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Small Modular Licensing Technical Support Program Update for Nuclear Energy Advisory Committee

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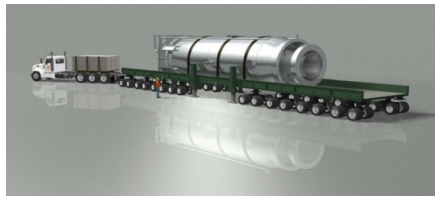
Why is the U.S. Government Interested in Supporting SMR Technologies?

NE working definition of SMRs: reactor units with a nominal output of 300 MWe or less and are able to have large components or modules fabricated remotely and transported to the site for assembly of components and operation.

Potential Benefits

- Enhanced safety and security
- Reduced capital cost makes nuclear power feasible for more utilities
- Shorter construction schedules due to modular construction
- Improved quality due to replication in factory-setting
- Meets electric demand growth incrementally
- Re-establish U.S. technical leadership in nuclear energy via international sales
- Domestic job creation potential very high



Potential Markets

- Domestic and international utility markets
- Non-electrical (process heat/desalination) customers

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Economic Challenges Facing SMRs

Economic viability depends on several factors:

- **Significant investment needed to reach commercialization**
  - On the order of $500M + per design
- **Can the plants be built cheaply enough?**
  - Economies of replication > economies of scale?
  - Need a factory to make the price attractive, need an attractive price to produce the orders to warrant building the factory
- **Can the operations and maintenance costs be kept down?**
  - How will simplified “inherently safe” designs translate into smaller workforce and operation costs and comply with regulatory requirements?

DOE commissioned an SMR economic study last year that implied SMRs can be competitive under certain conditions – We are following this up with a harder look at the economies of mass manufacturing

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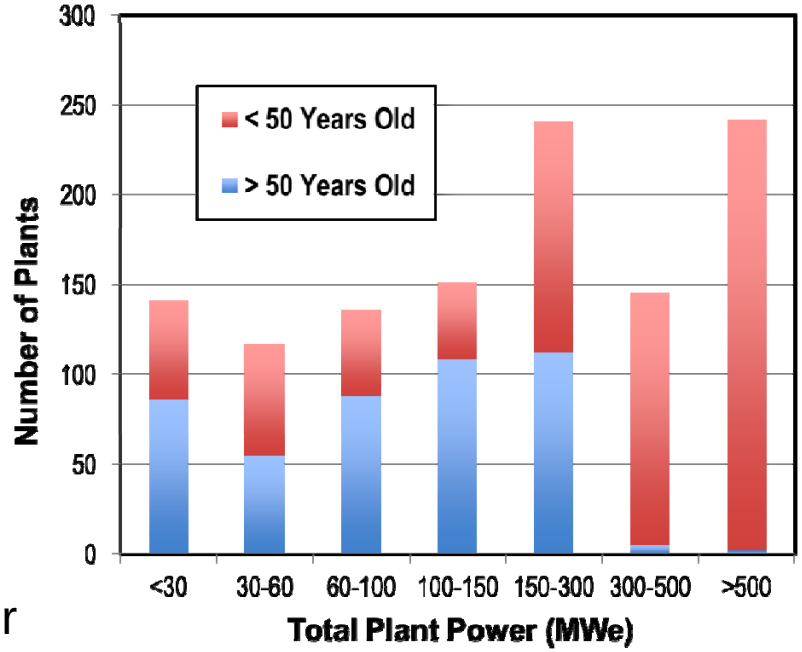
U.S. Utility Considerations

- **Site selection**
  - More siting flexibility than traditional nuclear plants
  - Lower land and water usage
- **Load demand**
  - Better match to power needs
  - Potential replacement of older coal plants
  - Use of existing infrastructure
- **Incremental demand growth**
  - Multiple modules
  - Operating units can provide financing for future additional units.

U.S. Coal Plants

99% of plants > 50 years old have less than 300 MWe capacity



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Goal of SMR Licensing Technical Support Program

- Facilitate and accelerate commercial development and deployment of U.S.-based SMR designs at domestic locations
- Soliciting applications from vendor/utility teams that have plans to construct SMRs at a domestic site
- 5 year/$452 M program; Minimum of 50% cost share
- Support up to 2 SMR designs, consistent with FY12 budget
- Support only design, certification, and licensing for new designs – no construction
- Events in Japan have prompted us to place additional emphasis on safety of SMR designs in selection process

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SMR Funding Opportunity Announcement (FOA)

- **Solicit applications from teams composed of SMR vendors and utilities or consortia willing to be first movers in constructing and operating mature SMR designs**

- **Support site permitting, design development, certification and operating license applications and NRC review processes - basically everything required to get to construction**
  - Requires vendor to achieve design certification

- **Open to LWR and advanced SMRs that can be deployed "expeditiously" – by 2022**

- **Larger focus is on promoting development of a fleet of SMRs**
  - Proposals that include longer-term, larger scale deployment plans should be considered favorably

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Nominal Solicitation Schedule - *DOE is motivated to make awards before the end of the calendar year 2012*

- **Release draft FOA** – January 19, 2012 (Completed)
- **30 day industry comment period**– January 19 – February 17, 2012 (Completed)
- **Incorporate industry comments** – February 17 – March 21, 2012 (Completed)
- **Issue Final FOA** – March 22, 2012 (Completed)
- **Industry Day** – April 12, 2012 (Completed)
- **Receive Applications** – May 21, 2012 (Completed)
- **Conduct merit review, make selection** – May 22 – September 2012 (Ongoing)
- **Announcement of Selections** – September 2012 (Goal)
- **Complete cooperative agreements and release funding** – November - December 2012 (Goal)

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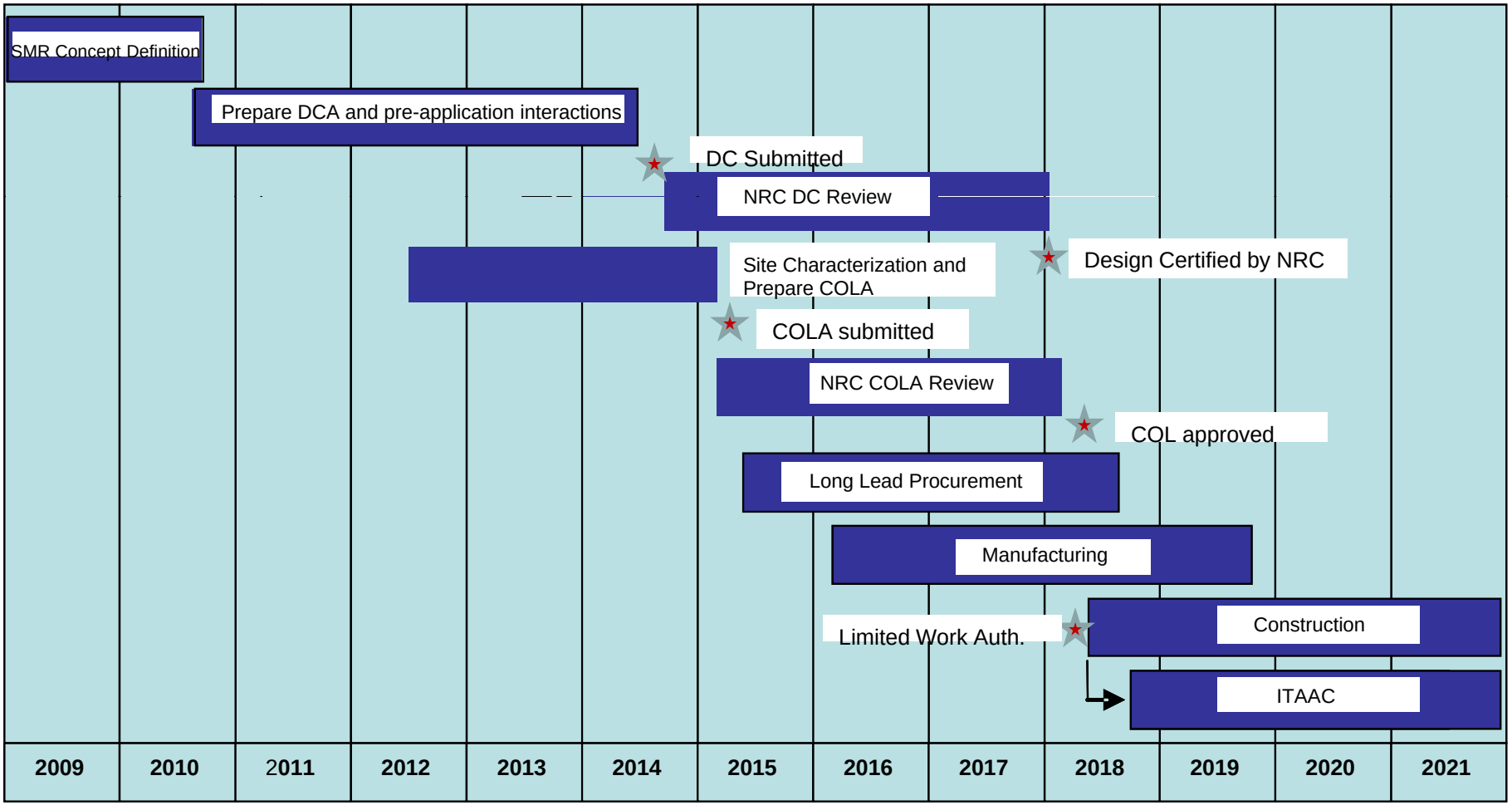
Notional Licensing and Deployment Schedule Under NRC 10 CFR Part 52



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Strategic Vision for SMR Deployment

- **Our long term goal is to enable deployment of a fleet of SMRs, not just 1 or 2 units, to support national goals**
  - *Vibrant industry with multiple dedicated SMR factories in the U.S. for domestic needs and exports*
- **Using Secretary of Energy Advisory Board to inform long term vision that would evolve through anticipated deployment phases**
  - Regulatory
  - First Movers
  - Early Adopters
  - Full-Scale Factory Production
- **Advanced SMRs deployment would be expected to follow the near-term SMR deployment path as they mature**

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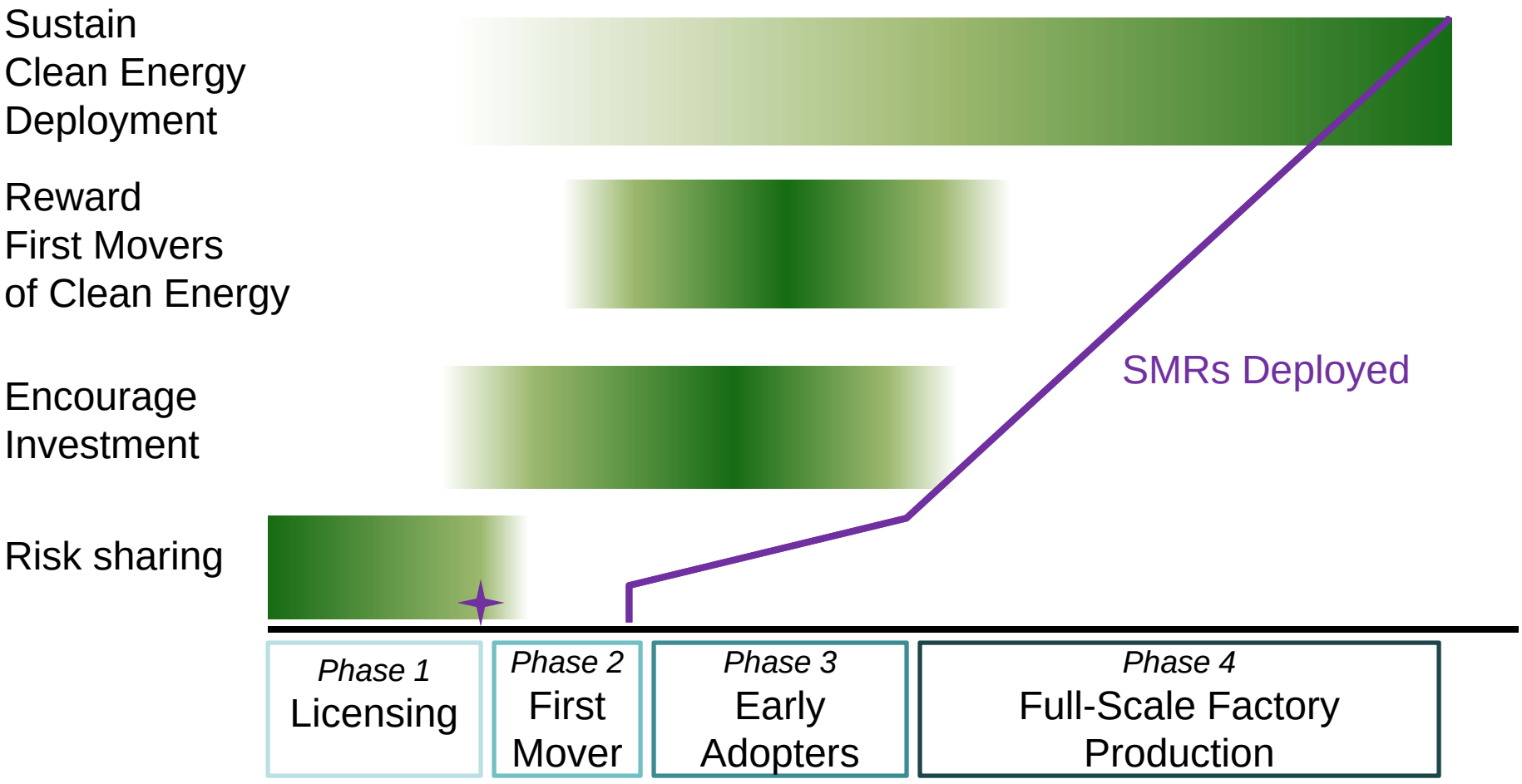
SMR Deployment



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Conclusion

- NE has the full support of the Administration to aggressively promote SMRs
- SMRs can provide a safe, secure, and economical option to meet the Nation's energy needs
- DOE funding should have a significant impact on accelerating the first movers and building the momentum for the subsequent builds

"The Obama Administration and the Energy Department are committed to an all-of-the-above energy strategy that develops every source of American energy, including nuclear power, and strengthens our competitive edge in the global clean energy race"
"Through the funding for small modular nuclear reactors announced today, the Energy Department and private industry are working to position America as the leader in advanced nuclear energy technology and manufacturing."