

Nuclear Energy: Today and Tomorrow

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October 15, 2020



NATIONAL NUCLEAR ENERGY STRATEGY

create the nuclear imperative

NUCLEAR NARRATIVE

PRESERVE

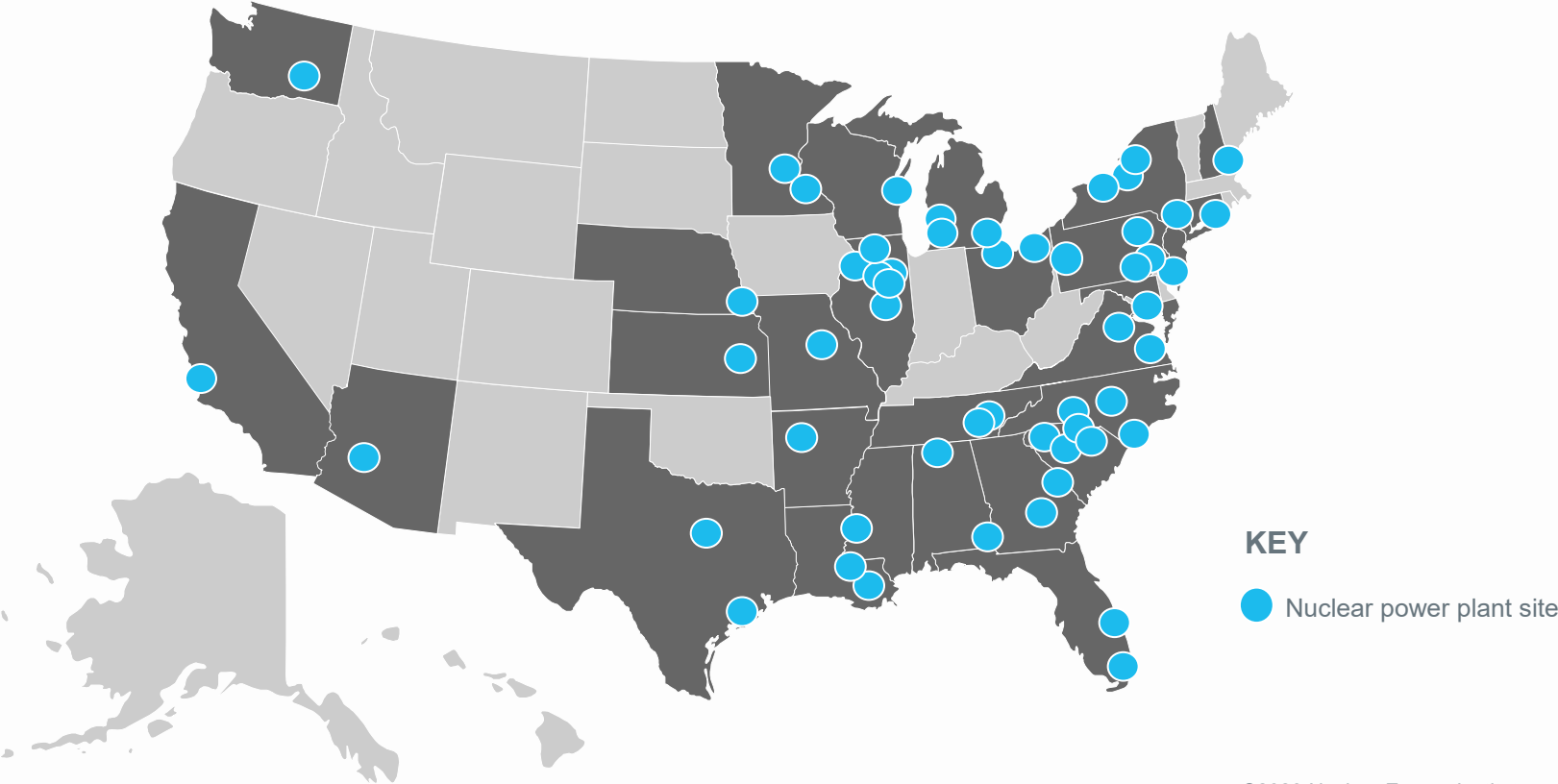
SUSTAIN

INNOVATE

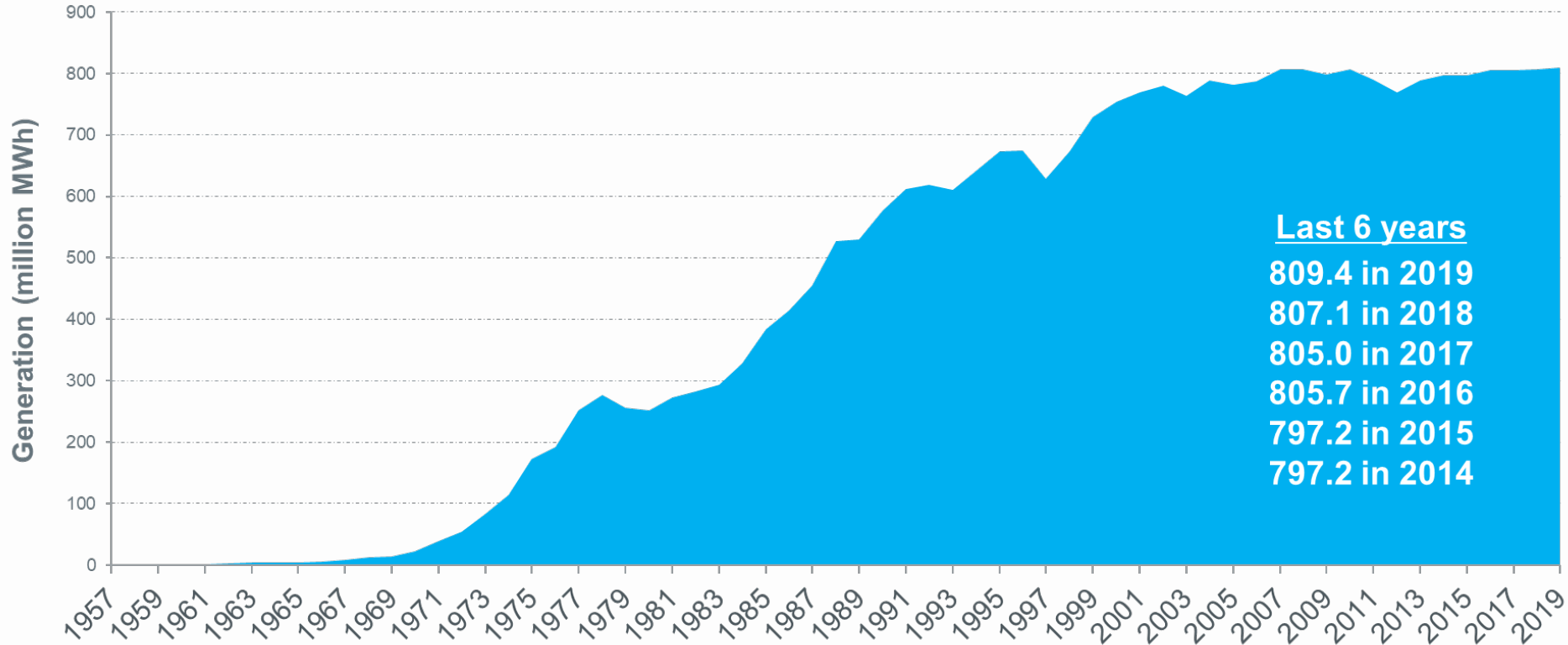
THRIVE

BEST-IN-CLASS

94 reactors at 55 plant sites across the country



Highest generation ever from nuclear power plants in 2019



Growth from efficiency improvements and uprates are equivalent to 32 new 1,000 megawatt power plants

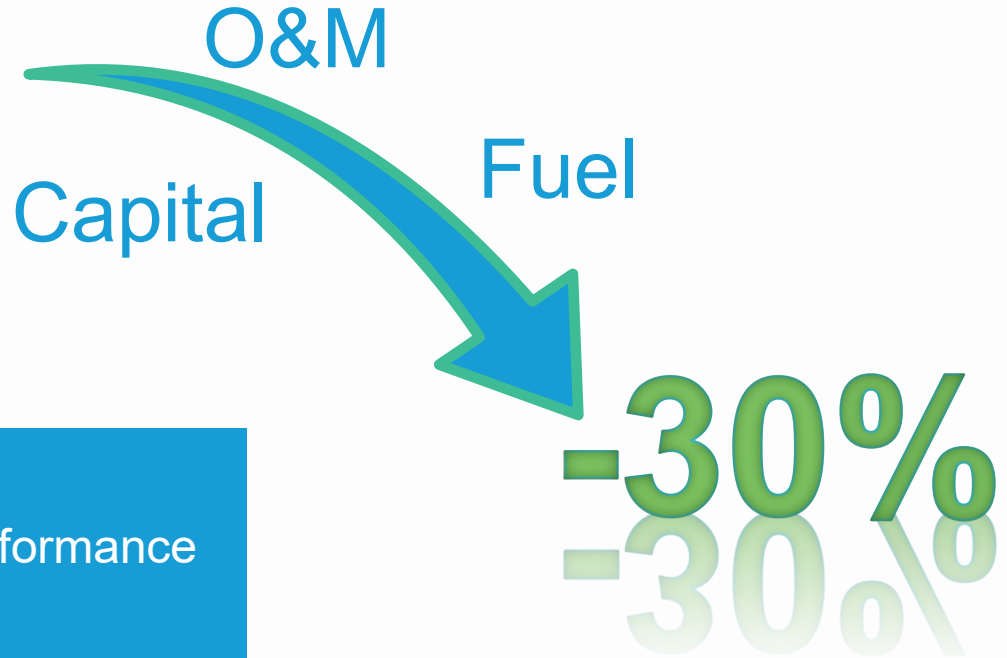


Source: Emissions avoided are calculated using regional and national fossil fuel emissions rates from the **U.S. Environmental Protection Agency** and plant generation data from the **U.S. Energy Information Administration**.
 Updated: March 2020

Operating Fleet

Cost Reduction Enablers

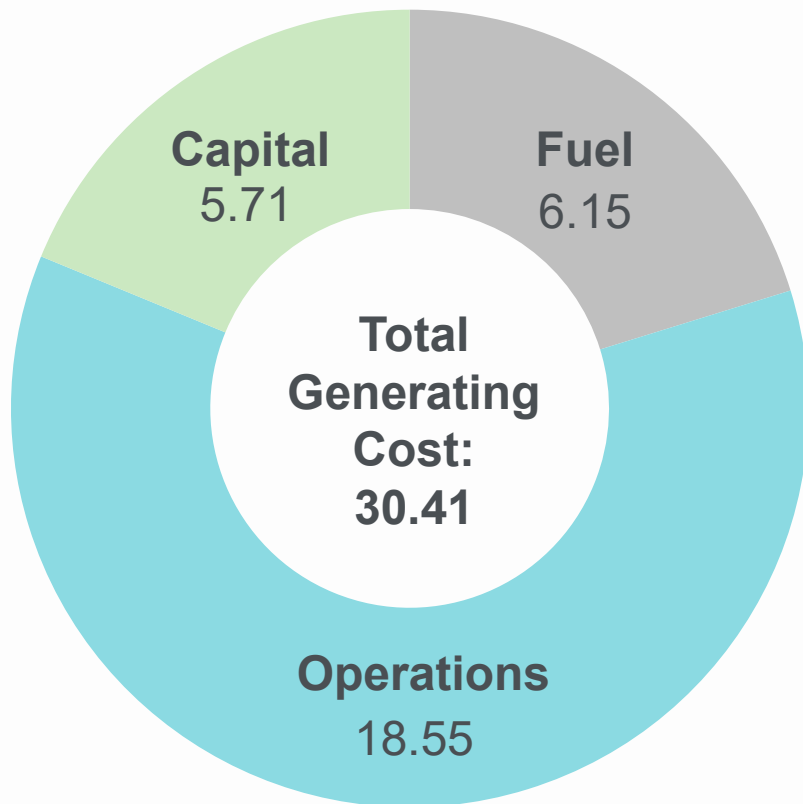
- Re-inventing processes
- Applying technology
- Focus on significance



Demonstrated Results

- ✓ Highest levels of operational performance and
- ✓ Best safety performance ever

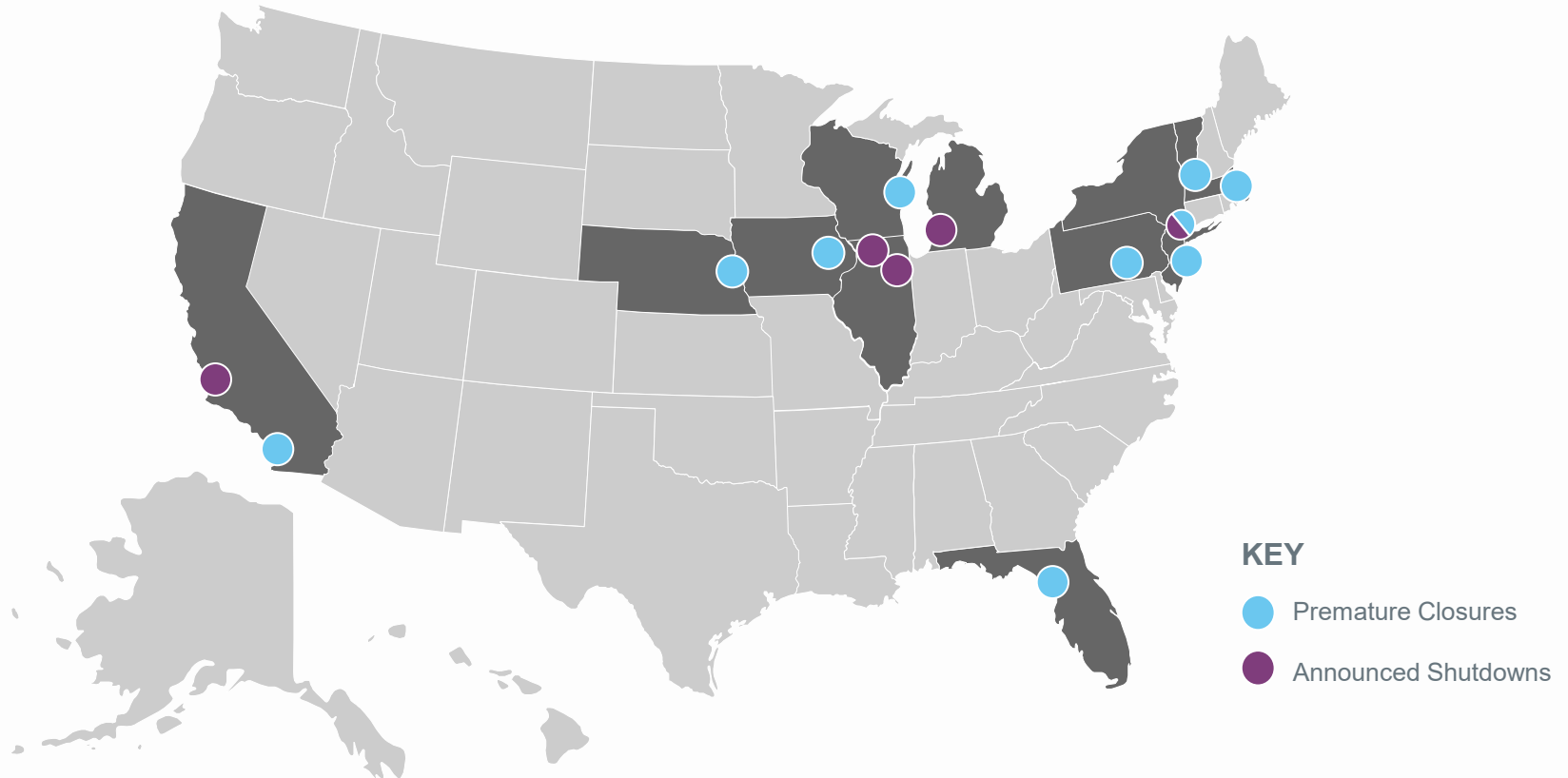
2019 total generating costs decreased nearly \$2.50/MWh



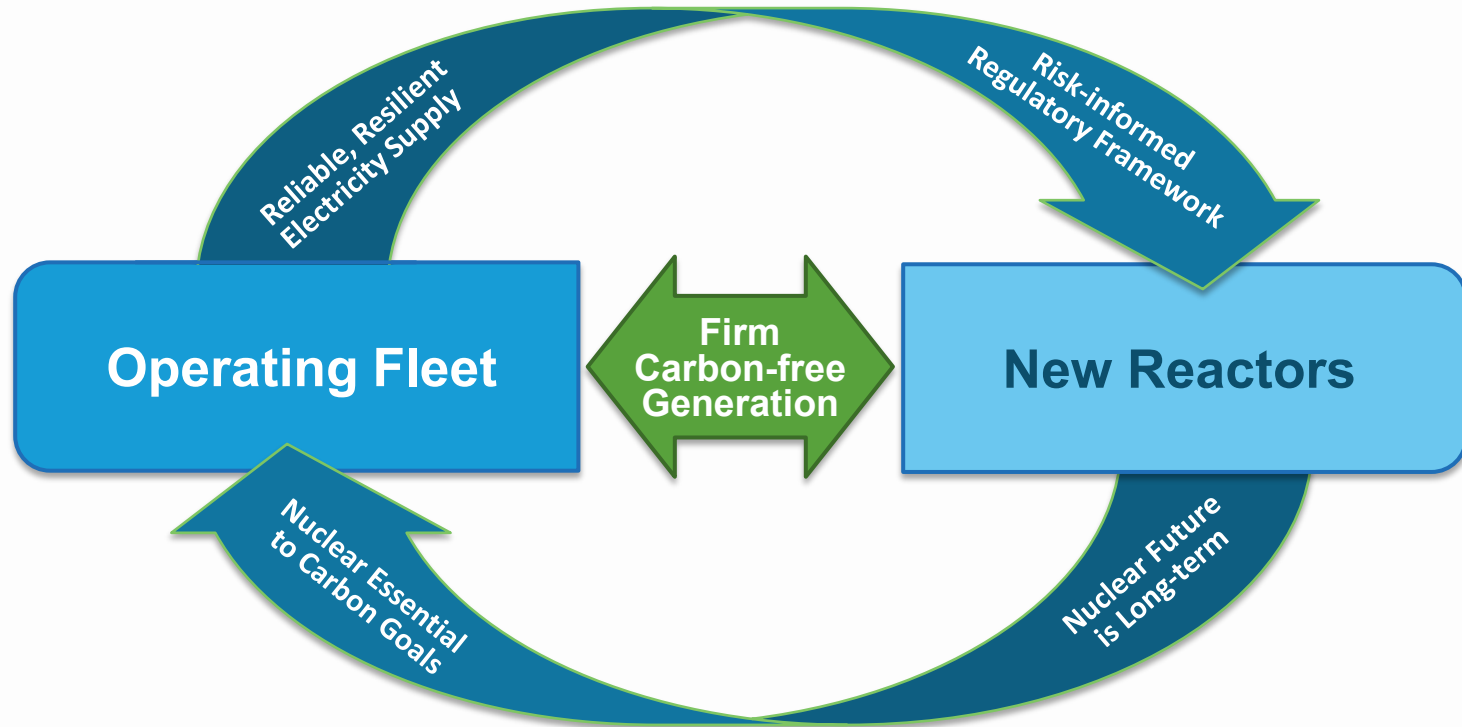
2019 costs compared to 2018:

- 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 **\$0.61/MWh (9.6% reduction)**
- Fuel costs decreased by **\$0.32/MWh (4.9% reduction)**

Premature Closures and Announced Shutdowns



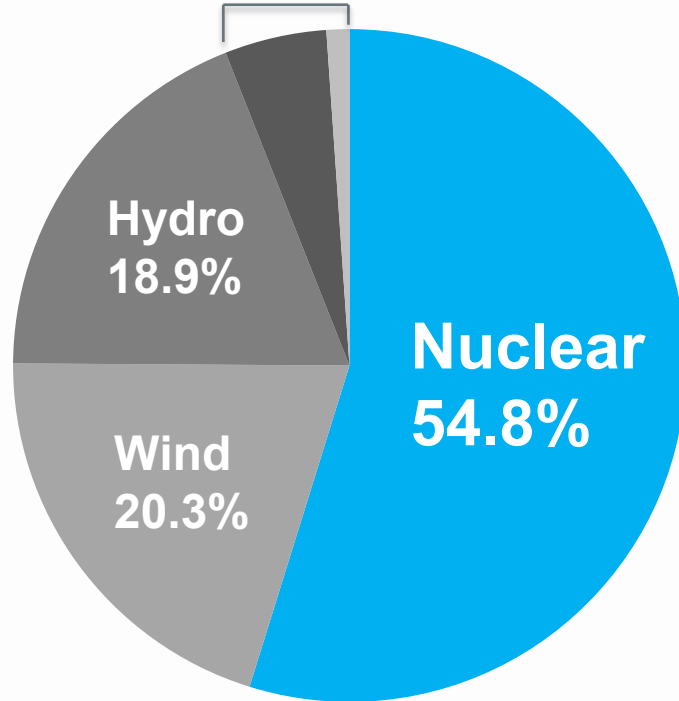
Existing and New Nuclear Support Each Other



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



Solar – 4.9%
Geothermal – 1.1%



Carbon-free generation increased by net 18.2 million MWh

Recognizing the Carbon-Free Attribute

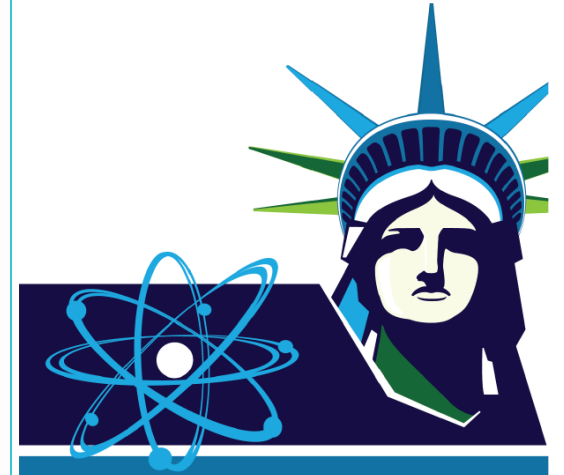
TRUMP ADMINISTRATION

Report of the Nuclear Fuel Working Group

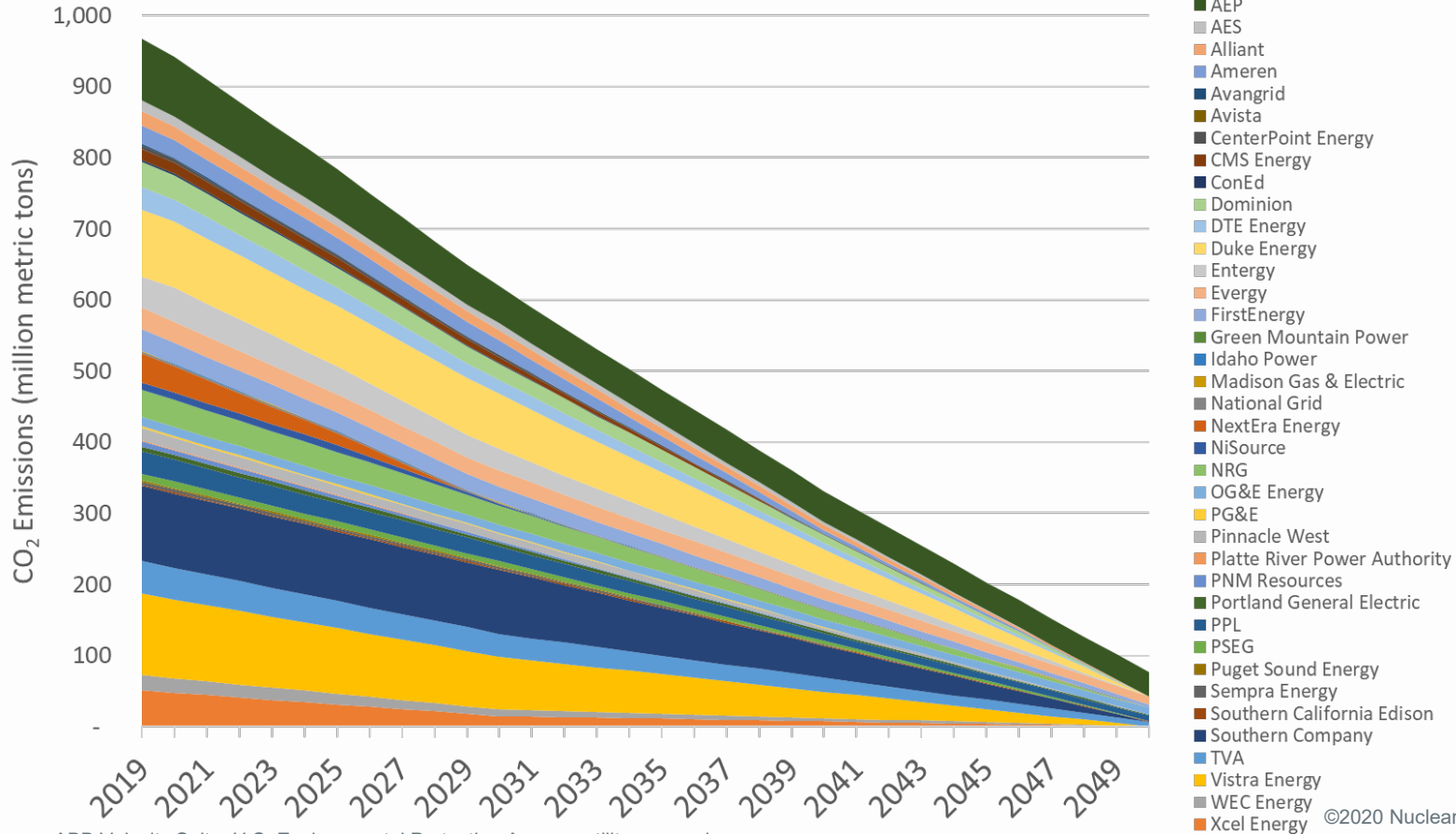
- “U.S. national security interests begin with preserving the critical infrastructure provided by baseload, carbon-free, reliable commercial nuclear power. ”
- “The policy measures considered in this strategy can help enable the continued and expanded use of clean, reliable, resilient baseload nuclear power . . . ”
- Report supports helpful policies:
 - Advanced reactor demonstrations, Accident Tolerant Fuel, High-Assay LEU, National Reactor Innovation Center and Versatile Test Reactor
 - Nuclear export agreements and financing
 - Domestic uranium reserve

RESTORING AMERICA'S COMPETITIVE NUCLEAR ENERGY ADVANTAGE

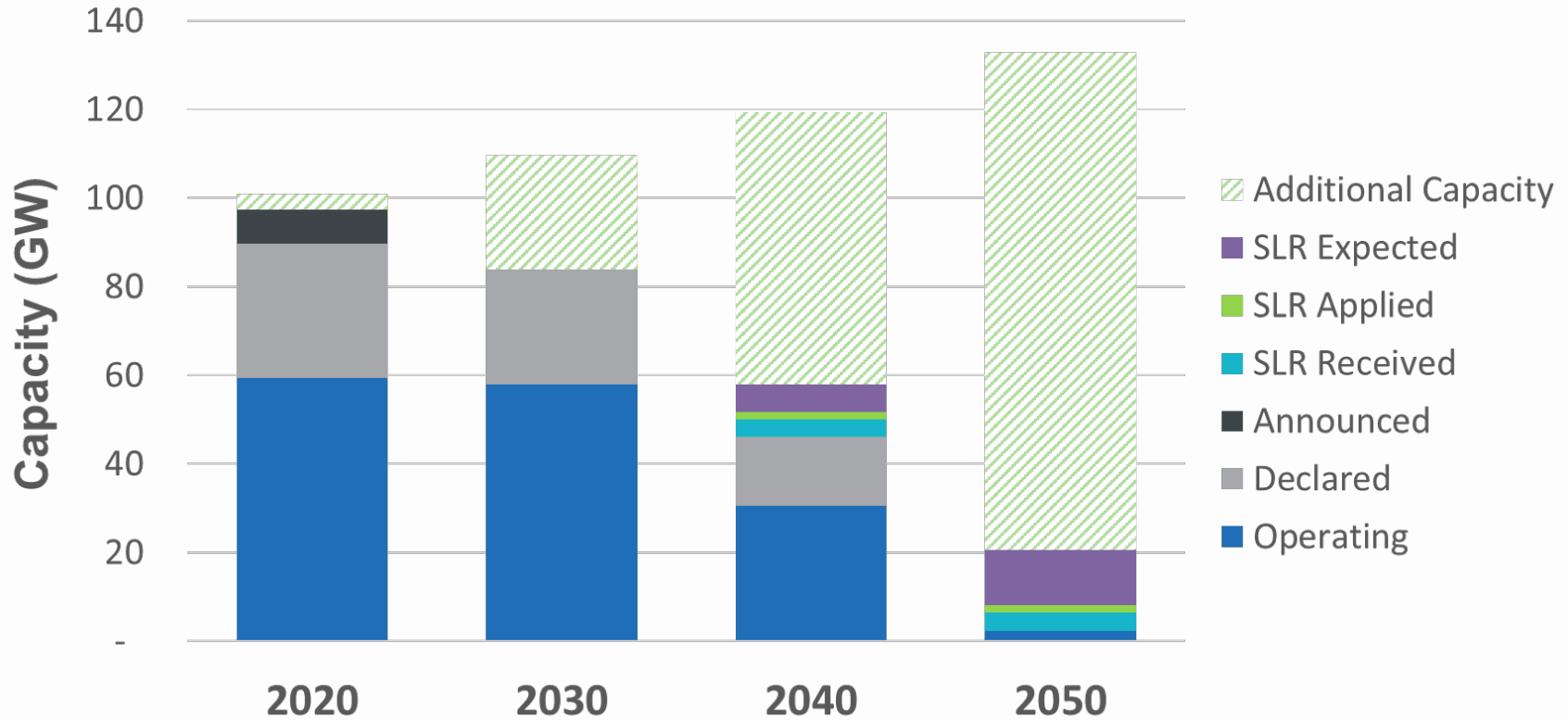
A strategy to assure U.S. national security



Utility carbon emission projections based on pledges



Maintaining 20% market share requires adding over 112 GW



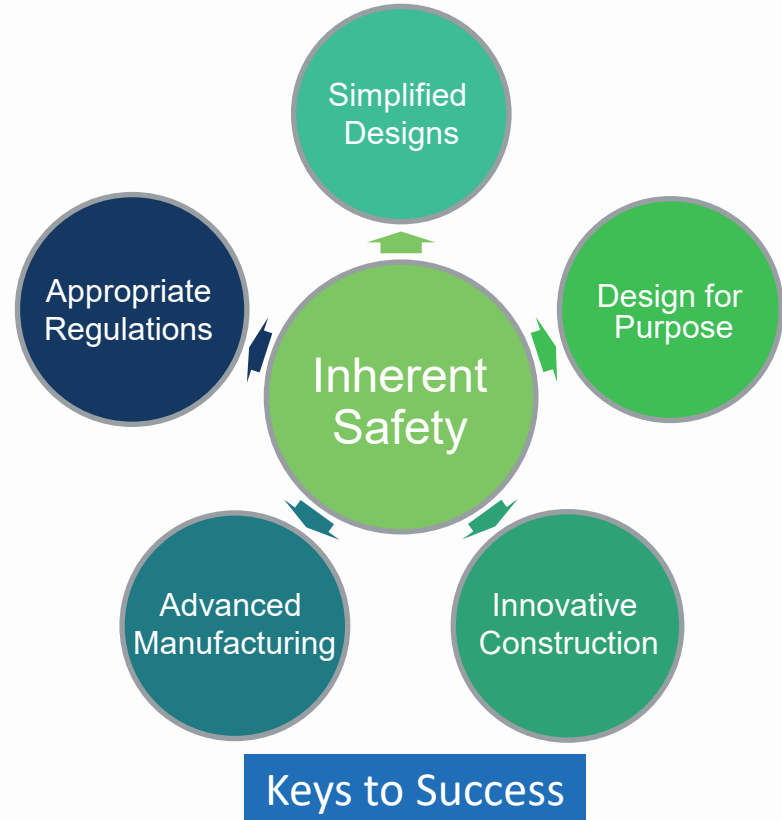
SMRs and Advanced Reactors

Cost Reduction Enablers

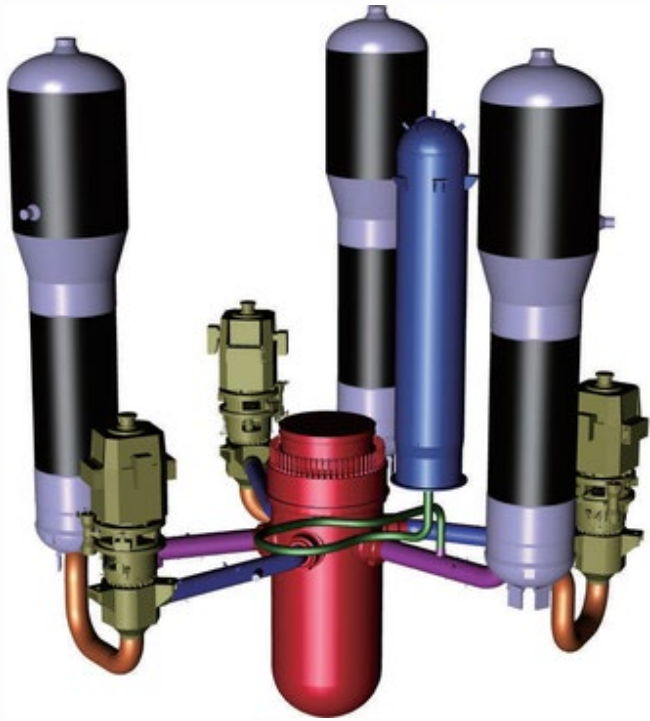
- Re-inventing processes
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Cost Competitive Products

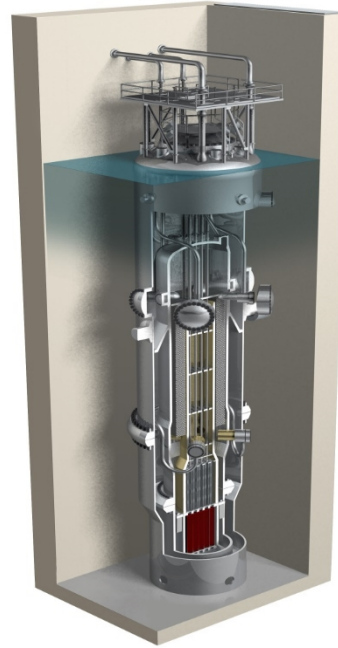
- ✓ Fit for Market
and
- ✓ Shortened time to operation



Range of Sizes Coming



1000 Megawatt Electric



60 Megawatt Electric



1-10 Megawatt Electric

Advancing Innovation to Ensure Success

Fuel Supply

- High-Assay Low Enriched Uranium enrichment capacity
- Transportation packages

Regulatory

- Technology Inclusive Content of Application effort
- Accelerating technical and environmental reviews
- NRC Emergency Preparedness Rulemaking
- NRC Physical Security Rulemaking
- Part 53 Rulemaking
- Fuel qualification

Establishing an Efficient and Reliable Framework

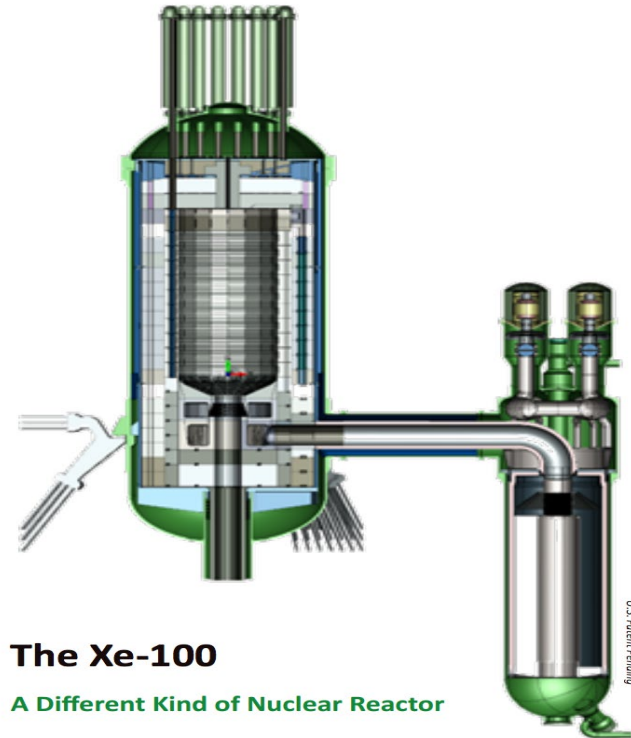
Advanced Reactor Development Support

Diverse NGO Support

- Clean Air Task Force
- Nuclear Innovation Alliance
- Third Way, ClearPath and others

Bipartisan Support

- Two bills signed into Law in Last Congress
 - Nuclear Energy Innovation Capabilities Act
 - Nuclear Energy Innovation and Modernization Act
- Nuclear Energy Leadership Act Introduced
- Strong appropriations in FY19 and FY20



Advanced Reactor Activity Growing

United States

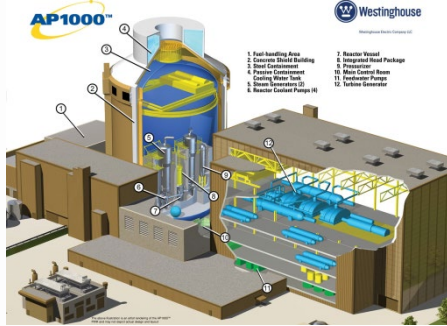
- NRC Staff approval of NuScale design – ahead of schedule
- NRC acceptance of Oklo combined operating license application
- Utah Associated Municipal Power Systems (UAMPS) Clean Power Project
- DOD Strategic Capabilities Office
- Advanced Reactor Demonstration Program
- Ten companies interacting with NRC
- Utility-developer/developer-supplier relationships

Canada

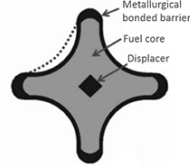
- Seven U.S. companies in vendor design review
- Utility-developer/developer-supplier relationships

Accelerating rate of development

Continuum of Innovation



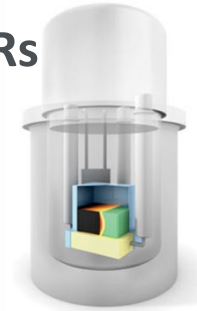
Evolutionary LWR Fuels



Lightbridge's four-lobe metallic fuel rod cross-section

Advanced Non-LWRs

- Hi-temp gas
- Liquid metal
- Molten salt



2022

Vogtle 3 & 4



2025

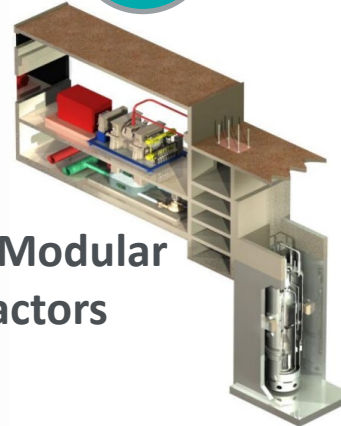


Micro-reactors

2030

NuScale Power Module

Small Modular Reactors



2035



New Reactor Projects

QUESTIONS?

ELR@NEI.ORG



By Third Way, GENSLER