



EPRI | ELECTRIC POWER
RESEARCH INSTITUTE

The Nuclear Opportunity

Secure
Creating a
Low-Carbon Future

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The Electric Power Research Institute

RD&D for the Electricity Industry

- Independent, unbiased, tax-exempt collaborative research organization
- Full spectrum industry coverage
 - *Nuclear*
 - *Generation*
 - *Environment*
 - *Power Delivery & Utilization*
- 460 participants in over 40 countries
- Major offices in Palo Alto, CA; Charlotte, NC and Knoxville, TN



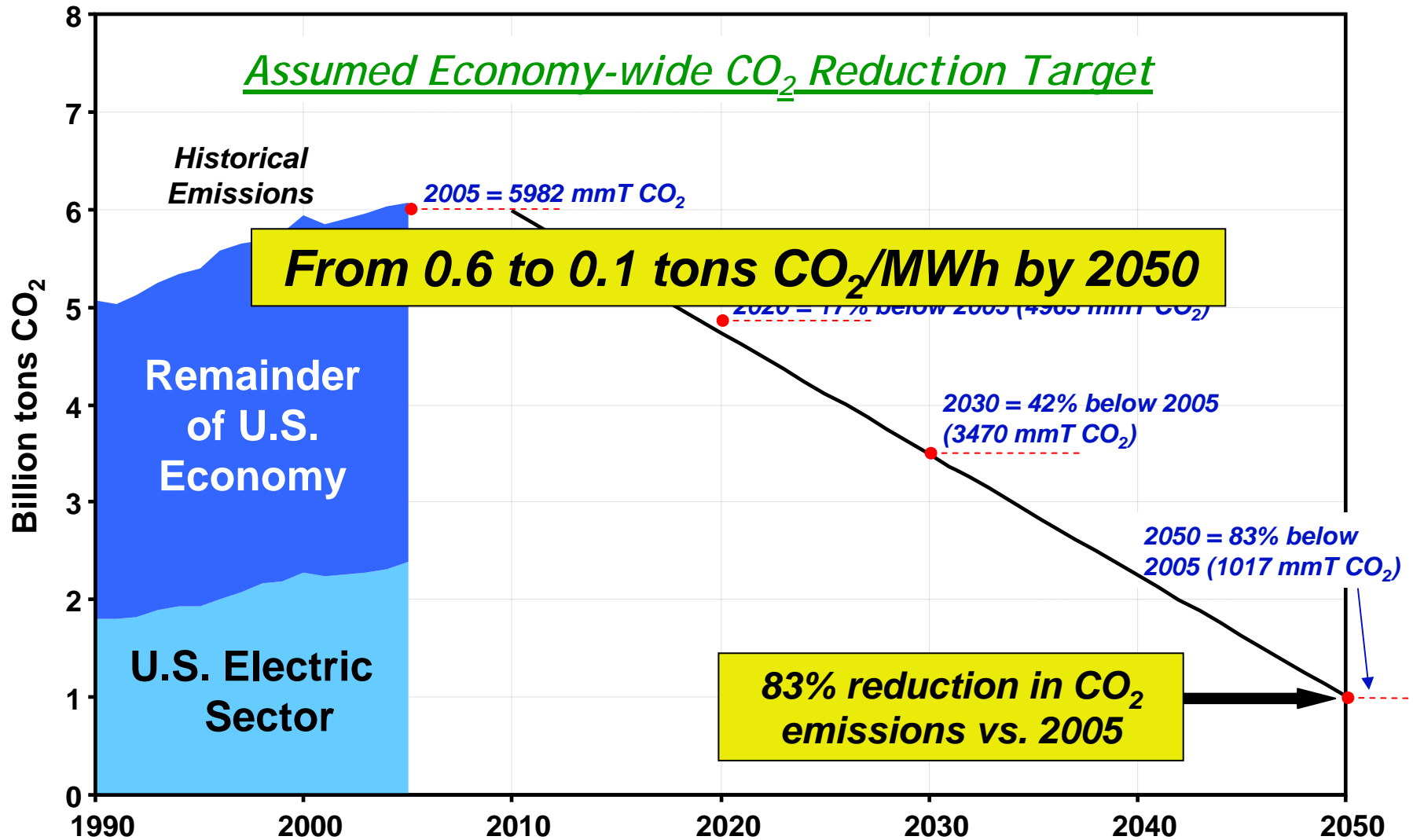
Presentation Overview

■ The Challenge

De-carbonize the electricity infrastructure and meet binding economy-wide CO₂ reduction targets

Provide reliable, affordable, and environmentally responsible electricity

The CO₂ Challenge



Presentation Overview

■ The Challenge

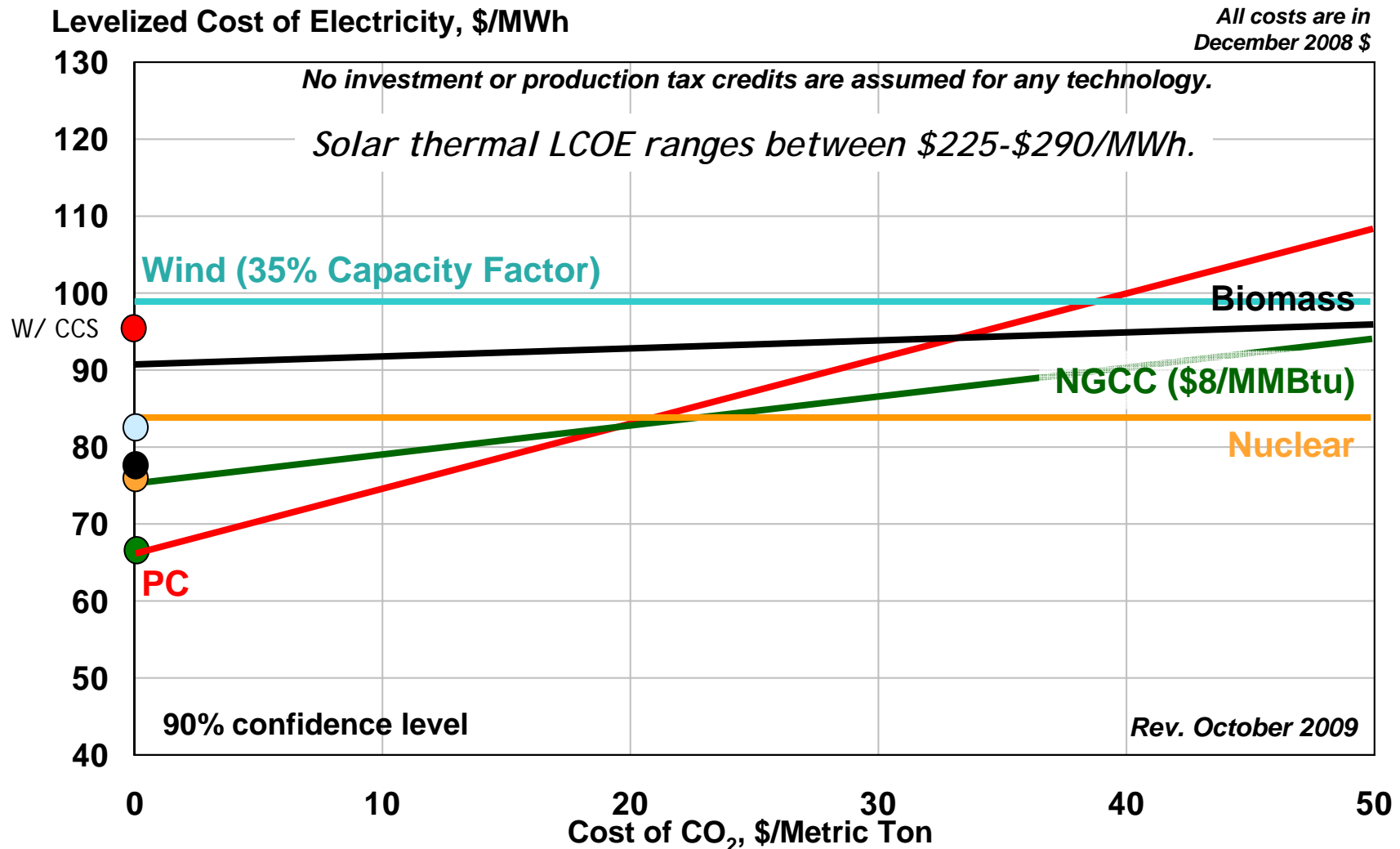
De-carbonize the electricity infrastructure and meet binding economy-wide CO₂ reduction targets

Provide reliable, affordable, and environmentally responsible electricity

■ Meeting The Challenge

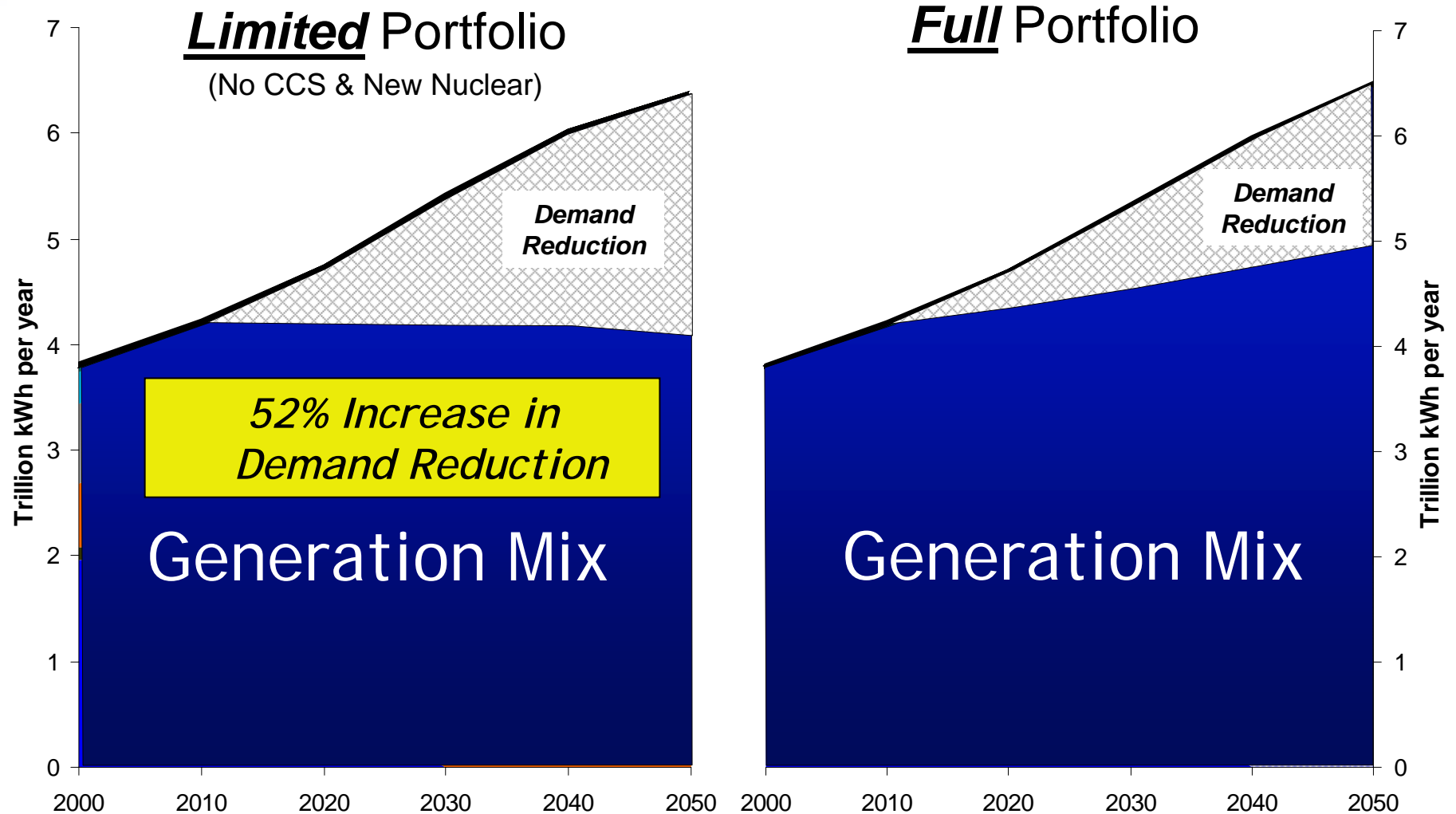
Technical, Economic and Scale

Levelized Costs of Electricity - 2015

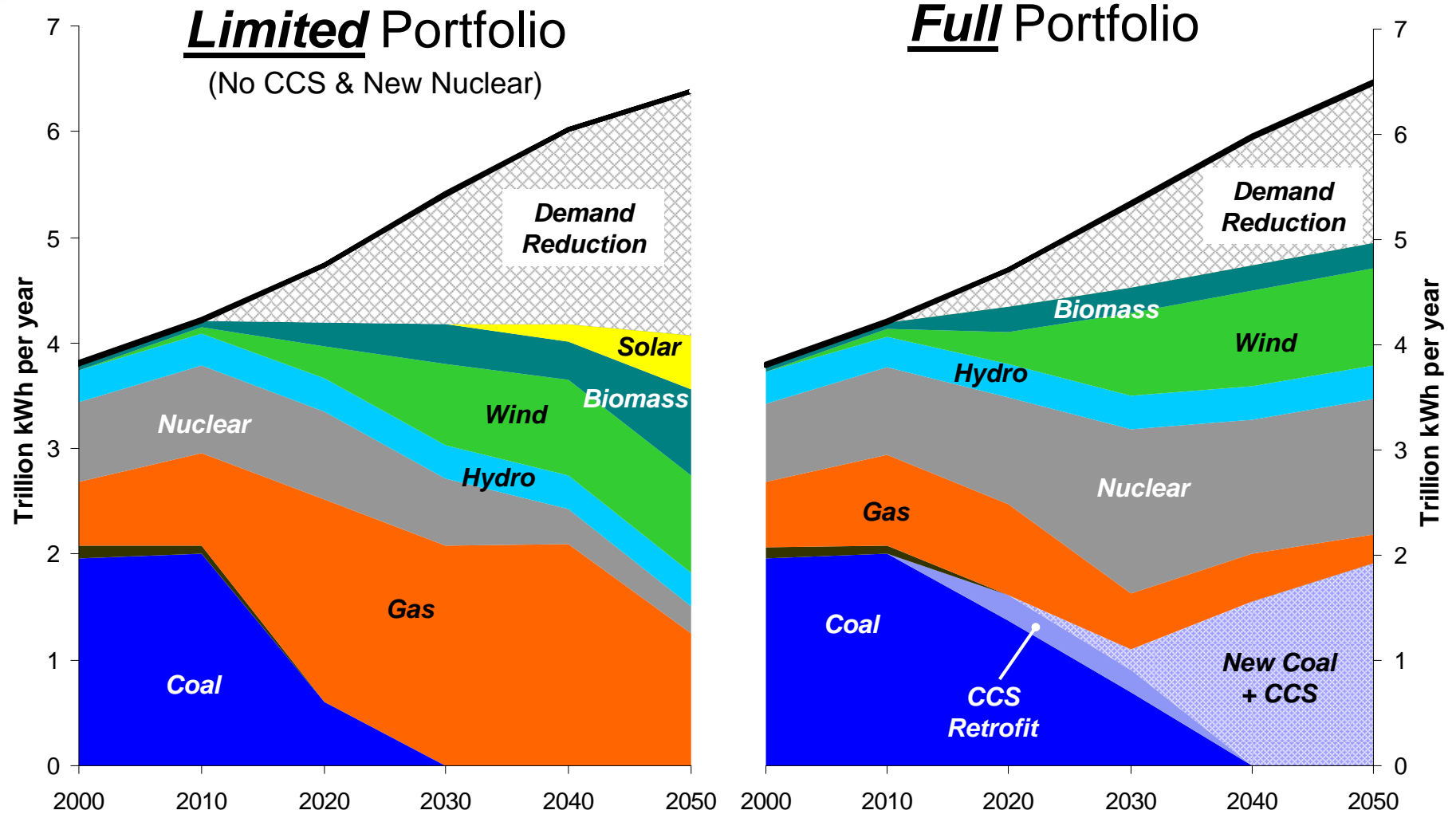


○ = LCOE in 2025, in Dec 2008\$ and 50% confidence level

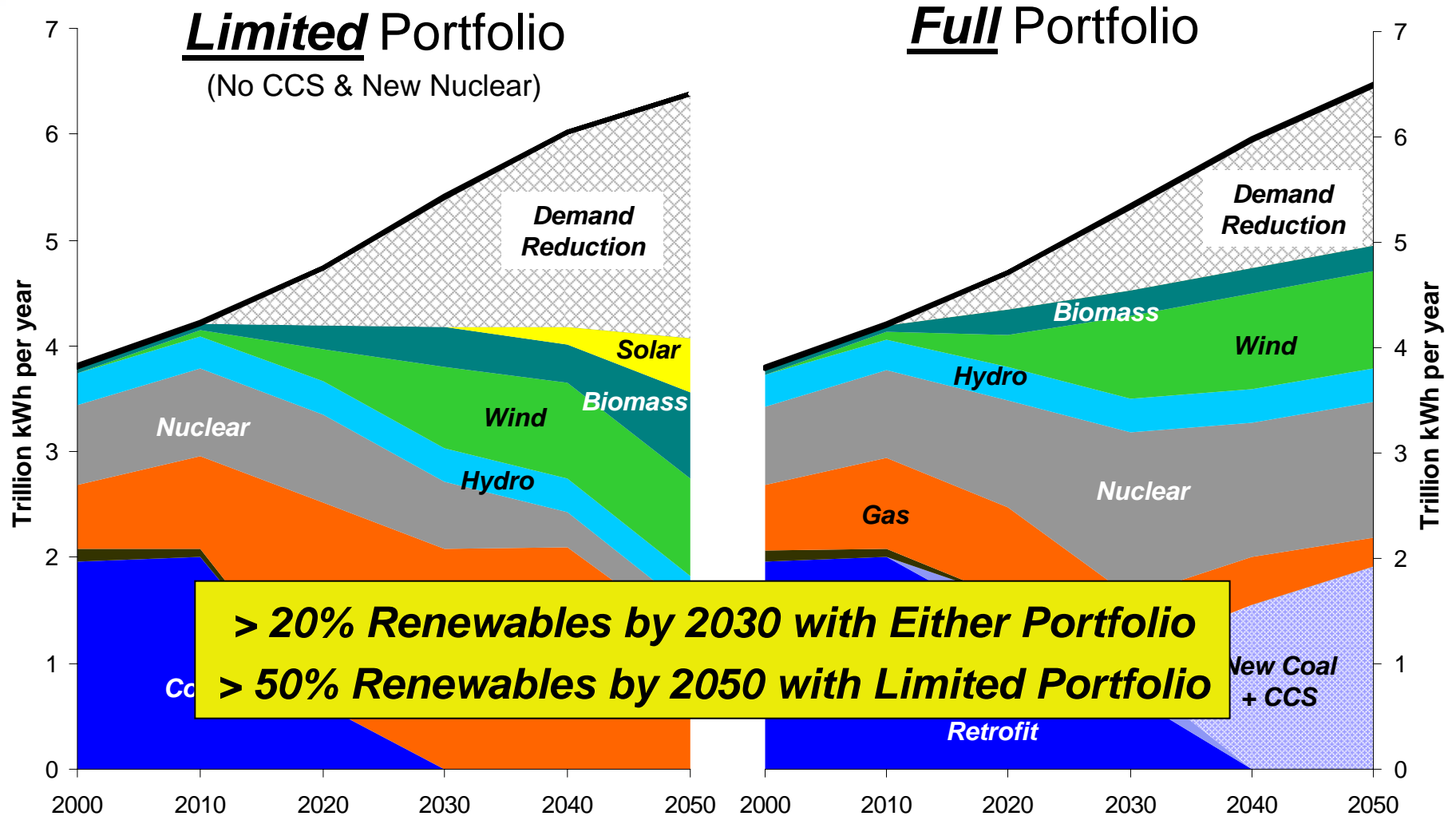
U.S. Electric Generation - MERGE Analysis



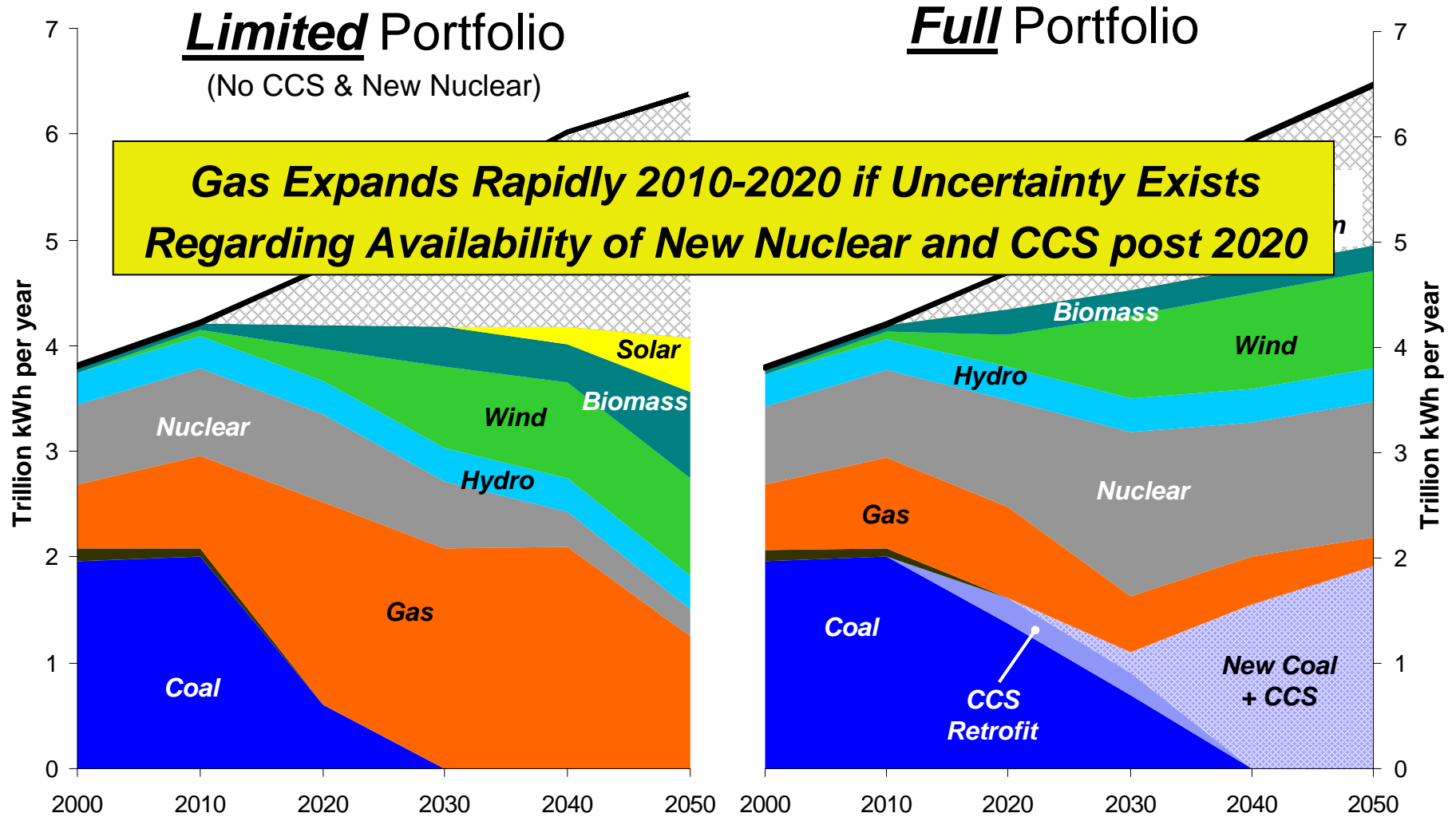
U.S. Electric Generation - MERGE Analysis



Insights - Renewables

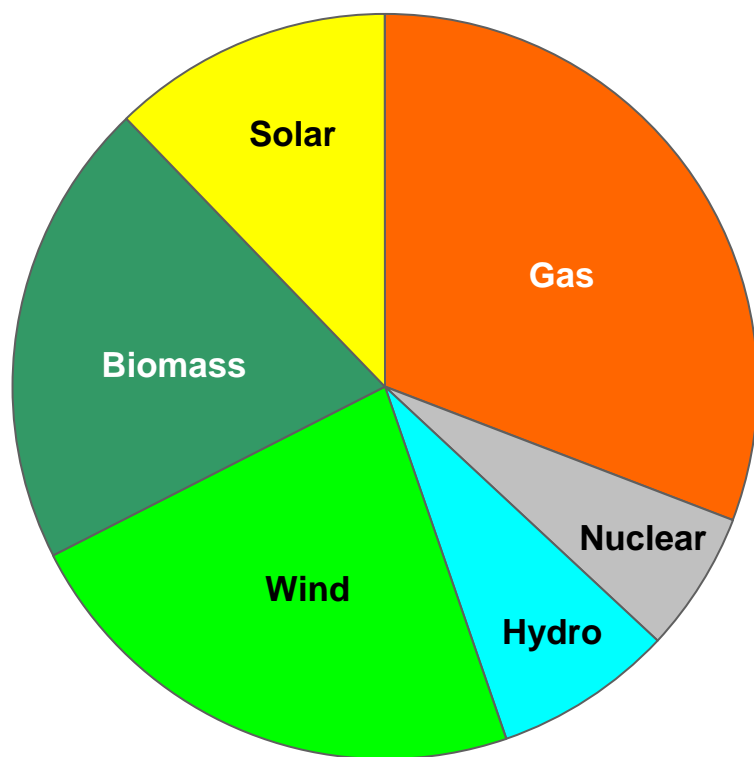


Insights - Nuclear and CCS

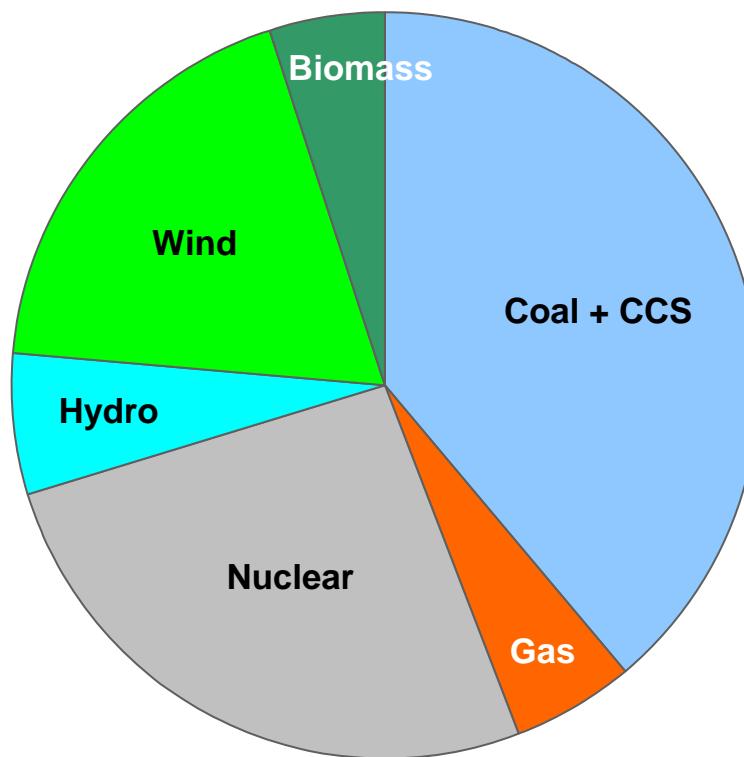


2050 Generation Mix

Totally different futures in 2050

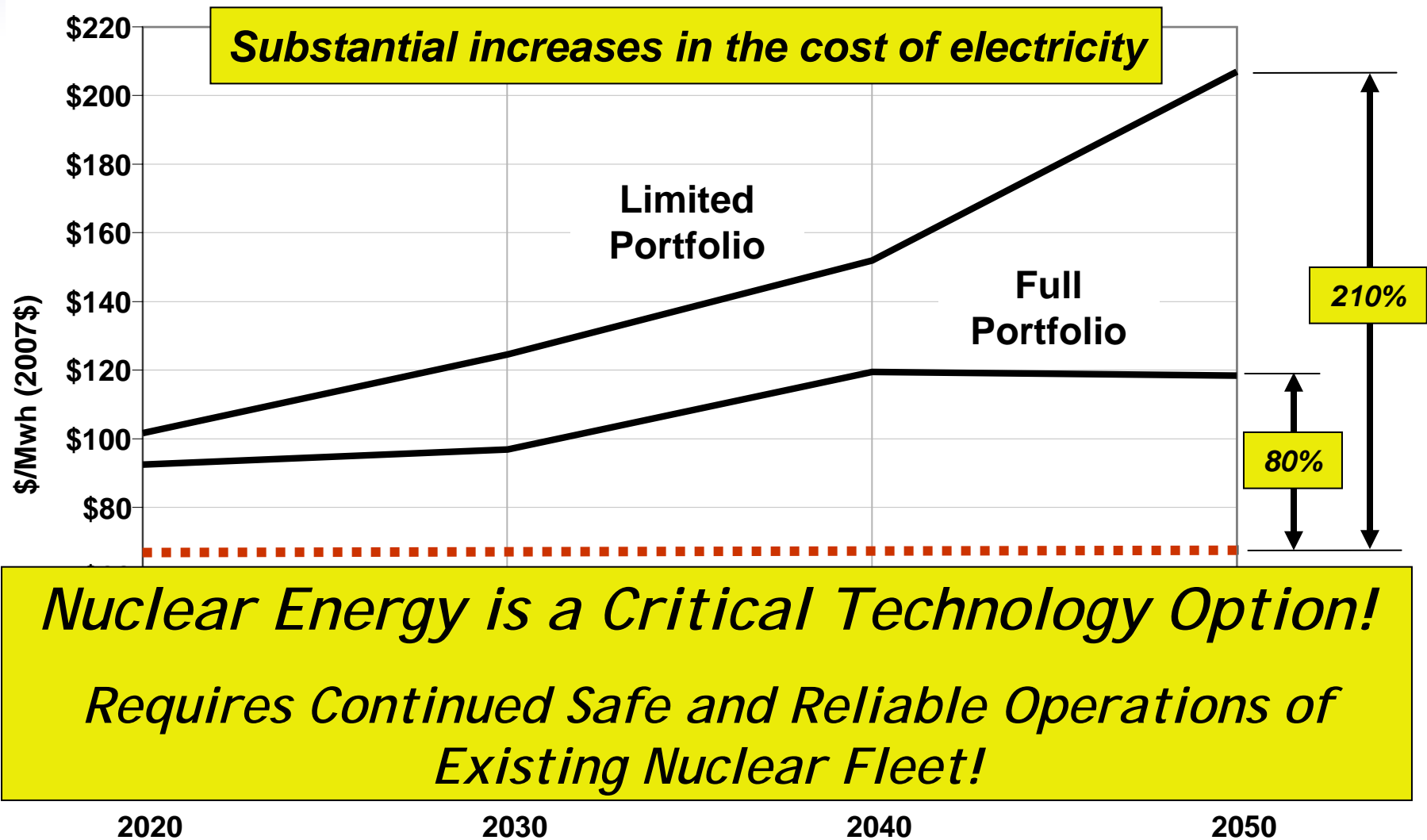


Limited Portfolio

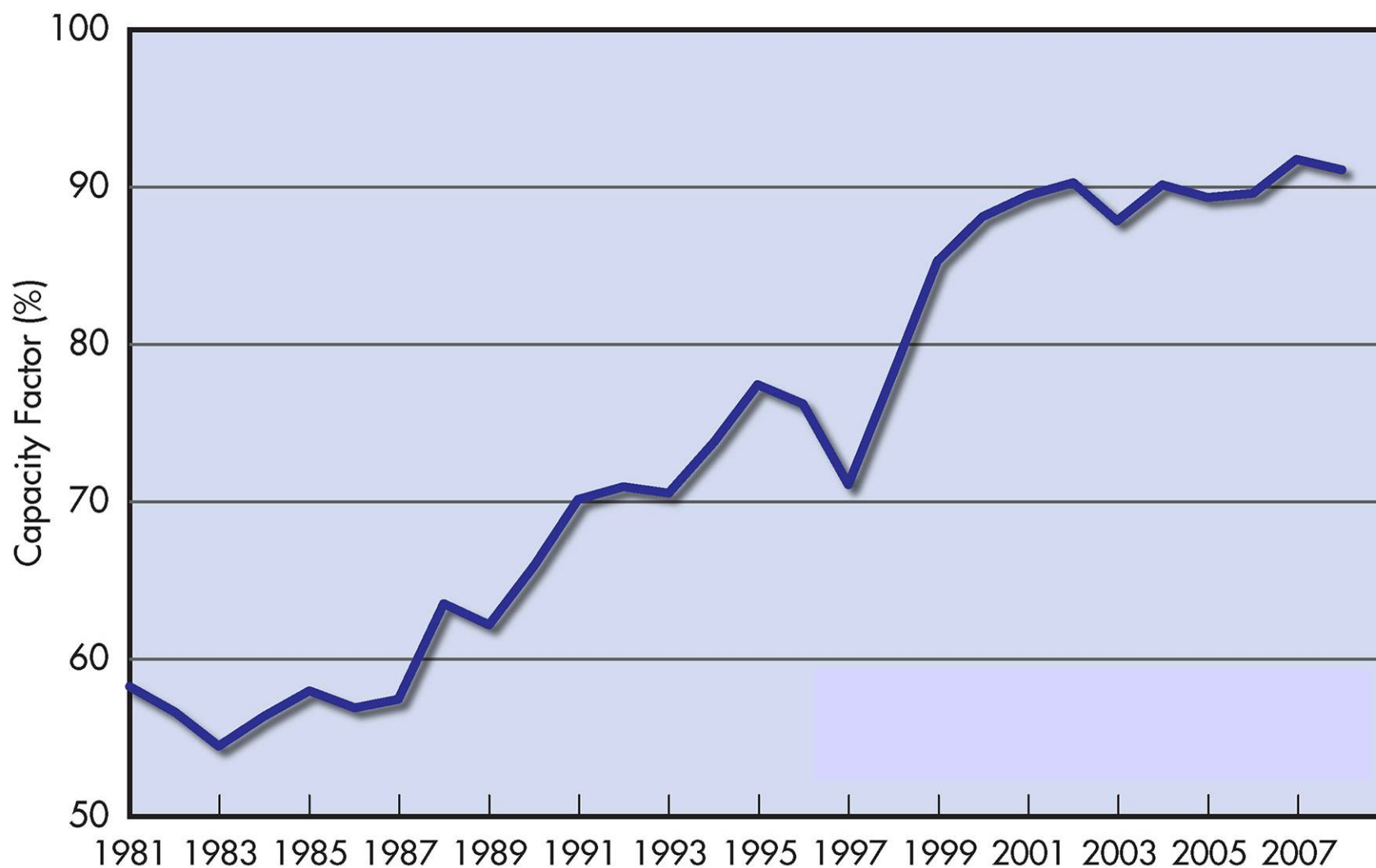


Full Portfolio

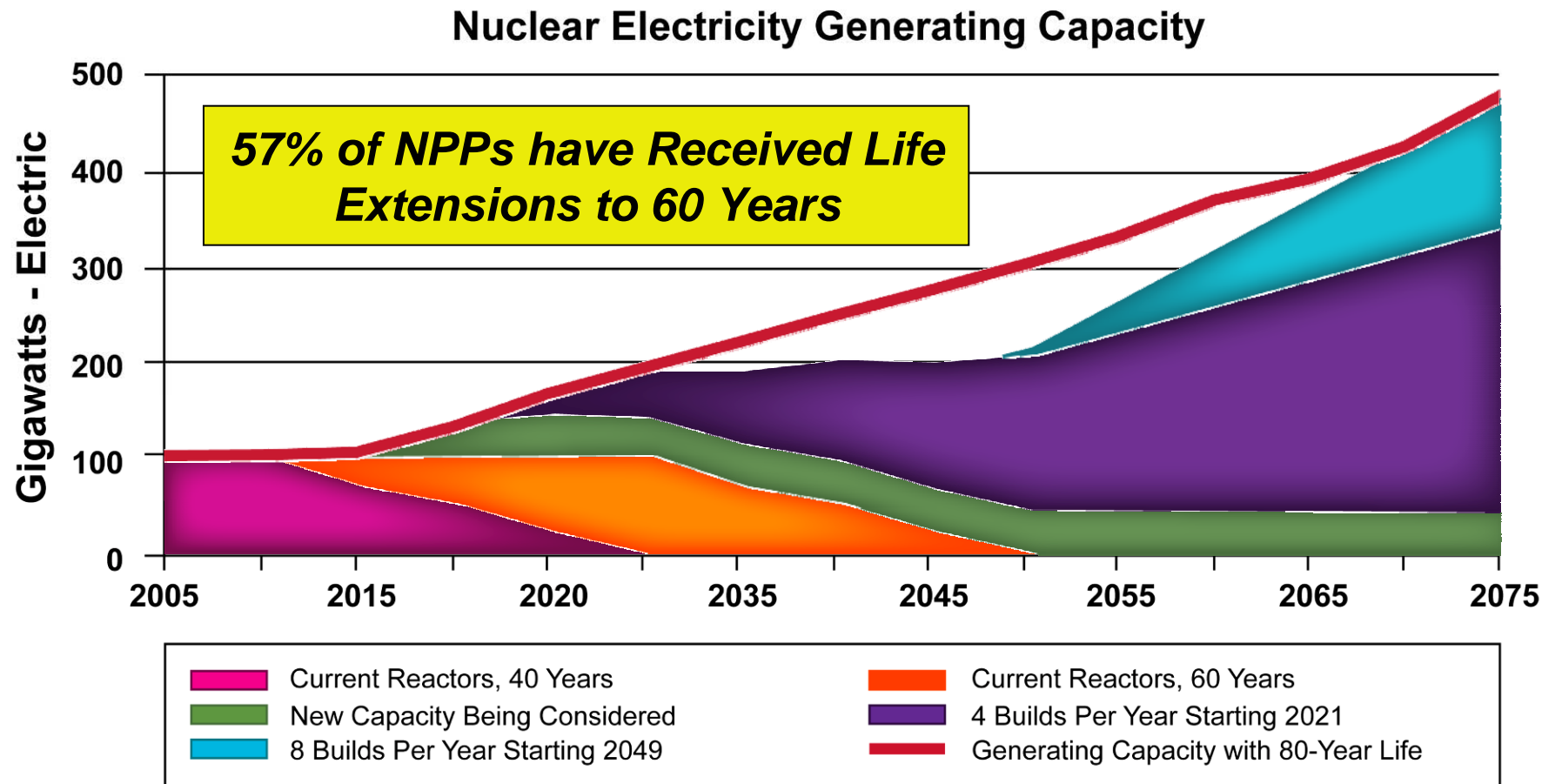
MERGE Wholesale Electricity Cost Results



U.S. Plants Sustaining ~90% Capacity Factor



Nuclear Generation



Source: DOE Life Beyond 60 Workshop

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EPRI Nuclear R&D Activities

Inspection



Risk & Safety



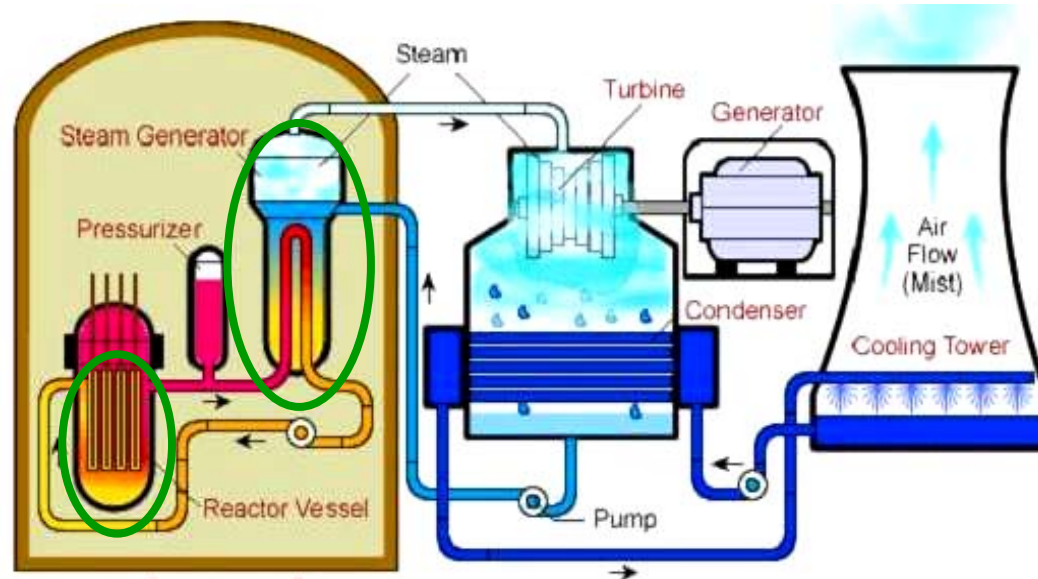
Equipment Reliability



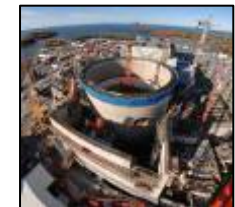
Material Degradation



Fuel Reliability



Adv. Nuclear Technology



Radiation Exposure and Waste Management



Conclusion

- Full portfolio of technology options is least-cost solution to decarbonizing the economy
- Requires continued safe and reliable operation of our existing nuclear fleet

Electricity policy and technology actions over the next decade will to a great extent shape the electricity future of 2050

Together...Shaping the Future of Electricity



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Image from *NASA Visible Earth*