U.S. DEPARTMENT OF ENERGY | Office of NUCLEAR ENERGY

Nuclear Energy in a Clean Energy Mix

Alison K Hahn
Nuclear Reactor Deployment Office Director
Office of Nuclear Energy

NASEO

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- In the United States, we are committed to getting to:
  - 100 percent clean energy on our transmission grid by 2035, and
  - net-zero carbon emissions by 2050.

- Investments in clean energy technologies will ensure the U.S. is the global leader in research, development, and deployment of critical energy technologies to combat the climate crisis, create good-paying union jobs, and strengthen our communities in all pockets of America.

Nuclear Energy in a Net Zero Economy

Nuclear Energy Generation

Light water reactors, high temperature advanced reactors, small modular reactors, microreactors

Other Energy Generation

Variable renewables, municipal waste, fossil with carbon capture, etc.

Biofuel

New chemical processes

Clean water

Industry

Electricity

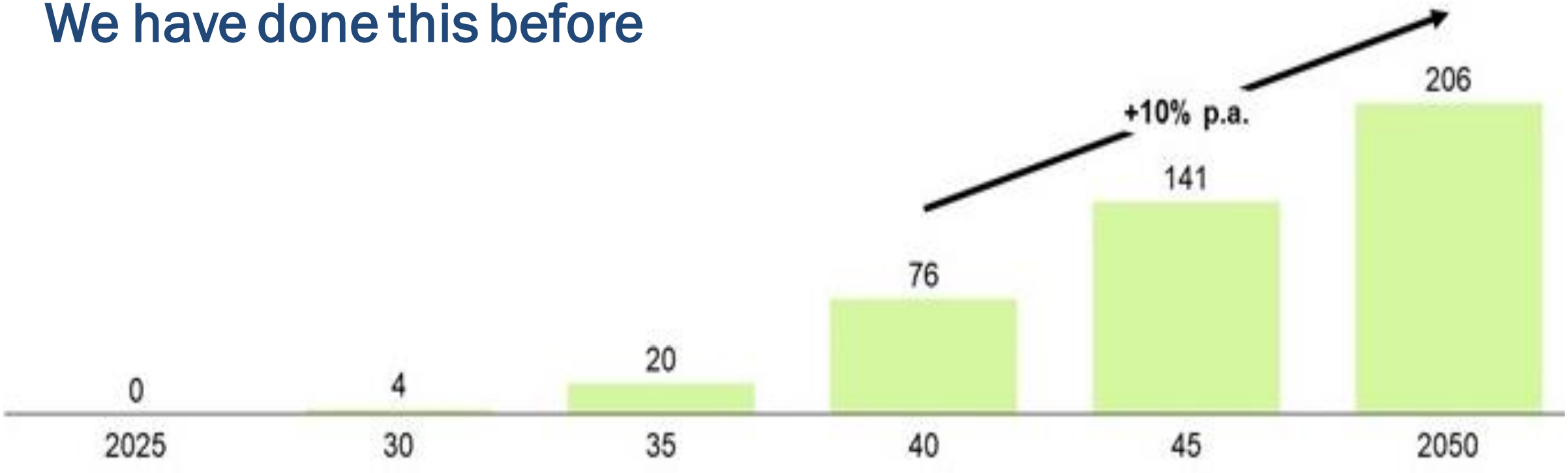
Hydrogen for vehicles and industry

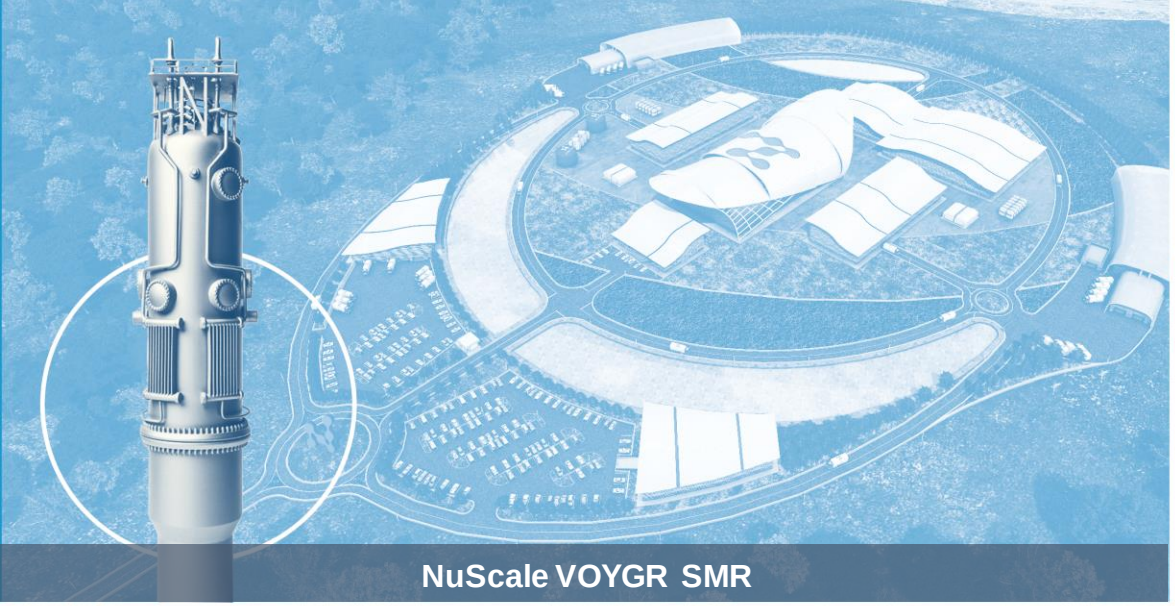
Required Nuclear Buildout – 200 GW by 2050

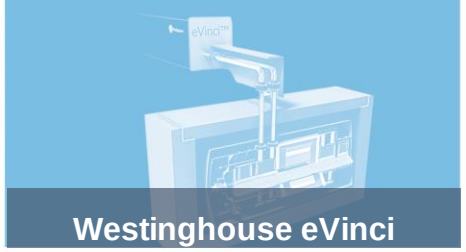
Annual industrial capacity additions:

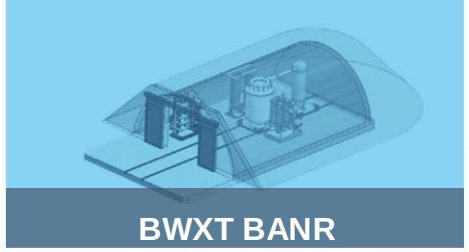
- 2 GW per year 2029 – 2034
- Ramping to 13 GW per year from 2035 – 2050

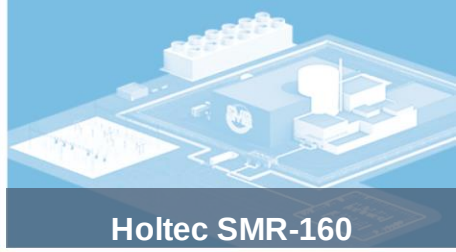
We have done this before




NuScale VOYGR SMR


Westinghouse eVinci


BWXT BANR


Holtec SMR-160


TP Molten Chloride Fast Reactor


Kairos KP-FHR

Advanced Nuclear Private-Public Partnerships

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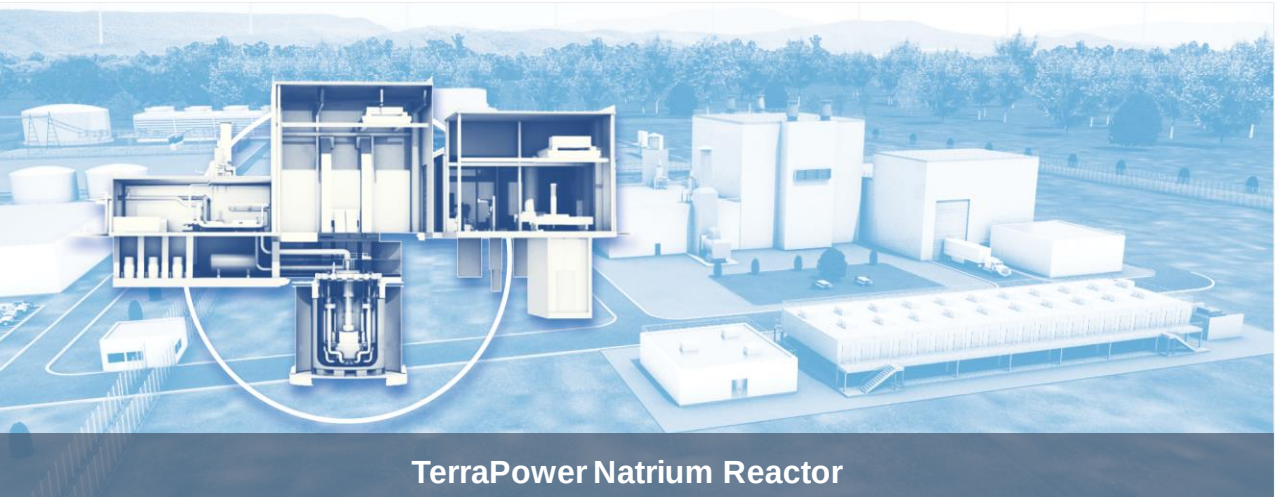
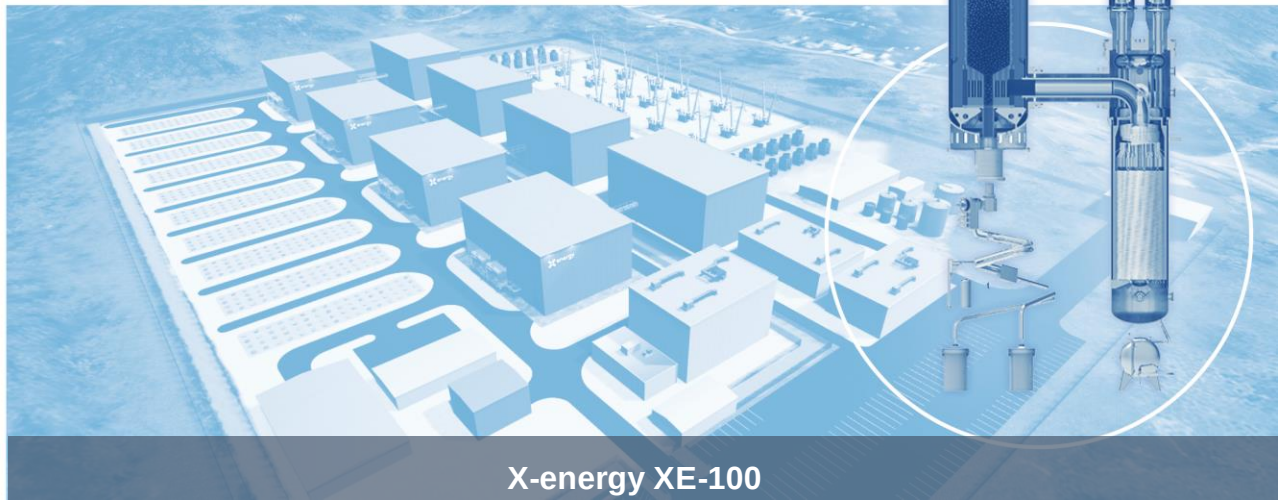

TerraPower Natrium Reactor


X-energy XE-100

Substantial Support for New Nuclear

Bipartisan Infrastructure Law

Advanced Reactor Demonstrations
$2.5B

Civil Nuclear Credits
$6B

Regional Hydrogen Hubs (at least 1/4 nuclear)
$8B

Inflation Reduction Act

HALEU Availability
$700M

Production Tax Credit
$15/MWh

Investment Tax Credit
30% of capital cost in tax credit in year 1 of operations

Inflation Reduction Act – New Loan Authority

$11.7 billion to support issuing new loans

Existing Loan Programs

Innovative Clean Energy Loan Guarantees
(Title 17 ICE)

$3.6 B

credit subsidy up to
$40.0 B in loan authority

Tribal Energy Loan Guarantee Program
(TELGP)

$75 M

to carry out up to
$20.0 B in loan authority

Advanced Technology Vehicles Manufacturing Direct Loan Program
(ATVM)

$3.0 B

credit subsidy up to approximately
$40.0 B in loan authority

New Loan Program

Energy Infrastructure Reinvestment Program
(Title 17 EIR)

$5.0 B

to carry out up to
$250.0 B in loan authority

To guarantee loans to projects that retool, repower, repurpose, or replace energy infrastructure that has ceased operations

OR

To enable operating energy infrastructure to avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases.

Ambitious Net Zero Goals Need Nuclear

ENERGY earthshots
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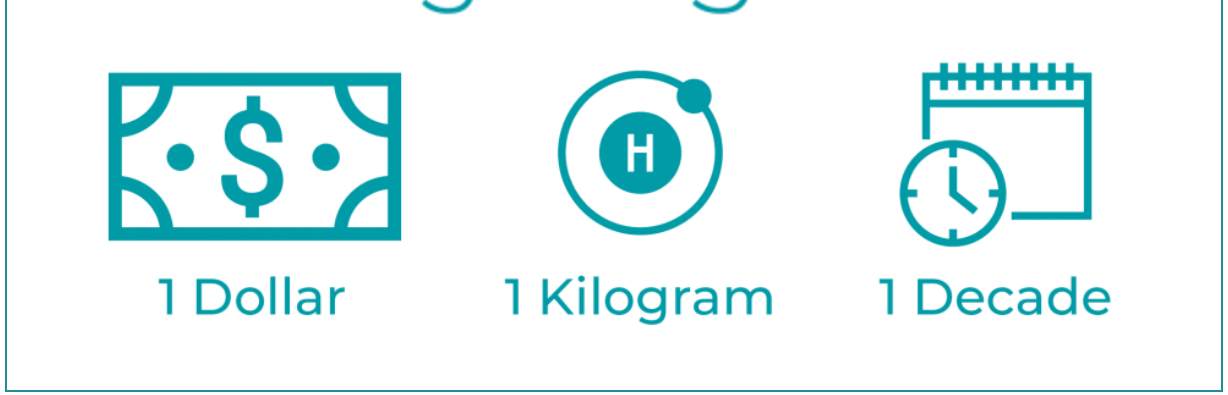
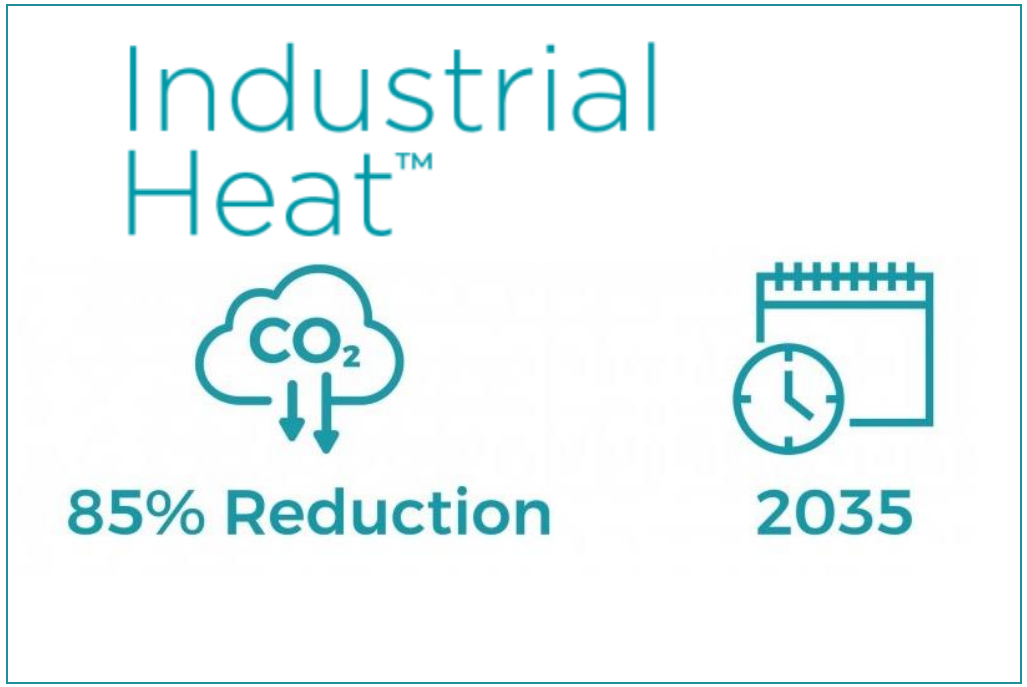




Nuclear-H_2 production demonstration projects

- **Constellation: Nine-Mile Point NPP**
  - 1 MWe Low Temperature Electrolysis (LTE)
  - Using "house load" power
  - H_2 production by end of year
  - First nuclear-powered clean hydrogen production facility in the US

- **Energy Harbor: Davis-Besse NPP**
  - 1-2 MWe LTE
  - Power provided by completing plant upgrade with new switch gear at the plant transmission station
  - H_2 production beginning in 2023

- **Xcel Energy: Prairie Island NPP**
  - 150 kWe High Temperature Electrolysis (HTE)
  - Engineering planned for tie into plant thermal line
  - H_2 production beginning early 2024

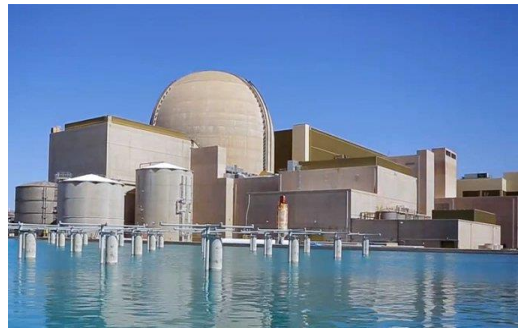
- **APS/PNW Hydrogen: Palo Verde Generating Station**
  - 15-20 MWe LTE H2 production, ~6-8 tons H2/day
  - H_2 storage + H_2 to gas peaking turbines (50%), syngas pilot
  - H_2 production expected 2024 (Award still under negotiation)

Nine Mile Point Nuclear Power Plant

Davis-Besse Nuclear Power Plant

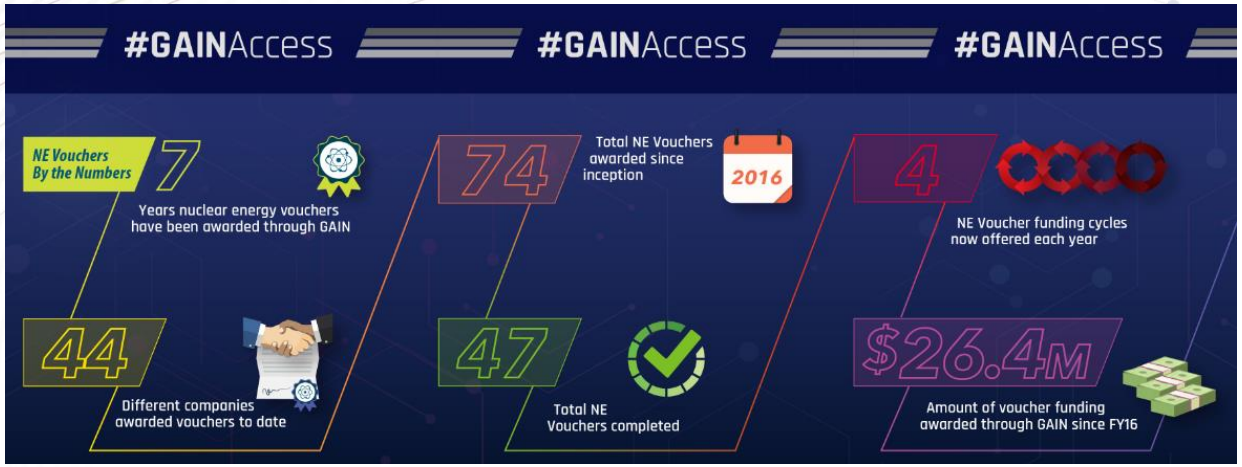
Prairie Island Nuclear Power Plant

Palo Verde Generating Station



2022 Activities

GAIN Gateway for Accelerated Innovation in Nuclear



State Level Outreach

- Policymakers, NGOs, Utilities, Regulators, Industrials, Commissioners
- Introduce Advanced Nuclear through direct conversation or testimony
- Help connect states to financial or technical resources across DOE complex
- Looking at state level regs

Advanced Nuclear Industry Milestones

Purdue University and Duk...
DATE
4/27/2022

VA Legislature Passes Bill ...
DATE
4/11/2022

Indiana Passes SMR Bill
DATE
3/18/2022

NuScale Power and KGHM ...
DATE
2/14/2022

West Virginia Repeals New...
DATE
2/8/2022

Oklo Partners with Argonn...
DATE
2/8/2022

USNC Partners with Coppe...
DATE
2/2/2022


Thank you!
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