

# Role of and Path to Advanced Nuclear Energy Technologies

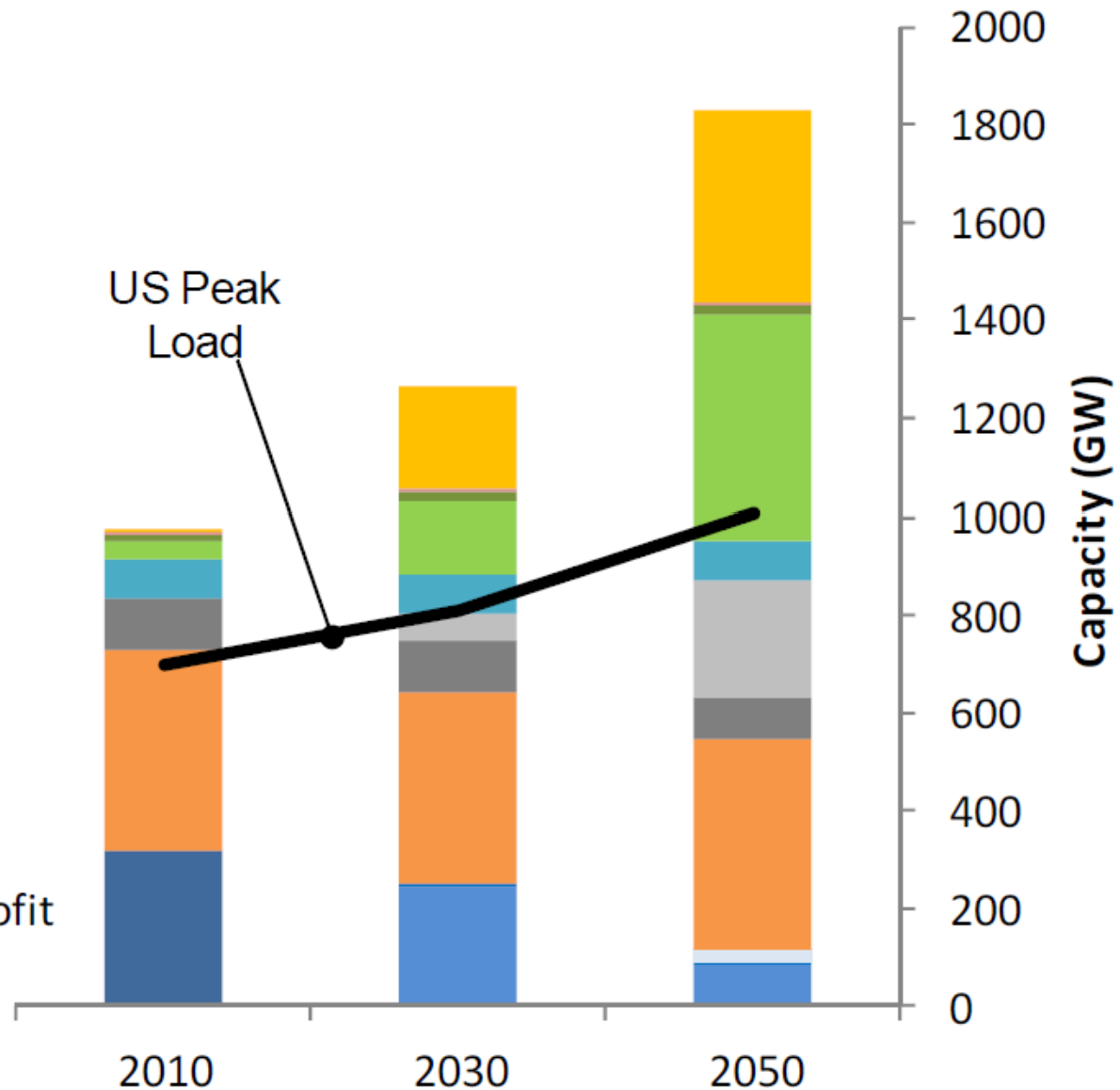
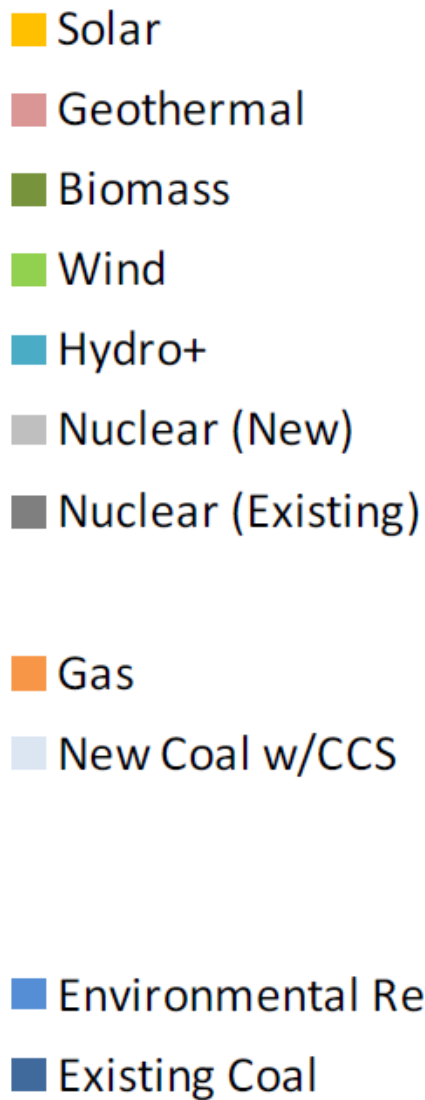
Stephen E. Kuczynski

Chairman, President, and CEO – Southern Nuclear



# Key Questions to Consider

- What is the role of nuclear energy in the future?
- Why advanced reactors/technology?
- What is the role of industry and government in this process?
- What outcomes should we expect from investment in advanced nuclear technology?



PRISM 2.0: Regional Energy and Economic Model Development and Initial Application: Phase 2: Electric Sector CO<sub>2</sub> Reduction Options to 2050: Dimensions of Technology, Energy Costs, and Environmental Scenarios. EPRI, Palo Alto, CA: 2013. 1025402.



# Why advanced reactors?

- **Technologies must be responsive to key nuclear questions:**
  - Develop more inherently safe designs.
  - Address fuel cycle issues to demonstrate long term sustainability.
- **Insure strength of the US economy through technologies that:**
  - Achieve significant capital cost reductions
  - Are highly efficient and provide operational flexibility
  - Account for future uncertainties (opportunities) through product diversity

# Innovation in Energy requires public/private partnership

- **The role of industry:**
  - **End users** – communicate what we want and need from technology
  - **Technology companies** – identify what is possible and innovate to deliver it to market
- **The role of government:**
  - **National Labs** – provide foundation of core R&D and infrastructure necessary to support an uncertain future.
  - **DOE** – partnership with industry to buy down risk of development and demonstrations (“valley of death”).
  - **Regulator** - Facilitate deployment through efficient and timely regulatory environment

# Advanced Reactor Working Group



NUCLEAR ENERGY INSTITUTE

The logo for EPR2, consisting of the letters "EPR2" in a blue, stylized, sans-serif font.

The logo for Southern Company, featuring a red triangle with a white arrow pointing up and to the right, above the text "SOUTHERN COMPANY" in a black, sans-serif font.

The logo for Entergy, featuring a red sun with white horizontal lines, above the word "Entergy" in a black, serif font.

The logo for SCE&amp;G, featuring a blue swoosh above the text "SCE&amp;G" in a bold, black, sans-serif font, with "A SCANA COMPANY" in a smaller font below.

The logo for TVA, consisting of the letters "TVA" in a white, bold, sans-serif font inside a blue square.

The logo for Exelon, featuring a colorful, stylized wave or ribbon graphic above the word "Exelon" in a blue, sans-serif font.

The logo for Dominion, featuring a blue circular graphic with a white sunburst inside, above the word "Dominion" in a black, sans-serif font.

The logo for Duke Energy, featuring a stylized green and blue graphic above the text "DUKE ENERGY" in a blue, sans-serif font.

The logo for Southern Company, featuring a red triangle with a white arrow pointing up and to the right, above the text "SOUTHERN COMPANY" in a black, sans-serif font.

# ARWG Mission

- Consolidate industry opinions on the cost and performance expectations for advanced reactors
  - Informs technology developers and the investment community
  - Aids in the alignment of R&D programs with industry perspectives
- Support the development of licensing pathways that reduce the barriers to deployment of new technology while maintaining a standard of excellence in performance

# Time is of the essence

2020s

- Small scale demonstrations (target 2025)
- Technology validation
- Utilize existing licensing paradigms

2030s

- Large scale demonstrations, likely power reactors
- Demonstration of enhanced licensing pathway

2035-2040

- Commercial technology in market
- Enhanced licensing pathway fully realized