Major Economies Business Forum
on Energy Security and Climate Change
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Role of Business and Technology in Managing Climate Risks

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on Energy Security and Climate Change

ACCI

BUSA
BUSINESS UNITY SOUTH AFRICA

AUSTRALIAN INDUSTRY GROUP

BUSINESSEUROPE

CBI
THE VOICE OF BUSINESS

CONFINDUSTRIA

USCIB
UNITED STATES COUNCIL FOR INTERNATIONAL BUSINESS

Confederation of Danish Industry

MEDEF

CII
Confederation of Indian Industry

CNECC
China New Energy Chamber of Commerce
中华全国工商业联合会新能源商会

TUSIAD 40

IDEAS
Iniciativa para el Desarrollo Ambiental y Sustentable

KCCI

BISD

CNI
National Confederation of Industry
Brazil

一般社団法人
日本経済団体連合会

BusinessNZ

CANADIAN COUNCIL of CHIEF EXECUTIVES
CONSEIL CANADIEN des CHEFS D'ENTREPRISE

BDI
Industrieland Deutschland stärken.

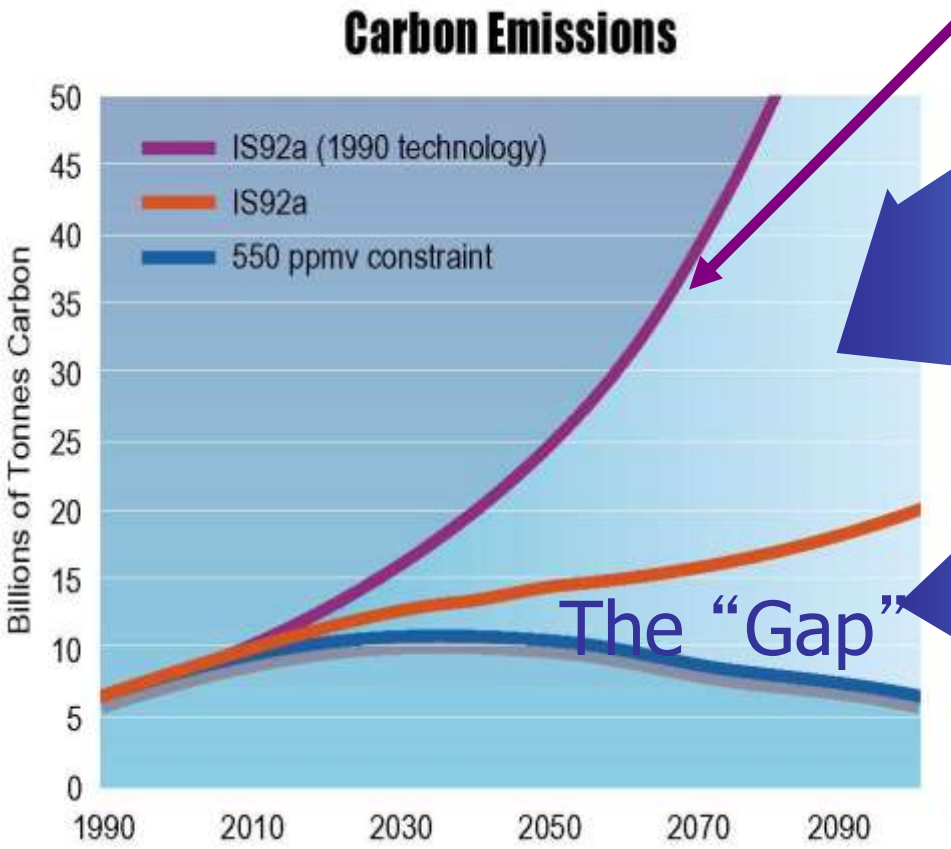
ICMM
International Council on Mining & Metals

POLISH CONFEDERATION
LEWIATAN

The Need for Innovative Technology

Technology frozen at 1990 efficiency levels

Source: J. Edmonds
PNNL



Assumed Advances In:

- Fossil Fuels
- Energy intensity
- Nuclear
- Renewables

Gap Technologies:

- Carbon capture and storage
- Nuclear
- H_2 and advanced transportation
- Bio-technologies
- Solar

Mitigation cost estimates depend sensitively on assumptions about the availability, cost, performance and public acceptance of advanced technologies

Technology Objectives

- Promote more widespread use now of existing efficient technology in developed and developing countries
- Encourage earlier retirement of less efficient but still productive technology
- Stimulate research and development to create innovative, affordable, lower GHG technologies sooner

Twin International Energy Challenges

- Meeting significant increase in energy demand and improving access to energy
- Responding to GHG risks

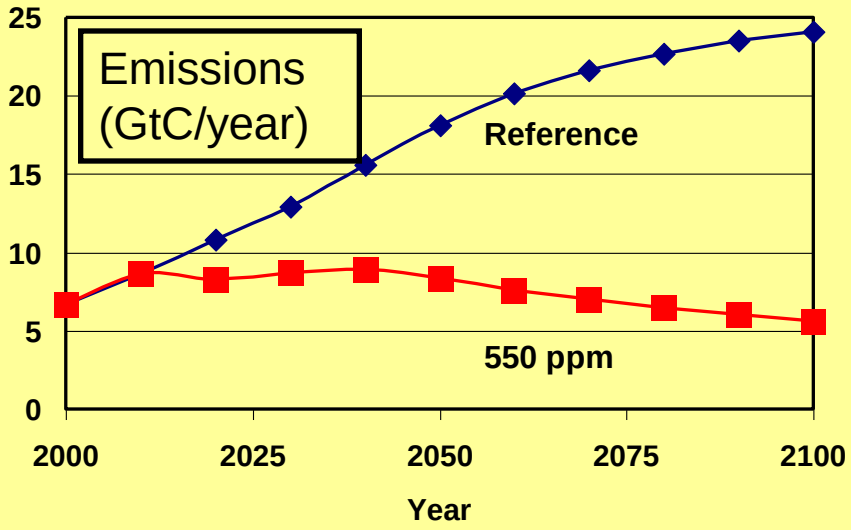
Context (IEA):

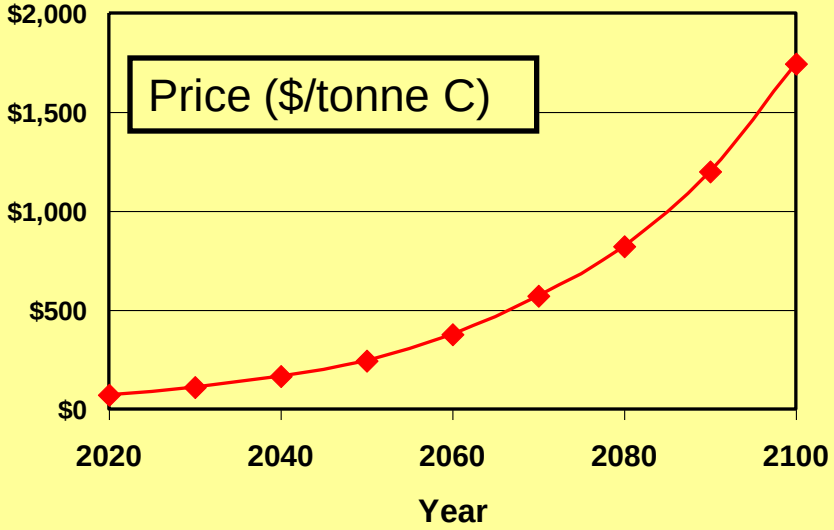
2B	People without access to commercial energy
$22T	Investment (through 2030) energy supply and distribution
$45T	Investment (through 2050) to manage climate risks

Accelerated development and deployment of advanced technology will be essential to meet aspirations and manage risks at affordable costs

Deployment will require thousands of multi-billion dollar investment projects, many for *currently non-commercial or politically challenged technologies*

Economic Models Explore CO_2 Stabilization



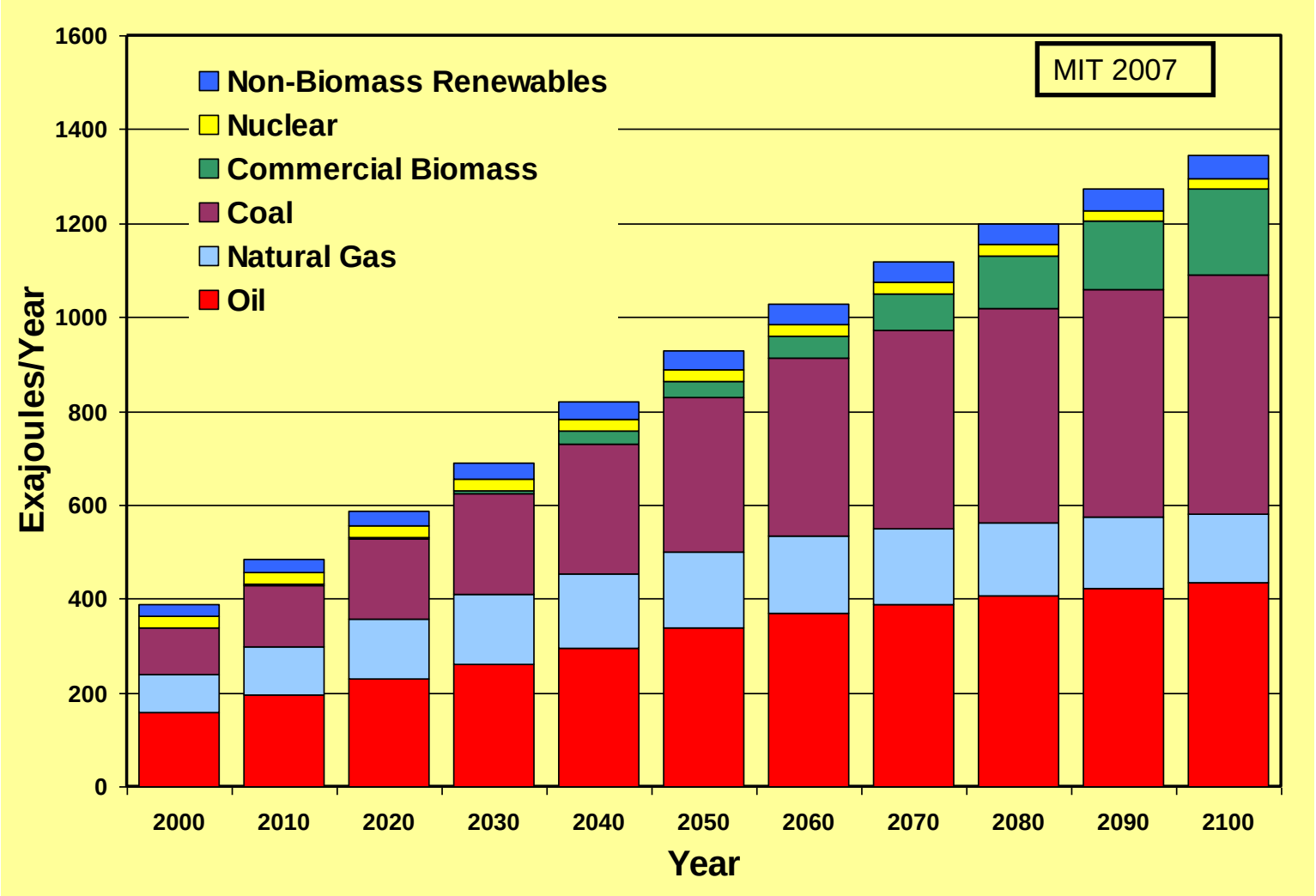


- Reference case key assumptions
  - Population
  - Economic growth
  - Available technology
- Stabilization pathway derived from climate, carbon models

- Carbon price tuned to achieve stabilization pathway
- Economic model:
  - Assumes global carbon tax
  - Computes technology mix and reduction in energy demand

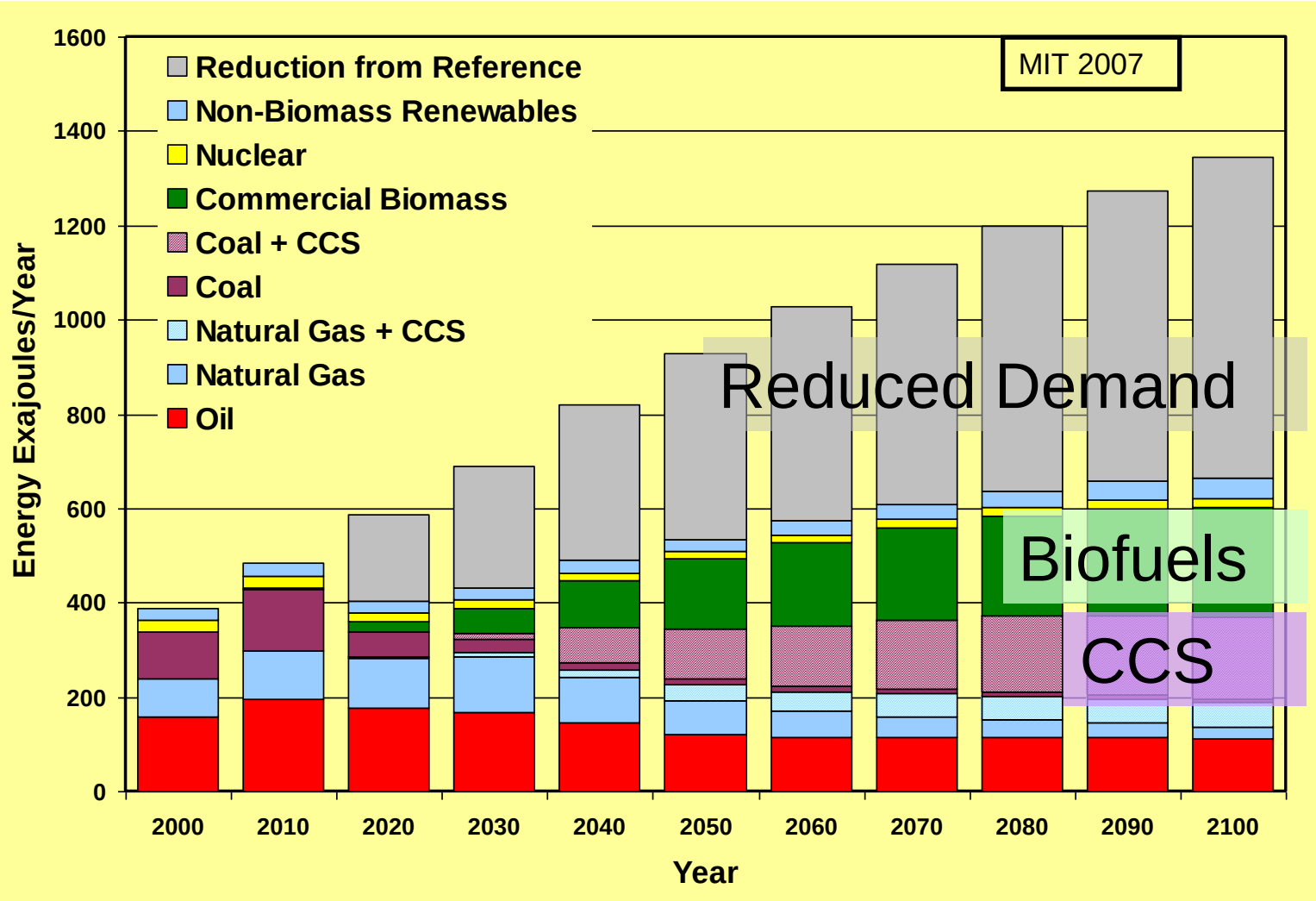
Stabilization scenarios MIT Joint Program on Science and Policy of Global Change (2007)

Global Primary Energy: Reference



Scenario without climate/carbon policy

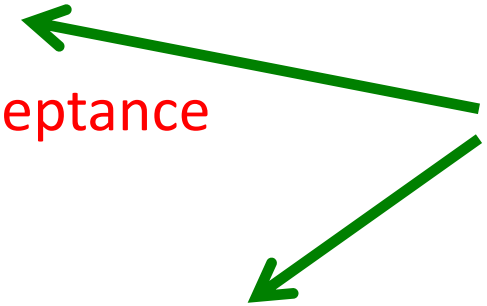
MIT 450 Stabilization Scenario



Scenario with economists' "ideal" climate policy

Criteria for Technology Evaluation

- Performance
- Cost
- Consumer acceptance
- Safety
- Enabling infrastructure and capacity
- Regulatory compliance
- Environmental and social impacts at large scale



Especially critical for developing countries

Weakest link paradigm: failure in any dimension will prevent widespread commercialization

Investment Decisions and Climate Policy

- Decisions on major capital expenditures by private firms are based on a risk-adjusted expectation of adequate returns
- Many of the technology systems that show promise for mitigation face high costs, limited or no commercial experience and political controversy
- Higher costs, potential for permitting or regulatory delays, public acceptance, and policy and legislative uncertainty add to perceived risks and raise costs
- Inadequate returns force firms to seek alternate approaches, defer decisions, or reject projects
- Effective climate policies will need to work with mainstream project investment and finance processes, and with local and national approval processes
- Business seeks sufficient clarity to plan, propose and implement projects with confidence that they will be commercially viable and proceed in a timely fashion

The key issue in climate finance is not so much raising funds, as confidence in returns from successful projects

Private Company Role

- Profitable multi-national companies with strategic emphasis on R&D play an essential role in research, development and global deployment of advanced technologies: resources, products, processes, services
- Research
  - Aimed both at near-term deliverables and long-term breakthroughs
  - Involving internal R&D and collaborations with academia, national programs, other companies
- Commercial opportunities typically derive from a combination of technology, business models and effective management systems (proprietary positions and know how)

Production control	Market strategies
Financial controls	Operations integrity
Energy management	Environmental Compliance
Maintenance	...

Requires a corporate culture of promoting, utilizing and gaining competitive advantage from technological innovation

Government Role

- Establish stable policy/regulatory environment
- Build societal capacity
  - Education/training especially in science and engineering
  - Fundamental Research
  - Infrastructure
- Create enabling frameworks
  - Governance and rule of law
  - Intellectual Property Rights
  - Investment
  - Technology deployment
  - Technology transfer
- National circumstances affect policy choices: ability of nations, firms, citizens to respond to an economic signal depends on: structure of economy, national circumstances, institutions, ...

Take Away Messages

- Large-scale investments that diffuse and transfer technology occur continuously using a variety of existing processes
- Climate policies need to leverage mainstream business activities, not create a separate playing field for “climate investments”
- In consulting business on finance, engage with operating companies as well as financial firms (and be aware that many firms self-finance their investments)
- Regulatory and permitting delays add costs and can tie up projects for years, try to expedite the investment process rather than add new complexity
- Private firms make investment decisions based on risk adjusted expectation of returns; without adequate returns they will not invest

Thank You