

# Looking for a Climate Signal in the US Nuclear Power Debate

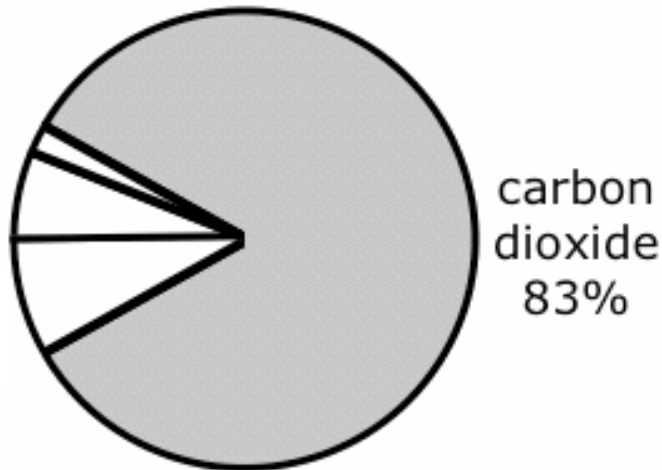
William Space

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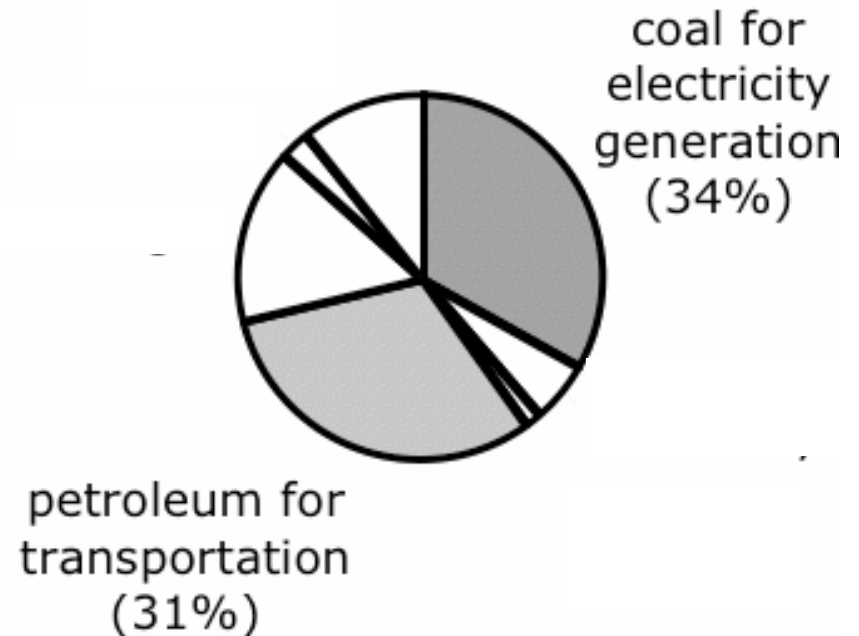
January 26, 2006

# US CO<sub>2</sub> Emissions, 2002

US GHG Emissions by Gas



US CO<sub>2</sub> Emissions by Source



(Data Source: EPA 2004)

# Research Question

- Is concern about climate change beginning to influence opinions about the possible construction of new nuclear power plants in the United States?
- Units of analysis: organizations, policies, and people.

# Research Outline

- Nuclear Power in the US
- Environmental Organizations
- The “Nuclear Industry”
- New Hampshire Case Study
- The Regional Greenhouse Gas Initiative
- Opinions of RGGI Participants
- General Conclusions

# Nuclear Power in the US

- Reactors supply about one fifth of US electricity.
- No new reactors have been ordered for several decades.
- Equipment upgrades and decreased down-time continue to result in increased production.
- Reactor owners are beginning to apply for twenty-year license extensions.
- New reactor designs have been certified.
- Substantial subsidies are available.

# Why Consider New Reactors?

- Existing US plants have operated with relatively minor impacts.
- Coal combustion is still widely used for electricity generation.
- Carbon emissions are causing climate change.
- Full fuel cycle emissions are low.

# Reasons for Skepticism

- Waste and safety challenges remain.
- Costs are uncertain and probably high.
- There is a history of emphatic opposition among environmentalists and others.
- There are many other energy sources.

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ENVIRONMENTAL DEFENSE



# Environmental Organizations

GREENPEACE

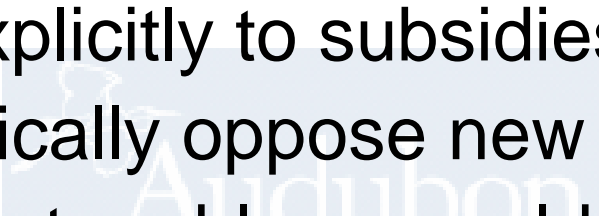
INTERNATIONAL



- Most organizations describe nuclear risks.
- Most object explicitly to subsidies.
- Some categorically oppose new reactors.
- Some imply that problems could be solved.
- Internal dissent is not evident.

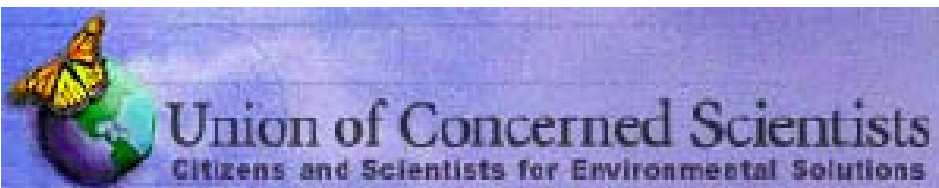


Friends of the Earth



CONSERVATION LAW FOUNDATION

ADVOCACY FOR NEW ENGLAND'S ENVIRONMENT

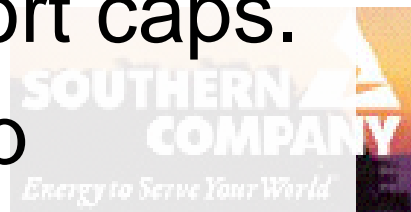


# The “Nuclear Industry”



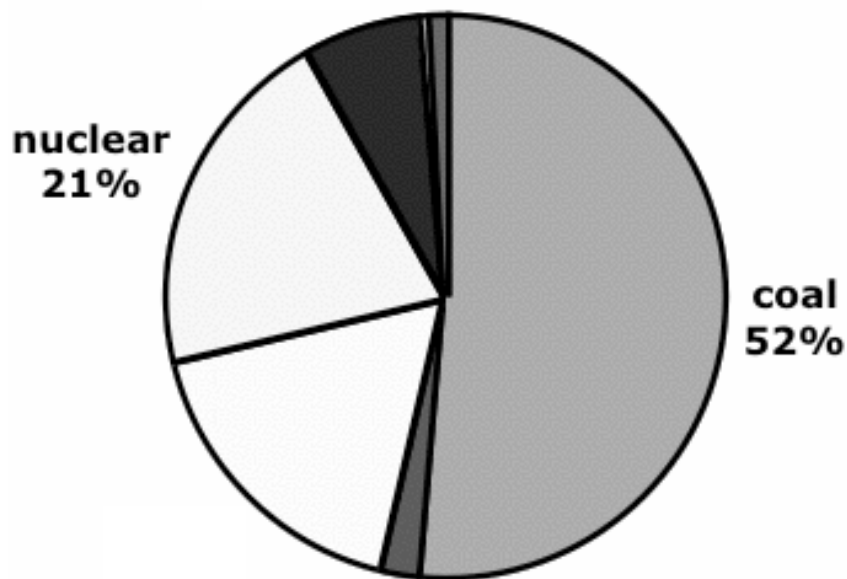
- Includes companies that own reactors.
- Many companies rely heavily on coal.
- Companies do not explicitly support caps.
- Few are aware of cross-ownership

FirstEnergy

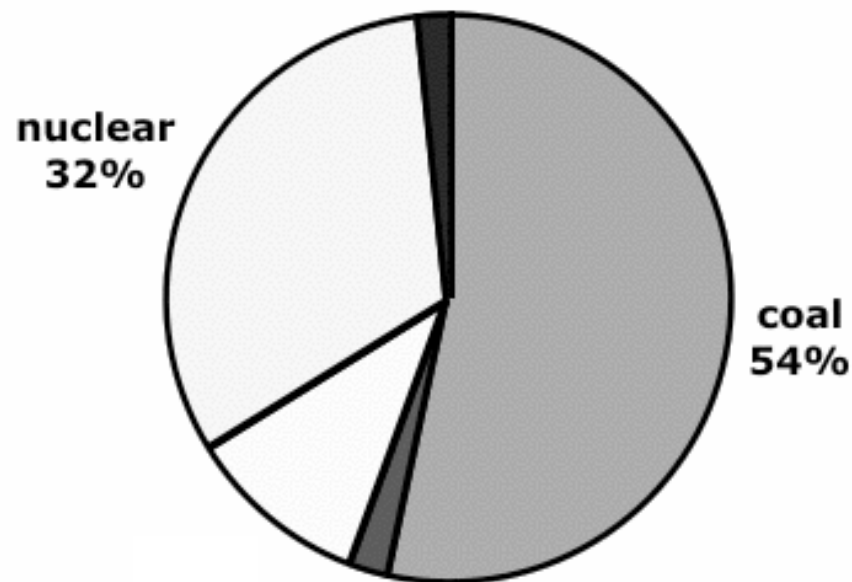


# Electric Industry Fuels, 2002

Electric Industry

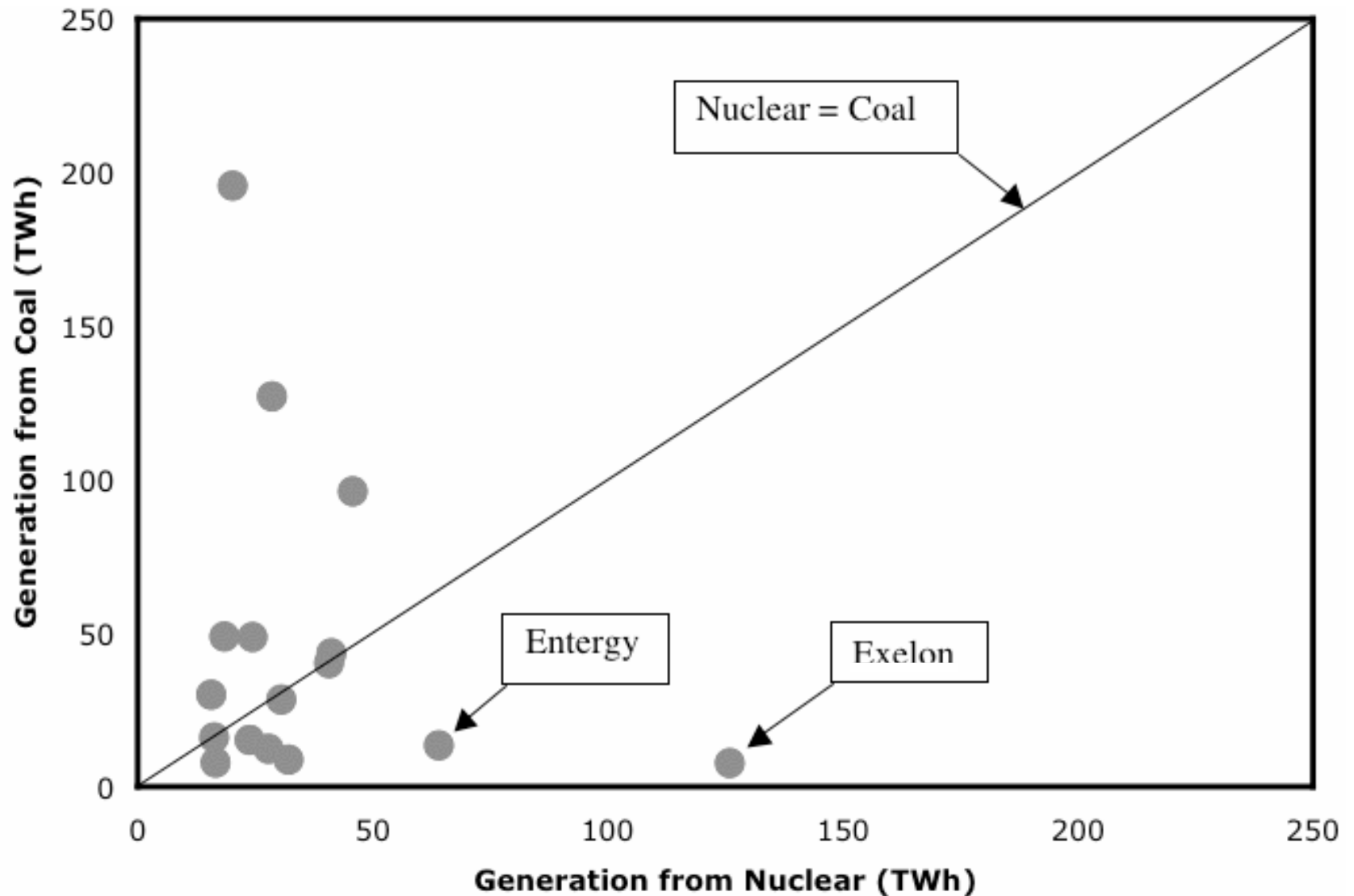


Nuclear Industry



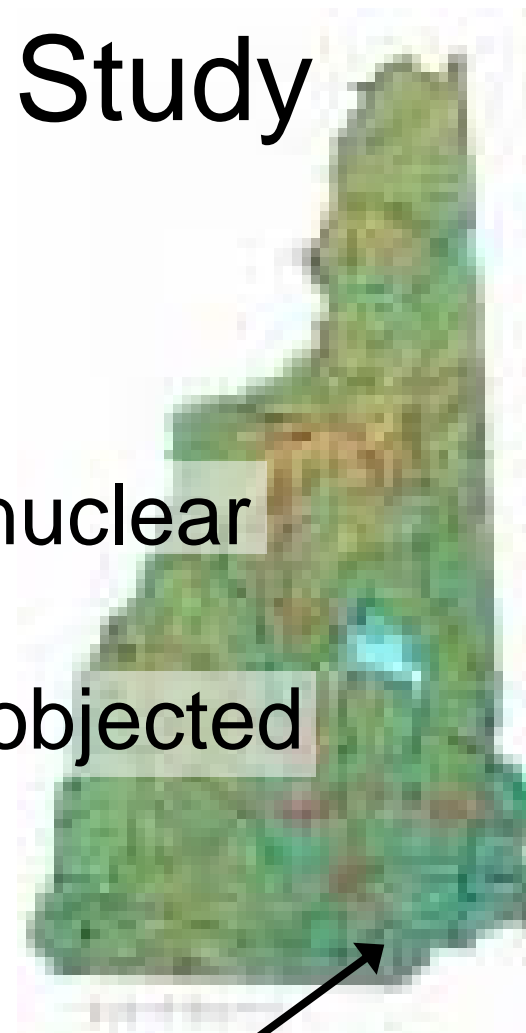
Data: *Benchmarking Air Emissions 2002* (NRDC et. al. 2003)

# The Nuclear Industry: Companies



# New Hampshire Case Study

- NH allocates NOx emissions allowances.
- Rules were changed to treat nuclear uprates like new renewables.
- Environmental organizations objected to the explicit subsidy.



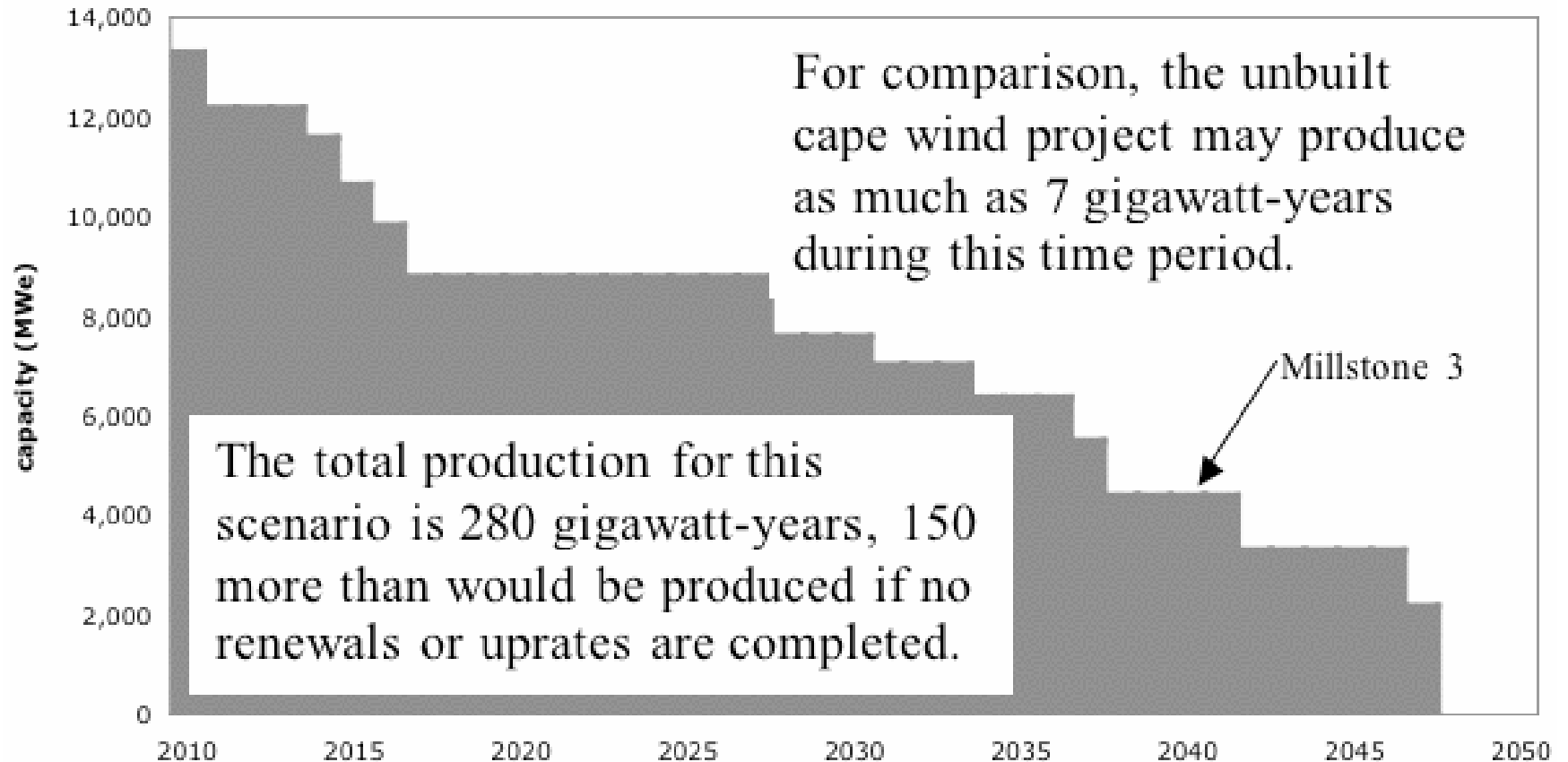
Seabrook

# Regional Greenhouse Gas Initiative (RGGI)

- Northeastern states plan to use a cap and trade system for CO<sub>2</sub> emissions from electric power plants.
- Fifteen reactors generate 30% of the region's electricity.
- Meetings include Stakeholders, a Resource Panel, and a Staff Working Group.

 = reactor

# Existing RGGI Region Reactors



The RGGI Region's nuclear plants will retire over the next 40 years. (Data Source: NRC)

# RGGI Participant Interviews

- Interviews with RGGI participants were taped and transcribed.
- Interviewees represented a cross section of organizations.
- Excerpts were organized in a spreadsheet for analysis.



	Interview	RGGI?	Non-profit	Industry?	State Gov	Stakehold	Resource	Oppose C	Oppose?	Support?	Expect?	No License		Used?	Useful Qu	NEI and M	the Packe	Risk?	Climate C	Waste?	Safety?	Proliferati	New Const	Political En	Efficiency?	Renewabl	Coal?	Gas and C	Updates a	Economics	Discussion	
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167	13	Y	Y		Y			Y					I'm not trying to shut down ev			Y										Y	Y					

# Interview Question

- *“Picture a future, perhaps only a few years away, in which the Regional Greenhouse Gas Initiative’s model rule has been successfully implemented in all participating states. Power plant emissions are falling as market forces select efficient solutions. The regional economy becomes more energy-efficient and the use of renewable energy increases markedly. And a large energy company proposes the construction of a new nuclear power plant in the region, asserting that the new reactor will help to facilitate even greater reductions in carbon pollution. Thinking of yourself, as a private citizen, how would you react to such a proposal? Why?”*

# Interview Results

- About half would be opposed given current technology; about half would be interested. Only a few were categorically opposed and about one quarter would be supportive.
- Most are skeptical that new nuclear plants will play an important role in facilitating emissions reductions.
- Reasons for skepticism include expected costs, concerns about waste, and strong preferences for expanded use of renewable energy.
- Few described explicit attempts to weigh climate risks against nuclear risks or alluded to specific potential or expected outcomes.

# The Traditional Face Off

- *“I think it would be a great idea . . . nuclear seems to be the thing that makes some sense in terms of the near future in terms of climate change. . . . we need to reduce our greenhouse emissions so much.”* (Staff Working Group)
- *“We have to figure out how to solve global warming as we phase out nuclear power. Now some will argue that means that the cuts in the other pieces will need to be deeper as a result and my answer to that is yeah, that’s right.”* (Stakeholder - Environmental)

# Evolving, Cautious Opinions

- *“Before I got involved in RGGI I would probably be totally opposed but realizing, because they’re non-emitting and they’re important for that respect . . . if someone could convince me that it’s safe, the waste . . . I wouldn’t be opposed to it.”*  
(Staff Working Group)
- *“Nuclear was absolutely the worst twenty years ago in my mind but now because of the better management of nuclear power plants and the context of climate change it’s competing almost equally in my mind for what I’ll call traditional coal.”* (Stakeholder - Industry)

# The Waste Challenge

- *“There’s a waste disposal problem that is absolutely fundamental that needs to be addressed before the technology can be relied on to a greater extent.” (Stakeholder)*
- *“I would probably react positively with only one caveat, which would be how to deal with the nuclear waste issues coming from the plant. I think . . . we’ll have some national legislation in terms of greenhouse gas issues. . . I’m hoping that at that point these various mixes of interests will say we need to do something now to solve this waste issue and to get the new nuclear plants licensed and get them built.” (Stakeholder - Industry)*

# Renewable Energy

- *“I don’t think that we gain anything by having a new fleet of nuclear plants be part of that package. . . people are becoming more familiar with all these other new technologies, people are building wind farms. . .”* (Stakeholder - Environmental)
- *“I’d have to look at . . . whether such a development would undercut more sustainable new markets like wind and other forms of renewable energy.”* (Stakeholder - Industry)
- *“In the short term I’m inclined to push against nuclear power plants. . . I would tend to want to keep pressure on the whole system to exhaust the available opportunities such as renewable energy.”* (Stakeholder)

# Coal and Sequestration

- *“Cleaner coal. . . is going to provide more of a solution than nuclear power. . . if you can sequester carbon then [coal’s] footprint is just miniscule compared to a new nuclear power plant. . . You have to figure out coal because you have all this coal resource. . . I haven’t had this huge insight with respect to nuclear power that I’ve had with respect to coal.”* (Staff Working Group)
- *“If I had the five billion dollars to spend or whatever we think the nuke is going to cost, I would spend it on carbon sequestration. . the world is going to be burning a lot of coal over the rest of my lifetime. . .”* (Resource Panel)

# On Relicensing

- Many who indicated strong opposition to new plants expressed willingness to relicense existing plants. This was true even for people that expressed particular concern about waste.
- *“I think the climate change question does factor into my thinking on the re-licensing. . . Those plants that run really well and have a decent short term on site storage solution you might consider for re-licensing.”* (Stakeholder - Environmental)
- *“I think the package doesn’t come in at costs we . . . are willing to pay. We need to buy twenty years.”* (Resource Panel)

# General Conclusions

- Growing concern about carbon emissions will drive efforts to develop non-emitting power plants. Nuclear opponents will be forced to repeatedly defend the exclusion of nuclear plants from the list of acceptable alternatives.
- Developments in nuclear technology and waste disposal methods will influence opinions and have the potential to facilitate acceptance of new reactors. They could also raise false hopes.
- Opinions about the desirability of building new reactors is likely to be very sensitive to perceptions about characteristics, especially costs, of other methods of generating electricity, including fossil fuels.

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