

PETER FOX-PENNER

# POWER AFTER CARBON

Building a Smart, Clean and Resilient Power Industry

Presented to:

Emerging Trends Series: New Business Models for Electrification

MIT Enterprise Forum, the Northeast Clean Energy Council, and Foley Hoag

May 6, 2020

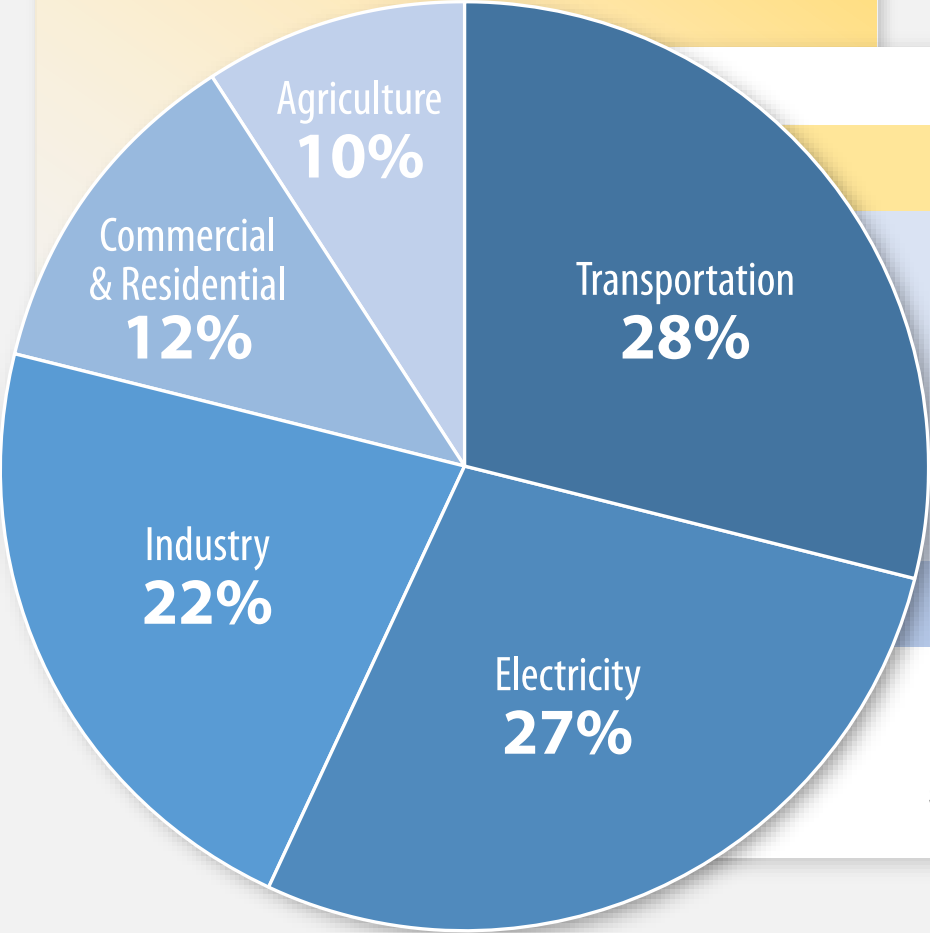


Boston University Institute for Sustainable Energy



# Sources of Greenhouse Gases By Sector - US

Total U.S. Greenhouse Gas Emissions  
By Economic Sector in 2018



In millions of metric tons of CO<sub>2</sub>e:

- Transportation: **1,869.5**
- Electricity: **1,803**
- Industry: **1,469**
- Agriculture: **667.7**
- Commercial & Residential: **801.2**
  
- **Total Emissions in 2018: 6,677**

\*Percentages may not add up to 100% due to independent rounding.

Source: EPA <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

# Energy-Climate Strategy for the Developed World: Efficiency + Clean Electricity



Accelerate energy  
efficiency



Electrify most  
transportation



Electrify most  
building heat



Electrify some  
industrial processes

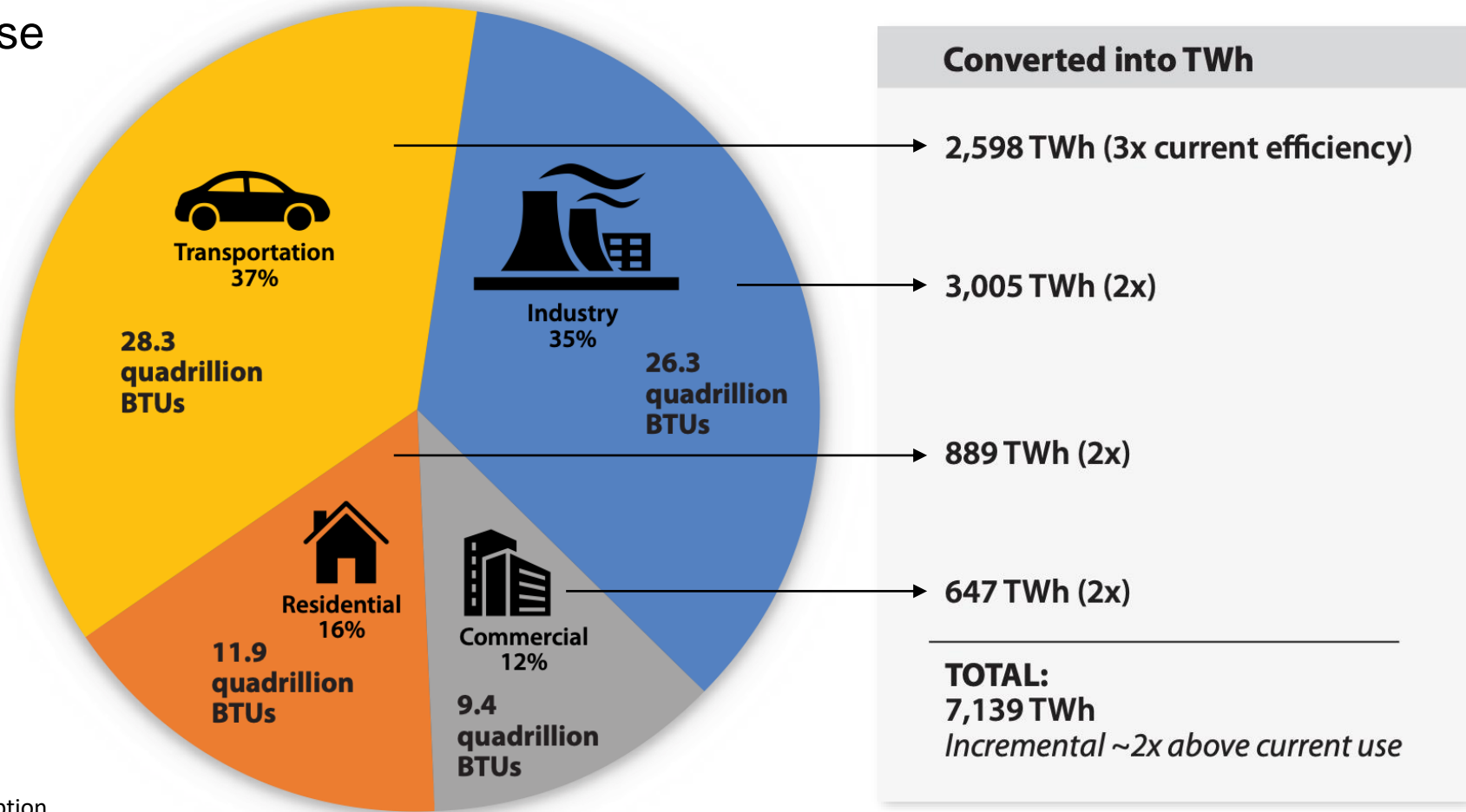
And the key:

A power system large enough  
to supply all this with

- ✓ No carbon
- ✓ High resilience and reliability
- ✓ Affordable and financially feasible

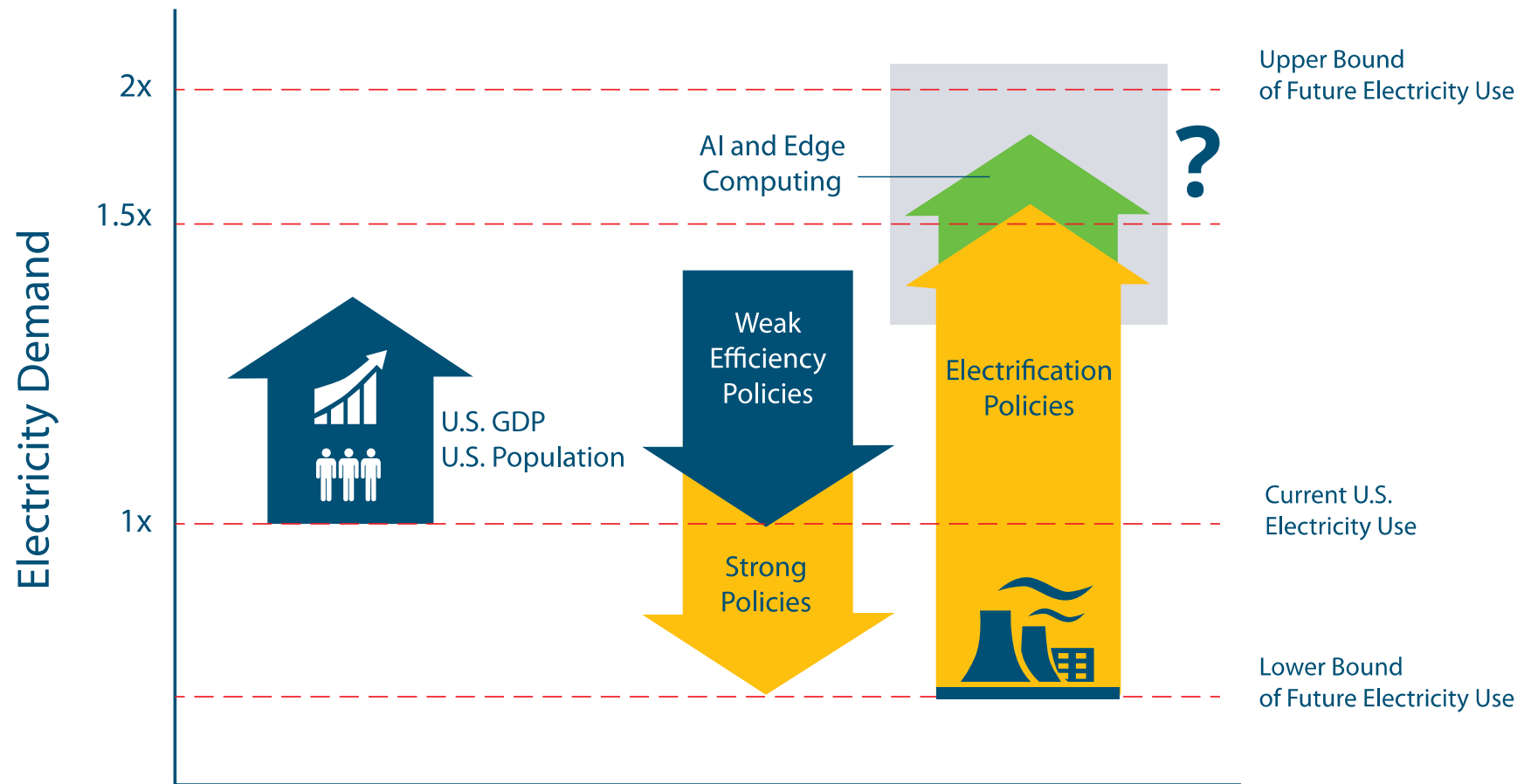
# The Upper Regions of “Electrifying Everything”

## U.S. Energy Use 2018

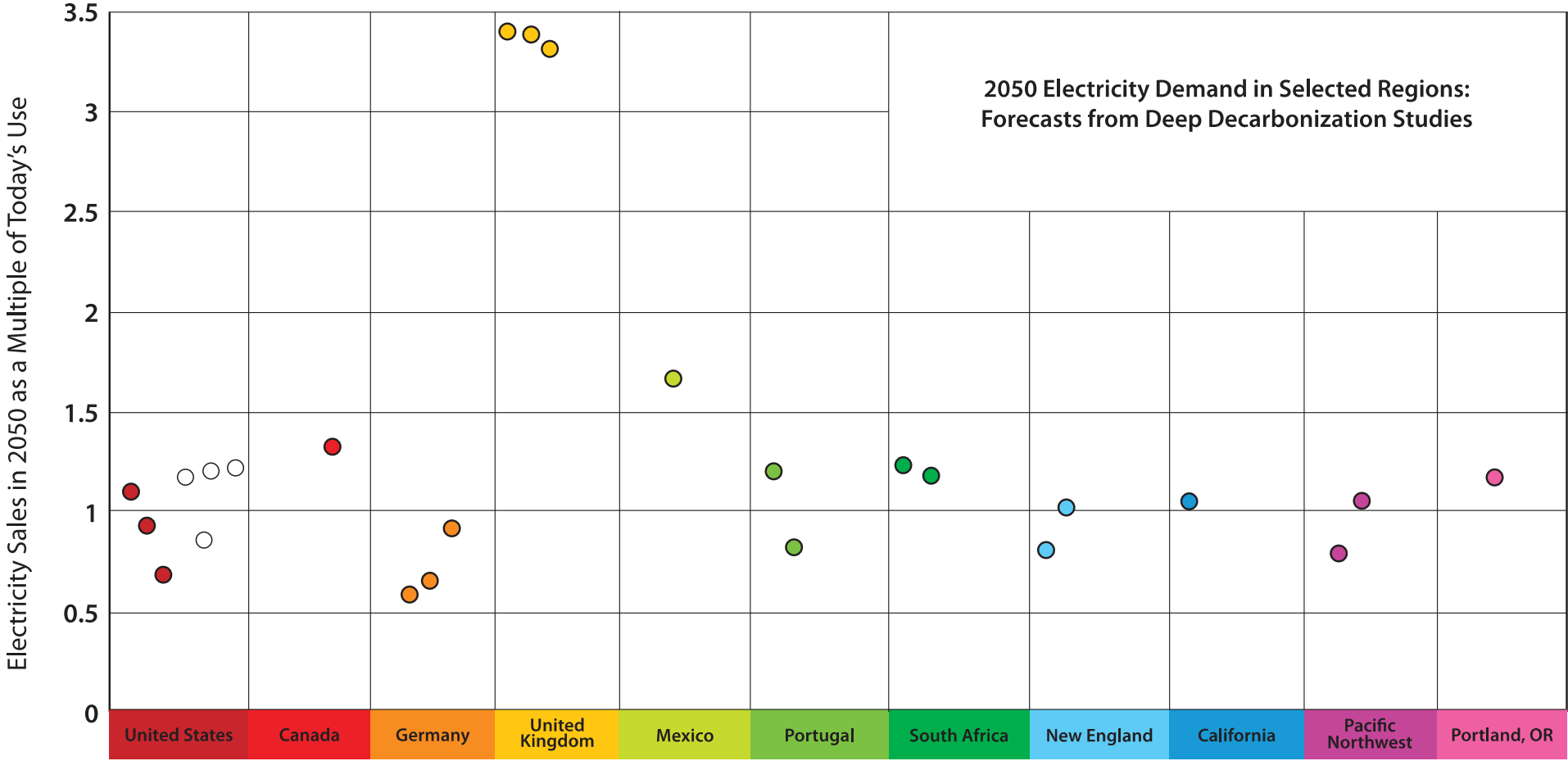


Source: EIA, U.S. energy consumption by source and sector, 2018.

# How Much Power Will We *Really* Need?



# Power Increases in Deep Decarbonization Studies

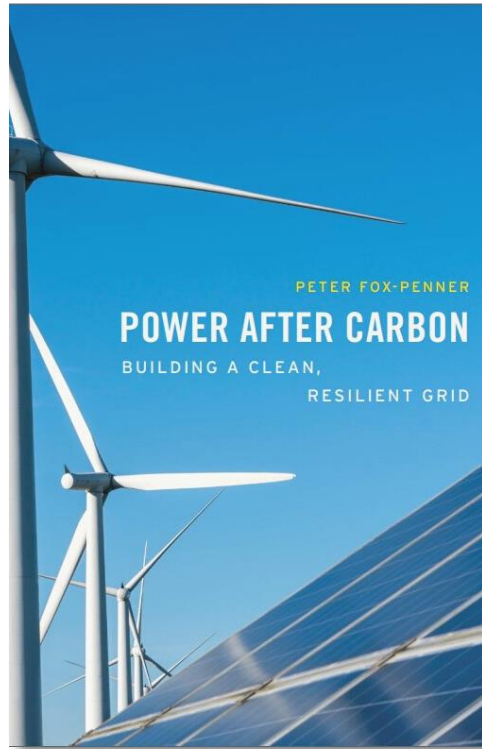


# Electrification: An Essential Frontier

- Transportation electrification: Strong market support
- Building Thermal Decarbonization: Public and private capital and strong policies
- Industry – specific RD&D collaboratives



# Thank You!



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### CONFLICT OF INTEREST DISCLOSURE

*Dr. Fox-Penner holds equity in Energy Impact Partners, a utility-backed energy investment and innovation firm, and consults for Energy Impact Partners and The Brattle Group on energy technologies. Dr. Fox-Penner also conducts research in areas of interest similar to the business interests of Energy Impact Partners and The Brattle Group. The terms of this arrangement have been reviewed by Boston University in accordance with its financial conflicts of interest in research policies.*

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