Commissioning of USS New Mexico

Nuclear Progress: Seizing the Opportunity

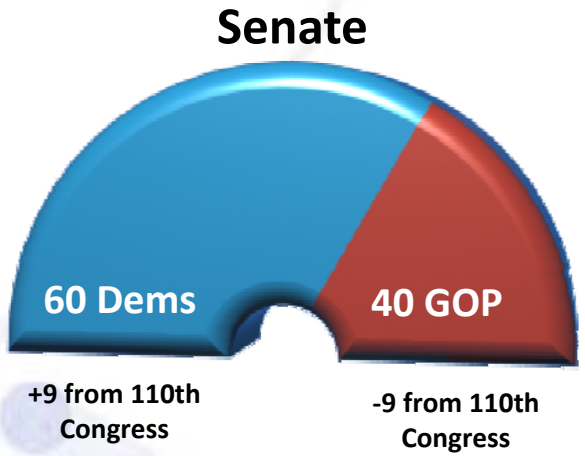
May 2010

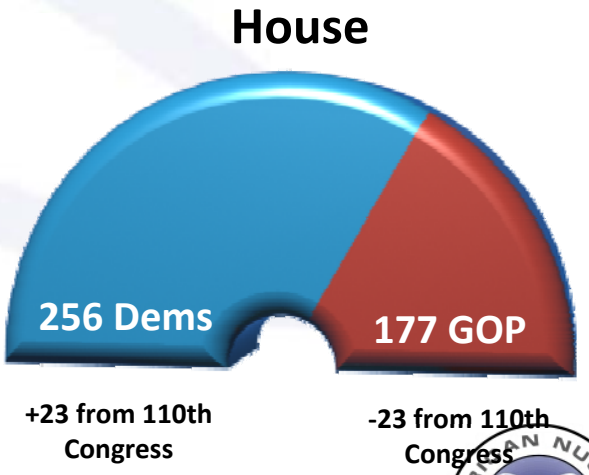
Outline

- The new politics of nuclear energy
- New nuclear plants: Progress and expectations
- Performance of operating nuclear plants
- ANS Initiatives

For Nuclear Energy, Political Uncertainty At the Beginning of 2009

- Increased Democratic control of House and Senate
- Lost a number of pro-nuclear champions (Sen. Pete Domenici)
- Rep. Henry Waxman (D-Calif.) replaced Rep. John Dingell (D-Mich.) as chairman of House Energy and Commerce Committee
- Obama: Terminate Yucca Mountain project





Energy Legislation in 2009: How Would Nuclear Be Treated?

- Economic stimulus legislation
  - Large boost in loan guarantees for renewables, transmission but no additional nuclear loan guarantee authority
- Energy/climate legislation passed House in June
- Energy/climate legislation stalled in Senate
  - Energy and Natural Resources Committee completed markup of energy legislation in June
  - Environment and Public Works Committee reported climate legislation in November

As 2009 Unfolded, Bipartisan Support For Nuclear Energy Increased

- Strong support for nuclear energy in Congress among Republicans, conservative Democrats, progressive Democrats
- House, Senate legislation included strong nuclear provisions
- Strong nuclear component a prerequisite for energy/climate legislation

The Washington Post

Nuclear power regains support

TOOL AGAINST CLIMATE CHANGE

Even green groups see it as 'part of the answer'

Washington Post, November 24, 2009

Unlikely Allies Find Common Ground In Nuclear Energy

Sen. John Kerry
(D-Mass.)

Sen. Lindsey Graham
(R-S.C.)

"[W]hile we invest in renewable energy sources like wind and solar, we must also take advantage of nuclear power, our single largest contributor of emissions-free power. Nuclear power needs to be a core component of electricity generation if we are to meet our emission reduction targets."

"Yes We Can (Pass Climate Change Legislation)"
by John Kerry and Lindsey Graham
Op-ed in New York Times, October 11, 2009

Kerry-Lieberman Climate Legislation
The American Power Act

- Introduced May 12, 2010 without Senator Graham
- Major nuclear provisions
  - Increase loan guarantee program to $54 Billion
  - Expedited procedures for issuing COL
  - Increases regulatory risk insurance for first 12 plants vice 6 plants
  - Requires DOE to designate a National Lab as center for spent fuel recycling and development excellence
- Nuclear tax provisions
  - Allows, tax-free municipal bonds, 5-year accelerated depreciation, 10% investment tax credit for some expenditure

Obama Administration Actions That Support Nuclear Energy Expansion

- Fixed rule governing energy loan guarantee program
- $36 billion increase in loan volume in FY 2011 budget
- Supported more liberal rules for nuclear financing under OECD protocols
- $73.8 million in clean energy manufacturing tax credits awarded to manufacturers of nuclear components
- Nominated (now confirmed) three qualified candidates for the U.S. Nuclear Regulatory Commission

Administration's View on Nuclear

"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."

– President Barack Obama
State of the Union
January 27, 2010

Used Nuclear Fuel: The New Reality

- Administration terminating the Yucca Mountain project
  - Blue ribbon commission to develop recommendations on used fuel management
- Interim storage safe, secure for indefinite period of time
- Used fuel issues not an impediment to operating reactors or new plant development

Dry cask storage for used fuel at the Surry station in Virginia

Uranium Recycling

- Worldwide expansion of nuclear energy likely will increase recycling for fuel supply and waste management
- Other countries recycle used nuclear fuel:
  - Russia; United Kingdom; Japan (soon); France
  - China and India have active development programs
- Develop advanced used fuel recycling systems
  - New fuel types and improved waste forms
  - New reactor designs
  - Support advanced fuel cycle R&D
  - Support international safeguards regimes

New Nuclear Plants: Progress and Expectations

Near-Term Fundamentals Negative, Long-Term Fundamentals Have Not Changed

- North American electricity demand will not recover to pre-recession levels until 2012 or so
- Most regional power markets likely to remain oversupplied for at least the next five years
- Spot power prices projected to remain soft in 2010-2011 at least
- Low natural gas prices likely to persist in near term
- Regional areas most in need for power not likely to build nuclear

Our Challenge: Reasonable Expectations for New Nuclear Build

- Positive
  - Significant growth in public support
  - Growing bi-partisan support in Congress
  - Recognition of nuclear growth needed to reduce green-house gases
- Negative
  - New build dependent on power needs not political desires
  - Slower build could result in reduced support

Snapshot of New Plant Development

- 13 license applications (22 reactors) under active review at NRC-First licenses late 2011, early 2012
- Design certification
  - Three design certifications in progress, two previously certified designs being updated
- First movers have started site preparation, ordered long-lead components
- Southern Company's Vogtle Units 3 & 4 received NRC Early Site Permit and Limited Work Authorization in August 2009
- Expect four reactors in commercial operation 2016-2017

Part 52 Licensing Process Working as Planned

- Technical questions are being addressed *before* construction begins
  - Process is transparent and readily available to the public
  - Hearing process is proceeding as scheduled where applicable
- Construction inspection in progress
- First facility start-up for combined license will occur in 2010 for LES' National Enrichment Facility

Loan Guarantee Program Moving Foward

- Loan guarantee authority
  - $18.5 billion in nuclear loan volume authorized
  - First four projects = approximately $38 billion in loan volume
  - Additional $36 billion loan volume in president's FY 2011 budget
  - Kerry-Lieberman increase to $54 billion
- Co-financing from export credit agencies in France, Japan will supplement U.S. loan guarantee authority
- Cost of loan guarantees still an open issue

Growth in Nuclear Supply Chain Continues

- Shaw Group near completion of new nuclear component manufacturing facility in Lake Charles, La.
- Global Laser Enrichment started test loop in Wilmington, N.C., in July 2009
- AREVA and Northrop Grumman broke ground in July 2009 in Newport News, Va., on nuclear components manufacturing facility
- 10 percent increase in number of domestic “N-stamps”

Groundbreaking for AREVA-Northrop Grumman manufacturing facility

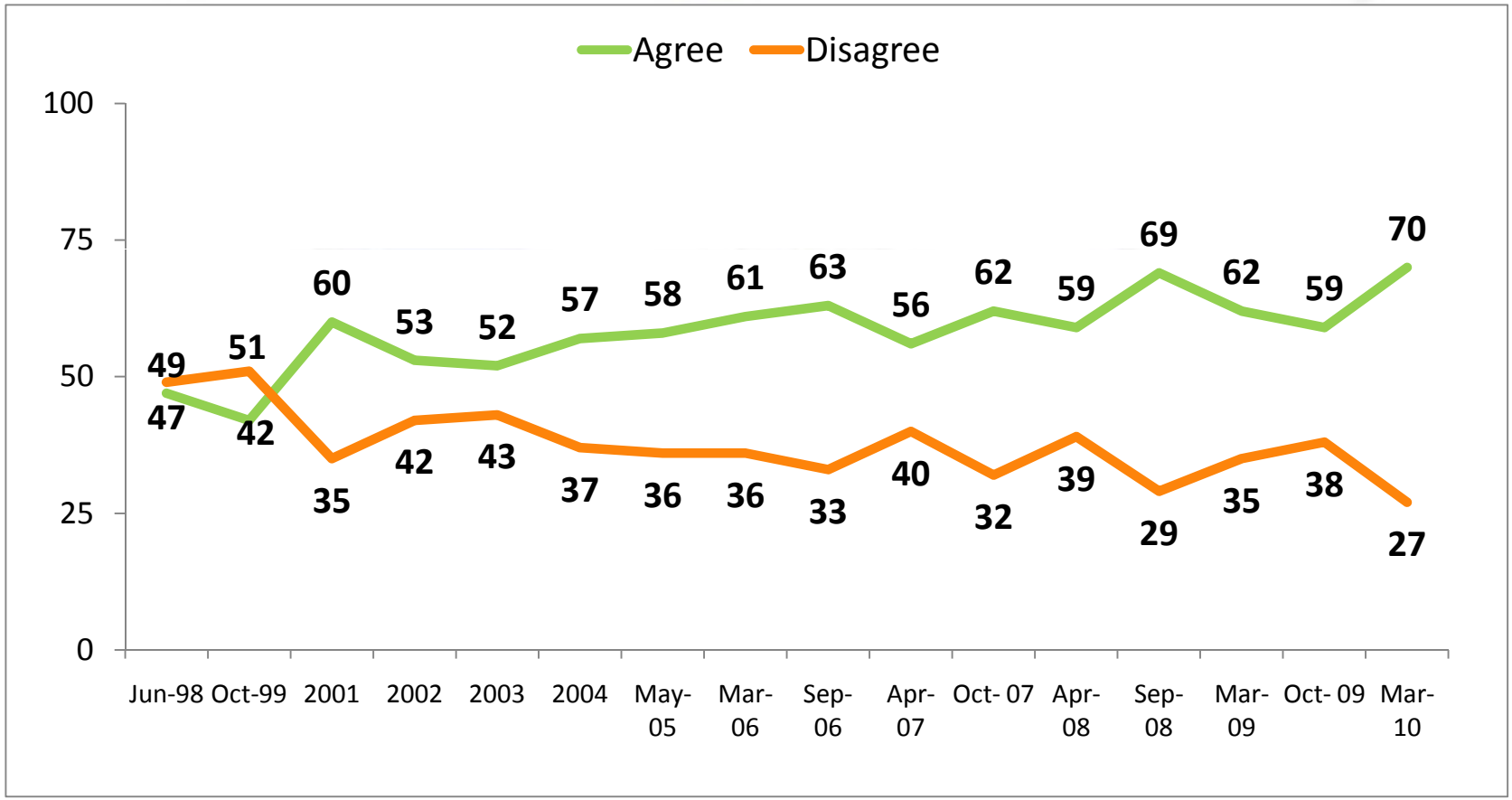
Photo Courtesy AREVA

Work Force: Training the Industry's Next Generation

- 52 community college nuclear partnership programs
- 28 state energy work force consortia
- More than $90 million in federal grants to support nuclear career and work force development activities

Agreement with Definitely Building More Nuclear Power Plants

Percentages



Bisconti Research, Inc. surveys of nationally representative samples of 1,000 U.S. adults; margin of error plus or minus 3 percentage points

New Nuclear Will Be Competitive

Levelized Cost of Electricity (2007 cents per kilowatt-hour)

Combined cycle (low gas price)	4-7
Wind (onshore)	4-10
Coal	5-9
Wind (offshore)	5-18
Nuclear	6-13
Combined cycle with CCS (low gas price)	7-10
Biopower	8-10
Solar CSP	8-20
Coal with CCS	9-15
Geothermal	10
Combined cycle (high gas price)	10-16
Combined cycle with CCS (high gas price)	14-21
Solar PV	14-30

Source: National Research Council of the National Academies, America's Energy Future: Technology and Transformation

Cape Wind Project
The Price of Wind

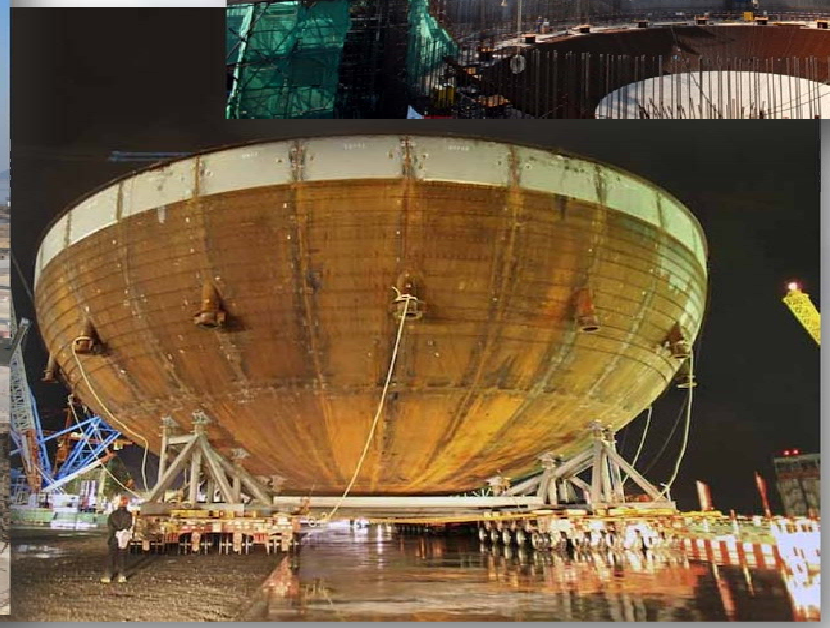
- Useful education in green energy politics
- Recently received Federal approval for 130 turbines in Nantucket Sound
- Cost of electricity from wind twice current cost to consumers
  - 2013 cost at 20.7 cents/KW, rising at 3.5% annually
  - Current average cost 9 cents/KW
  - Costs do not include Federal subsidies
- Irony- taxpayers are required to pay the cost for building project and then required to pay twice as much for power

Source-Wall Street Journal-May 12, 2010

Site Preparations Are Underway

Vogtle Units 3 and 4

Today China, Tomorrow America

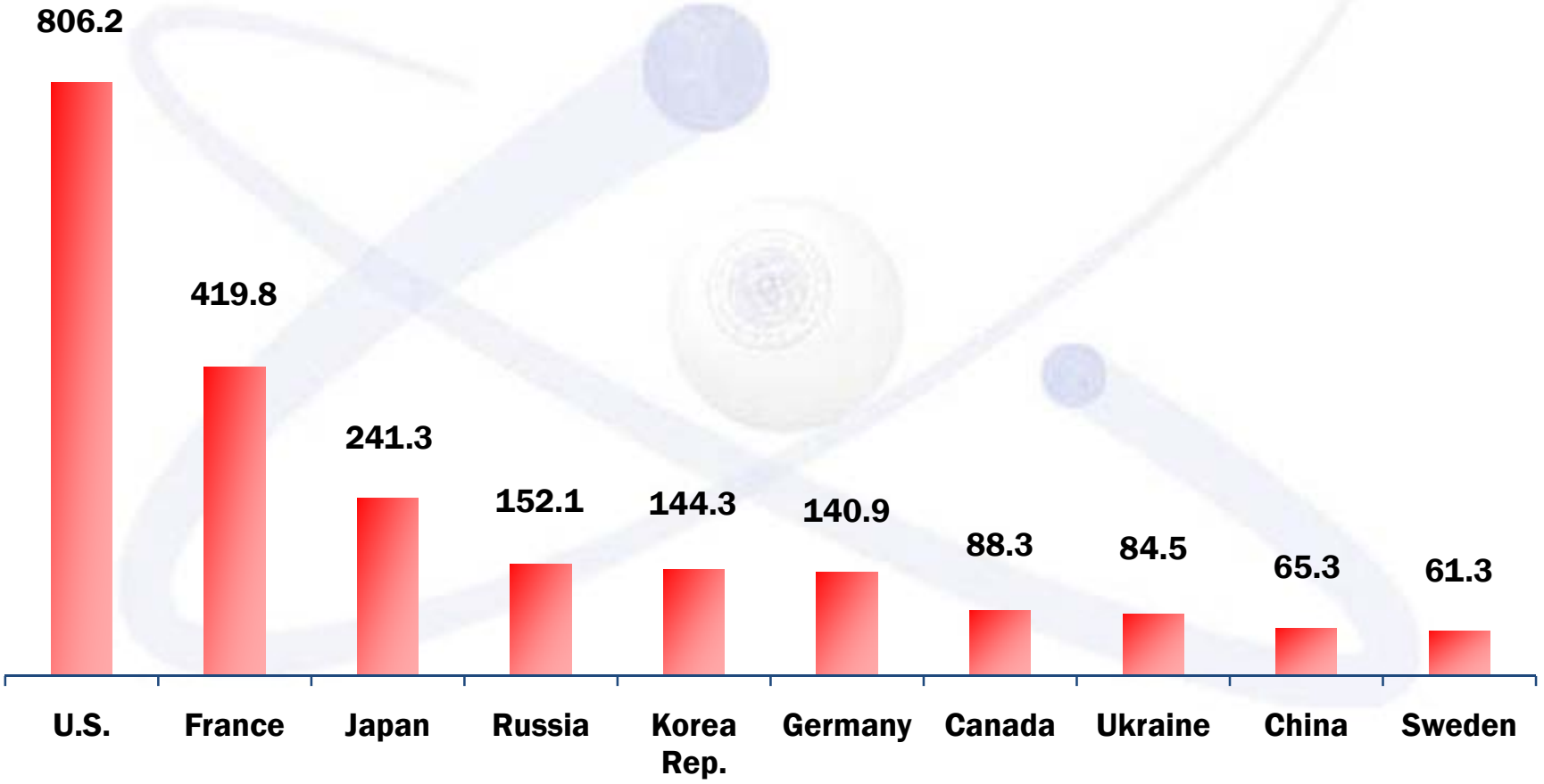


Photos Courtesy Shaw Group

Performance of Operating Plants

U.S. Is Global Leader in Nuclear Energy

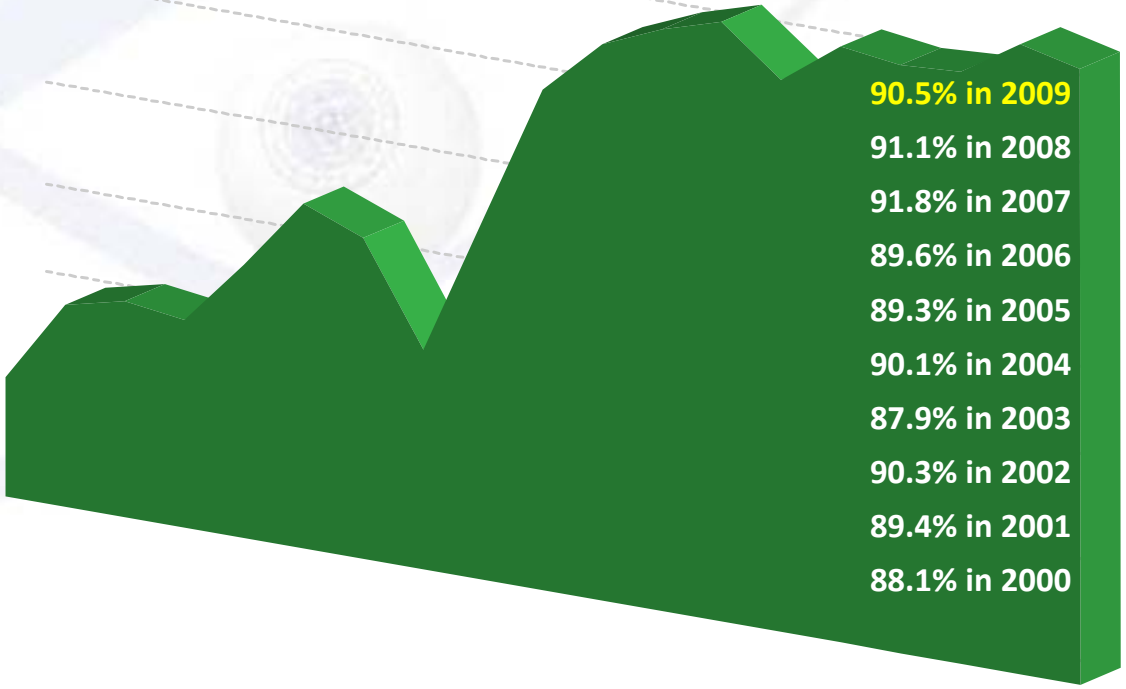
(Billion kilowatt-hours of electricity)



Source: International Atomic Energy Agency, U.S. is from Energy Information Administration. Updated: 9/09

Decade of Sustained Reliability

U.S. Nuclear Plant Average Capacity Factor



Highlights

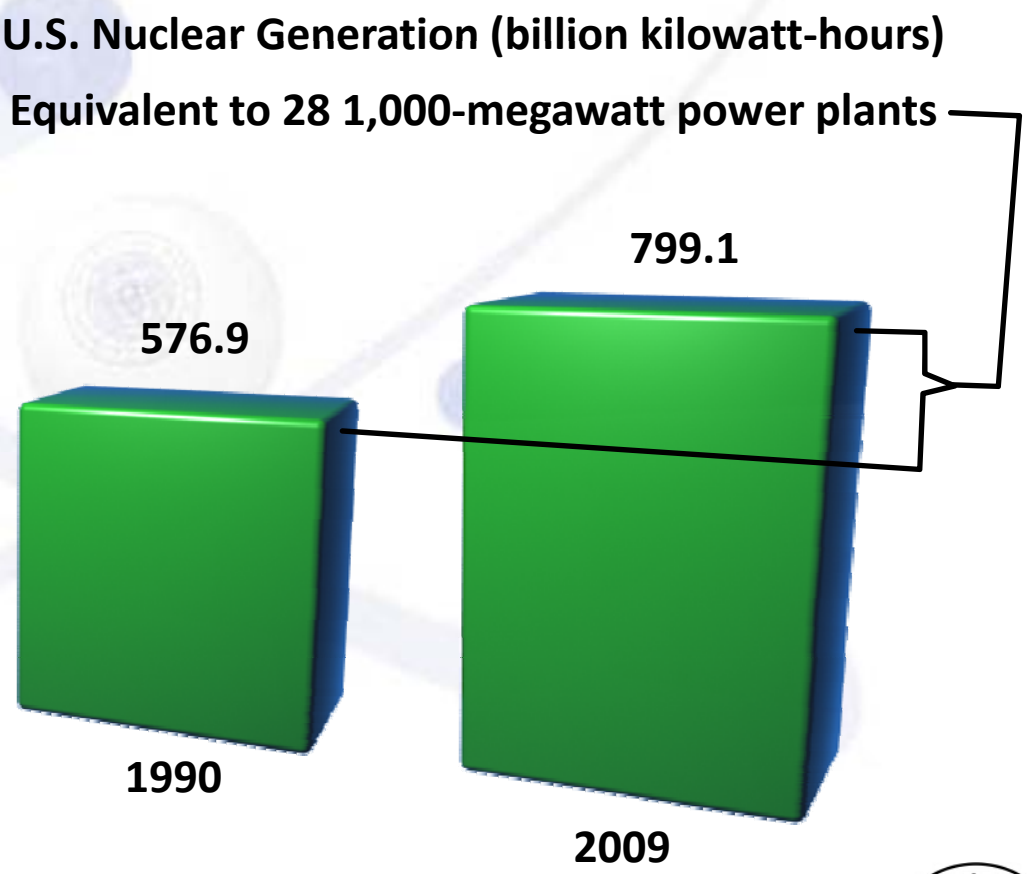
- Refueling outages: 66 in 2009, 66 in 2008
- Average refueling outage duration: 38.2 days in 2009, 37.6 days in 2008

Sources: U.S. Energy Information Administration, NEI estimate for 2009

Operating Plant Productivity

Highlights

- 5,200 MW of power uprates approved since 1990
- 935 MW of uprates under review
- 2,629 MW of uprates expected by 2014



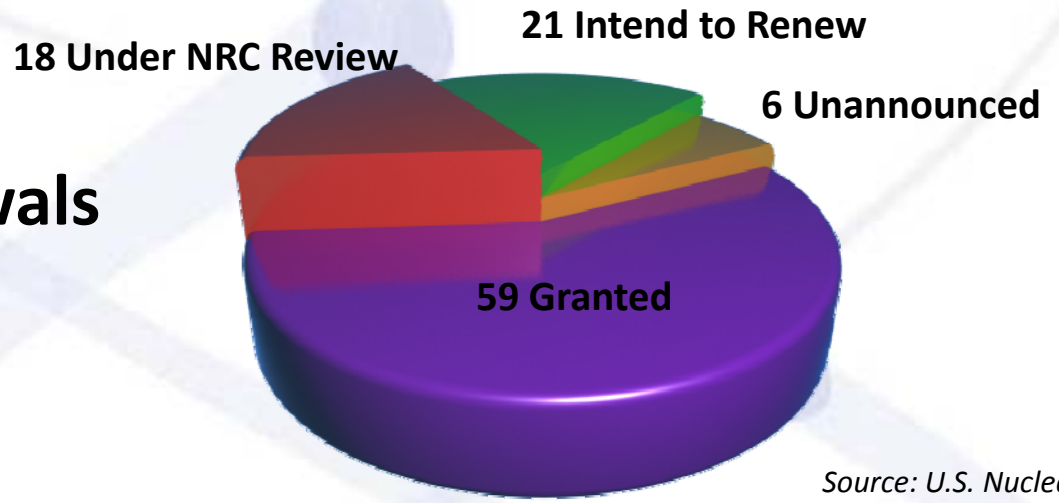
Sources: U.S. Energy Information Administration, U.S. Nuclear Regulatory Commission, NEI estimate for 2009

Comparison of Production Costs and Capacity Factors

- **2009 Production Costs**
  - Nuclear: 2.03 c/KW
  - Coal: 2.97 c/KW
  - Gas: 5.00 c/KW
  - Oil: 12.37 c/KW
- **2009 Capacity Factors**
  - Nuclear: 90.5%
  - Geothermal: 71.5%
  - Biomass: 66.0%
  - Coal (steam): 63.1%
  - Gas CC: 44.7%
  - Hydro: 29.4%
  - Wind: 27.8%
  - Solar: 23.5%
  - Gas (steam): 13.3%
  - Oil (steam): 7.4%

Preparing for Longer-Term Operation

License Renewals Continue ...

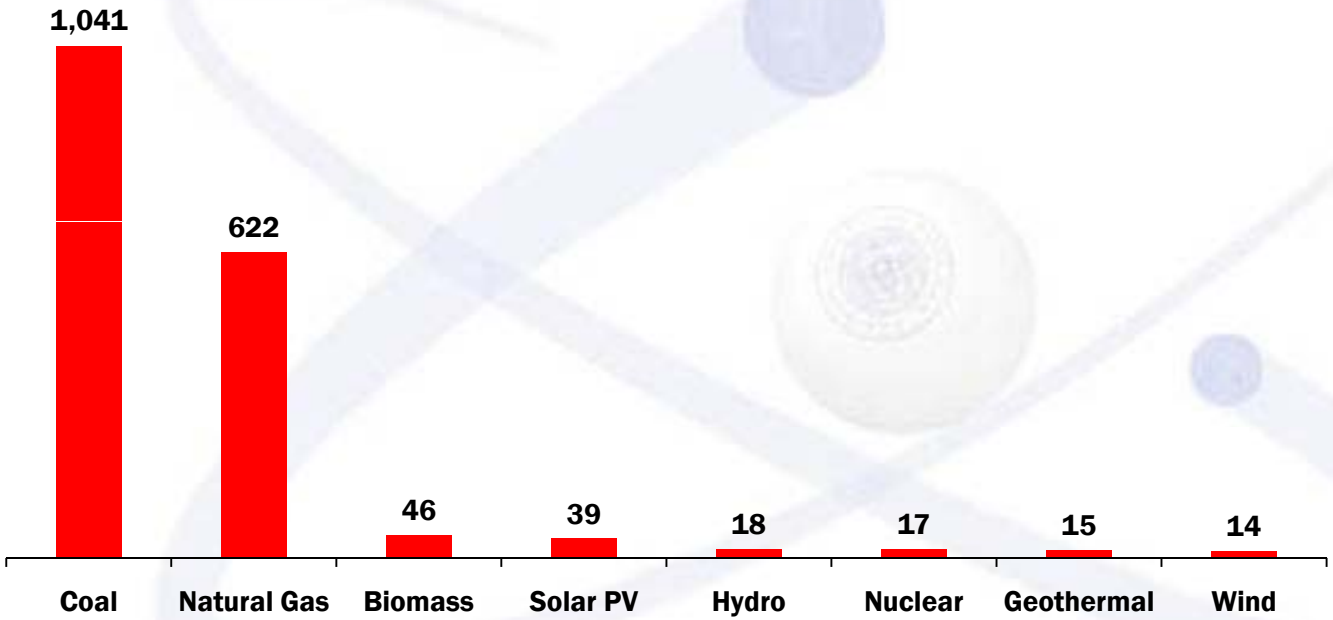


Source: U.S. Nuclear Regulatory Commission

- DOE and EPRI collaborating on extended operation
- Industry investing in extended operation through replacements, upgrades and uprates
- EIA's 2010 Annual Energy Outlook reference case assumes 41 nuclear units will operate beyond 60 years

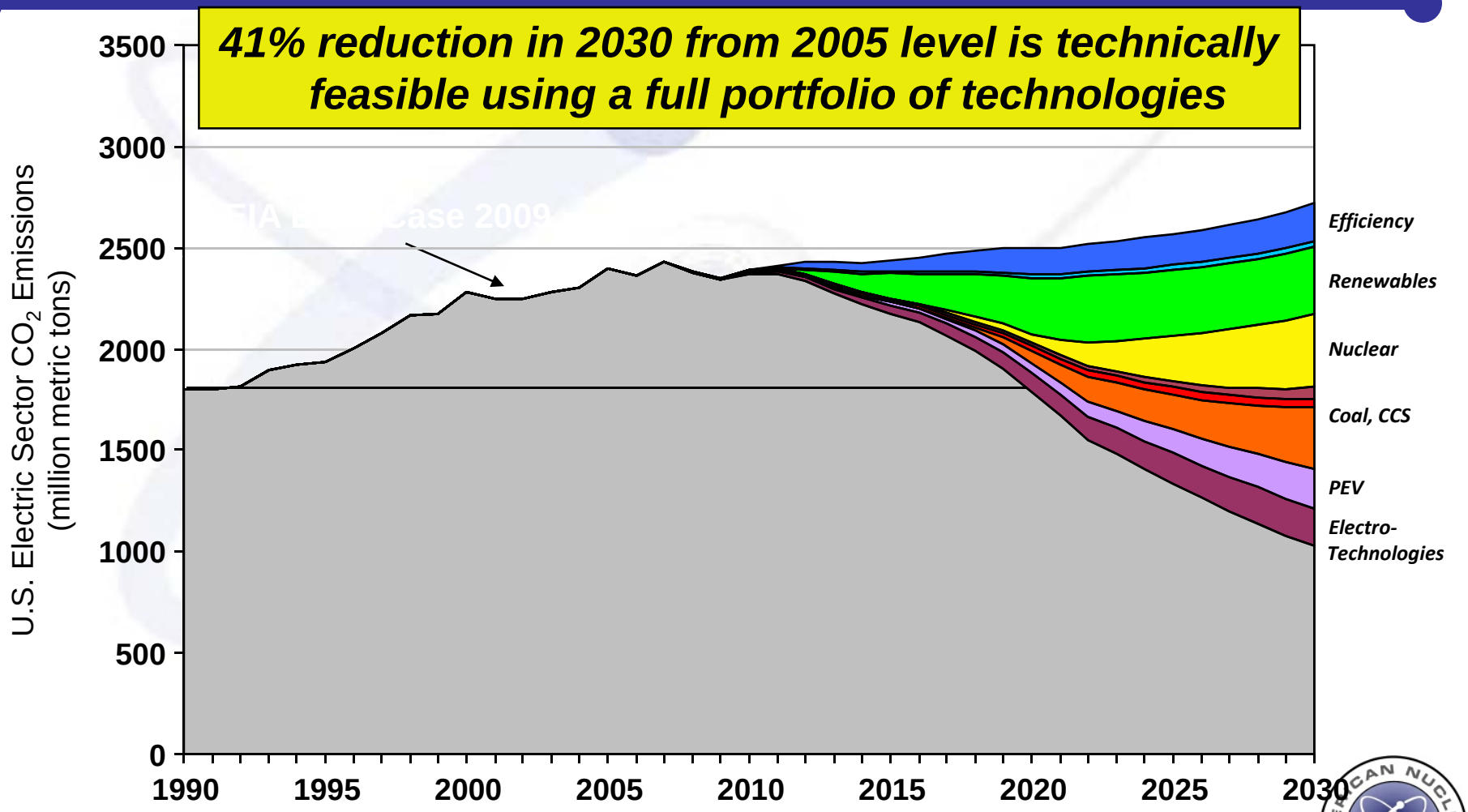
Comparison of Life-Cycle Emissions

Tons of Carbon Dioxide Equivalent per Gigawatt-Hour



Source: "Life-Cycle Assessment of Electricity Generation Systems and Applications for Climate Change Policy Analysis," Paul J. Meier, University of Wisconsin-Madison, August 2002.

Portfolio Approach Can Meet Carbon Reductions



Source: Electric Power Research Institute PRISM 2009

115 New Reactors Necessary To Meet Waxman-Markey GHG Goals

Nuclear Energy Required	2030	2040	2050
Electricity Production (billion kWh)	1,154 -1,257	1,758	2,081
New Nuclear Capacity Needed (GW)	44 - 57	120	161
Number of New Plants	31 - 41	86	115

Preliminary Analysis of H.R. 2454, American Clean Energy and Security Act of 2009, Environmental Protection Agency

The Priorities for 2010 and Beyond

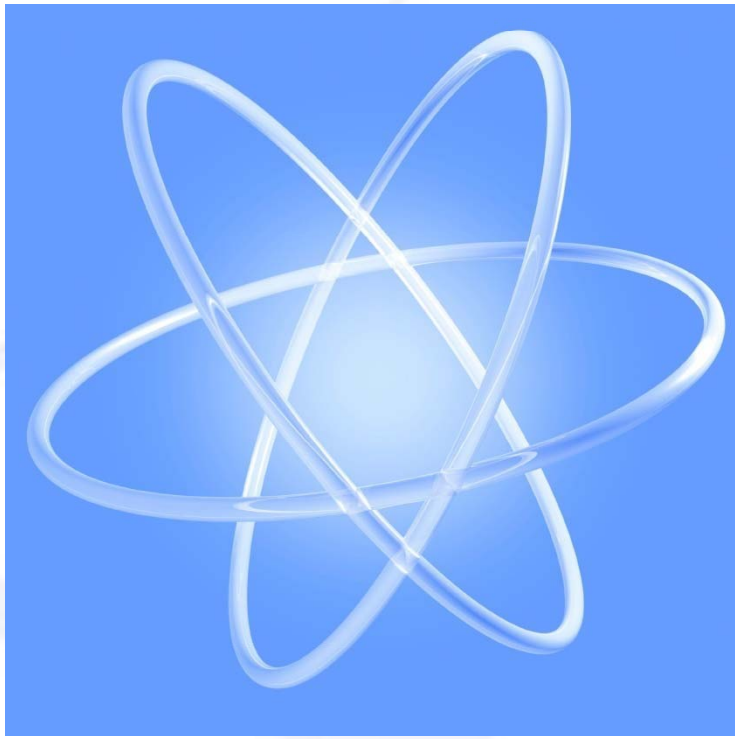
- **Operating plants**: Safety, reliability is top priority
- **New plants**: Risk management is highest priority
  - Disciplined project management essential
  - Ensure certainty, predictability in the licensing process
  - Firm up financing plans
  - Sustain programs to grow nuclear work force
  - Provide investment stimulus to expand nuclear supply chain
- Industry's major opportunity: Reinforcing and strengthening the new political mandate

ANS Initiatives

- New Executive Director in place for > one year
- Membership growing
- Efficiency and effectiveness Initiatives
  - Electronic Voting in place
  - Organizational and staffing review underway
- Campaign and Fundraising Initiative

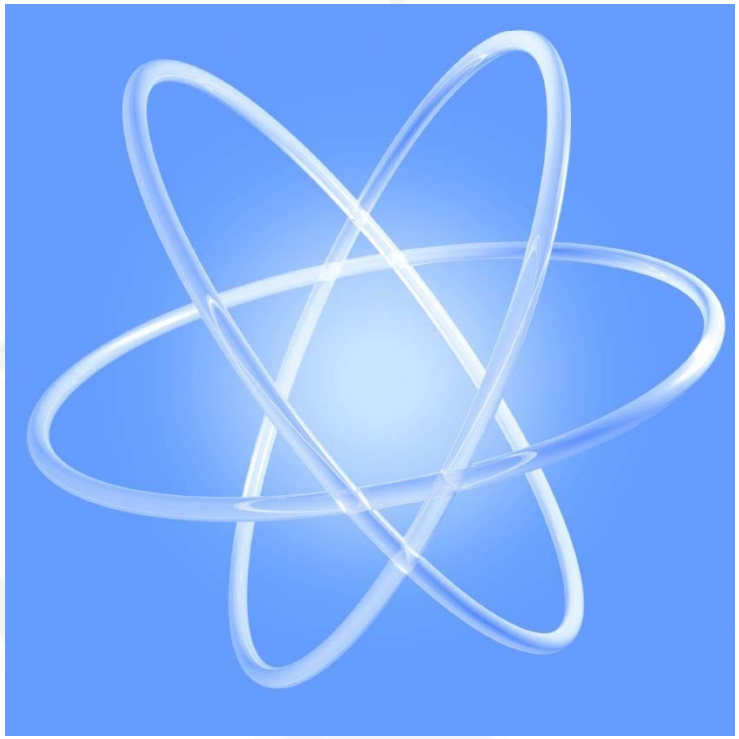
Campaign Vision – Overview

- Embrace ANS's unique position and the opportunity to fill a niche
- Leverage ANS's greatest asset – its membership
- Capitalize on ANS's technical strength and credibility
- Act on study findings to create ANS Center for Nuclear Science and Technology Information to implement a public awareness strategy and fund related operational needs



Campaign Vision – Overview

- ANS Center for Nuclear Science and Technology Information
  - Rebrand the nuclear science and technology community
  - Position ANS as the authority on nuclear science and technology
  - Use the Center to challenge long-held but incorrect beliefs about nuclear science and technology



Campaign Vision – Overview

- Public awareness strategy to:
  - Tell the truth about nuclear science and advance its image
  - Translate industry facts, figures, and experiences into easily understandable communications vehicles
  - Position these vehicles into the existing conversation via mainstream media and social media channels
  - Control the debate by proactively explaining the science for people to formulate informed opinions

Campaign Vision – Results

- **K-12**
  - Thousands more teachers and students will be engaged
  - Schools will have introduced new curricula
- **General Public**
  - The conversation about nuclear science and technology will occur without controversy
- **Policy-makers**
  - Policy-makers will understand our science and technology
- **Media**
  - More positive and factual articles about the industry will appear
  - Reporters will call ANS first when writing any stories on nuclear issues
  - ANS content will be used in online conversations

What does success look like?

- A new societal environment emerges
  - A paradigm shift is evident in conversational exchanges among the populace
- Evidence
  - Icebreaker conversations
  - Direction of pressure on policy-makers
  - Media predisposition and informal sourcing
  - K-12 educators leveraged to be extensions of our outreach
  - Members are energized
- Goal: Affect a culture change.

Local and Student Sections

- Herein lies the real strength of the Society!
- Get engaged and make a difference!
- Seize the incredible opportunities before us!