

# Securing the Future of the Nuclear Industry

Hilary Lane

Director, Fuel and Radiation Safety

October 24, 2023

NRC AMT Workshop





# THE NUCLEAR ENERGY INSTITUTE

is the **policy organization** of the nuclear technologies industry, based in Washington, D.C.

On behalf of its members, NEI is the **unified voice** of the nuclear energy industry on various **policy, technical, and regulatory issues**.

- **300+ MEMBERS IN 17+ COUNTRIES**

# 300+ Members



Nuclear Utilities



EPCs & Suppliers



Fuel Cycle



Decommissioning



National  
Labs



Investment &  
Financial Firms



Advanced  
Reactors



Universities



Law Firms



Consultants

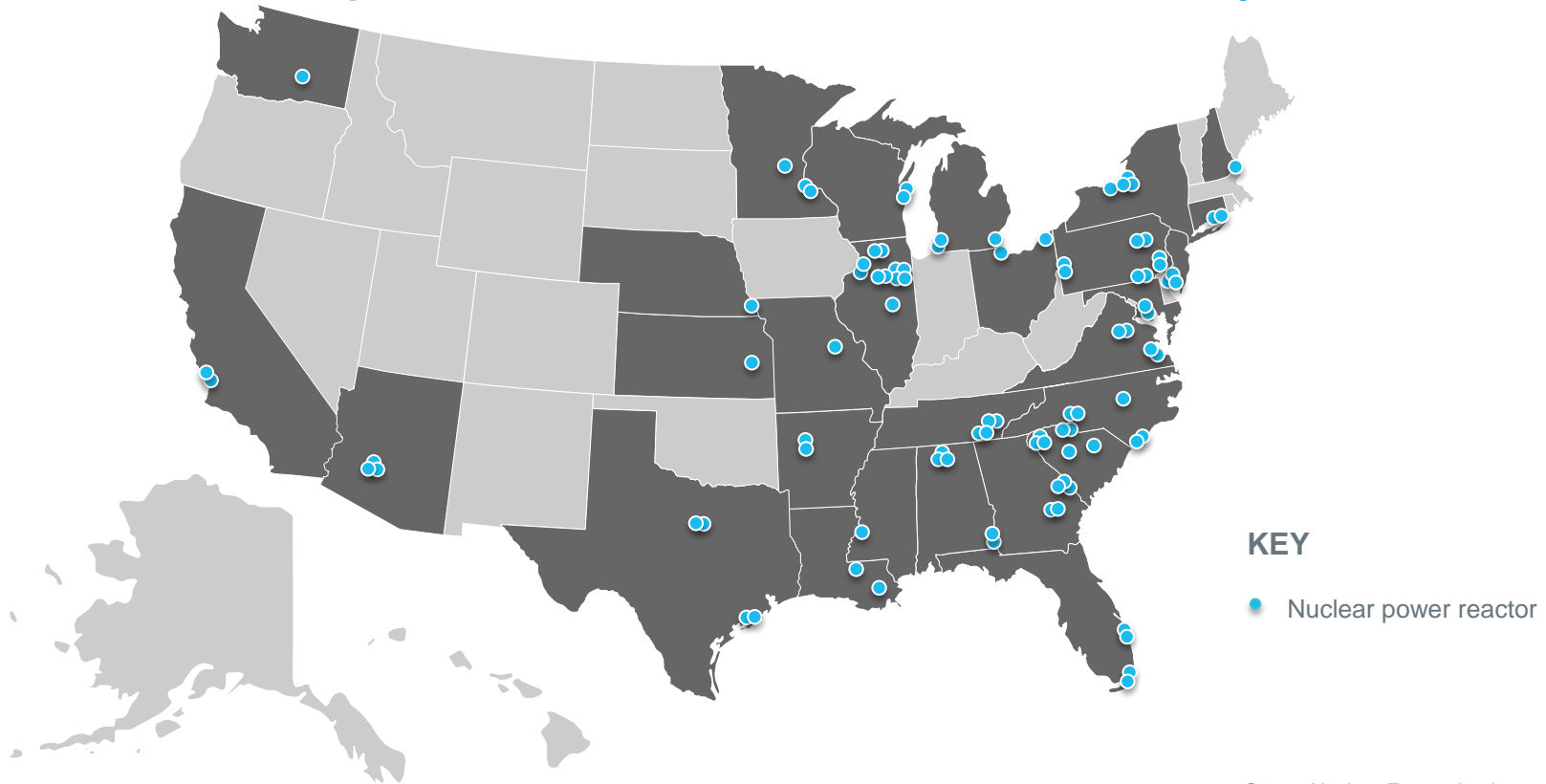


Labor Unions

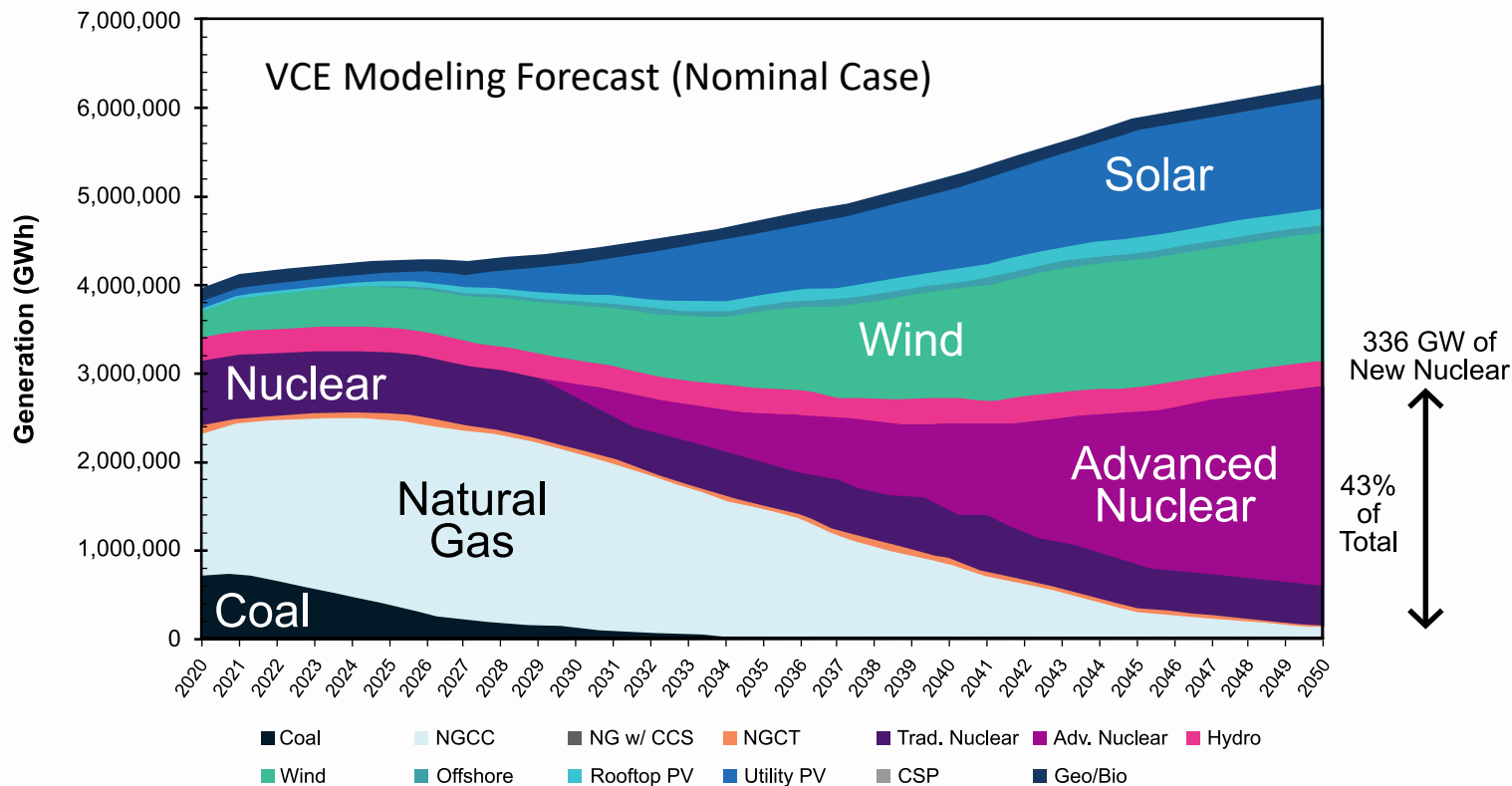


NGOs &  
Think Tanks

# Current Fleet: **93 reactors** at 53 plant sites across the country



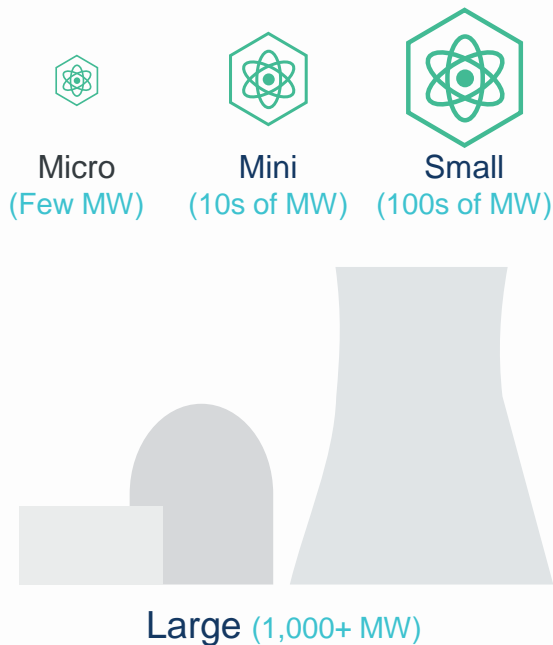
# U.S. Market Opportunity for Advanced Nuclear



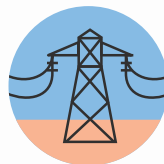
Source: Vibrant Clean Energy, *Role of Electricity Produced by Advanced Nuclear Technologies in Decarbonizing the U.S. Energy System* (June 2022), available at <https://www.vibrantcleanenergy.com/media/reports/>

# Advanced Nuclear's Potentially Versatile Applications

## Spectrum of Sizes and Options



## Variety of Outputs



Electricity



H<sub>2</sub> Hydrogen



Process Heat

## Multitude of Uses



Homes



Vehicles



Businesses



Aviation



Rail



Shipping



Concrete



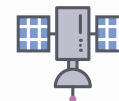
Steel



Factories



Water

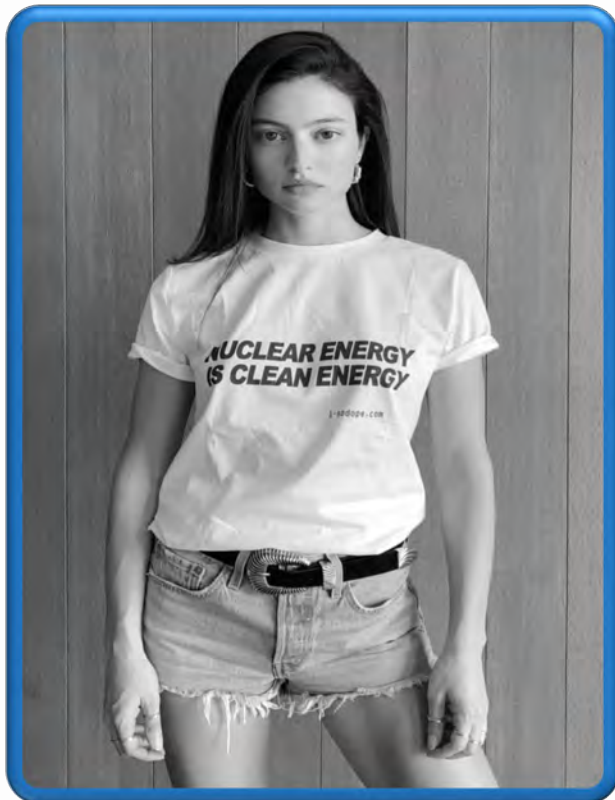


Space





# Nuclear Is POPULAR!



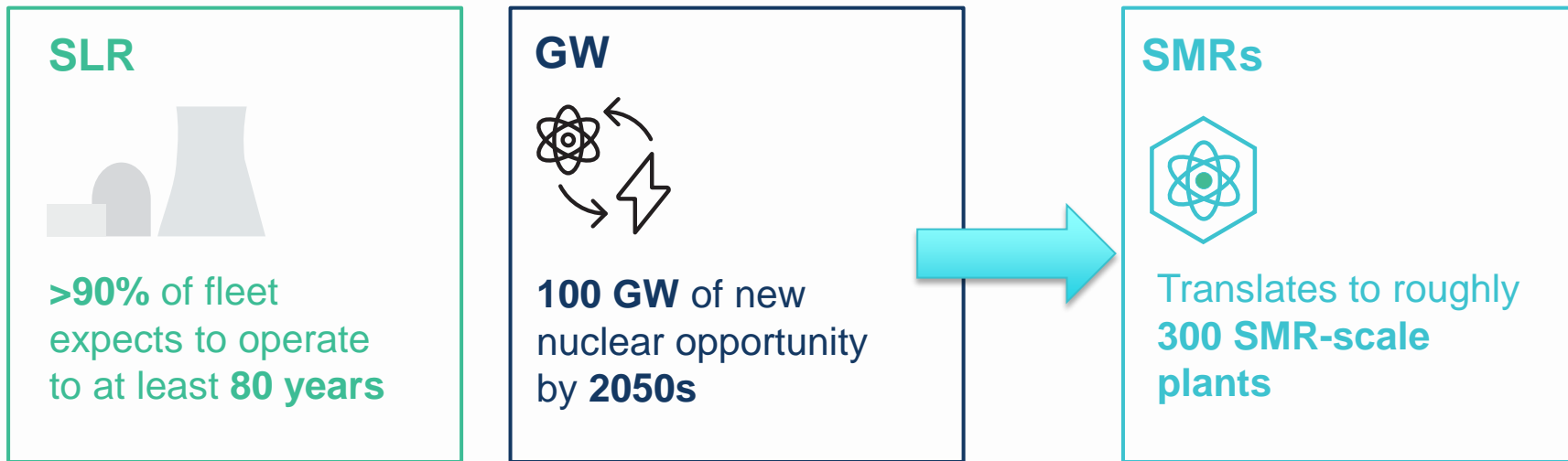
Isabelle Boemeke



Miss America 2023 ©2022 Nuclear Energy Institute

# Electric Utilities are Planning for New Nuclear

A recent survey of NEI's utility members confirmed nuclear power's expected role in meeting their company's decarbonization goals:



NEI utility member companies produce nearly half of all US electricity.

Source: NEI, [The Future of Nuclear Power: 2023 Baseline Survey](#) (Mar. 2023)



# Advanced Reactor Developer Members



**HITACHI**



*Muons, Inc.*  
*Innovation in Research*



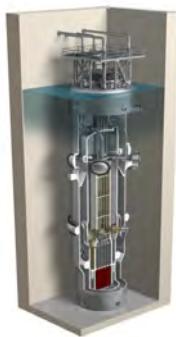
# Representative Advanced Reactor Technologies

## Micro Reactors ( $< 10\text{MW}$ )



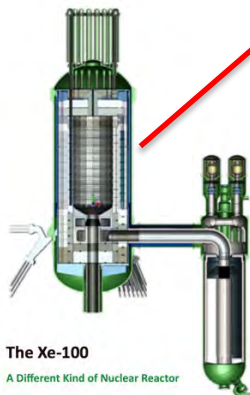
Oklo (shown)  
Approximately a dozen in  
development

## LWR SMRs $< 300\text{MW}$

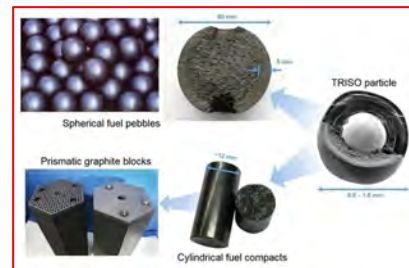


NuScale (shown)  
GEH BWR X-300  
Holtec SMR-160

## High Temp Gas Reactors



X-energy (shown)  
Several in development



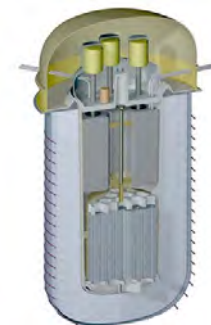
TRISO Fuel

## Liquid Metal Reactors



TerraPower Natrium (shown)  
Several in development

## Molten Salt Reactors

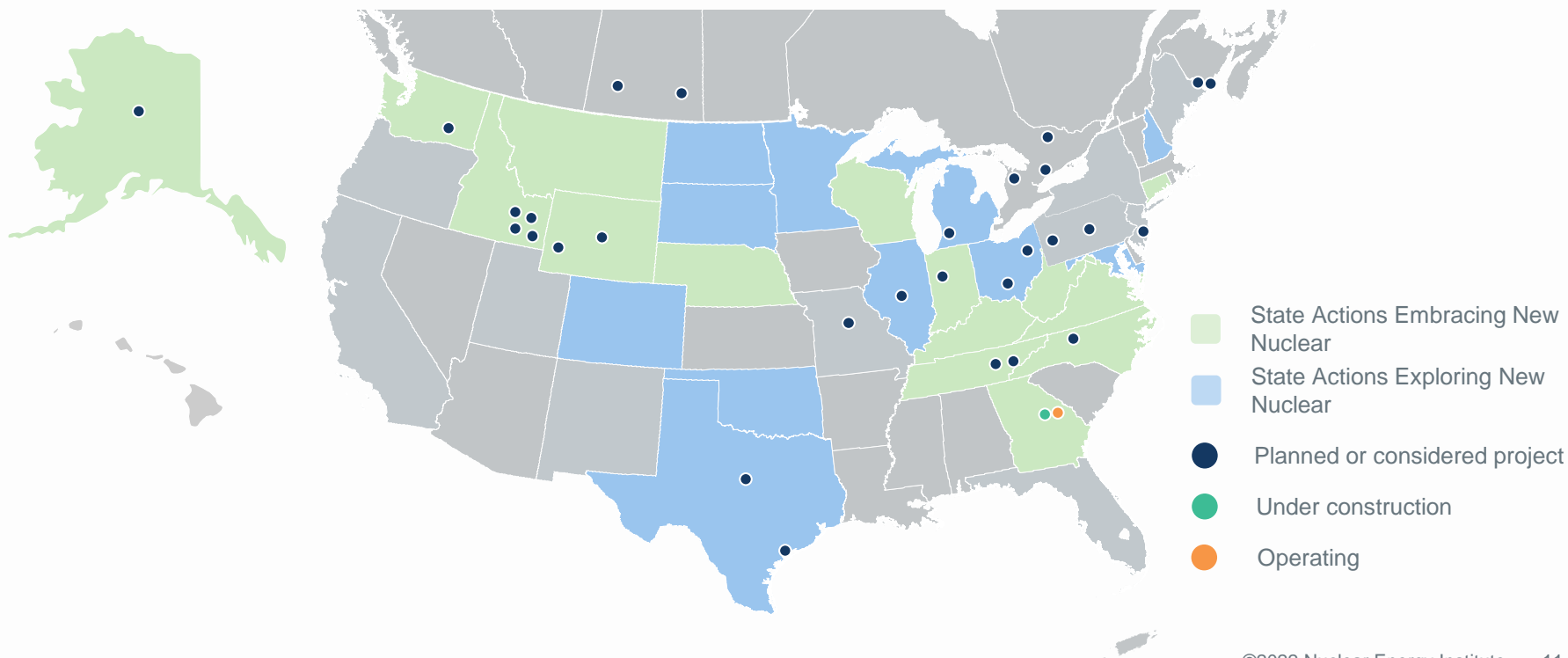


Terrestrial (shown)  
Several in development

**Non-Water Cooled**  
**Most  $< 300\text{MW}$ , some as large as  $1,000\text{ MW}$**

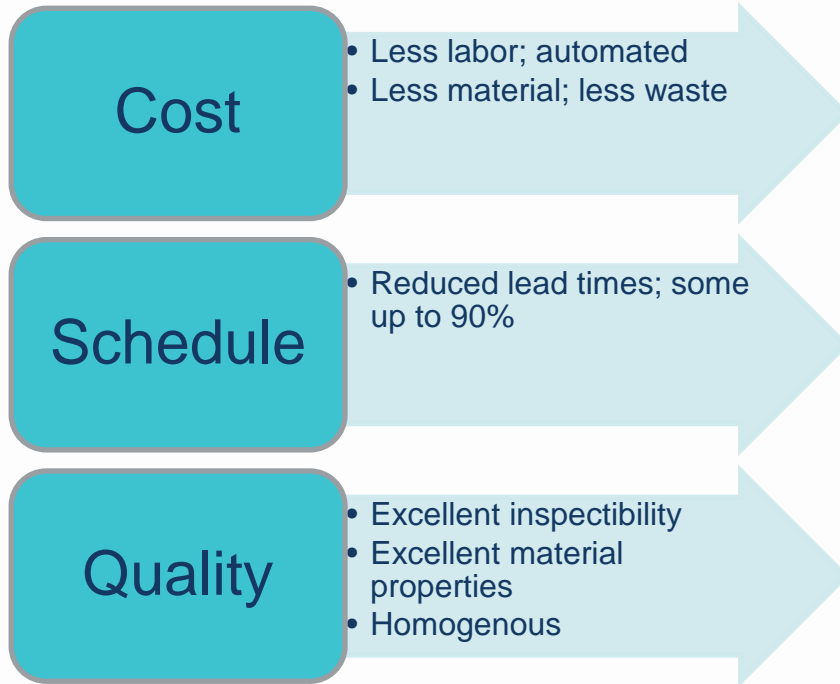
# Advanced Nuclear Deployment Plans

Projects in planning or under consideration in U.S. and Canada for Operation ~2030



# Advanced Manufacturing Technologies (AMT)

APPLICATIONS FOR BOTH THE CURRENT FLEET AND ADVANCED REACTOR DESIGNS



## AMT Good Candidate For:

- ✓ Long lead time components
- ✓ High value components
- ✓ Complex geometries
- ✓ Obsolete parts
- ✓ Mitigation work
- ✓ High T environments
- ✓ Reduced weight
- ✓ Localizing the supply chain
- ✓ True “Nth-of-a-kind”
- ✓ And more...



# First of a Kind (FOAK) Deployments – Fuel Assembly Components

2020



Courtesy: Westinghouse

2021

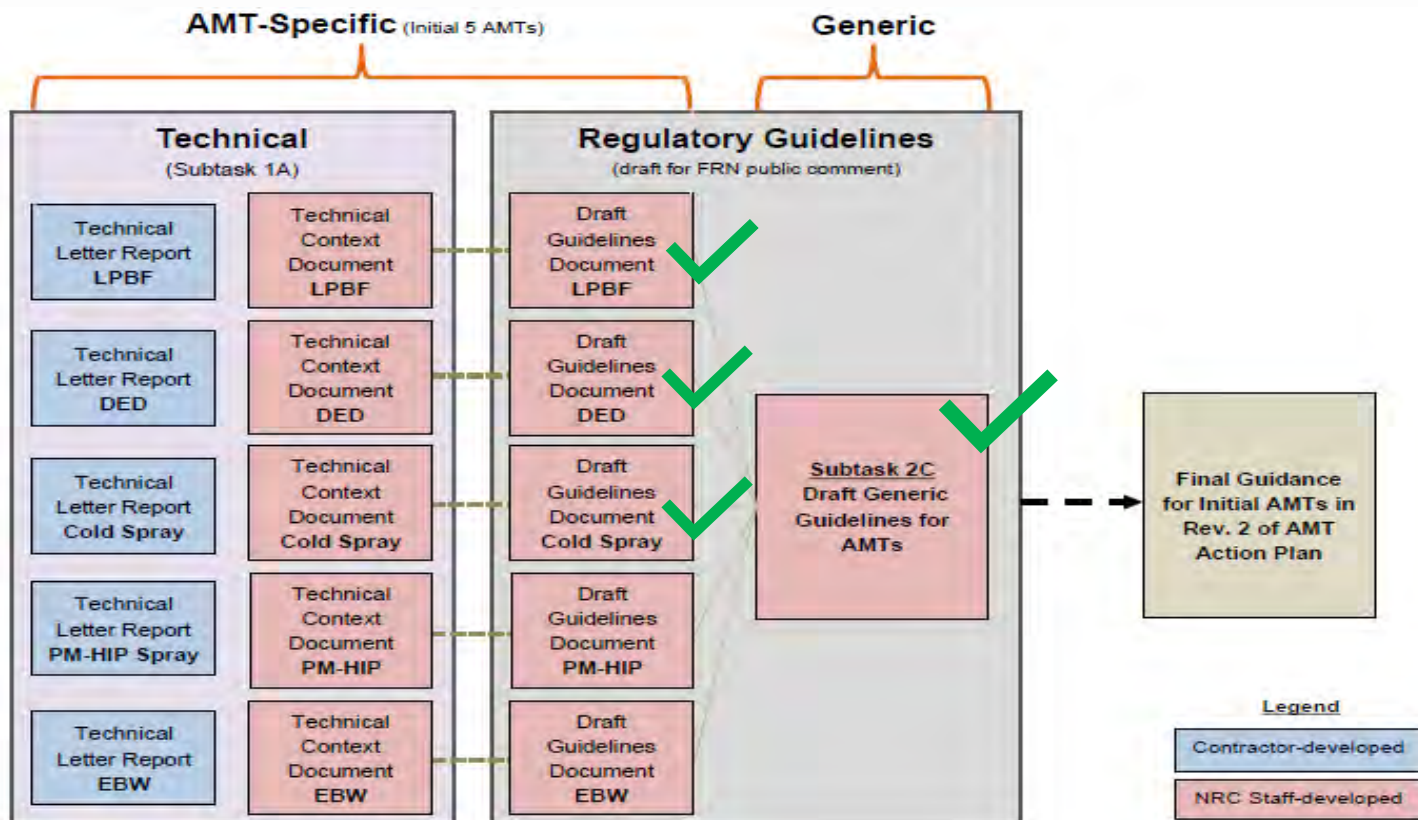


Courtesy: Framatome

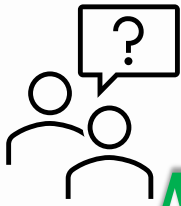


Courtesy: ORNL

# NRC's AMT Action Plan (Revised June 2020)



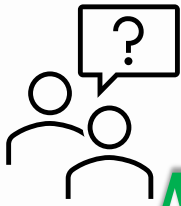




# General Sentiments from NEI's Advanced Manufacturing Task Force-

## Areas of Opportunity:

- *Need a more coordinated campaign (with funding) similar to Accident Tolerant Fuels (ATF) to jumpstart deployments*
- *Code acceptance is taking too long; uncertainty in qualifying new alloys of interest*
- *R&D still needed (i.e. radiation testing, etc)*
- *Interest in regulatory lessons learned and experiences*



# General Sentiments from NEI's Advanced Manufacturing Task Force-

- *Strong industry management and customer support for pursuing AMT development and deployments in the near term (next 1-2 years)*
- *AMT work continues in fuel assembly component space, building upon previous successes*
- *Suppliers are ready for orders*

Thank You  
[hml@nei.org](mailto:hml@nei.org)

