Overview:
Managing Long-Term Climate Risks

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Outline

- Scope of the challenge
- Status of Kyoto Negotiations
- Technology to address climate change
- Perspectives on the role of the private sector
- Considerations for a way forward
World Energy Demand 1990-2030

- Incorporates significant efficiency/conservation efforts
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- Highly optimistic solar/wind growth still only ~1% energy supply
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- Incorporates significant efficiency/conservation efforts
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Increasing CO₂ emissions
- Especially in developing countries
- Coal a major contributor
Carbon Emissions - Worldwide

Annual Emissions

Emissions Growth 1990-2030

Bn Tonnes Carbon

1990 2000 2010 2020 2030

Industrialized

Developing

ExxonMobil Energy Outlook 2004
Carbon Emissions - Worldwide

Annual Emissions

Emissions Growth 1990-2030
5,000 M Tonnes Carbon

- Major growth in Power and Transport

Industrialized

Developing

Power
Transportation
Industrial
Res./Comm.

5% 19%
16%
39%
14%
6%
0.4%

1.1% 3.0% 2.5% 1.9% 0.4%
1.3% 0.9% 0.7%
Climate Implications of Kyoto

Conclusions:
- Kyoto achieves very little
- Additional steps may be needed
Global Emissions for 550 Stabilization

IPCC 1994
Global Emissions for 550 Stabilization

- Would require
  - Massive reductions in Annex 1 country fossil fuel use
  - Large-scale development and deployment of new technology
  - Participation by developing countries

- As yet no scientific basis for choosing 550 ppm
  (or any other stabilization level)

IPCC 1994
Kyoto Targets Stimulate Near-Term Steps

Primarily

- Fuel switching (especially gas for coal)
- Energy efficiency
- Conservation

Beyond what might otherwise be economic: by anticipated carbon cost in countries with targets
International Policy: Key Considerations

- UNFCCC/Kyoto negotiators must soon address 2nd commitment period (beyond 2012, by 2005)
  - With Kyoto only now entering into force
  - With major developing countries refusing to discuss future targets
  - Without participation by USA, Australia
  - With no shared sense of a way forward

- Nations implementing Kyoto face serious issues
  - Competitive issues from unequal targets and emissions allocations (within sectors, across sectors, between countries)
  - Wealth transfers for international emissions trading
  - Potential for non-compliance by Kyoto signatories

- Developing countries without emissions commitments face the challenge of expanding reliable, affordable energy use to meet pressing social, economic and environmental needs (with 1.5-2 billion without access to commercial energy)
Cap & Trade and Technology

Three questions for the long-term path forward:

- Will ~$(5-10)$ euro/tonne price signal induce investment in 50-100 euro/tonne technology, or even research?
- Will competitive concerns/advantages induce or discourage developing country participation in Kyoto?
- Can programs focused on technology (research and deployment) deliver more?
GHG Emissions Trading: Fundamental Challenges

Increasingly it appears that the theoretical benefits of trading under:
  • A cap
  • In a single regulatory jurisdiction
  • With zero transaction costs

Do not apply to:
  • A series of caps in time
  • Linked trading in multiple regulatory jurisdictions
  • As implemented in practice (transaction costs, especially CDM)

International cap and trade regimes pose enormous challenges
  • Competition
  • Wealth transfers
  • Enforcement/liability
  • Evolution to future periods:
    + Mismatch between near term targets and strategic investment decisions (especially in energy)
    + Practical and political inability to establish binding long-term goals
Managing Long-Term GHG Emissions

Must address:

- Emissions growth, especially in developing countries
  - Access to energy
  - Economic development, poverty alleviation

- Need for innovative, affordable, low GHG emitting technologies, especially for
  - Electric Power
  - Transportation/Fuels
  - End-use energy applications
Technology Objectives

• Promote more widespread use now of existing efficient technology in developed and developing countries

• Stimulate research and development to create innovative, affordable, low GHG technologies sooner

• Encourage earlier retirement of less efficient but still productive technology
What Technologies Are Key Developing Countries Using & Investing In Today?

Greenhouse Gas Emissions Per Dollar of Output

Projected Chinese Emissions with Enhanced Technology

Criteria for Technology Evaluation

- Performance
- Cost
- Consumer acceptance
- Safety
  - Enabling infrastructure and capacity
- Regulatory compliance
- Environmental impacts

Especially critical for developing countries

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

- Profitable multi-national companies with strategic emphasis on R&D play an essential role in development and global deployment of advanced technologies.

- Commercial opportunity typically derives from advanced technology and effective management systems (proprietary positions and know how)-- especially with advanced technology:
  - Financial controls
  - Operations integrity
  - Energy management
  - Maintenance
  - …

- Enabling frameworks/capacity are essential to deliver benefits:
  - Rule of law
  - Safe, stable environment for workers and communities
  - Open markets
  - Realization of mutual benefits
  - Protection of intellectual property
  - Movement of goods, capital and people
  - Respect for the needs of host governments and communities
  - …
Key Elements to Manage Long-Term Climate Risk

• Promote global participation

• Encourage more rapid use of existing efficient technologies (in both developed and developing countries)

• Stimulate research and development to create innovative, affordable, low GHG technologies sooner

• Address climate risks in the context of developing country priorities: development, poverty eradication, access to energy

• Continue scientific research to assess risks, pace policy response

• Likely this requires a change (Beyond Kyoto)
  – From: a progression of binding, differentiated targets for some
  – To: incentives that encourage low emissions development for all