

# Is it possible to fully decarbonize the global supply of energy by 2050?

Role of Renewable Energy, Nuclear Energy and Energy Efficiency

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**THE NUCLEAR ENERGY INSTITUTE**  
is the **policy organization** of the nuclear  
technologies industry, based in  
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# Vision and Mission

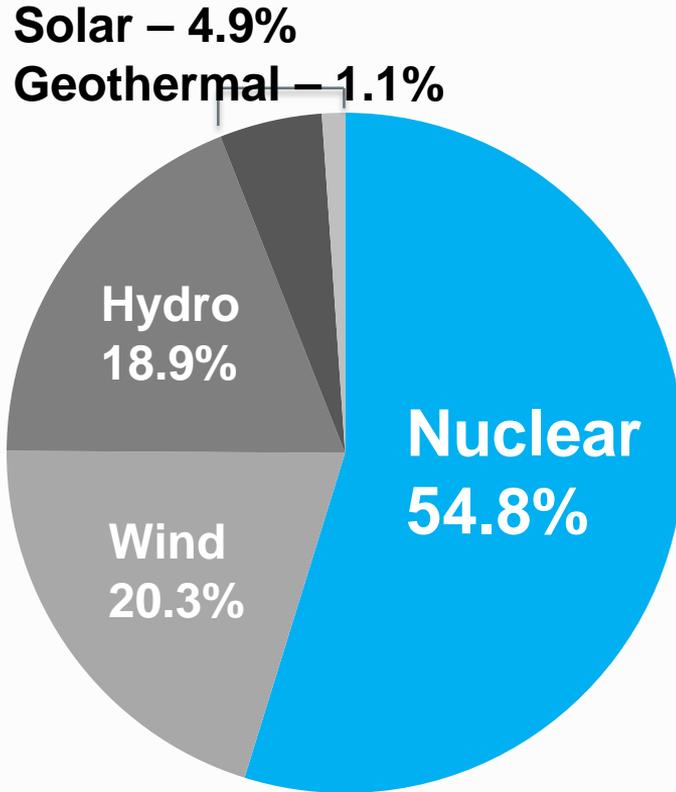
A world powered by clean  
and reliable energy

**VISION**

Promote the use and growth of  
nuclear energy through efficient  
operations and effective policy

**MISSION**

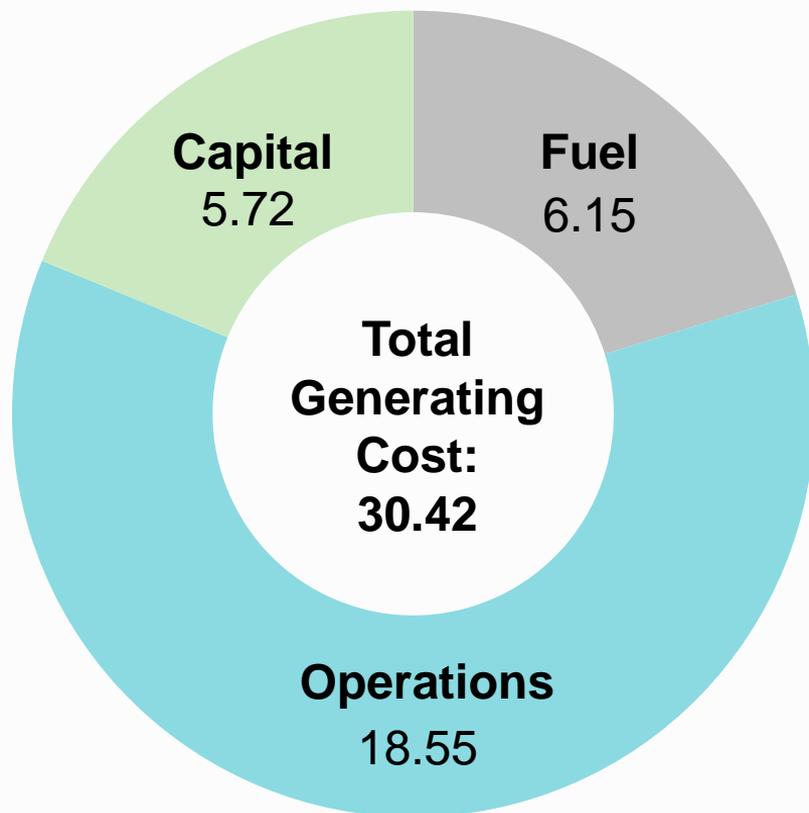
# Nuclear supplied more than half of U.S. carbon-free electricity in 2019



**Carbon-free resources generated about 37% of U.S. electricity in 2019**

**Carbon-free generation in U.S. increased by net 18.7 million MWh in 2019**

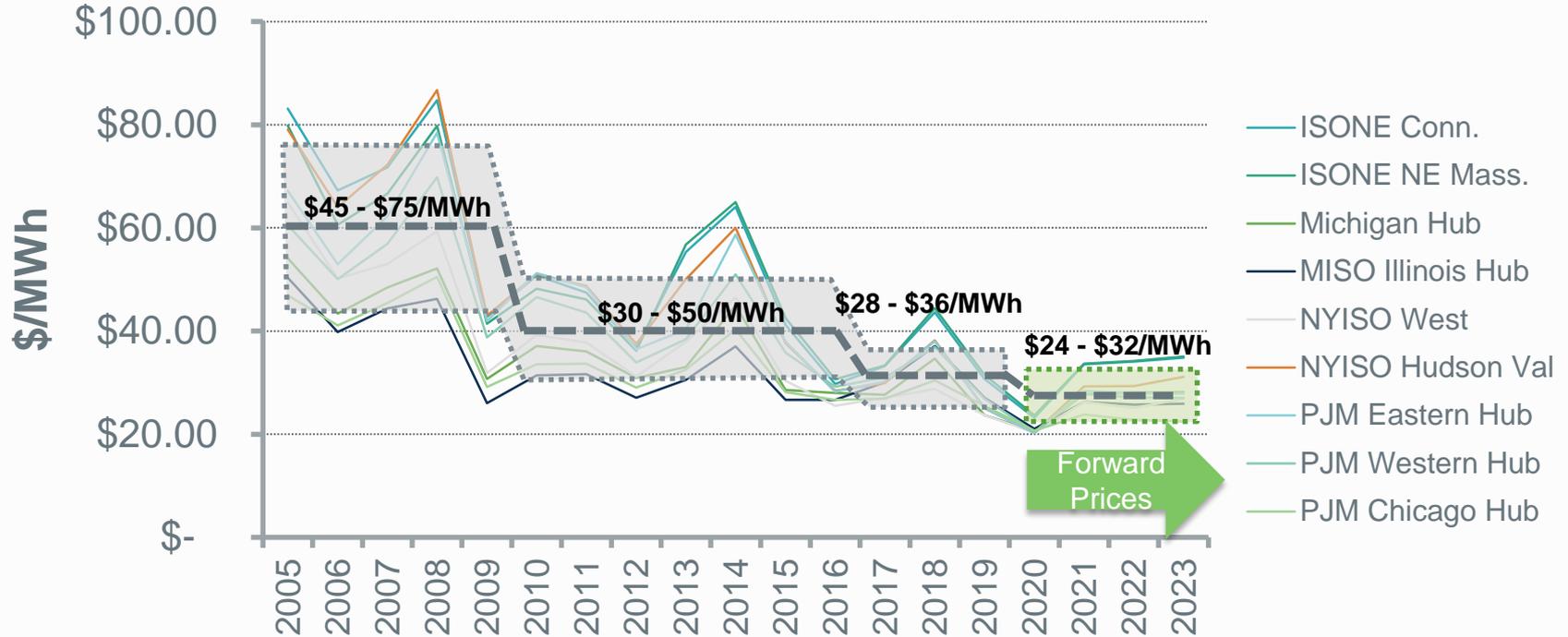
# U.S. Nuclear Plants are Cost-Effective to Operate



## 2019 costs compared to 2018:

- Total generating costs decreased by **\$2.49/MWh (7.6% reduction)**
- Operations costs decreased by **\$1.57/MWh (7.8% reduction)**
- Capital costs decreased by **\$0.60/MWh (9.5% reduction)**
- Fuel costs decreased by **\$0.32/MWh (4.9% reduction)**

# Declining U.S. Wholesale Electricity Prices



# The Emissions Reduction Imperative

ENVIRONMENT MARCH 20, 2018 / 10:28 AM / A YEAR AGO

## McDonald's sets greenhouse gas reduction targets

Lisa Baertlein 3 MIN READ

(Reuters) - McDonald's Corp on Tuesday announced an approved, science based target to cut greenhouse gas emissions and battle climate change, saying it is the first restaurant company to do so.

Supply chains + Add to myPT

## Blue chips act to cut supply chain greenhouse gas emissions

Rolls-Royce, Nestlé and Panasonic, among larger companies taking action

Michael Pooler JANUARY 29, 2018

The number of large companies taking serious action to tackle greenhouse gas emissions in their supply chains has doubled, according to research by an

CLIMATE

## Nestlé commits to net-zero target by 2050

Haley Weiss, E&E News reporter  
Published: Monday, September 16, 2019



E&E NEWS PM



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## Levi's Plans to Slash Emissions in Global Supply Chain by 2025

The apparel giant aims to reduce greenhouse gas emissions at a sprawling set of factories and mills in 39 countries, starting with suppliers



Levi's will start its effort to cut greenhouse gas emissions through energy-efficiency programs at factories run by vendors in the first tier of its supply chain, such as this supplier facility in Mexico. PHOTO:PHOTO COURTESY OF LEVI STRAUSS & CO.

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## Toyota wants zero carbon emissions in all factories by 2050

Marcus De Guzman

Clean, zero emission Toyota factories may soon be a reality

Toyota  
May 31, 2019 08:41

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Expand your Possibilities

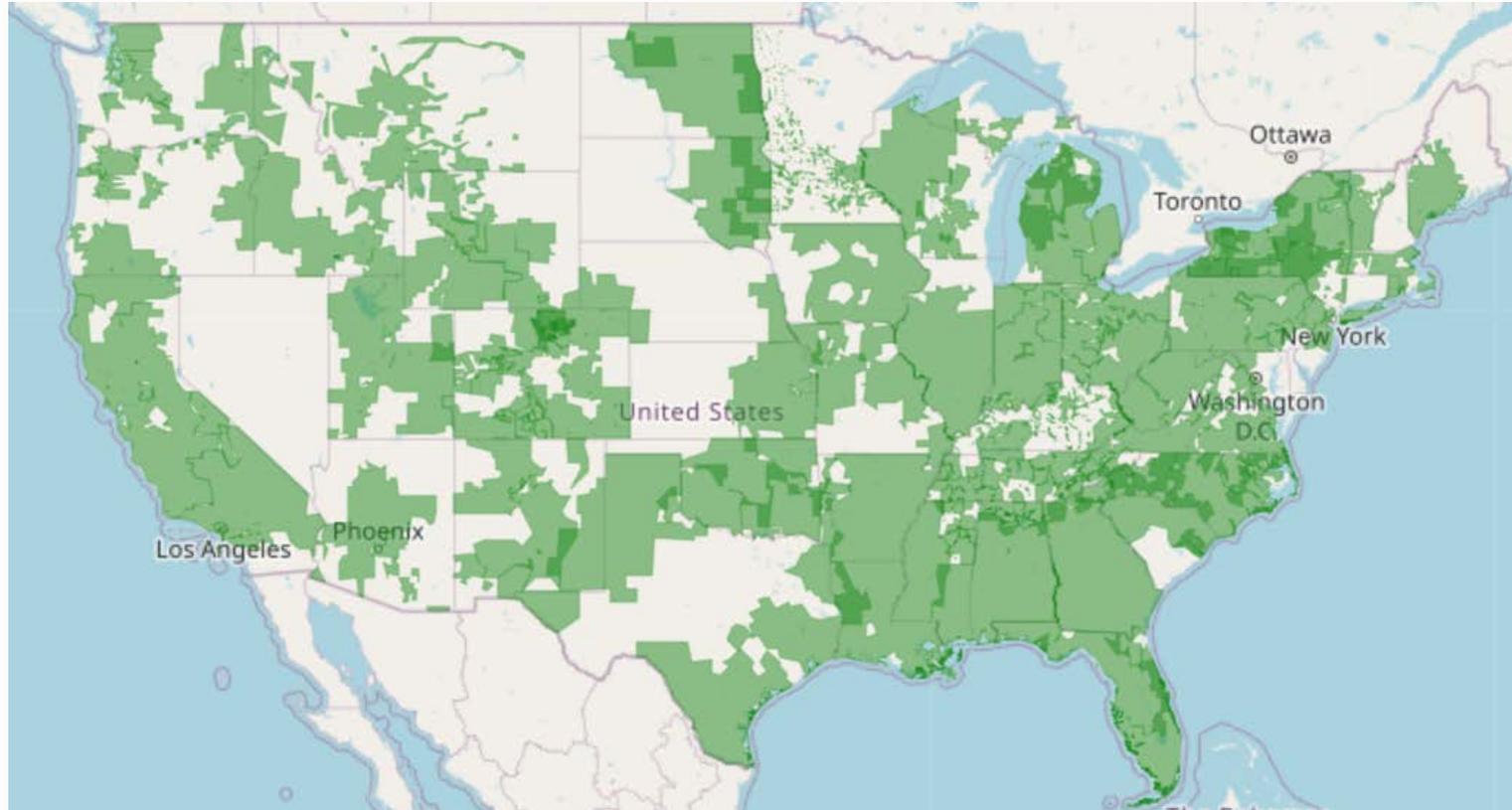
Let's face it, manufacturing cars is no easy feat. Aside from the fact that you have to build a whole fleet of them, you'll also need plenty of resources and energy to manufacture batches of them. But using energy means you're also producing CO2 emissions, which is never good.

That's right, aside from automobiles, car factories also use plenty of energy that result in more CO2 emissions that harm the environment and add more greenhouse gases that pollute the air. So how does Toyota plan to combat that? By setting a goal of achieving 35% reduced CO2 emissions in global plants worldwide by 2030, and having zero CO2 emissions in all manufacturing plants by 2050.

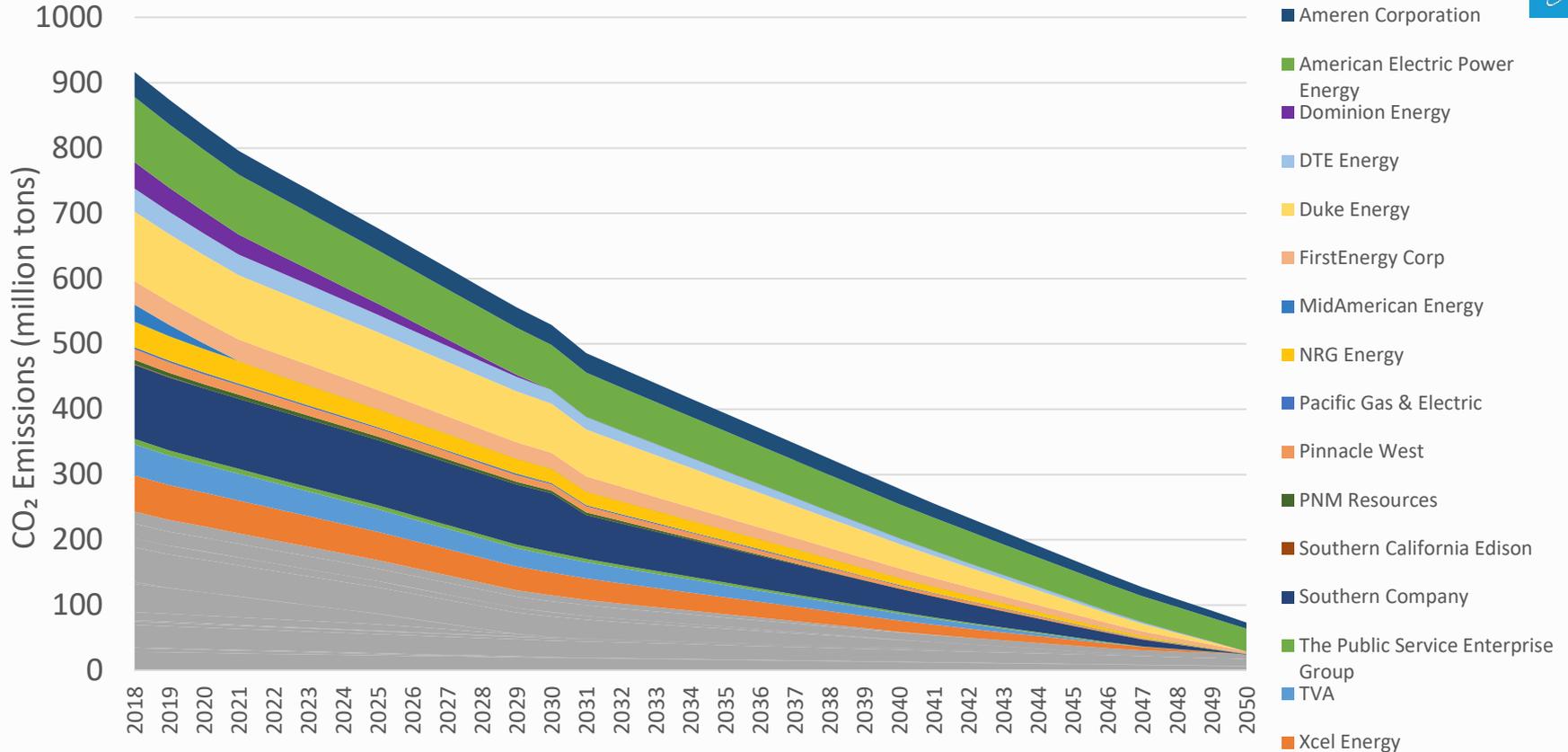
Part of the "Toyota Environmental Challenge 2050", the automaker is looking at not just reducing their carbon footprint from their cars, but also from their manufacturing facilities. To do this, Toyota has been finding ways of recycling and using alternative means of generating energy.



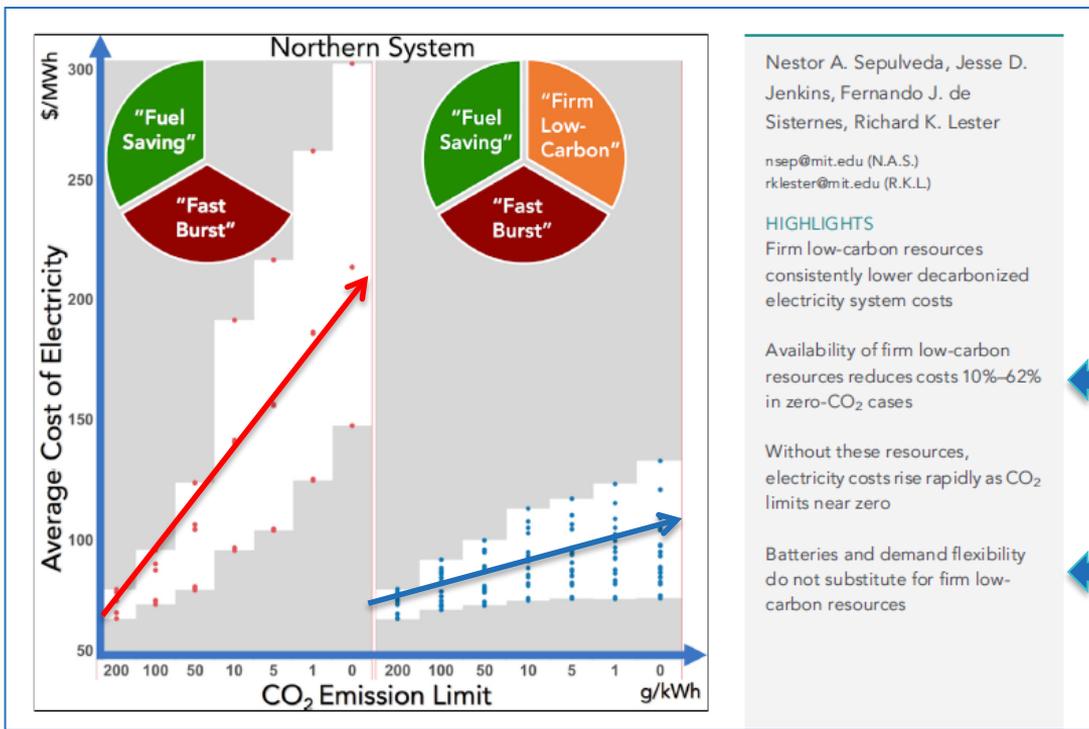
# Utilities with Emissions Reduction Pledges



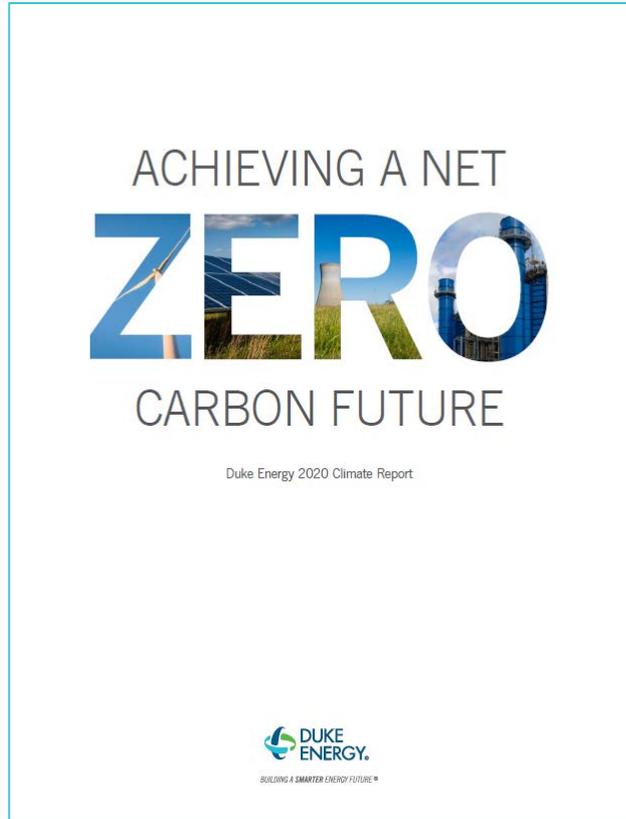
# Utility carbon emission projections based on pledges



# Firm, Low-carbon Generation (like nuclear) Enables Affordable Decarbonization



# Nuclear is key to meeting low-carbon goals



“Duke Energy aims to reduce carbon dioxide (CO<sub>2</sub>) emissions from electricity generation at least 50 percent below 2005 levels by 2030 and to achieve **net-zero CO<sub>2</sub> emissions by 2050.**”

“Our **nuclear** fleet’s nearly 11,000 MW of carbon-free generation in the Carolinas – enough to serve nearly 7 million homes – **is central to our ability to meet these goals.**”

“**Achieving net-zero CO<sub>2</sub> emissions by 2050 requires** our existing nuclear fleet to be granted **subsequent license renewals.**”

# Increasing Utility Interest in SMRs



“The grid can’t be 100 percent renewable...that last 20 percent [from 80 percent to 100 percent] has to be carbon-free, and it has to be dispatchable.”

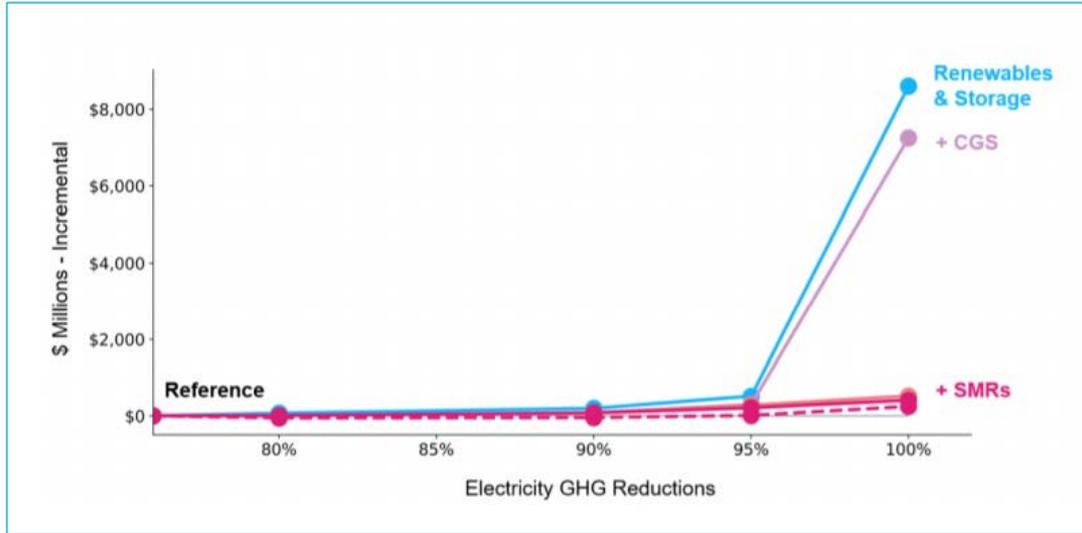
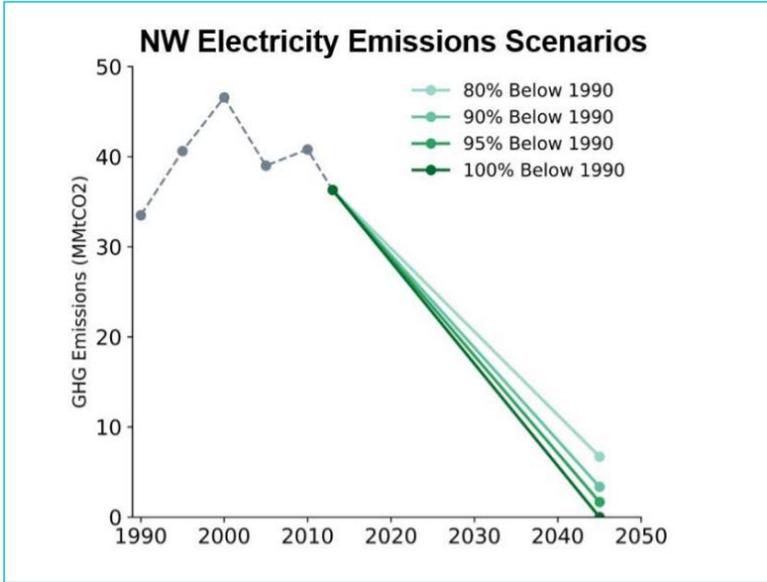
“I think nuclear plays a role in our carbon-free future...I think there's another generation out there that is smaller, less a capital bet for somebody like me sitting in a boardroom...and is safer, and has passive safety controls.” – Ben Fowke, CEO, Xcel

The price for storage has come down but is still not low enough to provide the backup needed for intermittent power sources like wind and solar. So Idaho Power will consider buying into a proposed modular nuclear reactor at the Idaho National Laboratory in East Idaho, [CEO Darrel] Anderson said. Idaho Power uses no nuclear power now, but it considers nuclear to be clean, carbon-free energy. – *Idaho Statesman*, March 26, 2019



"We believe that nuclear power has a vital role in ensuring a clean, reliable, and cost-effective supply of electricity to meet the needs of a growing economy," – Dan Stoddard, Chief Nuclear Officer, Dominion Energy

# Existing + New Nuclear is a Solution Pathway to Achieving Emissions Goals



Source: Energy + Environmental Economics (E3), see <https://www.energy-northwest.com/Documents/E3%20Study%20Executive%20Summary%20final.pdf>.

# Key Takeaways

- U.S. consumers and policymakers increasingly demanding low-carbon electricity
- States and utilities responding with deep decarbonization goals
- New nuclear is extremely valuable to deep decarbonization
  - Least-cost, most reliable low-carbon systems include nuclear energy
  - State and federal policy actions needed to overcome FOAK cost barriers

# QUESTIONS?

