



CO₂ Capture Project

CO₂ Capture Project's Policies & Incentives Study Final Results

Arthur Lee

*CCP Phase 1 Results: Stakeholder Workshop
24 March 2004*

Key Messages

- **Clear momentum exists as projects are being deployed and technology continues to be researched and developed.**
- **The London Dumping Convention and the OSPAR Convention (“Oslo Paris Convention”) may apply to CO₂ capture and storage deployment offshore in geologic formations. Issues for clarification may require several years of intergovernmental negotiations in order to accommodate such deployment.**
- **In general, there is little policy and regulatory development specifically addressing CO₂ capture and storage in individual countries.**
- **Specific countries (Australia, Canada, Netherlands, Norway, UK, US) are moving in the direction of policy development specific to CO₂ capture and storage.**
- **Public awareness is low to non-existent. Some NGOs will likely play a key role in public acceptance of the technology.**



Key Messages

- **Some non-government organizations (NGOs) and the public in the European Union are becoming slightly less skeptical of the technology. However, it is still too early to assess the level of public skepticism, which will become clearer when specific projects are reviewed for permitting or licensing.**
- **Existing and emerging financial incentives in Australia, Canada, the European Union, Denmark, Germany, Italy, Netherlands, Norway, the United Kingdom, and the United States are focused principally on research and development. Such incentives are needed to improve the cost-effectiveness for deploying CO₂ capture and storage technology.**
- **CO₂ capture and storage technology is becoming recognized and credited in some regulatory regimes, though it is not yet widely recognized nor credited. A monitoring and verification framework is needed to achieve wide recognition and crediting.**



P&I Team Mission Statement

- **The Policy & Incentives Team provides information and advice to the CO2 Capture Project Executive Board on national and global policies, regulations and legislation, incentives and any other external developments that may impact or benefit the technology program being developed by the CO2 Capture Project.**
- **CO2 Capture Project Executive Board recognized very early on that technology, policy, and public acceptance are intertwined and this team was formed in early 2002.**



P&I Team Objectives – Reaching Most Objectives

- ✓ Complete a survey of existing policies, regulations, and incentives that impact or benefit CO₂ injection and storage in geologic formations. (*Updating the 2002 study*)
- ✓ Complete a survey of existing policies, regulations, and incentives that impact or benefit CO₂ separation and capture technologies. (*Updating the 2002 study*)
- 1/3 Prioritize the list of “roadblocks” that may impact the project and the list of incentives that are available.
- ✓ Gap analysis needed to formulate the economic, legal and policy framework that will fulfill “where we want to be.”
- 1/3 Make recommendations to the Executive Board of the CO₂ Capture Project on appropriate actions to address issues identified.
- ✓ Establish a network monitoring function for the team and share information about proposed regulations, policies, and incentives that can affect the CO₂ Capture Project. Through this monitoring function, identify potential opportunities to inform the debate on CO₂ capture and geologic storage.



Members

- **Dag Christensen (Norsk Hydro)**
- **Jan Hartog (Shell)**
- **Arthur Lee (ChevronTexaco) – Team Lead**
- **Georgia Callahan (ChevronTexaco, alternate)**
- **Bill Senior (BP) / Mark Akhurst (BP, alternate)**
- **Alison Taylor (Suncor) / Geoff Johns (Suncor)**
- **Frede Cappelen (Statoil)**
- **Giuseppe Iorio (ENI, also Board member)**
- **Jim Provias (Suncor, also Board member)**



Actions by the Team

- **Identified road blocks for successful CO₂ capture and storage applications**
 - CO₂ potential classification as a waste is a key issue
 - London Convention and OSPAR
 - EU Water Directive
 - Overly burdensome site assessment, monitoring, verification requirements
- **Identified the need for geologic sequestration to fit into carbon crediting and trading schemes (e.g., EU Emissions Trading's M&V Guidelines will need to include CCS.)**
- **Keep a watching brief on political and legal/government developments in key countries and supra-national and scientific bodies including the IPCC**

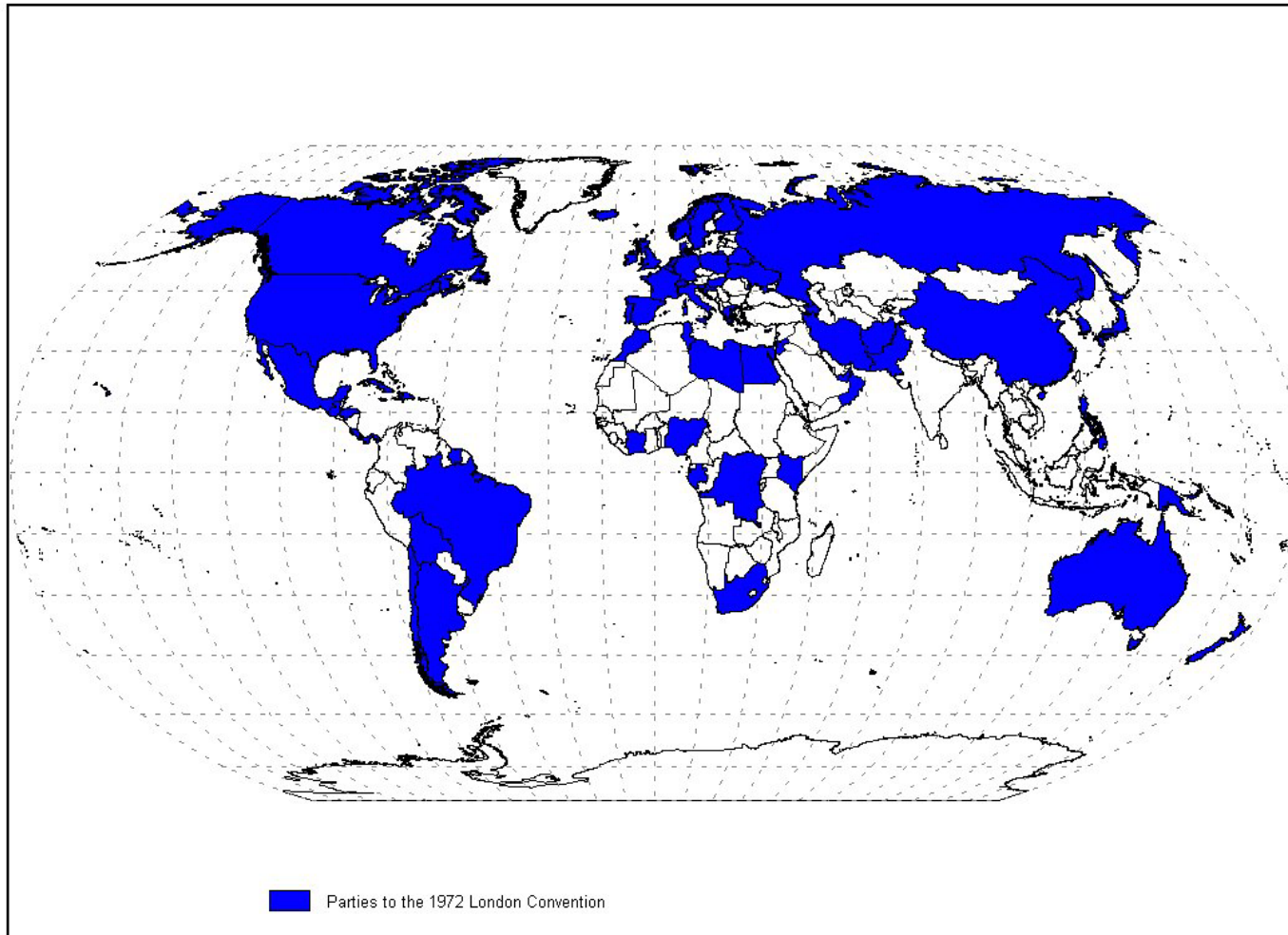


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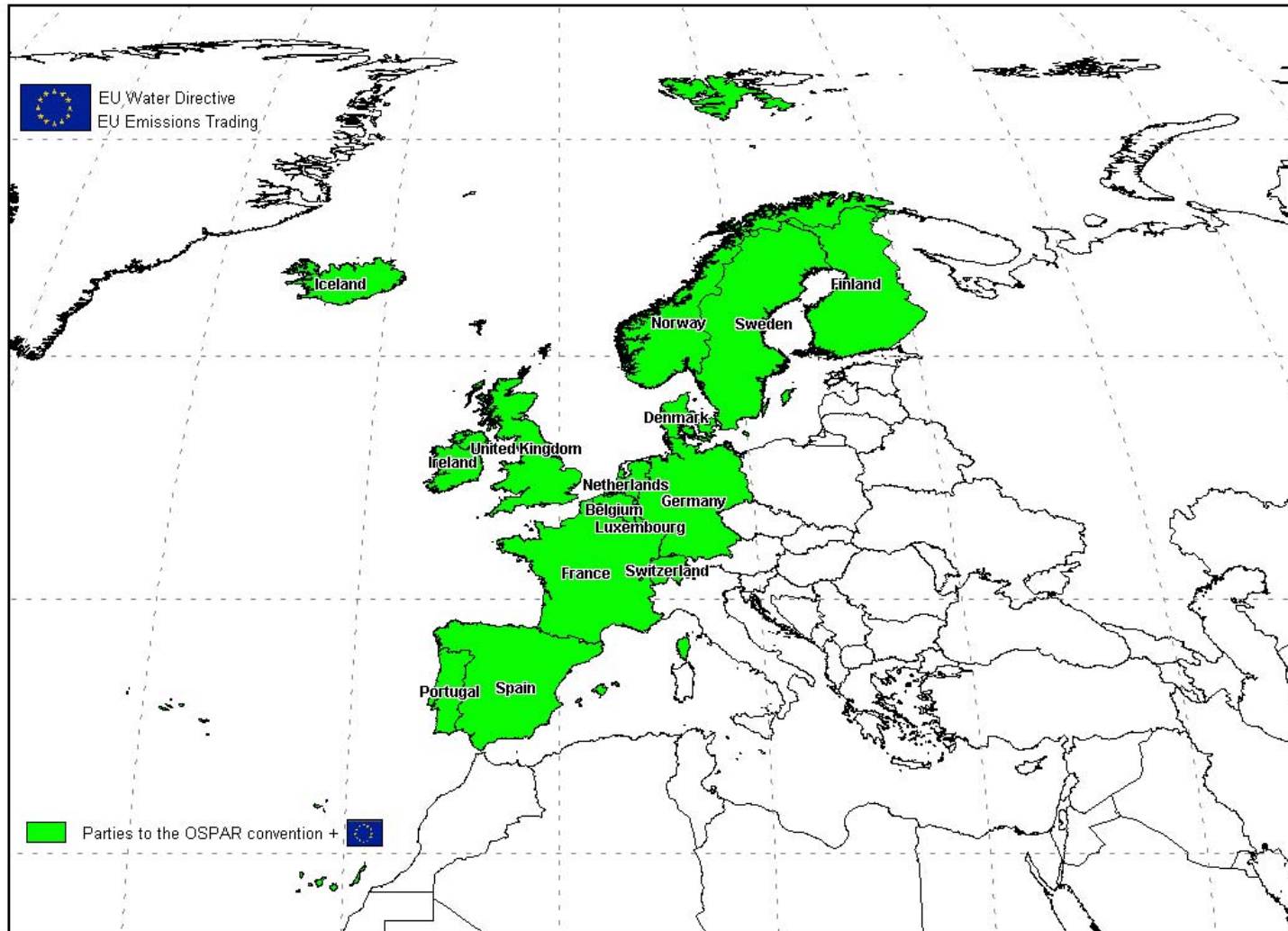
- **Key countries in scope of study**
 - Australia
 - Canada
 - Denmark
 - Germany
 - Italy
 - The Netherlands
 - Norway
 - UK
 - USA
 - In addition a brief survey with lower level of detail on China or a maximum of two other countries known to be active in this area is of interest. (Suggestions of Japan was heard at the MIT CSI Forum.)
- **Look for opportunities in public forums to promote workable policies and effective incentives for CO2 capture and storage**
 - Example: 2nd Annual DOE Carbon Sequestration Forum (Moderator's introduction and setup questions and issues) in May 2003
 - Example: Norcap Seminar, October 2003
 - Example: IPIECA CO2 Capture and Storage Workshop, October 2003
 - Example: MIT Carbon Sequestration Initiative Forum, November 2003
 - Example: Stakeholder Workshop, March 2004
 - Example: DOE Third Conference on Carbon Sequestration, May 2004
 - Scheduled Project Roll-out: Brussels, June 2004
 - Scheduled Project Roll-out: GHGT7, September 2004



Parties to the London Convention



Parties to OSPAR Convention



London and OSPAR Conventions

- **The overall intent of these treaties is to prohibit the dumping of wastes.**
- **The definition and handling of CO₂ will be an important determinant for implementation, particularly in offshore locations. Three factors are relevant:**
 - Whether the captured CO₂ is being stored or is, in effect, being disposed of
 - Whether the CO₂ is being placed in the water column or in the seabed and its subsoil as part of a scientific experiment as a prelude to CO₂ capture and storage or as part of the CO₂ capture and storage process
 - Whether the CO₂ contains impurities resulting from the capture stage (e.g. H₂S).



London and OSPAR

- **The discussions around the relevance of the London Convention to CO₂ capture and storage have only just begun.**
- **To make changes to the language of the Protocol or to clarify the intent of specific provisions will require long negotiations between nations that are parties to these international treaties.**
- **Therefore, the lack of clarity in these issues poses a potential barrier to the offshore deployment of CO₂ capture and storage.**
- **Amendments may be needed to develop the appropriate regulations of CO₂ storage within the frameworks of the London Convention.**



EU Water Framework Directive

- **The EU Water Framework Directive aims to “maintain and improve the aquatic environment in the Community.” The Directive has two main objectives:**
 - Achieve and maintain water quality (‘good status’) by the deadline of 2015;
 - Ensure that the quality of all ground and surface water does not deteriorate below present status.
- **The Directive defines a pollutant as:**
 - “the direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which may be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment.”
 - CO₂ is not on the Directive’s lists of pollutants or dangerous substances.
 - Potential triggers include whether CO₂ injection and storage has potential impact to ground and surface waters.



Final Results -- Policies

Country	Supportive Policies or Regulations <i>specific to CO₂ capture and storage</i>	Restrictive Policies or Regulations <i>specific to CO₂ capture and storage</i>	Supportive Policies or Regulations <i>extended to CO₂ capture and storage</i>	Restricting Policies or Regulations <i>extended to CO₂ capture and storage</i>	Will lack of regulatory framework restrict CCP projects development? (Yes/ No)	Limited awareness, Negative (-ve) or Positive (+ve) NGO actions?	Limited awareness, Negative (-ve) or Positive (+ve) public opinion?
EU	x	x	✓	✓	Yes	+ve	Limited
Denmark	x	x	✓	✓	No	-ve	Limited (potentially -ve)
Germany	x	x	x	x	Yes	-ve	-ve
Italy	x	x	x	✓	No	+ve	+ve
Netherlands	✓	x	✓	✓	No	-ve	Limited
Norway	x	x	✓	✓	No	-ve ^[1]	Limited
The UK	✓	x	x	✓	Yes	-ve and +ve	-ve
USA	x	x	✓	✓	Yes	Limited	Limited
Canada	✓	x	✓	✓	Yes	Limited	Limited
Australia	x	x	✓	✓	Limited	-ve	-ve
China	x	x	x	x	-	Limited	Limited



x: no existing Policies or Regulations; ✓: Policies or Regulations exist;

Final Results -- Policies

- **Little progress in the development of policy and regulatory frameworks for CO₂ capture and storage in the countries of interest to this study.**
- **Some non-government organizations (NGOs) and the public in the European Union are becoming slightly less skeptical of the technology.**
- **It may still be too early to assess the level of public skepticism, which will become clearer when specific projects are reviewed for permitting or licensing.**



Final Results -- Policies

- **Australia, Canada, Netherlands, Norway, UK and US are developing or implementing policy measures aimed at promoting the use of CO2 capture and storage.**
 - US is revising 1605b guidelines to include detailed monitoring and verification provisions.
 - UK has not yet developed policies specifically aimed at CO2 capture and storage, but has developed recommendations that encourage a move in that direction.
 - The Alberta government has announced that 2003 greenhouse gas emissions are required to be reported in 2004.
 - Norway proposed a strategy to develop gas-fired power generation with CO2 capture and storage.
 - Netherlands Electricity Act of 2003 through tax exemptions will promote carbon neutral electricity including CO2 capture and storage.



Final Results -- Incentives

Country	Existing or expected financial incentives?	Existing or expected financial disincentives?	Existing or expected program or funding?	Existing or expected Capture and storage pilot or demonstration projects?
EU	✓	✗	✓	✓
Denmark	✗	✓	✓	✓
Germany	✓	✗	✓	✓
Italy	✓	✗	✓	✓
The Netherlands	✓	✓	✓	✓
Norway	✓	✗	✓	✓
The UK	✓	✗	✓*	✓
USA	✓	✓	✓	✓
Canada	✓	✗	✓	✓
Australia	✓	✗	✓*	✓*
China	✗	✗	✗	✗

✗: non existant; ✓: existant; * expected



Final Results -- Incentives

- **Clear momentum exists as projects are being deployed and technology continues to be researched and developed.**
- **In the EU, Australia, Canada and US, additional efforts for R&D programs and other financial incentives emerged in 2003.**



MIT Carbon Sequestration Initiative's Preliminary Results of a Public Awareness Poll

- Tom Curry, Howard Herzog, et al.
- **Knowledge Networks**
 - Maintain a membership panel representative of the United States.
 - Randomly select the panel from the general public.
 - Randomly select panel members to answer each survey.
 - Conduct surveys using the Internet.
- **Survey Design**
 - Influenced by the MIT “Future of Nuclear Power” survey.
 - 20 questions.
 - 1,205 respondents out of 1,710 (70%).
 - Results are representative of the general public.

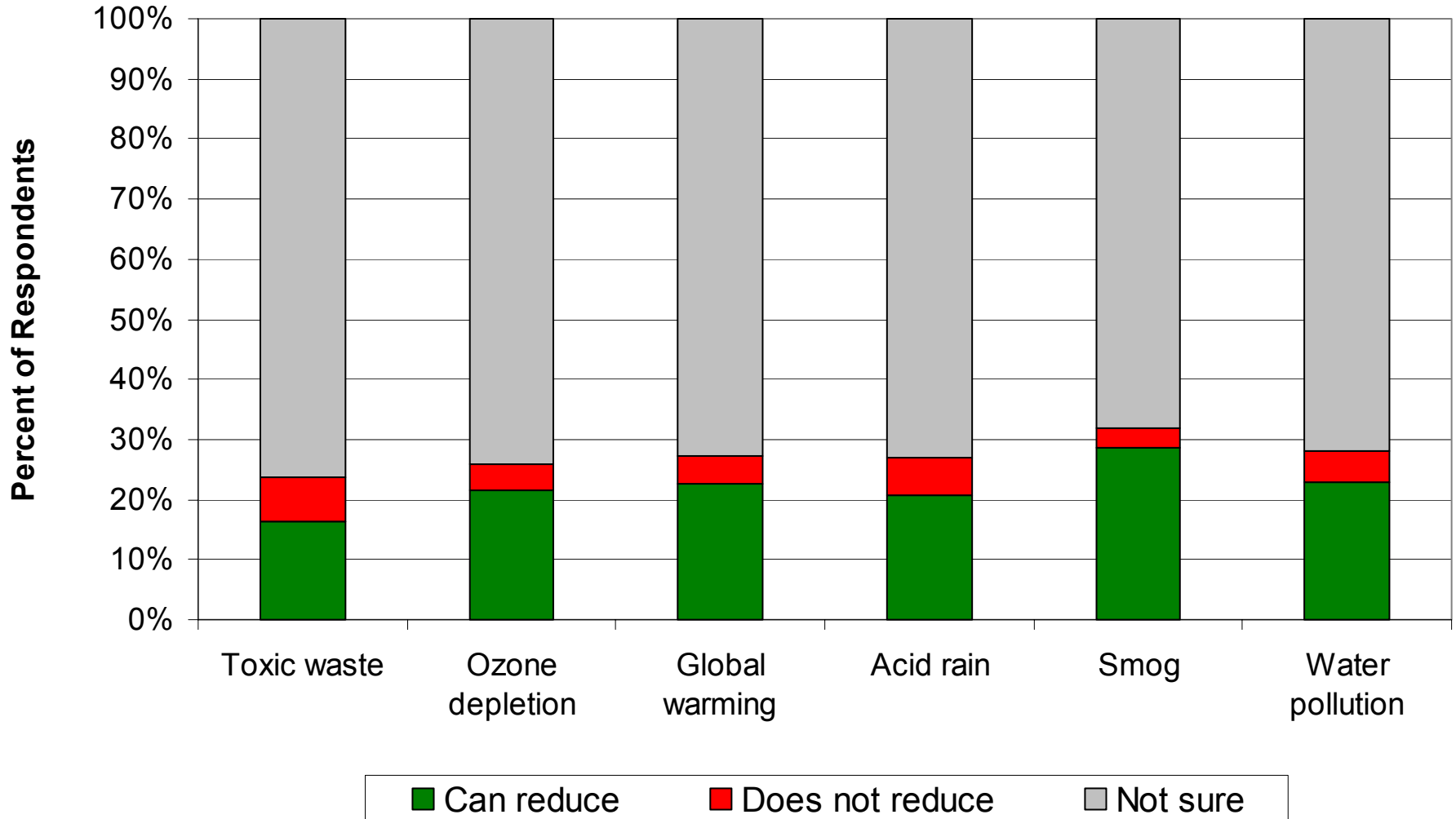


MIT Carbon Sequestration Initiative's Preliminary Results of a Public Awareness Poll

- Tom Curry, Howard Herzog, et al.
- “Understanding Technology”
- What environmental concerns can carbon sequestration or carbon capture and storage reduce?
- Panel members given a list of 6 environmental concerns and asked if carbon sequestration or carbon capture and storage can reduce or does not reduce each. Panel members could also indicate they were not sure.



Select if "carbon sequestration" or "carbon capture and storage" can reduce each of the following environmental concerns.

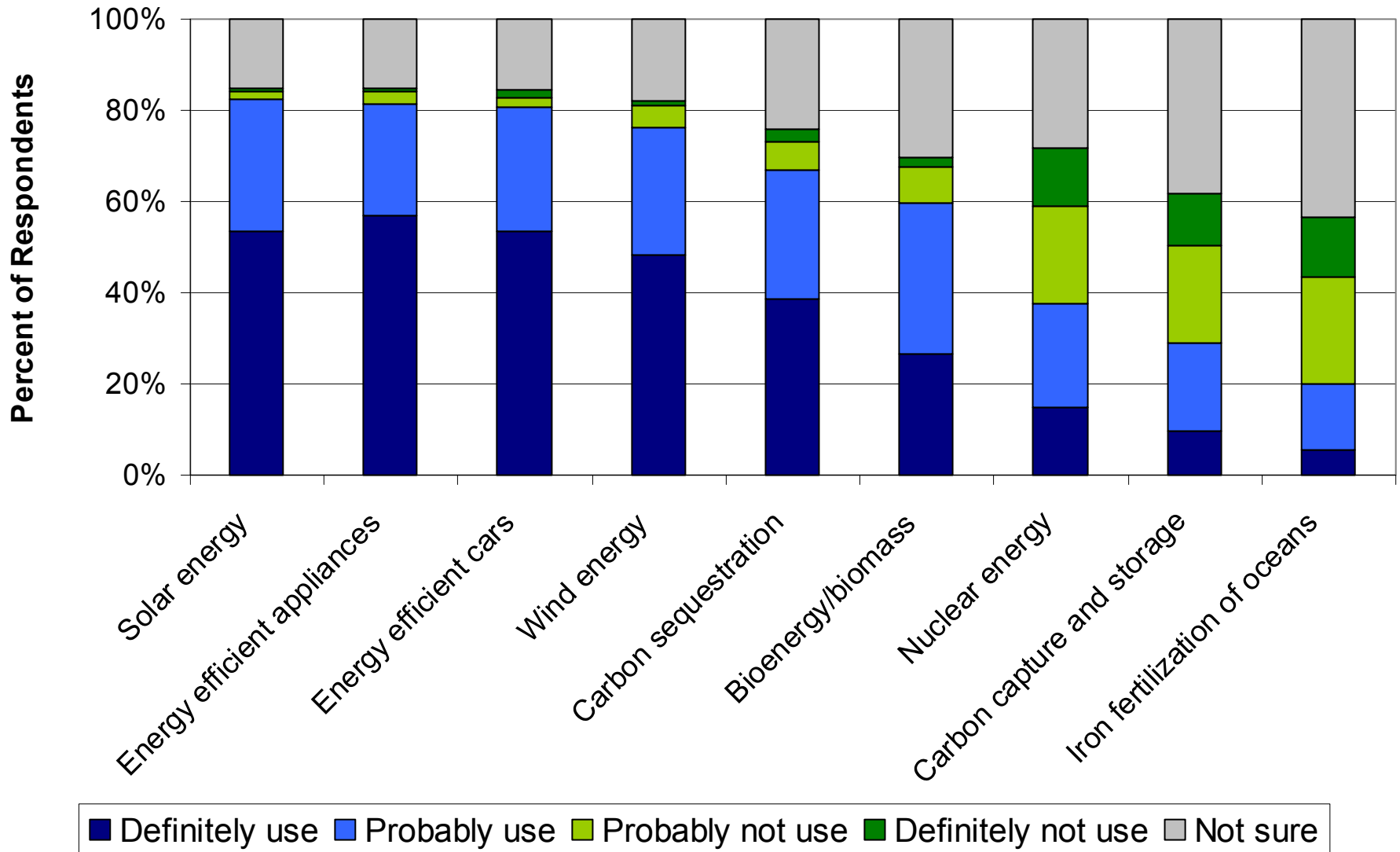


MIT Carbon Sequestration Initiative's Preliminary Results of a Public Awareness Poll

- Tom Curry, Howard Herzog, et al
- “Addressing Climate Change”
- What technologies would the public use to address global warming?
- Panel members given a list of 9 technologies and asked to indicate if they would definitely use, probably use, probably not use, or definitely not use each technology to address global warming. Panel members could also indicate they were not sure.



Would you use these technologies to address global warming?



2003 Final Results – Key Messages

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