The Role of Nuclear Energy In the US

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May 5, 2004

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Nuclear Energy

- The current role of nuclear energy
- Challenges
- Building a foundation for the future
- Public and political support

US Electricity Generation
(3,839 bkwh)

- Coal – 51%
- **Nuclear – 20%**
  - **103 nuclear units (780.2 bkwh)**
  - **31 states**
  - **1 in 5 homes**
- Natural Gas – 16.5%
- Hydro – 7.2%
- Oil – 3.1%
- Renewables – 2.2%

Capacity Factors

(2002)

Nuclear	**91.7**
Coal	68.7
Gas (Combined Cycle)	40.5
Gas (Steam Turbine)	26.7
Hydro	35.4
Wind	29.0

Source: RDI 10/03

Economics

- **Nuclear** **1.71 Kwh**
- Coal 1.85 Kwh
- Gas 4.06 Kwh
- Oil 4.41 Kwh

Increasing Nuclear Generation

- 10,000 MWe by 2012
  - Power uprates
  - Improved capacity factors
  - Plant restart
- License renewal/life extension

Expanding Capacity

- Power uprates
  - 5,000 to 6,000 MW of capacity additions between 2002 and 2012
- Improved capacity factors
  - 3,000 to 5,000 MW of additional capacity in 2002-2012
- Plant restart
  - Refurbishing and restarting Tennessee Valley Authority's Browns Ferry Unit 1 would add 1,250 MW

License Renewal/ Life Extension

- 25 units – granted additional 20 years of operation
- 15 units now under review by NRC
- 16 units have announced intention to renew
- 47 have not announced but most are expected to renew

Challenges

- Continued safe operation
- Materials management
- Security
- Used fuel management
- Communicating environmental benefits

The Challenges: Materials Issues

- Davis-Besse
- Industry is committed to identifying and solving problems
- Goal is to a anticipate problems before they occur
- Developing industry programs to monitor, inspection and repair potential problems

The Challenges: Security

- Security has always been important
- Since September 11, 2001
  - Additional people
  - New facilities and defenses
- New NRC regulations
- Broad-based recognition that nuclear plant security sets the standard for industrial facilities

The Challenges: Used Fuel Management

- Good Political Support
- Increased funding
  - Highest ever funding for Yucca Mountain program in current fiscal year ($580 million)
  - $880 million requested for next year
- DOE developing transportation infrastructure
- DOE to file license application with NRC this year
- Major industry initiatives underway

Communicating Environmental Benefits

- Nuclear Energy – the clean air energy
- Industry communications about clean air benefits often hard to understand
  - Example: How can absence of emissions reduce emissions? A difficult concept for members of the public.

Good Environmental Message

"We need reliable sources of electricity for the future. We also need clean air. With nuclear energy, we can have both."

- It's positive, simple.
- It's credible.

Building for the Future

- Maintain safe operation
- Design certification
- Early site permits
- Combined construction/operating license
- Resolve financing issues
- Joint government/industry program

Building for the Future: Economics of New Plants

- The first plants built will be in the range of $1,400 per kilowatt ($1.5 – $2 billion)
- After the first few nuclear plants – $1,000 to $1,200 per kilowatt – fully competitive with other fuels
- (Coal plants can be built for $1,000 to $1,500 per kilowatt)

Building the Future: Key Elements

- Dominion, Exelon, Entergy seeking Early Site Permits
- DOE solicited proposals to demonstrate process for obtaining combined construction/operating license
- Three consortia – cost-sharing programs with the federal government to validate licensing process and competitive designs

Political Support

- In 2002, the Congress and the President supported Yucca Mountain
- Continuing strong congressional support

Public Support

- 65% favor the use of nuclear energy as one of the ways to provide electricity
- 64% said it would be acceptable to add a nuclear power plant next to the nearest operating plant
- 60% rated nuclear plants as safe

Public Support

- 82% support license renewal
- 74% said DOE and electric companies should work to develop state of the art nuclear power plants that can be built to meet new electricity demand

Forecast

- 358,000 MWe will be needed by 2025
- Nuclear expects to be an important part of that new generation