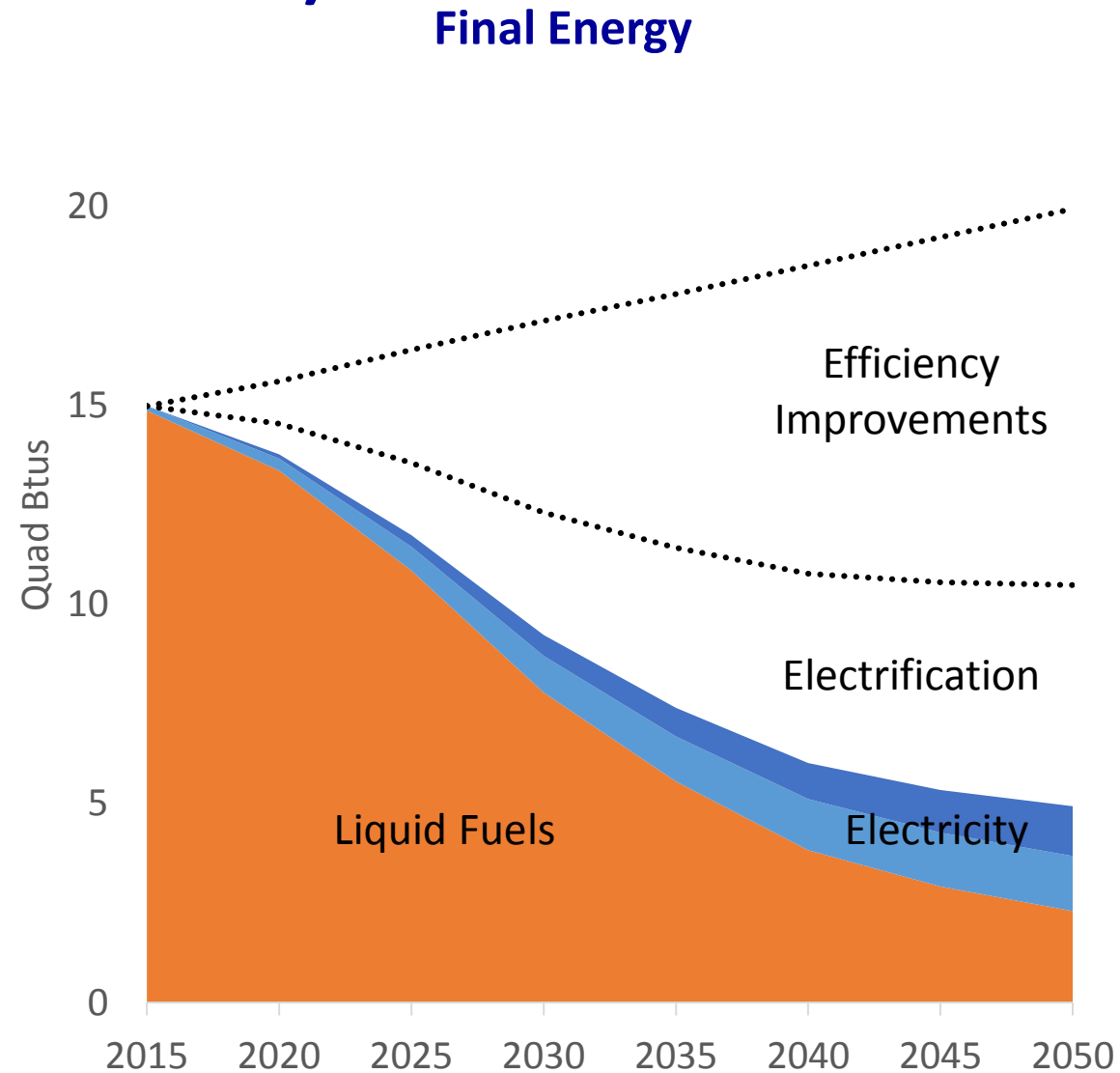
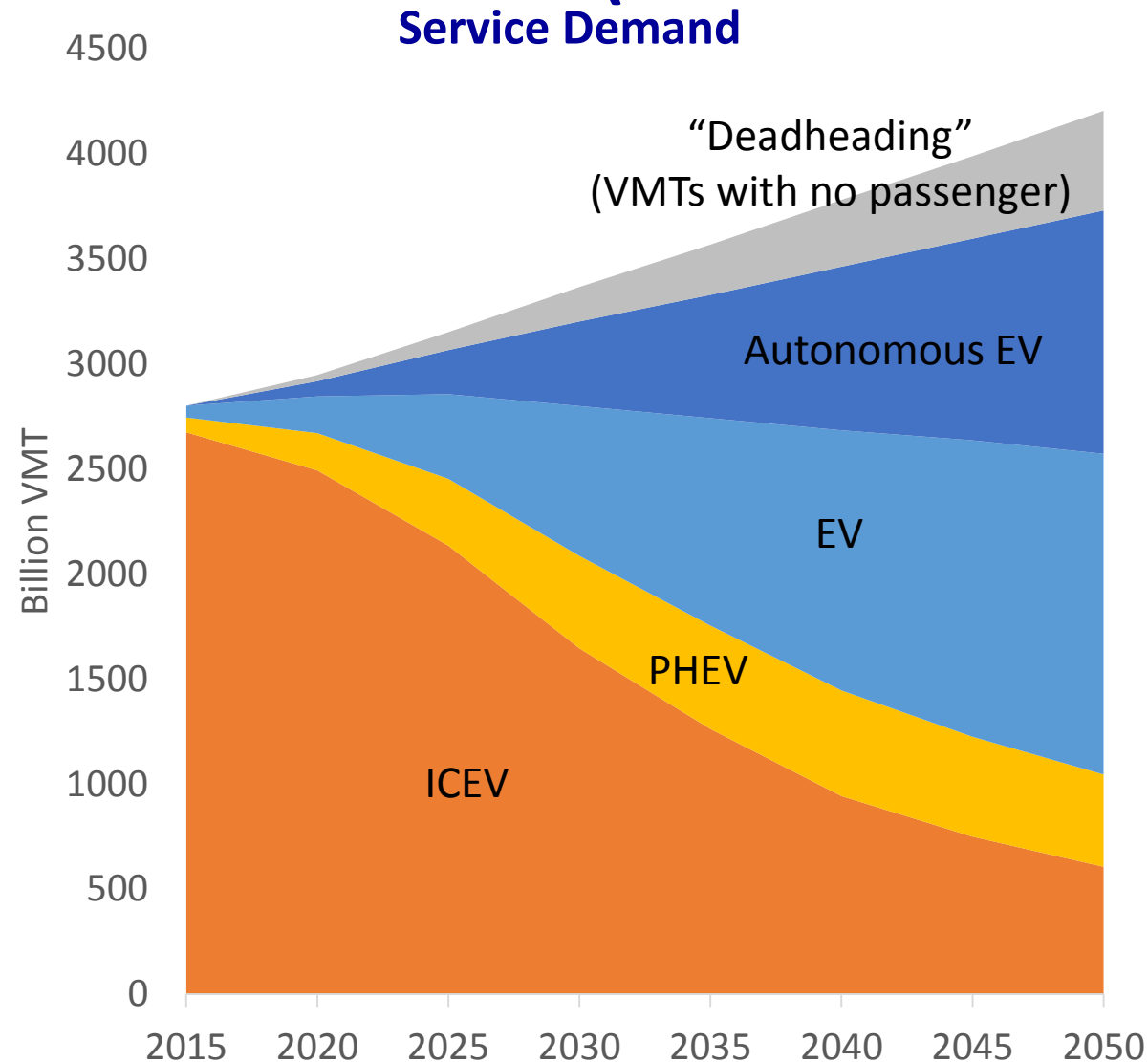


# U.S. Final Energy Reference – EPRI Projection

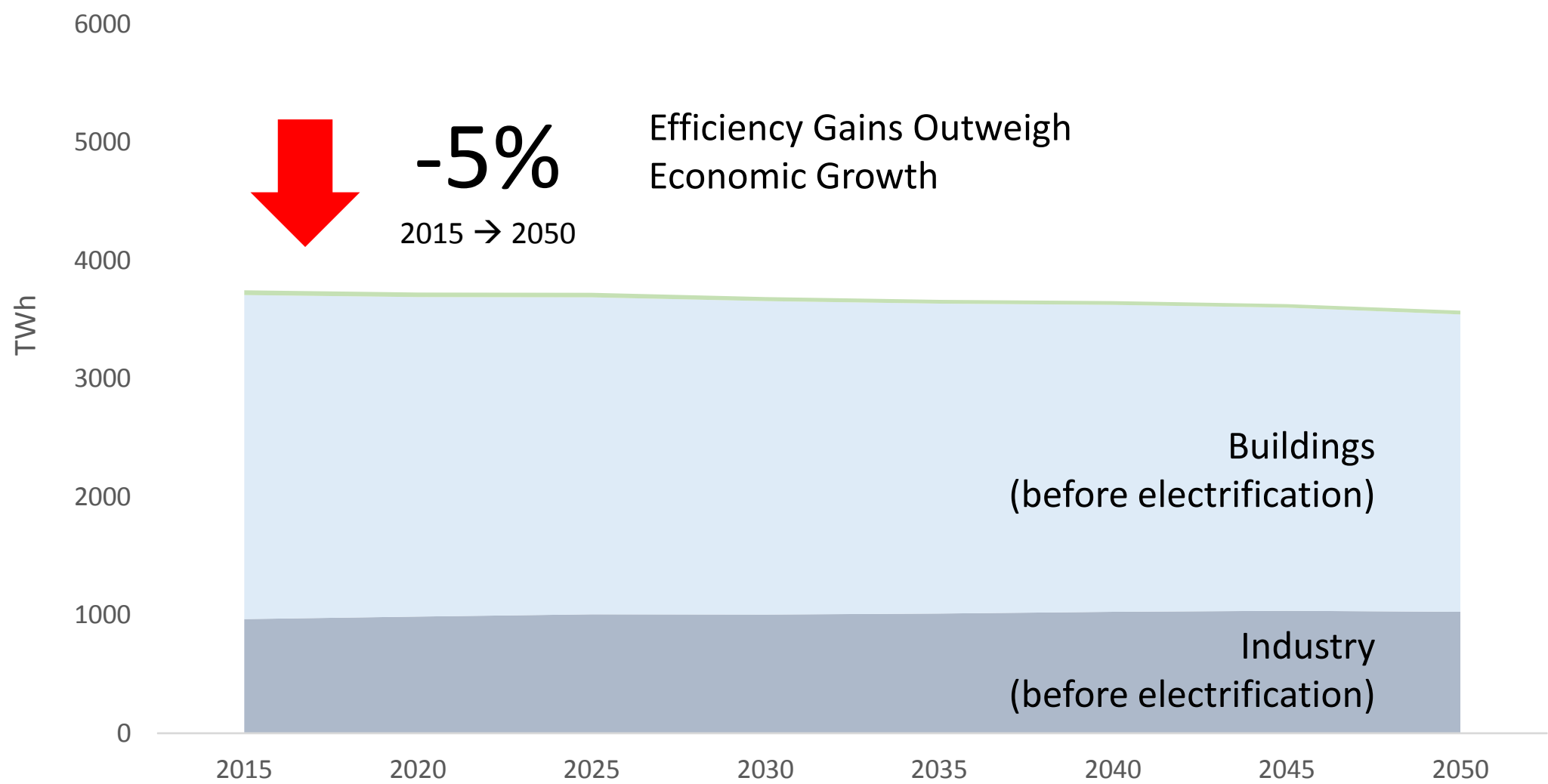




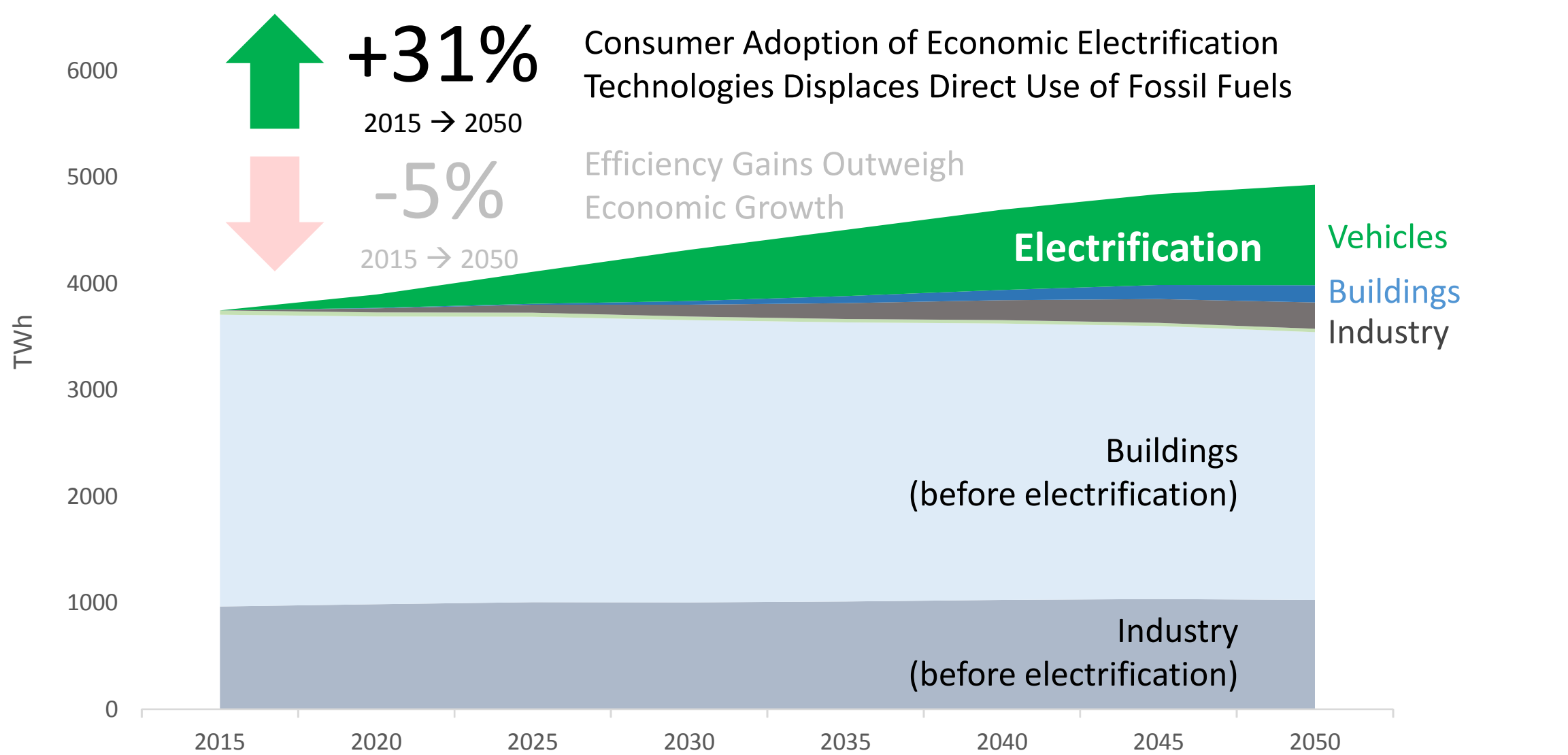
# Passenger Vehicles: Two Revolutions (Electric and Autonomous)



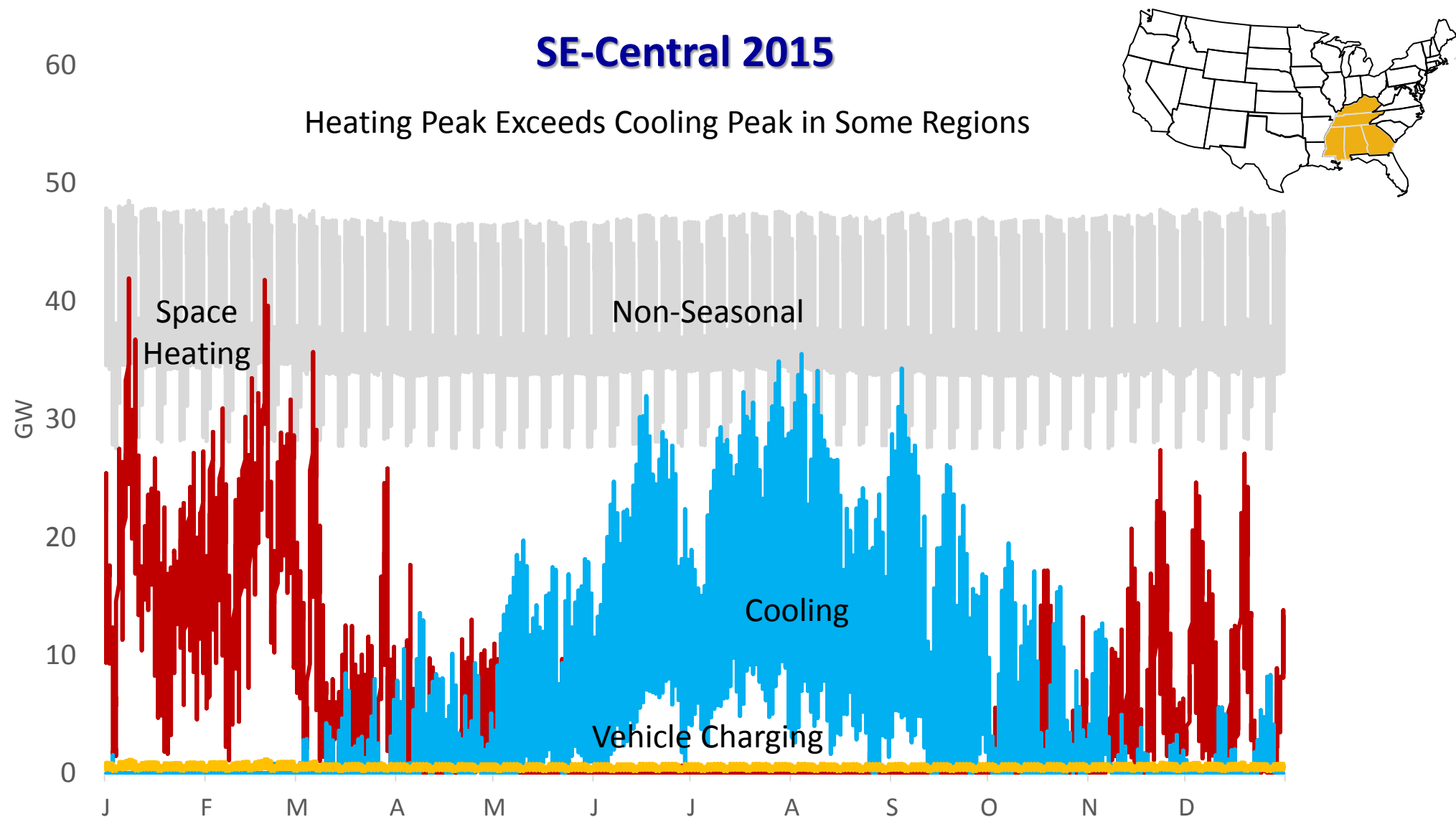
# For Traditional Electric Loads, Efficiency Gains Likely to Exceed Population and Economic Growth



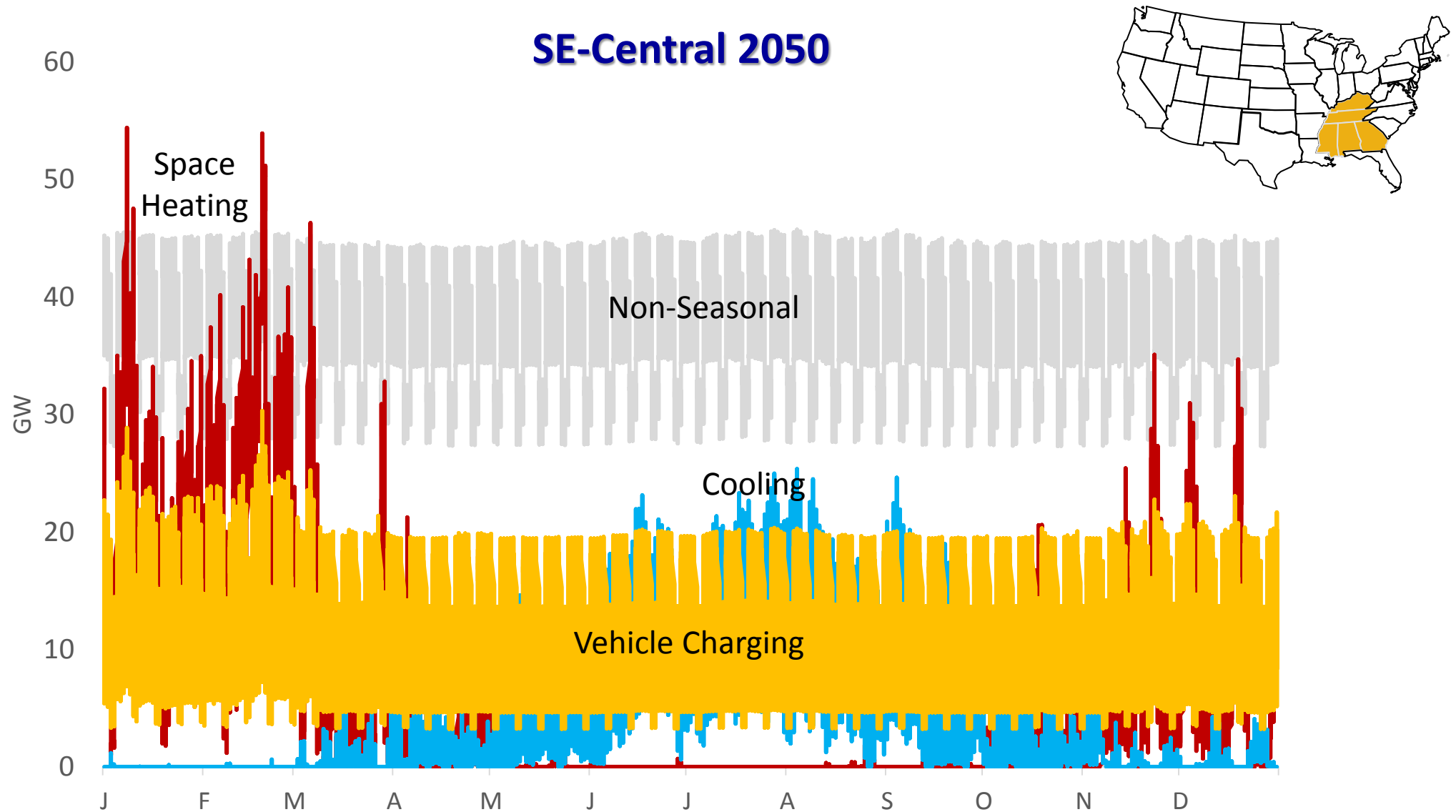
# Load Growth Driven by Electrification



# Load Shape Changes...Electrification and Efficiency Impact

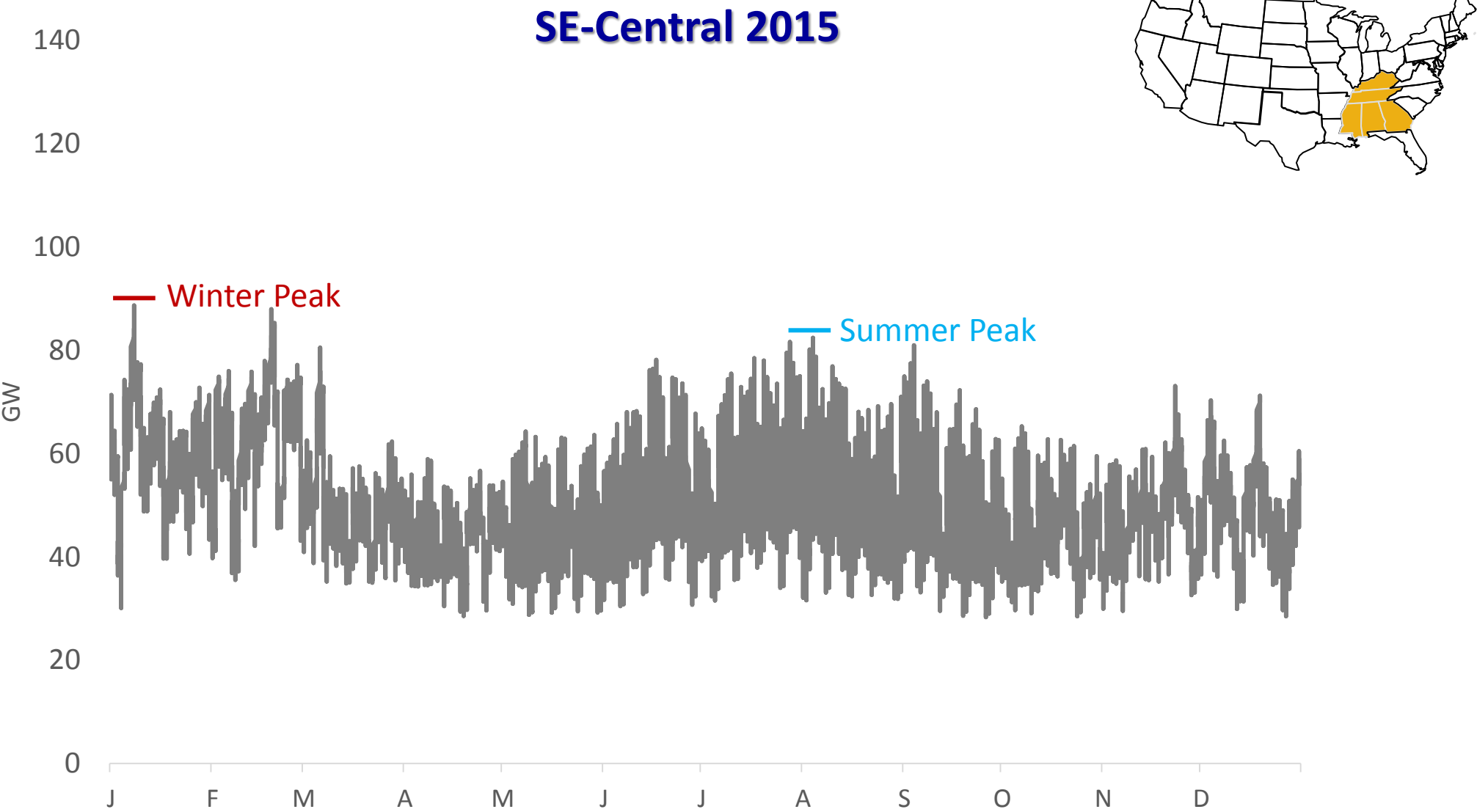


# Load Shape Changes...How Will This Impact Supply Mix/Grid Assets?

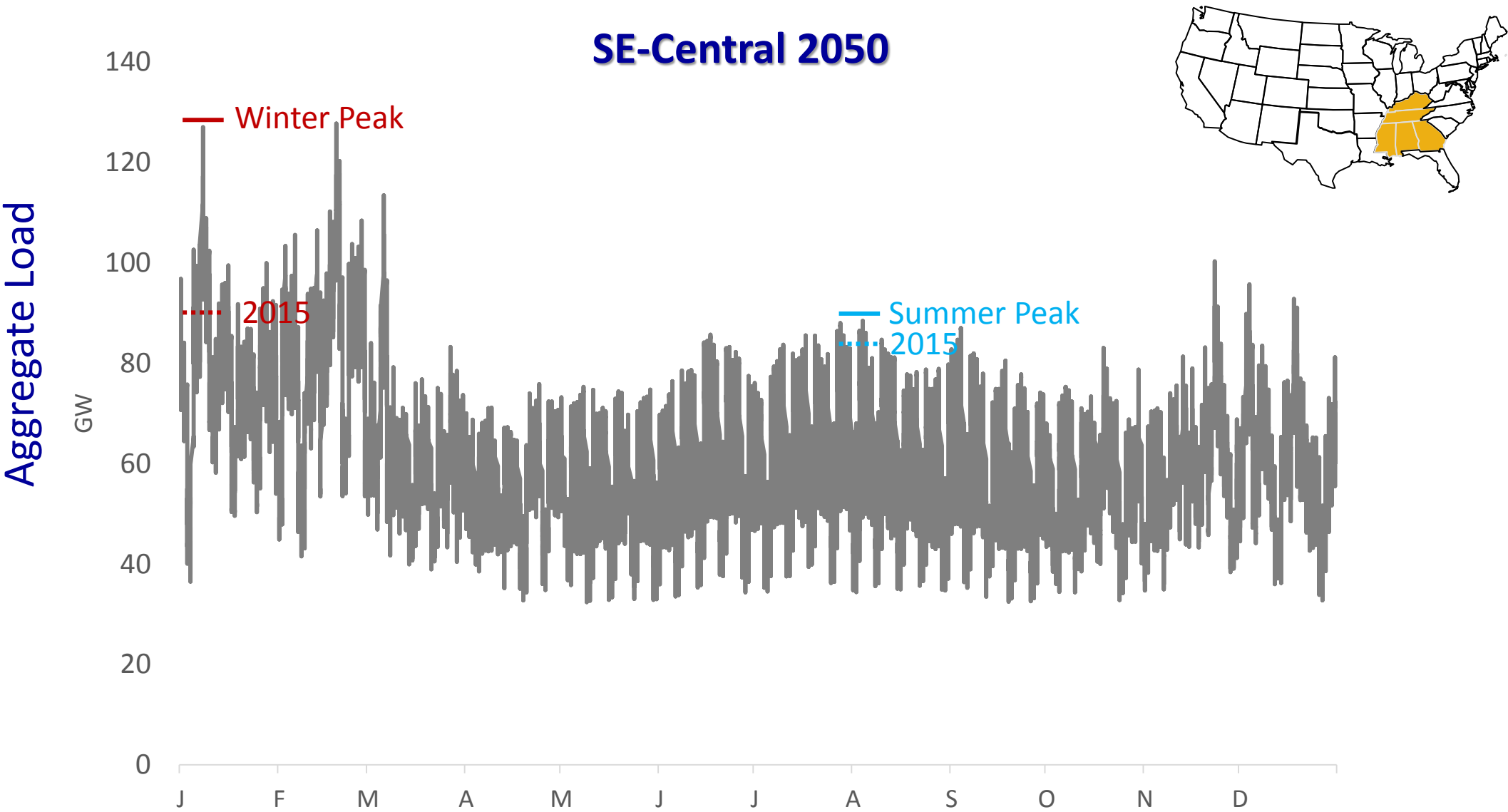




# Hourly Load Shape Aggregated Across Uses



# Load Shape Changes...How Will This Impact Supply Mix/Grid Assets?



# EPRI Initiative on Efficient Electrification – Much More to Come





# Together...Shaping the Future of Electricity