Peter A. Bradford

Peter Bradford is an adjunct professor at Vermont Law School, where he teaches "Nuclear Power and Public Policy" and has taught "The Law of Electric Utility Restructuring". He also advises and teaches on utility regulation, restructuring, nuclear power and energy policy in the U.S. and abroad. He is a member of the Vermont Oversight Panel for the reliability assessment of Vermont Yankee and has served as an expert witness on the risks of investment in new nuclear power plants in several states. He has been a visiting lecturer in energy policy and environmental protection at Yale University.

He has recently served on a Keystone Center fact finding collaboration on nuclear power and a National Academy of Sciences panel evaluating the alternatives to continued operation of the Indian Point nuclear power plants in New York. He is also affiliated with the Regulatory Assistance Project, which provides assistance to state and federal energy regulatory commissions regarding economic regulatory policy and environmental protection. He is vice-chair of the Board of the Union of Concerned Scientists.

He served on a panel advising the European Bank for Reconstruction and Development on how best to replace the remaining Chernobyl nuclear plants in Ukraine and also on an expert panel advising the Austrian Institute for Risk Reduction on regulatory issues associated with the opening of the Mochovce nuclear power plant in Slovakia. He advised the Vermont Legislature on issues relating to spent fuel storage at Vermont Yankee and the Town of Wiscasset, Maine, on issues related to the storage of spent nuclear fuel at the site of the former Maine Yankee nuclear power plant.

He has advised on electric restructuring issues and has testified on aspects of nuclear power, electricity and telecommunications restructuring in many U.S. states.

He has also advised on energy, telecommunications and water utility restructuring issues in China, Armenia, Azerbaijan, Georgia, India, Indonesia, Mongolia, Canada, Russia, Samoa, South Africa and Trinidad and Tobago. He is a member of the Policy Advisory Committee of the China Sustainable Energy Program, a joint project of the David and Lucille Packard Foundation and the Energy Foundation.

He chaired the New York State Public Service Commission from 1987 until 1995 and the Maine Public Utilities Commission from 1982 until 1987. During these years, New York resolved its stalemate over the Shoreham nuclear power plant and Maine resolved its similarly controversial involvement in Seabrook, both on favorable economic terms. He was Maine's Public Advocate in 1982 and was President of the National Association of Regulatory Utility Commissioners during 1987.

He served on the U.S. Nuclear Regulatory Commission from 1977 until 1982. During his term, the NRC undertook major upgradings of its regulatory and enforcement processes in the wake of the Three Mile Island accident.

Prior to becoming a member of the NRC, he had served on the Maine Public Utilities Commission (1971-1977) and was Chairman in 1974-1975.

Mr. Bradford was an advisor to Maine Governor Kenneth Curtis from 1968 to 1971, with responsibilities for oil, power and environmental matters. He assisted in preparing landmark Maine laws relating to oil pollution and industrial site selection and was Staff Director of the Governor's Task Force on Energy, Heavy Industry and the Coast of Maine.

Mr. Bradford is the author of Fragile Structures: A Story of Oil Refineries, National Security and the Coast of Maine, a book published by Harper's Magazine Press in 1975. His articles on utility regulation and nuclear power have appeared in many publications, including The New York Times, The Washington Post, The Los Angeles Times, The Boston Globe, Newsday, and The Electricity Journal.

He is a 1964 graduate of Yale University and received his law degree from the Yale Law School in 1968.

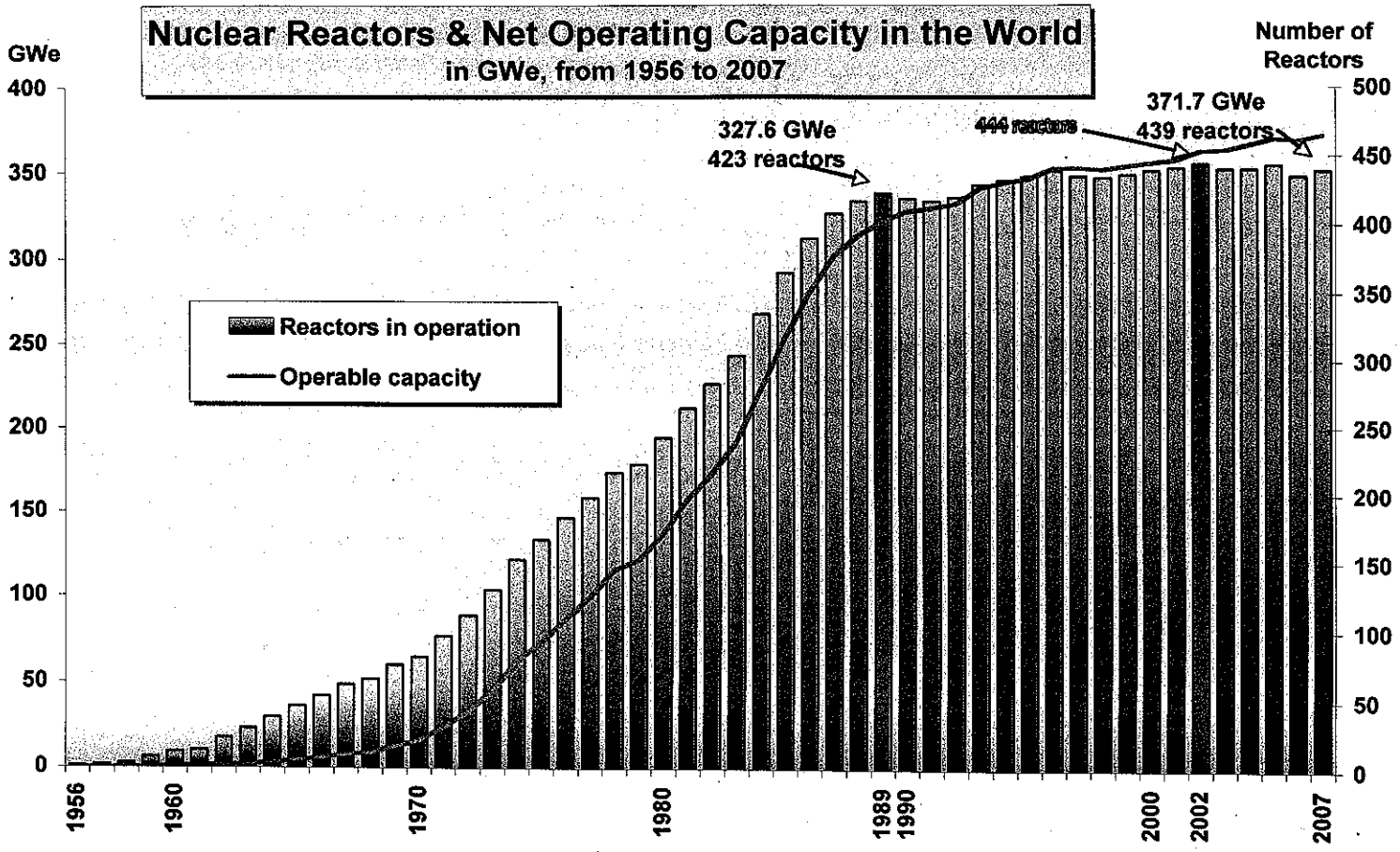
Nuclear Renaissance: Myths and Realities

Michigan Senate Energy Committee

April 23, 2009

Peter A. Bradford

Myth #1: A nuclear renaissance is sweeping the world

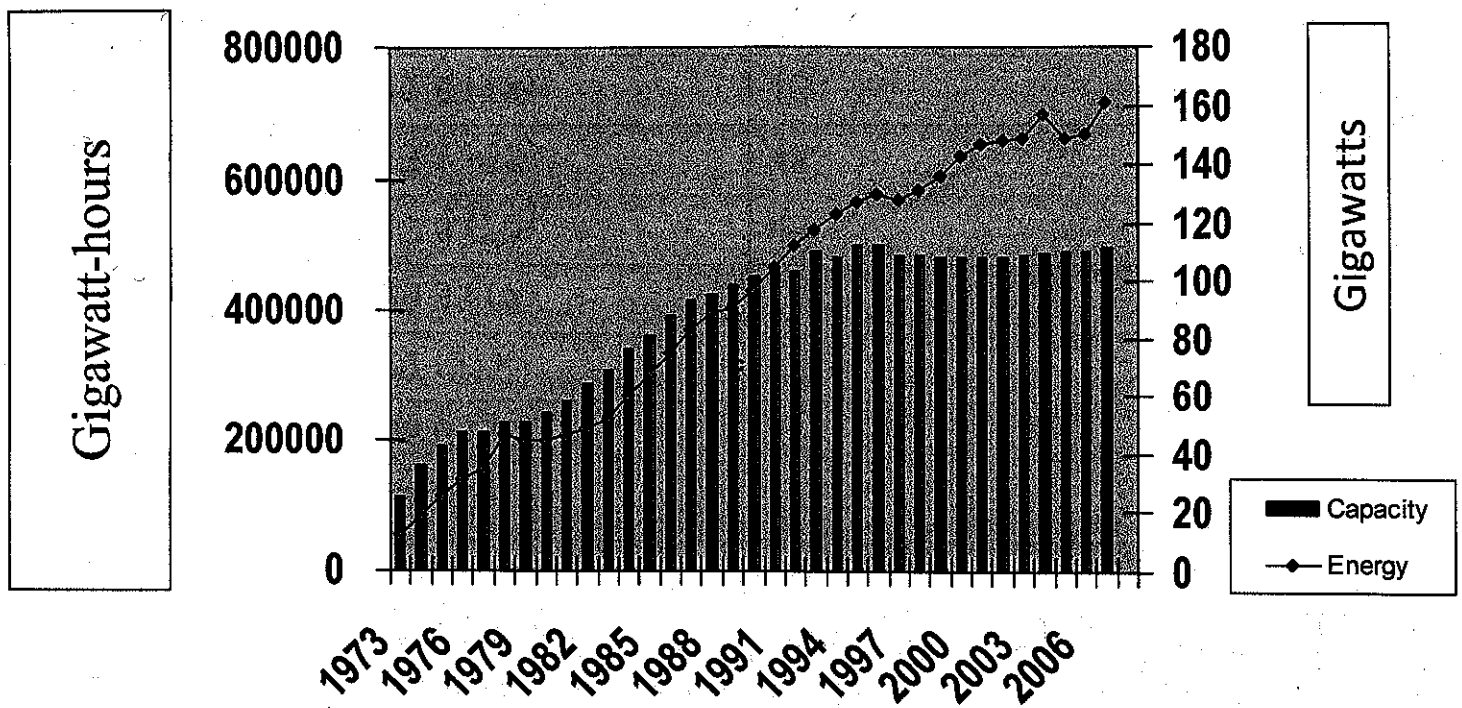


Current status of nuclear power

Country	Nuclear capacity GW (plants)	Percent of electric generation	Plants under construction
United States	100.3 (104)	19	1
France	63.3 (59)	79	1
Japan	46.6 (53)	27	2
Russia	22 (31)	14	8
Germany	20.3 (17)	29	0
South Korea	17.5 (20)	40	5
Ukraine	13.1 (15)	48	2
Canada	12.6 (18)	13	0
Great Britain	11.0 (19)	18	0
China	9.7 (11)	02	11
India	3.8(17)	03	6
World total	370 (436)	16	44

Data from the International Atomic Energy Agency, http://www.iaea.org/programmes/a2/index.html.

U.S. Nuclear Output and Nuclear Capacity, 1973-2007: Productivity Improvement in the Face of Competition



Myth 1a: Pending NRC applications portend a U.S. renaissance

- The reality is that none of the pending applications will be built without government support, either
  - Federal loan guarantees, shifting risks from investors and lenders to taxpayers (but enough for only 3-4 plants has been authorized), or
  - State ratemaking policies that
    - Circumscribe customer choice;
    - Charge the plant to customers before it comes on line;
    - Assure that even cancelled plants will be charged to customers

Myth 2: The nuclear industry's problems were caused by environmentalists, regulators and TMI

- Reality: New nuclear power plants been unable to compete in the U.S. or anywhere else since competitive power procurement began thirty years ago.
  - Not one new reactor has been bid in a competitive power procurement
  - Which is why risks have to be shifted from investors to taxpayers or back to customers

Some Recent Cost Estimates (Mark Cooper, 2009)

	OVERNIGHT COSTS ($/kw)			DELIVERED COSTS ($/kw)			
Study	**Low**	**Mid**	**High**	**Low**	**Mid**	**High**	**$ Date**
MIT	1000	2000					2002
DOE	1200	1500	1800				2003
Keystone	3600	4000					2007
S&P	3000	4000	5000				2007
AEP		4000					2007
DOE Loan					8100		2007
Moody's				5000		6000	2007
Harding 1	4300	4425	4550				2007
CBO		2400					2008
Synapse				5500		8100	2008
Constellation	3500	4000	4500				2008
FPL	3500	4000	4500	5500		8100	2008
Lazard	3750	4500	5250	5750		7550	2008
Harding 2		5000					2008
E.ON					6000		2008
Duke		4900			6400		2008
Progress				6400		7600	2009
Severance	4900	5800		6900	8200		2008
Moody's		6250			7500		2008

Myth # 2a: New designs, streamlined licensing and standardization have solved the economic problems

- These features either do not address the cost problem or are unproven
- If this myth were true, loan guarantees and/or special rate treatment would be unnecessary.
  - In fact, high costs and high risk still preclude private investment
- The Olkiluoto plant in Finland – the first advanced reactor undertaken in the West – is now nearly three years behind the 2005 schedule and some $2 billion over budget

Myth 3: The risk of loss from loan guarantees for new units is very small

- Half of all construction permits ever granted in the U.S. ended in cancellation (including six in Michigan).
- There have been 51 year long shutdowns at U.S. reactors.
- Many plants required special "stranded cost" recovery to avoid major losses in the last 15 years.

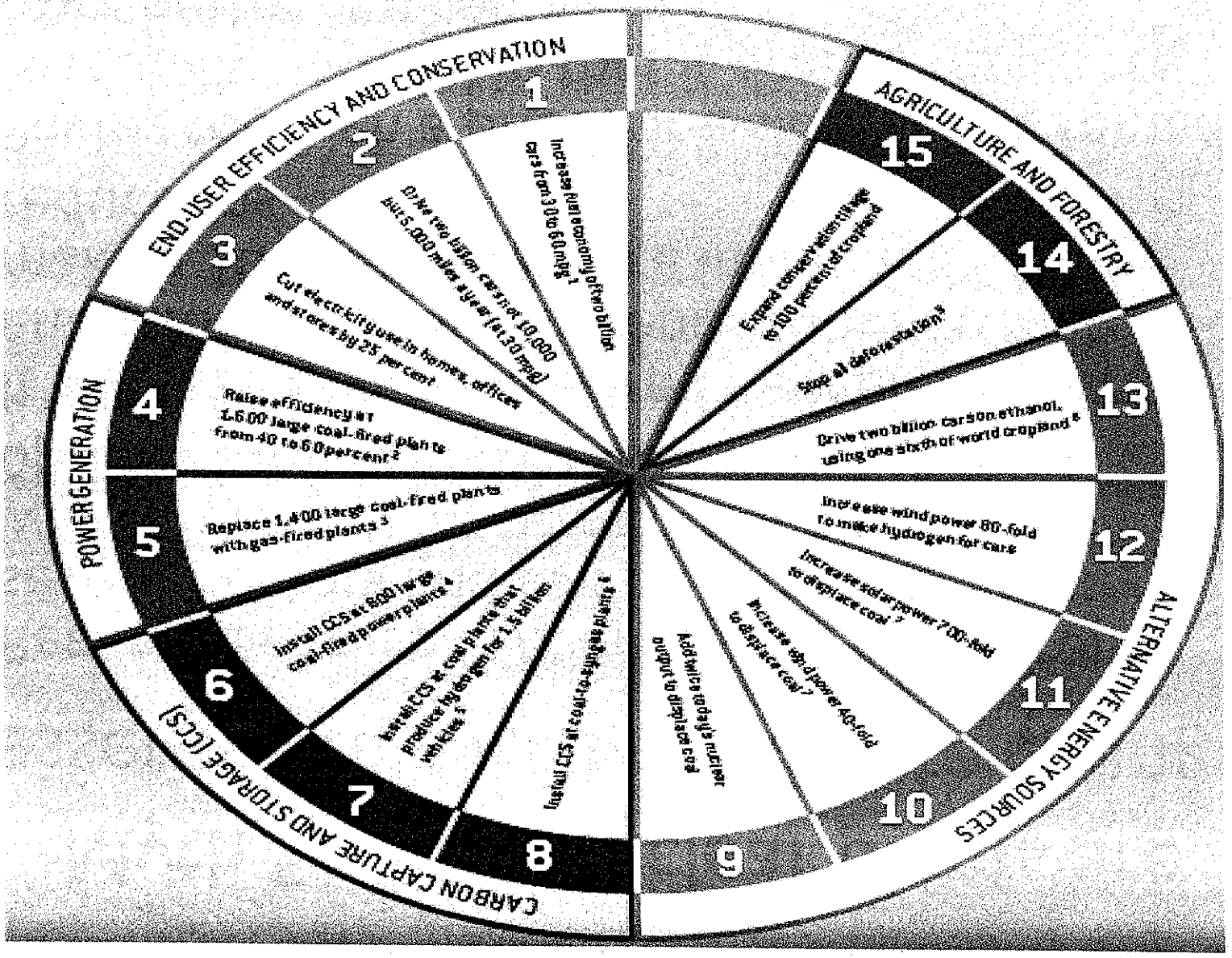
Myth 4: A New Nuclear Plant Will Create Jobs for Michigan

- Reality: No state ever created a net increase in jobs by raising electric rates to commercial and industrial customers more than necessary to maintain supply. Such a policy drives jobs out of many businesses to create relatively few permanent jobs at the new reactor.
  - A new nuclear plant in Michigan will do nothing to further the success of hybrid automobiles.

Myth 5: New nuclear plants are essential to avoiding climate change

- Reality: Because CO2 emissions come from several sectors and can be reduced in many ways, new nuclear power is one among many options for large scale CO2 reductions.
- It will take several hundred new plants – with enrichment and waste repositories to match – to make a 10-15% difference in needed CO2 reductions
- Paying too high a price for a slow acting remedy is actually harmful in that it diverts resources from better choices

Do Everything or Prioritize Wisely? The Pacala/Socolow Wedges (Scientific American, 9/06)



The Nuclear Wedge

- Doubling of nuclear power really requires tripling the existing capacity (372GW/438plants) because today's plants must be replaced.
  - Probably 700-900 new plants needed to get 1100GW
- Assumes nuclear replaces all coal. In fact, nuclear will replace some gas and large hydro, requiring more new capacity to make a wedge.
- Prodigiously difficult and expensive, but so are many of the wedges.
- Little impact before 2020.

Myth #5a: "We have to do everything"

- Some alternatives foreclose others
  - Because there just isn't enough money
  - And because commitment to new plants means commitment to commensurate sales
  - And because of timing issues
    - Some sources require a massive commitment years in advance, after which other alternatives will be less economically attractive than they were.

Myth 6: New nuclear plants are essential to assuring adequate "baseload" power supply

- This has been asserted since the 1970s, when the Atomic Energy Commission forecast 1000 plants by the year 2000. We have had adequate power ever since without adding new nuclear plants.
  - Mixtures of efficiency, natural gas, renewables and load management often displace or postpone "baseload".
- Competitive power procurement is the way to find out what we really need at the lowest cost.

Myth 7: The nuclear waste problem can be solved by reprocessing "like they do in France"

- Reprocessing leaves most radioactivity still to be disposed of.
- Reprocessing adds substantially to the cost of nuclear power.
- Reprocessing creates wastes of its own.
- Reprocessing adds to the risks of weapons proliferation.

Choosing Wisely: Sensible Energy Policy that Might (or Might Not) Improve Nuclear Power's Prospects

- 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;
- Take the time to deal sensibly with waste and proliferation ;
- Rigorous prioritization of options for research purposes – effective, efficient, expeditious

  Avoid funding commericalization as "research"

  Avoid "pin the tale on the donkey" energy choices