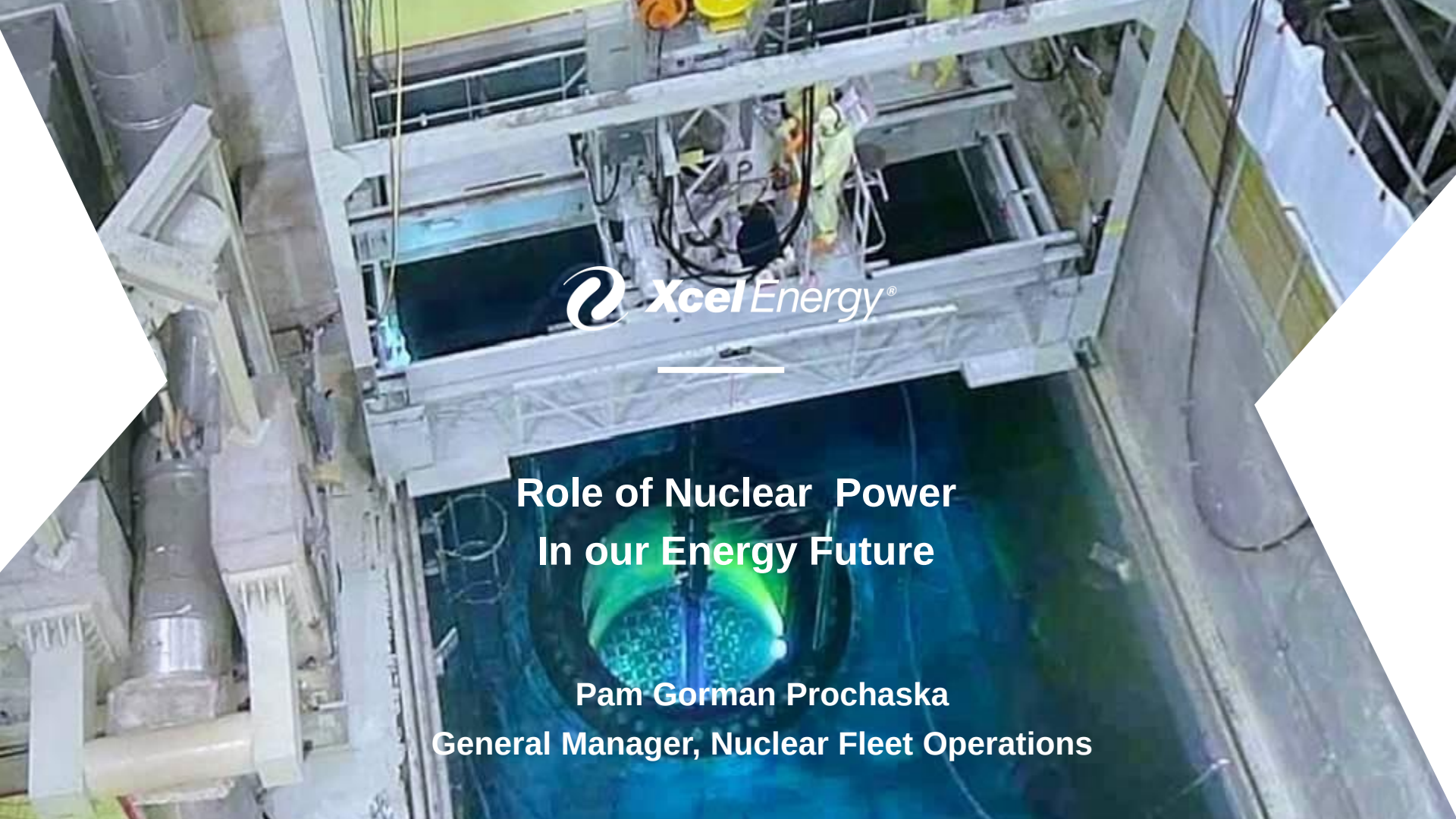


Role of Nuclear Power In our Energy Future

Pam Gorman Prochaska
General Manager, Nuclear Fleet Operations

Today’s Agenda

Nuclear Policy Updates

Advanced Nuclear

Management of Spent Nuclear Fuel

State of the industry

Nuclear Fleet update

Xcel Energy®

Xcel Energy Nuclear Generating Fleet

Over five decades of carbon free power

Prairie Island Nuclear Plant

- 2 Pressurized water reactors
- Unit 1 (1973); Unit 2(1974)
- Licensed through 2033/2034
- 1,100 MW
- 800 Employees; 1,000 more during refueling

Monticello Nuclear Plant

- 1 Boiling water reactor (1971)
- Licensed through 2050
- 671 MW
- 650 employees; 800 more during refueling

Extending Xcel Energy Nuclear Fleet

- **Monticello Nuclear Generating Plant**
  - State Certificate of Need (CON) for 10-year extension approved August 2023
  - NRC license extension approved Dec 30, 2024
  - NRC License expires 2050
- **Integrated Resource Plan**
  - Filed Feb 2024
  - Preferred plan would extend Monticello by 10 years (to 2050), Prairie Island by 20 years (to 2053/43)
- **Prairie Island Nuclear Generating Plant**
  - Current operating license expires 2033/2034
  - State CON for 20-year extension filed Feb 2024
    - CON decision will follow IRP decision
  - Federal license application to extend will be filed with NRC after CON decision final in 2026

Xcel Energy Nuclear Fleet

- Nuclear plants > 50% existing carbon-free generation and 1/3 total generation in Upper Midwest
- Nuclear fleet adds important diversity to our generation portfolio
- Critical piece of our reliability requirement > 90% capacity factors

Advanced Nuclear

Xcel Energy®

Advanced Nuclear Reactors Vary in Size

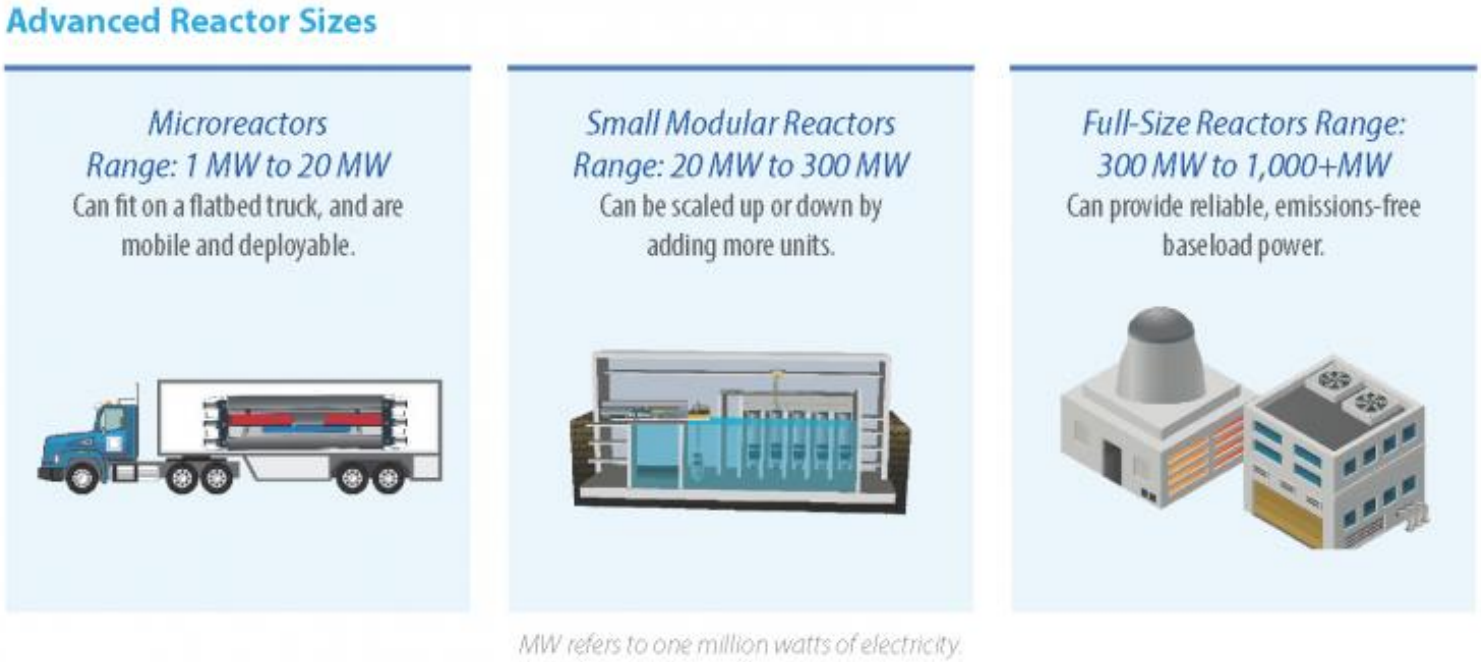


Image from U.S. Department of Energy Office of Nuclear Energy – Advanced Reactor Technology Development Fact Sheet: https://www.energy.gov/ne/articles/advanced-reactor-technology-development-fact-sheet

Advanced Nuclear Tech Overview

Small Modular Nuclear Reactors (SMRs)
Zero-Carbon Dispatchable Base Load

- SMRs: Modular fission reactors generally 50 to 300 MW
- Strong federal support: DOE >$5B over 7 years
- GE BWRX-300 under construction in Canada
- TerraPower, and X-Energy in varying stages of pilot projects
- Project development, licensing and construction timeline estimated at 10-14 years
- Micro Reactors: Factory-built, 1-20 MW, very small footprint

Considerations:
- Fuel, supply chain, licensing

Gen III+

Strong Safety Case

Substantial Operating Experience

Design and Licensing Maturity

Conventional Fuel

Gen IV

Gas and molten salt/metal coolant

Includes: “fast” reactors

TRISO/HALEU fuel

2030

Technology Readiness

2040+

III+ HITACHI

IV TerraPower

III+ Westinghouse

IV energy

III+ NUSCALE

IV TERRESTRIAL ENERGY

IV moltex clean energy

IV Flibe ENERGY

IV Kairos Power

IV OKLO

IV ULTRA SAFE NUCLEAR

30 + companies

Micro Reactors
(< 20MW)

Oklo (shown)
Approximately a dozen in development

LWR SMRs
<300MW

NuScale (shown)
GEH X-300
Holtec SMR-160

DOE Advanced Reactor Demonstrations

- **Reactor demonstrations** expected to result in a fully functional advanced nuclear reactor within 7 years of the award. Timeline is a challenge.

Two designs funded by DOE
Moving into next phases

April 2024 – TerraPower submits Construction Permit application to NRC

January 2025 – first developer to receive state permit for adv nuclear project

TerraPower Natrium

- Sodium cooled fast reactor, combined with thermal storage
- Pilot location in Kemmerer, Wyoming. It is coal plant conversion
- Early construction activities started in 2024

X-Energy Xe-100

- Four, 80 MWe High temperature gas reactors
- Working with Dow on Pilot
- Ontario Power Generation and X-energy pursue deployment in Canada
- MOU with Saskatchewan company SIMSA for supply chain
- Announced selection of constructors

Notable issues to consider around adv nuclear generation

Risk factors to consider in evaluating new nuclear technologies

- Cost (LCOE)
- Licensing / Regulatory Risk
- Construction Risk
- Supply Chain
- Fuel Supply
- Spent Fuel

Long Term Resource Planning Considerations

- Industry is under-going tremendous change with the generation fleet turning over at an accelerating pace
- Currently there are limited dispatchable generation options available long term
  - Long Duration Battery Storage, Natural Gas w/clean fuels or carbon capture, Advanced Nuclear, Geothermal+
- Advanced nuclear is gaining national support
  - Multiple utilities are identifying it as a long-term resource option
  - DOE is developing programmatic support to catalyze development

Management of Spent Nuclear Fuel

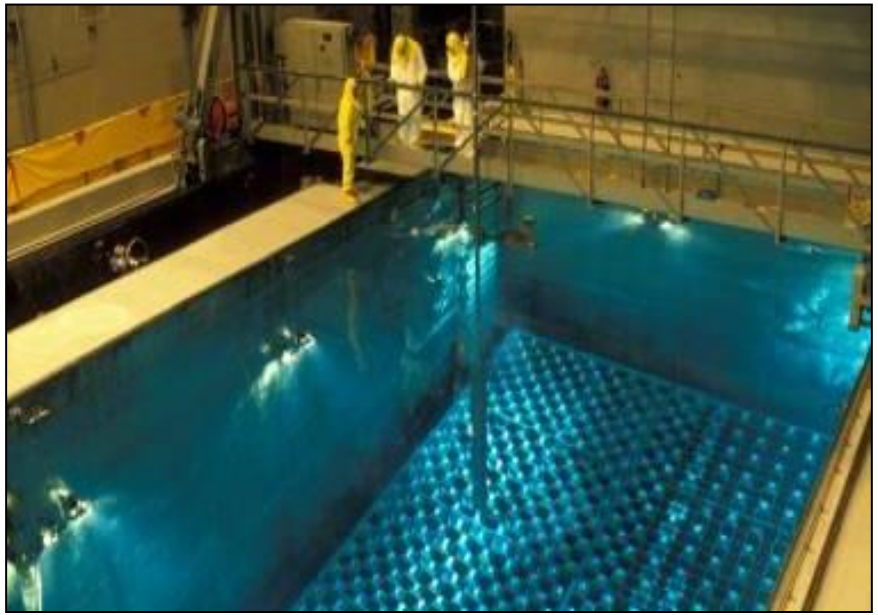
Xcel Energy®

Spent Fuel Pools

After producing electricity for 5– 6 years, spent fuel assemblies stored in pools inside the plants. Once cooled sufficiently it is moved to dry storage systems.

Pools have 3-6 feet of concrete with stainless-steel liners.

Pools contain a leakage detection and collection system.



Status of On-Site Storage

30 loaded canisters stored on site

- Supports operations to 2030
- Mid-1980's shipped 33 casks containing ~1,000 assemblies to General Electric facility in Morris, IL

50 loaded casks stored on site

- 64 approved to support 2033/2034

Managing Spent Nuclear Fuel

Department of Energy responsible for permanent disposal (by law)

- Yucca Mountain not viable (politically)
- DOE Consent Based Siting Program for interim storage
  - Increased grant program to $26M as a result of the Consolidated Appropriations Act, 2023
  - 13 grantees awarded ~$2 Million each
  - Goal is to increase stakeholder capacity, dialogue, and education to assist the DOE to develop a community-focused consent-based approach
  - 2025 will begin next phase of program

Consolidated Interim Storage

Holtec *Hobbs, New Mexico*

Integrated Storage Partners

Andrews, Texas

- Private Initiative
- Received NRC licenses but legal and state challenges remain
- Will be heard by US Supreme Court in March, decision before recess

State of the Nuclear Industry

Xcel Energy®

State of the Nuclear Industry in the US

94 operating reactors at 53 plants across the country

18.2% of US electricity production in 2023

45.5% of emission-free electricity generation in 2023

93% capacity factor

$30.18 MWh industry average generating cost

New Vogtle Unit 4 online in 2024

History of Nuclear Power at Xcel Energy

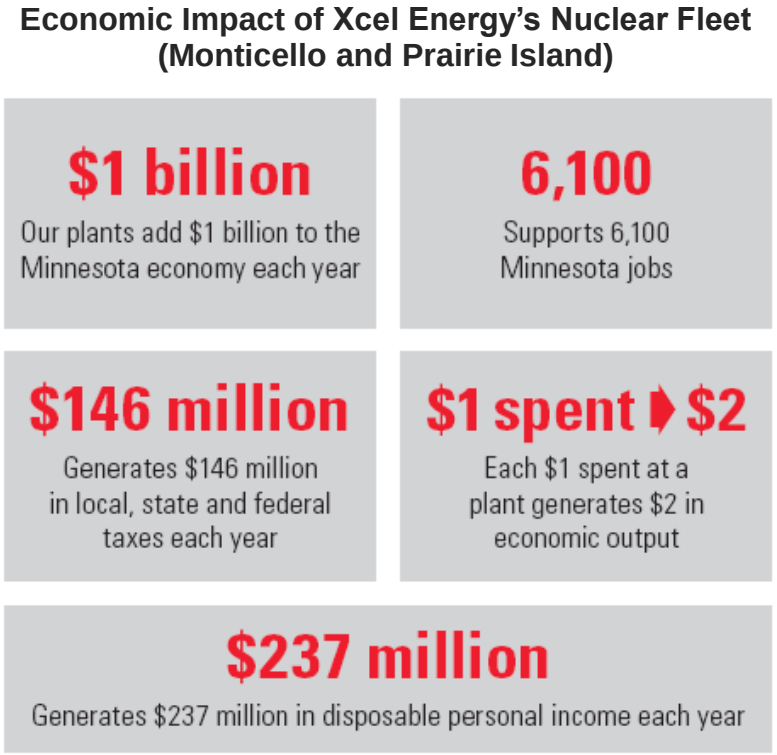
PLANT	TIME	TYPE	MWe	LOCATION	NOTES
Pathfinder	1966-67	BWR (Boiling Water Reactor)	59	Sioux Falls, South Dakota	Test Reactor used to gain knowledge Site - Angus Anson Plant
Fort St. Vrain	1979-89	HTGR (High Temp Gas Reactor)	330	Platteville, Colorado	• Converted to Natural Gas in 1996 • Only Nuclear Plant in CO • One of two HGTRs in country • Uranium / Thorium Fuel
Monticello	1971 - Current	BWR (Boiling Water Reactor)	671	Monticello, Minnesota	Applied for second 20-year license extension to operate 80 years until 2050
Prairie Island	1973/74 - Current	PWR (Pressurized Water Reactor)	1,100	Red Wing, Minnesota	Plan to apply for second 20-year license extension to operate 80 years until 2053/54

BENEFITS OF NUCLEAR POWER

Clean	**Nuclear provides more than 1,700 MW of clean energy**
Economic	**Nuclear provides $1B to the local economy**
Reliable	**Nuclear is always on 24/7 - regardless of the weather. Can flexibly operate.**
Safe	**Nuclear is highly regulated and secured**

Community Involvement

- Monticello and Prairie Island nuclear plants pay significant local taxes, and generate a billion dollars in local economic activity/yr
- The plants support over 1000 jobs directly and supports nearly 2,000 jobs indirectly
- Monticello and Prairie Island are the largest sources of carbon-free energy in Minnesota
- Nuclear employees contribute significantly to the local United Way, and are personally involved in the community



In Summary

Xcel Energy's nuclear fleet is important to our customers, employees and the communities we serve

- Nuclear provides around the clock grid stability, voltage support and overall reliability

Existing Nuclear is a key component of our company's future

- Working to extend Monticello and Prairie Island part of our integrated resource plan
- Advanced nuclear could have a role in the future and we plan to stay engaged with nuclear developers

Finding a solution for spent nuclear fuel is a priority – especially for Xcel Energy

- We continue to provide industry leadership on all initiatives
- Intend to work with the Department of Energy to establish an interim siting program and continue to engage with federal and state policy makers on long-term storage
- Support the Consolidated Interim Storage applicants

The value of studying nuclear now

Xcel Energy®

Q & A