The Nuclear Energy Renaissance: Realistic Expectations

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Today's Briefing

- Electric sector investment and financing challenges
- What's driving the interest in new nuclear plants?
- Industry plans for new nuclear plant construction
- Identifying and addressing the challenges

Electric sector investment and financing challenges

The Last 15 Years: Investment in Electric Infrastructure Collapsed

- Living off of investments made during 1960s, 1970s, 1980s, deferring investment in new generation
- 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

Source: Energy Information Administration

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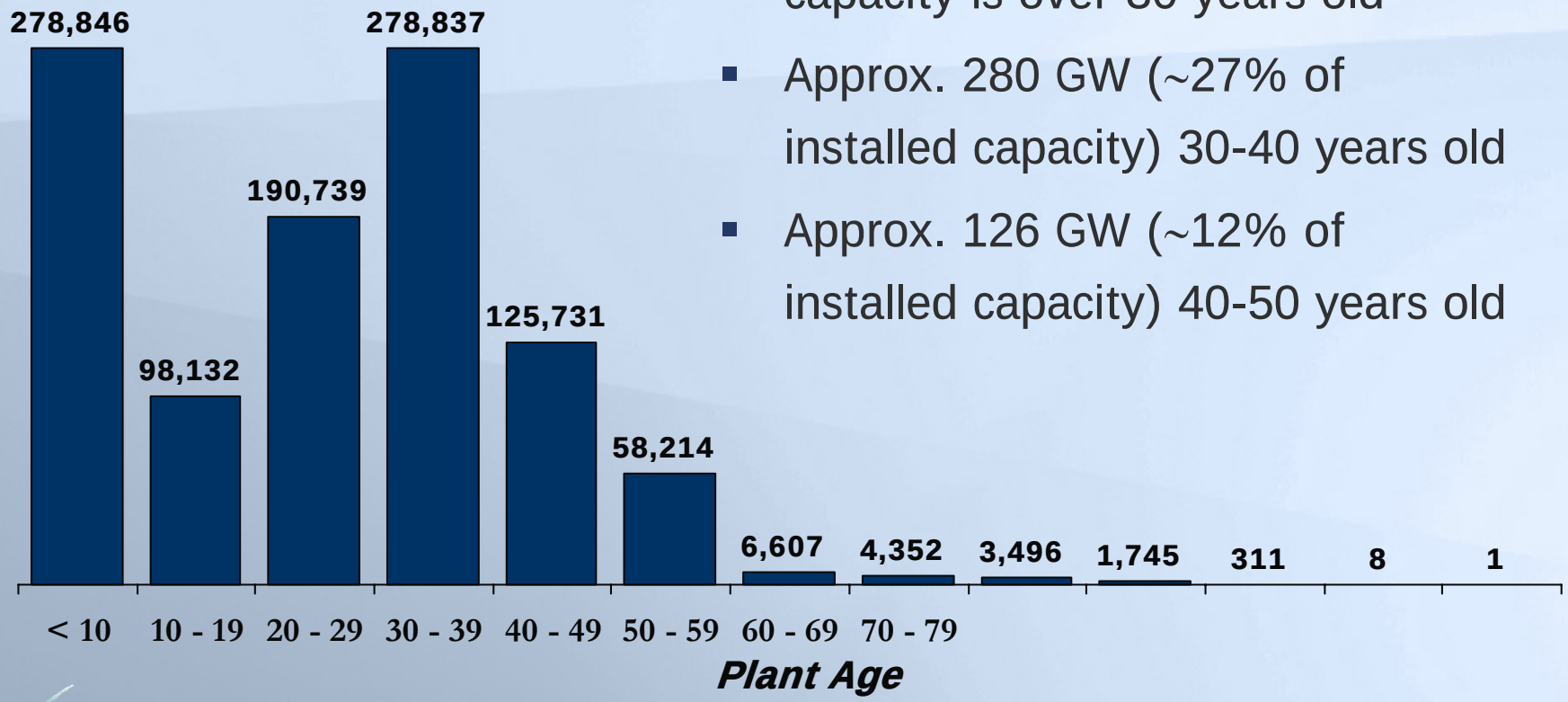
The "Graying" of the Grid: Age of U.S. Generating Capacity

(Nameplate MW)



- Approx. 45% of U.S. generating capacity is over 30 years old
- Approx. 280 GW (~27% of installed capacity) 30-40 years old
- Approx. 126 GW (~12% of installed capacity) 40-50 years old

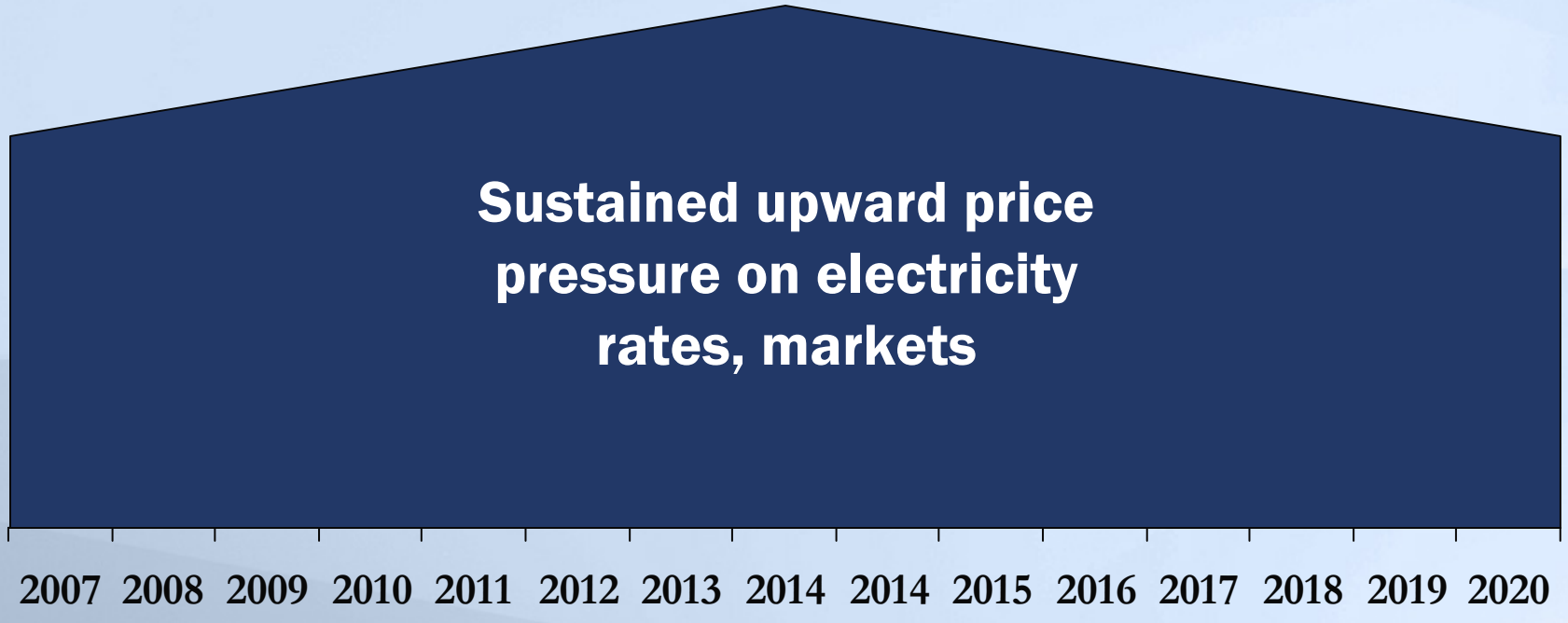
Source: Global Energy Decisions, Updated: 8/07

Electric Infrastructure Investment to 2020

Generating capacity	$250-300+ billion
Environmental controls	$45-50 billion
Transmission	$150+ billion
Distribution	$300+ billion
Total = At least $750 billion	

Source: Cambridge Energy Research Associates, Edison Electric Institute

A Challenging Environment for Capital Investment



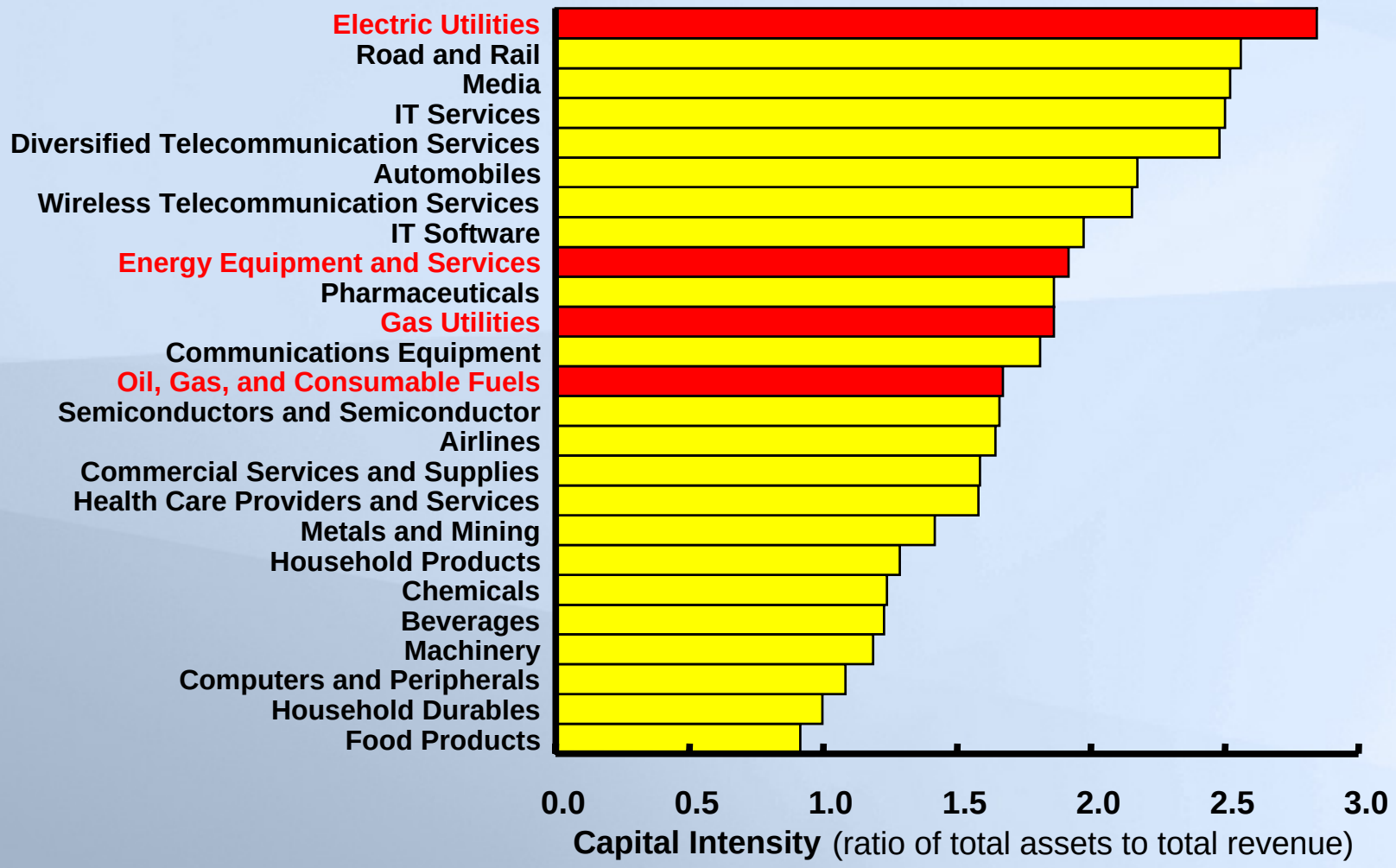
$750 billion to $1 trillion in capital investment through 2020 in generation, transmission, distribution

NEAR-TERM: Rate caps expiring, recovery of higher fuel costs, capex for environmental controls

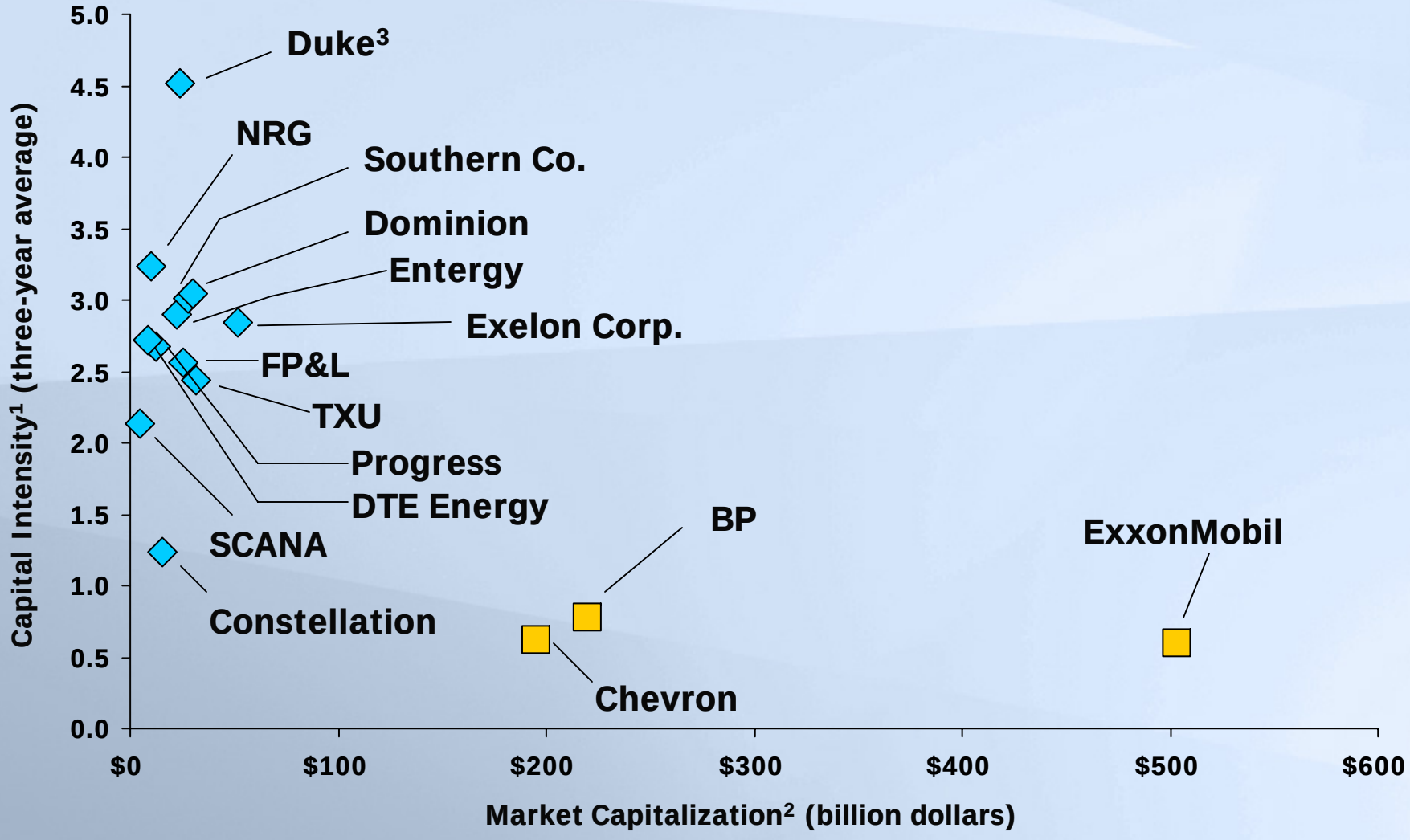
MEDIUM-TERM: Capex for new coal plants

LONGER-TERM: Capex for new nuclear plants

Capital Intensity by Industry

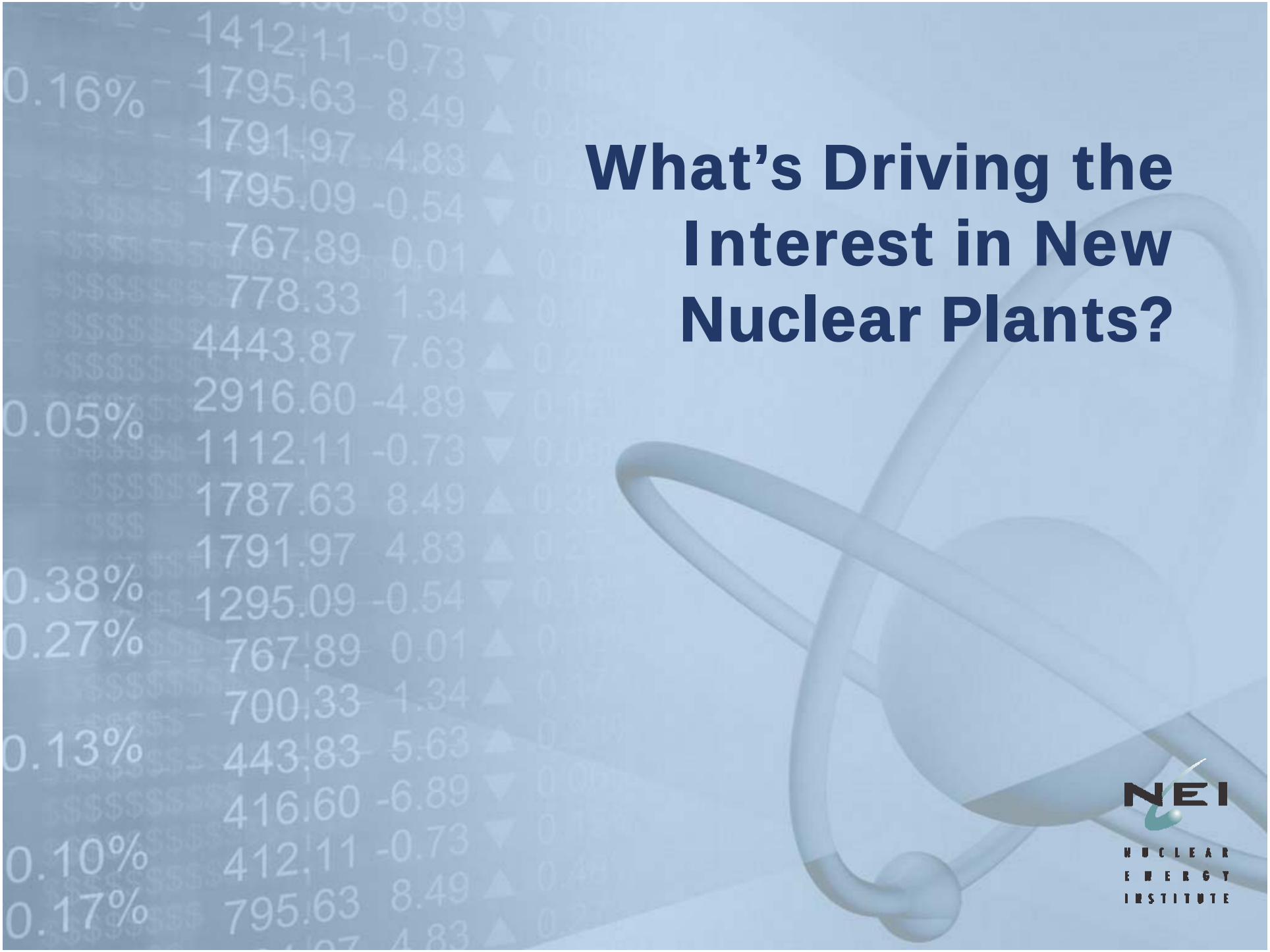


The Challenge of Scale



1. *Capital Intensity = total assets divided by total revenues, 2004 – 2006..*
2. *Market capitalization = number of shares outstanding times share price on 10.4.07.*
3. *Capital Intensity for Duke is for 2006 only.*

What's Driving the Interest in New Nuclear Plants?



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Why Nuclear?
Electricity Market Fundamentals

- Growing need for baseload generation
  - Near-term need for new baseload capacity (e.g., Northeast, mid-Atlantic, Southeast, South, Texas)
- Chronic volatility in natural gas prices due to unsustainable pressure on natural gas supply
- Increasing environmental constraints and compliance costs, potential controls on carbon emissions
- Performance of operating nuclear plants
- Political and public support

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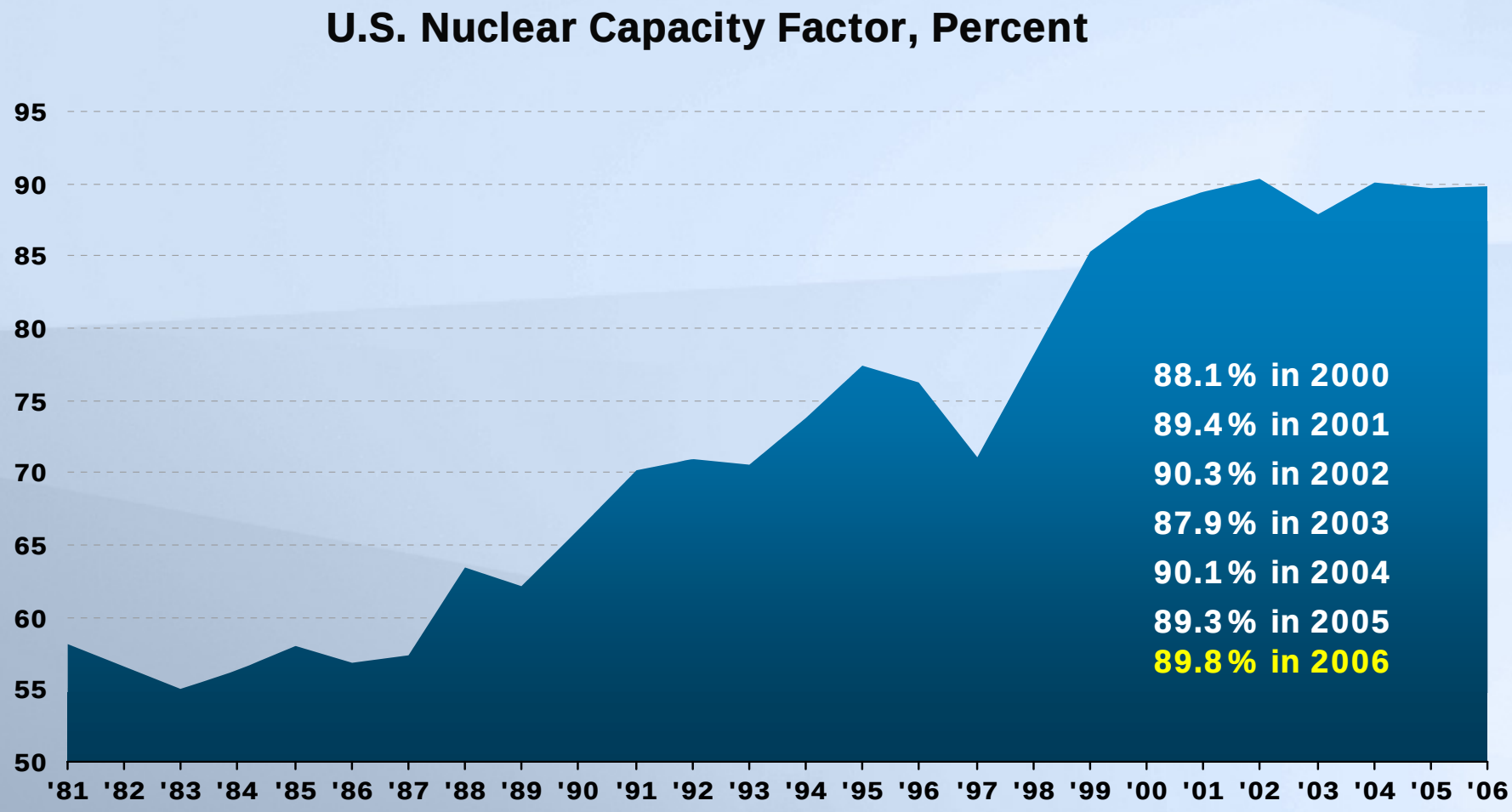
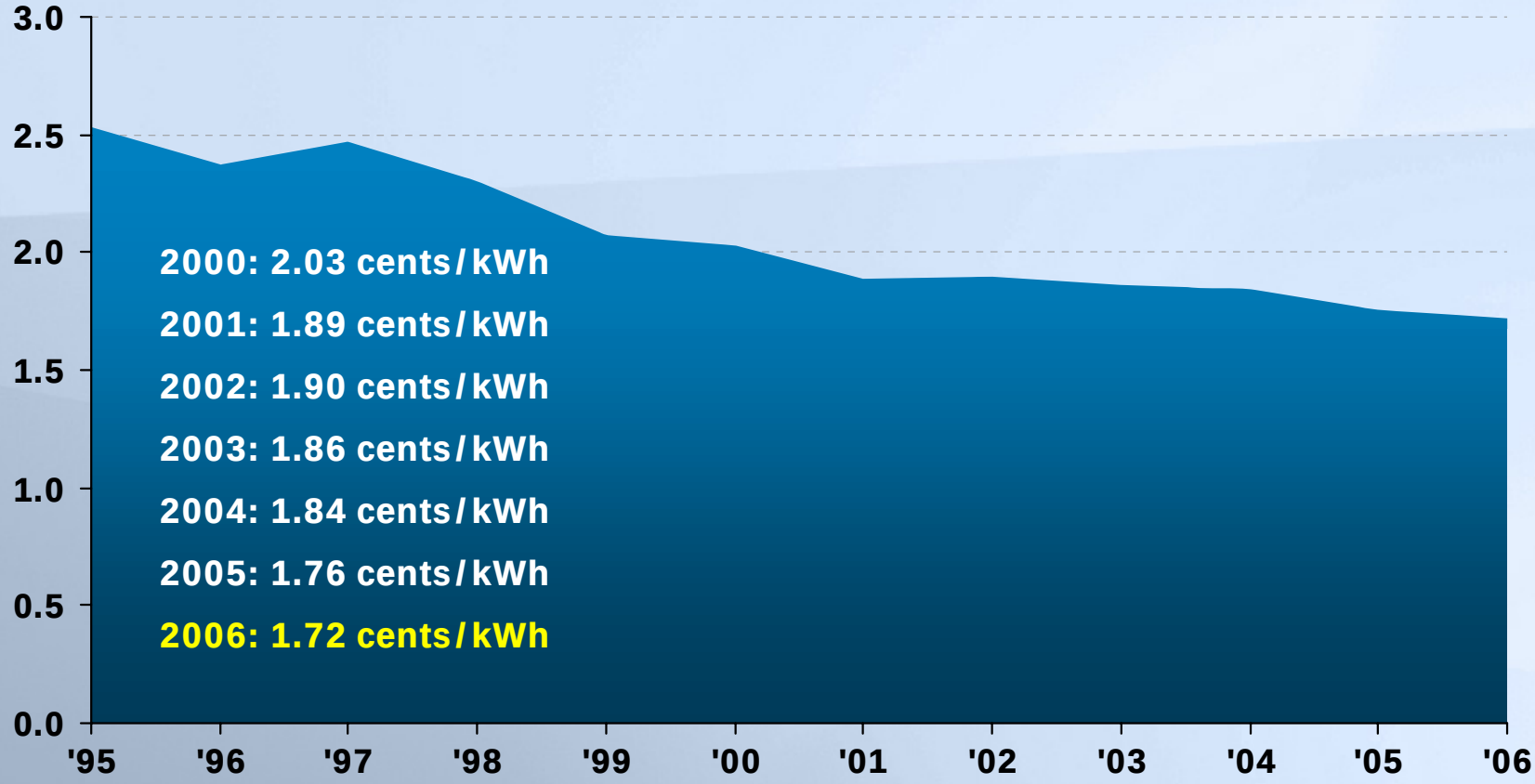
Sustained Reliability and Productivity



Source: Global Energy Decisions / Energy Information Administration

Solid Economic Performance Continues

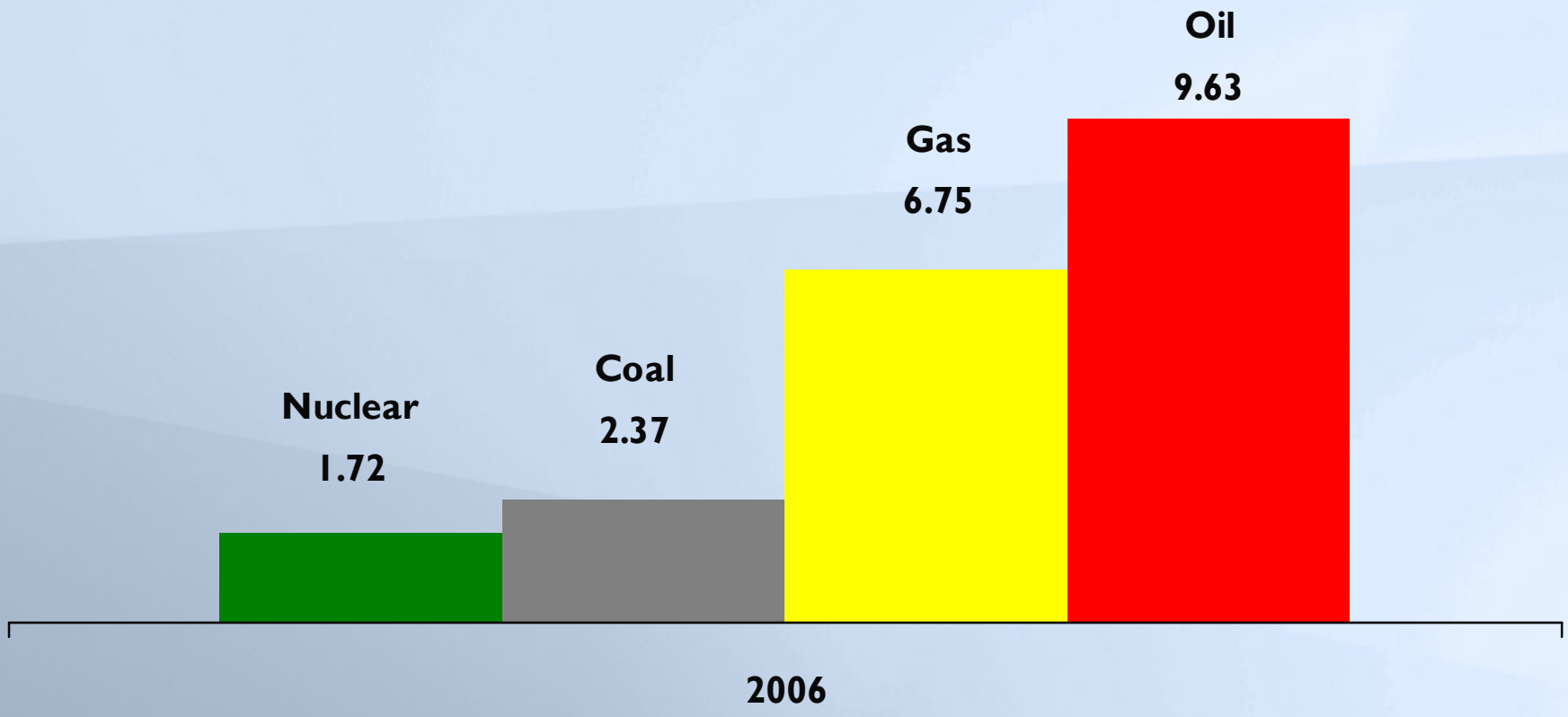
U.S. Nuclear Production Cost, in 2006 cents/kWh



Source: Global Energy Decisions

Nuclear Energy Is Low Cost Producer

U.S. Electricity Production Costs 2006



Production Costs = Operations and Maintenance Costs + Fuel Costs

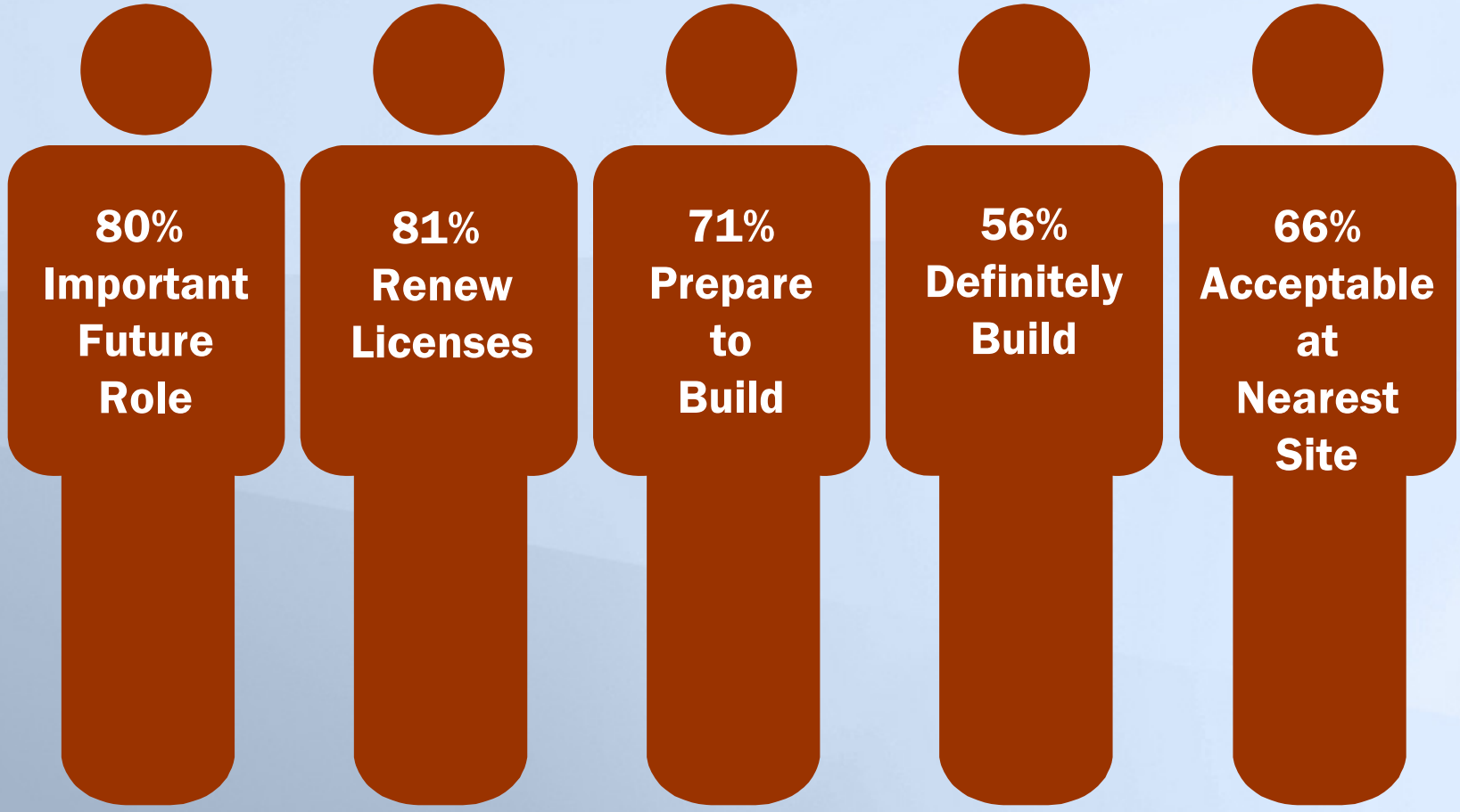
Source: Global Energy Decisions
Updated: 6/07

Strong National Political Support

- Bipartisan support in Congress
- Increasingly strong relationships with organized labor and moderate environmentalists (important parts of the Democratic base)
- Climate change has become a defining Democratic issue and nuclear energy is essential to reduce carbon emissions

Strong Public Support Continues

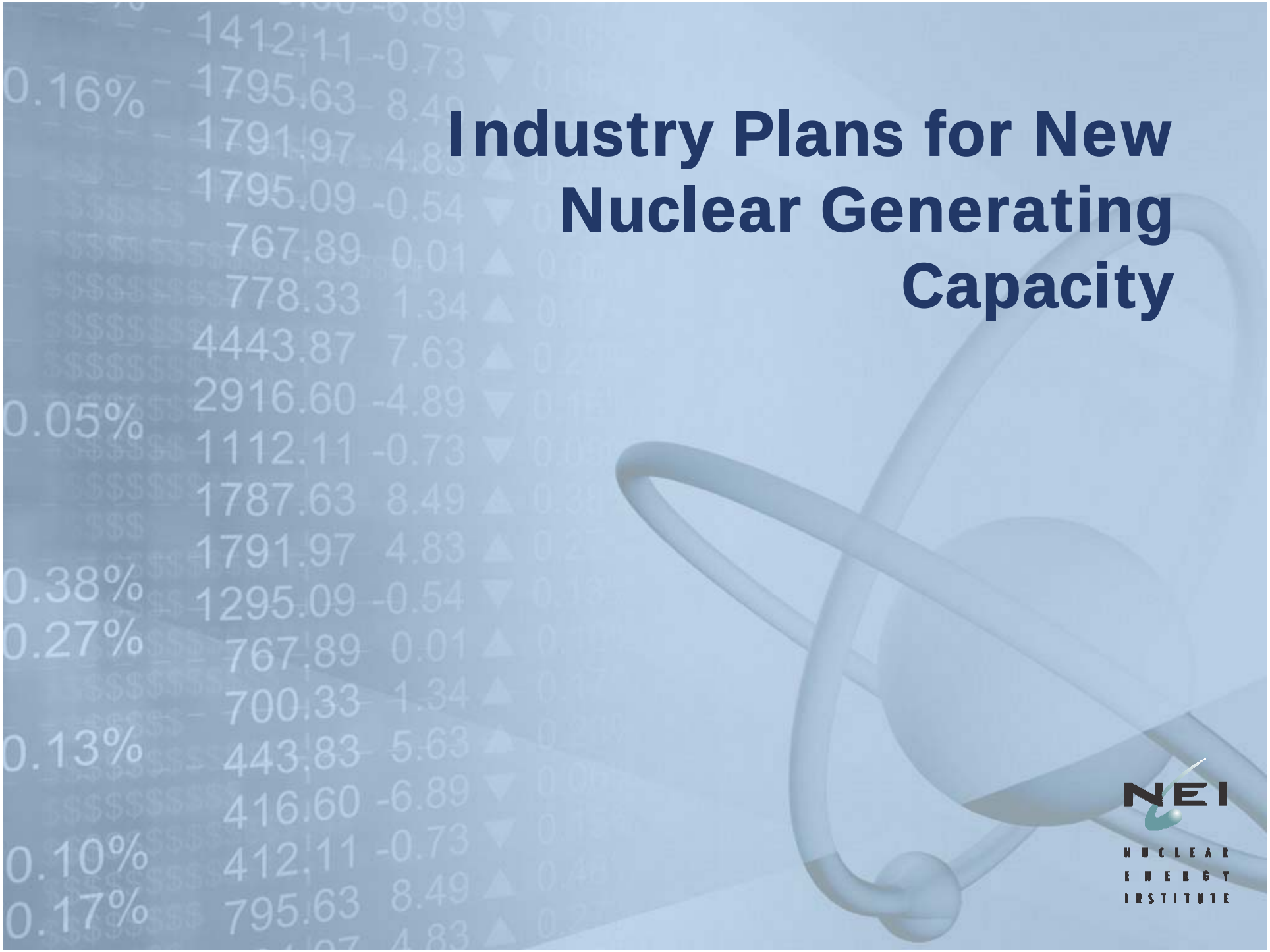
April 2007 Survey



Source: Bisconti Research Inc.

April 2007 poll of 1,000 U.S. adults; margin of error is +/- 3%

Industry Plans for New Nuclear Generating Capacity



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Preparing for New Nuclear Plant Construction

- Major investments in:
  - Design and engineering
  - Long-lead procurement
  - Expansion of U.S. manufacturing capability
- Licensing
  - 3 early site permits in 2007 (Exelon, Dominion, Entergy)
  - 2 designs certified (ABWR, AP1000) , 3 more expected (ESBWR, EPR, US-APWR)
  - 17 companies, consortia preparing license applications for as many as 31 reactors

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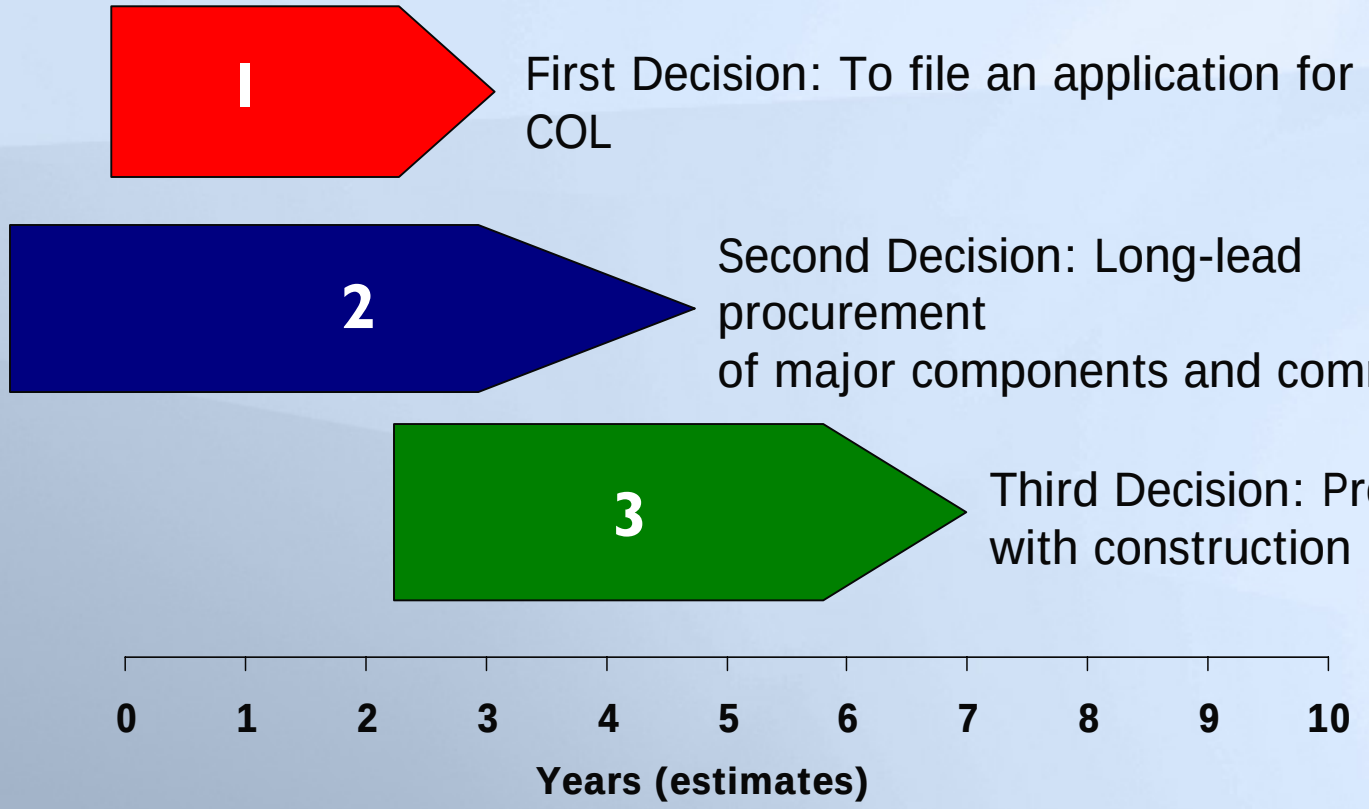
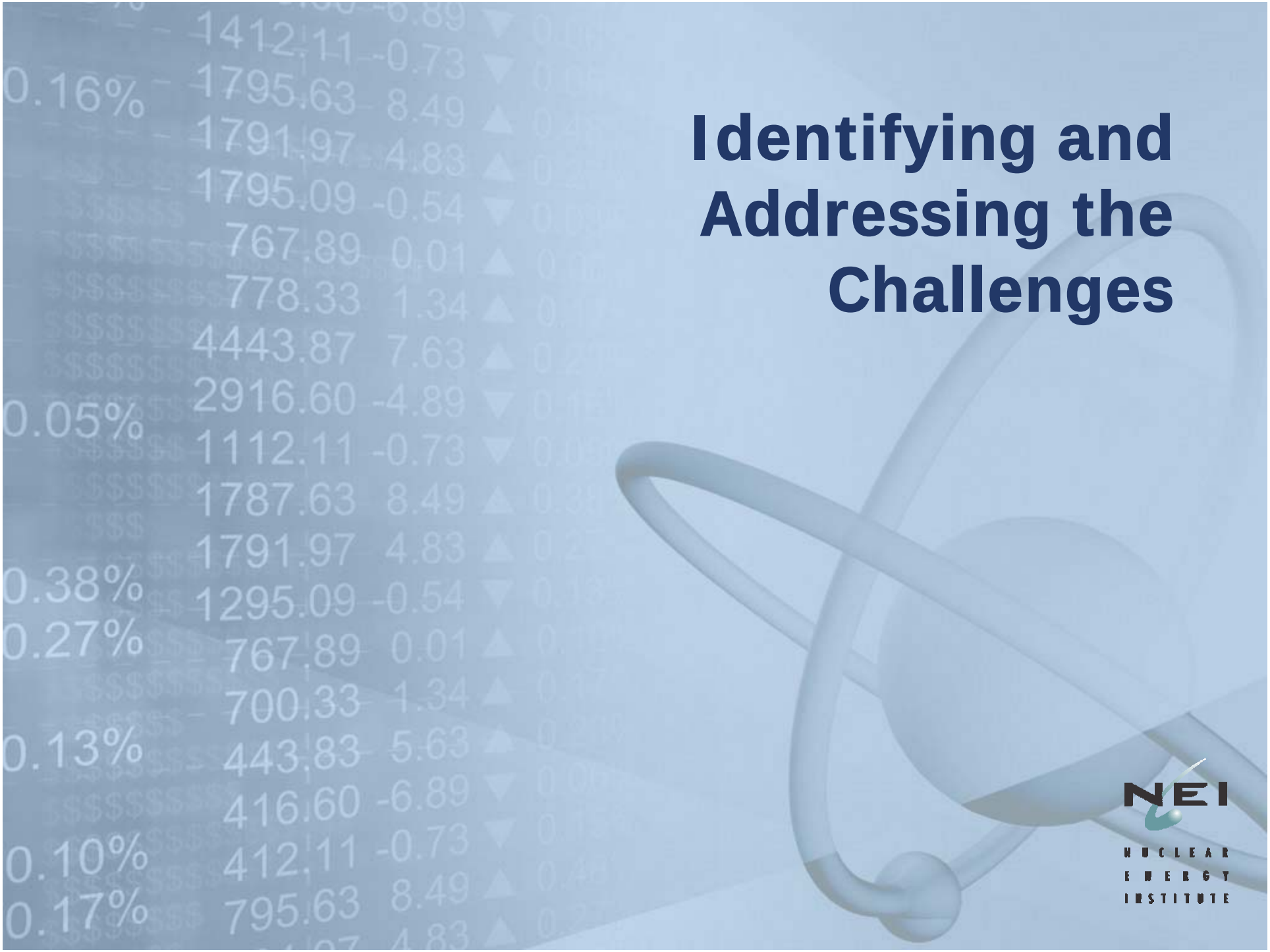
Roadmap to Commercial Operation

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



Identifying and Addressing the Challenges



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Major Challenges

- Financing
- Licensing
- Supply chain
- Construction management
- Work force

The Challenge of Scale

(Market values 10.4.2007)

Exelon	**$51.43 billion**
TXU	**$31.70 billion**
Dominion	**$30.05 billion**
Southern	**$28.02 billion**
FPL	**$25.37 billion**
Duke	**$24.28 billion**
Entergy	**$22.02 billion**
Constellation	**$15.65 billion**
Progress	**$12.31 billion**
Two-unit nuclear power station	**$10-12 billion**
NRG	**$10.35 billion**
DTE Energy	**$8.34 billion**
SCANA	**$4.54 billion**

Energy Policy Act of 2005: Investment Stimulus for New Plants

- **Federal loan guarantees**
  - Covers up to 80% of project cost
  - Allows project financing, more highly leveraged capital structure, reduces cost of electricity
- **Production tax credits**
  - $18/MWh for up to 6,000 MW
  - Worth up to $125 million in tax credits per year for 8 years for 1,000 MW of capacity
- **Federal standby support**
  - $2 billion of risk coverage for first six plants
  - Covers delays resulting from licensing or litigation
- **Price-Anderson Act Renewal**
  - Over $10 billion total industry-funded accident insurance covering the public
  - Renewed for 20 years, the longest extension Congress has granted

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Financing New Nuclear Plants

- Competitive, restructured markets:
  - Non-recourse project finance off-balance sheet
  - Debt financing secured by the federal government (loan guarantees)

- Regulated markets (without rate shock, EPS dilution, pressure on credit quality and ratings from additional debt on balance sheet):
  - Rate base financing
  - Supported by PSC regulations or legislation supporting cost recovery
  - CWIP (recovery of financing charges, return on equity)
  - Possibly federal loan guarantees

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State Policies Supporting New Nuclear Construction

- Utilities and policymakers in regulated states realize need for fuel and technology diversity
- Policies being implemented that:
  - Value diverse generation portfolio
  - Limit retroactive reviews of prudence
  - Allow investment recovery during construction

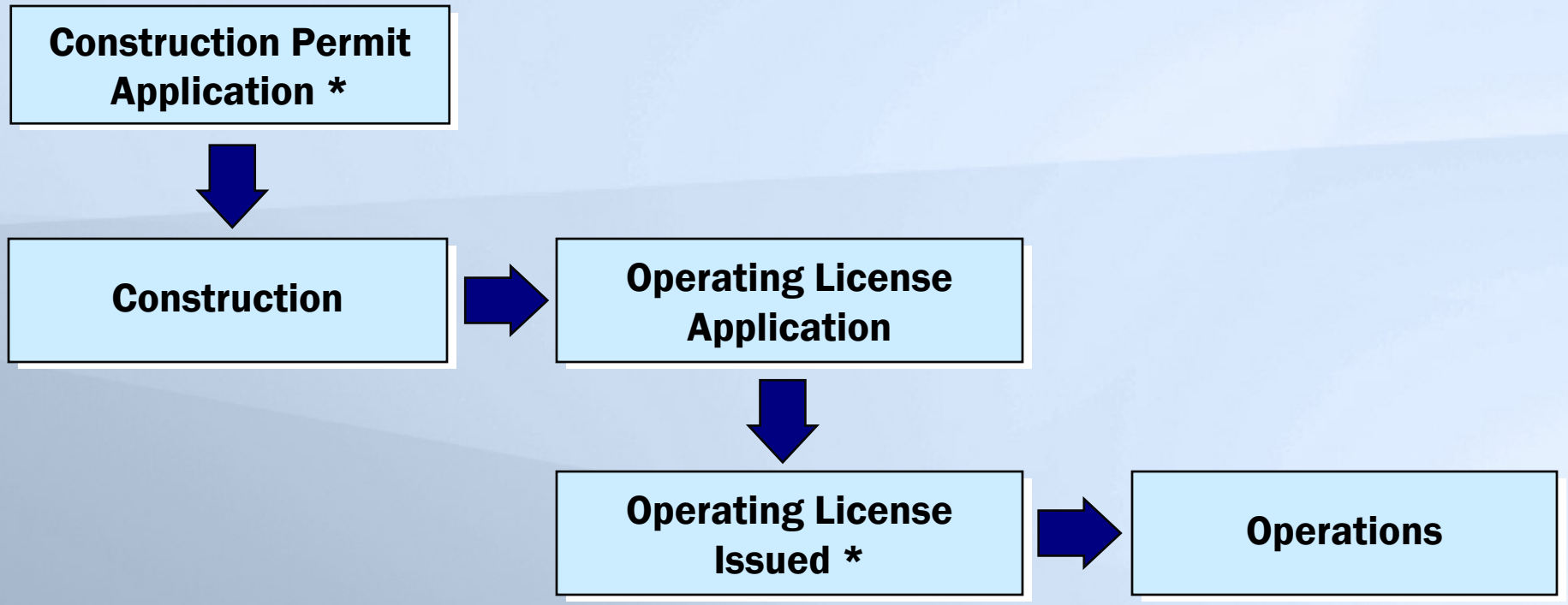
Nuclear Plant Construction: "Then and Now"

Then
Changing regulatory standards and requirements
Design as you build
No design standardization
Inefficient construction practices
Multiple opportunities to intervene, cause delay

Nuclear Plant Construction: "Then and Now"

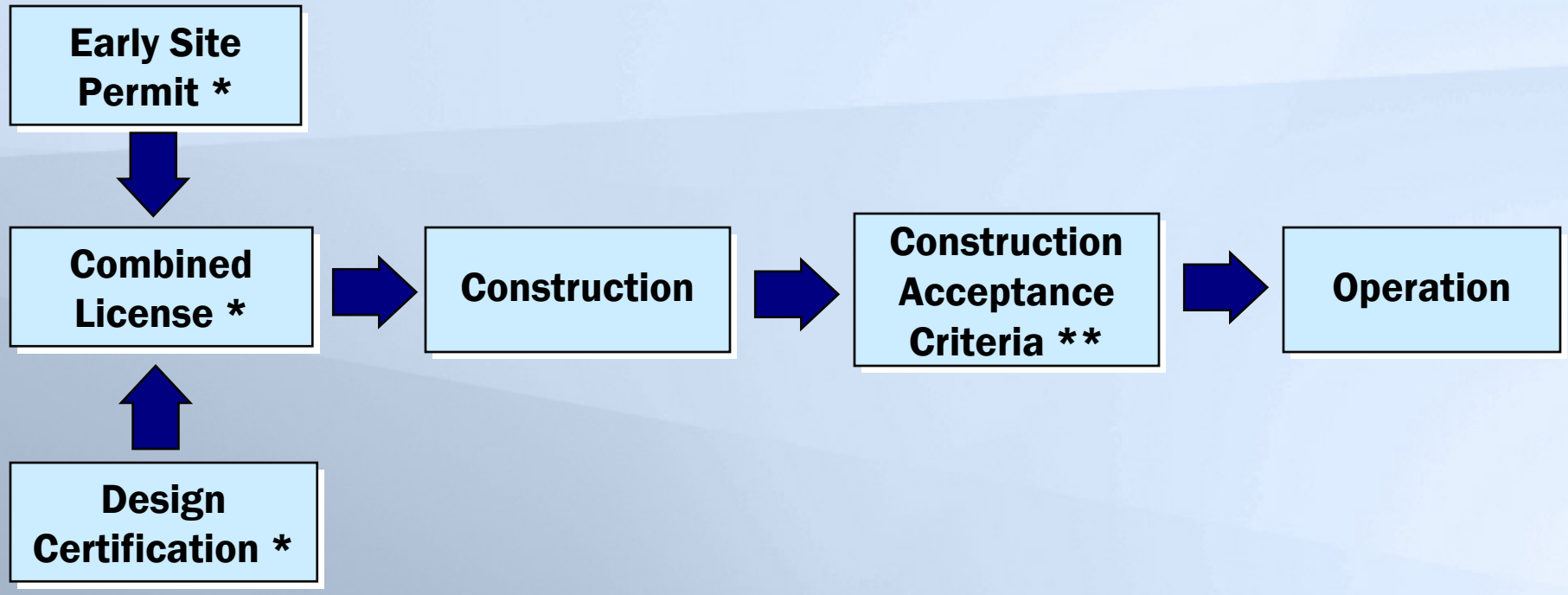
Then	Now
Changing regulatory standards and requirements	More stable process: NRC approves site and design, single license to build and operate, before construction begins and significant capital is placed at risk
Design as you build	Plant fully designed before construction begins
No design standardization	Standard NRC-certified designs
Inefficient construction practices	Lessons learned from nuclear construction projects overseas incorporated, and modular construction practices
Multiple opportunities to intervene, cause delay	Opportunities to intervene limited to well-defined points in process, must be based on objective evidence that ITAAC have not been, and will not be, met

Old Licensing Process



* Potential for Challenge

New NRC Licensing Process



* Potential for challenge

** Potential for challenge but threshhold very high

Possible Pinch Points in Supply Chain

- Commodities (structural and specialty steels, concrete, etc.)
- Pipe, compressors, valves, tubing, vessels, steam generators, pumps, steam turbines, reactor vessels, forgings, etc.
- Skilled craft labor
- Construction management

Forging for reactor pressure vessel:

24’ diameter x 13’ high: 127 Tons

Restart of Browns Ferry Unit 1
May 2007

- Completed on schedule
- $1.8 billion project
- 1,280 MW of capacity
- Virtually every system, component, structure replaced, refurbished, upgraded
- 150 miles of cable, 6.5 miles of pipe
- Over 11.2 million work hours
- 1,200 tests and inspections

Realistic Expectations

- Supply chain, manpower, etc. will govern pace of new nuclear development
- Disciplined project execution is key
- What does success look like? By 2015 or so ...
  - 3-6 new reactors in commercial operation, built to cost and schedule
  - Clear evidence that infrastructure is expanding to meet sustainable nuclear expansion
  - Second wave well along in licensing or in early stages of construction

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Long-Term Need for Additional Baseload Capacity

- According to the U.S. Energy Information Administration, electricity demand in 2030 will be 40% greater than today
- To maintain current electric fuel supply mix would mean building:

35	Nuclear reactors (1,400 MW)
240	Coal-fired plants (600 MW)
260	Natural gas plants (400 MW)
90	Renewables facilities (100 MW)

Source: 2007 Annual Energy Outlook, Energy Information Administration

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The "Once Through" Fuel Cycle: The Old View of Used Fuel Management

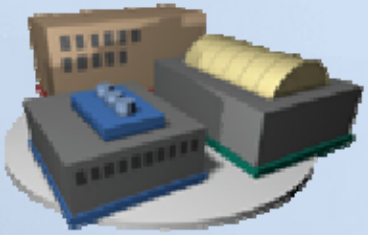
Nuclear Plant

Used Fuel

Yucca Mountain

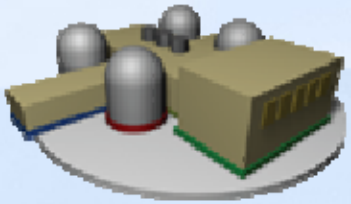
Used Fuel Management: New Strategic Direction

Used Fuel

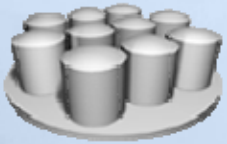


Used Fuel Recycling, Interim Storage

Recycled Nuclear Fuel



Advanced Recycling Reactors



Nuclear Waste

Yucca Mountain

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Used Fuel Management: An Integrated, Phased Program

- Developing advanced technologies to recycle nuclear fuel provides needed flexibility
- Sites for recycling logical candidates for interim storage
  - Allows DOE to meet statutory obligation to remove used fuel from operating plants
  - Sustains public, political, industry confidence in used fuel management program
- Yucca Mountain still needed long term

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