Today’s Briefing

- Review of 2008 Operating Performance
- New Nuclear Plants
  - Progress and Expectations
  - Economics and Financing
- Politics and Policy: The Year Ahead
Review of 2008
Operating Performance
Sustained Reliability

U.S. Nuclear Plant Average Capacity Factor

Highlights

- Average refueling outage duration: 37.6 days in 2008, 40.4 days in 2007

Steady Output
From the Operating Plants
U.S. Nuclear Generation (billion kilowatt-hours)

Highlights

- 5,640 MW of power uprates approved since 1977
- 595 MW of uprates under review
- 2,882 MW of uprates expected by 2013

Other Key Highlights From 2008

License Renewals Continue ...

... And America’s 105th Plant Is Well Under Way

- TVA sanctioned Watts Bar 2 completion in August 2007
- 5-year, $2.5 billion project
- On schedule and on budget for April 2012 construction completion
- Currently employs 1,500 people on-site

Source: U.S. Nuclear Regulatory Commission
Best Regulatory Performance Ever: 93 Plants “In the Green”

NRC Action Matrix Summary

- Column 4
- Column 3
- Column 2
- Column 1

Increasing Regulatory Oversight
New Nuclear Plants: Progress and Expectations
The Business Case for Nuclear Power

- Need for new baseload capacity
- Constraints on carbon emissions
- Solid business case for new nuclear plants at commercial operation in 2016 and beyond

New Generating Capacity Needed
Assumes 0.7% Annual Growth in Peak Load

- No Carbon Control: 133 GW
- With Carbon Controls: 216 GW

Building a new nuclear plant is not a one-step process or decision. It is a sequence of decisions, which provides substantial flexibility.

1. Long-lead procurement of major components, EPC contract negotiated, financing secured, site preparation, limited construction work

2. U.S. NRC review of COL

3. Construction
Progress Toward New-Plant Development

2007
- 3 early site permits granted
- 2 design certifications submitted
- 4 COL applications submitted

2008
- 1 design certification submitted
- 13 COL applications submitted
- 3 engineering and procurement contracts signed
- Fabrication of long-lead components

2009−2010
- Site excavations begin
- 1 early site permit expected
- Additional COL applications
Major New Plant Issues Being Managed by the Industry

- Licensing
- Supply Chain
- Work Force
- Financing
New Licensing Process Reduces Uncertainty and Financial Risk

**COL Application And Review**
References a specific design; may reference an early site permit

**Construction**
Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) review

**Hearing**
Potential for challenge, but major capital investment has not occurred

**Operation**
High threshold for hearing (must prove ITAAC have not been or will not be met) and narrow scope if it occurs
Managing the Licensing Process

- Industry approach: design-centered working groups to achieve standardization
- NRC approach: single review of standard materials, "one issue, one review, one decision"
- Protocols for construction inspection and ITAAC being developed
U.S. Manufacturers Ramping Up
Supply Chain and Fuel Supply Expansion Plans

- AREVA and Northrop Grumman
  Newport News, Va.
- Shaw Group and Westinghouse
  Lake Charles, La.
- Curtis Wright
  Cheswick, Pa.
- Alstom
  Chattanooga, Tenn.
- National Enrichment Facility
  Eunice, N.M.
- American Centrifuge Project
  Portsmouth, Ohio
- GE Hitachi Nuclear Energy
  Wilmington, N.C.
Rebuilding the Work Force: Supply Responds to Demand

- 42 community college nuclear partnership programs
- 16 state-based work force development initiatives
- 500 percent increase since 1999 in nuclear engineering enrollment
New Nuclear Power Plants Will Be Competitive

- FPL, Progress, SCE&G filings
  - FPL: nuclear superior in 8 of 9 scenarios
  - Progress: nuclear “better than AFBC, pulverized coal and coal gasification”

- Brattle Group analysis:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Nuclear</th>
<th>SCPC</th>
<th>SCPC w/ CCS</th>
<th>IGCC</th>
<th>IGCC w/ CCS</th>
<th>Gas CC</th>
<th>Gas CC w/ CCS</th>
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<td>2,214</td>
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<td>2,567</td>
<td>3,387</td>
<td>869</td>
<td>1,558</td>
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<td>Levelized Cost ($/MWh)</td>
<td>83.40</td>
<td>86.50</td>
<td><strong>141.90</strong></td>
<td>92.20</td>
<td><strong>124.50</strong></td>
<td>76</td>
<td><strong>103.10</strong></td>
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Comparative Costs Of New Generation Options: 2015-2020

Average 2007 U.S. wholesale electricity price = 66 $/MWh

Coal without CCS
NGCC ($8-10/MMBtu)

Levelized Cost of Electricity, $/MWh

Cost of CO₂, $/Metric Ton

All costs are in 2007 $; Rev. October 2008; Copyright EPRI
Comparative Costs Of New Generation Options: 2015-2020

Average 2007 U.S. wholesale electricity price = 66 $/MWh

All costs are in 2007 $; Rev. October 2008; Copyright EPRI
Comparative Costs Of New Generation Options: 2015-2020

Levelized Cost of Electricity, $/MWh

Cost of CO$_2$, $/Metric Ton

Coal with CCS (2020)

Coal without CCS

Wind (32.5% CF)

Nuclear

NGCC ($8-10/MMBtu)

Average 2007 U.S. wholesale electricity price = 66 $/MWh

All costs are in 2007 $; Rev. October 2008; Copyright EPRI
Comparative Costs
Of New Generation Options: 2015-2020

Solar PV = $250/MWh
Central Station Solar = 175 $/MWh

Average 2007 U.S. wholesale electricity price = 66 $/MWh

All costs are in 2007 $; Rev. October 2008; Copyright EPRI
Electric Sector Capital Spending

- Credit crisis could not have come at a worse time
- Industry in early stages of major capital investment cycle
- Total capex for 2010-2030: $1.5 trillion - $2 trillion
- Financial crisis: 2009 capex down 10% or more

2008 Capital Spending

- Generation: 35.9%
- Environment: 14.4%
- Transmission: 11.7%
- Distribution: 24.5%
- Gas-Related: 8.9%
- Other: 4.7%
Rapid Capex Growth Since 2004

Capital Spending: Trailing 12 Months
U.S. Shareholder-Owned Electric Utilities ($ Billions)

Source: Edison Electric Institute
Rate Cases on the Rise

Rate Cases Filed
U.S. Shareholder-Owned Electric Utilities

Source: Edison Electric Institute
Awarded ROEs Trending Down

Average Awarded ROE: 1990 - Q3 2008 (Quarterly)

Sources: SNL Financial/Regulatory Research Associates, Edison Electric Institute
Recent Authorized ROEs
(Highest to lowest by state – First 9 months of 2008)

Source: Edison Electric Institute
Bond Spreads Dramatically Wider

Utilities' 10-year Bond Spreads vs. Treasuries

Average Spread Over Treasury by Calendar Quarter (bps)

Source: Edison Electric Institute
## Industry Leverage Beginning to Rise

### Capitalization Structure

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<th>6.30.08</th>
<th>12.31.07</th>
<th>12.31.06</th>
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<td>Equity</td>
<td>43.9%</td>
<td>45%</td>
<td>45.9%</td>
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<tr>
<td>Debt</td>
<td>56%</td>
<td>54.9%</td>
<td>54%</td>
<td>61.3%</td>
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Source: SNL Financial, Edison Electric Institute
Credit Quality Started to Slide in 2008
Rating Actions: U.S. Shareholder-Owned Electric Companies

Downgrades outpaced upgrades in 2008 – first time since 2004

* Activity through 9/30/08

Sources: Fitch Ratings, Moody’s, Standard & Poor’s
The Business Case for Nuclear Power

- New nuclear projects still in early stage of development
  - Cost estimates will firm up as design/engineering completed
- Capital cost important but does not measure economic viability
- Relevant metric is the cost of electricity produced relative to:
  - alternative sources of electricity
  - market price of electricity at COD
- Based on what we know, all signs suggest solid business case for new nuclear plants
Financing New Baseload Capacity

- Nuclear is competitive but has a structural challenge: very large projects relative to the size of the companies building them
- This challenge can be managed
  - Supportive rate policies at the state level
  - Loan guarantees from the federal government
    - Higher leverage (up to 80 percent)
    - Non-recourse to sponsor’s balance sheet
# Market Value of Energy Companies

## U.S. Power Companies Are Undersized

### Market Value $ in billions

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<thead>
<tr>
<th>U.S. Power</th>
<th>BRK</th>
<th>EXC</th>
<th>SO</th>
<th>FPL</th>
<th>D</th>
<th>DUK</th>
<th>PCG</th>
<th>PEG</th>
<th>ETR</th>
<th>FE</th>
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<td>$24</td>
<td>$24</td>
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<td>$18</td>
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<th>Oil Majors</th>
<th>XOM</th>
<th>RDS</th>
<th>CVX</th>
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<th>COP</th>
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<td>Value</td>
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<td>$139</td>
<td>$130</td>
<td>$59</td>
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<td>Market Value</td>
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<th>Europe Power</th>
<th>EDF</th>
<th>EON</th>
<th>IBE</th>
<th>RWE</th>
<th>ENEL</th>
<th>END</th>
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<tr>
<td>Value</td>
<td>$76</td>
<td>$56</td>
<td>$38</td>
<td>$40</td>
<td>$32</td>
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Source: NEI
## The Structural Challenge

*(Market values as of 3.26.09)*

<table>
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<tr>
<th>Company</th>
<th>Value (billion)</th>
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<tr>
<td>Exelon</td>
<td>$30.2 billion</td>
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<td>Southern</td>
<td>$23.9 billion</td>
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<td>Dominion</td>
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<td>FPL</td>
<td>$21.2 billion</td>
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<td>Duke</td>
<td>$18.6 billion</td>
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<td>Entergy</td>
<td>$13 billion</td>
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<tr>
<td><strong>Two-unit nuclear power station</strong></td>
<td><strong>$12-16 billion</strong></td>
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<td>PPL Corp.</td>
<td>$11.3 billion</td>
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<td>Progress</td>
<td>$10.04 billion</td>
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<td>AmerenUE</td>
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<td>DTE Energy</td>
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<td>NRG</td>
<td>$4.16 billion</td>
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<td>SCANA</td>
<td>$3.75 billion</td>
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Status of Loan Guarantee Program

- $18.5 billion in loan guarantee volume for nuclear power projects authorized
- Applications from 14 projects (28,800 megawatts) for $122 billion in loan volume
- Co-financing from export credit agencies in France, Japan will stretch existing U.S. loan guarantee authority
- Need more loan volume, permanent financing platform for clean energy technology deployment
State Policies Favoring Nuclear

- Legislation in place that helps secure financing
- Regulation in place that helps secure financing
- Legislation that includes nuclear in clean portfolio standard
- Legislation and regulation in place that help secure financing

Potential location for new nuclear plant
Politics and Policy: The Year Ahead
A New Political Environment

- Increased Democratic majority in both House and Senate
- Despite changes, still solid base of support for nuclear power
- House Energy & Commerce Committee: significantly more liberal
The New Secretary of Energy on Nuclear Power

“The first [priority] is to accelerate this loan guarantee program for several [new] nuclear reactors.”

“[N]uclear power ... is going to be an important part of our energy mix. It is 20 percent of our electricity generation today, but it is 70 percent of the carbon-free portion of electricity today. And it is baseload. So I think it is very important that we push ahead.”

—Dr. Steven Chu during his Senate confirmation hearing
Jan. 13, 2009
Key Energy Priorities for the New Administration and Congress

- Green jobs
  - Nuclear sector expanding, not contracting
  - 15,000 new jobs created

- More energy efficiency and renewables
  - Significant new baseload capacity still required

- Climate change
  - Analysis of all major climate change legislation requires nuclear expansion
Key Nuclear Energy Priorities

- Sustained, safe, reliable operation of current fleet
- New plants
  - Predictable licensing
  - Financing
- Used fuel management
A Reasoned Approach to Used Fuel Management

- Three-part strategy
  - Long-term technology development to recycle nuclear fuel
  - Eventually ... permanent disposal facility
  - Interim storage
- Create “blue ribbon” commission to conduct reasoned reassessment of the government’s program
Strong Public Support Continues

72% Safe and Secure
85% Renew Licenses
89% Important for Future
69% Definitely Build New Reactors
75% Acceptable at Nearest Site

Source: Bisconti Research Inc.
September 2008 poll of 1,000 U.S. adults; margin of error is +/- 3%
The New Politics of Nuclear Energy

- State and local government officials, business leaders
- Organized labor
- Organized grassroots organizations (CASEnergy Coalition)
- State coalitions
- Nuclear industry employees
- New alliances
The Value Proposition

- Operating plants are safe, reliable and profitable
- New plants are financeable and profitable, particularly in a carbon-constrained world
- New nuclear plant construction will contribute significantly to President Obama’s top priorities:
  - Jobs
  - Climate change
  - Energy security