

# Subprime Power Plants: Who Will Underwrite A Nuclear Renaissance?

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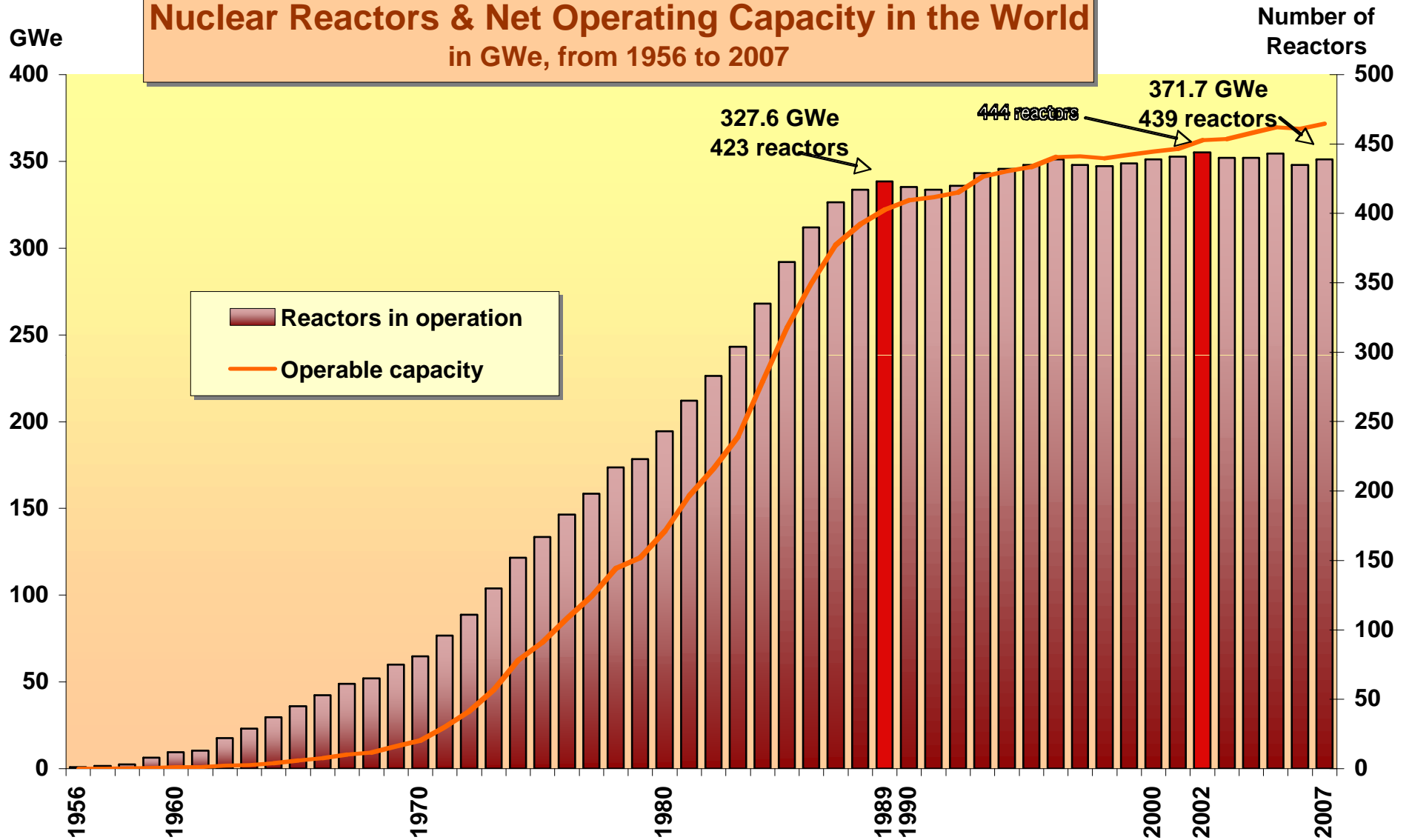
Workshop on Low Carbon Electricity

ELCON, October 21, 2008

# Just So We're Clear

- “Without loan guarantees, we will not build nuclear power plants”. (Michael Wallace, CEO, Constellation, July 2007)
- Progress Energy has just been awarded a 10.2% rate increase to begin to pay for its Levy County (Fla.) station, not due on line until 2016.
  - About 1.1cents/kWh in 2009 for power in (perhaps) 2016.

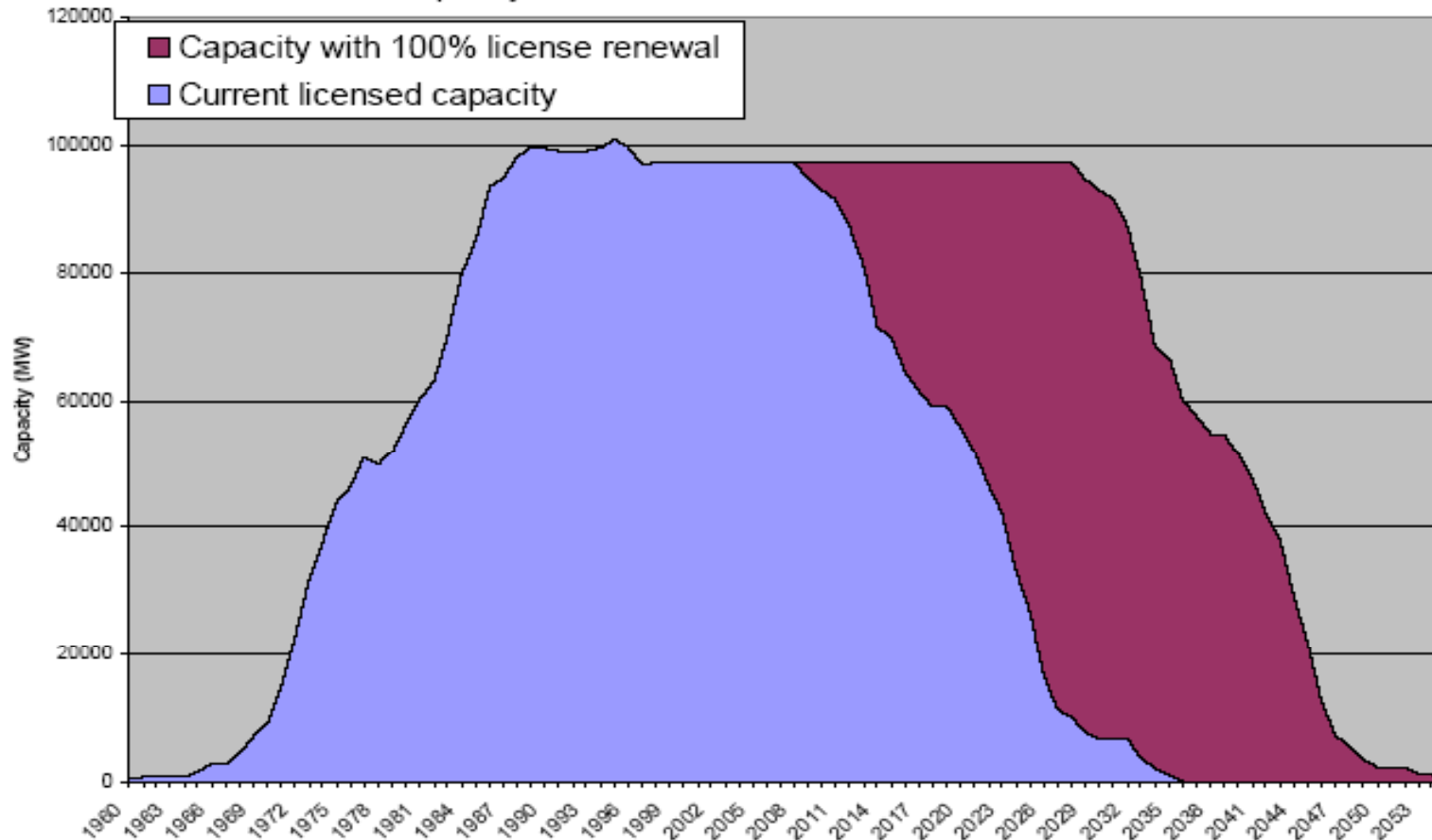
# Nuclear Reactors & Net Operating Capacity in the World in GWe, from 1956 to 2007



# Holding the 20% Share of U.S. Electricity

(Paul Joskow, MIT)

Capacity With and Without License Renewal



# NUCLEAR Costs per 2007 Keystone Collaborative Fact Finding – Consistent with Fla. estimates

	Low case	High case
Capital costs	4.6 cents/kwh	6.2
Fuel	1.3	1.7
Fixed O&M	1.9	2.7
Variable O&M	0.5	0.5
Total (levelized)	8.3	11.1

# Moody's, Oct. 2007

## Estimated Valuations for Generation

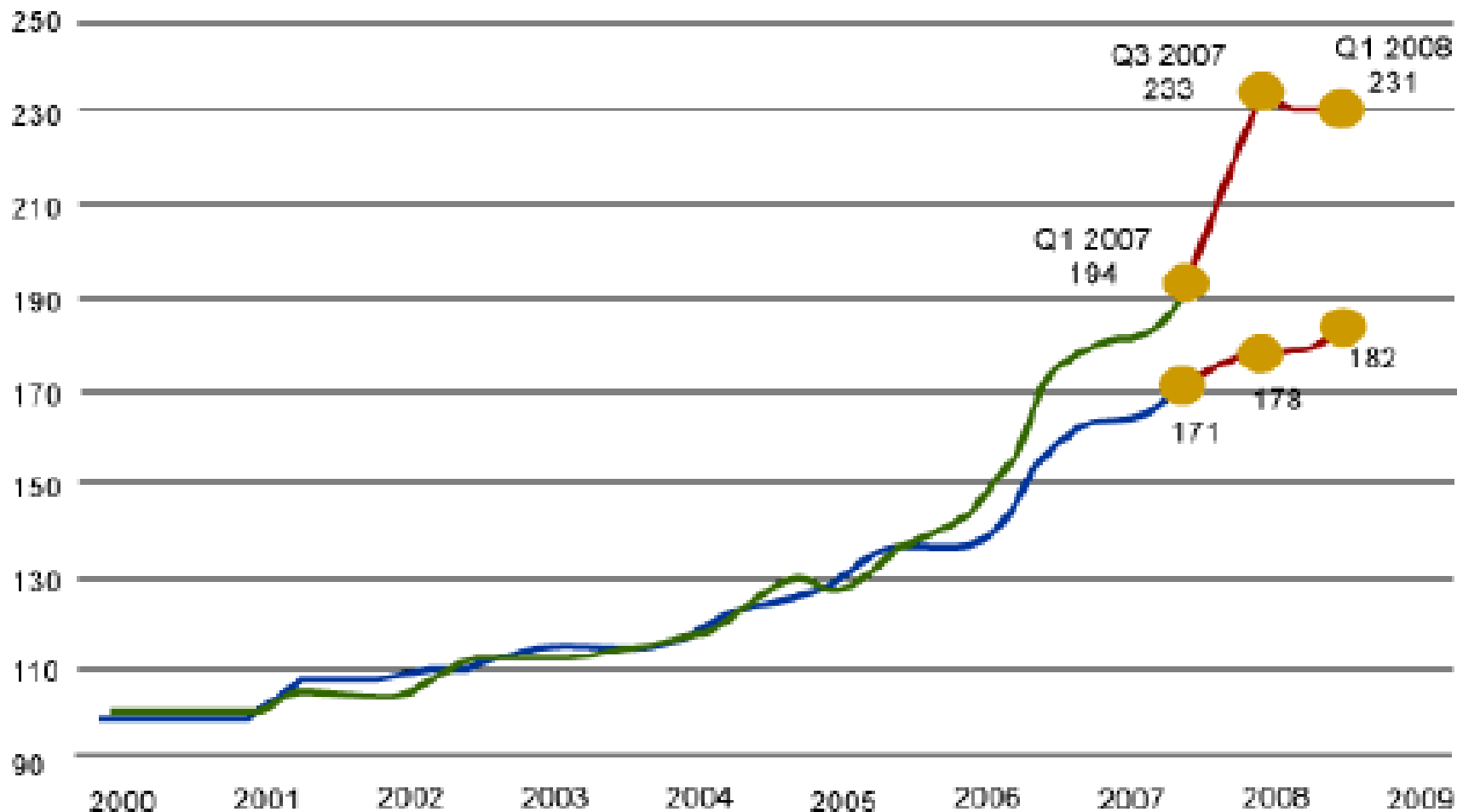
\$ / kw capacity

	Low	High
<b>Nuclear</b>		
Existing fleet	\$2,700	\$3,500
New build - market estimates	\$3,000	\$4,000
<b>New build - Moody's estimates</b>	<b>\$5,000</b>	<b>\$6,000</b>
<b>Coal</b>		
Existing fleet	\$1,700	\$2,200
New build - Traditional	\$2,500	\$2,900
New build - IGCC	\$3,300	\$3,700
<b>Natural Gas</b>		
Combined Cycle (non-city)	\$700	\$900
Peakers	\$600	\$800

# IHS/CERA Power Capital Costs Index With And Without Nuclear

— PCCI — PCCI without nuclear

Cost index (2000 = 100)



Source: Cambridge Energy Research Associates.

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# During the U.S. nuclear construction boom years

- There were no loan guarantees;
- Capital was usually borrowed (rather than conscripted) from taxpayers
- Customers were rarely asked to pay for a plant before it came on line.
- The U.S. Nuclear Regulatory Commission issued some 230 construction permits, more than the next five countries combined
  - But half of these plants were cancelled before completion due to falling demand, cost overruns and cheaper competitors

# During the U.S. nuclear construction boom years

- Electric rates tripled nationwide between 1970 and 1980
  - Not all due to nuclear power
  - But more than half of the U.S. states were involved in nine figure nuclear cost overruns

# Industrial Customer Reaction

- Rate shock broke the informal alliance that had existed between utilities and industrial customers in many states
  - Industrial customers understood better than most the consequences of runaway construction costs in a real market economy
  - Leading first to PURPA and ultimately to electric restructuring, which put risk of building power plants largely on investors.
  - Stranded costs as after the fact bailouts

# Lessons of the 1970s, Now Being Studiously Unlearned

Who bears risks of runaway costs and poor performance?

1970s	1980s and 1990s	Today (for new units)
customers	investors	taxpayers and customers

# Reasons to underwrite nuclear, as told

- To Wall Street and state governments
  - Mature technology;
  - Mature licensing process;
  - Enhanced public acceptance;
  - Costs under control;
  - Alternatives inadequate
- To Congress
  - Unproven technology;
  - Untested licensing process;
  - Vampire intervenors;
  - Costs unforeseeable;
  - Alternatives inadequate but might temporarily get ruinously plentiful and cheaper.

# Recent Federal Nuclear Support

- \$18.5 billion for loan guarantees;
- 1.8 cent/kWh production tax credit;
- Accident liability limit renewal;
- Delay insurance (.7-.8¢/kWh for 1<sup>st</sup> tier)
- Funding for GNEP;
  - \$750 million over last 6 years, \$300 million more requested in next fiscal year
- Plus licensing cost sharing; ongoing commitment to take the waste and the evisceration of public involvement.

# Recent Nuclear Support in Unrestructured States

- Fast track approvals of decision to build
- Elimination of “used and useful” test
- “Rolling” prudence
- Elimination of competitive bidding requirements

# Are Nuclear Investments Really “Too Large for the Private Sector”

- TransAlaska Pipeline cost some \$7 billion in 1970s and was privately financed.
- Problem with nuclear is not investment size but risk.

# Don't Say the Right Didn't Warn You

- **Federal credit programs merely shift funds from one borrower to another. They do not increase the funds available to the economy.**
- **Who gets squeezed out? New and small businesses, school districts and smaller local governments and individuals, private mortgage borrowers not under the federal umbrella. The unsubsidized borrowers wind up paying higher interest rates.**
- **Federal credit programs put the government in the position of holding assets of questionable quality or limited use, making it difficult to recover the original value of the loans in the case of default.**
- **Loan guarantees undermine a basic function of credit markets, i.e. distinguishing credit risks and assigning appropriate risk premiums;**
- **In a stressed credit environment guarantees could exacerbate weakening of dollar and inflationary concerns**

(Murray Weidenbaum et al, "Government Credit Subsidies for Energy Development", 1978)

# Don't Say the Left Didn't Warn You

“If the demonstration takes place before it is economically justified, the government may have to subsidize the program at a high level for a long time after demonstration, and the ultimate product may be inferior to that which would have resulted from continued development. In addition, premature commitment to expensive demonstration programs can distort the balance of the federal energy program.....”

Ford Foundation “Nuclear Power Issues and Choices”, 1977

# Don't Say The Industry Didn't Warn You

- “In the 1970s and 1980s, some utilities faced bankruptcy and ratepayers were forced to bear the costs of ‘mismanagement, project overruns, productivity issues and just bad design,’ but ‘there was not a contractor that I ever remember that did anything other than profit wildly. So the model has got to change.’”

(Christopher Crane, COO Exelon Generation, Nucleonics Week, March, 2008)

# Loan guarantees distort power markets

- To investors nuclear power will be less risky and will promise higher returns (because the equity owners will need to put up less capital).
- To regulators and to market operators, nuclear power will seem less expensive because risks have been shifted to taxpayers;
- Loan guarantees underwrite high risk behavior and incompetence;
- Loan guarantees hide the true cost from consumers and thereby encourage wasteful consumption practices;
- Thus both public and private investment will be disproportionately shifted toward nuclear power.

# The Loan Guarantee Cost Overrun

- In 2005, Congress believed that the EPA Act support package (including \$4 billion for loan guarantees) would be enough to allow a few “first mover” nuclear units to demonstrate the new designs and the new licensing process
- Now, Congress is told that unless the industry gets far more, the "nuclear renaissance" will be stillborn because "there is not going to be any financing." [The Hill](#), May 24, 2007
  - This jump in two years from \$4 billion to \$100 billion or more is the greatest nuclear cost escalation in history, and no one has even broken ground yet.

# Are the Default Risks Real?

- In the 1990s, nuclear power was the largest beneficiary of a rescue that Moody's estimated at "between \$50 billion and \$300 billion" and necessary to avoid bankruptcy for several major utilities.
  - These were the "stranded cost" surcharges that accompanied electric restructuring and charged the unrecoverable costs of nuclear power to the customers
  - Loan guarantees would charge the next rescue to the taxpayers instead of the customers, and would do so before the fact.
  - At \$50 billion, the stranded cost rescue would have amounted to \$500 million per plant, so a one time loan guarantee fee would have had to exceed 15% (assuming debt of \$3 billion/plant) to be revenue neutral.
    - Exelon has proposed "7 to 8 percent".

# Are the Default Risks Real?

- Fifty-one nuclear plants have shut down for a year or longer;
- As many U.S. plants were canceled as completed, some after billions spent;
  - Much maligned “old” NRC licensing process licensed more plants (200+) than next four countries combined. No rejections.
- Some cost overruns bankrupted N-plant builders in the 1970's/1980's; several others nearly did so.
- French flagship EPR in Finland now 3 years behind schedule and 50% over budget.

# The 1980 Renaissance

- “Halfway between ecstasy and euphoria”
- Intense federal support for expedited licensing, reprocessing, advanced reactors, cheerleading.
- Achievements
  - No new license applications
  - No reprocessing
  - No breeders
  - Waste repository date slipped two years/year

# Are Massive Subsidies for Nuclear Power Crucial to Fighting Climate Change?

- Even asking the question suggests we're once again on the road to an energy policy based on prophesy and political strength rather than principles.

# Ingredients of a Sustainable Nuclear Renaissance

- Significant number of new plants per year financed by private capital;
- Successful participation in competitive power supply markets;
- A waste disposal program decisively underway;
- A nonproliferation regime adequate to the nuclear fuel cycles in prospect;

# Sensible Energy Policy that Might (or Might Not) Improve Nuclear Power Prospects: Toward Rational Federal Infrastructure Choices

- Implement climate change policy that recognizes value of all carbon reducing technologies, including carbon sequestration, energy efficiency and renewable energy
  - Carbon caps and markets, or
  - Carbon taxes
  - Production tax credits
  - Remove liability limitations for future projects
- Use neutral market mechanisms – i.e. auctions, integrated resource planning - to choose least costly approaches among these;
- Avoid “pin-the-tail-on-the-donkey” energy policy making;
- Take the time to deal sensibly with waste, proliferation and safeguards;
- Rigorous prioritization of options for research purposes – effective, efficient, expeditious