

# The Industry's Innovation Imperative

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March 14, 2024



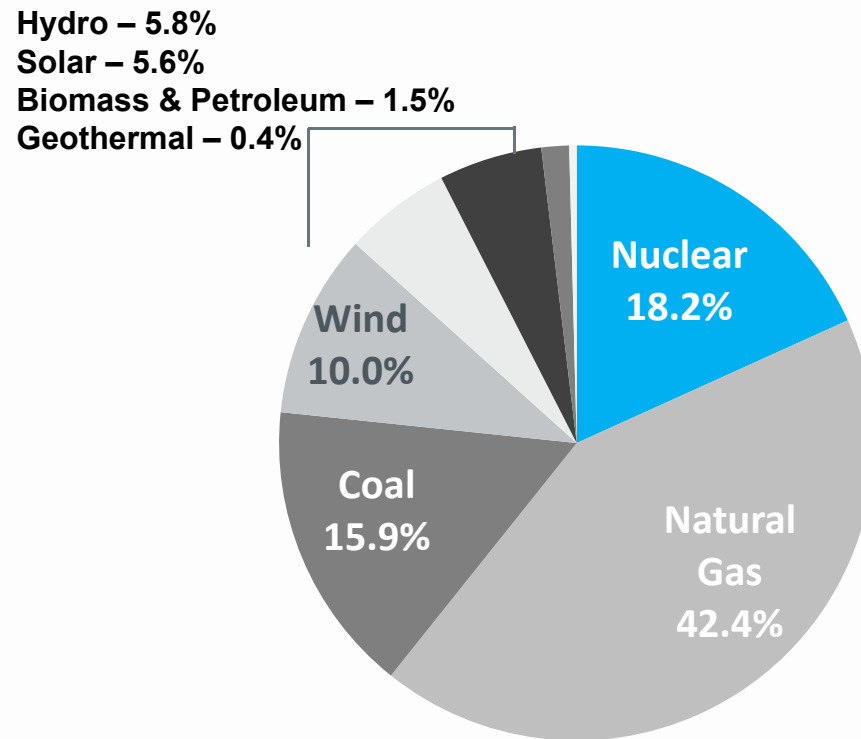
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# Topics

- The Nation's need for nuclear energy
- The industry's innovation imperative
- How can the NRC enable innovation?
- Does the drive for transparency inhibit innovation?
- Finding the right balance

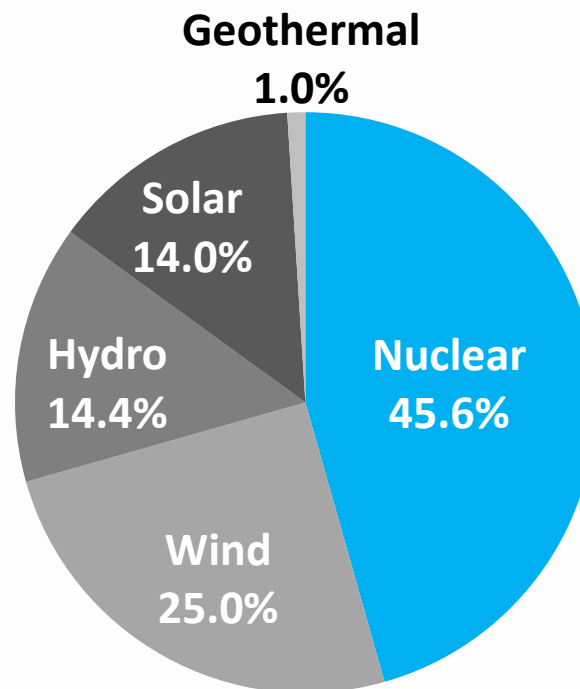
## Nuclear Generated 18% of U.S. Electricity in 2023



Notes: Includes small-scale solar.  
Source: U.S. Energy Information Administration  
Updated: February 2024

# U.S. Carbon-free Sources of Electricity in the U.S. in 2023

Nuclear Energy is the Largest Source By Far



Notes: Includes small-scale solar.  
Source: U.S. Energy Information Administration  
Updated: February 2024

## Nuclear is the Backbone of our Stable Electric Grid



- 775.3 million MWh of electricity generated
- 93.0% capacity factor
- Over two decades of an average capacity factor > 90%

# Recognition of Need for Nuclear Energy

- Global recognition of the important role nuclear can play in decarbonization, reliability, and energy security
  - COP28 pledge to triple nuclear globally by 2050
  - DOE Liftoff Report calls to triple U.S. nuclear generation by 2050 (200 GW of new nuclear)
  - Subsequent license renewal is a necessary part of the energy future
- U.S. needs to enhance its role in the global market
- Tech companies, oil & gas companies, chemical companies all interested in nuclear as source of highly reliable power
- U.S. utility demand projections growing rapidly – data centers, AI centers, electrification

The industry needs to sustain high standards

# Nuclear Energy Has Strong Federal Support

## Bipartisan Infrastructure Bill

### Civil Nuclear Credit Program

\$6B to support financially challenged plants

### ARDP Funding

\$2.5B funding for two projects

### Nuclear Hydrogen Hub

\$8B total in the bill

## Inflation Reduction Act

### Production Tax Credit (PTC) for Operating Plants

Up to \$15 per MWh

### Technology-Inclusive PTC for Clean Electricity

\$30 per MWh

### Technology-Inclusive Investment Tax Credit (ITC) for Clean Electricity

30% + 10% in coal communities + 10% using U.S. components

### Clean Hydrogen Credit

\$3 per kilogram

# 2023 NEI “Futures” Survey

## License Renewal

- **>90%** of fleet expects to operate to at least **80 years**
- **>4** LR applications expected by 2026
- **>20** SLR applications expected by 2030

## Investments

- **>20** power uprate applications expected by 2030
- **>11** Extended Fuel Cycle applications
- Greater than **\$6B** in other capital investments over next 10 years

## Behind the Meter

### Action or Interest

	Sites	MWe
Hydrogen	26	50-300
Data Center	22	200-900
Bitcoin	1	
Reverse Osmosis	1	200

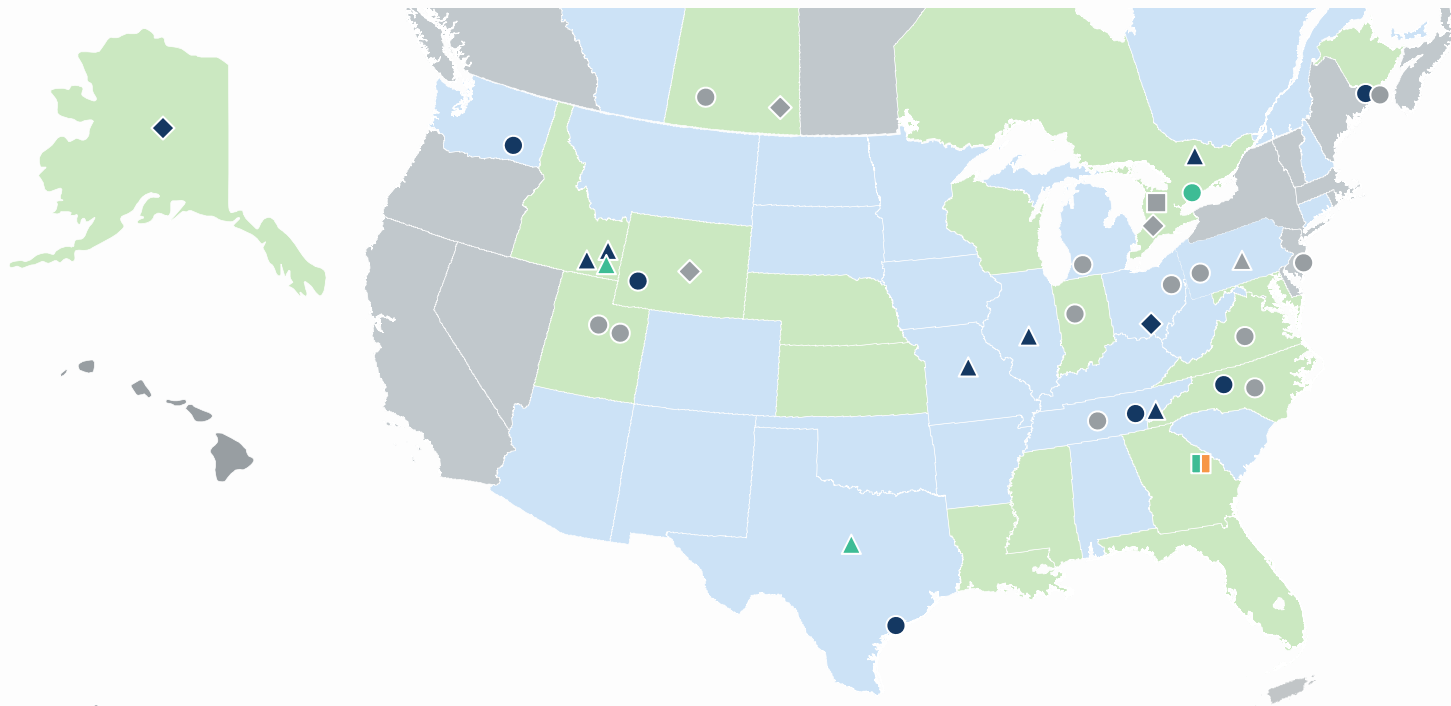
## New Nuclear

- Increased interest in new nuclear at ~60% of utilities
- New nuclear generation needs increased to **>100 GWe**
- **> 1/3** of utilities considering ESP applications

# Advanced Nuclear Deployment Plans

State support and projects that may be in operation by early 2030s

Updated 11/16/2023



## Legend

- |  |  |
|--|--|
| State Actions – Substantive Incentives | State Actions – Supportive and Exploring |
| Considered project                     | Planned project                          |
| Under construction                     | Operating                                |
| Large (1,000 MWe)                      | Small (<300 MWe)                         |
| Micro-reactor (<50 MWe)                | University / Research / Test             |

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# Innovation is Necessary to Meet Demand

- Offer a wide array of advanced plant options to existing and new customers
- Enhance safety
- Enhance efficiency
- Address obsolescence
- Attract, train, qualify & retain the workforce
- Compete internationally to support national security
- Others...

# To Enable Innovation, the NRC Must Be Flexible

Has a our drive for transparency backfired?

## Transparency

- Standard Review Plan ~ 2000 pages
- > 400 Regulatory Guides
- GALL – SLR -1300 pages
- 400 NUREGs
- Branch Technical Positions

## Flexibility

- The reviewer makes the call based on sound engineering, DiD & safety margins – holistic reviews may help
- What is necessary for reasonable assurance of adequate protection
- Leadership must limit variability between reviewers must be limited

Regulations must be flexible but repeatable

# Key Takeaways

1. Nuclear's role in decarbonization is accepted as essential
2. New plants & SLR will play key roles in nation's energy mix
3. Innovation is an imperative to meet the moment
4. NRC must embrace decision-making with no/little guidance
5. NRC must ensure repeatability as well as flexibility
6. Performance-based regulation & holistic reviews can help