



Natural Resources
Canada

Ressources naturelles
Canada

C E T C

CANMET ENERGY TECHNOLOGY CENTRE

Canada's CO₂ Capture and Storage Technology Roadmap

CLEAN ENERGY TECHNOLOGIES

3rd CSLF Capacity Building Workshop

January 29th, Saudi Arabia

Bill Reynen

Canada 





Outline

- Why a roadmap?
- Participants
- The Roadmap's Roadmap
- Roadmap Structure
- Critical Objectives
- Linkages
- Implementation



Why a Roadmap?

CO2 Capture & Storage Technology Roadmap

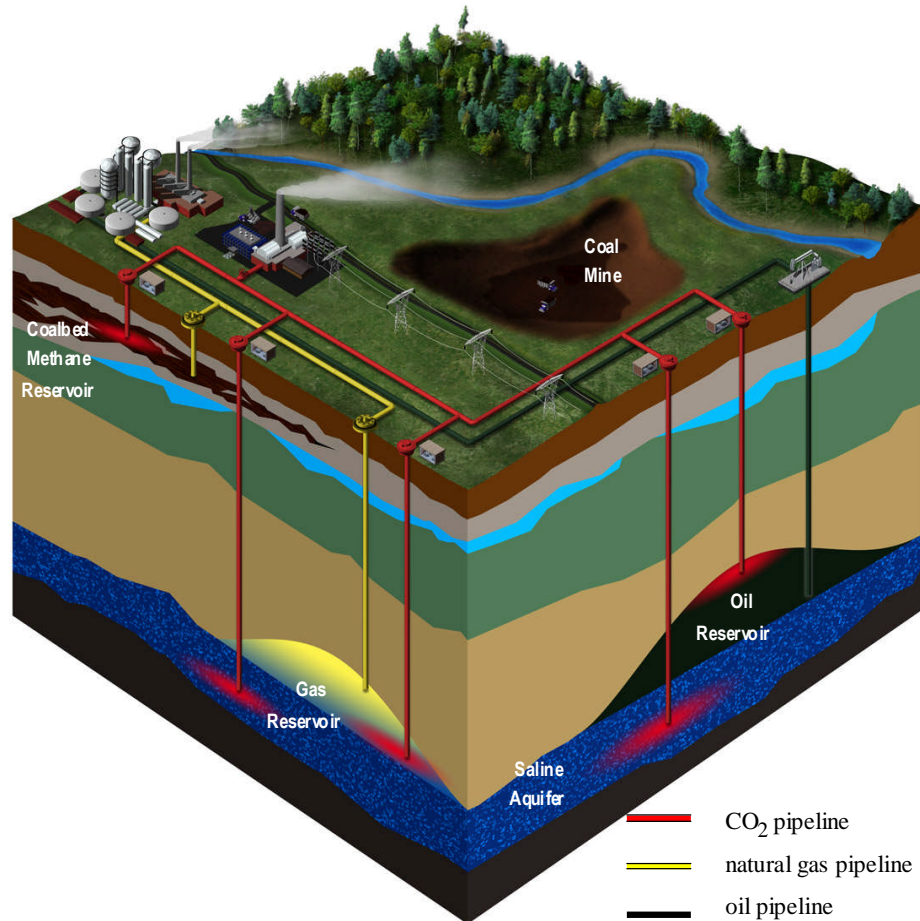
The Roadmap was developed in cooperation with industry and government stakeholders to help formulate a climate change mitigation strategy employing CCS technology for large industrial emitters.

Some of the key questions addressed included:

- What will tomorrow's fossil fuel industry look like?
- What technologies will be required to support that vision?
- When should they be ready?
- What actions are required?



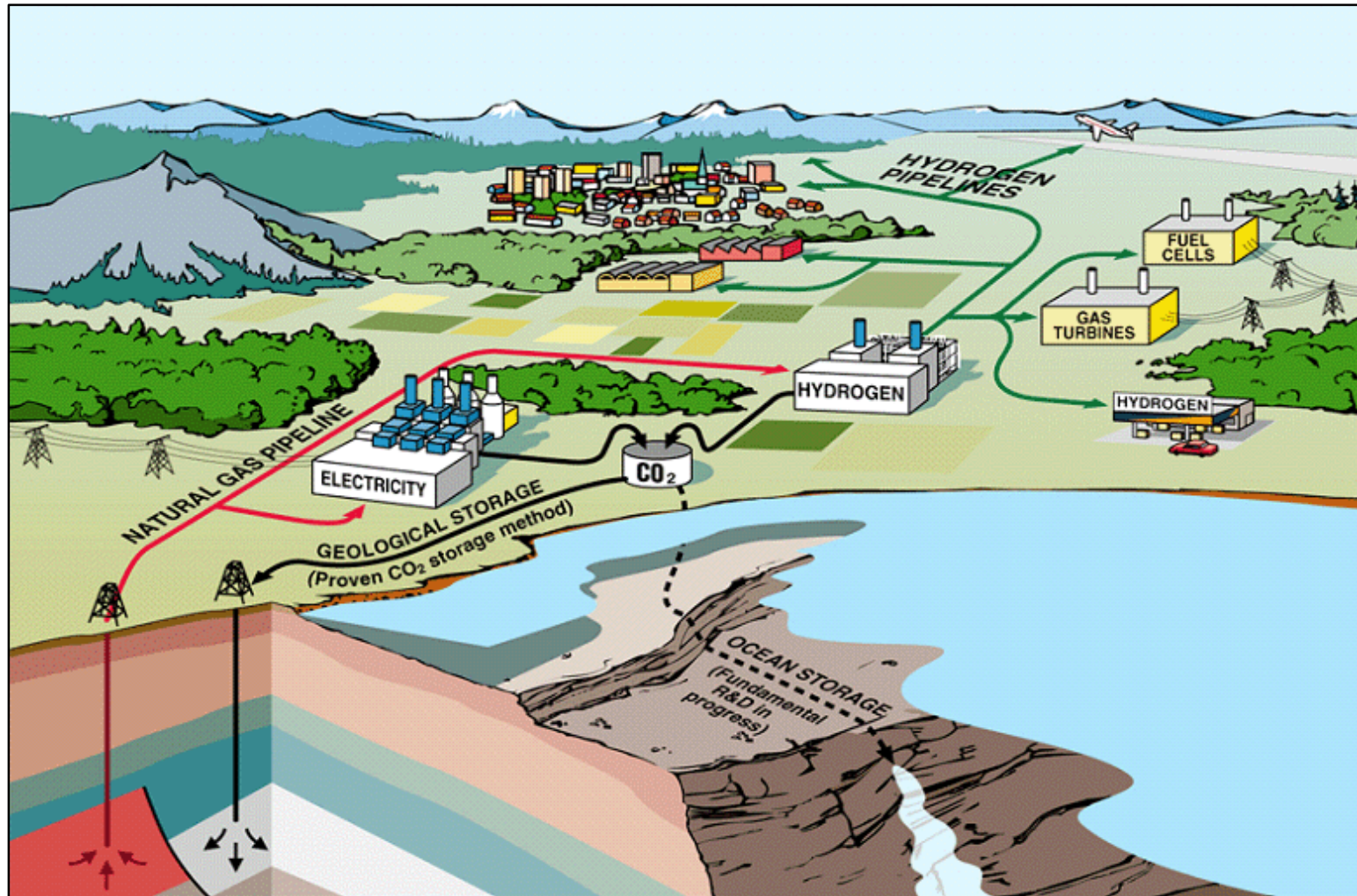
Geologic Storage of CO₂



- Storage in geologic formations over geologic time
- Options include: oil reservoirs, coalbed methane reservoirs, depleted oil and gas reservoirs and deep saline aquifers
- Injection into oil reservoirs and coalbed methane reservoirs produces oil and gas revenues which can offset costs
- Afford the time to continue to use fossil fuels until renewables are developed
- CO₂ for re-pressurization of gas caps



A vision for a future energy industry



Adapted from Olav Karstaad , Statoil, Norway



Participants

- 3 workshops were held over a 3 year time period
- Over 180 people from industry, academia, provincial & federal governments participated in these workshops and in developing Canada's Technology Roadmap
- Experts from Canada, USA, UK, Norway and Australia
- NGO's (environmental groups) also included in workshops

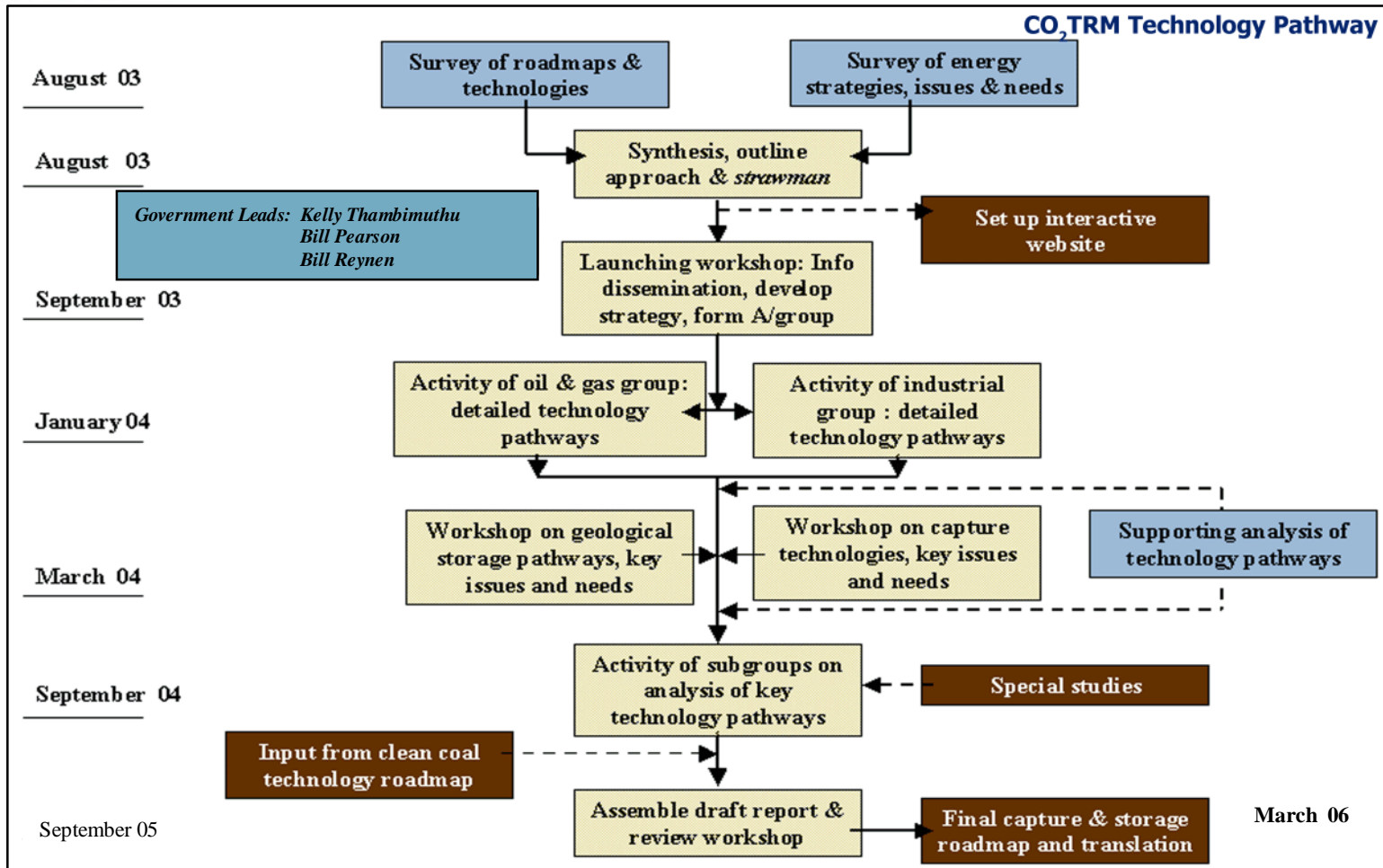




Financial Support and In-kind Assistance

- The CCSTRM received primary funding from Industry Canada and Natural Resources Canada (NRCan). The following organizations also provided in-kind or financial support (in alphabetical order):
 - Advanced Resources International
 - Alberta Energy Research Institute
 - Alberta Research Council
 - BP North America Corporation
 - CANMET Energy Technology Centre – Devon
 - CANMET Energy Technology Centre – Ottawa
 - Carnegie Mellon University
 - CO2CRC Program
 - International Energy Agency Greenhouse Gas Programme
 - Fluor Canada Ltd.
 - Natural Resources Canada
 - Natural Resources Defense Council
 - Statoil
 - United States Department of Energy
 - University of Regina

The Roadmap's Roadmap



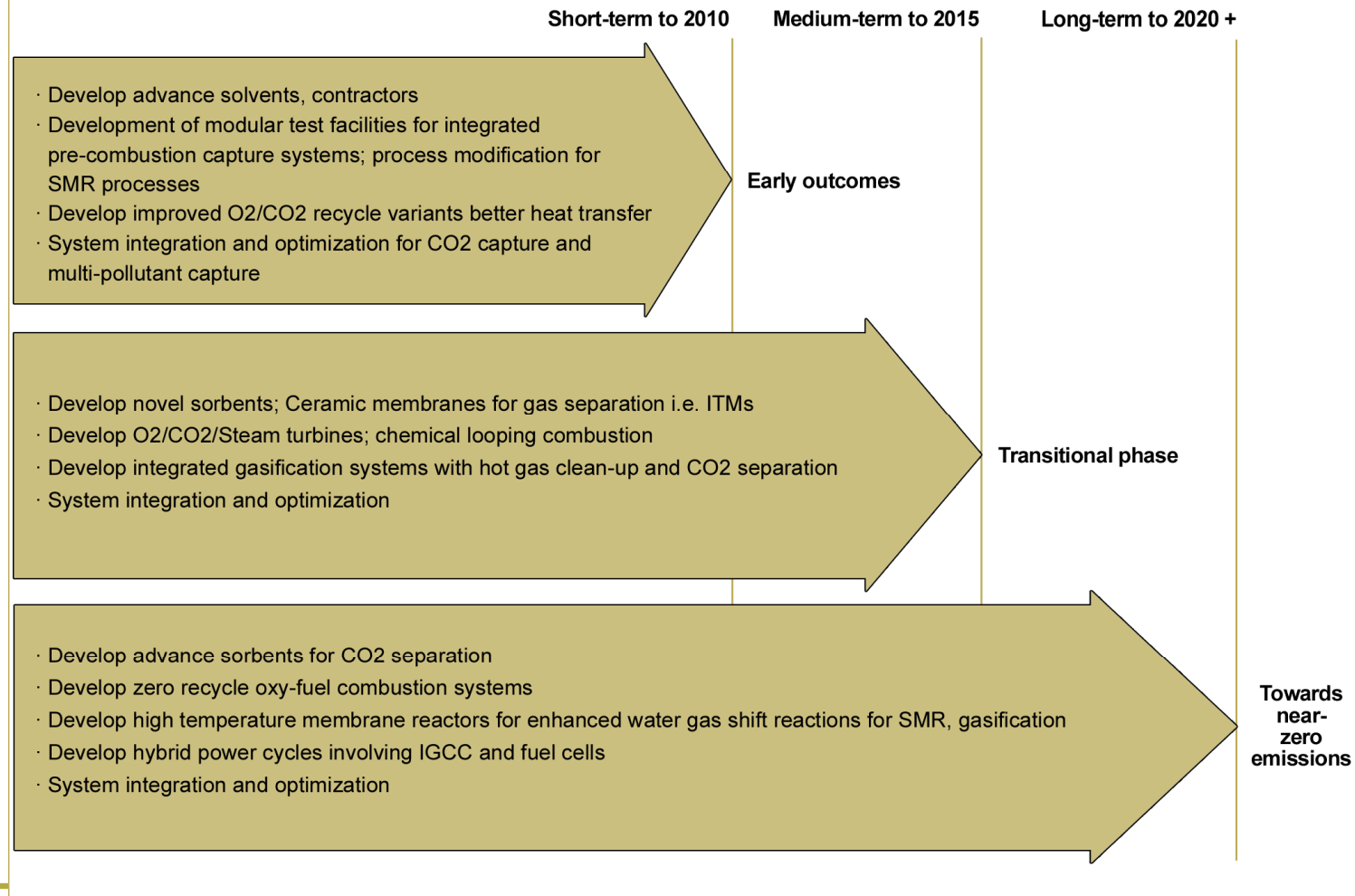


Roadmap Structure

1. The Canadian Advantage –
Carbon Dioxide Capture and Storage
2. The Global Challenge – an Issues Scan
3. The Opportunity – Cleaner Fossil Fuels
4. Technology Pathways
5. The Way Forward

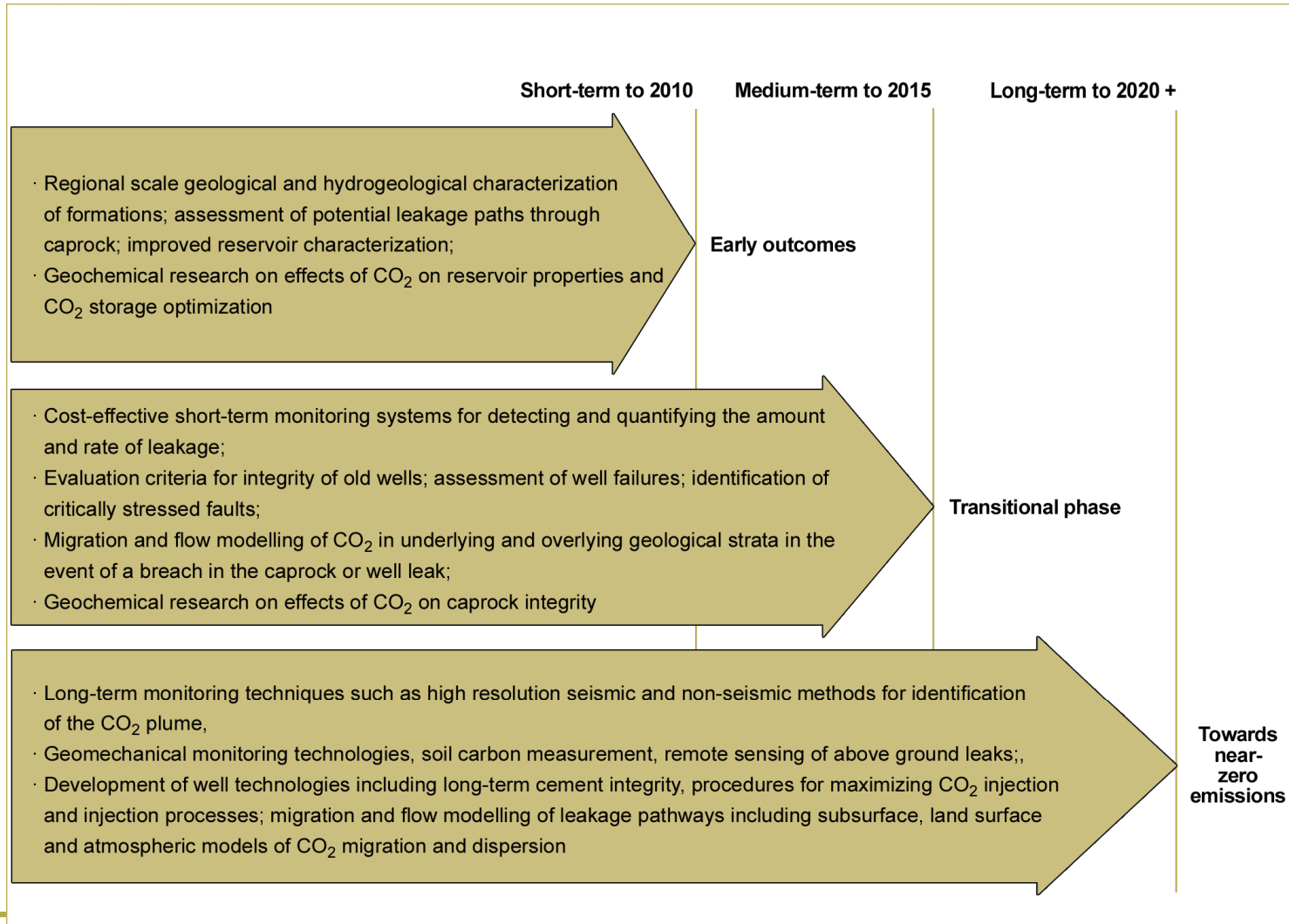


The Path Forward- Capture





The Path Forward - Storage





Critical Objectives

- Policy development
- Regulatory frameworks
- Public outreach and education
- Technology watch and international collaboration
- Address technology gaps
- Demonstration
- National coordination



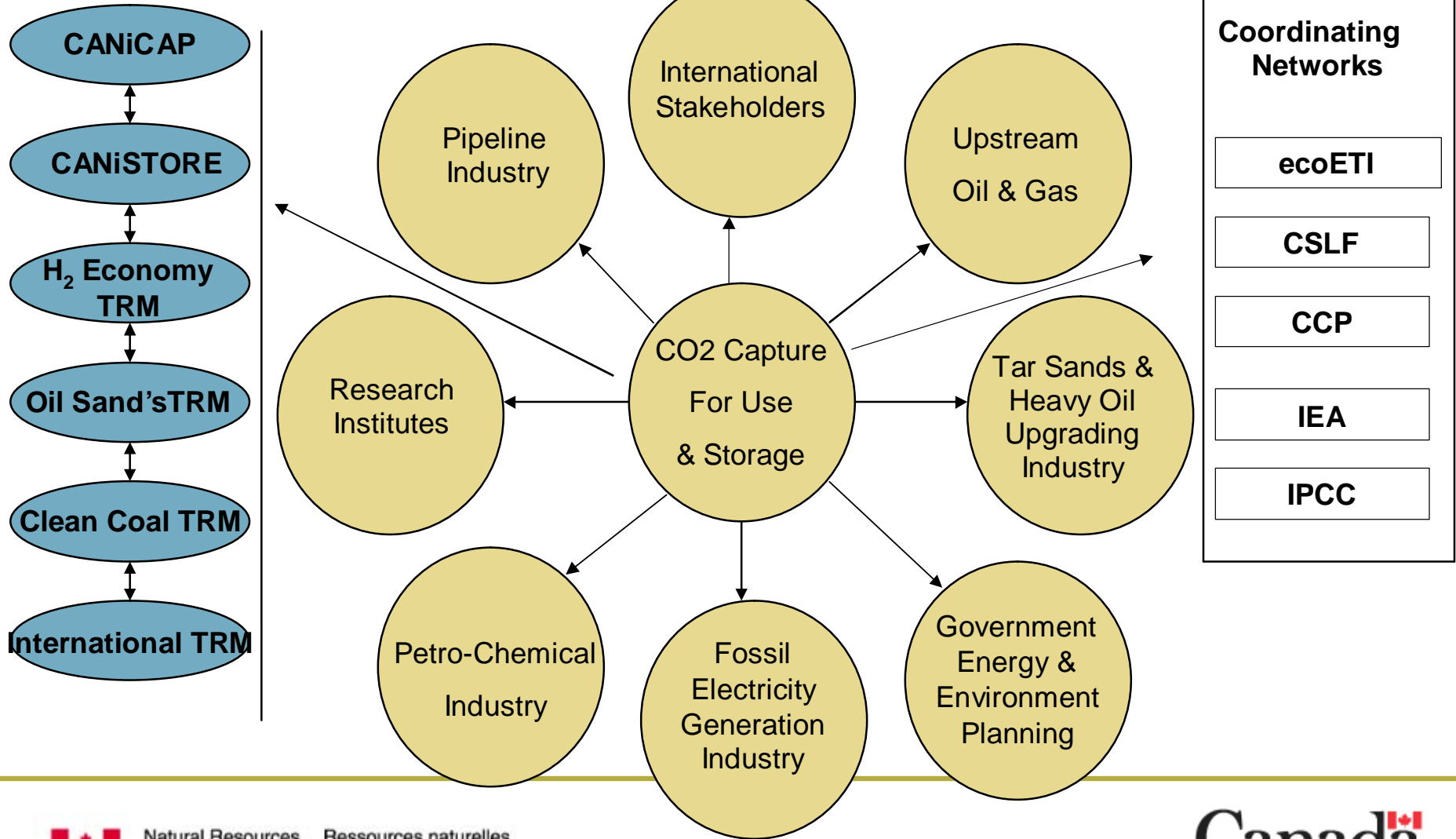
Implementation

- Original implementation was to be undertaken the designation of “champions” for each critical objective
- Political uncertainty prevailed for almost two years
- In the meantime, funding through existing R&D programs based on compliance with CCSTRM criteria
- Current government canvassed industry on how to implement CCS
- Industry responded with the CCSTRM
- Task Force established by Prime Minister
- Task Force provided policy and regulatory recommendations to Ministers on January 9th



Linkages

Cross Cutting Roadmaps





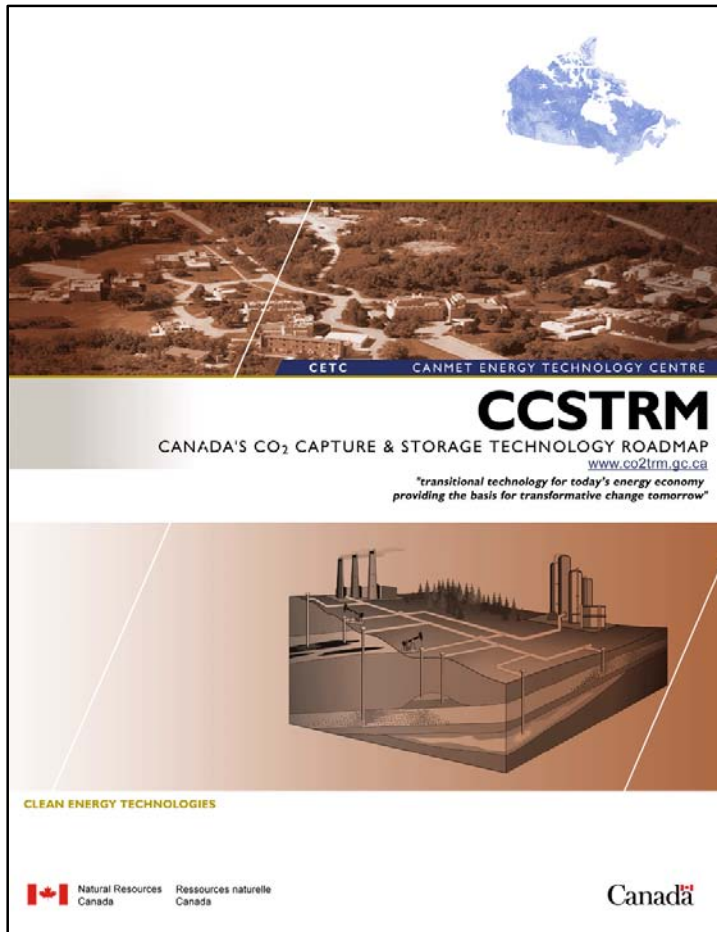
Linkages

- CCSTRM Roadmap
 - www.co2trm.gc.ca
- CCTRM Roadmap
 - www.cleancoaltrm.gc.ca
- Oil Sands Roadmap
 - http://www.acr-alberta.com/Projects/Oil_Sands_Technology_Roadmap/Oil_Sands_Technology_Roadmap.htm
- Hydrogen Roadmap
 - <http://strategis.ic.gc.ca/epic/internet/inhfc-hpc.nsf/en/mc00006e.html>





Release of CCSTRM



- The Canadian CO₂ Capture & Storage Technology Roadmap was released March, 2006
- Be sure to visit our website for updates
www.co2trm.gc.ca