

# Electrification and Decarbonization

## EPRI's US National Electrification Assessment

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**EPRI**

ELECTRIC POWER  
RESEARCH INSTITUTE



# U.S. National Electrification Assessment (USNEA)

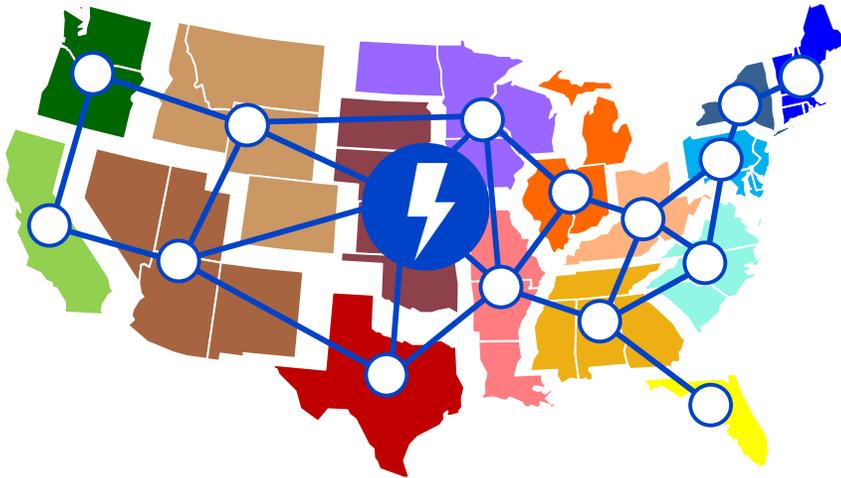


- Economy-wide assessment:
  - Residential, commercial, industrial and transport
- Customers have broad technology choices and control
- Customer decisions integrated with detailed electricity supply model
- Progressive and Transformation scenarios include economy-wide carbon pricing
- **Just the beginning... kickstart to EPRi's Electrification Initiative**

*<https://www.epri.com/#/pages/sa/efficientelectrification>*

# US-REGEN: Modeling Platform for USNEA

## Electric Generation



### Detailed representation of:

- Energy and capacity requirements
- Renewable integration, transmission, storage
- State-level policies and constraints

Synchronized



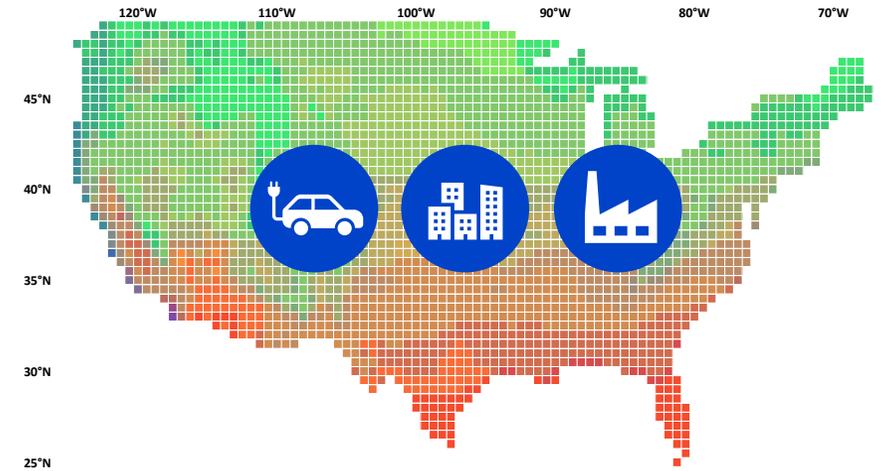
Hourly Load,  
Renewables,  
and Prices

### Model Outputs:

Economic equilibrium  
for generation, capacity,  
and end-use mix

Emissions, air quality,  
and water

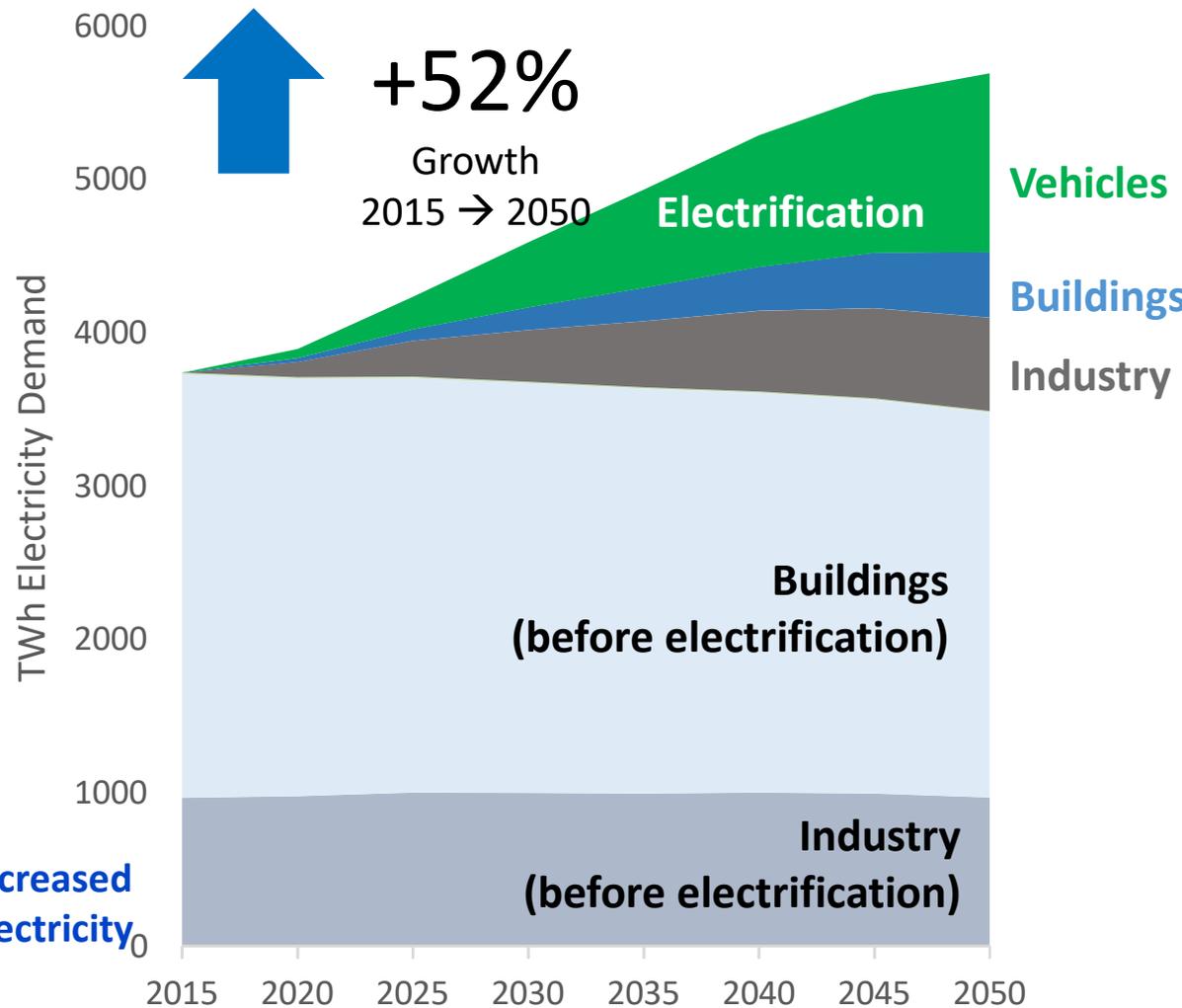
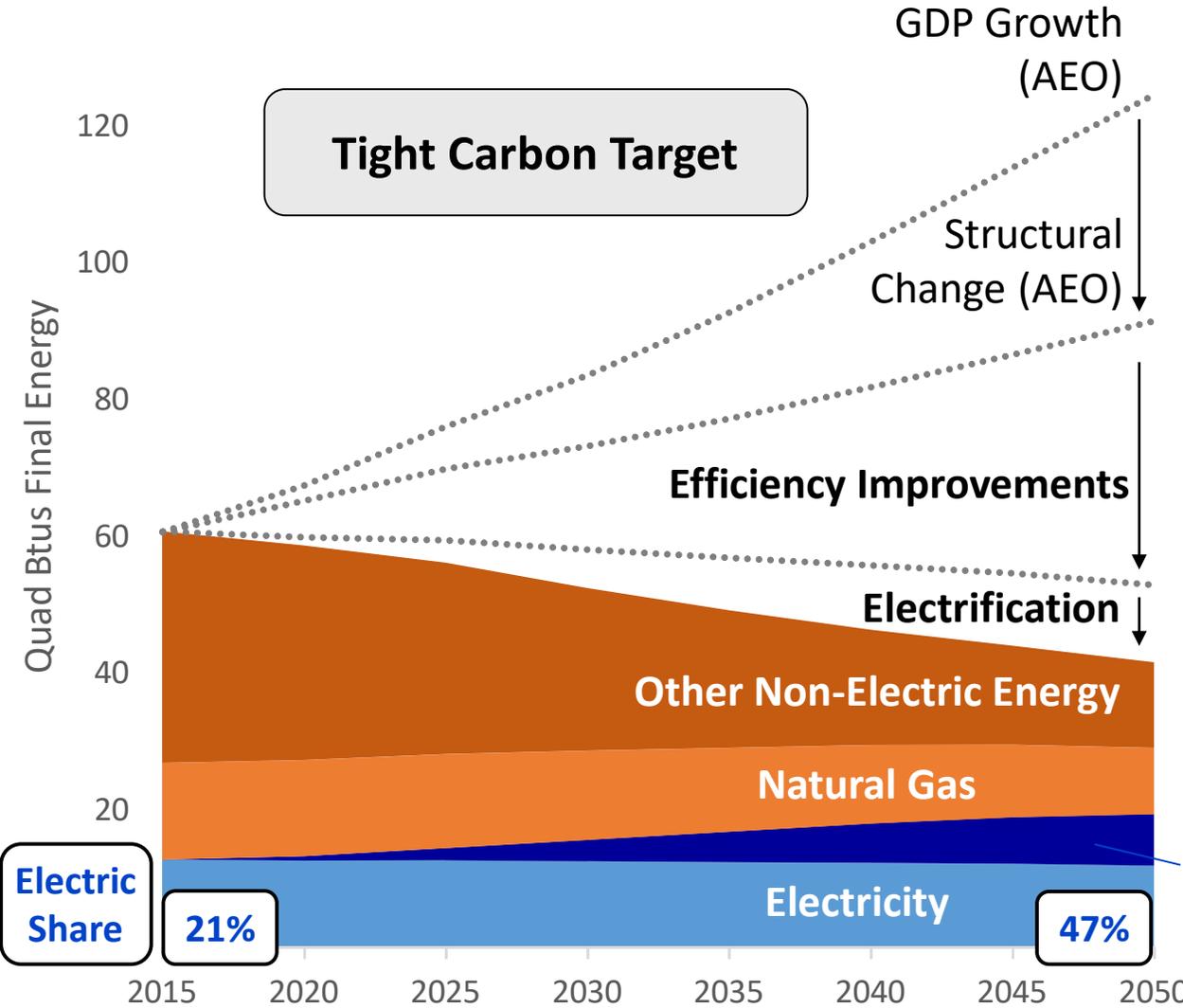
## Energy Use



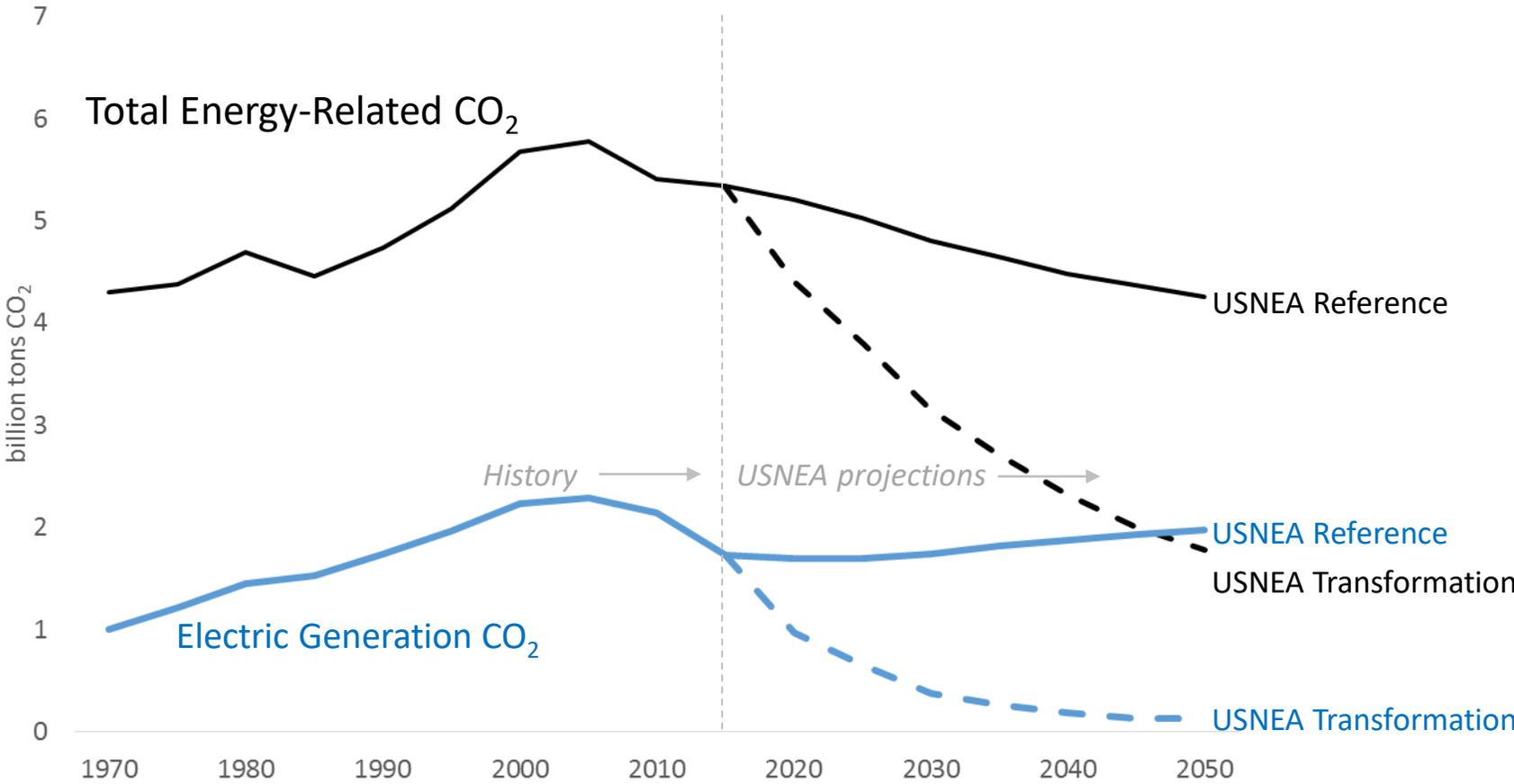
### Detailed representation of:

- Customer heterogeneity across end-use sectors
- End-use technology trade-offs
- Electrification and efficiency opportunities

# Efficient Electrification: Transformation Scenario



# Electrification Drives CO<sub>2</sub> Emissions Reductions

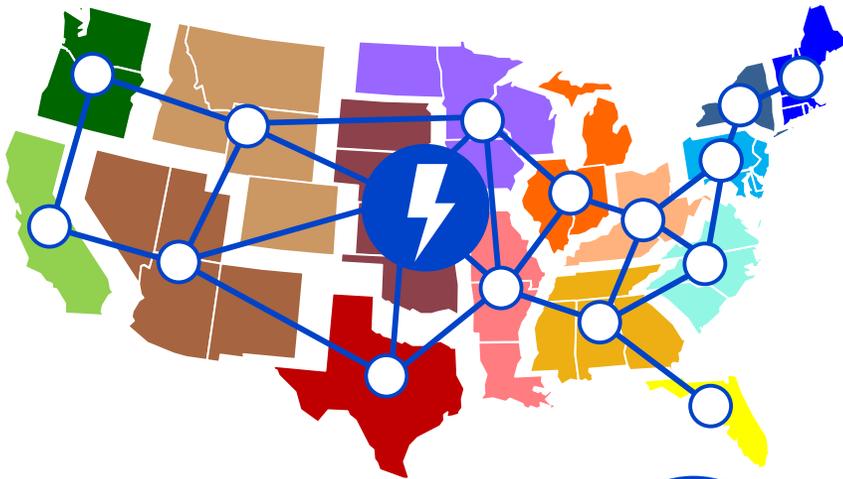


Increasing electrification leads to lower overall CO<sub>2</sub> emissions, even as emissions from electric generation increase in the USNEA Reference

- Further reductions?**
- Hydrogen
  - Bioenergy
  - Advanced low-carbon technologies

# Next Steps: Low Carbon Resources Initiative

## Electric Generation



### Hydrogen



- Production and storage
- Conversion to end-use fuels
- Power-gas-power

### Bioenergy



- Feedstock supply and conversion
- Agriculture and forestry
- Renewable natural gas

Synchronized

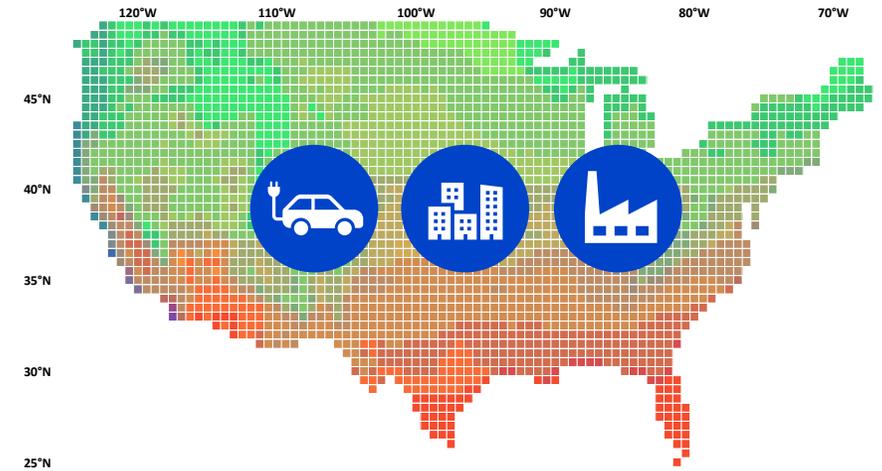


Hourly Load,  
Renewables,  
and Prices

New Model Features

Integrated Energy  
System Analysis

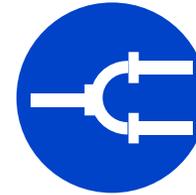
## Energy Use



### Other Low-Carbon Options

- Industrial CCS
- CO2 removal
- Advanced low-carbon energy

### Infrastructure



- Electricity T&D
- Natural gas pipelines
- Delivery of low-carbon fuels

# Together...Shaping the Future of Electricity