



U.S. DEPARTMENT OF
ENERGY

Office of
Nuclear Energy

U.S. Nuclear Energy Program

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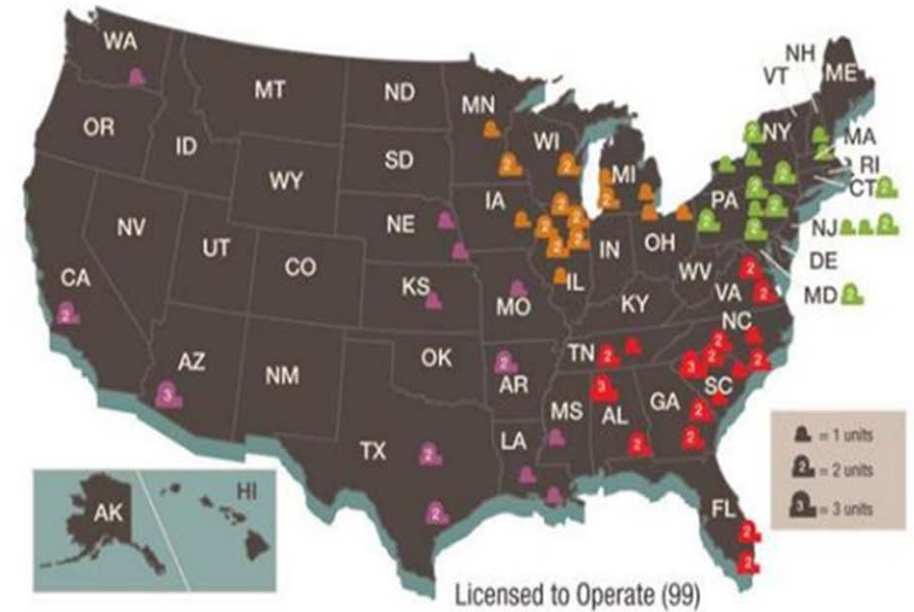
U.S. Department of Energy

June 26, 2017

2017 EIA Energy Conference

Trends in Nuclear

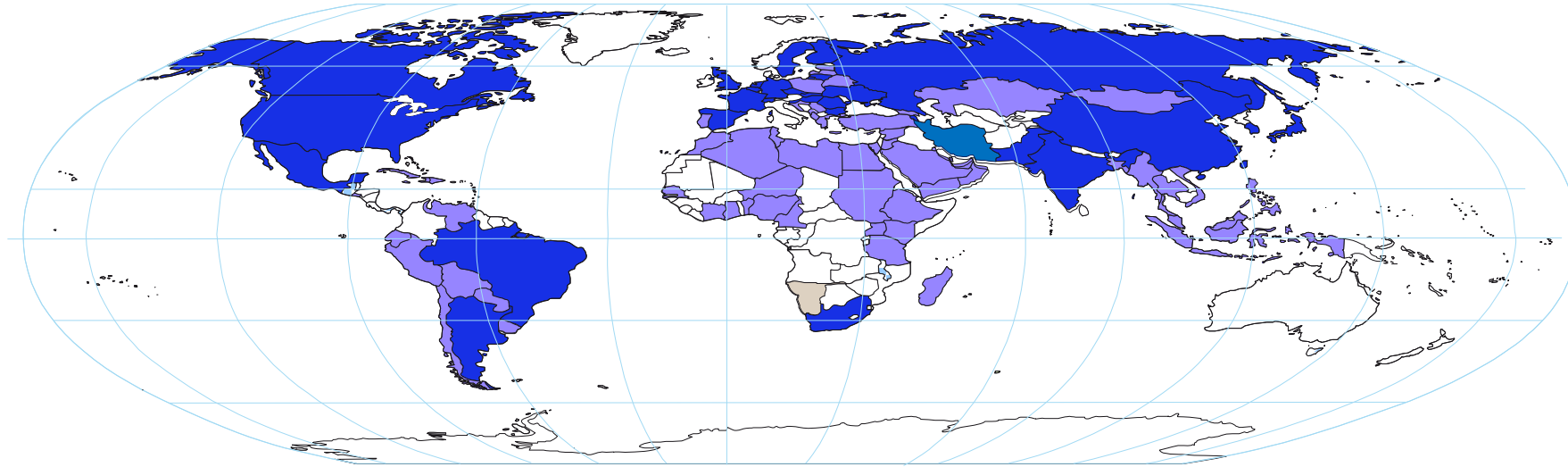
- Recognition of the importance of nuclear – today and in the future
 - Energy Security
 - Economic Prosperity
 - Global Security
 - Environmental Sustainability
- Concern about financial viability of some currently operating plants, yet benefits from keeping them running
- Increased interest in nuclear in some domestic and international markets
- Innovators and utilities looking at advanced nuclear as a way to move beyond electricity



- 20% of electricity (60% of non-emitting)
- 99 operating (avg. age 36 yrs)
- 90% capacity factor of plants
- 4 under construction

*"If you really care about this environment that we live in... then you need to be a supporter of this [nuclear energy] amazingly clean, resilient, safe, reliable source of energy."
Secretary Rick Perry at Press conference, May 10th*

Global Growth and Market Opportunity



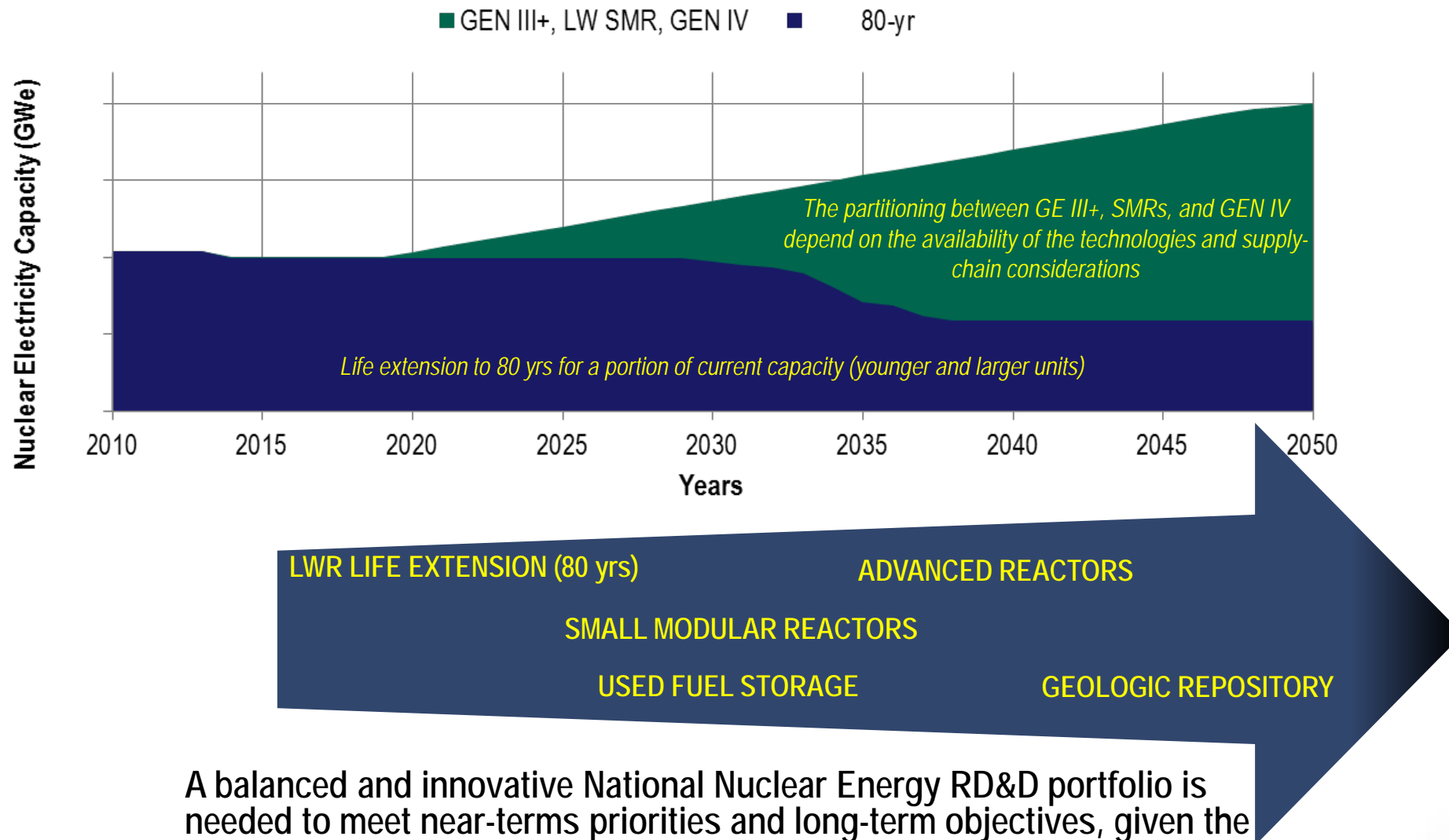
Potential Nuclear Power Expansion

- 35 countries taking steps to develop nuclear power
- 30 countries with operating reactors developing expansion plans

~450 reactors operating
11% of electricity / 40% of clean electricity

- 60 reactors under construction in 15 countries (20 in China)
- ~170 reactors planned in over 25 countries, worth as much as \$700 billion over the next 5-10 years
- ~370 reactors proposed in 36 countries, worth as much as \$1.6 trillion over the next 10-25 years

Enabling Multiple Nuclear Energy Pathways



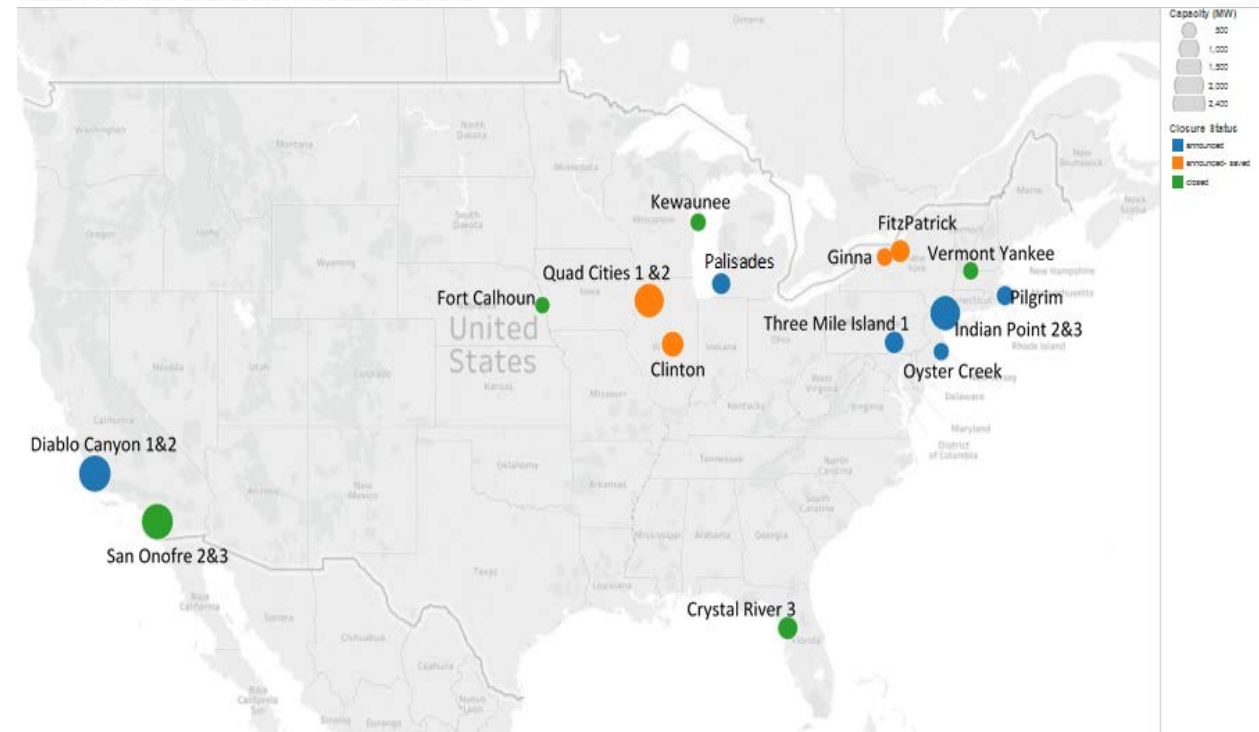
A balanced and innovative National Nuclear Energy RD&D portfolio is needed to meet near-terms priorities and long-term objectives, given the long development and deployment period for nuclear technologies.

Improving the Economics of America's Nuclear Power Plants

- Policy should be technology neutral
 - Focus on the end goal (i.e., reduced carbon emissions) rather than advancing a particular technology
 - Level the Playing Field – treat all clean technologies equally
- Outreach and education
- Near-term action by FERC on Price Formation
- Valuation needs to be considered by FERC/Markets
 - Zero-carbon, Reliability, Resiliency, Affordability,
 - Fuel Diversity, Sustainability, Security, Flexibility, etc.
- Clean Energy Standards
- **Reduce Operating Costs**
 - **Delivering the Nuclear Promise**
 - **LWR Working Group – technical advances**
 - **Additional energy services (i.e., process heat)**
- Power Purchase Agreements
- Legislation
 - Carbon Price, Production Tax Credit
- Re-regulate

Summit Report & Cost Gap Analysis
available at <https://gain.inl.gov>

Nuclear Power Plant Closures and Announced Retirements¹²



Combined Construction and Operating Licenses (COLs)

SITE/LOCATION	UTILITY	REACTOR/ NO. UNITS	COLA DATES		
			Submitted	Docketed	Issued
Vogtle	GA	Southern Nuclear AP1000 2	3/31/2008	5/30/2008	2/10/2012
V.C. Summer	SC	SCE&G AP1000 2	3/27/2008	7/31/2008	4/10/2012
Fermi	MI	DTE Energy ESBWR ² 1	9/18/2008	11/25/2008	5/1/2015
South Texas Project	TX	STPNOC ABWR ² 2	9/20/2007	11/29/2007	2/12/2016
Levy	FL	Duke Energy AP1000 2	7/30/2008	10/6/2008	10/26/2016
William States Lee	SC	Duke Energy AP1000 2	12/13/2007	2/25/2008	12/19/2016
North Anna	VA	Dominion Energy ESBWR 1	11/27/2007	1/28/2008	5/31/2017
Turkey Point	FL	Florida Power and Light AP1000 2	6/30/2009	9/4/2009	-

18 COLs have been docketed by the NRC since 2007

- 7 (totaling 12 reactors) have been approved
- 1 (totaling 2 reactors) is under review
- 10 (totaling 14 reactors) haven been suspended and/or withdrawn

Small Modular Reactors

NuScale

- Design Certification Application (DCA) submitted to the NRC in January 2017
 - NRC accepted and docketed March 2017
 - DCA review and approval within 40 months

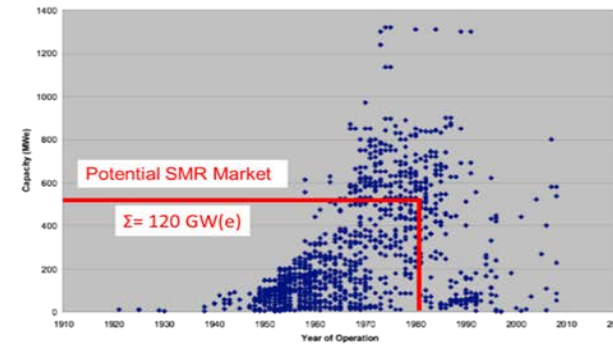
NuScale/UAMPS Siting

- Site use agreement for a site on the INL
 - Preferred site identified in August 2016

TVA Siting

- Submitted Early Site Permit Application to NRC
 - Review commenced January 2017, completed in approximately 30 months

Clean Energy Option



U.S. Coal Plant Capacity vs. Age

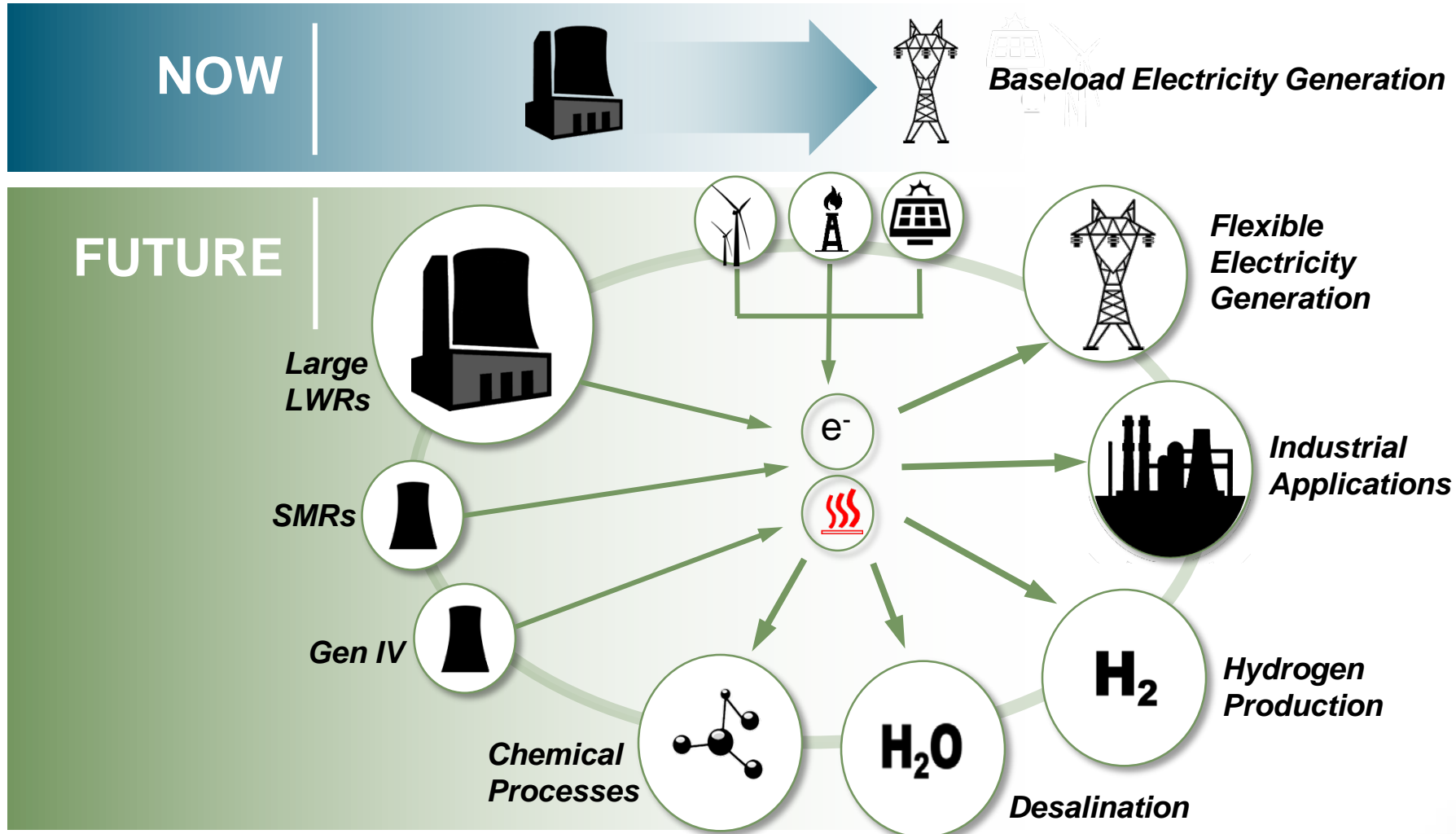
Microgrids



Factory Fabrication

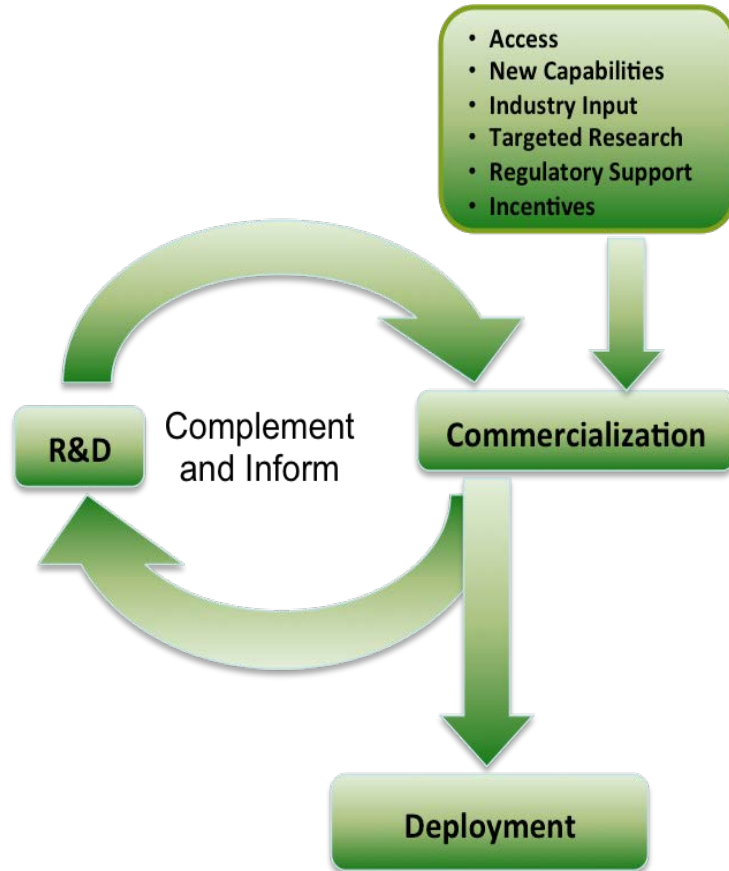


Nuclear Beyond Electricity – Advanced Reactors

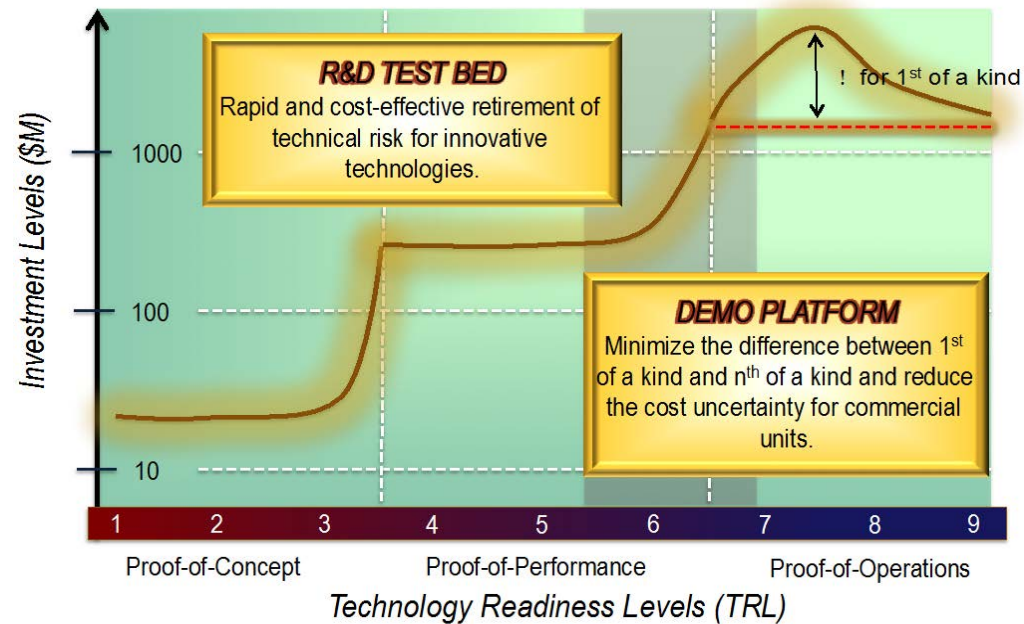


Flexible Generators ❖ Advanced Processes ❖ Revolutionary Design

Gateway for Accelerated Innovation in Nuclear (GAIN)



Removing barriers nuclear energy deployment



A tailored approach to support technologies of varying TRLs



<https://gain.inl.gov>

Summary

- The demand for domestically-generated, reliable and clean sources of base-load electricity will continue to drive many countries toward nuclear energy as part of their “energy security” and national economic and environmental calculus.
- Profound opportunity for new nuclear growth:
 - Strong global market interest
 - Growing need for increased global access to electricity
 - Support energy security, economic and environmental goals
 - U.S. leadership to ensure safety & nonproliferation are as important as ever
- The Administration is committed to advancing nuclear energy in the U.S. and abroad.