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Arkansas Joint Committee on Energy

August 28, 2017

THE FUTURE OF NUCLEAR ENERGY

POWERPOINT 2

OVERVIEW

- Nuclear has an essential role to play in a cleaner, resilient, affordable electric grid.
- The existing nuclear fleet is a foundational piece of our electric grid and must be maintained.
- Innovation is an American strength—the U.S. must innovate, deploy and export new nuclear technologies.



STATUS NUCLEAR ENERGY IN THE U.S.



NUCLEAR IN THE U.S



- 99 reactors across 60 sites in 30 states
- 98,672 MWe of baseload capacity
- 805.3 billion kWh in 2016
- 92.1% capacity factor in 2016



2016 NUCLEAR ENERGY SUPPLY

19.7%





2016 NUCLEAR GENERATING COSTS





NUCLEAR INDUSTRY CONTRIBUTIONS





WHAT DOES NUCLEAR MEAN FOR ARKANSAS?

- 78 percent of carbon-free electricity in Arkansas
- Over 1000 direct jobs and 3,750 direct, indirect and induced jobs
- \$260 million total average annual wages
- \$15 million collected annually by state and local Arkansas governments

OVER 50 PERCENT ENTERGY ARKANSAS HOUSEHOLDS POWERED BY NUCLEAR



NATIONAL IMPERATIVES



FUTURE OF NUCLEAR ENERGY IN THE U.S.



THE ROLE OF NUCLEAR ENERGY

- Grid reliability and resilience
- Zero-carbon generation
- Economy and jobs
- National security
 - Over-reliance on a single fuel can leave us vulnerable to attacks or other disruptions
 - Robust nuclear fleet allows the U.S. to maintain international leadership on nuclear issues

Existing fleet, expertise provide the foundation to future designs



PROJECTED U.S. NUCLEAR POWER CAPACITY If all existing If all existing





NEW REACTORS WORLDWIDE



GLOBAL MARKET PLACE



NEARLY 2/3 OF ALL **NUCLEAR POWER PLANTS UNDER CONSTRUCTION** USE **CHINESE OR RUSSIAN** DESIGNS



RAPID COMMERCIALIZATION



- Ensuring US continued leadership in nuclear means:
 - Maximizing investments in advancing technology
 - Significant steps to improve licensing efficiency



IMPORTANCE OF NUCLEAR INNOVATION

Innovation in Operations



Innovation in Commercialization





CONTINUUM OF INNOVATION



SMALL MODULAR REACTORS



NuScale Power Module



NuScale Control Room

Holtec SMR-160



NEW GENERATION OF DESIGNERS













TRANSATOMIC



THE FEDERAL GOVERNMENT AND NUCLEAR INNOVATION



SECRETARY OF THE U.S. DOE RICK PERRY

- One goal at DOE is to "Make nuclear cool again."
- It's time to begin talking about nuclear "in great truthfulness and honesty about what it can add to America from an environmental standpoint and from a security standpoint.
- U.S. will engage with India on nuclear power development as part of a threepart plan to export energy technologies to foreign markets.





DEPARTMENT OF ENERGY GAIN INITIATIVE

Access to DOE resources maximizes investor dollars and accelerates innovation



GAIN SMALL BUSINESS VOUCHERS



Provides nuclear entrepreneurs with direct access to the cutting edge capabilities of the national labs

DOE BUDGET CHALLENGES



Reductions in DOE nuclear budget will limit investments in U.S. innovation

Proposed FY18 DOE Office of Nuclear Energy Budget



NRC NEW REACTOR LICENSING



 NRC culture and behavior creates
 overly detailed reviews in areas of little safety significance

Existing processes were based on large LWR reactor technology and allows little flexibility

New designs are inherently safer and simpler to operate, but more difficult to license



LICENSING INEFFICIENCY OBSTACLES TO DEPLOYMENT

ADDED TIME

Lack of flexibility requires case-by-case reviews creating unnecessary delays

ADDED COST

Overly detailed reviews add unnecessary cost

ADDED UNCERTAINTY

Unclear licensing for new technology cause issues and delays in developing new designs

Uncertainty in slow licensing processes discourage investors and drive innovation outside of the U.S.



Advancement of nuclear will outpace incremental improvements by NRC



EVOLVING THE REGULATORY ENVIRONMENT



Need to establish a sense of urgency and motivation for significant change

MAINTAINING US NUCLEAR LEADERSHIP

Preserving US nuclear leadership requires increased momentum in innovation and a strong drive to evolve licensing



NUCLEAR IN 115TH CONGRESS BIPARTISAN PROGRESS

- Bipartisan and bicameral support for advanced nuclear
- Number of bills introduced to address NRC reform and provide DOE direction
- Importance of NRC
 oversight hearings





STATE SUPPORT FOR NUCLEAR INNOVATION



STATE SMR AND ADVANCED NUCLEAR TECHNOLOGY SUPPORT

- National organizations pass resolutions of support
 - SSEB, NARUC, SLC, The Energy Council
- Individual state examples
 - Tennessee
 - Washington
 - Indiana









STATE POLICY OPTIONS TO SUPPORT NEW NUCLEAR

- Valuing carbon free electricity
- Lowering financing costs
- Tax Incentives
- Purchase power agreements
- Infrastructure support



QUESTIONS

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