

New Nuclear Power Plants: Economic and Regulatory Concerns

RICHARD J. MYERS

Executive Director, Policy Development

NUCLEAR ENERGY INSTITUTE

at the

AMERICAN ENTERPRISE INSTITUTE

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Energy Policy: The Bottom Line

- The lesson of the last 15 years in U.S. electricity policy:
 - ❖ Diversified fuel and technology portfolio is essential
 - ❖ All fuels and technologies (nuclear, coal, natural gas, renewables, efficiency) have a legitimate role

- The challenge for the future:
 - ❖ Preserving/restoring diversified portfolio
 - ❖ Defining appropriate roles for the various fuels and technologies
 - ❖ Ensuring resource adequacy, particularly in competitive markets

Nuclear Plant Construction: “Then and Now”

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Technology still evolving	Technology mature, stable designs

**Major
investment
challenges facing
the electric
sector**

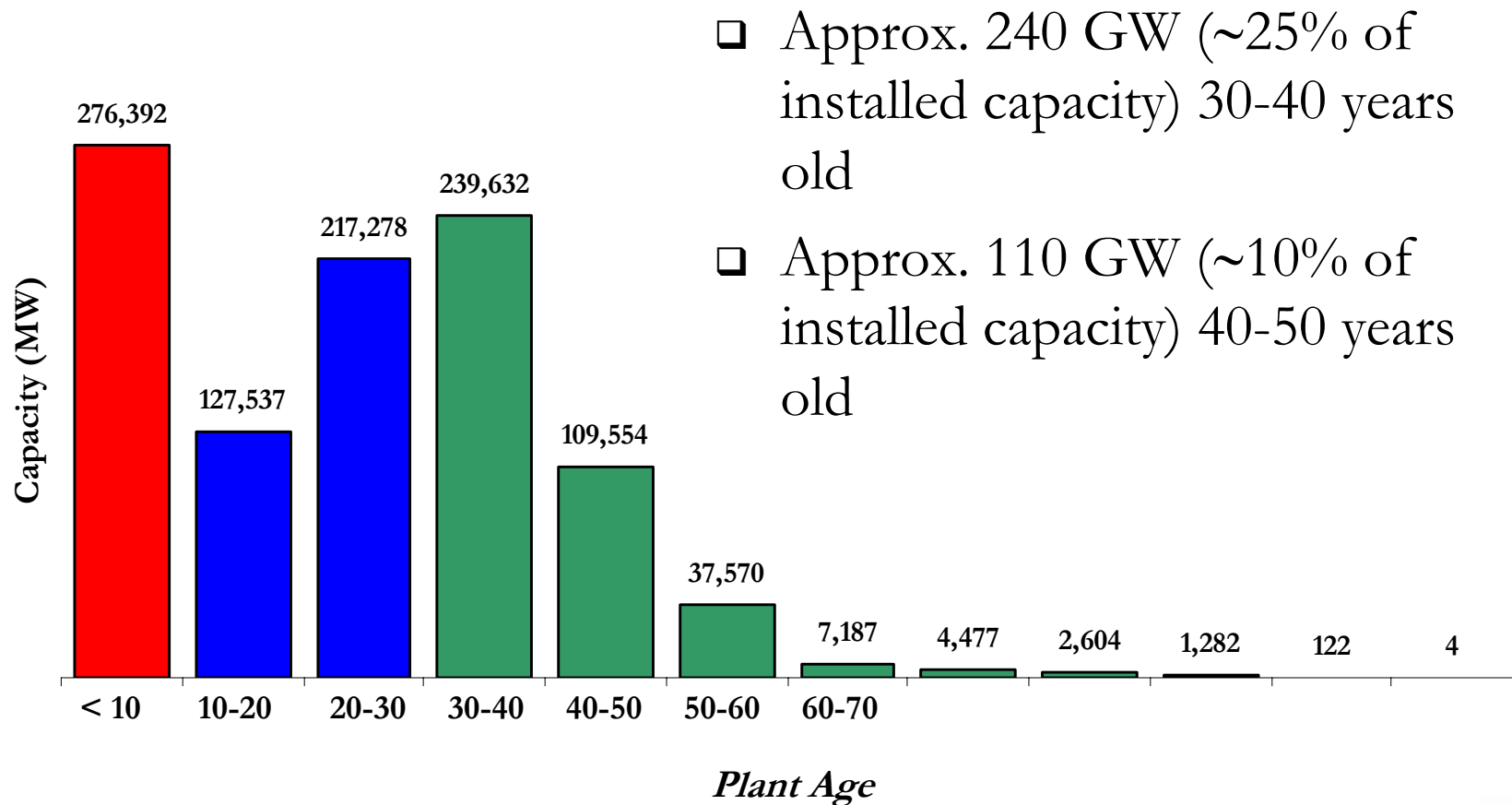
The Last 15 Years: Investment in Electric Infrastructure Collapsed

- ❑ Massive build of gas-fired capacity: Lowest investment risk
- ❑ Investment in new coal and nuclear generating capacity all but disappeared, even though they represent ...
 - ❖ 70 percent of U.S. electricity supply
 - ❖ Greatest forward price stability

New Generating Capacity: 1992-2005	
Coal	8,044 MW
Gas	288,576 MW
Nuclear	2,485 MW
Oil	4,933 MW
Renewables	9,983 MW
Hydro	2,629 MW
Other	223 MW

Data source: Energy Information Administration

The “Graying” of the Infrastructure: Age of Generating Capacity



Source: Energy Information Administration data



Today's Challenge: Addressing the Energy Investment Crisis

- ❑ Near-term need for new baseload capacity (e.g., Northeast, mid-Atlantic, Southeast, South, Texas)
- ❑ Resurrecting coal and nuclear investment
 - ❖ *Coal*: 9 GW under construction, 33 GW in development
 - ❖ *Nuclear*: ~40 GW under consideration
- ❑ Resurrecting investment in electric transmission:
 - ❖ Steady decline since late-1970s (\$4.0-4.5 billion/year)
 - ❖ Bottomed out through 1990s (~\$2.5 billion/year), now turning around
- ❑ \$400-500 billion in investment in new generating capacity, transmission required over next 20 years¹
- ❑ \$45-50 billion in environmental controls² (CAIR, CAMR only)

Major Investment Challenges In an Industry Under Financial Stress

- In 2005, industry operating cash flow insufficient to cover capital expenditures and operating costs²
- Significant deterioration² in credit quality:
 - ❖ End of 1999, 75% of regulated utilities rated BBB+ or higher; end of 2005, 45% rated BBB+
 - ❖ Also marked increase in number of companies rated below investment grade (BBB-)
 - ❖ Unregulated companies: in 2000, 15% below investment grade; in 2005, 40% below investment grade

**New Baseload Plant
Construction:
Economic/Financing
Issues**

Baseload (Nuclear, IGCC, Advanced Coal) Financing Challenges

- Developing workable approaches to finance high-capital-cost plants in competitive, restructured markets

- Developing workable approaches to investment recovery of high-capital-cost assets in regulated markets, without
 - ❖ rate shock
 - ❖ significant earnings-per-share dilution
 - ❖ Substantial pressure on credit quality, ratings from additional debt on balance sheet

Market Values¹ of Companies Planning Nuclear Projects

<i>Exelon</i>	<i>\$40.7 billion</i>
<i>Duke Energy</i>	<i>\$37.6 billion</i>
<i>Dominion</i>	<i>\$28.2 billion</i>
<i>TXU</i>	<i>\$27.8 billion</i>
<i>Southern</i>	<i>\$25.1 billion</i>
<i>FPL</i>	<i>\$17.8 billion</i>
<i>Entergy</i>	<i>\$16.3 billion</i>
<i>Progress Energy</i>	<i>\$11.2 billion</i>
<i>Constellation</i>	<i>\$10.5 billion</i>
<i>NRG</i>	<i>\$6.8 billion</i>
<i>SCANA</i>	<i>\$4.7 billion</i>

Electric power companies are small relative to the size of \$3-4 billion nuclear power projects.

Some energy companies (e.g., ExxonMobil with market cap of \$397 billion) routinely build \$3-4 billion projects. All the companies planning new nuclear plants in the United States have a combined market cap of \$226.7 billion, a little more than one-half the market cap of ExxonMobil.

1. Market value or market capitalization = number of shares outstanding times share price on 8.20.2006



Energy Policy Act of 2005: Investment Stimulus for New Nuclear Plants

- **Production tax credits**
 - ❖ \$18/MWh for up to 6,000 MW
 - ❖ Worth up to \$125 million in tax credits per year for 8 years per 1,000 MW of capacity
- **Standby support**
 - ❖ \$2 billion of delay insurance coverage for first six plants
 - ❖ Covers delays resulting from licensing or litigation
- **Federal loan guarantees**
 - ❖ Covers up to 80% of project cost
 - ❖ Allows project financing, more highly leveraged capital structure, reduces project cost

Production Tax Credit

- ❑ Production tax credit enhances financial attractiveness of project *after* it is built and in commercial operation
- ❑ Does not address financing challenges before and during construction:
 - access to capital on acceptable terms
 - ability to use most efficient capital structure
 - earnings-per-share dilution during construction

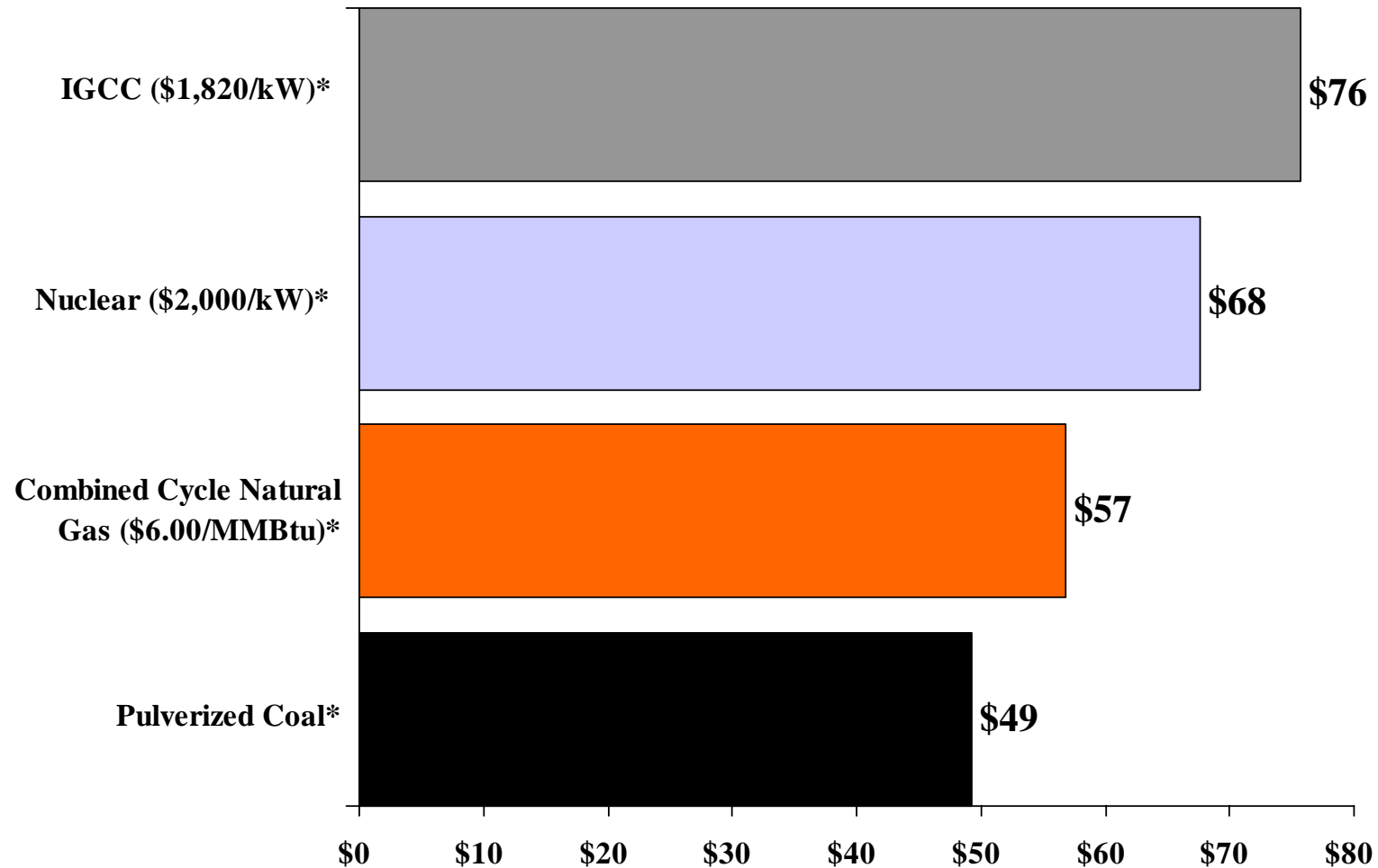
Standby Support (Delay Insurance)

- “Safety net” for investors: Psychological value
- First two \$500-million insurance policies have substantial value; value of four \$250-million policies diluted
 - ❖ \$500-million policies: 100% of delay costs, no waiting period for claims
 - ❖ \$250-million policies: 50% of delays cost after 6-month delay

Energy Loan Guarantee Program: Allows Access to Capital, Financeability

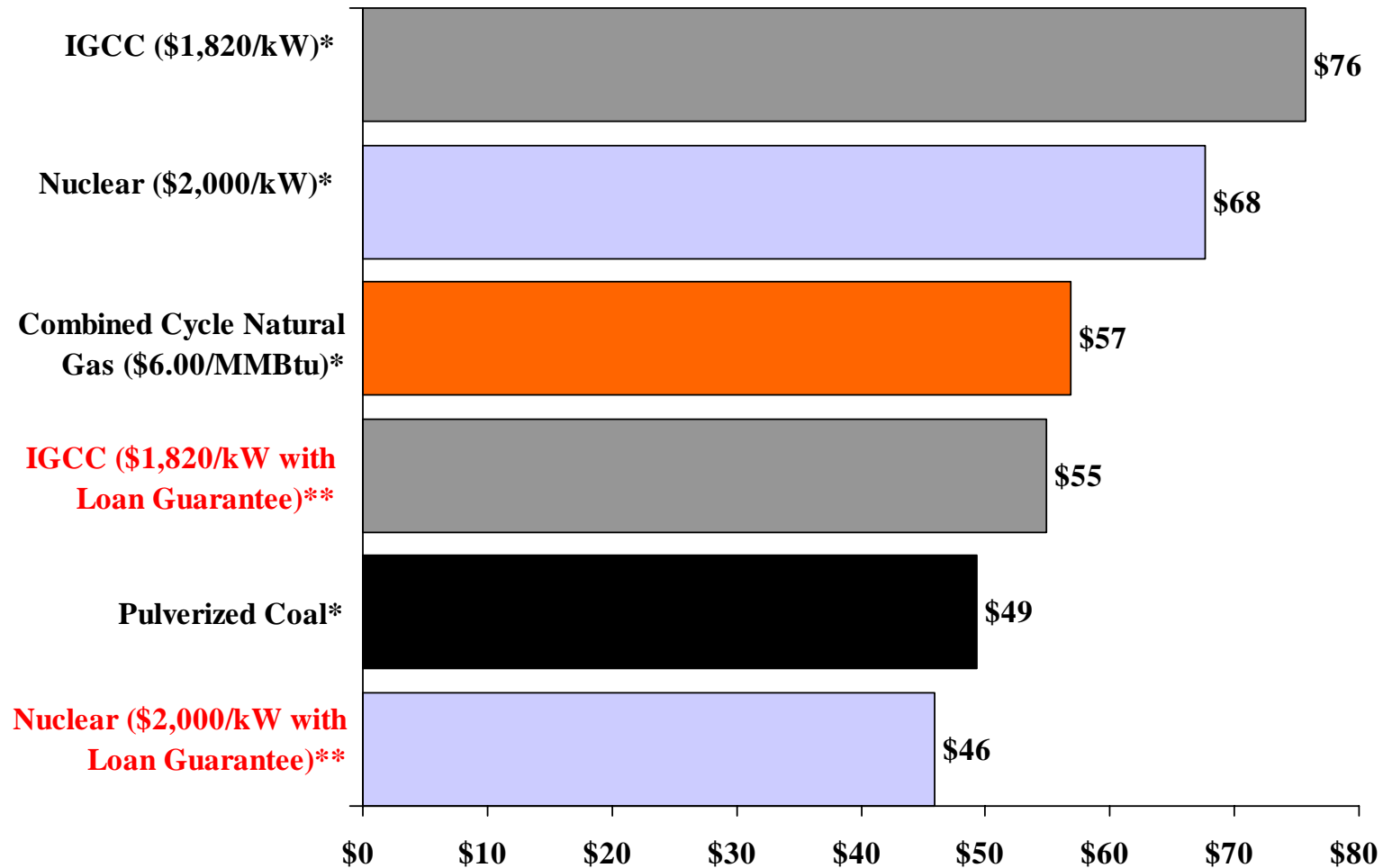
- ❑ Ability to use “project finance” (non-recourse, higher leverage) offsets significant financing challenge: Cost of nuclear projects relative to size, market value and financing capability of companies that will build them
- ❑ Unregulated companies cannot build nuclear projects except on project finance basis with debt financing secured by federal government
- ❑ Regulated companies severely limited in ability to build multiple nuclear projects without project finance capability:
 - ❖ Earnings-per-share (EPS) dilution from new equity issuance
 - ❖ Stress on credit quality from additional debt

New Generating Capacity: Estimated Power Costs (\$/MWh)



*Assumes 15% cost of equity, 8% cost of debt, and a 50/50 debt/equity structure; Source: NEI Analysis

New Generating Capacity: Estimated Power Costs (\$/MWh)



*Assumes 15% cost of equity, 8% cost of debt, and a 50/50 debt/equity structure; **Assumes 15% cost of equity, 6% cost of debt and an 80/20 debt/equity structure..

Source: NEI Analysis

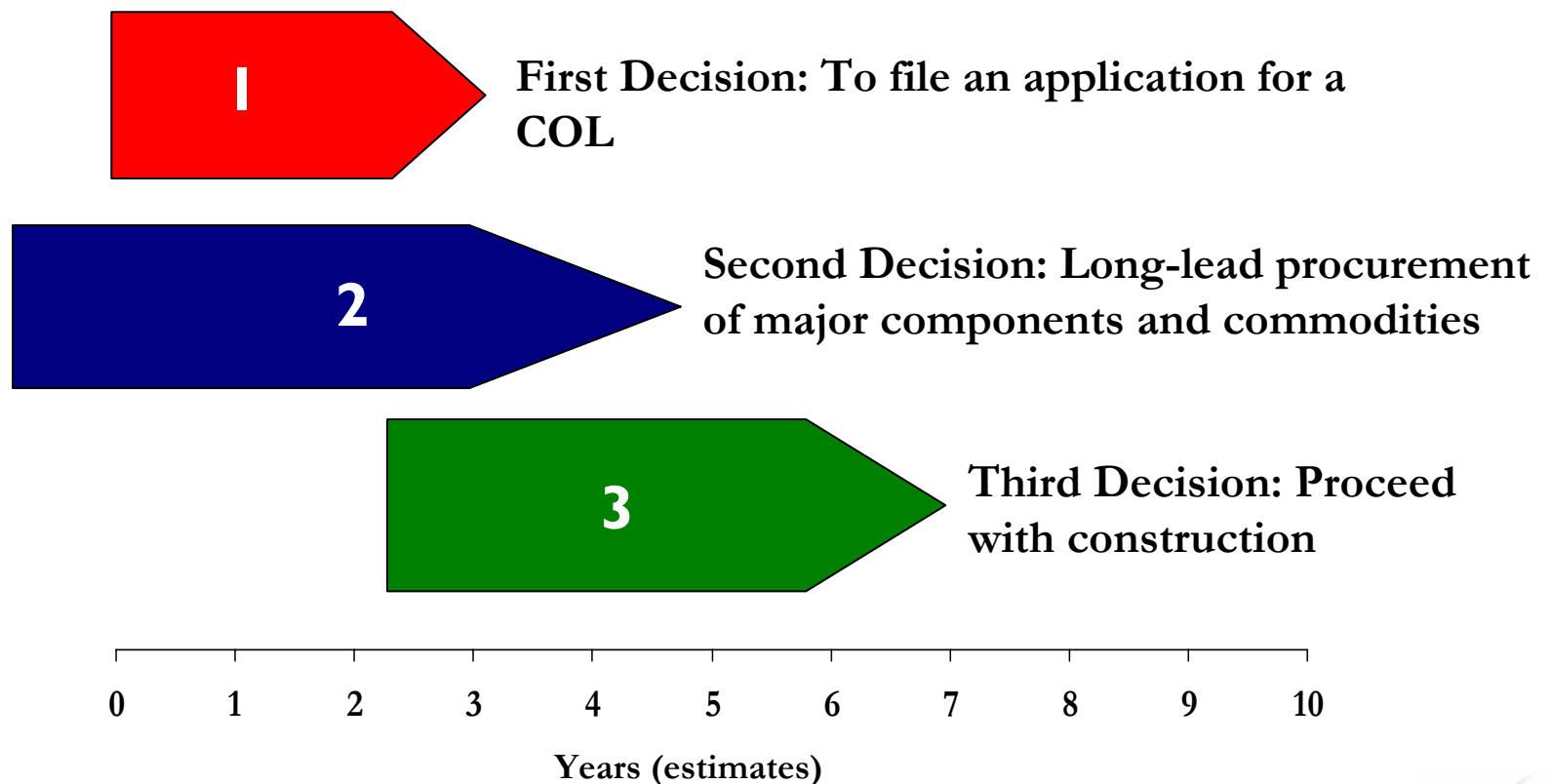
New Nuclear Plants Under Consideration

Company	Design	Units	Date for Filing COL Application
Dominion	ESBWR	1	2007
NuStart Energy (TVA)	AP1000	2	2007
NuStart Energy (Entergy)	ESBWR	1	2007/2008
Entergy	ESBWR	1	2008
Southern Co.	AP1000	1-2	2008
Progress Energy	AP1000	2-4	2007
South Carolina Electric & Gas	AP1000	1-2	2007
Duke Energy	AP1000	2	2008
UniStar Nuclear	U.S. EPR	1-4	2008
Florida Power and Light	TBD	TBD	2009
NRG (at South Texas Project)	ABWR	2	2007
Amarillo Power	ABWR	2	~2007
TXU	TBD	2-5	~2008
Exelon	TBD	2	2008



Roadmap to Commercial Operation

Building a new nuclear plant is not a one-step process or decision: It is a sequence of 3 successive decisions



Significant Industry Investment Underway

- ❑ Design and engineering:
 - ❖ 2 designs certified: AP1000, ABWR
 - ❖ ESBWR under review, U.S. EPR being prepared for certification
- ❑ Supply chain: Major investments underway in long-lead procurement, expansion of U.S. manufacturing capability
 - ❖ BWXT renewed “N-Stamp” accreditation from ASME
 - ❖ BWXT-AREVA joint venture to manufacture heavy components
 - ❖ LES enrichment facility licensed
- ❑ Licensing
 - ❖ 3 ESPs (Exelon, Dominion, Entergy) under NRC review: approval 2007
 - ❖ Southern Nuclear preparing 1 ESP (Vogtle), Duke considering 2
 - ❖ 13 companies, consortia preparing license applications for as many as 31 units: submittal 2007-2009 (public announcements only)



Growing Need for Additional Baseload Capacity

- ❑ Electricity demand in 2030 will be 45% greater than today
- ❑ To maintain current electric fuel supply mix would mean building:

50	Nuclear reactors (1,000 MW)
261	Coal-fired plants (600 MW)
279	Natural gas plants (400 MW)
93	Renewables (100 MW)

Source: 2006 Annual Energy Outlook, Energy Information Administration

