



Gaps and Critical Needs in the Commercialization of Advanced Nuclear Reactor Technology

Jeffrey S. Merrifield

Chairman, Advanced Reactors Working Group

U.S. Nuclear Infrastructure Council

Partner, Pillsbury Winthrop Shaw Pittman

USNRC Commissioner (1998-2007)

NRC-DOE Workshop on Advanced Non-LWR Reactors

September 1-2, 2015

About the USNIC

- Leading business consortium advocating for increased U.S. nuclear use and global deployment of U.S. nuclear technologies and services
- Represents over 70 member companies encompassing wide representation of the nuclear energy supply chain and key movers
- Member of the Civil Nuclear Trade Advisory Committee, ANS International Committee and the U.S. Industry Delegation to the IAEA
- Strongly supports Gen 3+ reactors, small modular reactors and advanced reactors moving in parallel paths



NRC/DOE Workshop

- NIC commends the NRC and DOE for organizing this workshop today
- Both organizations have been challenged by Congress to find ways to enable the development of Advanced Reactor Technologies
- This meeting provides a meaningful and timely forum to share views
- We recognize there are differences in the roles and responsibilities of the NRC and DOE
- We look forward to working together to identify ways to allow the deployment of Advanced Reactor Technologies through a timely licensing process consistent with NRC safety standards



Why Advanced Reactors?

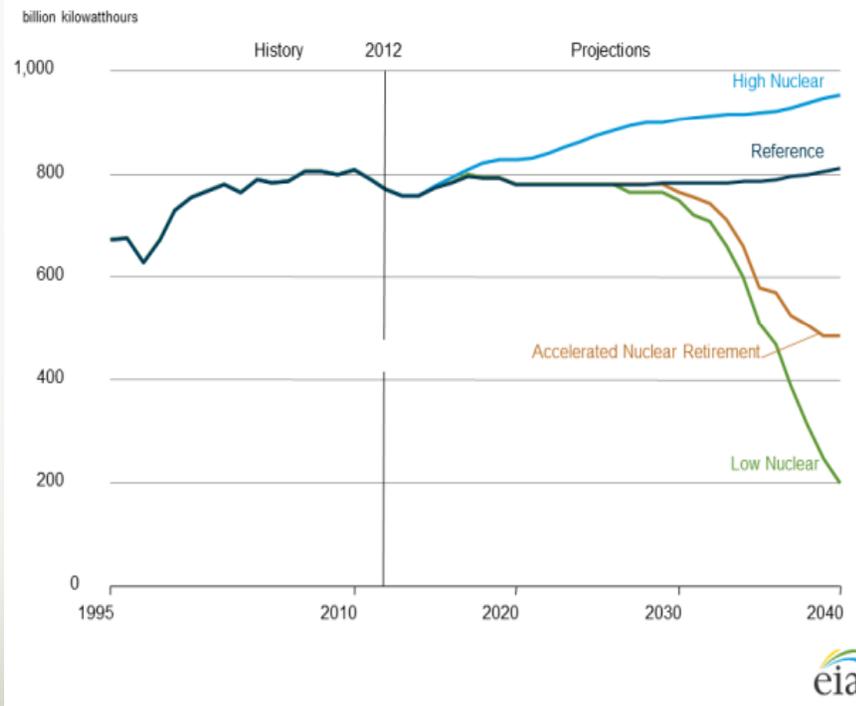
- Meet clean energy requirements with zero carbon emissions
- Provide trailblazing evolution in safety, economics, and fuel use
- Create viable commercial option to replace retiring fossil and nuclear generation in 2025-30 time frame
- Significant export potential in \$1.4 trillion international market
- Allow the U.S. to maintain nuclear energy technology leadership



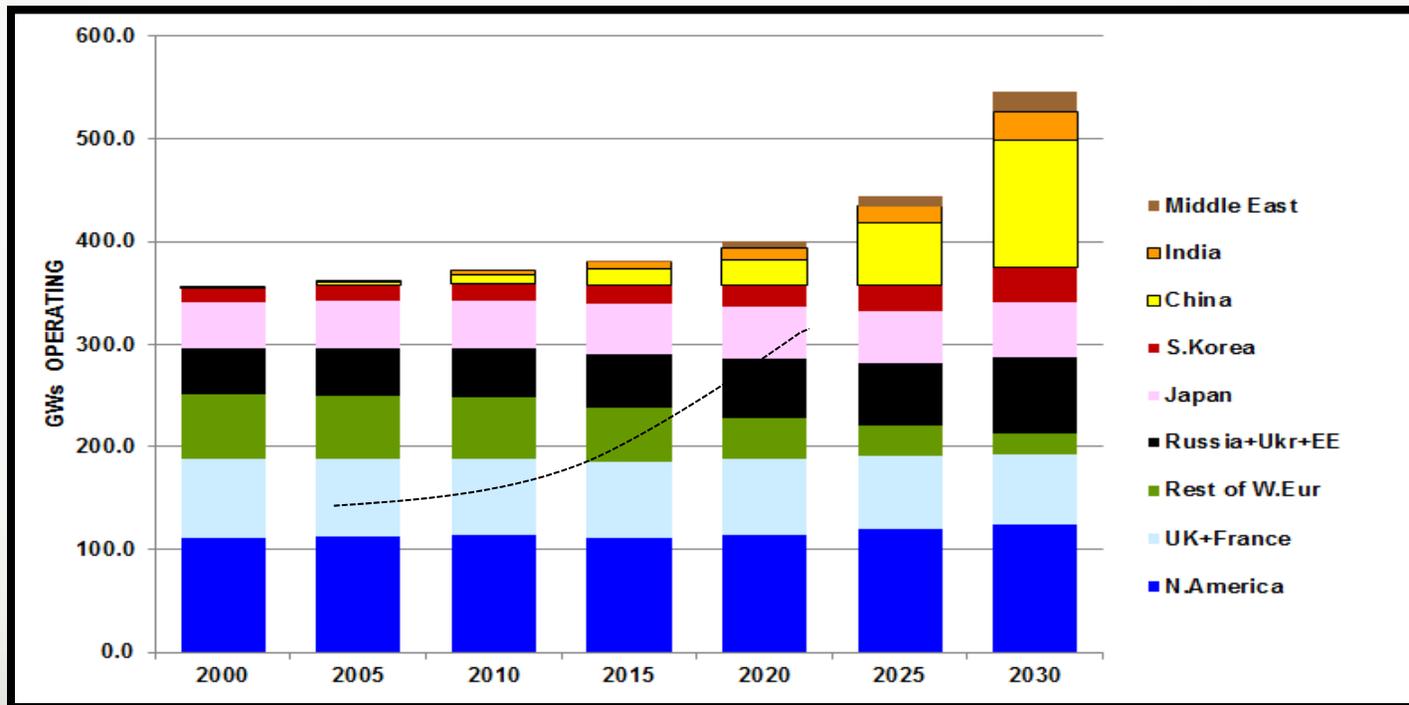
U.S. Nuclear Fleet

Nuclear Plant Life After 60 an X Factor

Figure MT-35. Nuclear electricity generation in four cases, 1995-2040



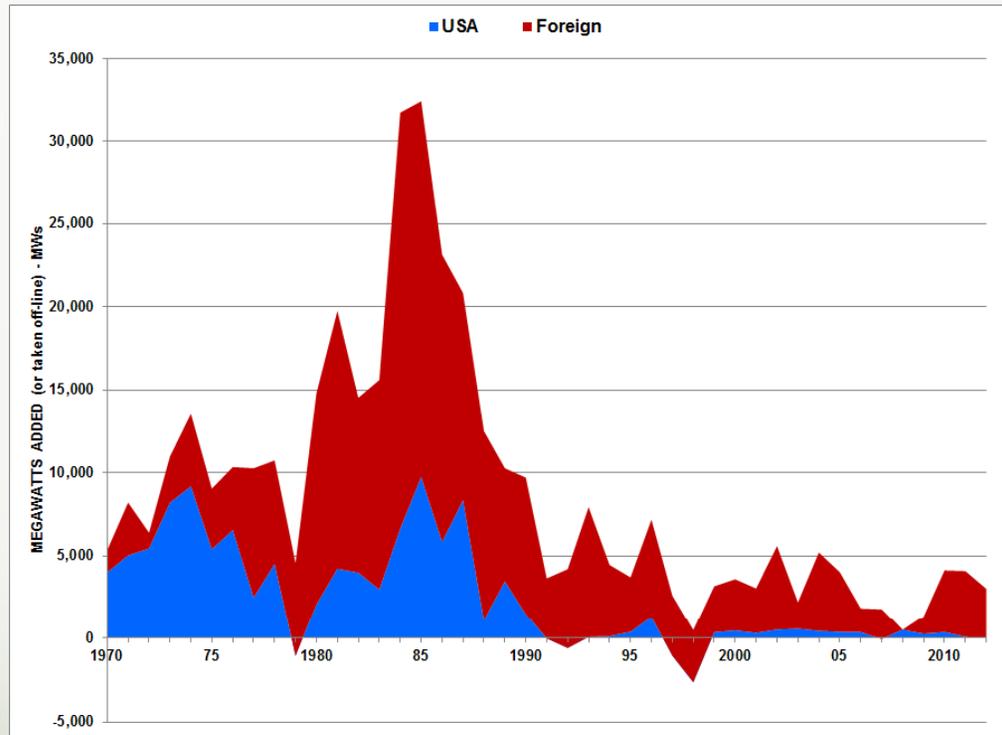
Booming Global Market Demand



Source: Verdigris Capital, LLC



New Reactors Brought on Line (1970-2012)



Source: Verdigris Capital, LLC



USNIC Sept. 6, 2011 letter to DOE Secretary Chu

- Admin./DOE must elevate the prioritization of advanced reactors
- Key part of a continuing and growing role for nuclear energy
- Essential to assure reliable, low-carbon, baseload electricity
- Vital for US energy security, economic growth and tech leadership
- Complementary to continued deployment of light water reactors
- Imperative that the DOE provide the leadership and resources needed to champion the development of advanced reactors
- Development costs will not be incurred by private companies without a policy that establishes value of advanced reactors



This message is as valid today as it was four years ago...

USNIC/Argonne & USNIC/UM-Lowell Advanced Reactors “Summit” Communiqués, 2014-15

- Advanced Reactors must be a national priority for DOE and requires funding as large or larger than NP2010 and SMR FOA programs
- Advanced Reactors offer significant economic advantages and can also be used to make global environmental progress
- Current USNRC-LWR paradigm is not workable for advanced reactors
- Developing a “staged” approach to licensing is critical to securing private funding for advanced reactor development
- US High flux test reactor facility coupled with prototypes is needed to enable advanced reactor development of designs, fuels and materials



Gaps and Needs - DOE

Gaps

- Insufficient funding for DOE Advanced Reactor effort causes selection of “winners and losers”
- Woefully insufficient R&D funding to develop new reactors, fuels and materials
- Requiring broad IP waivers to receive funding is disincentive to innovative developers

Needs

- Enhanced funding of Advanced Reactor initiatives to allow broader tech development
- Systemic sustainable funding comparable to NP2010 with lower cost-share
- Eliminate or reduce IP requirements



Gaps and Needs - DOE

Gaps

- Infrastructure for Advanced Reactor technology developers
- Nuclear industry is treated as one “stakeholder group”

Needs

- Advanced Test Reactor
- Small Scale Prototype Incubators
- Easier access to DOE facilities
- The needs of utilities and reactor vendor developers are different and need to be recognized by the USG



Gaps and Needs - NRC

Gaps

- Non traditional vendors don't know how best to engage with the NRC staff in initial technology discussions
- Significant early cost of NRC licensing fees
- Developers seeking phases of investor funding can't wait years to find out if technology "viable"
- Lack of clear milestones and timelines for licensing Advanced Reactors

Needs

- Identify "key questions" the NRC would like developers to address in introductory discussions
- Fee waivers through use of general revenues or DOE funding pass-through
- Creation of phased licensing approach – "is it licensable" - to increase investor confidence
- Commission must set targeted timeline for license review and hold the staff and itself accountable



Gaps and Needs - NRC

Gaps

- Policy issues remaining to be resolved –security/control room staffing, insurance. – cause uncertainty for developers
- Lack of understanding of what resources are needed for NRC to license Advanced Reactors
- Prescriptive regulatory framework developed for light water technology does not meet Advanced Reactor needs and could require major revisions to requirements or significant exemptions

Needs

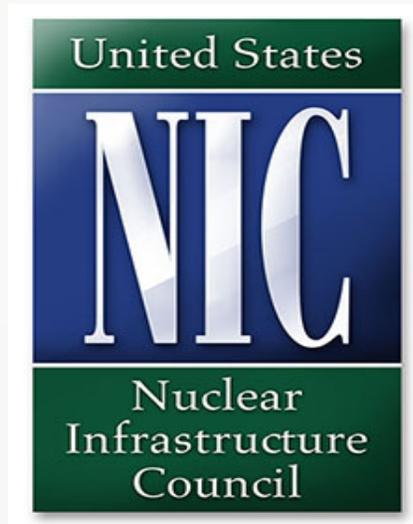
- Similar to recent EPZ and fee papers – staff should actively elevate generic Advanced Reactor issues to Commission
- Congress should understand what is needed for NRC to enable Advanced Reactor review
- The NRC needs to develop a risk informed framework that recognizes the significantly reduced source term risk from Advanced Reactors



Summary

- NIC appreciates the opportunity to participate
- We expect this to be the first of a continuing series of these meetings
- Advanced Reactor progress is pivotal both domestically and globally
- U.S. needs to continue to be a global trailblazer in safe nuclear energy
- Window of opportunity is finite – these technologies can go abroad
- Ramped-up programmatic, funding and regulatory commitment is vital to promote innovation along with investment in infrastructure





The United States Nuclear Infrastructure Council (NIC) is the leading U.S. business consortium advocate for new nuclear and engagement of the American supply chain globally. Composed of over seventy companies NIC represents the "Who's Who" of the nuclear supply chain community. For more information visit www.usnic.org

U.S. Nuclear Infrastructure Council
1317 F Street, NW – Suite 350 – Washington, DC 20004
(202) 332-8155 www.usnic.org