



Role of Nuclear Power In our Clean Energy Future

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Nuclear Fleet Update

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

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

Economic Impact of Xcel Energy's Nuclear Fleet (Monticello and Prairie Island)

\$1 billion

Our plants add \$1 billion to the Minnesota economy each year

6,100

Supports 6,100 Minnesota jobs

\$146 million

Generates \$146 million in local, state and federal taxes each year

\$1 spent ▶ \$2

Each \$1 spent at a plant generates \$2 in economic output

\$237 million

Generates \$237 million in disposable personal income each year

Extending Xcel Energy Nuclear Fleet

- **Monticello Nuclear Generating Plant**

- State Certificate of Need (CON) for 10-year extension approved August 2023 (2030 to 2040)
- 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
 - Legislative stay
- 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

Advanced Nuclear Reactors Vary in Size

Advanced Reactor Sizes

Microreactors

Range: 1 MW to 20 MW

Can fit on a flatbed truck, and are mobile and deployable.



Small Modular Reactors

Range: 20 MW to 300 MW

Can be scaled up or down by adding more units.



Full-Size Reactors Range:

300 MW to 1,000+MW

Can provide reliable, emissions-free baseload power.



MW refers to one million watts of electricity.

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:
- 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



2040+



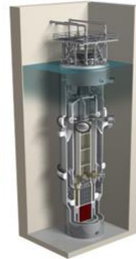
30 +
companies

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



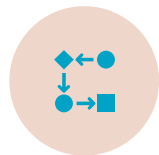
Cost (LCOE)



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

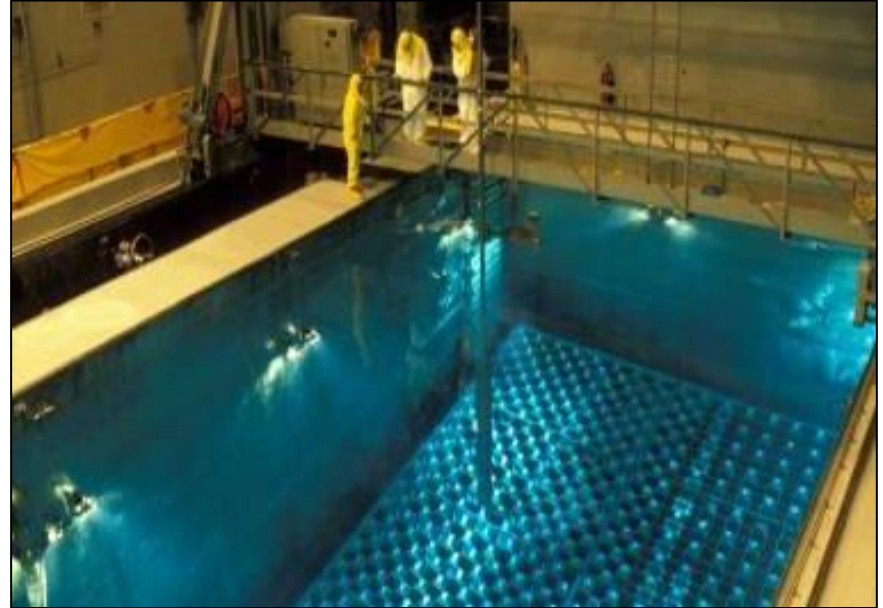
Management of Spent Nuclear Fuel

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 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

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

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
- 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

