NARUC

National Association of Regulatory Utility Commissioners

DOE-NARUC Nuclear Energy Partnership

Nuclear Regulatory Modernization Workshop

February 26, 2025

NARUC

National Association of Regulatory Utility Commissioners

Welcome and Introductory Remarks

Tony Clark, Executive Director, NARUC

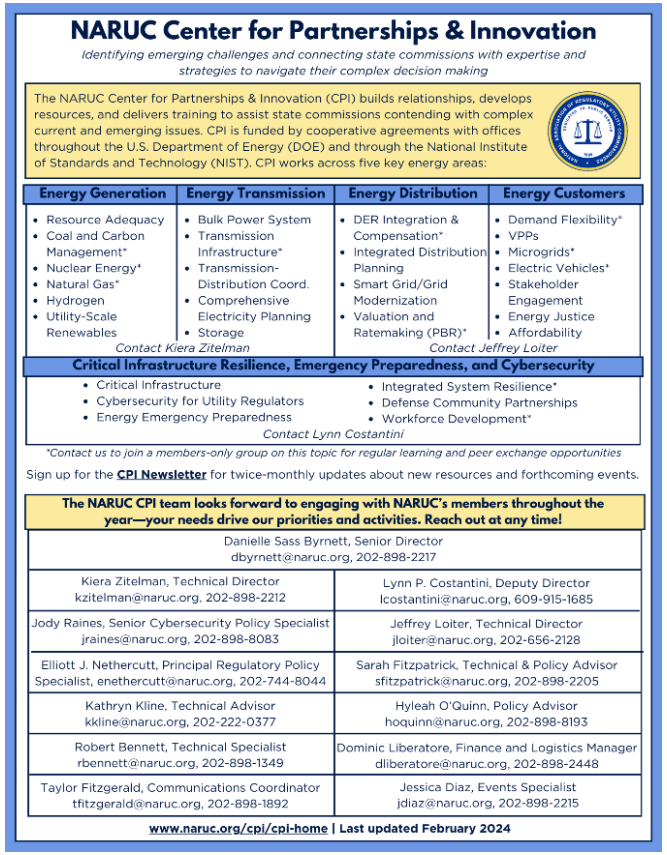
Kiera Zitelman and **Kathryn Kline**, NARUC Center for Partnerships & Innovation

THE NARUC CENTER FOR PARTNERSHIPS & INNOVATION

Background & Focus

- NARUC staff dedicated to providing technical assistance to members.
- CPI identifies emerging challenges and connects state commissions with expertise and strategies to inform their decision making.
- CPI builds relationships, develops resources, and delivers trainings.
- All CPI support is federally funded via cooperative agreements with U.S. Department of Energy and U.S. National Institute of Standards and Technology.

Newly updated CPI fact sheet with recent publications, upcoming events, new member working groups located at: www.naruc.org/cpi/cpi-home/



NARUC Center for Partnerships & Innovation

Identifying emerging challenges and connecting state commissions with expertise and strategies to navigate their complex decision making

The NARUC Center for Partnerships & Innovation (CPI) builds relationships, develops resources, and delivers training to assist state commissions contending with complex current and emerging issues. CPI is funded by cooperative agreements with offices throughout the U.S. Department of Energy (DOE) and through the National Institute of Standards and Technology (NIST). CPI works across five key energy areas:

Energy Generation	Energy Transmission	Energy Distribution	Energy Customers
• Resource Adequacy • Coal and Carbon Management* • Nuclear Energy* • Natural Gas* • Hydrogen • Utility-Scale Renewables	• Bulk Power System • Transmission Infrastructure* • Transmission-Distribution Coord. • Comprehensive Electricity Planning • Storage	• DER Integration & Compensation* • Integrated Distribution Planning • Smart Grid/Grid Modernization • Valuation and Ratemaking (PBR)*	• Demand Flexibility* • VPPs • Microgrids* • Electric Vehicles* • Stakeholder Engagement • Energy Justice • Affordability
Contact Kiera Zitelman		*Contact Jeffrey Loiter*	

Critical Infrastructure Resilience, Emergency Preparedness, and Cybersecurity

- Critical Infrastructure
- Cybersecurity for Utility Regulators
- Energy Emergency Preparedness
- Integrated System Resilience*
- Defense Community Partnerships
- Workforce Development*

Contact Lynn Costantini

*Contact us to join a members-only group on this topic for regular learning and peer exchange opportunities

Sign up for the **CPI Newsletter** for twice-monthly updates about new resources and forthcoming events.

The NARUC CPI team looks forward to engaging with NARUC's members throughout the year—your needs drive our priorities and activities. Reach out at any time!

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www.naruc.org/cpi/cpi-home | Last updated February 2024

Recent Publications

- **Cybersecurity Baselines for Electric Distribution Systems and Distributed Energy Resources (DER)** (Feb 2024)
- **Cybersecurity Issue Brief: Volt Typhoon** (Feb 2024)
- **NCEP Mini Guide on Air Regulators and PUCs/SEOs** (Feb 2024)
- **Guide to Coal and Carbon Management Resources** (Feb 2024)
- **Guide to Natural Gas Resources** (Feb 2024)
- **National EV Infrastructure Formula Program Brief** (Feb 2024)
- **Mitigating Stranded Asset Risks to Utility Customers** (Feb 2024)
- **Certified Natural Gas Primer** (Feb 2024)
- **Regulators' Financial Toolbox: BTM Storage** (Jan 2024)
- **Grid Data Sharing Framework & Playbook** (Nov 2023)
- **Nuclear Generation in Utility Resource Planning** (Nov 2023)
- **Guidebook for Federal Funding Opportunities** (Nov 2023)
- **Resource Adequacy for State Utility Regulators** (Nov 2023)
- **Mini Guide on Fusion Centers** (Oct 2023)
- **Energy Resilience Reference Guide** (2023)
- **Regulators' Financial Toolbox Brief: VPPs** (Aug 2023)
- **Overview of RTO/ISO Filing Status in FERC Order 2222** (2023)
- **State Microgrid, Policy, Programmatic, and Regulatory Framework** (Aug 2023)
- **Clean Energy Microgrids: Considerations for Energy Offices and PUCs** (June 2023)

Forthcoming Publications

- Interregional Transmission Planning White Paper
- CCUS Technology and Policy Status
- Issue Briefs on Microgrid Applications
- Long-Term Gas Planning

Support Opportunities!

- Join a members' only state working group
- Request grid data sharing technical assistance from NARUC.
- Apply for an Advanced Cybersecurity Training scholarship by April 1.
- Join Cybersecurity Baselines Phase 2 Steering Committee *Contact Lynn.*
- Host a DOE Clean Energy Innovator Fellow. Apply by March 5.

Virtual Learning Opportunities

- **Monthly Innovation Webinars. Feb 15:** 24/7 Carbon Free Electricity. **March 21:** The Many Flavors of Consumer Choice. **April 18:** Electric Vehicles. Register and find past recordings. *Contact Jessica*
- **NARUC-NASEO DER Integration & Compensation Webinar Series: March 12:** Federal Funding, **April 4:** ADER Interconnection, **May 1:** Integrated Dist. Syst. Planning. Recordings / summaries of recent webinars on DER Services, Valuation, and Compensation. Learn more. *Contact Jeffrey*
- **Bulk Power System Learning Modules. April 2, 9, 16, 2024.** Topics include: Transmission Siting and Permitting, Exploring Approaches to Capacity Accreditation, Integrated Resource Planning for Systems in Transition. Register and find past recordings. *Contact Elliott*
- **On-Demand, Video-Based Learning Modules.** Dozens of training videos in English and Spanish on distribution systems and planning, smart grid and EV interoperability, and more. *Contact Jeffrey*
- **On-Demand Cybersecurity Training Modules.** "Cybersecurity 101" training allows for a self-paced learning experience. Includes knowledge assessments for optimal retention. *Contact Lynn*

Upcoming In Person Events *Travel Stipends Available*

- **Integrated Distribution Planning & Resilience Training, Nashville, TN. Mar 20-21, 2024.** *Register*
- **Certified Natural Gas Site Visit, Denver, CO. Mar 25-27, 2024.** *Register*
- **Cybersecurity Training for Utility Regulators, New Orleans, LA. April 16-18, 2024.** *Register*
- **Nuclear National Lab Site Visit & Workshop, Knoxville, TN. April 25-27, 2024.** *Register*
- **Renewable Energy Site Visit, Indianapolis, IN. May 1-2, 2024.** *Contact Danielle*
- **Mid-Atlantic Regional Energy Equity Workshop, Washington, DC. May 7-9, 2024.** *Contact Danielle*
- **Coal Modernization & Carbon Management Site Visit, Gillette, WY. June 5-7, 2024.** *Contact Kiera*

www.naruc.org/cpi/cpi-home | Last updated February 2024

www.naruc.org/cpi/cpi-home/

In partnership with DOE, NIST, and members NARUC CPI work spans five key topical areas

Energy Generation

- Resource Adequacy
- Coal and Carbon Management*
- Nuclear Energy*
- Natural Gas*
- Hydrogen
- Utility-Scale Renewables

Energy Transmission

- Bulk Power System
- Transmission Infrastructure
- Transmission-Distribution Coordination
- Comprehensive Electricity Planning
- Storage*

Contact Kiera Zitelman

Energy Distribution

- DER Integration & Compensation*
- Distribution Systems and Planning*
- Smart Grid / Grid Modernization
- Microgrids*
- Valuation & Ratemaking*

Energy Customers

- Demand Flexibility*
- Virtual Power Plants
- Electric Vehicles*
- Stakeholder Engagement
- Energy Justice*
- Affordability

Contact Jeffrey Loiter

Critical Infrastructure Preparedness, Response, and Resilience

- Critical Infrastructure
- Cybersecurity for Utility Regulators*
- Energy Emergency Preparedness
- Integrated System Resilience*
- Defense Community Partnerships
- Workforce Development*

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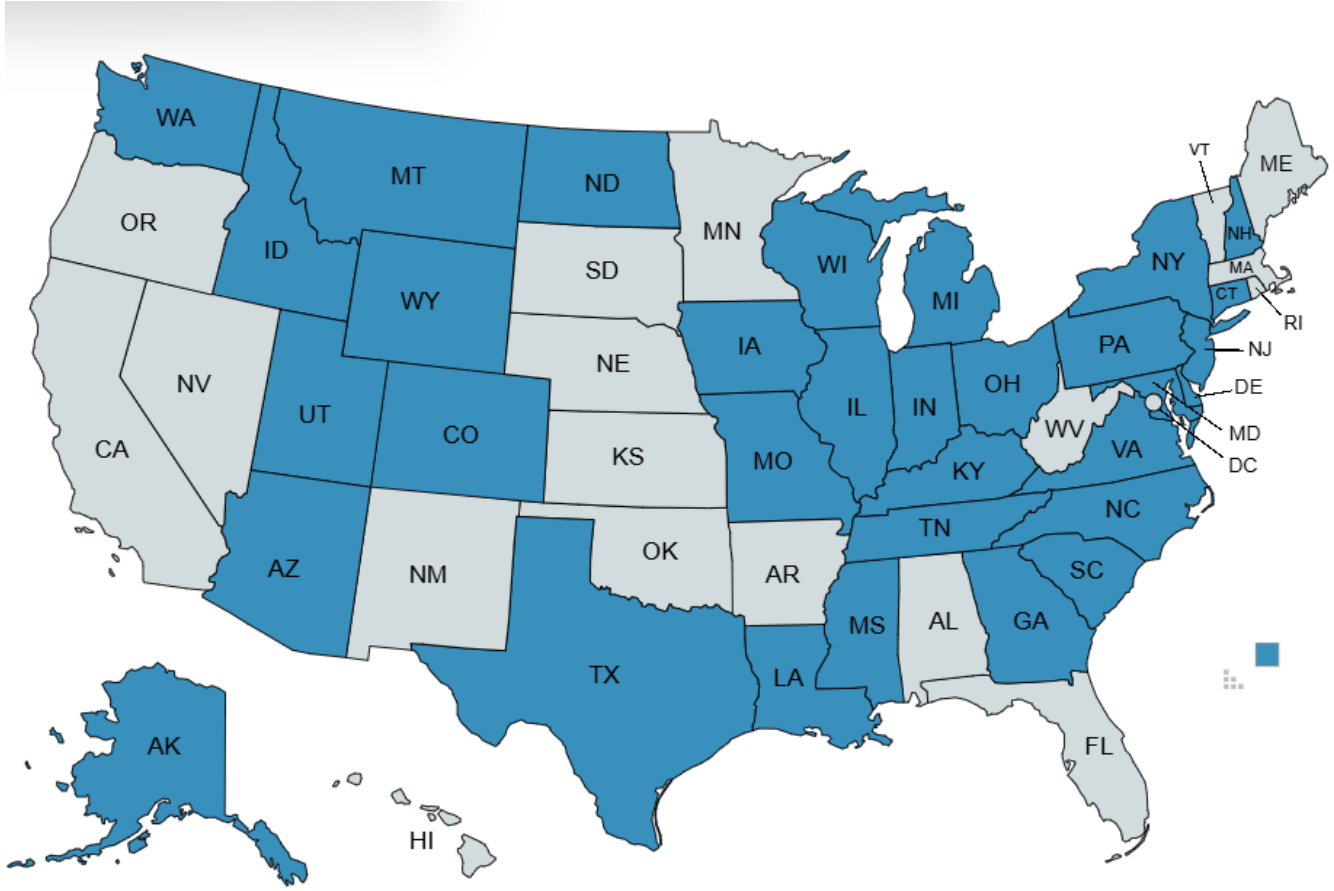
ANSC Background

NASEO-NARUC Collaborative supported through U.S. DOE - NARUC Nuclear Energy Partnership

Convened in 2023 to enhance collective understanding of the unique regulatory and policy questions surrounding the consideration and deployment of new nuclear generation and support peer learning across states.

Membership is open to all states interested in participating on a rolling basis

Member States & ANSC Leadership



ANSC Leadership Team

Molly Cripps, Tennessee Department of Environment and Conservation Office of Energy Programs

Hon. Lea Marquez Peterson, Arizona Corporation Commission

Hon. Floyd McKissick, North Carolina Utilities Commission

Alyse Peterson, New York State Energy Research and Development Authority

Past Webinars & Peer Sharing Calls

Webinars

- Updated Pathways to Advanced Nuclear Commerical Liftoff (Oct. 2024)
- Nuclear Power Plant Uprates (Aug. 2024)
- Facilitating Equitable Community Engagement to Support the Deployment of Advanced Nuclear (Aug. 2023)
- Evaluating Nuclear Waste Considerations for Advanced Nuclear Deployment (September 2023)

Webinar links available on the NARUC ANSC web page, group notes from peer sharing calls available on request from NARUC & NASEO staff

Peer-Sharing Calls

- White House Briefing on Nuclear Project Management and Delivery Working Group Report (January 2025)
- Updates on Commitments to Nuclear by Large Electricity Customers (November 2024)
- ANSC Briefing: Status and Challenges of Restarting and Extending Nuclear Generation in California and Michigan (May 2024)
- ANSC State Advanced Nuclear Action Tracker Release and Member Roundtable (January 2024)
- Developing State Advanced Nuclear Frameworks with the Wyoming Energy Authority (December 2023)
- Repowering Coal Sites with Nuclear Energy (October 2023)
- Virtual ANSC Introduction Call for ANSC and NEP Members (April 2023)

Reports, Newsletter & Tools

- **Energy and Industrial Use Cases for Advanced Nuclear Reactors (**October 2024) This report offers a comprehensive overview of potential alternative use cases for advanced nuclear energy, highlighting key considerations and critical questions for state utility regulators and State Energy Offices
- **Coal to Nuclear Repowering: Considerations for State Energy Offices and Public Utility Commissions** (April 2024) This report highlights some of the benefits and challenges associated with the coal to nuclear repowering process, with a particular focus on the policy, programmatic, and regulatory considerations of relevance to State Energy Offices and Public Utility Commissions
- **Advanced Nuclear State Action Tracker** (March 2024, updated continuously) The Advanced Nuclear State Action tracker provides an overview of state activities that may impact states' advanced nuclear efforts
- **Bimonthly ANSC Newsletter** which provides a roundup of state and national news related to advanced nuclear

Site Visits

Washington, Pacific Northwest National Lab - 2023

- *Pacific Northwest National Laboratory Tour*
- *Framatome Fabrication Facility Tour*
- *Advanced Nuclear State Collaborative Kickoff Workshop*

Tennessee, Oak Ridge National Lab – 2024

- *Oak Ridge National Laboratory tours*
- *Workshop on Nuclear Framework Guidance Document*
- *Speakers on economic and workforce development*

Upcoming Events & Work Products

- **Workshop: Nuclear Regulatory Modernization**, February 26 1:00 – 4:30 pm at the NARUC Winter Policy Summit
- *Developing State Advanced Nuclear Energy Strategic Frameworks: Guidance for State Energy Offices and Public Utility Commissions* | Last call for comments Friday, 2/28!
- March Bimonthly Newsletter
- March 2025 Siting Tool Demo
- **Site Visit to Charlotte, NC**, April 14-16 (Catawba Power Station & EPRI Lab tour)

www.naruc.org/events/all-events

Apr

14

to

16

NARUC-NASEO Advanced Nuclear State Collaborative Spring 2025 Site Visit

Members of the NARUC-NASEO Advanced Nuclear State Collaborative are invited to participate in a site visit to Charlotte, NC which will include a tour of the Catawba Nuclear Plant, EPRI Research Labs, and presentations from North Carolina utilities and industry experts on advanced nuclear development in the state.

IN-PERSON

NARUC

National Association of Regulatory Utility Commissioners

Welcome and Introductory Remarks

U.S. Department of Energy, Office of Nuclear Energy

NARUC

National Association of Regulatory Utility Commissioners

Ground Rules

- Slides will be posted on NARUC's website and shared with registered attendees by the end of this week
- Q&A time available, deferring to the moderator and NARUC members first
- Closed to press
- Break at 2:45; feel free to come in and out

Time (ET)	Title	Speakers
1:00 – 1:15	Welcome and introductory remarks	NARUC and DOE NE staff
1:15 – 1:45	Advanced Reactors Outlook and Economic Assessment for the U.S. and Canada	Hon. Radina Valova, New York Francisco Fonseca, EPRI
1:45 – 2:45	Regulatory Modernization at the NRC	Hon. Marcus Hawkins, Wisconsin Mike King, NRC Doug True, NEI
2:45 – 3:00	Break	
3:00 – 3:30	Palisades Restart Approach, Status, and Challenges	Hon. Katherine Peretick, Michigan April Nguyen, NRC Justin Poole, NRC
3:30 – 4:15	Facilitating Uprate Transactions	Hon. Carolee Williams, South Carolina Julie Kozeracki, DOE LPO
4:15 – 4:30	Conclude	NARUC staff

NARUC

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Session 1

Advanced Reactors Outlook and Economic Assessment for the U.S. and Canada

Francisco Fonseca, Climate and Energy Analyst, EPRI

Hon. Radina Valova, New York

Assessment of the economic feasibility of advanced nuclear reactors in the U.S. and Canada

Francisco Fonseca
Energy System & Climate Analysis, EPRI

Introduction

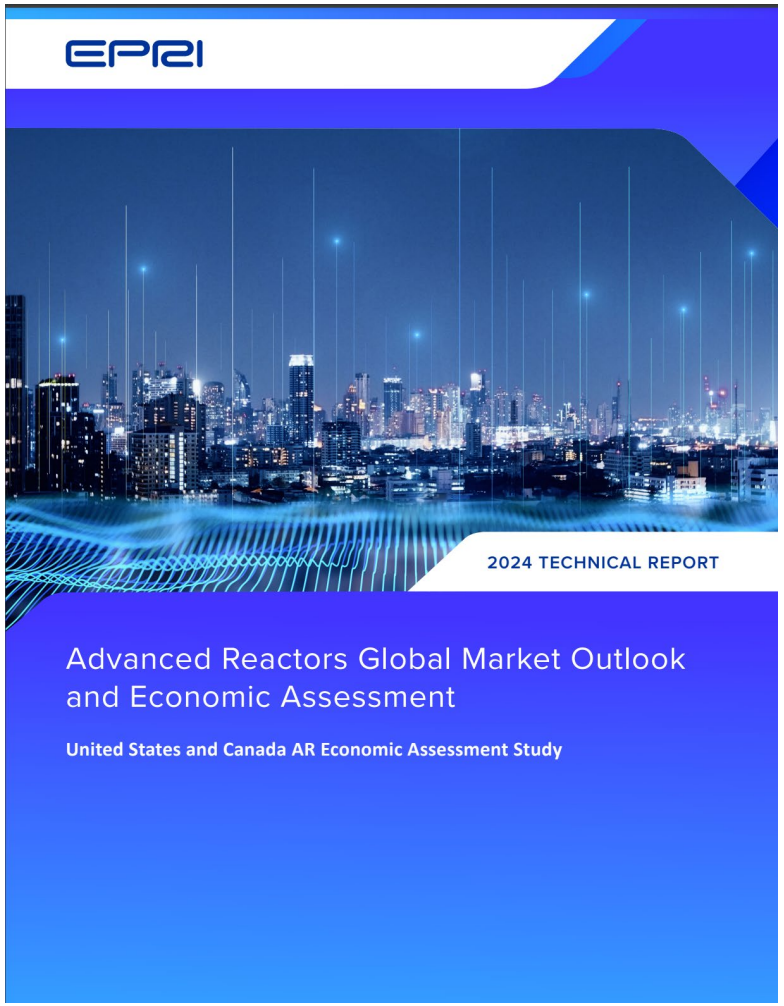
Background

- **Nuclear energy** is arguably an important option in the U.S. and global **clean energy portfolio**
  - The COP28 in 2023 finished with an announcement by leaders of 22 countries of a goal of tripling nuclear energy capacity by 2050 to meet climate goals and energy needs
- However, nuclear power still faces **techno-economic challenges** that have resulted in a **limited deployment** of new nuclear projects
- **New advanced nuclear reactor (ANR) technologies** could help to overcome some of these challenges and support a more robust deployment of new nuclear capacity
  - But their competitiveness will likely depend on market and policy conditions

Objective

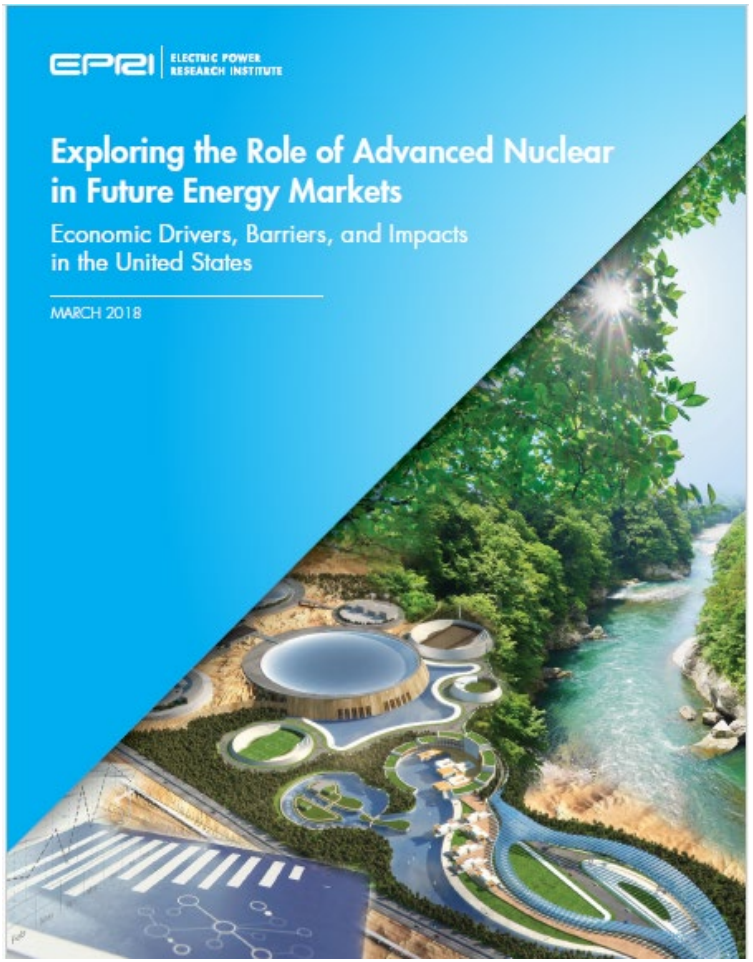
- The objective of this analysis is to **investigate economic and policy conditions** that could impact the energy market **competitiveness of ANRs** in **U.S. and Canada**, and explore their **advantages and challenges** compared to other power sector resources

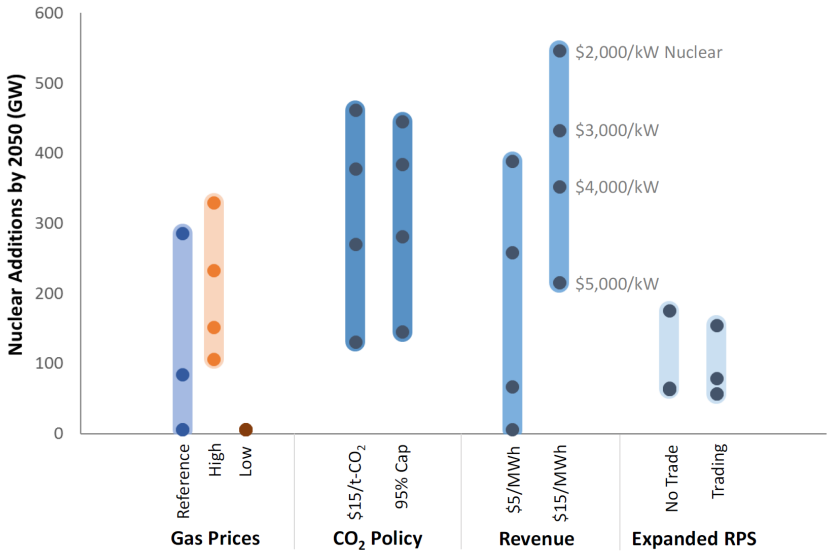
- Perform a **scenario analysis** to explore topics such as
  - Which **conditions** are necessary for **economic feasibility** of ANR technologies;
  - The **relative importance** of different **costs and policy factors** to future deployment,
  - Potential **regional differences** in deployment opportunities.



Report is available for download at https://www.epri.com/research/products/000000003002029257

2018 Report : Exploring the Role of Advanced Nuclear in Future Energy Markets



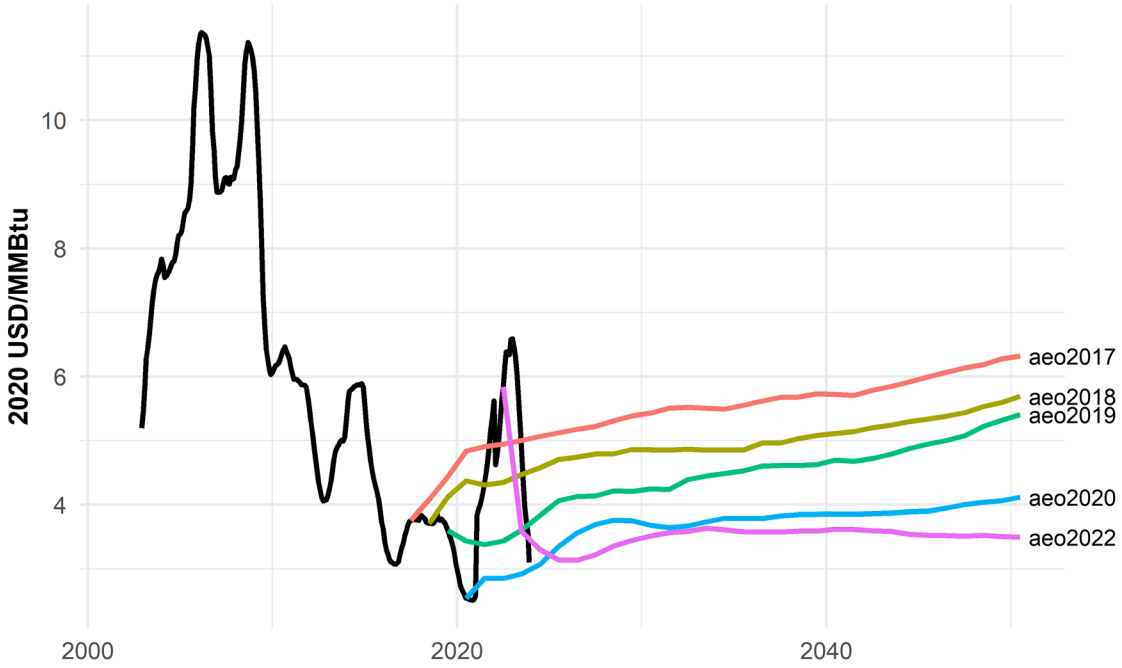


Compare capacity investment and generation decisions across a wide range of scenarios that examine alternative capital costs of advanced nuclear, market uncertainties (such as natural gas prices), policy environments, and potential additional revenue streams.

https://www.epri.com/research/products/000000003002011803

This analysis updates the 2018 report to reflect new market conditions

Projected Natural Gas Prices Have Decreased Substantially

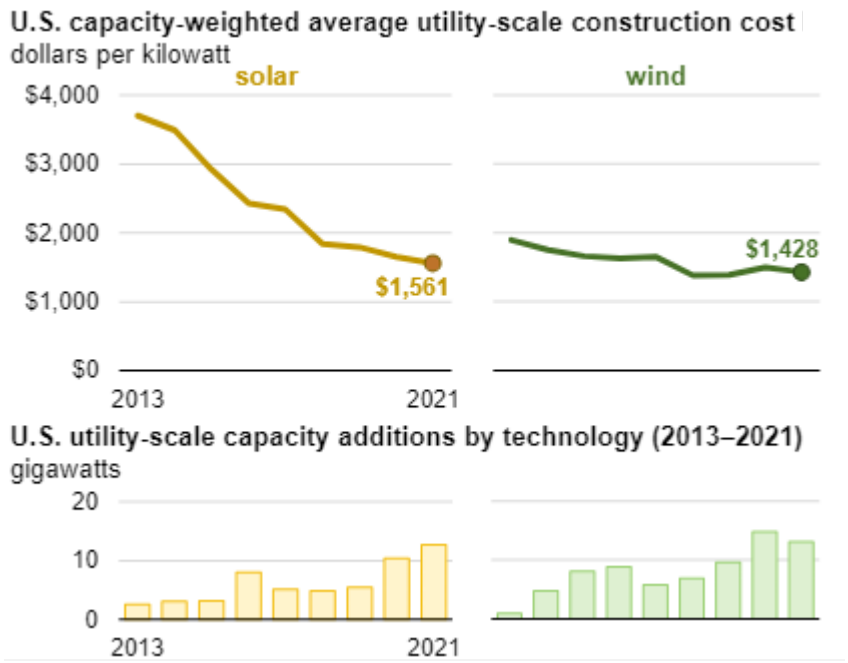


Source: EIA

- Despite the 2022 spike in gas prices, **natural gas prices** have been following a **decreasing trend** since 2018

- Long-term projections from the EIA's Annual Energy Outlook (AEO) decreased even more substantially
  - The projected 2050 price of natural gas in the 2022 AEO is ~45% lower than the one in the 2017 AEO (which was used in the 2018 study)

Costs of Renewables Have Continued to Decrease



Source: https://www.eia.gov/todayinenergy/detail.php?id=60562

- **Costs of renewables** have continued their **decreasing trend** since 2018
- Capital costs of **utility scale solar PV** in 2021 were **26%** lower than the average 2017/2018 value
- Capital costs of **onshore wind** projects were **6%** lower in 2021 compared to the average 2017/2018 value

Inflation Reduction Act (IRA) Has Introduced New Incentives

Clean Electricity Production Credit

- Up to ~$30/MWh (for 10 years), with complex bonus rules
- Replaces existing credits for wind/solar starting in 2025 for all technologies with "emissions intensity not greater than zero"
- IRA §13701

45Y

Clean Electricity Investment Credit

- 30% with labor bonus with 10 p.p. bonuses for Domestic Content and Energy Communities
- Standalone storage is eligible (in addition to PTC-eligible technologies)
- Like PTC, extends until power CO_2 is 25% of 2022 levels (or 2032)
- IRA §13702

48E

CO_2 Capture & Storage Credit

- Up to $85/t$CO_2$ captured with bonus
- 12-year eligibility
- Must begin construction by 2032
- Projects cannot stack 45Q and other credits
- Like 45V, no bonuses for domestic content/EC
- IRA §13104

45Q

Clean H_2 Production Credit

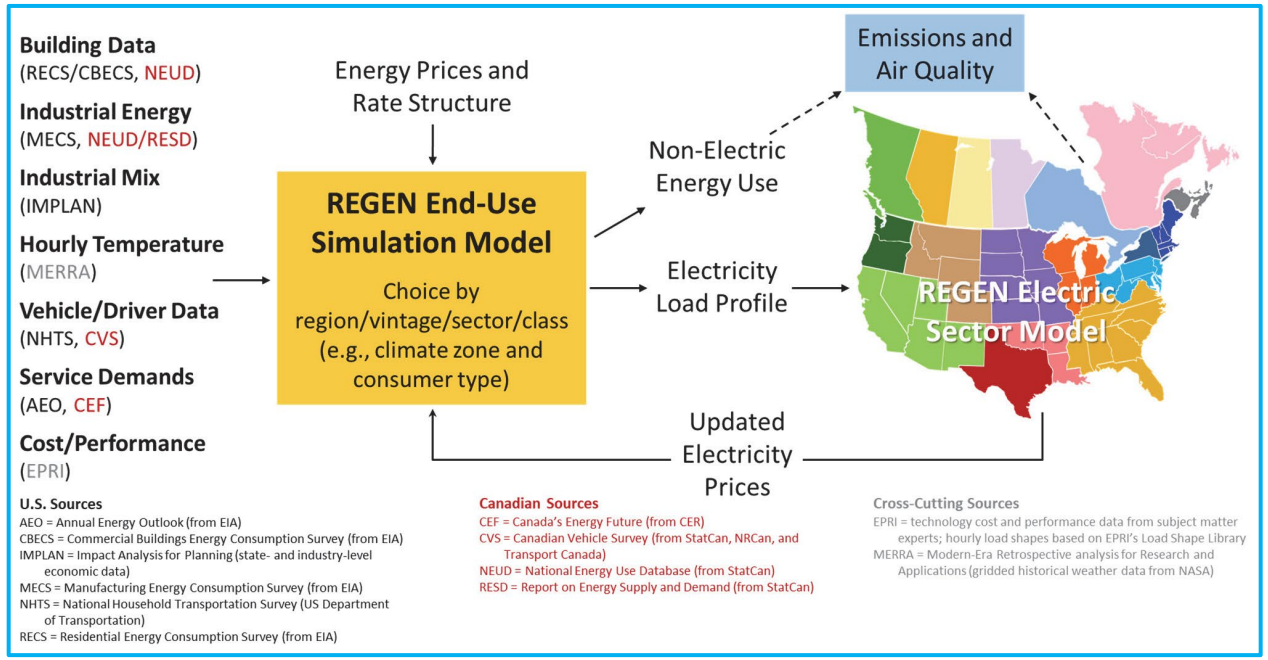
- Depends on lifecycle GHG intensity of production, measured by ANL's GREET model
- Up to $3/kg with 10-year eligibility (must begin construction by 2032)
- Can be "stacked" with 45Y or 48E for electrolytic hydrogen
- IRA §13204

45V

NB: All dollar figures here refer to 2022 dollars; bill includes adjustments for inflation in future years

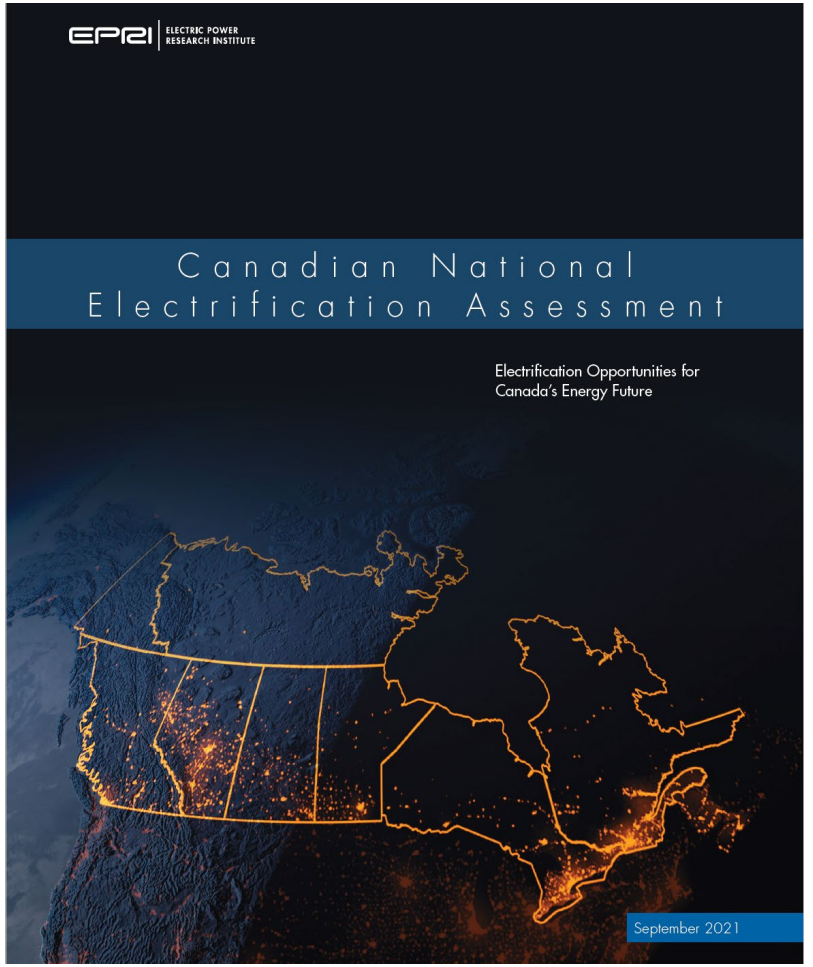
Methods and Scope

North America REGEN (NA-REGEN)



NA-REGEN *is an* ***energy system model*** *developed by EPRI for exploring the evolutions of energy supply and demand in* ***Canada and the United States*** *with technological, sectoral, temporal, and spatial detail.*

NA-REGEN provides a ***framework for assessing opportunities and challenges associated with decarbonization of the U.S and Canadian energy systems****.*



https://www.epri.com/research/products/000000003002021160

Documentation and report available at https://esca.epri.com

Scenarios

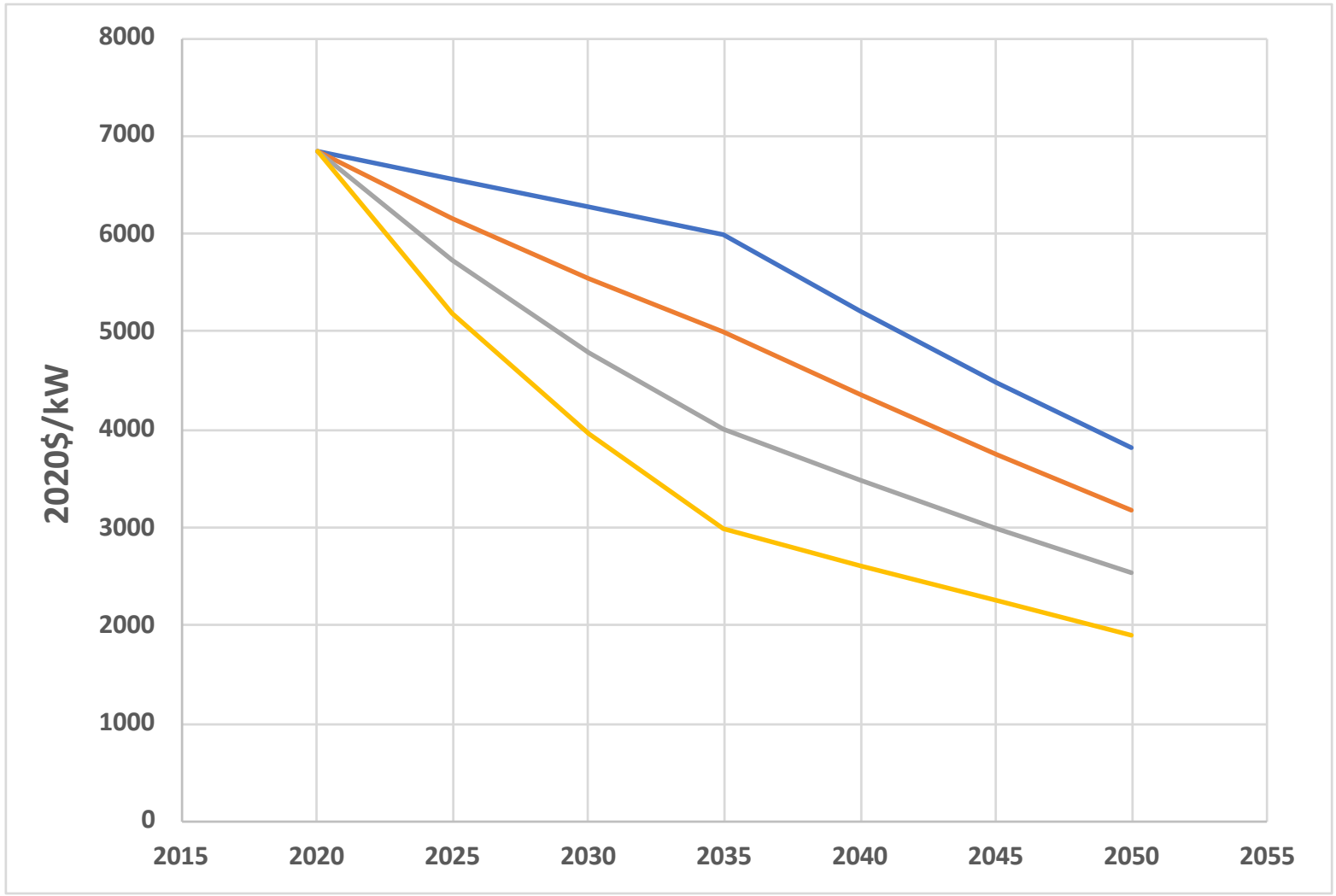
Policy	Description of policy assumptions	Natural Gas Prices sensitivities	Advanced Nuclear Reactors capital costs sensitivities ($/kW in 2035)			
			3000	4000	5000	6000
Reference(*)	*Existing state and federal decarbonization policies; reference electrification of energy demand*	Reference				
		High				
		Low				
Net-zero	*Power Sector in U.S. and Canada net-zero by 2050; faster electrification of energy demand*	Reference				
		High				
		Low				
Net-zero + No CCS	*Power Sector in U.S. and Canada net-zero by 2050; faster electrification of energy demand; no CCS technologies are allowed in the power sector*	Reference				
		High				
		Low				

(*) In Canada, this policy scenario includes the federal carbon tax that rises to C$170/t-CO2 by 2030 and then is held constant in nominal terms

CCS = Carbon Capture and Storage

- Total of **36 scenarios**
  - Three policy scenarios
  - Four scenarios of capital costs of ANRs
  - Three scenarios of natural gas prices

Scenarios of Capital Costs of ANRs



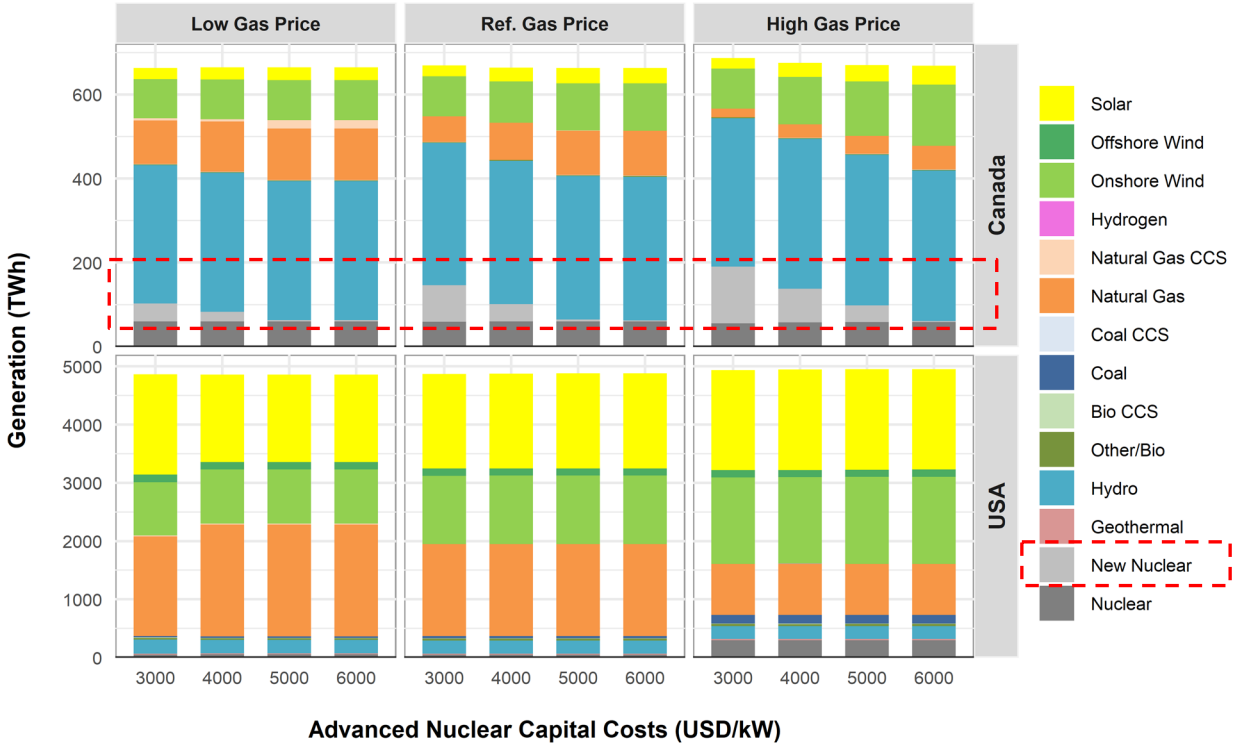
- Capital cost trajectories were designed to reach target values by 2035 and continue decreasing until 2050.
  - Not supposed to be interpreted as forecasts
  - Used to explore how capex assumptions impact deployment of ANRs

Caveats and Limitations

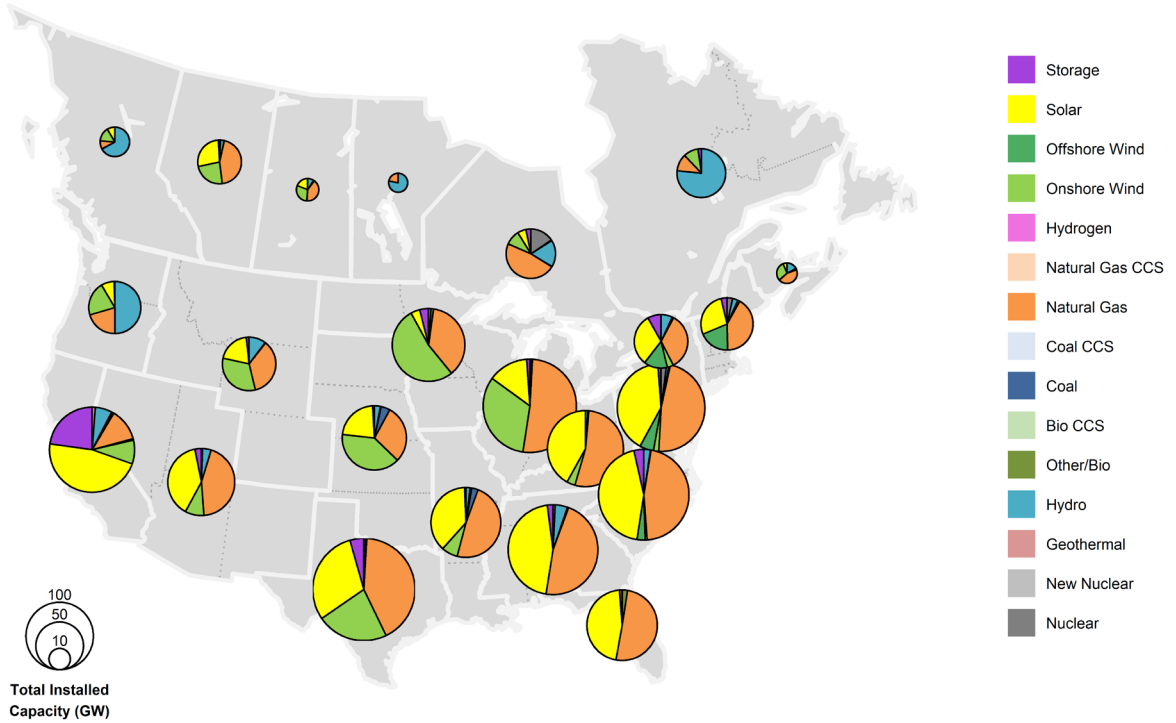
- Model results should **not be interpreted or used as forecasts**. They are useful for exploratory analysis to investigate the uncertainty space of some of the main factors that could impact the deployment of ANRs technologies
- NA-REGEN is a **deterministic model** that provides least-cost investment and dispatch equilibria given assumptions about future technologies, markets, and policies (no intrinsic representation of uncertainty).
- NA-REGEN does **not explicitly differentiate** between **different kinds of ANR technologies** (ANR projects are treated generically as a single type of technology).
- Because of the **aggregated spatial and temporal representation** of NA-REGEN, there could be several ANR attributes that are not fully incorporated in this modeling (e.g. valuable siting and construction advantages)
- While this analysis represents **hydrogen production for power-to-power applications**, it does not include the potential demand of clean hydrogen from other end uses.
- There is **no explicit representation of anciliary services** markets in this analysis
- There is **no explicit representation of** decarbonization goals of **private companies**

Results

Reference Policy Scenario



Annual Generation in 2050

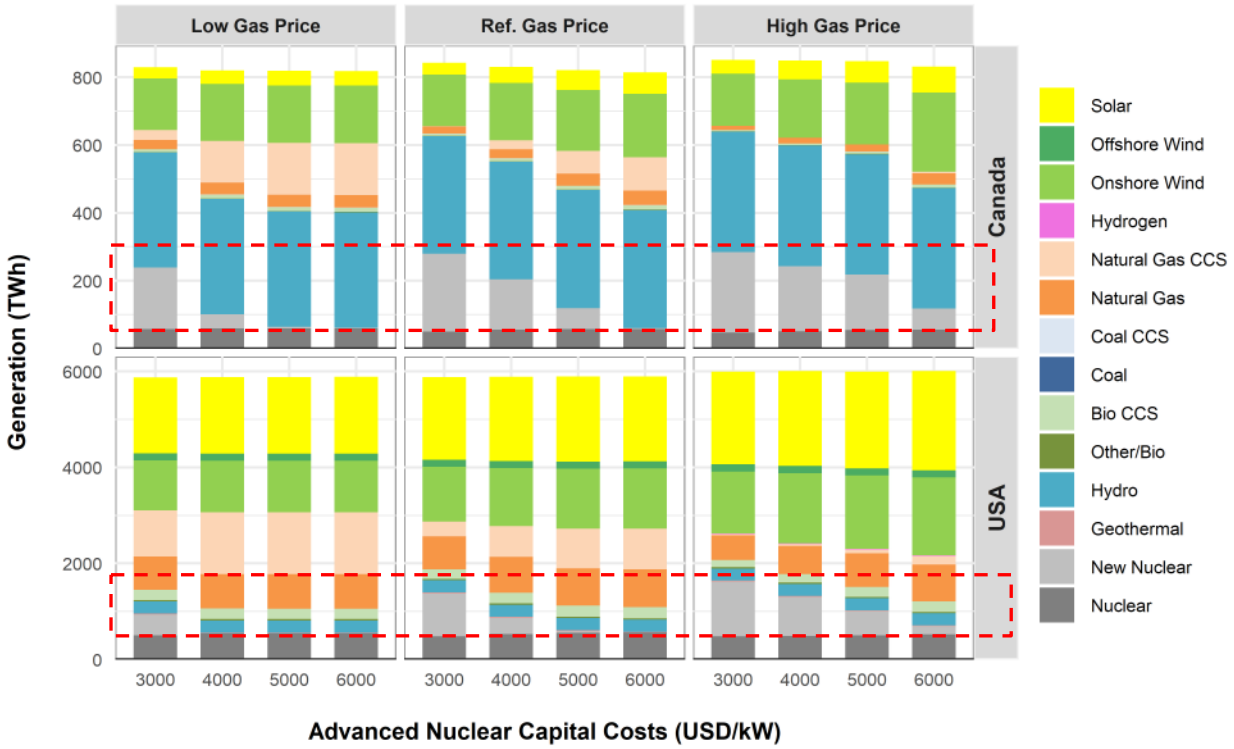


Regional Composition of the fleet in 2050 ($5000/kW and Reference Gas Prices)

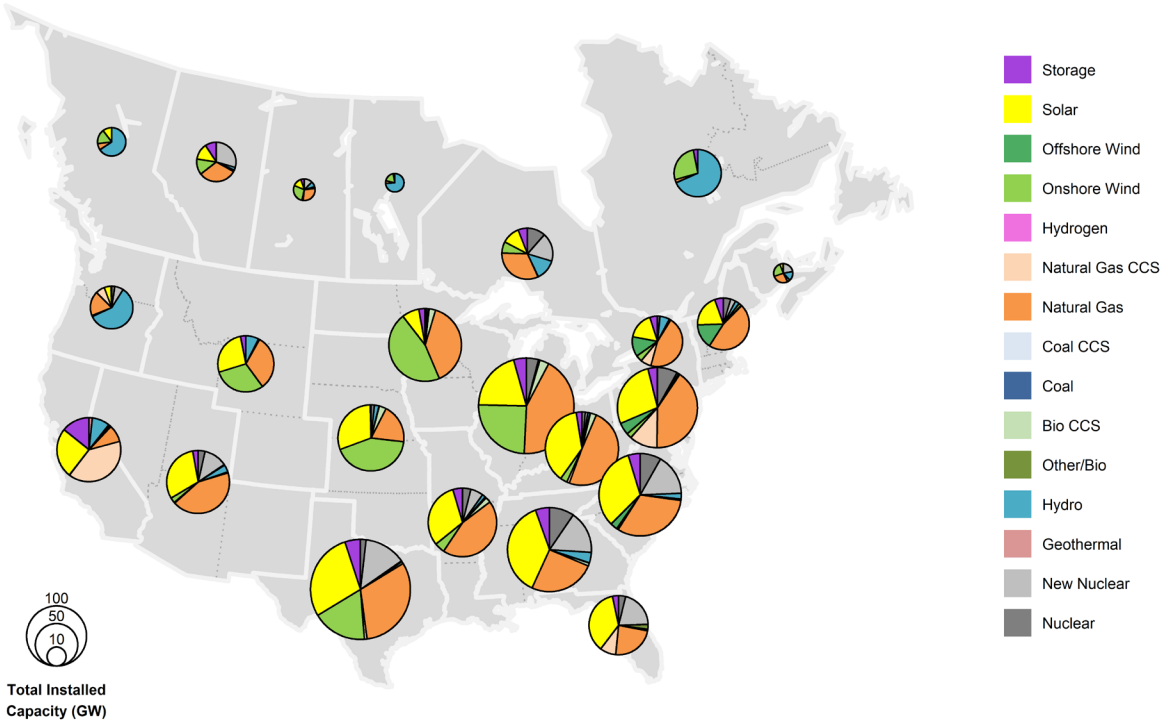
- Without an explicit emission target in the U.S., there is virtually no deployment of ANRs for all combinations of capital costs and gas prices
- In Canada, the existing federal carbon tax results in some deployment of ANRs, but only assuming lower levels of capital costs and/or higher values of natural gas prices

- Natural gas, solar and onshore wind tend to be the main technologies in the fleet in most regions
  - However, there is considerable variation in the composition of the fleet in each region

Net-zero Scenario



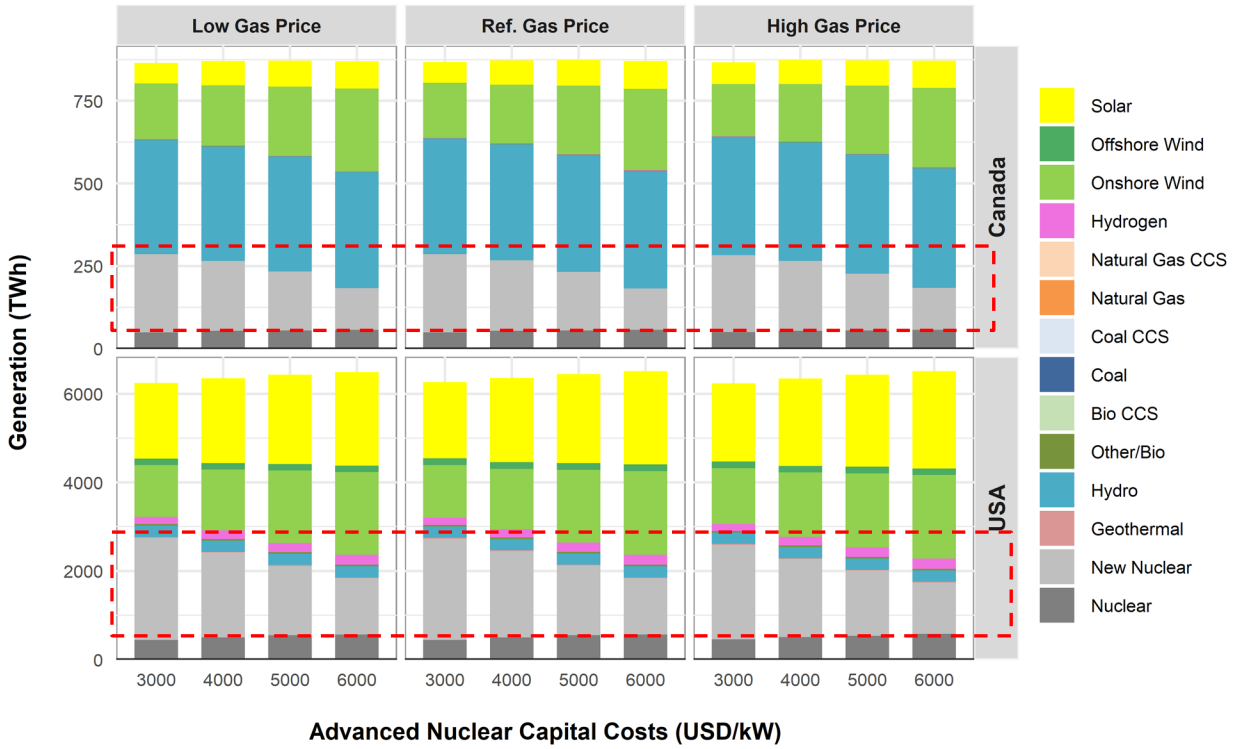
Annual Generation in 2050



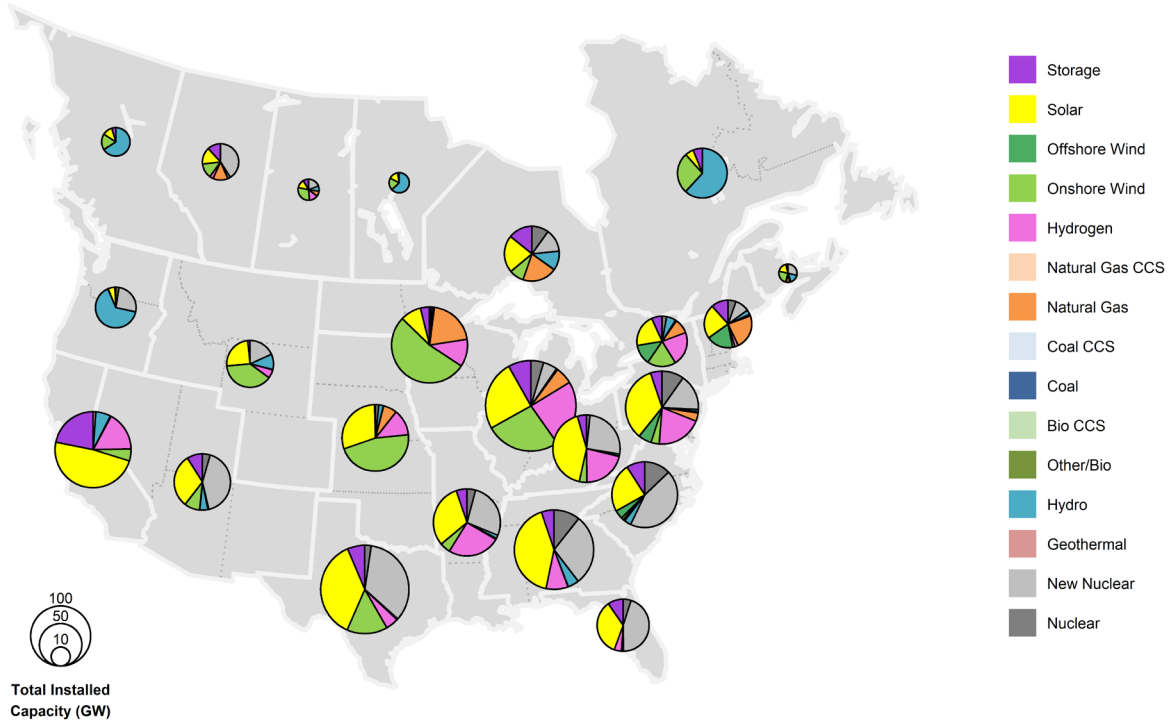
Regional Composition of the fleet in 2050 ($3000/kW and Reference Gas Prices)

- Even with a net-zero target, capital costs of ANRs would still need to decrease substantially to encourage their deployment
- With reference natural gas prices and capital costs of ANRs at $5000/kW, NG with CCS generation tends to be more competitive than ANRs
  - But as ANRs become cheaper, they tend to replace NG with CCS
- Regional differences (e.g., natural gas pipelines, policies, renewable resources, existing asset mix, transmission) could result in substantial variation in the economic competitiveness of ANRs across the U.S. and Canada
  - For example, in the U.S., results show the deployment of nuclear mostly concentrated in the eastern and southern U.S.

Net-zero + No CCS Scenario



Annual Generation in 2050

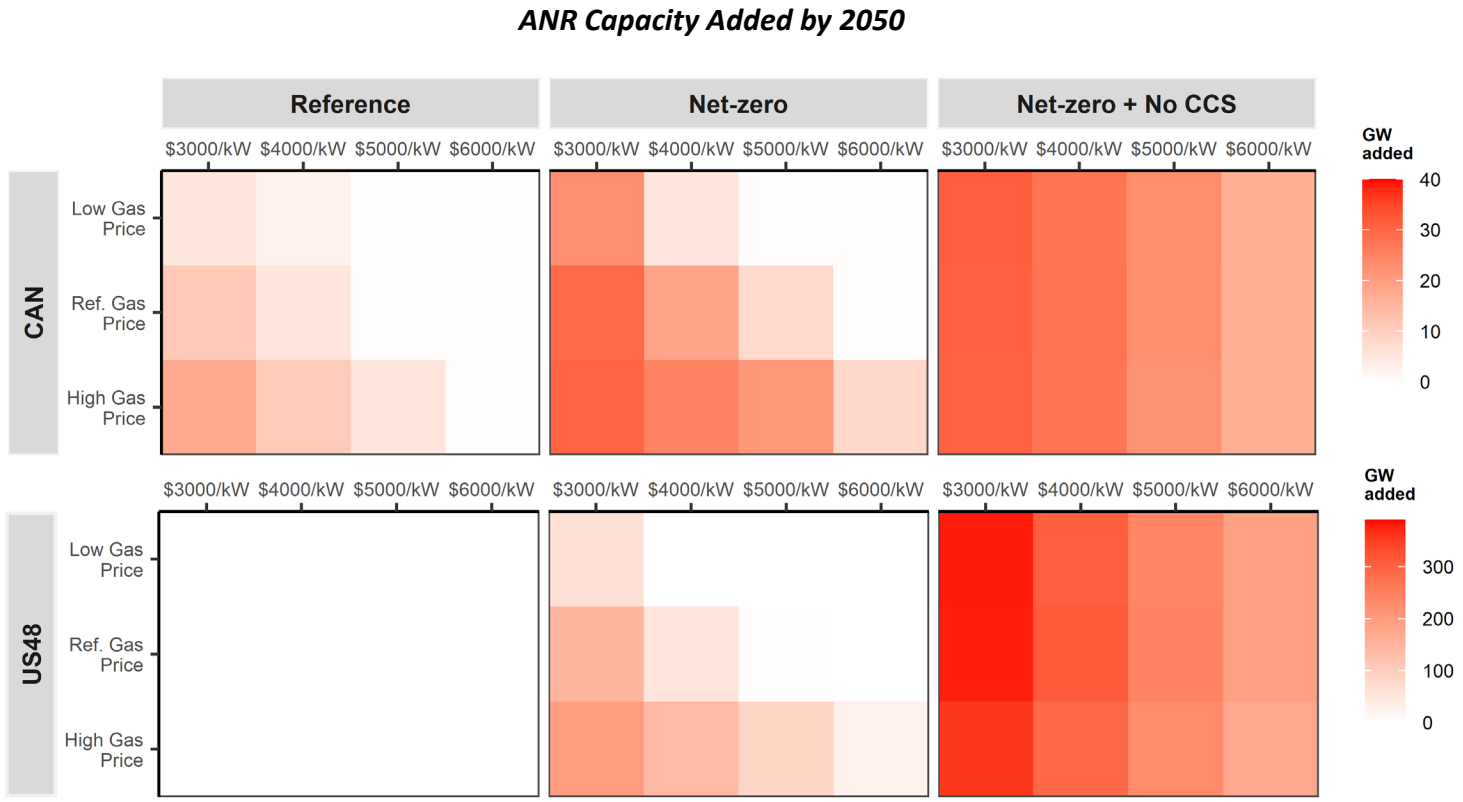


Regional Composition of the fleet in 2050 ($3000/kW and Reference Gas Prices)

- Results in the previous slide suggest that CCS technologies tend to be more competitive than ANR technologies
  - Unless under assumptions of lower costs of ANRs and higher values of natural gas prices
- If CCS technologies are not allowed, ANRs could become a more competitive source of zero emission and firm generation
  - In this case, ANRs could be deployed under all scenarios

- With the exclusion of CCS options, deployment of ANR capacity increases in the regions where it was already been deployed in the scenarios with CCS.
- Additionally, deployment of ANRs expands to more regions in the western U.S.

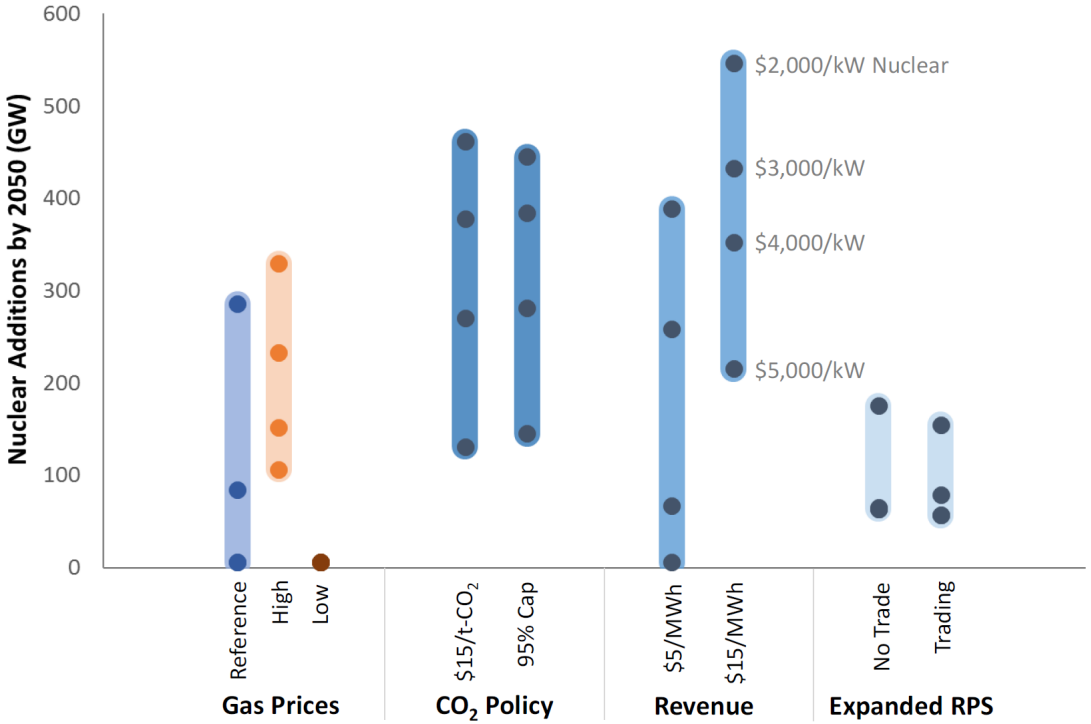
Summary of ANR Deployment Across All Scenarios



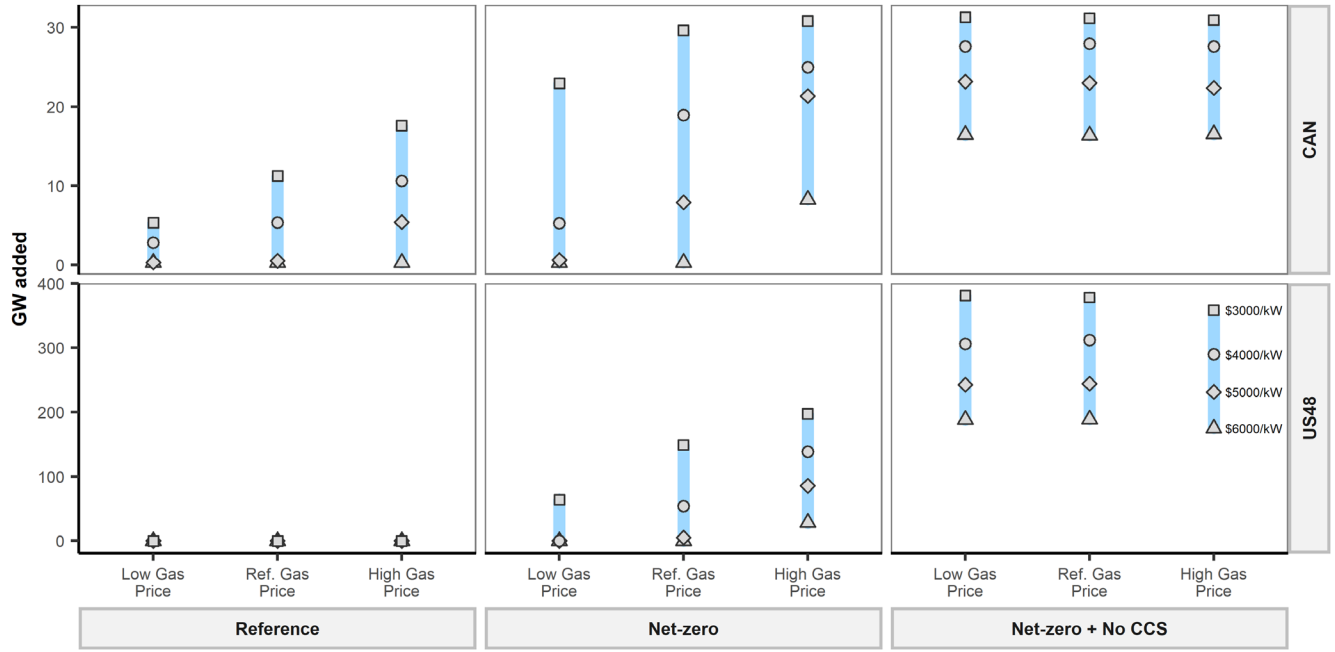
- When assuming only existing decarbonization policies in the U.S., deployment of ANRs is virtually zero.
  - In Canada, the existing carbon tax leads to some deployment of ANRs for lower values of capital costs
- When assuming a net-zero target by 2050 in both U.S. and Canada, deployment of ANRs tends to increase.
  - In the U.S., capital costs would need to approximate $4000/kW by 2035 to result in a more substantial deployment
  - Canada could see relative more deployment at higher values of capital costs
- When CCS technologies are not allowed, ANRs tend to become a competitive option of zero-emission and firm energy generation
  - Deployment of ANRs tends to be substantial for all combinations of capital costs and natural gas prices

Comparison With 2018 Results

2018 Report



2024 Report



- Compared to the 2018 report, results from this analysis tend to show less deployment of ANRs
- Lower values of natural gas prices and of capital costs of renewables lead to ANRs being less competitive compared to the results from the 2018 report

Conclusion and Insights

Conclusion and Insights

- Model results suggest that **ANRs could be economically viable** across a range of scenarios, but there may need to be a **substantial change in current market and policy conditions** in order to encourage a stronger deployment of ANR capacity in the U.S. and Canada.
  - Nuclear energy could have a largest role in scenarios that combine more aggressive emissions reduction policies, cost reductions, and constraints on the deployment of other technologies

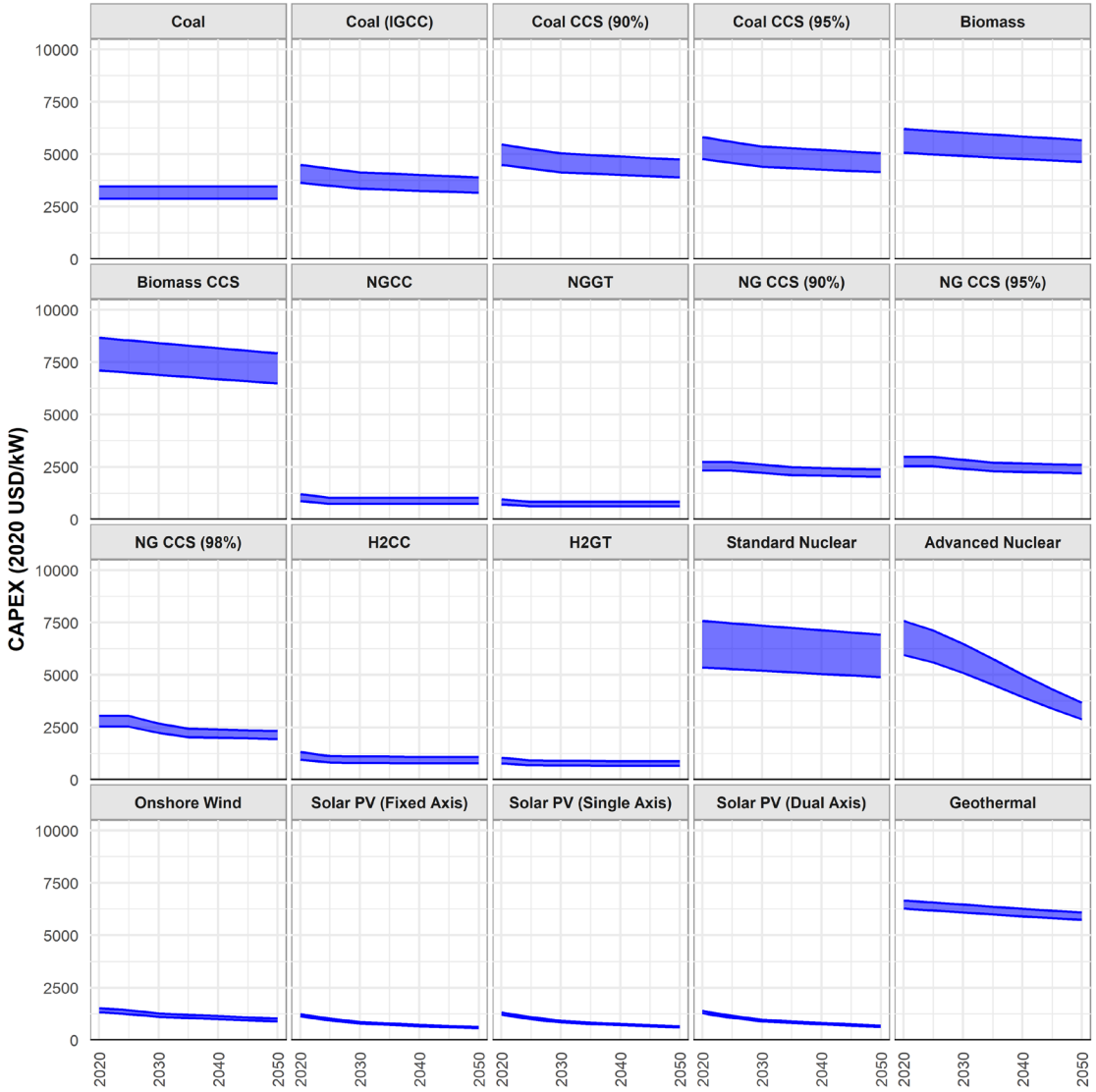
- Reductions in the **prices of natural gas and in the costs of solar and onshore wind** in the U.S. and Canada over the last 5+ years have made these lower-emission technologies **increasingly competitive** compared to ANRs.
  - Results suggest that capital costs of ANRs would likely need to follow trajectories that approximate $4000/kW by 2035 in order to incentivize a stronger deployment of ANR capacity in the U.S. and Canada

- Results show that **natural gas with CCS** appears to be the **main lower-emission technology competing with ANR**.
  - In the net-zero scenarios that do not allow the use of CCS technologies, deployment of ANR capacity in both U.S. and Canada could be substantial for all levels of capital costs

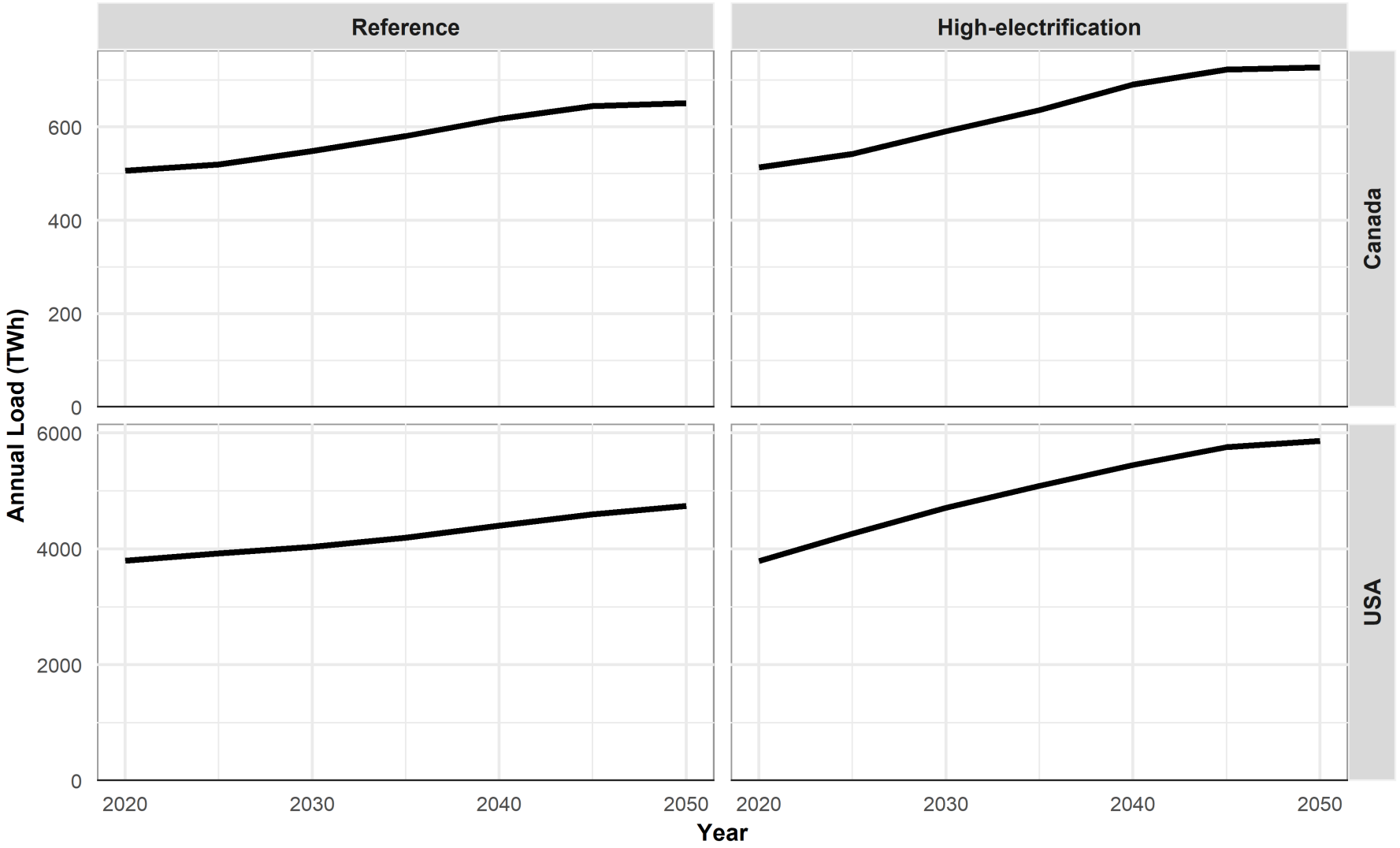
Report is available for download at https://www.epri.com/research/products/000000003002029257

Appendix

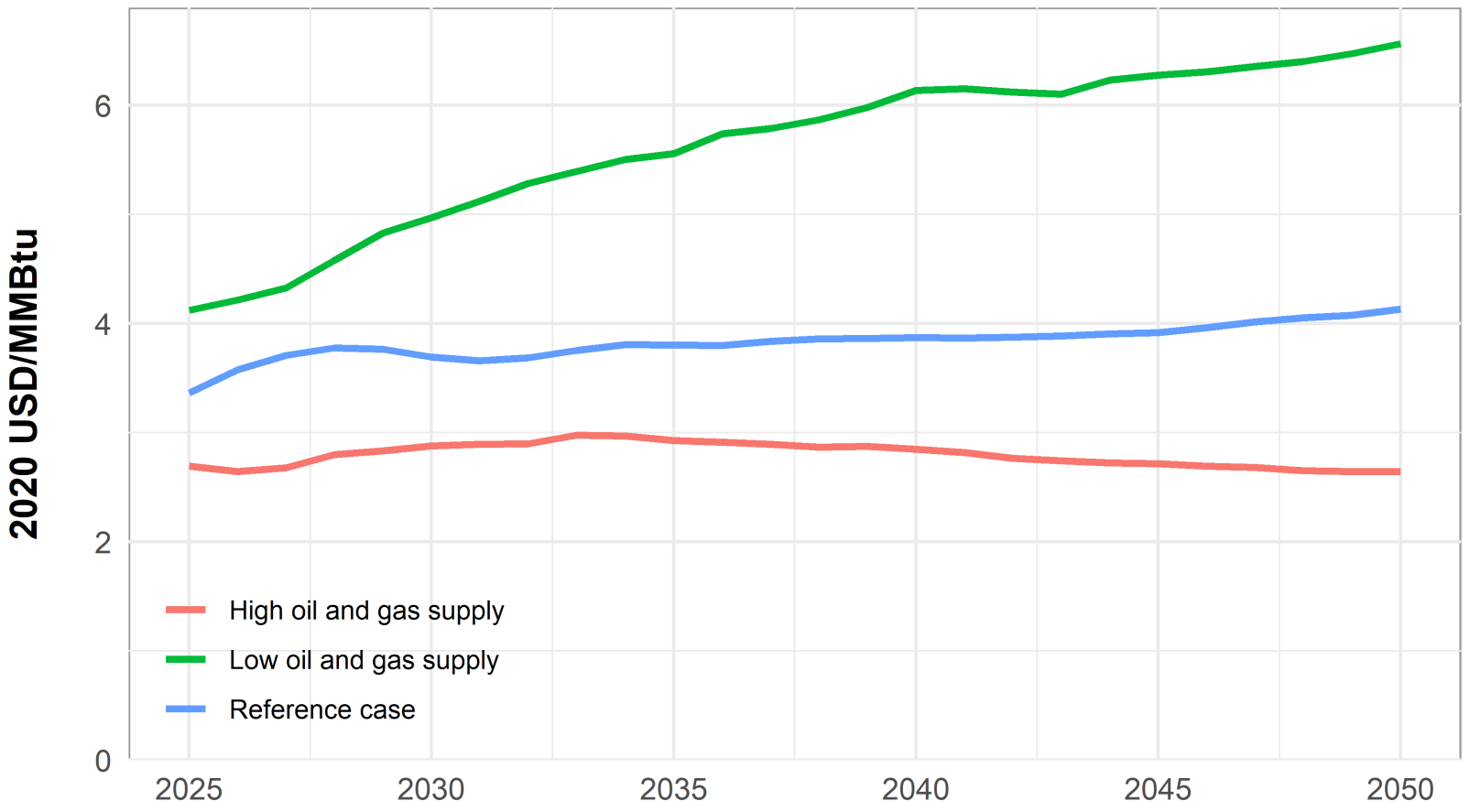
Capital Costs of all Technologies



Electricity Demand Scenarios



Natural Gas Price Scenarios



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Session 1

Advanced Reactors Outlook and Economic Assessment for the U.S. and Canada

Hon. Radina Valova, New York

Francisco Fonseca, Climate and Energy Analyst, EPRI

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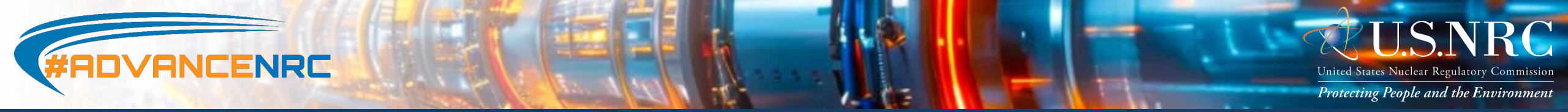
Session 2

Regulatory Modernization at the NRC

Hon. Marcus Hawkins, Wisconsin

Mike King, Special Assistant for ADVANCE Act, Office of the Executive Director of Operations, Nuclear Regulatory Commission

Doug True, Chief Nuclear Officer and Senior Vice President, Nuclear Energy Institute



Regulatory Modernization at the NRC

Mike King
Special Assistant for ADVANCE Act Implementation

February 26, 2025

The Landscape Has Changed

Growing demand to support advanced tech

Increased need for energy security

Improved public perception

Overview of the Act

Update mission statement and develop implementing guidance

Enhance initiatives for efficient, timely, and predictable license application reviews

Establish an expedited procedure for reviewing qualifying new reactor license applications

Implement changes regarding fee recovery, including a reduced rate for advanced reactor applicants and pre-applicants

Overview of the Act

- Develop a regulatory framework for fusion technology
- Assess the licensing review process for new nuclear facilities at former fossil-fuel power plant sites and brownfield sites
- Implement new requirements relating to nuclear fuel
- Remove certain limitations on foreign ownership of some types of licensed facilities

Overview of the Act

Continue to support international coordination on nuclear technologies and licensing activities

Develop strategies and guidance for microreactors

Establish a nuclear energy traineeship subprogram to meet critical mission and nuclear workforce needs

Take appropriate actions on new pay and hiring authorities

The Core Team

Mike King
Special Assistant

Jessica Bielecki
Assistant General Counsel

John Lubinski
Director, NMSS

Owen Barwell
Chief Financial Officer

Jack Giessner
Administrator, Region III

The Support Team

Annie Ramirez
Project Management

Luis Betancourt
Project Management

Aaron McCraw
Communications

#ADVANCENRC

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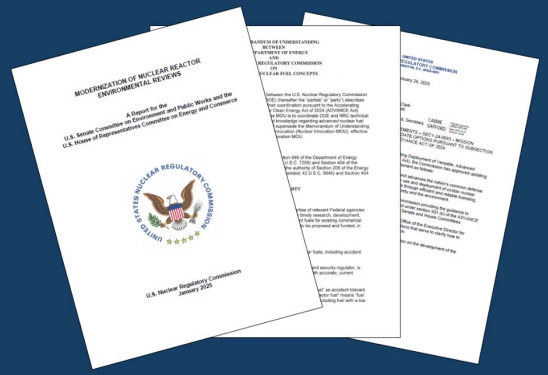
Protecting People and the Environment

ADVANCE Act by the Numbers

36

Actions tasked related to the ADVANCE Act
(8 completed as of February 1)



20

Agency project teams formed to address actions

Over
25

Public meetings held to engage interested parties on ADVANCE Act topics

Over
30

Submissions from the public related to the ADVANCE Act

Over
100

Ideas from the NRC staff related to the ADVANCE Act

ADVANCE-ing the Mission

NRC Mission Statement

The NRC protects public health and safety and advances the nation's common defense and security by enabling the safe and secure use and deployment of civilian nuclear energy technologies and radioactive materials through efficient and reliable licensing, oversight, and regulation for the benefit of society and the environment.

Strengthening The NRC Workforce

- ADVANCE Act Direct-Hire Authority
  - New ADVANCE Act direct-hire authority provides additional ways for the NRC to address workforce gaps, in addition to existing authorities
- Competitive Compensation for Designated Covered Positions
  - Importance of Strategic Workforce Planning for data-driven identification of critical and specialized roles
  - Compensation strategy: Align pay with qualifications and hiring bonuses up to $25,000 with a two-year service agreement
- Bonuses for Exceptional Performance
  - Bonuses up to $25,000 for exceptional performance, with competitive pay and incentives for critical projects

Other Milestones of Interest

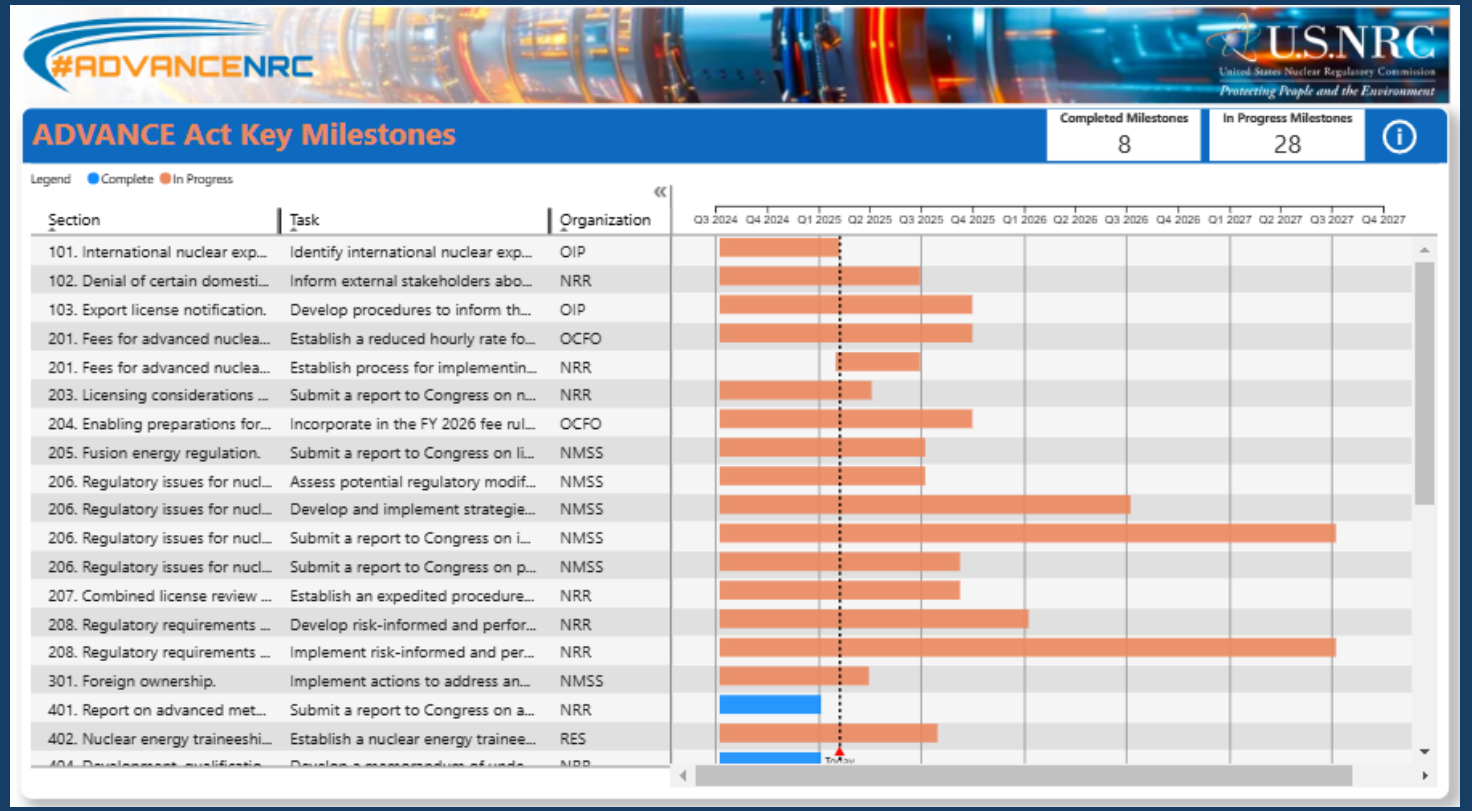
Signed Memorandum of Understanding with DOE on advanced nuclear fuels, as required by Section 404
December 12, 2024

Issued report on advanced methods of manufacturing and construction, as required by Section 401
January 6, 2025

Issued report on environmental reviews, as required by Section 506
January 6, 2025

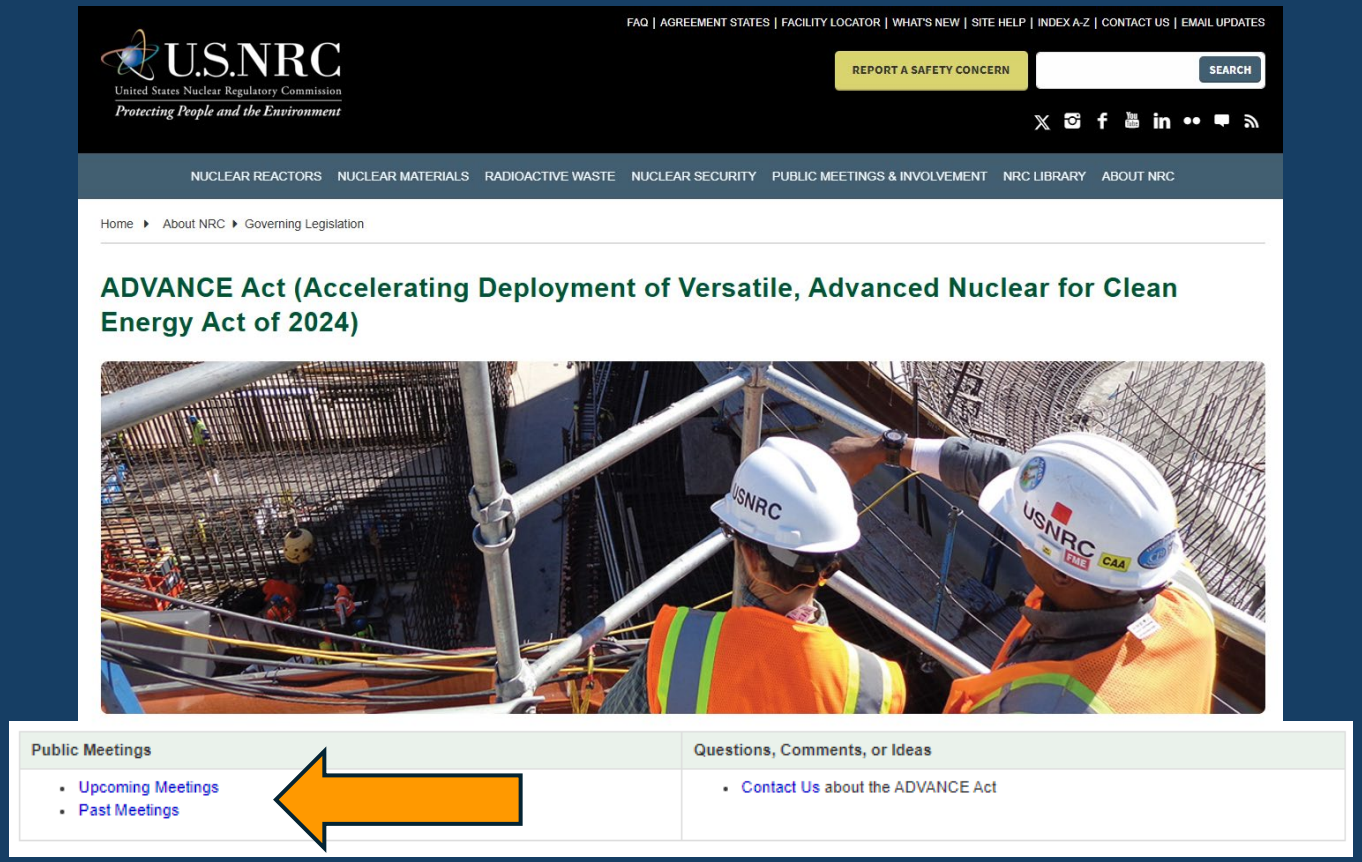
How to Follow Our Progress

Follow NRC's ADVANCE Act implementation with this Dashboard



How to Stay Engaged

For NRC's public meeting information on ADVANCE Act



Public Commission Meeting

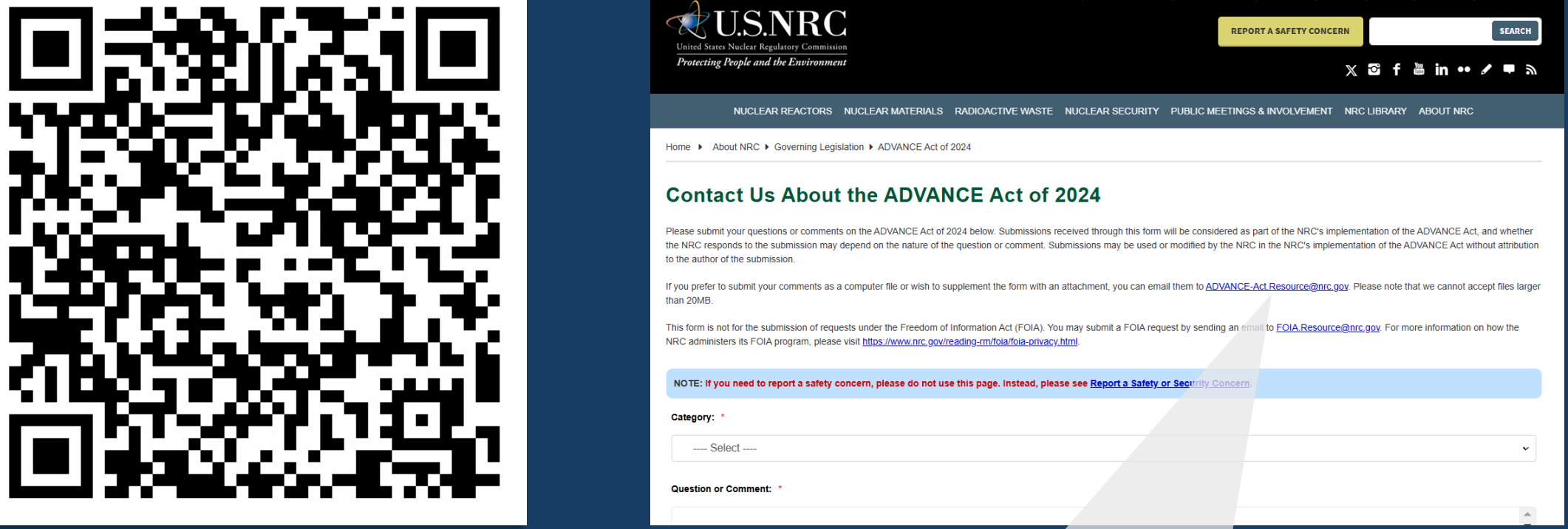
Briefing on ADVANCE Act Activities

March 4, 2025
9:00am EST
Commissioners' Hearing Room
11555 Rockville Pike
Rockville, Maryland
https://video.nrc.gov/

Regulatory Information Conference

- Plenary Sessions with the Chairman, Commissioners, and Executive Directors for Operations
- Special guest U.S. Senator Shelley Moore Capito (R-W.Va.), sponsor of the ADVANCE Act
- 10+ technical sessions related to the ADVANCE Act
- Digital exhibit on NRC's implementation of the ADVANCE Act
- Hybrid event
  - Sign up to attend in person or virtually at https://ric.nrc.gov/ricregistration.aspx

How to Ask Questions and Submit Ideas



Contact us with ADVANCE Act questions, comments, and ideas

ADVANCE-Act.Resource@nrc.gov

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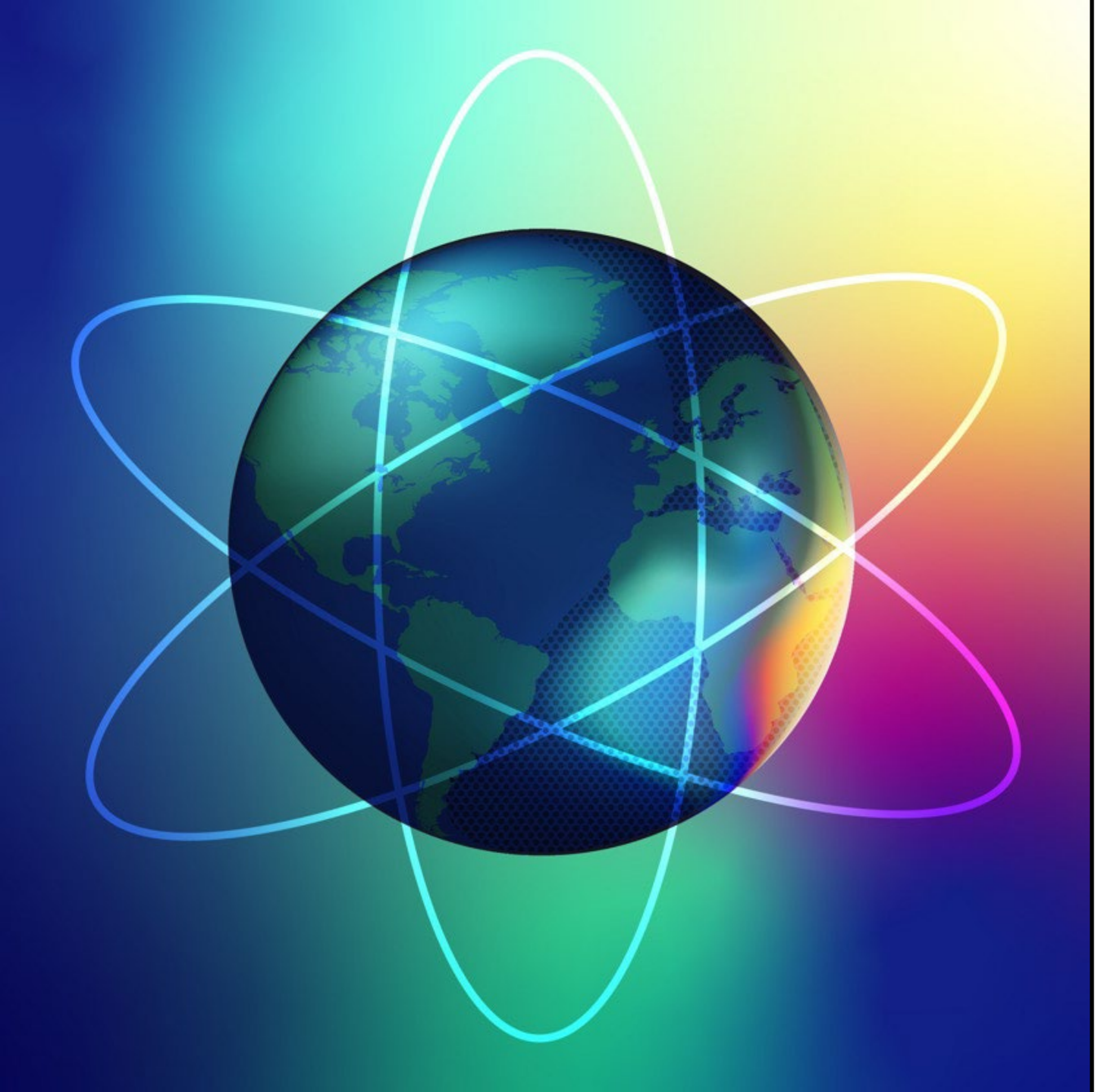


NUCLEAR ENERGY INSTITUTE

The Urgency to Modernize Nuclear Regulation

Doug True
Sr. VP & CNO, NEI

ANSC Workshop:
Nuclear Regulatory Modernization

NARUC Winter Summit

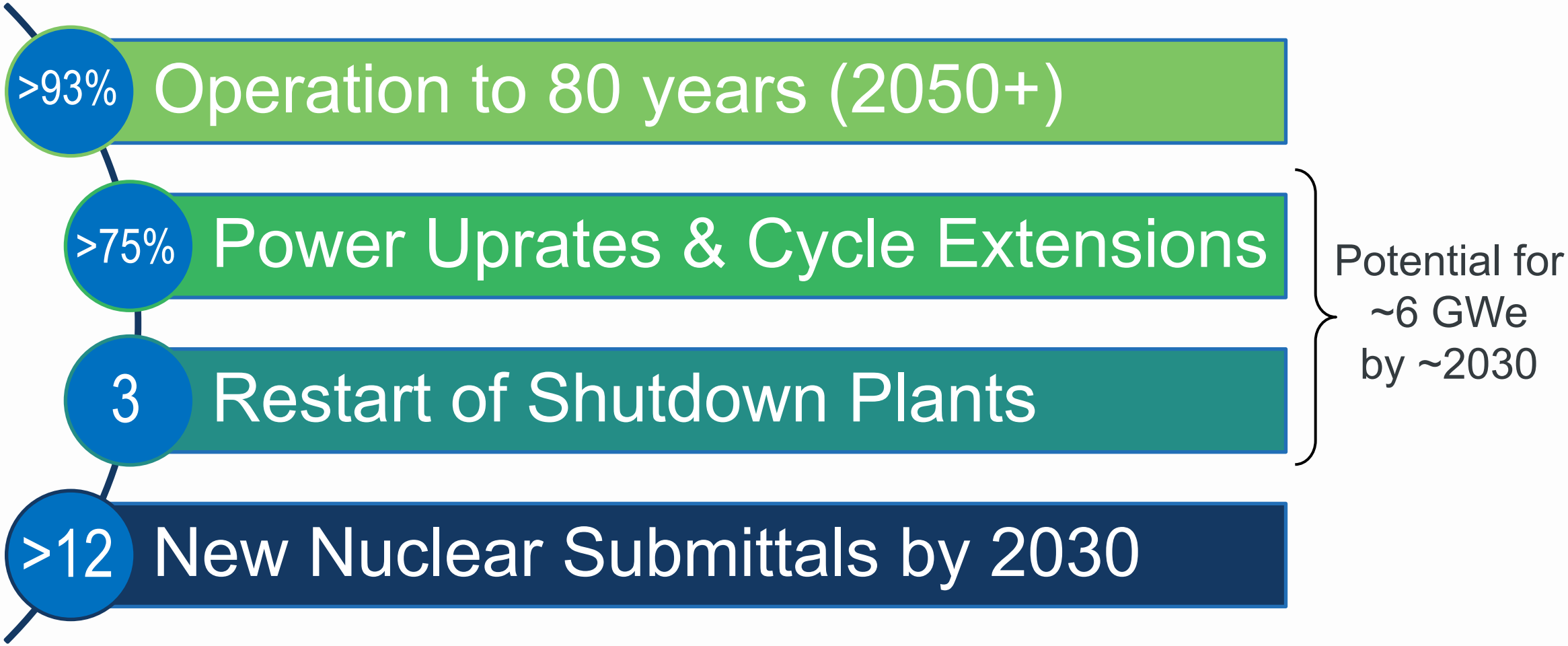
February 26, 2025

NRC Regulatory Framework

- Important that NRC be a strong, independent regulator
- The current regulatory framework (regulations, processes, culture) have roots in the 1960s & 70s
- Reinforced over 50+ years through regulation of a largely static/shrinking industry
- Recent resurgence of interest in nuclear has created an entirely new dynamic in an entirely different business environment

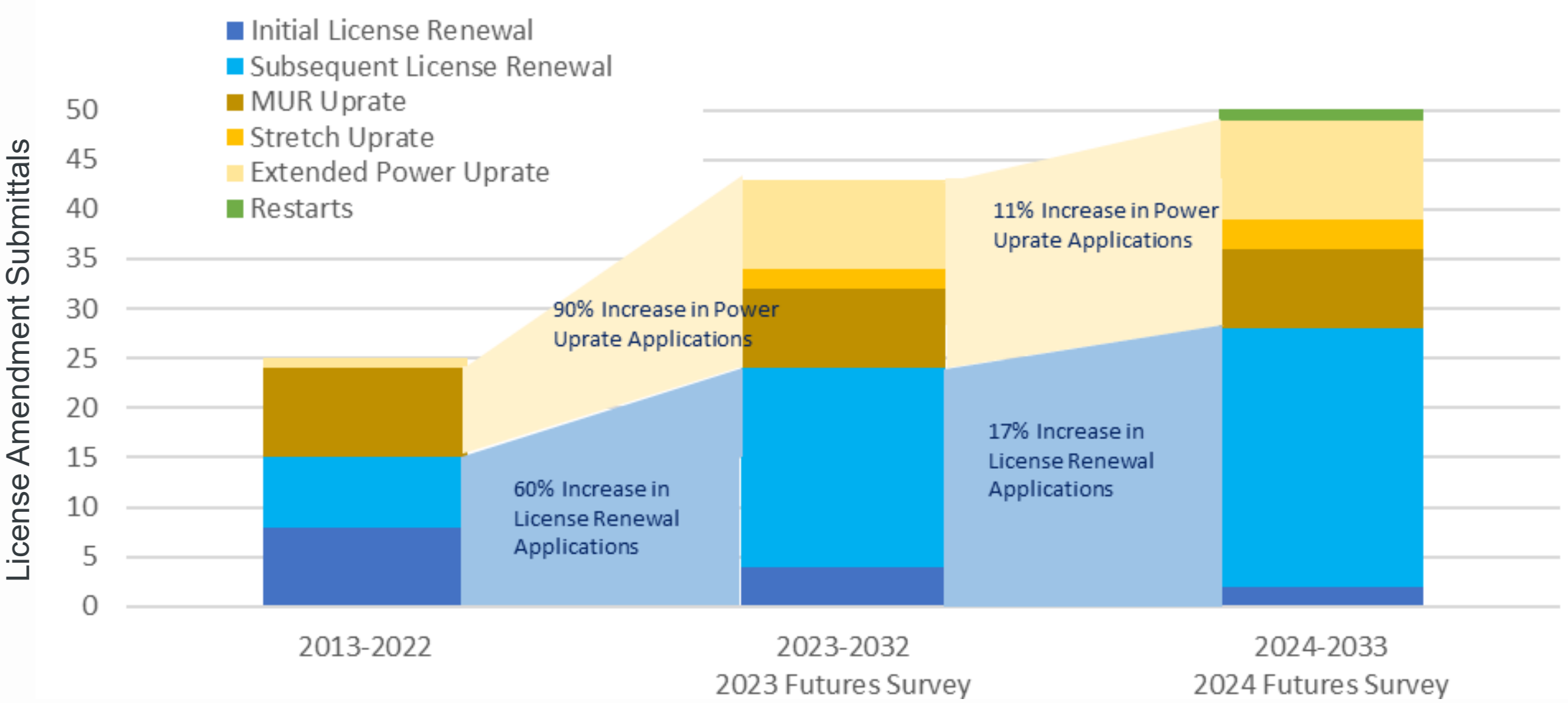
No reason we should expect NRC to be ready for this moment

Highlights of Recent CNO Survey



https://nei.org/resources/reports-briefs/the-future-of-nuclear-power-2024-survey

2024 Survey – Existing Fleet



Key ADVANCE Act Opportunities

- Updated oversight process reflecting lessons-learned
- Efficient and predictable licensing schedules
- Enhanced project management and transparent performance metrics
- Rapid disposition of low safety significance issues
- Efficient decision-making processes
- Right-sized regulatory requirements for micro reactors and SMRs

Important that Efficiency is Achieved Across All Business Lines

Summary

- NRC processes and regulations in need of modernization
  - Safety and efficiency are not mutually exclusive
- NRC's leadership team has taken up the charge
- Significant opportunities exist to create:
  - Efficient processes for expanding generation from the existing fleet
  - Regulatory framework for efficient deployment of advanced and micro-reactors at-scale

The ADVANCE Act is an important start on this journey but not the end

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Session 2

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National Association of Regulatory Utility Commissioners

Session 3

Palisades Restart Approach, Status, and Challenges

Hon. Katherine Peretick, Michigan

April Nguyen, Lead of Restart Project Team in Region III Office, NRC

Justin Poole, Senior Project Manager, Division of Operator Reactor Licensing, Leading Restart Projects, NRC

PALISADES RESTART PROJECT

US NUCLEAR REGULATORY COMMISSION
APRIL NGUYEN
JUSTIN POOLE

PALISADES TIMELINE

May 2022

Ceased Unit Operations (economic reasons)

June 2022

Removed Fuel from Reactor; Transferred license to Holtec Decommissioning

February 2023

Holtec submits proposed plan for reauthorization of power operations

September 2023

Submitted first licensing action to support restart

NRC ACTIVITIES (SO FAR)

November 2023

Created Palisades Restart Panel and issued Charter

February 2024

Started Restart Readiness Inspections (Region III)

April 2024

Held first Palisades Restart Panel Public Meeting local to site

May 2024

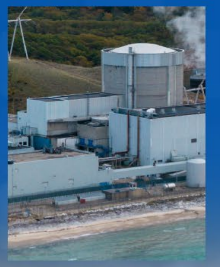
Received all Licensing Actions from Holtec for review

NRC PROCESS

- Created new guidance, Inspection Manual Chapter 2562, which established oversight policies, requirements, and guidance for transitioning from a decommissioning reactor facility to an operational power reactor facility subject to the Reactor Oversight Process (ROP). Not Palisades-specific.
- Activities overseen by a chartered panel of senior leaders in the NRC.
- Independent assessment of readiness to restart through licensing reviews and inspection activities.
- Coordination of activities – decommissioning, licensing, inspection, environmental review, communications, outreach.

Palisades Licensing and Inspection Transition Activities

NRC OVERSIGHT



The NRC will independently review Holtec's readiness assessment to decide if Palisades is safe to restart.

Exit Operating Reactor Oversight
Certifications of permanent cessation of operations and removal of fuel from the reactor vessel

Decommissioning Inspections
Decommissioning Reactor Oversight (Decommissioning License Only)

Licensing
The NRC will review Holtec's requests (Exemption, **license** amendment requests) to restore the operating license.

Inspections
The NRC will review and **inspect** Holtec's assessment of systems, structures, and components to return to operations.

Environmental
The NRC will conduct an **environmental** review of the potential resumption of power operations at Palisades.

Return to Reactor Oversight Process
Operating License Restored

May/June 2022 (shutdown) | **Fall 2023** | **Spring 2024** | **Transition Date**

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NRC PROCESS – LICENSING

- Need a “path” to reauthorize power operations
- Transfer license to a subsidiary of Holtec that will be qualified to operate a plant
- Revise design and licensing basis documents to support power operations
  - Technical Specifications, Emergency Plan, Quality Assurance Plan, Security Plan
- Go back to the last revision of the operating documents, with some minimal updates
  - For example, most recent revision of UFSAR will go back into effect with only administrative changes. Will be more fully updated after resumption of power operations.
- Status of Licensing Actions updated on public webpage

HOLTEC PALISADES' ACTIVITIES

- Finish hiring staff (~600 full-time plant employees). Currently using contractors for many activities.

- 2024 Work Activities – large component inspections and major modifications: Reactor Vessel Inspections, Steam Generator Inspections, Reactor Coolant Pump refurbishments, Decontamination of Primary Coolant System, Dry Fuel Storage campaign, Fire Protection system modifications.

- 2025 "Outage" Window – structures, systems, and components maintenance and testing for operability/functionality. Re-load fuel. Pre-operational testing.

NRC INSPECTION ACTIVITIES

- Goal is to assess Holtec Palisades' readiness to operate facility and meet all requirements for operating reactors.
- Risk-informed approach based on changes made to the facility, restoration of operating license conditions and bases, and any significant items of interest prior to the facility shutdown.

Examples of Inspections

- ✓ SSC Restoration
- ✓ Re-implementation of QA program
- ✓ Programmatic updates and procedure revisions
- ✓ Re-implementation of training
- ✓ Security and Emergency Plan changes back to operating state
- ✓ Major modifications
- ✓ Licensing and design-basis changes
- ✓ Open or deferred items for resolution

OUTREACH/COMMUNICATIONS

- Palisades has a history of strong external stakeholder engagement from local, county, state, and tribal groups, anti-nuclear activists, and Congressional representatives.
- Hosting approximately quarterly public meetings in area around Palisades to discuss current status of activities and engage in dialogue with community.
- Conducting outreach in area such as government-to-government meetings (including local tribes), engaging in discussions with concerned local stakeholders, and conducting briefings of Representatives as requested.
- Responding to media inquiries including personal interviews, site tours, and press conferences.

OTHER POTENTIAL RESTART PROJECTS

- Three Mile Island Unit 1 and Duane Arnold Energy Center have submitted their restart plans and exemption requests.
- Both sites shutdown for economic reasons.
- Both plan to restore the operating licensing basis following the same model as Palisades.
- Both plants have all spent fuel in dry fuel storage, most major plant systems are drained, and no major decommissioning activities have occurred at either site.

NRC PROCESS FOR FUTURE RESTART PROJECTS

- Use of Inspection Manual Chapter 2562, which established oversight policies, requirements, and guidance for transitioning from a decommissioning reactor facility to an operational power reactor facility subject to the Reactor Oversight Process (ROP).
- A charter is being drafted to create a panel of senior leaders in the NRC to oversee activities.
- Independent assessment of readiness to restart through licensing reviews and inspection activities.
- Coordination of activities – decommissioning, licensing, inspection, environmental review, communications, outreach.

QUESTIONS AND COMMENTS

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National Association of Regulatory Utility Commissioners

Session 3

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April Nguyen, Lead of Restart Project Team in Region III Office, NRC

Justin Poole, Senior Project Manager, Division of Operator Reactor Licensing, Leading Restart Projects, NRC

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Session 4

Facilitating Uprate Transactions

Hon. Carolee Williams, South Carolina

Julie Kozeracki, Director of Strategy, Loan Programs Office, U.S. Department of Energy

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National Association of Regulatory Utility Commissioners

Thank you!

To stay informed on NARUC's nuclear activities, please contact Kiera and Kathryn.

kzitelman@naruc.org | kkline@naruc.org

www.naruc.org/events/all-events

Apr

14

to

16

NARUC-NASEO Advanced Nuclear State Collaborative Spring 2025 Site Visit

Members of the NARUC-NASEO Advanced Nuclear State Collaborative are invited to participate in a site visit to Charlotte, NC which will include a tour of the Catawba Nuclear Plant, EPRI Research Labs, and presentations from North Carolina utilities and industry experts on advanced nuclear development in the state.

IN-PERSON