

Council on Competitiveness

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Sources of U.S. Electricity (2006)

19.9% Natural Gas

Low construction cost

Volatile fuel cost

Combined cycle capacity factor: 39.9%

Steam plant capacity factor: 17.2%

Emissions: NO_x, CO₂

19.4% Nuclear

High construction cost

Stable fuel cost

Capacity factor: 89.9%

Emissions: None

6.9% Hydro

Large-scale opportunities gone

No fuel cost

Capacity factor: 31.8%

Emissions: None

3.1% Renewables (and Other)

Very high construction cost

No fuel cost

Capacity factor: 26.8%

Emissions: None

1.6% Oil

Volatile fuel cost

Capacity factor: 14.9%

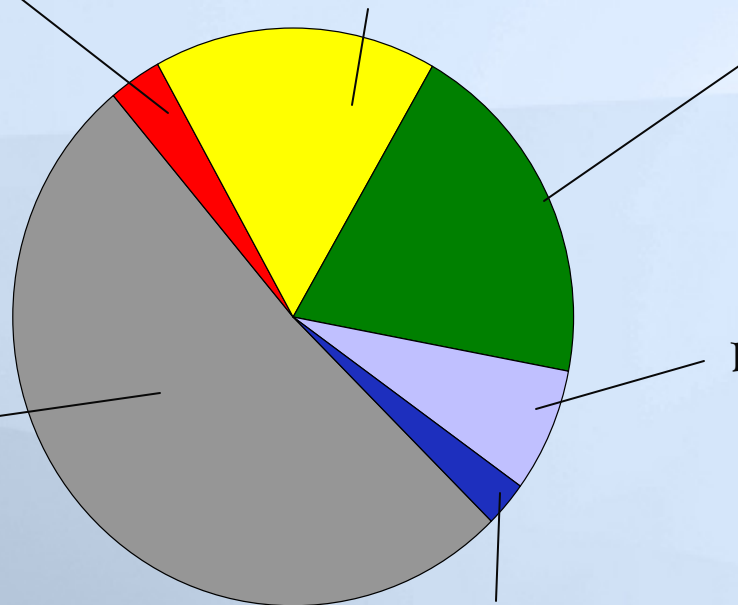
Emissions: SO₂, NO_x, CO₂

49.0% Coal

High construction cost

Capacity factor: 71.1%

Emissions: SO₂, NO_x, CO₂,
particulates, mercury, toxic
metals



Nuclear Energy Today

	Operating Units	% Generation	Planned Units
US	104	20%	>30
World*	438	16%	320

- Base-load 24/7 power
- No emission of greenhouse gas or air pollutants

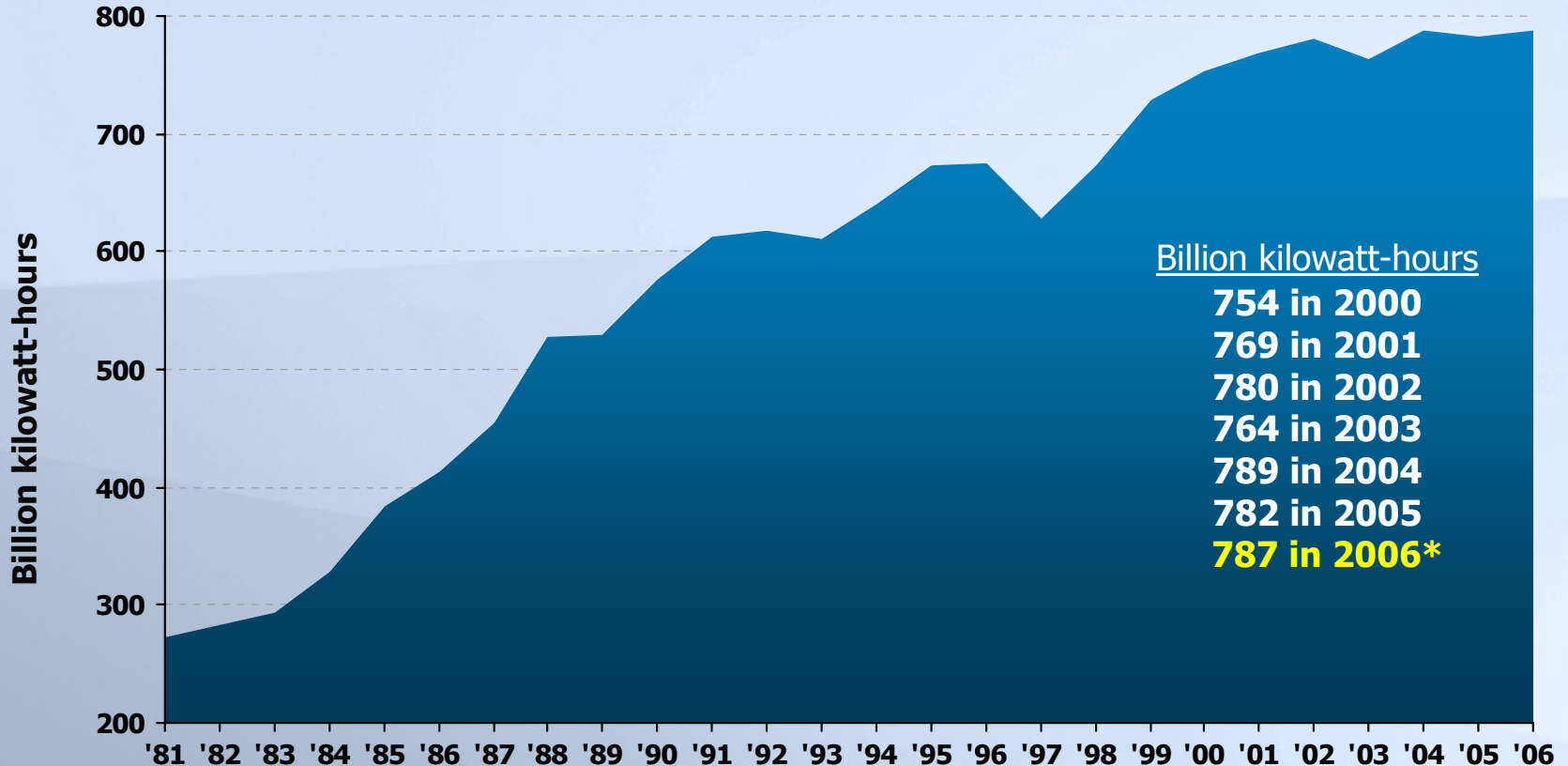
Sustained Reliability and Productivity

U.S. Nuclear Capacity Factor



Output Remains Near Record Levels

U.S. Nuclear Generation

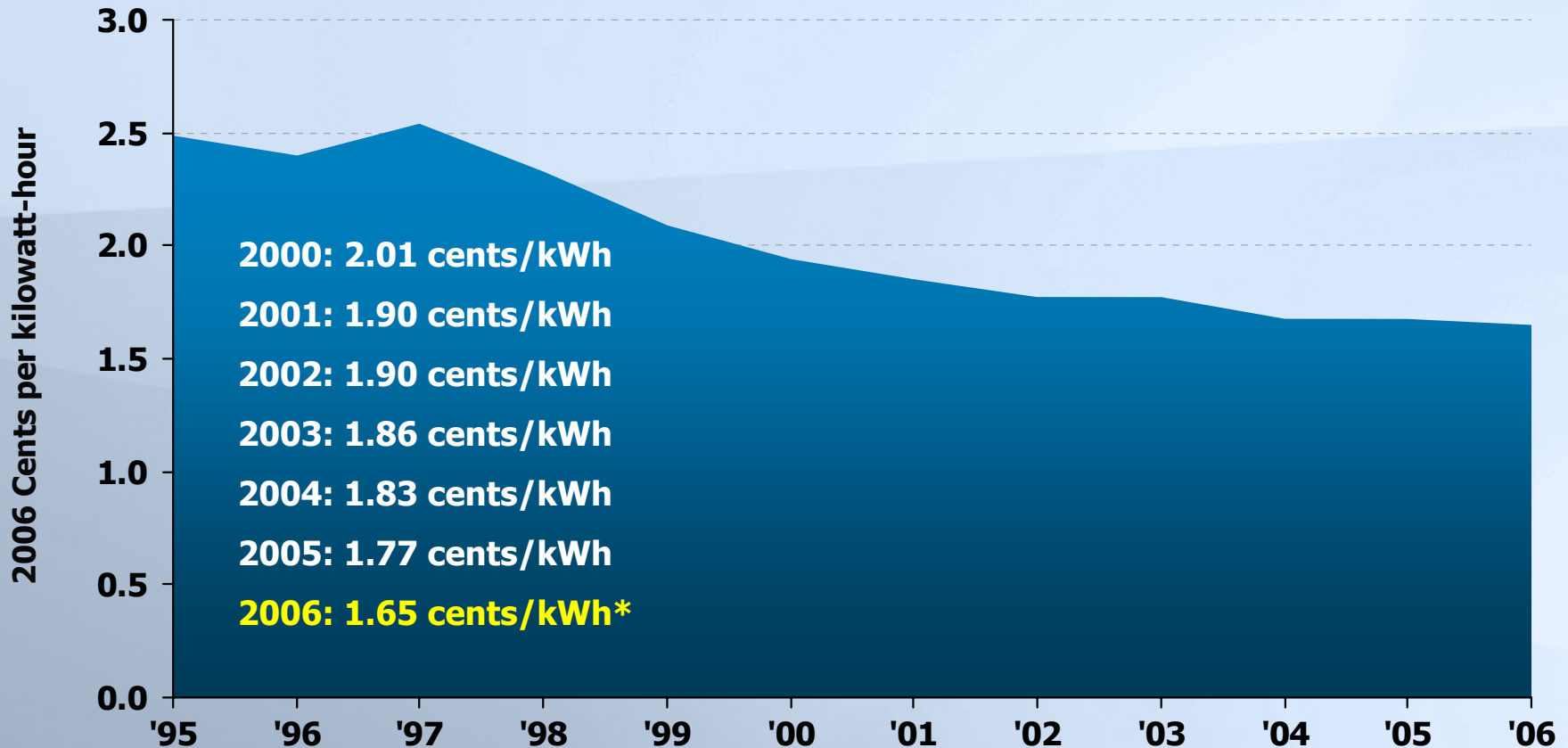


Source: Global Energy Decisions / Energy Information Administration

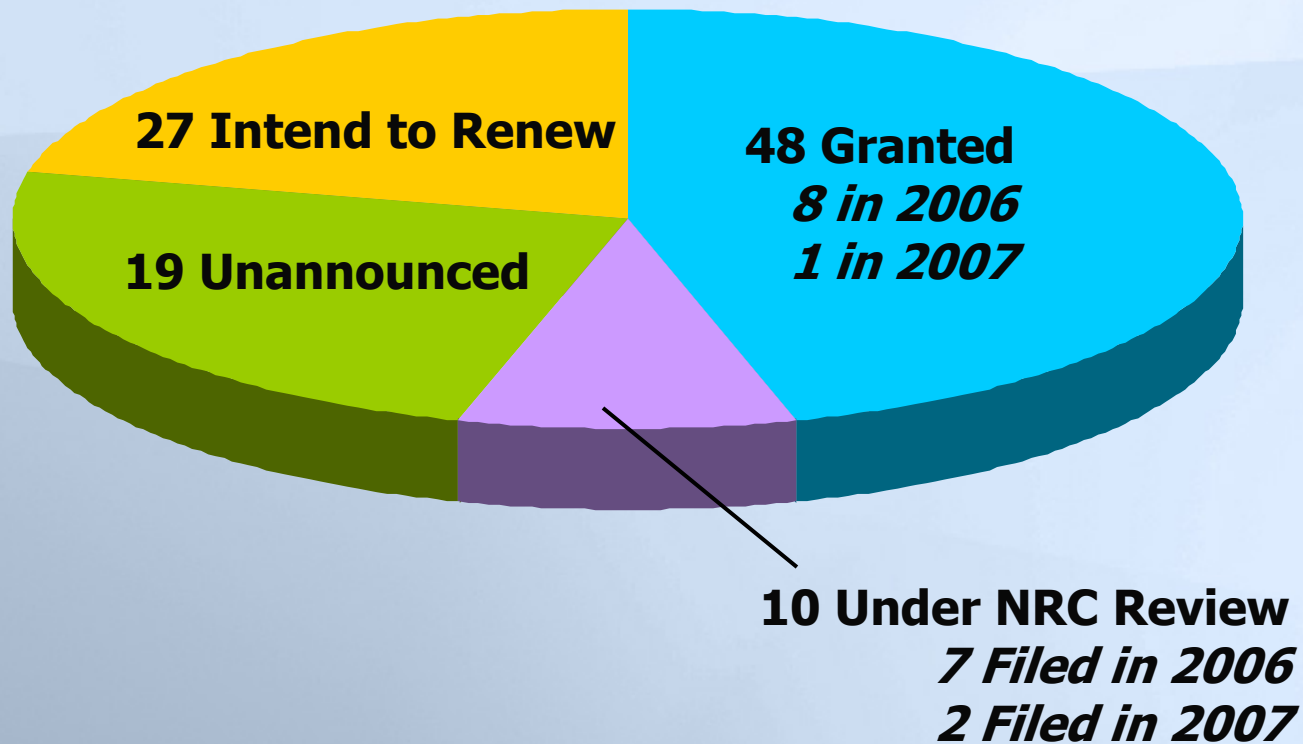
* Preliminary

Solid Economic Performance Continues

U.S. Nuclear Production Cost

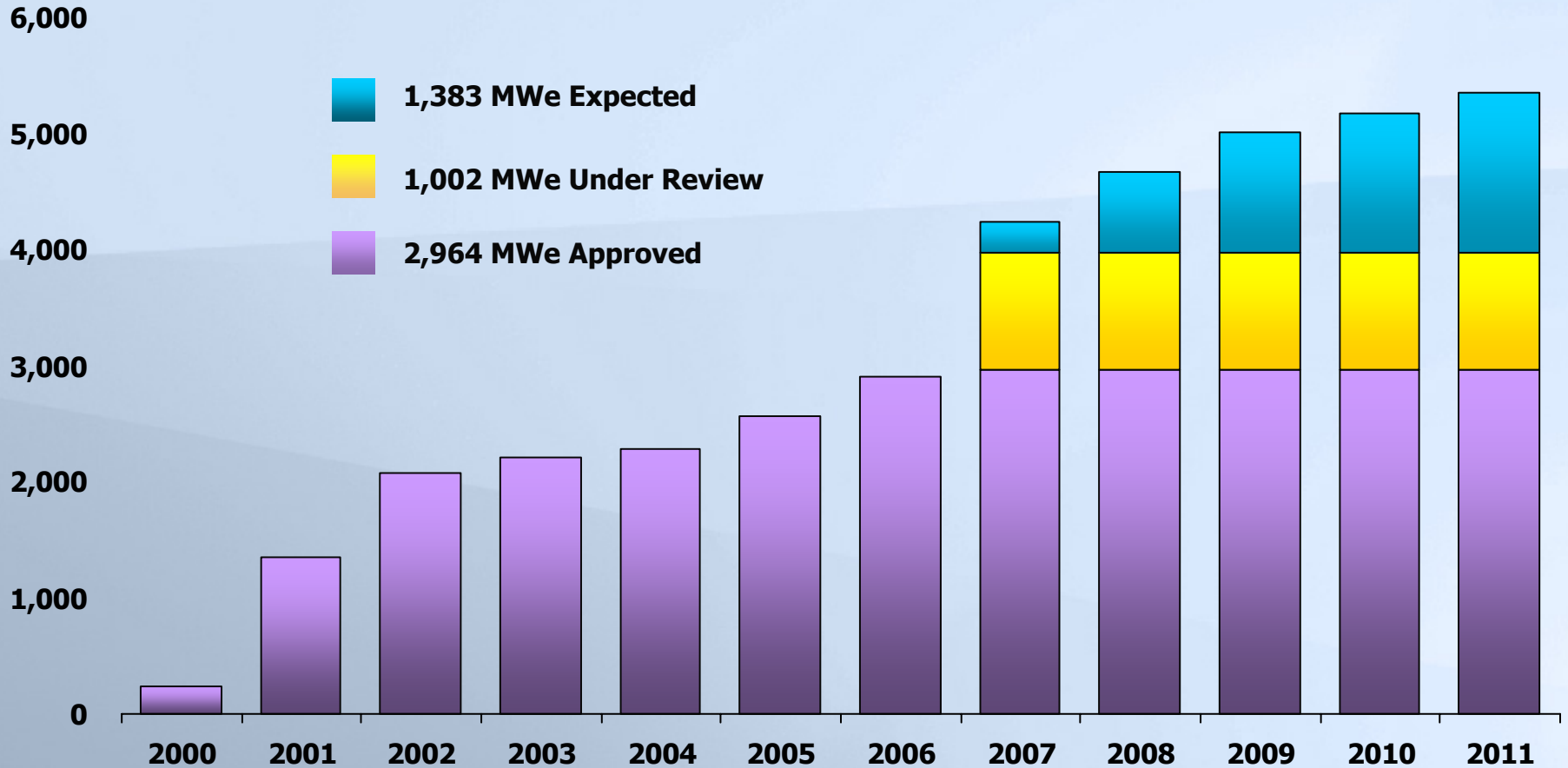


Renewal of Operating Licenses Continues



U.S. Nuclear Plant Uprates

Cumulative Capacity Additions at Existing Plants 2000-2011

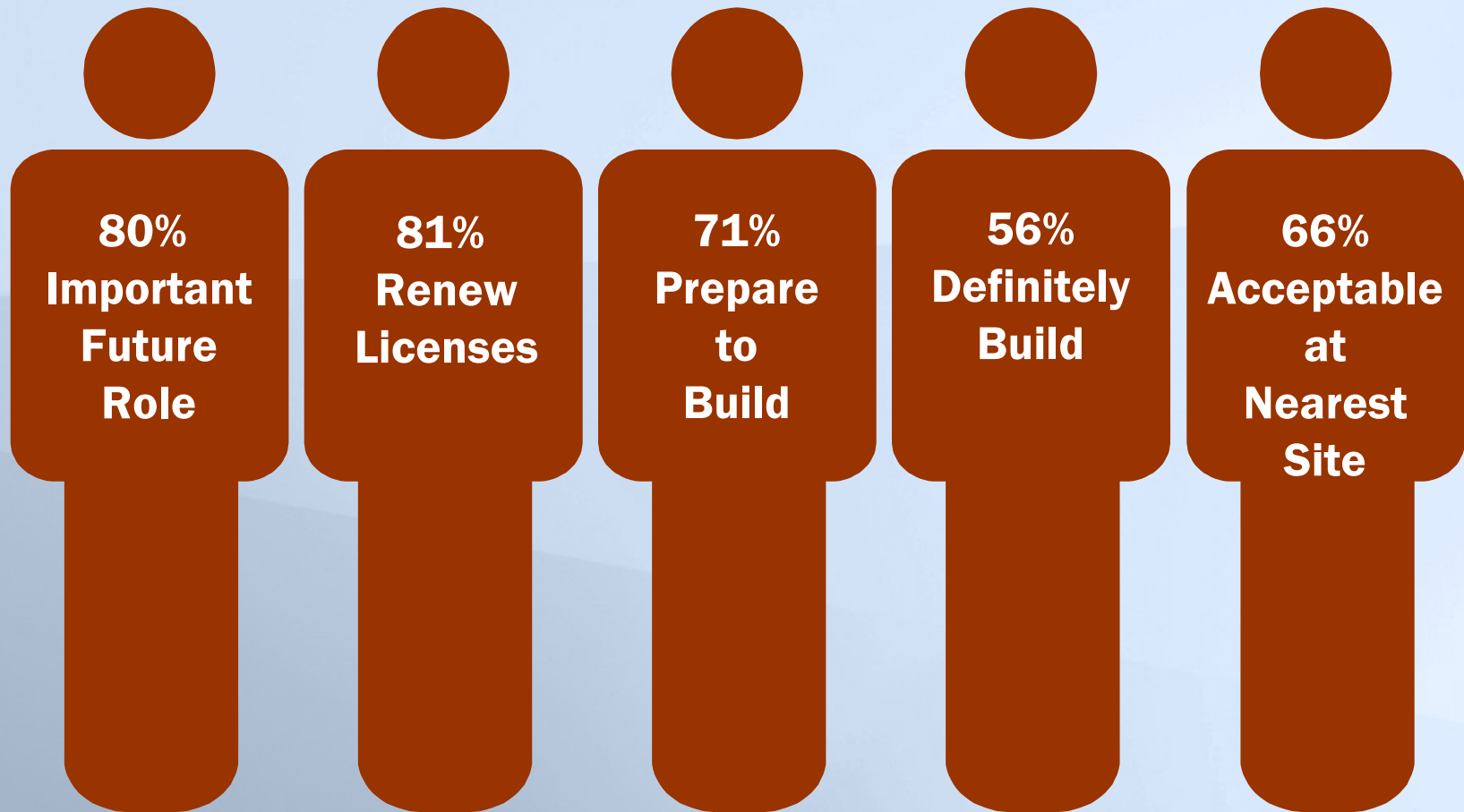


Restart of Browns Ferry Unit 1

- **Restarted May 2007**
- **\$1.8 billion project**
- **Adds 1,280 MW of capacity**



Strong Public Support Continues



Electricity Marketplace Drives the Need for New Nuclear Power Plants

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

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) , 2-3 more expected (ESBWR, EPR, US-APWR)
 - 17 companies, consortia preparing license applications for as many as 30 reactors

New Nuclear Plants Under Consideration

Company	Location (Existing Plant)	ESP	Design (Units)	COL Submittal
Alternate Energy Holdings	Owyhee County, ID	–	EPR	FY2009
Amarillo Power	Vicinity of Amarillo, TX	–	EPR	FY2009
AmerenUE	Callaway County, MO (Callaway)	–	EPR	FY2008
Constellation (UniStar)	Calvert County, MD (Calvert Cliffs) and two other sites	Will go to COL but submit siting information early	EPR (3)	First submittal - FY2008
Detroit Edison	Fermi, MI (Fermi)	Not yet determined	Not yet determined	FY2008
Dominion	Louisa County, VA (North Anna)	Approval expected 2007	ESBWR (1)	FY2008
Duke	Cherokee County, SC (Lee)	–	AP1000 (2)	FY2008
Duke	Davie County, NC	Under consideration	Not yet determined	Not yet determined
Duke	Oconee County, SC	Under consideration	Not yet determined	Not yet determined
Entergy	West Feliciana Parish, LA (River Bend)	–	ESBWR (1)	FY2008
Entergy (NuStart)	Claiborne County, MS (Grand Gulf)	Approved April 2007	ESBWR (1)	FY2008

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Exelon	Clinton, IL (Clinton)	Approved March 2007	Not yet determined	Not yet determined
Exelon	Matagorda and Victoria County, TX	—	Not yet determined	FY2009
Florida Power & Light	Turkey Point, FL	Not yet determined (2)	Not yet determined	FY2009
NRG Energy/STPNOC	Matagorda County, TX (South Texas Project)	—	ABWR (2)	FY2008
PPL Corp.	Susquehanna, PA	Not yet determined	Not yet determined	Not yet determined
Progress Energy	Wake County, NC (Harris)/ Levy County, FL	—	AP1000 (2)/ AP1000 (2)	FY2008/ FY2008
South Carolina Electric & Gas	Fairfield County, SC (V.C. Summer)	—	AP1000 (2)	FY2008
Southern Company	Burke County, GA (Vogtle)	Approval expected early 2009	AP1000 (2)	FY2008
Texas Utilities	Glen Rose, TX (Comanche Peak)	—	APWR (2)	FY2008
TVA (NuStart)	Jackson County, AL (Bellefonte)	—	AP1000 (2)	FY2008

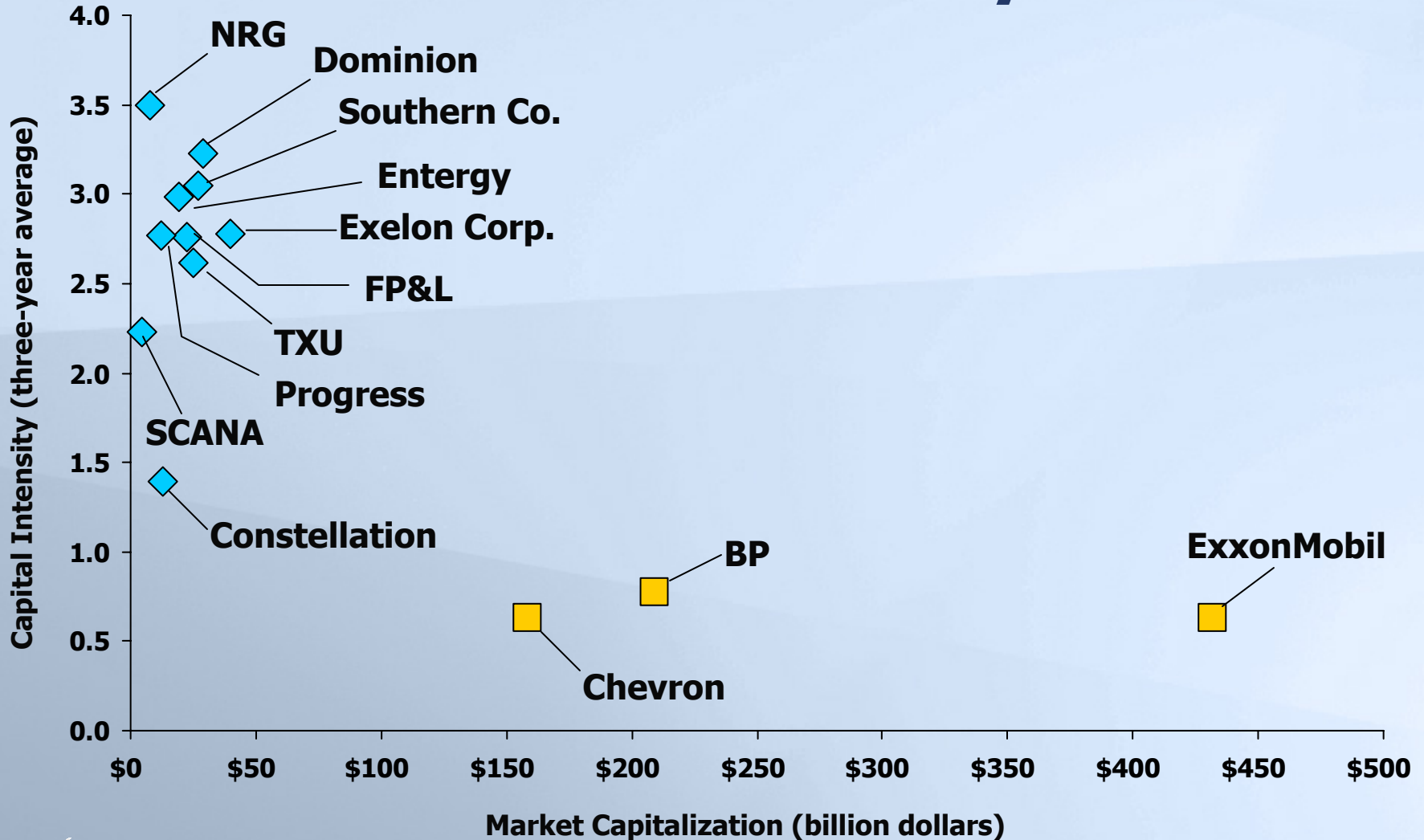
Nuclear Plant Construction: “Then and Now”

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

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	

Investment Challenge for a Capital Intensive Industry



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 project cost
- **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

Investment not Subsidy

- Each new 1,000 MW nuclear plant
 - Adds \$500 million/yr to economy
 - Provides for large capacity of stable, low cost, clean electricity
 - Long term benefit to industry and consumers
 - Provides 1100 jobs for three generations

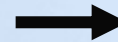
The “Once Through” Fuel Cycle: The Old View of Used Fuel Management



Nuclear Plant



Used Fuel

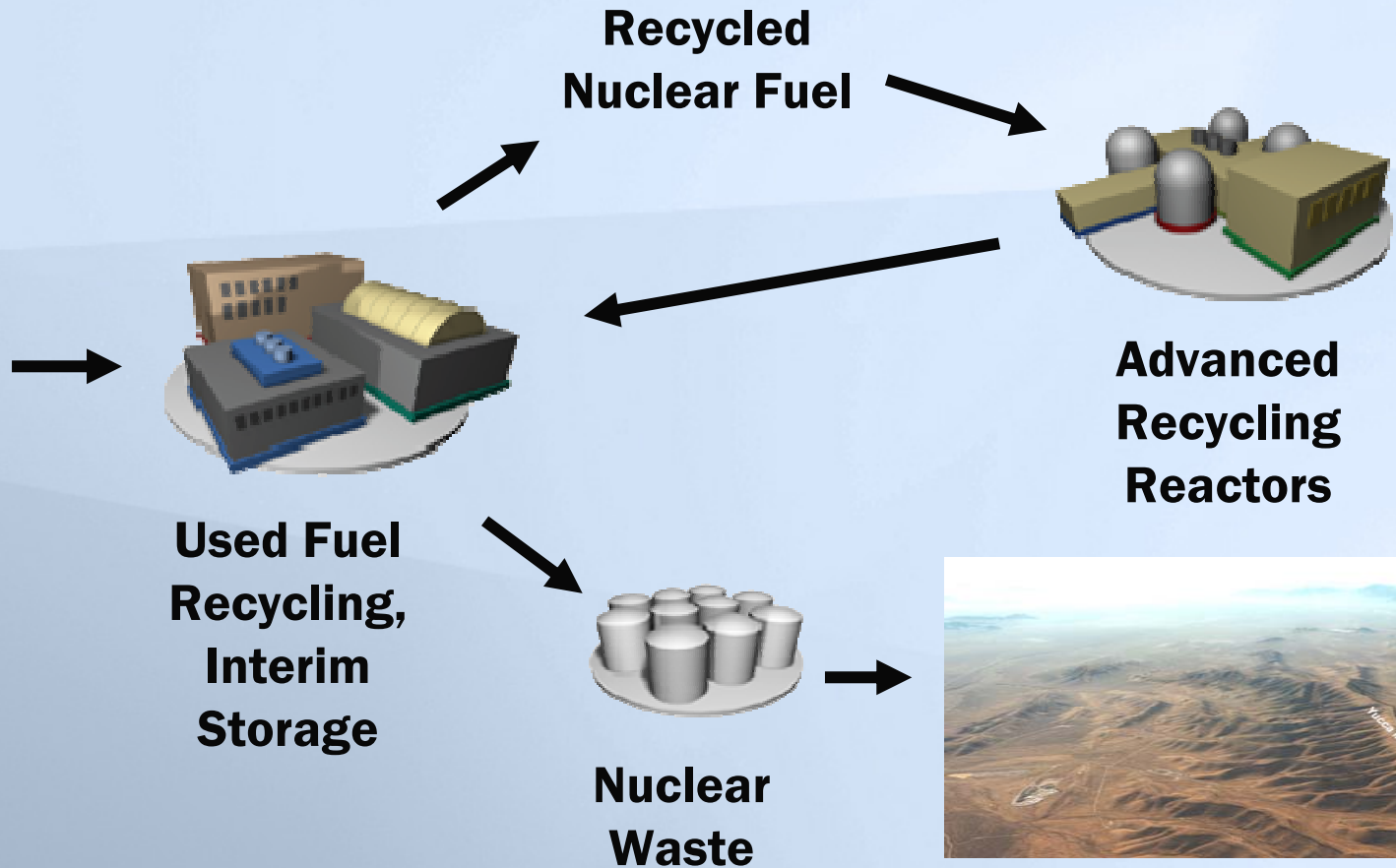


Yucca Mountain

Used Fuel Management: New Strategic Direction



Used Fuel



Used Fuel
Recycling,
Interim
Storage

Recycled
Nuclear Fuel

Advanced
Recycling
Reactors

Nuclear
Waste



Yucca Mountain

Used Fuel Management: An Integrated, Phased Strategy

- Use future recycling sites for interim storage now
 - Allows DOE to meet statutory obligation to remove used nuclear fuel from operating plants
 - Sustains public, political, industry confidence in used nuclear fuel management program
 - DOE awards grants to 11 volunteer sites for siting studies
- Develop advanced technologies to recycle used nuclear fuel and deploy when ready
- License and build Yucca Mountain as permanent long-term geologic disposal facility

The Future

- To achieve 25% share of US generation by 2030 need 45 new plants – achievable
- High potential for High Temperature Reactors
 - Deployment in 2020s
 - Industrial process heat –
 - Hydrogen
 - Electricity generation in developing world
- If we are serious about climate change and energy security nuclear cannot be ignored