



# The State of Nuclear: Current Challenges and Opportunities

---

NARUC-DOE Nuclear Energy Partnership

**FRIDAY, MAY 7, 2021**

**2:00 – 3:00PM ET**

# WELCOME

- **Commissioner Anthony O'Donnell**, Maryland Public Service Commission, Partnership Co-Chair
- **Commissioner Tim Echols**, Georgia Public Service Commission, Partnership Co-Chair



# NARUC-DOE NUCLEAR ENERGY PARTNERSHIP

- Launched in March 2021 with support from the U.S. Department of Energy Office of Nuclear Energy
- An educational partnership that provides opportunities for state public service commissioners and commission staff to better understand barriers and possibilities related to the U.S. nuclear fleet, the nation's largest source of zero-carbon power
- Includes commissions and commission staff representing 20 states and territories
- Associate members from the Coalition for Advanced Reactor Solutions, University of Michigan Nuclear Engineering and Radiological Sciences



# PANELISTS

- **Matthew Crozat**, Senior Director for Strategy and Policy Development, Nuclear Energy Institute
- **Heather Feldman**, Director of Innovation in the Nuclear Sector, Electric Power Research Institute (EPRI)
- **Jessica Lovering**, Co-Founder, Good Energy Collective



# Role of Nuclear Energy in U.S.

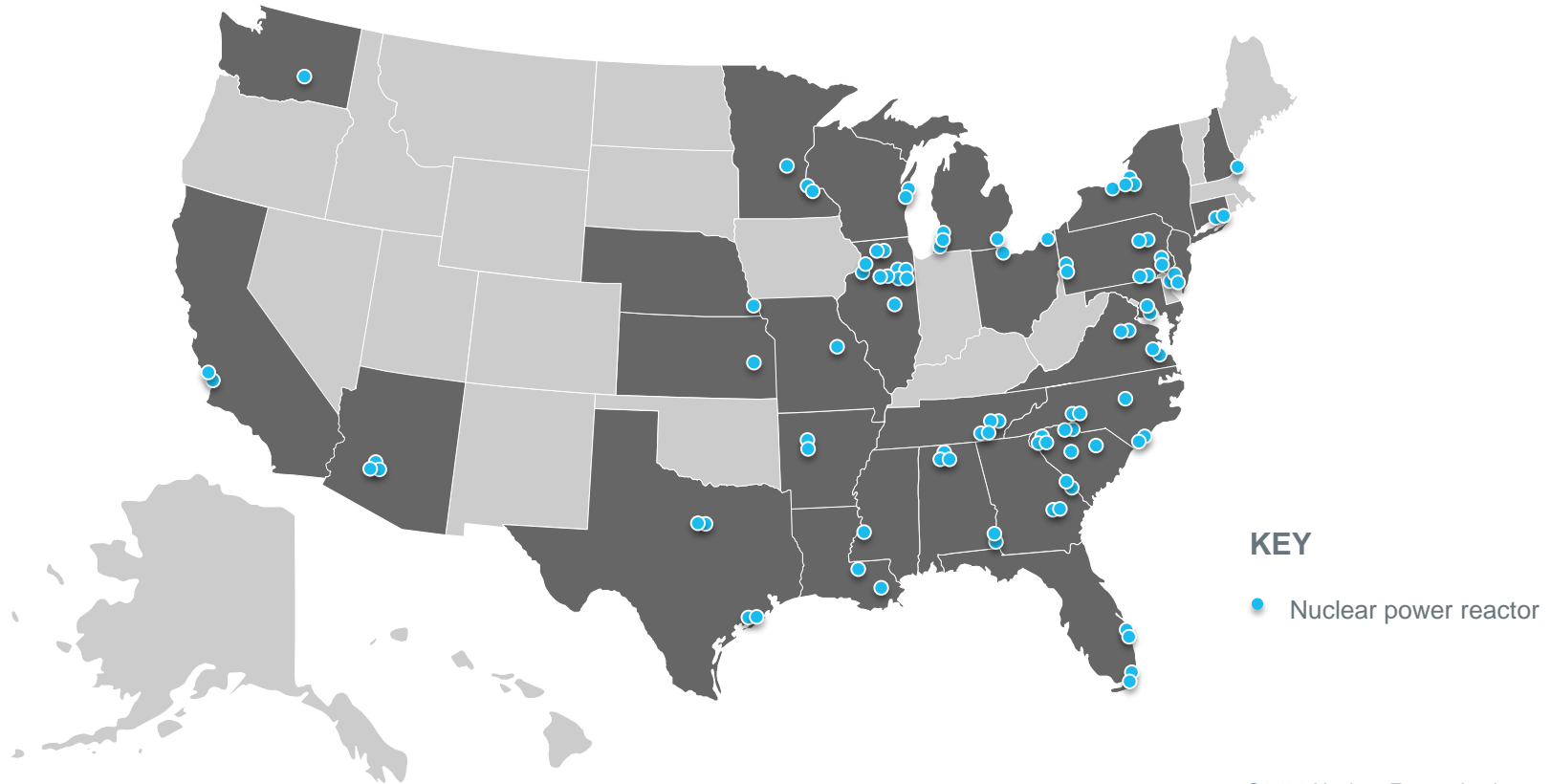
Matt Crozat

Senior Director, Strategy and Policy Development

May 7, 2021



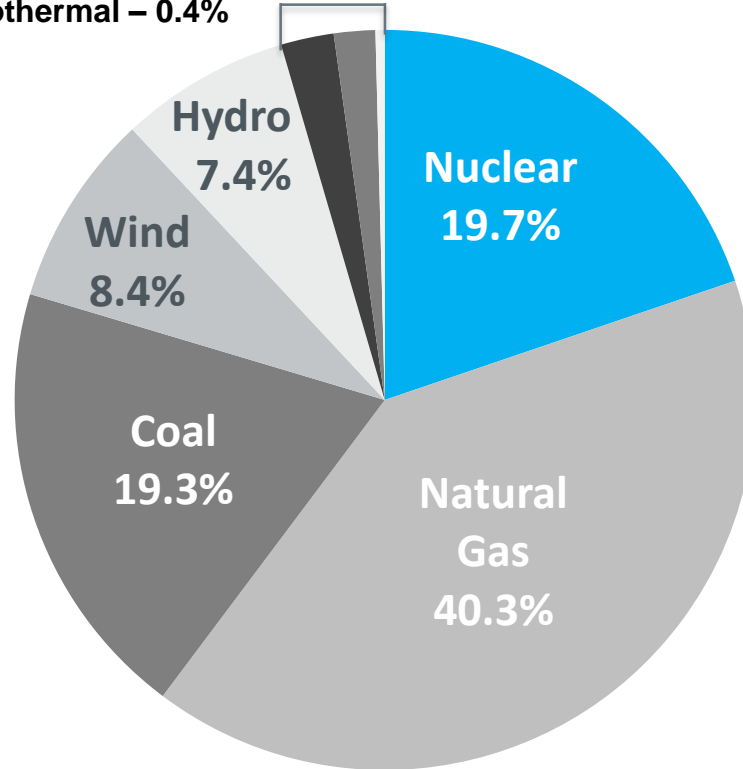
# 93 reactors at 54 plant sites across the country



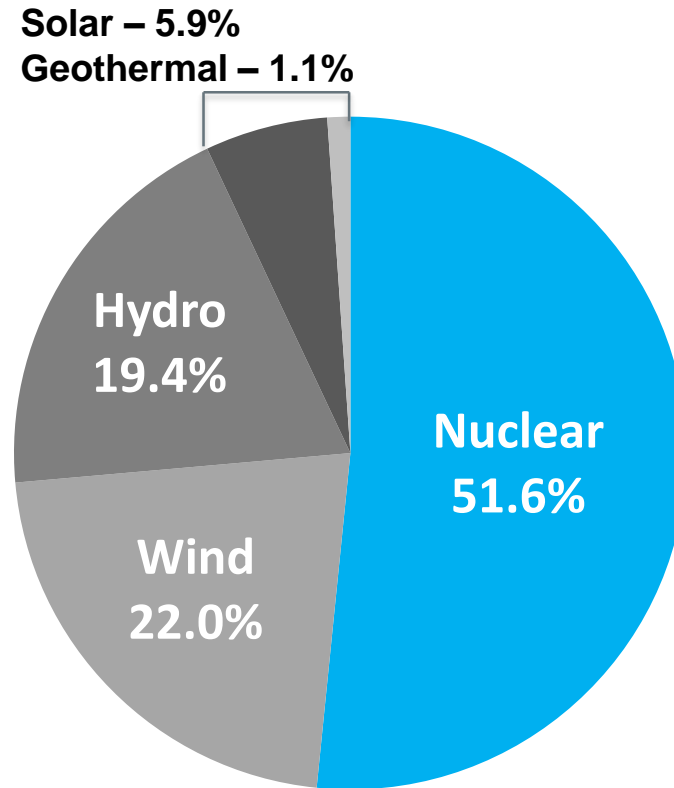
# Nuclear is the second-largest generation source in the U.S.



Solar – 2.3%  
Biomass & Petroleum – 1.8%  
Geothermal – 0.4%

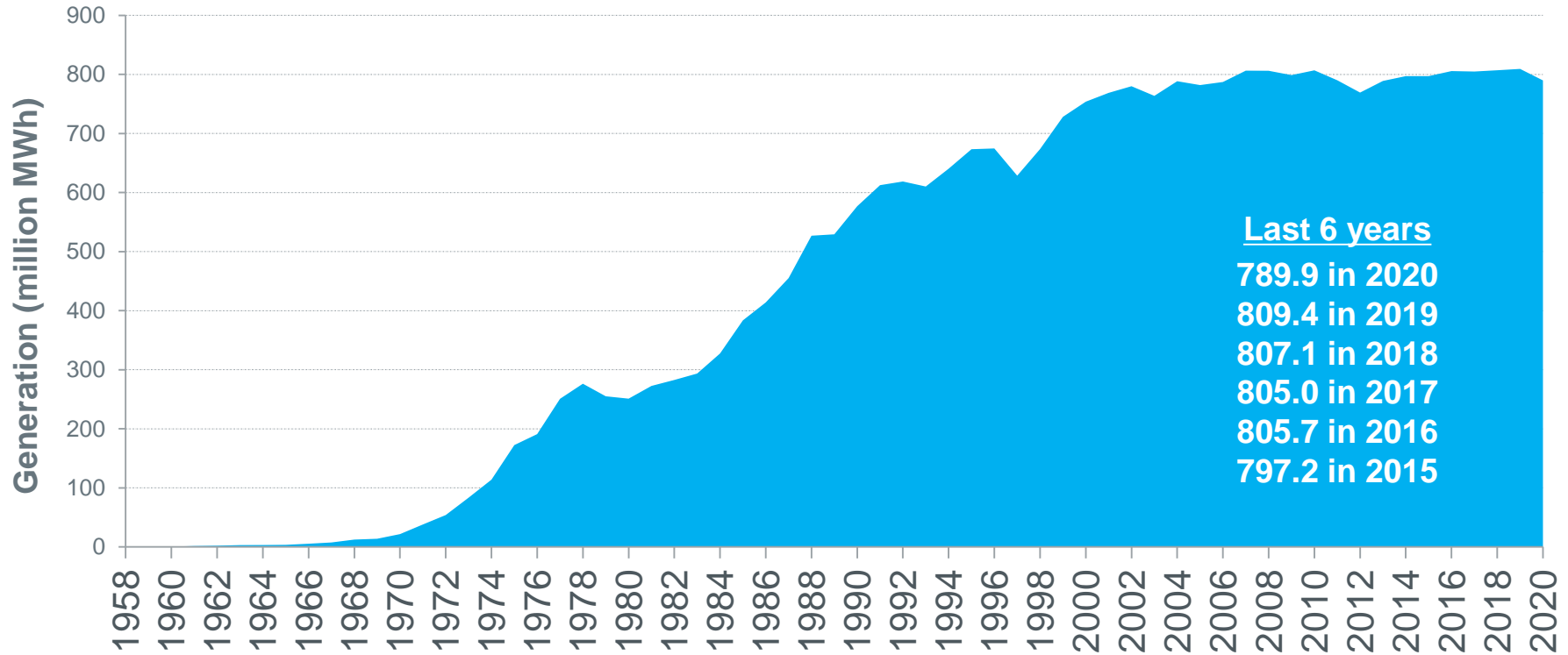


# Nuclear power continued to provide **more than half of U.S. emissions-free electricity** in 2020

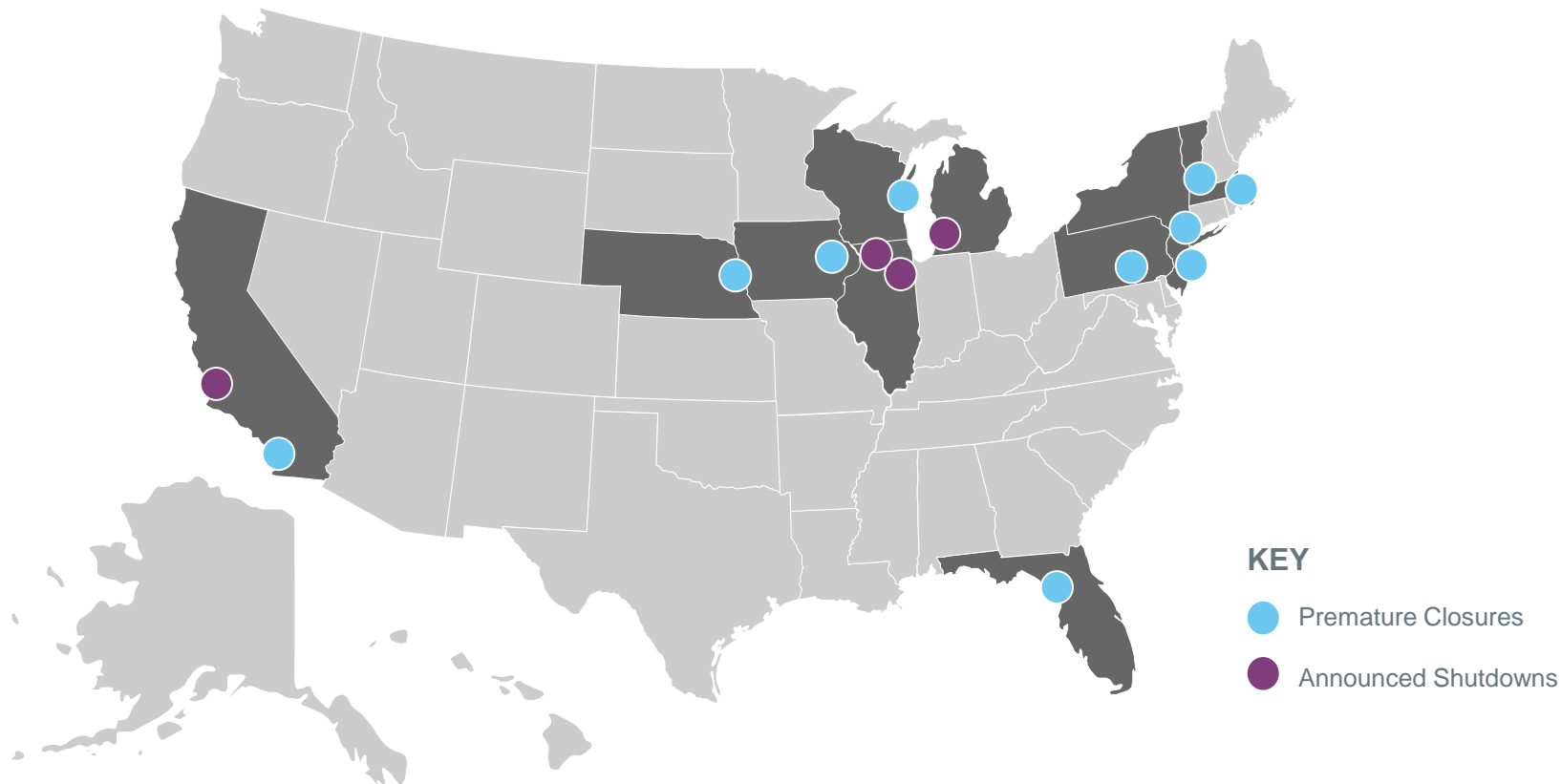




# Nuclear power plants sustained high generation in 2020



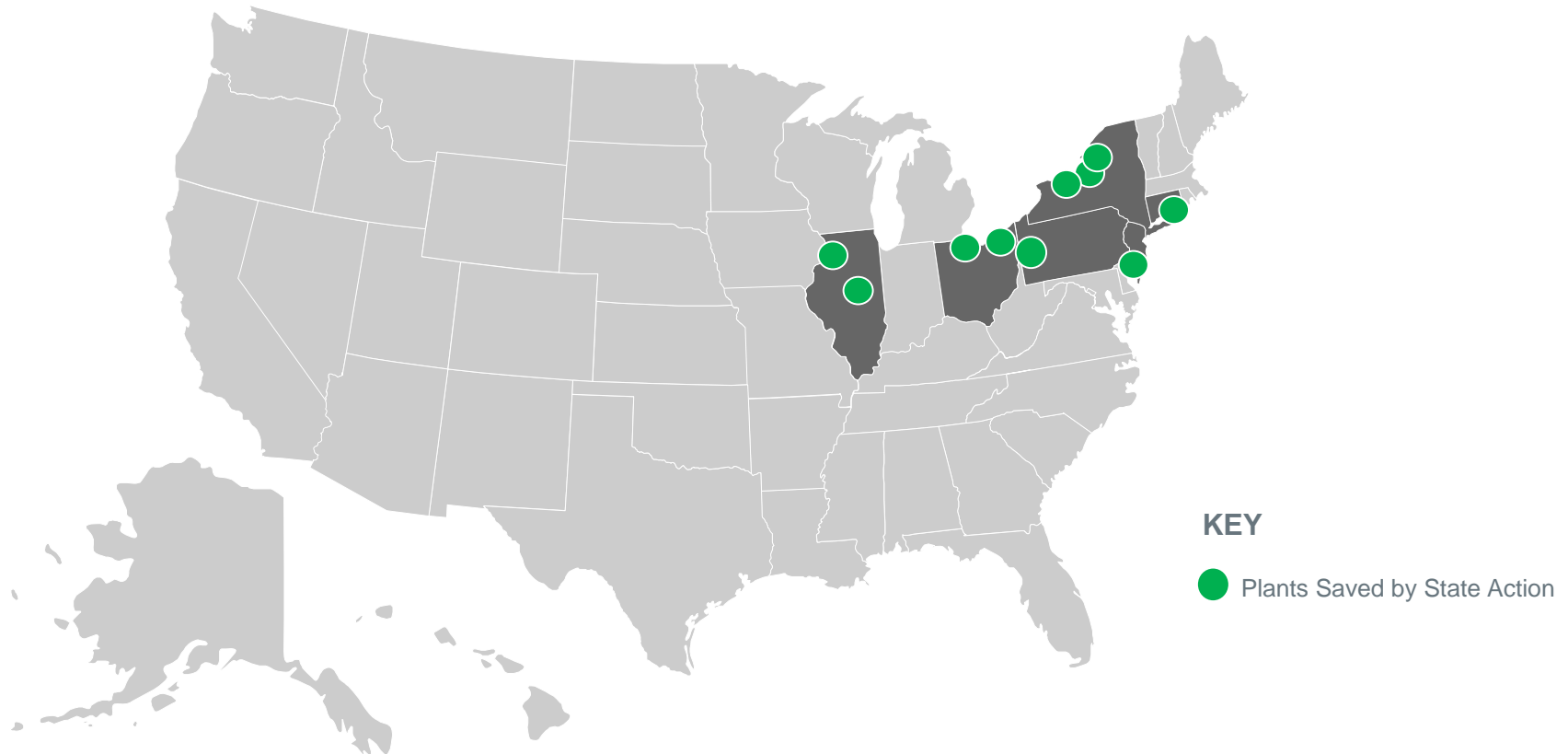
# Premature Closures and Announced Shutdowns



## KEY

-  Premature Closures
-  Announced Shutdowns

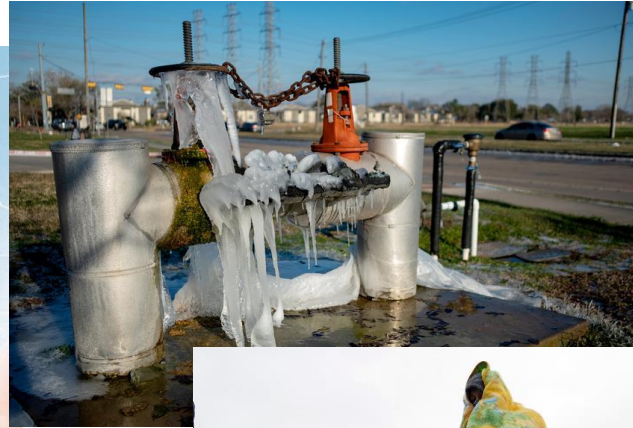
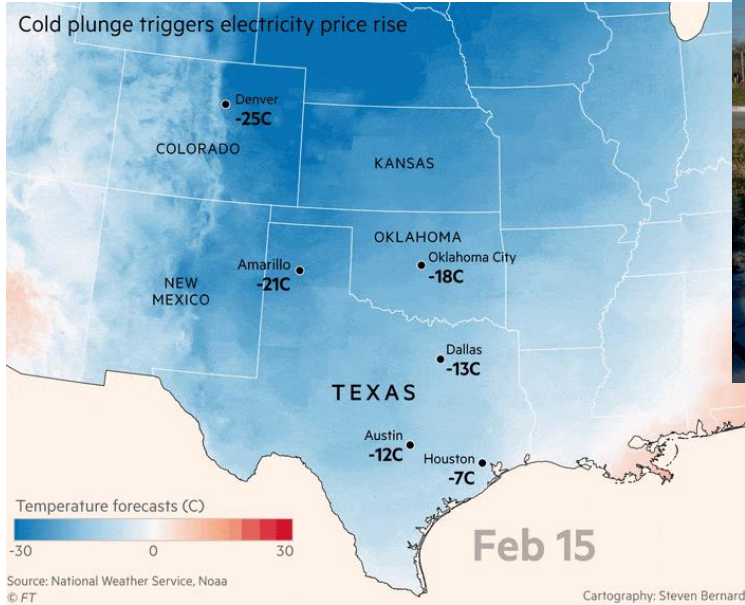
# More than 10,000 direct jobs saved from state actions



# Nuclear Value Proposition

Nuclear Energy. Firm. Carbon-Free.

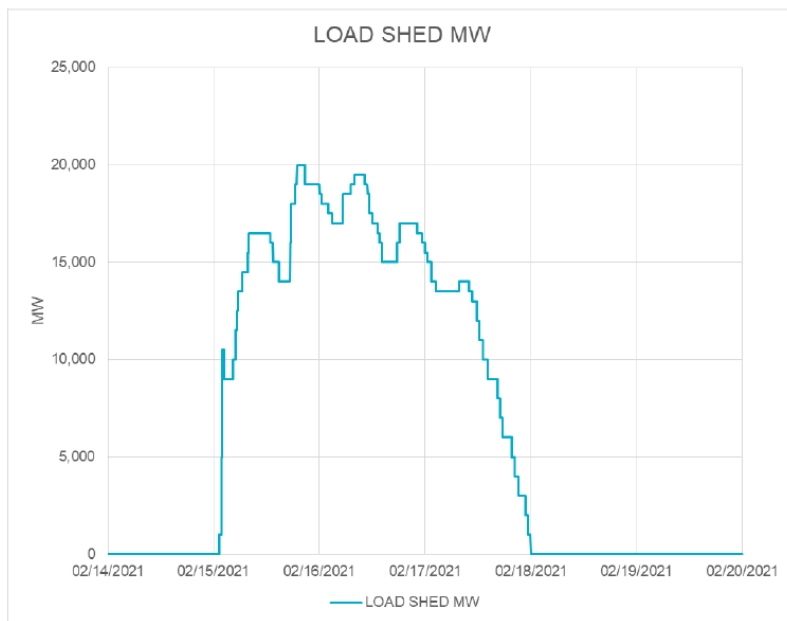
# Need for Firm Power: Texas, Feb. 2021



# Need for Firm Power: Texas

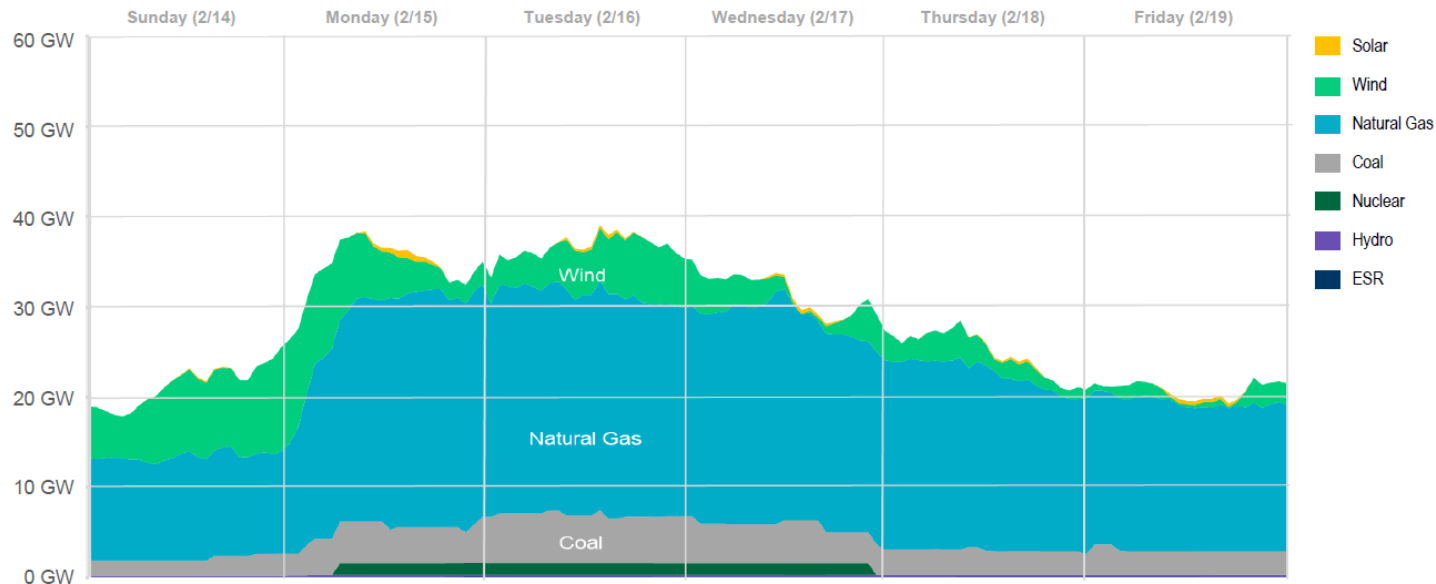
## Load Shed Ordered By Transmission Owner

Transmission Operator	% of MW
AEP Texas Central Company	8.7
Brazos Electric Power Cooperative Inc.	4.95
Brownsville Public Utilities Board	0.37
Bryan Texas Utilities	0.51
CenterPoint Energy Houston Electric LLC	24.83
City of Austin DBA Austin Energy	3.71
City of College Station	0.28
City of Garland	0.75
CPS Energy (San Antonio)	6.79
Denton Municipal Electric	0.48
GEUS (Greenville)	0.15
Lamar County Electric Cooperative Inc*	0.07
LCRA Transmission Services Corporation	5.96
Oncor Electric Delivery Company LLC	36.01
Rayburn Country Electric Cooperative Inc.	1.3
South Texas Electric Cooperative Inc.	2.52
Texas-New Mexico Power Company	2.62
<b>ERCOT Total</b>	<b>100.00</b>



# Need for Firm Power: Texas

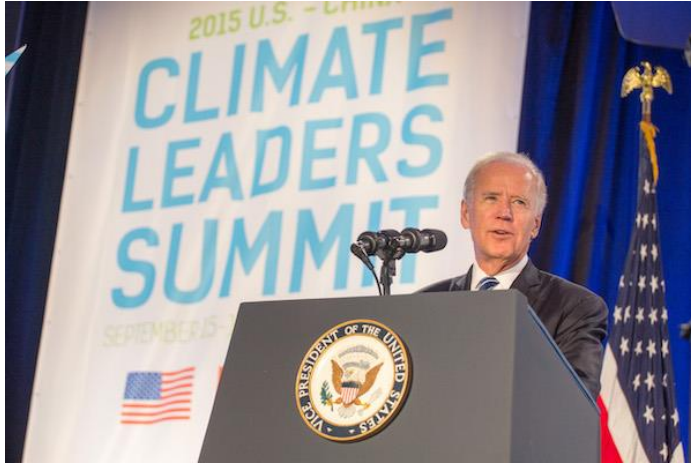
## Net Generator Outages and Derates by Fuel Type (MW)



Version Date: 4/22/2021

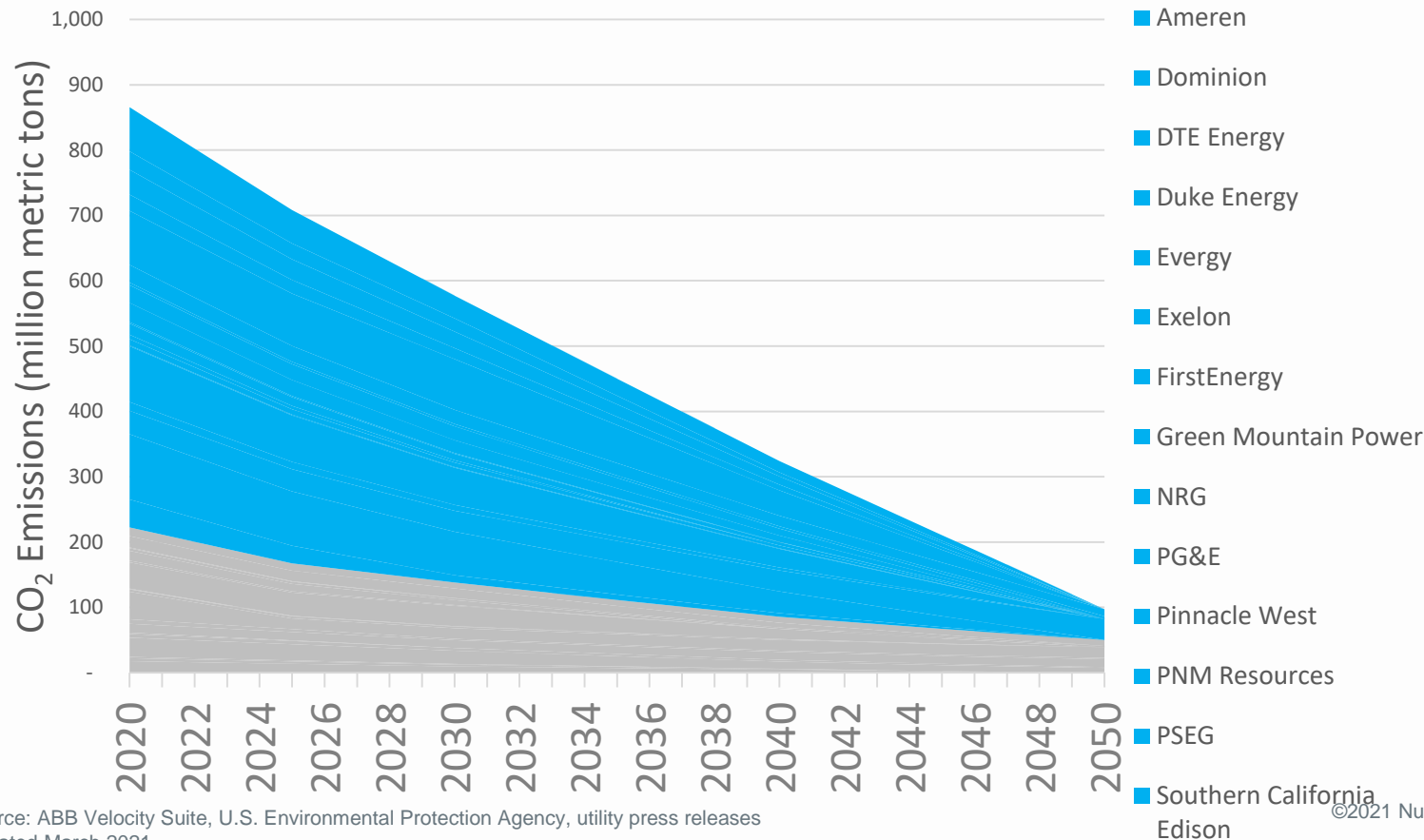
Wind and solar MW values based on estimated lost output due to outages and derates from slides 15 and 16.

# Need for Carbon-Free Electricity: Policy

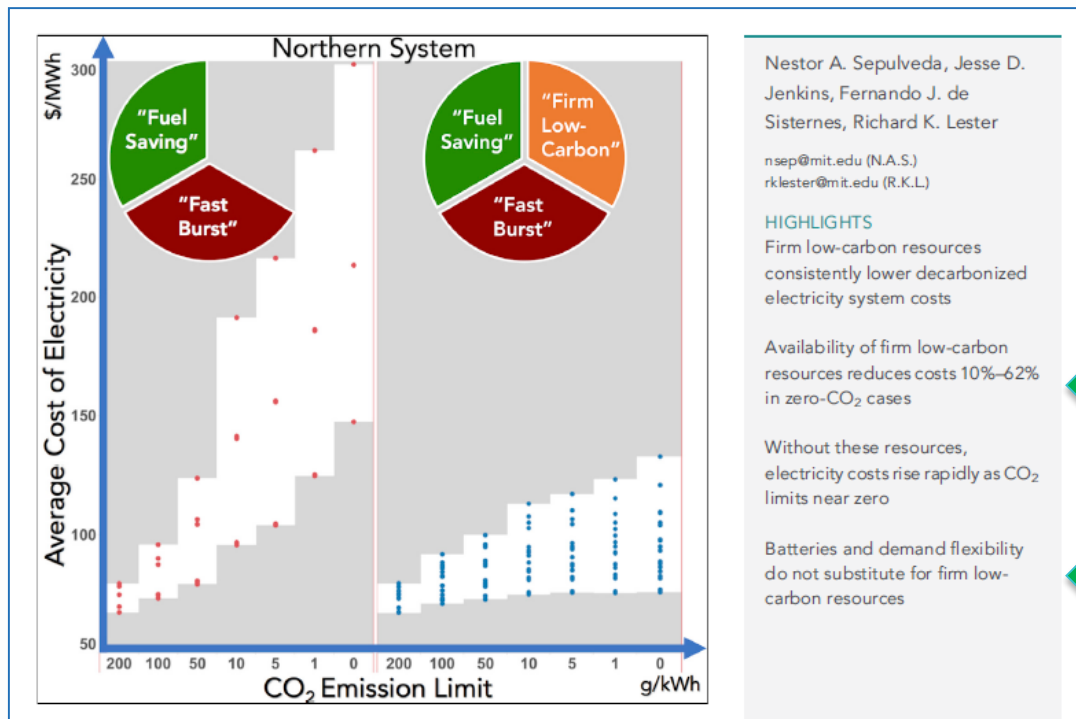




# Need for Carbon-Free Electricity: Utilities



# Need for Firm AND Carbon-Free



**FIRM GENERATION ASSURES RELIABILITY, REDUCES TOTAL SYSTEM COSTS**

# Nuclear Value Proposition

Nuclear Energy. Firm. Carbon-Free.

# State of Nuclear Power

## And its role in economy wide decarbonization

**Heather Feldman**

Director, Nuclear Innovation

May 2021



[www.epri.com](http://www.epri.com)

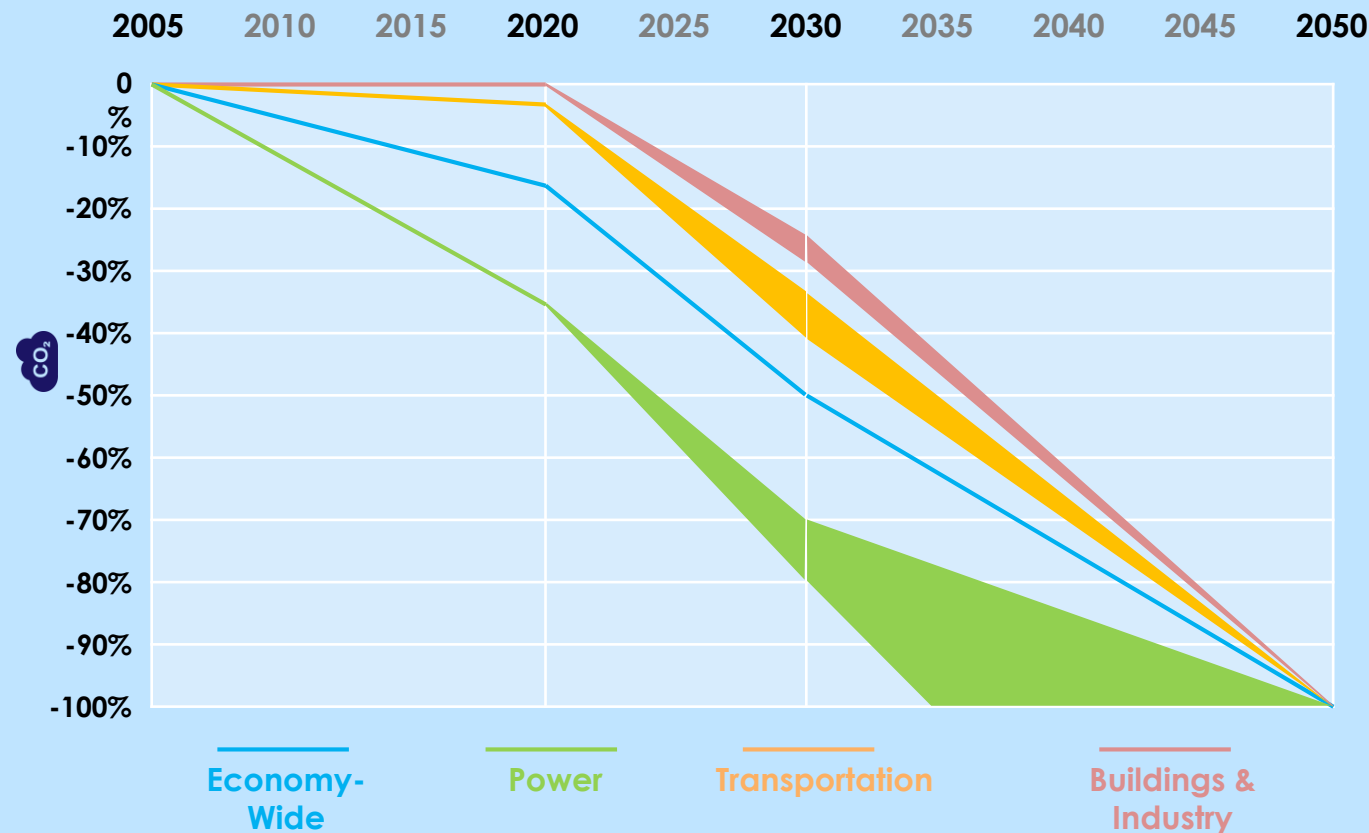
m

© 2021 Electric Power Research Institute, Inc. All rights reserved.



# Examining the Pace of U.S. Carbon Reduction Based on 2030 Goals

Collaborative innovation essential to an affordable and reliable energy future



# Today's plants enable for our long-term future

World Nuclear  
Generation

2,560,05



GWH



March 2020, NEI

Emissions  
**AVOIDED**



in the  
U.S.

Emissions from  
**100** million

=



passenger vehicles

**86**  
U.S. Reactors

License Renewals

for

**40-60**  
years



March 2020, NEI

License  
Renewals

for

**80**  
years

**Peach Bottom 2, 3**  
(Pennsylvania)

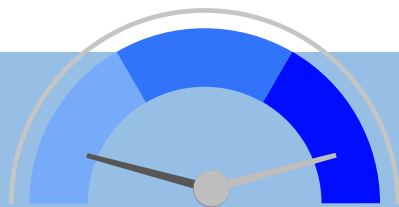
**Surry 1, 2**  
(Virginia)

**Turkey Point 3, 4**  
(Florida)



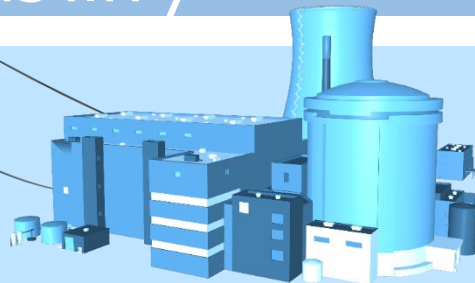
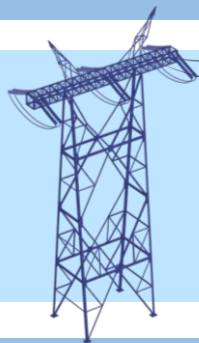
# Flexible operations for a resilient energy portfolio

# EXPANDING the Range of flexibility



## Frequency Control

## & Other Grid Services

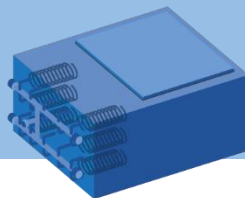


## Nuclear Beyond Electricity



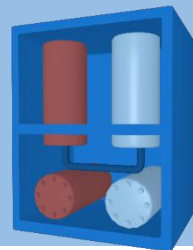
Hydrogen  
Generation

Water desalination



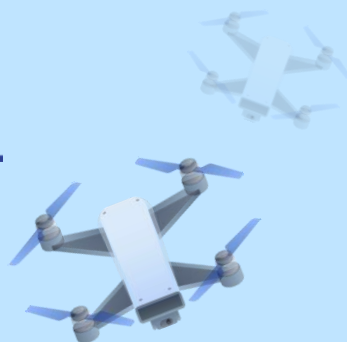
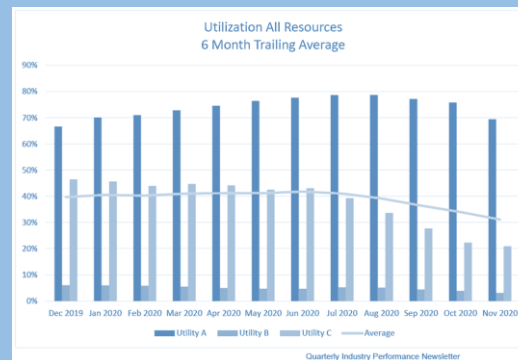
Thermal  
storage

Electrical  
storage



# Deploying technology and innovation to optimize O&M

## Electronic work packages



## Drones



# Our long-term future

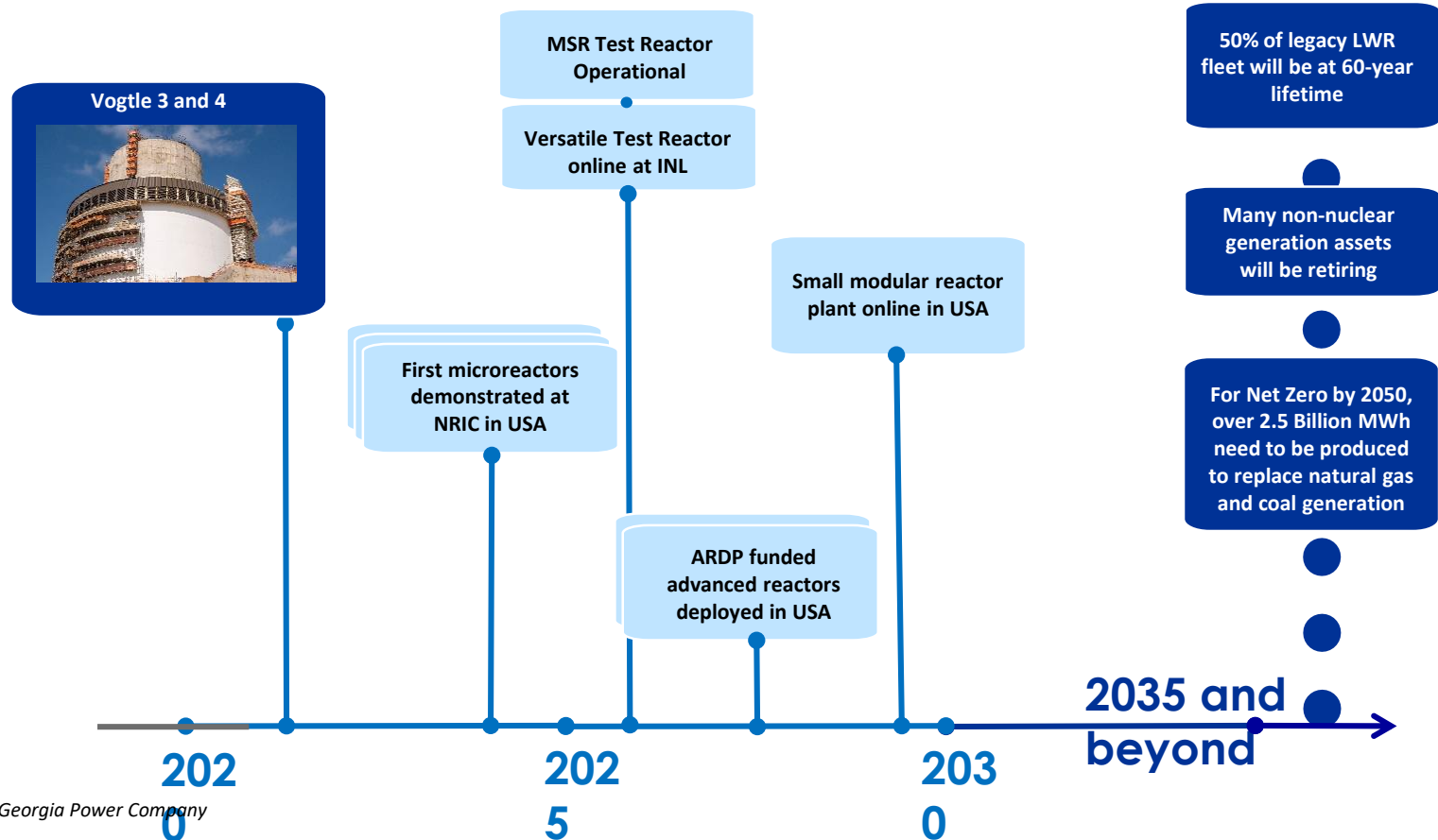


Photo credit: Georgia Power Company

A blue-tinted photograph of four people, two men and two women, standing in a row. They are all wearing white lab coats or work shirts. The woman in the center is also wearing a white hard hat. They are all smiling and looking towards the camera. The background is a solid blue color.

# Together...Shaping the Future of Electricity



Jessica R. Lovering, @J\_Lovering  
NARUC-DOE Nuclear Energy Partnership  
Friday, May 7, 2021

[www.GoodEnergyCollective.org](http://www.GoodEnergyCollective.org)  
Twitter: @GoodEnergyColl


# Who We are

The **Good Energy Collective** is a progressive think-tank that delivers policy and leadership on nuclear energy.



good energy collective

# Earning Social License for New Nuclear



# Old Model for Siting & Project Development

- Decide-Announce-Defend
- Need a new, community-driven model
- States can play a strong role in holistic planning of siting new energy infrastructure

# Community Opposition



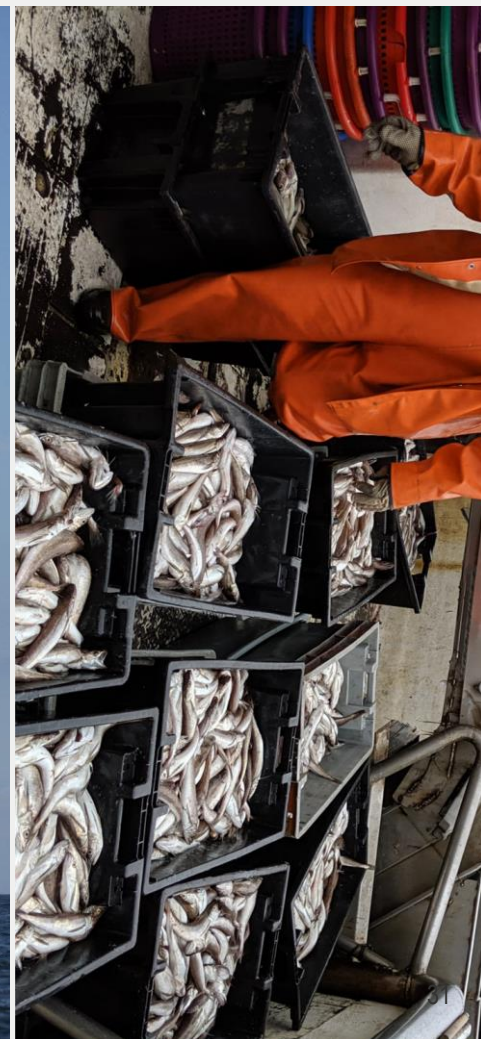
## Nation's first mega-offshore wind project stalled for additional study



Scott Tong

Sep 13, 2019

The nation's first large-scale offshore wind farm has been delayed by the federal government, leaving unclear how long it will be until America's next renewable energy sector will launch. The main opposition: outspoken commercial fishing interests in New England.



# Current Context

- Green New Deal
- Tying climate action to Environmental Justice
- Explicit in Biden's campaign, climate agenda, and now in American Jobs Act

*We will advance innovative technologies that create cost-effective pathways for industries to decarbonize, including carbon capture and sequestration that permanently stores greenhouse gases and advanced nuclear that eliminates risks associated with conventional nuclear technology, while ensuring environmental justice and other overburdened communities are protected from increases in cumulative pollution.*

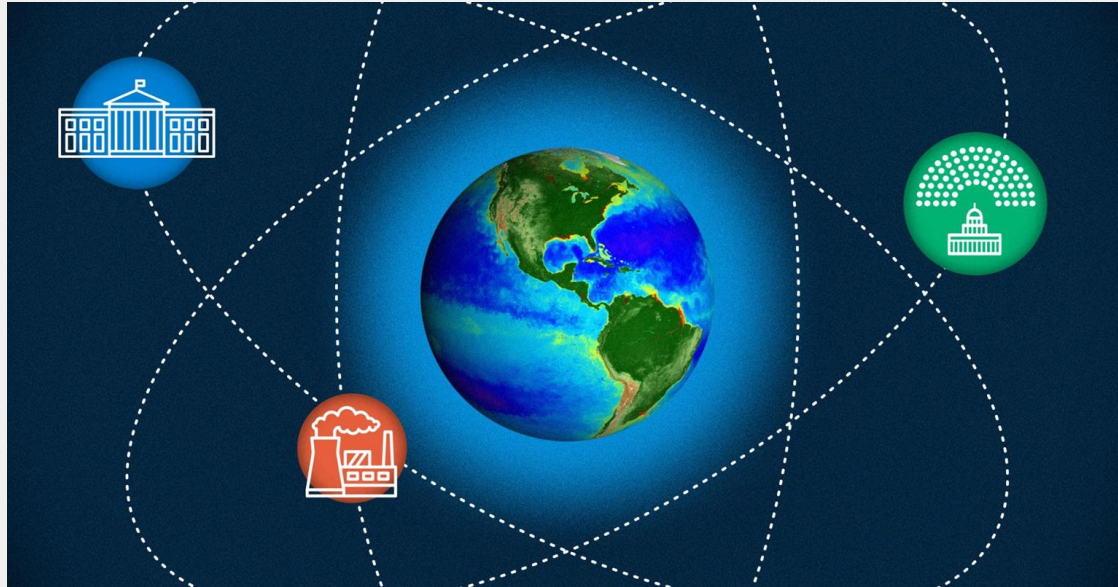
-Biden-Sanders Unity Task Force



WHAT WE CAN DO

# Our Progressive Policy Agenda for Advanced Nuclear Energy

<https://www.goodenergycollective.org/policy/progressive-policy-agenda-for-advanced-nuclear-energy>

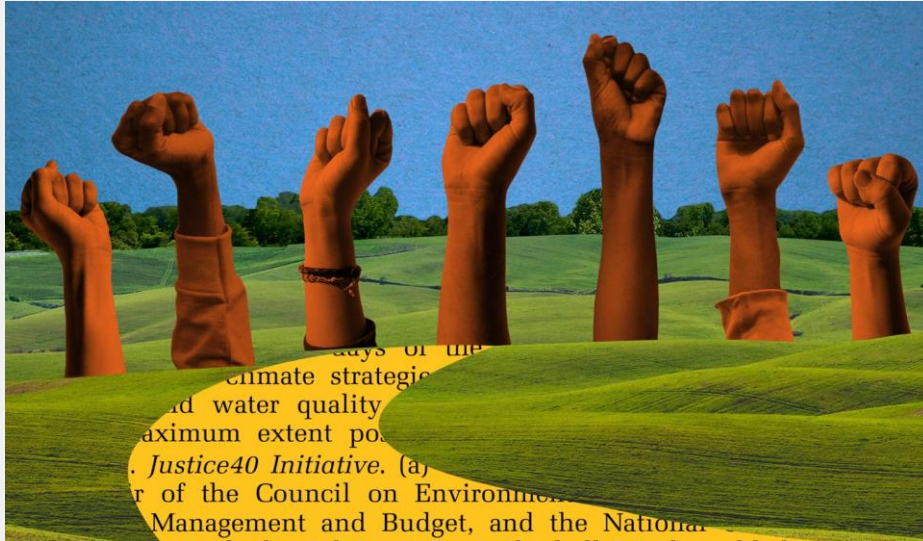


# What's Next?

- Justice40
- Clean Electricity Standard

# Biden's Justice40 Initiative

- Requires 40% of the benefit of federal spending on climate and energy go to disadvantaged communities.
- How can nuclear align with this goal?
- Our Response: *A Policy Pathway for Nuclear Justice*



<https://www.goodenergycollective.org/policy/a-policy-pathway-for-nuclear-justice>

# Equitable & Just Deployment of New Nuclear

- Expanding access (and economic benefits) of new nuclear
- Community-driven adoption
- Potential markets:
  - SMRs and Microreactors for Community Microgrids
  - Microreactors for critical loads on larger grids
  - Coal Re-Powering
- How to fund feasibility studies at community level
- Education campaigns?
- Open regulatory questions regarding distributed siting.

## Ex. Coal Re-Powering



Coal power plants, greater than 100MW, retiring after 2020, in states that do not have restrictions on new nuclear. Light green states have explicit inclusion of nuclear in RPS or CES

# Federal Clean Electricity Standard

- In March, House Democrats introduced the CLEAN Future Act, which would require that all retail electricity providers get 80% of their generation from zero-emissions sources by 2030, and **100% by 2035**.
- Explicitly includes nuclear
- Could benefit existing nuclear plants and incentivize new nuclear.
- Important for state regulators to start thinking about long-term integrated planning.



[www.GoodEnergyCollective.org](http://www.GoodEnergyCollective.org)

Twitter: @GoodEnergyColl

# UPCOMING PARTNERSHIP WEBINARS

- June 4, 2021 – Introduction to advanced nuclear
- June 11, 2021 – Quarterly Partnership meeting, *members only*
- August 6, 2021 – How nuclear energy can advance grid reliability and resilience
- September 10, 2021 – Quarterly Partnership meeting, *members only*
- October 8, 2021 – Compensating carbon-free power

[naruc.org/cpi-1/energy-infrastructure-modernization/nuclear-energy](https://naruc.org/cpi-1/energy-infrastructure-modernization/nuclear-energy)





# THANK YOU

Chair Tim Echols, Georgia

Chair Anthony O'Donnell, Maryland

NARUC staff supporting the Partnership:

- Jasmine McAdams, [jmcadams@naruc.org](mailto:jmcadams@naruc.org)
- Kiera Zitelman, [kzitelman@naruc.org](mailto:kzitelman@naruc.org)

