

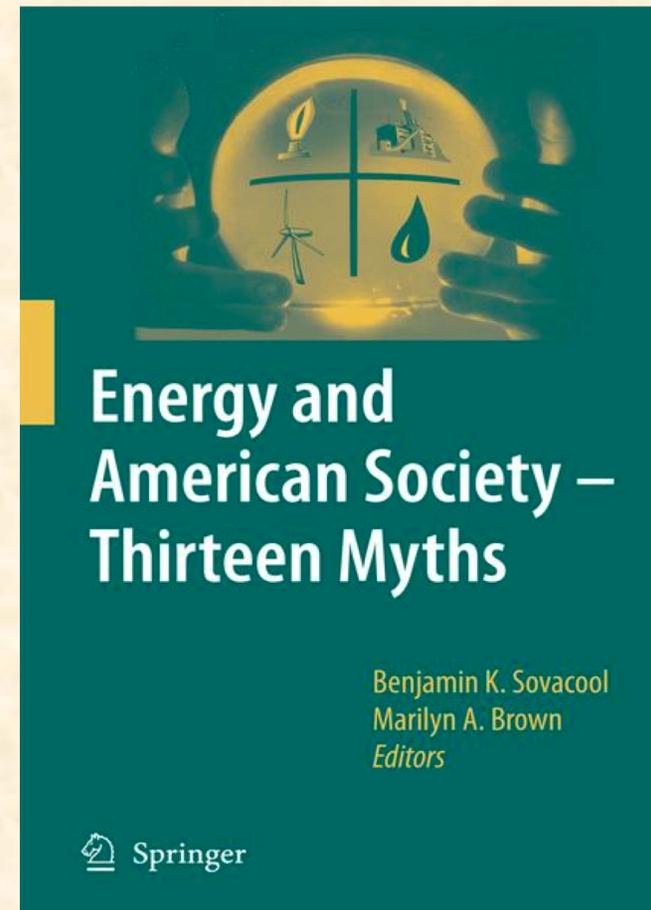
Nuclear Energy and the Transition to a Sustainable Energy Future

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Women in Nuclear Conference

Oak Ridge National Laboratory

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Women in Nuclear: History's Legends



Marie Curie



Lise Meitner (1878–1968), photo taken in 1900.

Lisa Meitner

Dixy Lee Ray



Strategic Energy Institute

Women in Nuclear: Some of Today's Leaders



Millie Dresselhaus



Shirley Ann Jackson

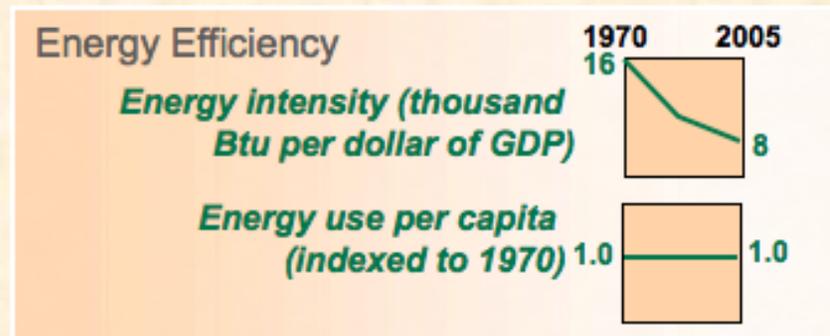
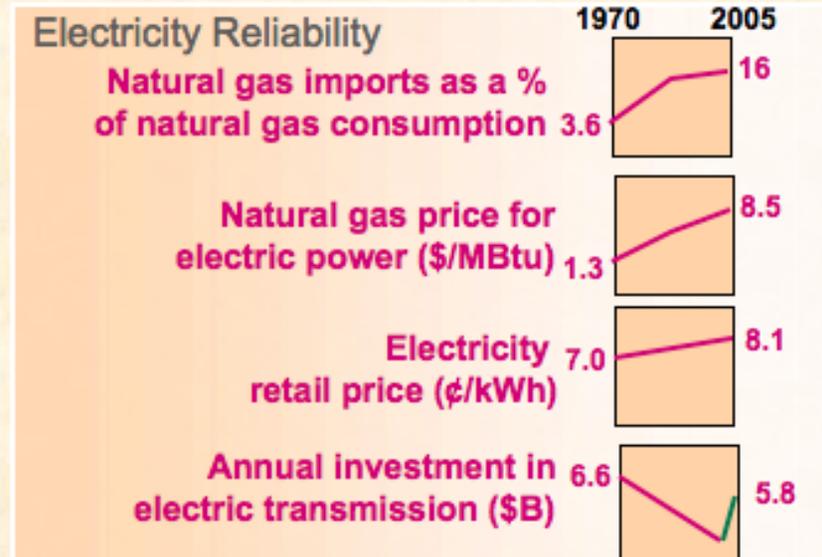
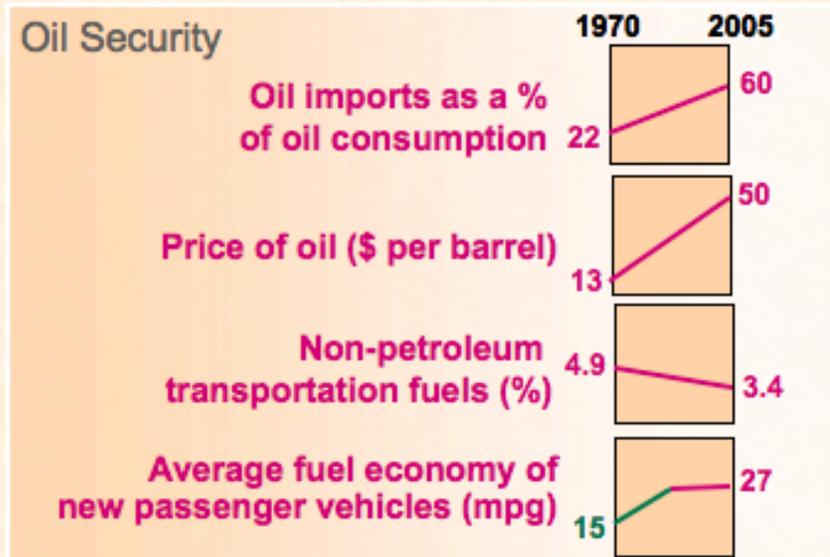


Rosa Yang

Energy Demand is Surging, Along with Opposition to New Infrastructure

- One myth is that “the energy crisis is exaggerated, fabricated, or some sort of cover-up.”
 - Market analysts see price shocks and blackouts as the product of market manipulation
 - Science and technology champions question the reality of a crisis
 - Energy resource analysts see ample supply options
- Are energy resources, technologies and infrastructure keeping up with the growing demands of an expanding economy?
- Can growing energy demand be met without compromising the environment?

Indicators of “Energy Sustainability” show few positive trends*

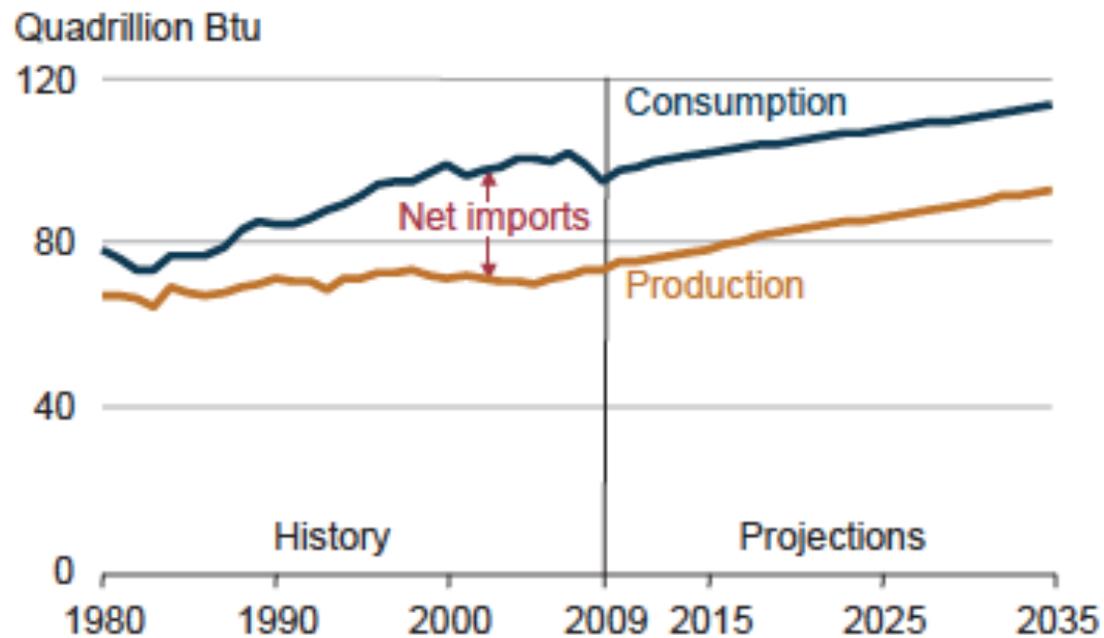


Source: Brown and Sovacool (2006). *Developing an “Energy Sustainability Index” to Evaluate U.S. Energy Policy* <http://www.spp.gatech.edu/faculty/workingpapers.php>.

Oil Security

Myth: “*Hydrogen is a panacea for the nation’s energy woes.*”

Figure 10. Total energy production and consumption, 1980-2035

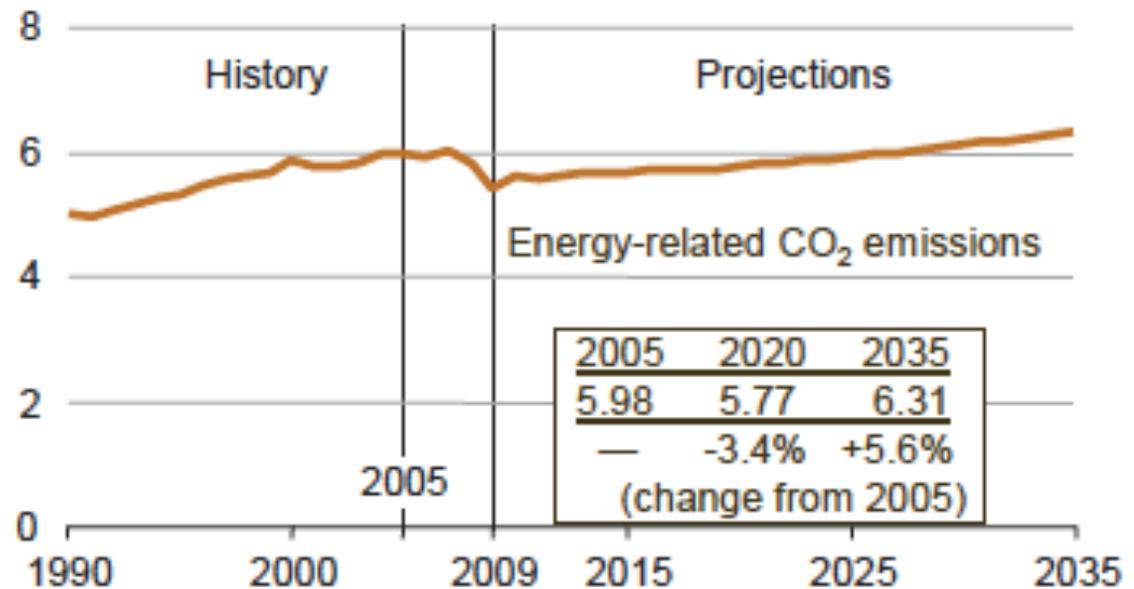


Environmental Quality

Myth: “*Climate policy will bankrupt the U.S. economy.*”

Figure 3. In the AEO2011 Reference case, energy-related carbon dioxide emissions grow to almost 6 percent over 2005 levels by 2035

Billion metric tons carbon dioxide equivalent

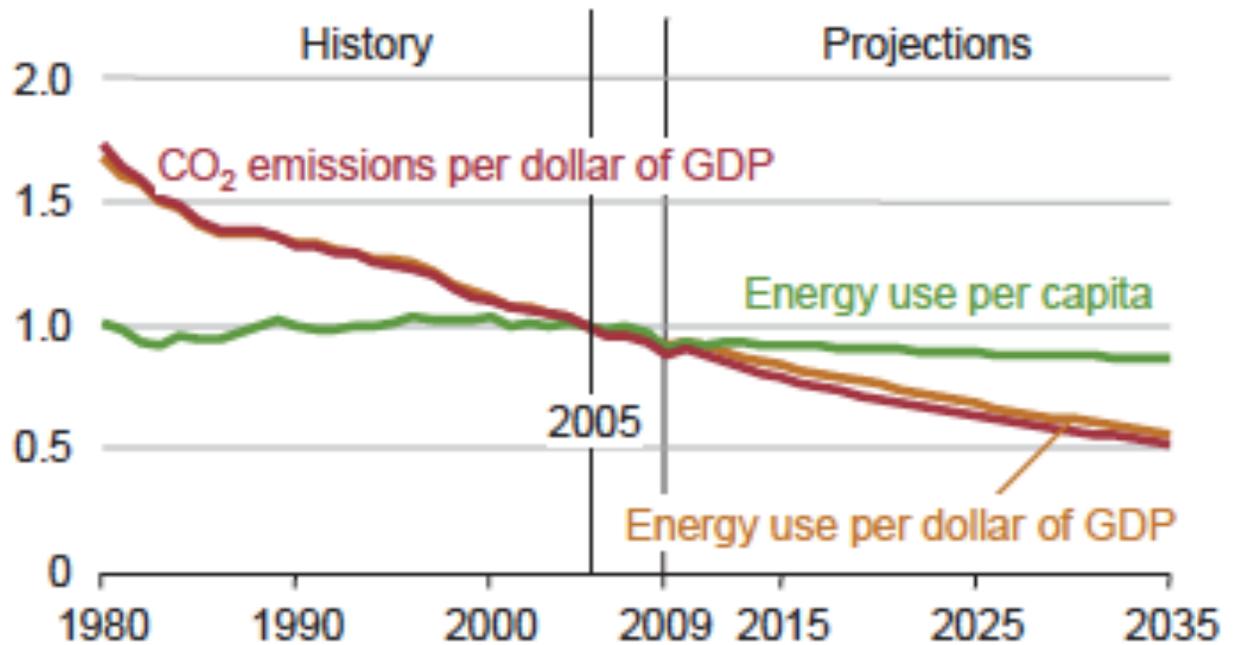


Energy Efficiency

Myth: “*Energy efficiency is tapped out.*”

Figure 8. Energy use per capita and per 2005 dollar of gross domestic product, 1980-2035

Index, 2005 = 1

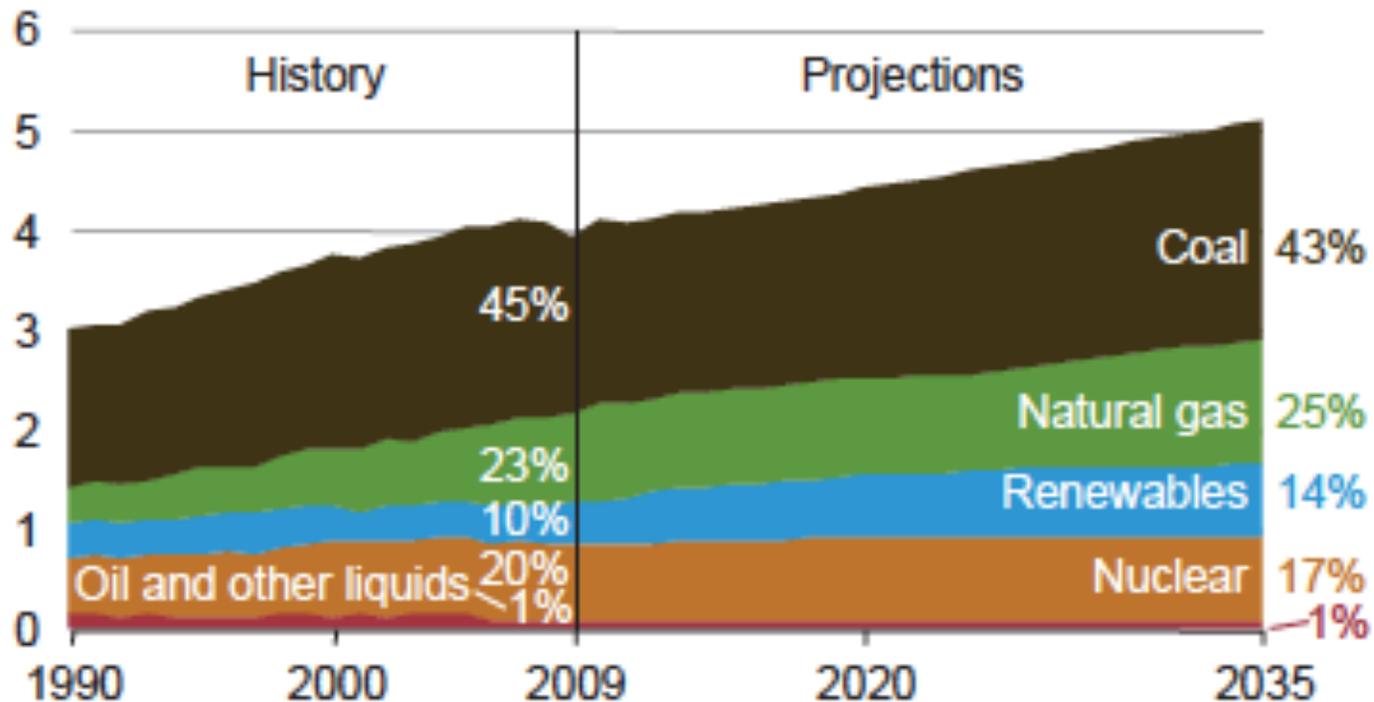


Electric Reliability

Myth: “*The barriers to new and innovative energy technologies are primarily technical.*”

Figure 2. The projected fuel mix for electricity generation gradually shifts to lower carbon options

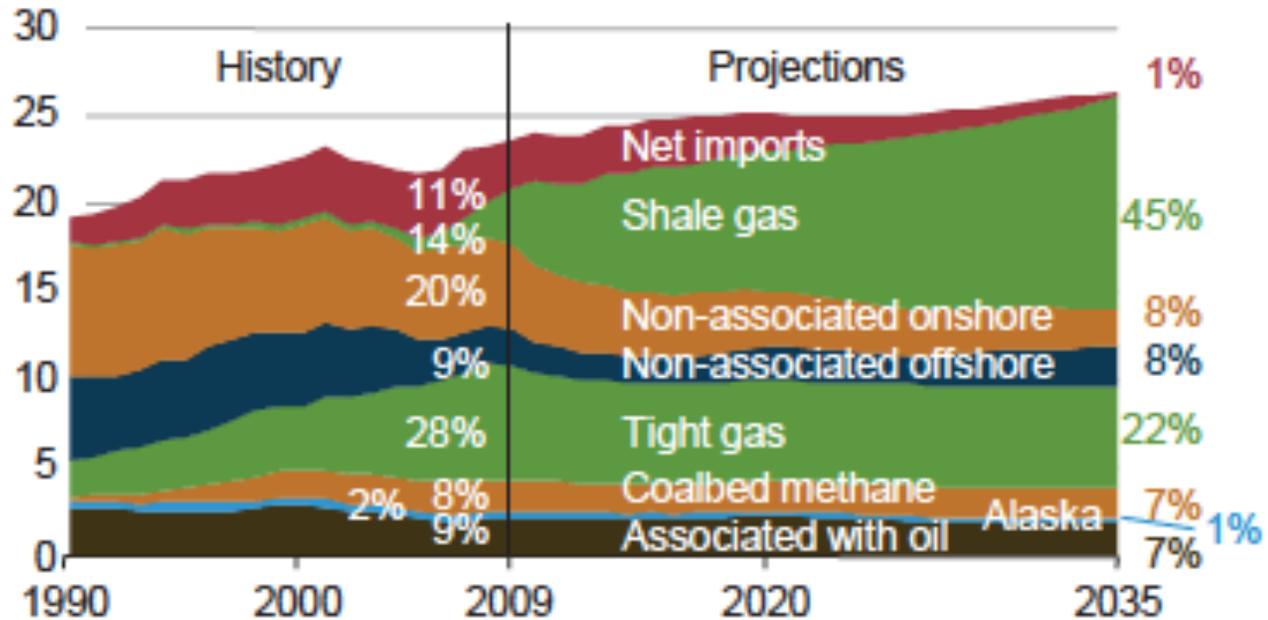
Net electricity generation (trillion kilowatthours per year)



Natural Gas

Figure 1. Shale gas offsets declines in other U.S. supply to meet consumption growth and lower import need

U.S. dry gas production (trillion cubic feet per year)



A Regulatory “Train Wreck” Threatens “Uncontrolled” Coal Plants

- Pending EPA regulations on air (SO₂, No_x, mercury, etc.), water, and coal ash on or around 2015:
 - May require retrofit, retirement or replacement of substantial portion of existing coal fleet in short period of time;
 - Some estimate potential for near-term retirement of 50 GW or more of coal capacity;
 - Regulations could impact reliability in some regions; and
 - Some estimates of capital costs exceed \$100B.

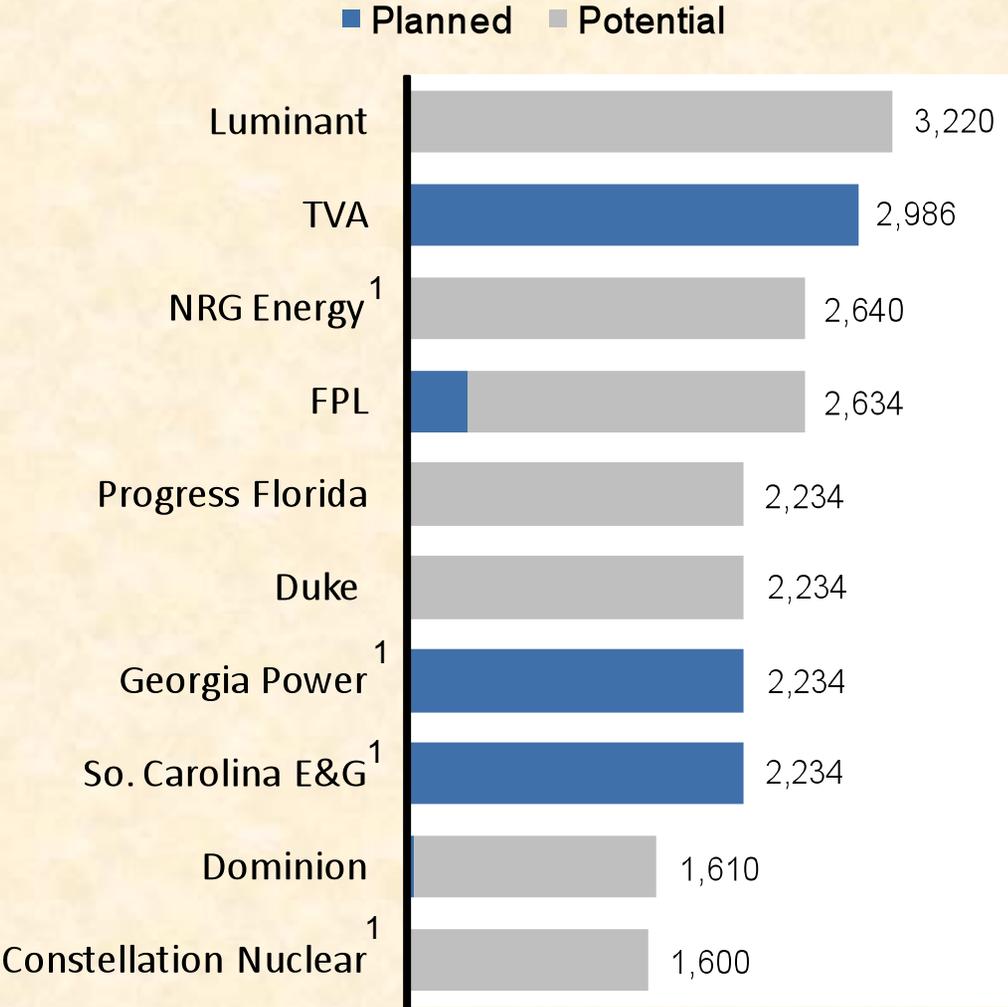


Source: J. Edward Cichanowicz. 2011. “The Trouble with Being Coal,” *Public Power* January-February, PublicPowerMedia.org

Nuclear Energy Worldwide



Nuclear Renaissance in the South



TVA's New Vision



Watts Bar



Bellefonte

Concluding Remarks

- “So tonight, I challenge you to join me in setting a new goal: by 2035, 80 percent of America’s electricity will come from clean energy sources.”

“Some folks want wind and solar. Others want nuclear, clean coal and natural gas. To meet this goal, we will need them all—and I urge Democrats and Republicans to work together to make it happen.”

January 2011, State of the Union Speech, President Obama

- It is an exciting time to be part of the nuclear power industry.

