



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

DOE Office of Nuclear Energy Activities

Dr. Pete Lyons
Acting Assistant Secretary for Nuclear Energy
U.S. Department of Energy

November 15, 2010
NARUC Nuclear Issues Subcommittee



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

January 27, 2010: President Obama's State of the Union Speech

“But to create more of these clean energy jobs, we need more production, more efficiency, more incentives. And that means building a new generation of safe, clean nuclear power plants in this country.”

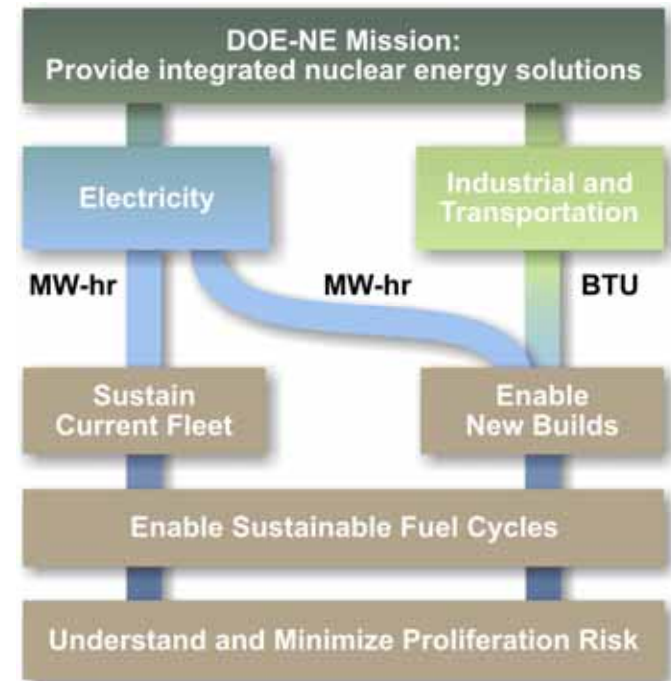




Nuclear Energy Roadmap Released in April 2010

Nuclear Energy Objectives

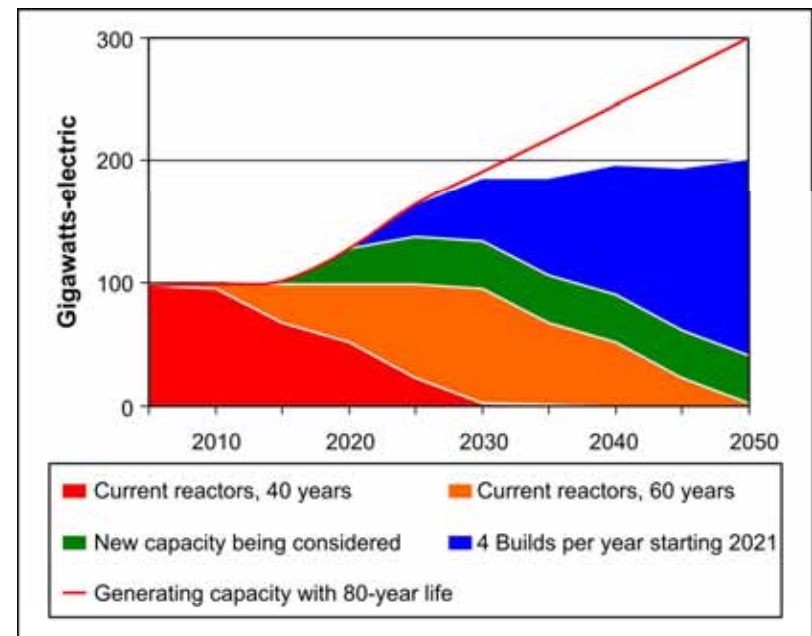
1. Develop technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors
2. Develop improvements in the affordability of new reactors to enable nuclear energy to help meet the Administration's energy security and climate change goals
3. Develop sustainable nuclear fuel cycles
4. Understand and minimize the risks of nuclear proliferation and terrorism





Objective 1: Life Extension

- **Goal is to provide technical basis to extend plant life beyond 60 years with improved performance**
- **Challenges**
 - Aging and degradation of system structures and components
 - Fuel reliability and performance
 - Obsolete analog instrumentation and control technologies
 - Design and safety analysis tools based on 1980's vintage knowledge bases and computational capabilities





Objective 2: New Builds

■ Goals

- Demonstrate 10 CFR Part 52 licensing framework
- Facilitate accelerated licensing of small modular reactors
- Facilitate development and demonstration of advanced manufacturing and construction technologies
- Develop and demonstrate next generation advanced plant concepts and technologies



■ Challenges

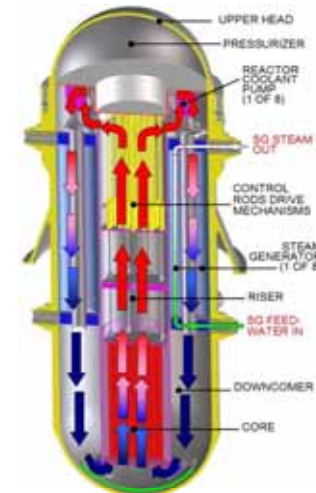
- Address financial hurdles associated with new plants
- Develop appropriate public/private business models that balance risk for First of a Kind deployment
- Execute path forward for NGNP



Small Modular Reactors

- **Financing: smaller per unit cost – don't have to bet the company; could use initial unit(s) to finance future additions**
- **Factory fabrication: potential for significant cost reductions; shipbuilding industry uses figures of merit comparable to 8-to-1 for cost savings where work is done at factory versus on-site**
- **Potentially simplified licensing process. Possibly smaller emergency planning zone; could be air-cooled**
- **DOE Office of Nuclear Energy has proposed a program for FY2011 that would accelerate licensing of SMRs**

POSSIBILITY OF DOE AND/OR DOD SITING OF FIRST UNITS



IRIS



NuScale



mPower



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Objective 3: Enable Sustainable Fuel Cycles (Fuel Cycle R&D)

■ Goals

- In the near term, define and analyze fuel cycle technologies to develop options that increase the sustainability of nuclear energy
- In the medium term, select preferred fuel cycle option for further development
- By 2050, deploy preferred fuel cycle

■ Dry cask storage is safe, and used nuclear fuel can be stored for at least 60 years

- R&D includes work on long-term storage

■ The once-through fuel cycle is the baseline

- Options will be evaluated against the baseline
- Final choice may include both once-through for some used fuel and reprocessing for other used fuel

■ At least one repository will be needed for all options

■ Blue Ribbon Commission will provide a policy/planning framework that will guide FCRD

- The Commission will produce an interim report by mid-2011 and a final report by January 2012



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Blue Ribbon Commission on America's Nuclear Future

- On January 29, Secretary of Energy Steven Chu announced the formation of a 15-person Commission to conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle
- The Commission will provide recommendations for developing a safe, long-term solution to managing the United States' used nuclear fuel and nuclear waste
- Co-chaired by former Congressman Lee Hamilton and former National Security Advisor Brent Scowcroft
- The Commission will produce an interim report in 18 months, and a final report no later than 24 months
- BRC recommendations will influence U.S. policy and future programmatic direction of the Nuclear Energy Roadmap.



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

February 16, 2010: President Obama announces Vogtle loan guarantee

"We need to look no further than the worker and apprentices standing behind me to see the future that's possible when it comes to clean energy."

"And this is only the beginning. My budget proposes tripling the loan guarantees we provide to help finance safe, clean nuclear facilities – and we'll continue to provide financing for clean energy projects in Maryland and across America"





Renewed Nuclear Energy Interest

- Early Site Permits**: 4 early site permits approved for Clinton, Grand Gulf, North Anna sites, and Vogtle; additional permit applications filed.
- Construction and Operating License Applications**: 18 Construction and Operating License applications for 30 new reactors have been submitted for NRC review. Areva and USEC enrichment licenses filed.
- Reactor Design Certifications**: 2 designs in current applications certified by NRC (ABWR and AP1000); 3 new designs (ESBWR, EPR, APWR) and 1 amendment (AP1000) under NRC review.
- New Plant Orders**: 4 plant construction contracts initiated; 9 power companies have placed large component forging orders.
- Plant Construction**: TVA has resumed construction activities at Watts Bar 2, and reinstated construction permits for Bellefonte 1 and 2. LES enrichment plant operating.
- Financial Incentives**: First DOE conditional loan guarantees approved for Vogtle; 3 other power companies selected for negotiations towards conditional loan guarantees. Loan guarantee ceiling proposed to increase to \$54 billion in FY11. Conditional loan guarantee approved for Eagle Rock enrichment plant.