

SUMMARY REPORT

AN IPIECA WORKSHOP

Beijing, China, 25–26 October 2005

International Policy Approaches to Address the Climate Change Challenge



INTRODUCTION

International cooperation will be critical if society is to efficiently manage the risks posed by global climate change. To date, most attention has been focused on the emission targets of the first commitment period of the Kyoto Protocol that apply to most developed countries. However, these emission targets encompass only a minority of global greenhouse gas emissions and do not yet continue beyond 2012. As a consequence, initiatives to implement existing low emission technologies and to develop new technologies are making progress in an environment of uncertainty regarding future climate change policy. In addition, massive investment in energy infrastructure is needed, and is progressing, to deliver the energy necessary to ensure future growth and socio-economic development. What international policy architectures can enable international cooperation to manage the risks of climate change? What are the implications of these architectures for business? To address questions such as these, IPIECA convened this international workshop in October 2005 to consider the future of international policy architectures to manage climate change risk.

The workshop examined:

- key elements of climate change risk management;
- attributes of different policy architectures to address climate change;
- issues and opportunities that arise from policy architectures and their interaction with international trade; and
- transitions from current policies to address climate change, to potential future architectures given uncertainties and a sequential decision-making process.

This booklet summarizes the IPIECA Climate Change Working Group's understanding of the presentations and discussions at the workshop. All workshop presentations are available on the CD at the back of this booklet, and can also be found on the IPIECA website (www.ipieca.org) along with publications in the IPIECA climate change workshop series (see back cover).

This workshop brought together approximately 100 experts from academia, business, governments, and international and non-governmental organizations and was held in China enabling broader regional participation. We are grateful to all the participants for their efforts and contributions throughout the workshop.

The workshop and this publication are part of an ongoing effort by IPIECA and its members to raise understanding and provide constructive input on key climate change issues.

EXECUTIVE SUMMARY

Meeting global energy demand while limiting or reducing carbon dioxide emissions presents an enormous challenge. Energy outlooks show that between now and 2030 the bulk of the increase in energy demand will be met by fossil fuels. Renewable energy sources, such as wind and solar, will enjoy high growth rates; however, they start from a very low level and will have a limited impact in this timeframe. Growth in fossil fuel energy demand will lead to an increase in carbon dioxide emissions. Most of the world's energy demand currently comes from developed countries; however, growth in energy demand is now dominated by the developing countries of Asia. To meet growing demand, huge investments are needed to get energy resources to market. While progress is being made, access to affordable modern energy services remains a development priority for more than a billion people, particularly in South Asia and Africa. Access to affordable energy, investment to ensure energy supply, and reduction of greenhouse gas (GHG) emissions are all important challenges and are international policy issues.

Actions are called for to address the long-term risks posed by climate change, recognizing the limits of our ability to assess risks and manage them. Predictions of how future climate may change are limited by, for example, gaps in our understanding of how clouds may act in the climate system, an important factor limiting our understanding of the sensitivity of climate to greenhouse gas concentration levels. Estimates of future emissions, and how they may be reduced, rely on predictions of how technology will improve and which technologies will be successful in the marketplace over the next century. Given the absence of a clear single



solution at this time, any future climate change policy will be an exercise in risk management and sequential decision making recognizing existing uncertainties.

Key elements of a response to global climate change include: research to better assess the risk of global climate change and to form a basis for society's response; emission reductions, addressing as appropriate all agents affecting climate, and focusing on economic opportunities such as improvements in efficiency and protection of forests; research to develop new technology options capable of supplying future energy demand with low emissions; and actions to address development priorities, reducing vulnerability to a wide range of risks.

Cooperation in addressing climate change is an overarching element, and is the central objective of international policies on climate change.

Technology transfer presents the greatest near-term potential for reducing emissions and improving living standards. There is a huge disparity in technology between developing and developed countries that suggests that technology transfer can produce large emissions reductions. It is important to undertake actions to address the barriers to the flow of technologies. Analyses of successes and failures have shown that the most important factor is the existence of government and legal institutions that support an open and efficient market economy. In many cases, without fundamental reforms, even cost-effective technologies for improving energy efficiency and emissions will not be viable.

The workshop noted a number of approaches for future international cooperation to enable the key elements of an approach to manage the risks posed by climate change. These approaches may grow from domestic initiatives or agreements between countries with complementary goals. They could be the outcome of multiple processes such as: the UNFCCC, the G8, the Asia-Pacific Partnership, and other bilateral or regional negotiations. Additional approaches may be used to address different key response elements including, for example, technology development, climate science, and actions to more broadly

enable development and increase resilience. Climate change policies around the world are likely to look very different from that envisioned in the negotiation of the Kyoto Protocol's 2008–2012 commitment period.

Policies that are capable of significantly affecting global emissions will also affect global energy and economic markets. The use of market-based mechanisms, such as cap-and-trade, in international climate change policy presents both issues and opportunities. Ideally, markets could minimize the cost of reducing GHG emissions. However, the uncertainty in future national commitments, the prospect of non-compliance, and nations without commitments or opting out of a global agreement limit the advantages of market-based mechanisms. Nevertheless, learnings gained from experiences, such as projects (e.g., under the Clean Development Mechanism of the Kyoto Protocol) in developing countries will likely continue in some form after 2012. It is important to understand and avoid unintended and unwanted effects that policies may have on competitiveness, international trade and development.

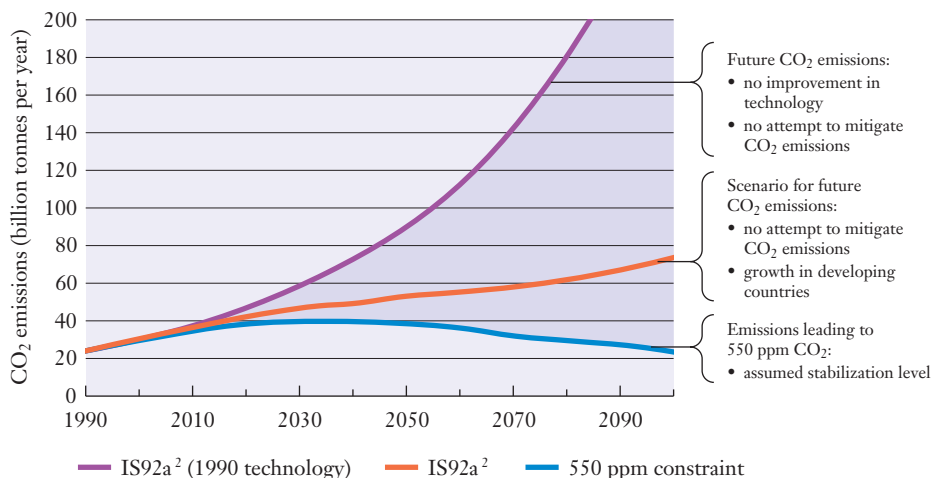
For international policy to significantly affect global emissions, it will need to involve all major countries. Nations, however, have differing circumstances, priorities, and legal systems, and are implementing a diversity of policies to address climate change and energy challenges. Although the post-2012 period of the Kyoto Protocol remains the focus of international climate change policy discussions, a decentralized network of policy regimes and cooperative frameworks is emerging. Given trends in energy, it is clear that policies capable of significantly affecting global GHG emissions will affect society in many ways, and the economic future of all businesses worldwide. If climate change policy is to evolve from its current limited development, then greater engagement by society, and by business, is required.

CLIMATE CHANGE RISK MANAGEMENT

The climate change challenge

Meeting global energy demand with low carbon dioxide emissions presents an enormous challenge. Energy outlooks show that between now and 2030 growth in energy demand will be met increasingly by fossil fuels as their growth rate surpasses that of other energy sources such as nuclear, and biomass used for heating and cooking¹. This growth in fossil fuel energy demand is projected to lead to an increase in carbon dioxide emissions as indicated by the middle curve (IS92a^{2,3}) in Figure 1; this assumes substantial improvement in the efficiency with which energy is provided and used along with the sustained expansion of renewable energy. If current technology and the way we use energy did not improve, emissions would follow the much higher curve in Figure 1 to result in the same economic growth. To limit the rise of CO₂ to an assumed atmospheric concentration level would require CO₂ emissions to eventually peak and then decline, as in the lower curve in Figure 1, implying that energy services would need to be provided with even higher efficiency, expanded use of low-CO₂ energy sources such as nuclear, renewables and CO₂ capture and storage^{4,5}, or that some energy services (with their associated carbon emissions) are not delivered. The challenge for climate change policy is to enable the right balance of actions to address the long-term risks that climate change poses, taking into account inherent uncertainties, differing priorities, and evolving capabilities.

Figure 1: Global CO₂ emission scenarios and CO₂ stabilization



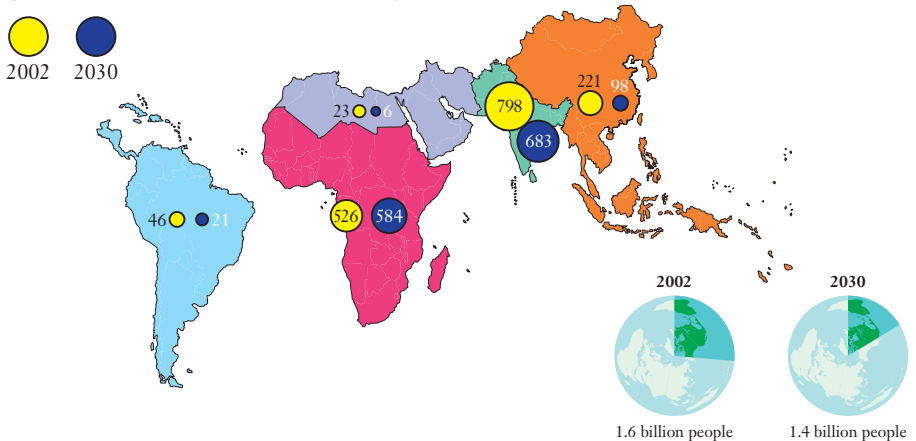
Source: Edmonds, 2005⁶

¹ OECD/IEA, 2006, *World Energy Outlook 2006*. ² One of a series of six alternative emissions scenarios (IS92a to f), published in 1992 by the IPCC (<http://ipcc-ddc.cru.uea.ac.uk/is92/index.html>). ³ Intergovernmental Panel on Climate Change, 2000, *Special Report on Emissions Scenarios*. ⁴ IPIECA, 2003, *Carbon Dioxide Capture and Geological Storage: Contributing to Climate Change Solutions*. ⁵ Intergovernmental Panel on Climate Change, 2005, *Special Report on Carbon Dioxide Capture and Storage*. ⁶ See [Jae Edmonds' presentation](#) on accompanying CD-ROM.

Energy, emissions and investment trends

Access to affordable energy, investment to ensure reliable energy supply, and reduction of GHG emissions, are all important challenges and are international policy issues. To meet growing demand, huge investments are needed to get energy resources to market; the IEA estimate 16 trillion dollars investment are needed by 2030⁷. Access to affordable modern energy services remains a development priority for more than a billion people, particularly in South Asia and Africa (see Figure 2). Most of the world's energy demand currently comes from developed countries; however, growth in energy demand is now dominated by the developing countries of Asia. CO₂ emissions increasing with the growth in energy demand of developing countries surpasses global emissions associated with CO₂ stabilization scenarios such as the one shown in the lower curve in Figure 1 around 2050⁸. For international policy to significantly affect global emissions, it will need to involve all major countries.

Figure 2: Population without electricity (millions)



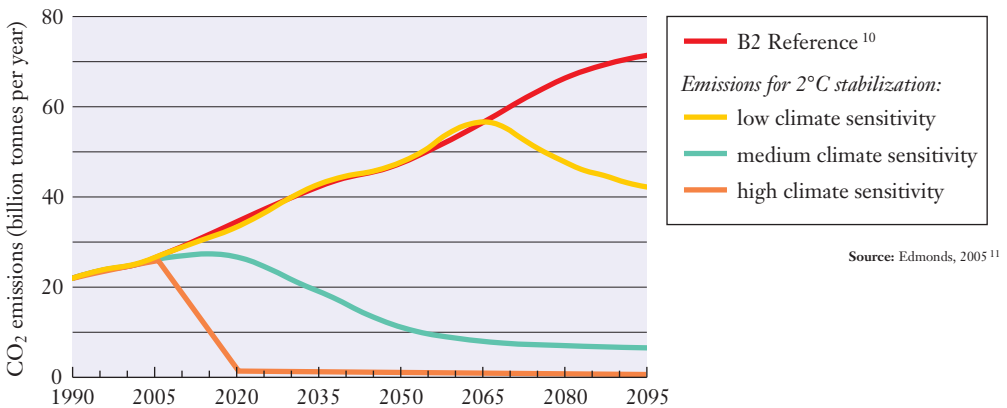
Source: OECD/IEA World Energy Outlook 2004⁹

Assessment and management of risk

Actions are called for to address the long-term risks posed by climate change, recognizing the limits of our ability to assess risks and manage them. A key uncertain factor in climate model projections is the global climate sensitivity. Its value has often been taken to be between +1.5 to +4.5°C for a doubling of CO₂ concentration. Certainty of climate sensitivity's value is limited by poorly constrained phenomena such as the way clouds may act as a feedback in the climate system. Figure 3 (overleaf) indicates the estimated global CO₂ emissions that would lead to a 2°C increase in modelled global temperature assuming a low (1.5°C), medium (2.5°C) or high (4.5°C) climate sensitivity. To limit temperature rise in this model to 2°C would require CO₂ emissions to immediately fall to zero in the case of high climate sensitivity, or follow a no-climate-action scenario until beyond 2050 in the case of low climate sensitivity. Furthermore, scenarios of future emissions and how they may be reduced, rely on forecasts of how technology will improve and what technologies will be successful in the marketplace over the next century. Given the absence of a clear solution at this time, any future climate change policy will be an exercise in risk management and sequential decision making taking into account existing uncertainties.

⁷ OECD/IEA, 2003, *World Energy Investment Outlook*. ⁸ Bolin, B. and Keshgi, H.S., 2001, On Strategies for Reducing Greenhouse Gas Emissions. In: *PNAS*. ⁹ See [Fatih Birols' presentation](#) on accompanying CD-ROM.

Figure 3: Modelled global fossil fuel emissions to limit global temperature rise to 2°C



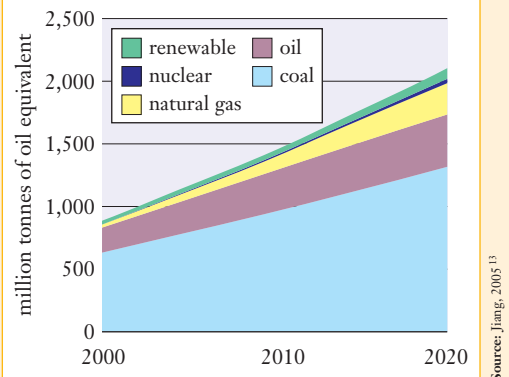
¹⁰ Intergovernmental Panel on Climate Change, 2000, *Special Report on Emissions Scenarios*. ¹¹ See [Jac Edmonds' presentation](#) on accompanying CD-ROM.

CHINA'S ENERGY AND TECHNOLOGY FUTURE

Over recent years, China has experienced strong growth in its economy, exports, access to energy, per capita energy use, and GHG emissions. China is on the road to improving its peoples' access to affordable, modern, energy services as the numbers without access to electricity will fall from 221 million in 2002 to an estimated 98 million in 2030 (see Figure 2). Recent growth in China's energy demand has been fuelled mostly by coal which is responsible for most of China's GHG emissions. Over the past 5 years, the rate of global fossil fuel CO₂ emissions has risen by approximately 1 billion tonnes carbon per year to a current (2005) global rate of about 8 billion tonnes carbon per year¹². China's increase in GHG emission rate accounts for more than half of the 1 billion tonne global increase.

As seen in Figure 4, China's energy demand is forecast to double by 2020, and much of this demand will be met by coal. Natural gas, renewables and nuclear have high rates of growth for this period, but start from a small base. Coal, drawing from China's extensive natural resources, remains the dominant source of energy followed by oil. Domestic policies to improve energy

Figure 4: Outlook for China's primary energy demand



supply and its efficient use, while thought to have the potential to reduce emissions by 38 per cent by 2003, do not change the underlying pattern of increased coal use.

The intensity of China's GHG emissions per unit of economic output is higher than other large economies due to the level of technology, inefficient energy use, and an energy-intensive mix of industries. As shown in Figure 5, the GHG

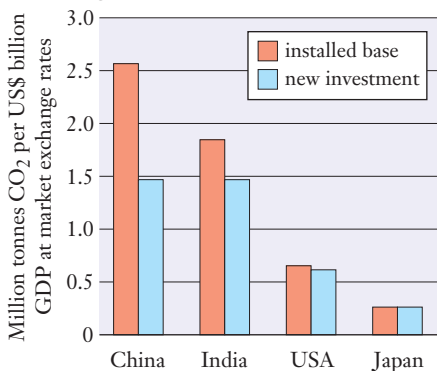
¹² BP, 2006, *Statistical Review of World Energy 2006*.

¹³ See [Kejun Jiang's presentation](#) on accompanying CD-ROM.

Key elements of climate change risk management

- Key elements of a response to global climate change include:
 - research to better assess the risk of global climate change and form a basis for society's response;
 - emission reductions, addressing as appropriate all agents affecting climate, and focusing on economic opportunities such as improvements in efficiency and protection of forests;
 - research to develop new technology options capable of supplying future energy demand with low emissions; and
 - actions to address development needs, strengthen governance, and improve institutional capacity thereby reducing vulnerability to a wide range of risks and enabling investment in superior technologies.
- Enabling all of these is the fundamental challenge for international climate change policy, recognizing national differences in priorities, capacity and risks, and the uncertainties inherent in the behaviour of climate change and the socio-economic system.

Figure 5: Emission intensity of nation's technologies



Source: Montgomery *et al.*, 2005¹⁴

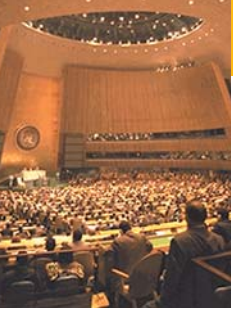
intensity of the installed base of technologies is about 5 times higher in China than in the USA, and almost 10 times higher than Japan. The GHG intensity of new investment is greatly improved—comparable to India's—but remains higher than the USA and significantly higher than Japan's.

¹⁴ Bernstein, P.M., Montgomery, W.D. and Tuladhar, S.D., 2006, Potential for reducing carbon emissions from non-Annex B countries through changes in technology. In: *Energy Economics*, Volume 28, November 2006. Elsevier. (See also [David Montgomery's presentation](#) on accompanying CD-ROM.)



Workshop attendees

These differences indicate a potential for reducing GHG emissions by more efficiently using fossil fuels in China. For example, if newly installed technology were as efficient as that of the USA, this would lead to a reduction of 3,600 million tonnes CO₂ by 2017. An important GHG emission reduction opportunity exists through the introduction in China of efficient, economic technology that has already been deployed in developed countries.



POLICY ARCHITECTURES

International policy architectures and domestic actions

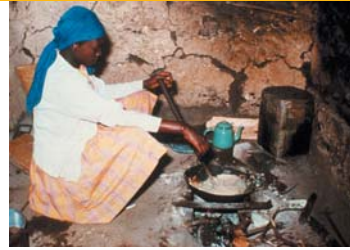
- Policy architecture is a unifying structure that restricts potential agreements in ways that simplify negotiations and point them toward common goals. Policy architectures are often envisaged as policies or targets common to all nations. However, national circumstances differ and the ideal of a purely common policy or target that is in the interest of every nation does not currently exist. Another general architecture is one that grows from the bottom up, considering not only common goals, but also national circumstances. Important national circumstances may include nations' capacities to develop or adopt technologies, their economies, and their institutions and governance. Each nation has the unique potential to set a development and climate strategy with its own technology pathways and regional characteristics. Common goals include the key elements of a response to climate change, as well as addressing national economic, social and environmental priorities which are increasingly recognized to be a common goal.

Current policy architectures

- The United Nations Framework Convention on Climate Change (UNFCCC) provides a common reference point, although the current architecture worldwide is a decentralized network of policy regimes and cooperative arrangements. One focus is the Kyoto Protocol's commitment to limit emissions by at least 5 per cent below 1990 levels in the first commitment period (2008–2012). The European Union's Emission Trading Scheme (EU ETS) is geared to cap large installation CO₂ emissions and allows common currency between EU ETS allowances and JI and CDM project credits. This focus is providing experience with market-based (cap-and-trade) and project-based (Clean Development Mechanism, Joint Implementation) policies.
- Multiple venues for international climate change negotiations and numerous bilateral and multilateral agreements have occurred outside of the Kyoto Protocol. Examples include: the G8 Gleneagles Plan of Action on Climate Change, Clean Energy, and Sustainable Development; the Asia-Pacific Partnership on Clean Development and Climate; Methane to Markets Partnership; Carbon Sequestration Leadership Forum; and the International Partnership for Hydrogen Economy. These international partnerships encourage cooperation and domestic action. At the same time actions are being taken at the company local, state and national level. While it is not clear how current actions may interact within a climate change policy architecture, these experiences may well shape future architectures.

Development and adaptive capacity

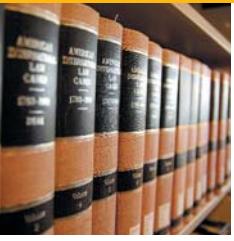
- To manage climate change risk, international policy architecture and its implementation in domestic actions will need to be taken in the context of national development priorities. The need for food, water, poverty eradication, electrification, education, health and other development priorities define both constraints on climate policies and opportunities for



- win-win actions. Increasing the robustness of society to a host of climate-related impacts—
- increasing adaptive capacity—can reduce vulnerability to a wide range of impacts, whether
- their cause is anthropogenic climate change, climate variability or many sources of risk
- beyond climate. Actions encompass increasing the robustness of agricultural systems, water
- supply, public health, access to energy, and addressing poverty and education. The climate
- change challenge must be met while providing affordable energy in a socially,
- economically, and environmentally sustainable manner.

Possible future international architectures

- In 2005, negotiators began to address the Kyoto Protocol's future beyond the 2008–2012
- commitment period. Alternative approaches, options and even venues range far beyond a
- simple extension of the Kyoto Protocol's first commitment period. More than at any time
- since the ratification of the UN Framework Convention on Climate Change in 1992 there
- is the opportunity for negotiations about climate change risk management to occur in
- multiple venues (e.g. via G8 processes, through regional partnerships such as the Asia-
- Pacific Partnership, and through bilateral or regional negotiations). Many approaches of
- future policy architectures are being considered: carbon taxes, technology agreements,
- intensity or dynamic targets, non-binding targets for developing countries, allowing sale of
- surplus emissions reductions by developing countries, and sector-wide targets (industry,
- transport, country-only, regional, or with international agreements on industry sectors and
- combinations of these). Whatever form such policy development will take, the policy
- architecture will need to satisfy national interests and development priorities.



INTERNATIONAL POLICY: ISSUES AND OPPORTUNITIES

Compliance and legal framework

- Compliance is often seen as the weakest aspect of international treaties; in some sense all treaties are voluntary since they are entered into voluntarily. The prospect of non-compliance may loom if policies force, for example, competitiveness issues or transfers of wealth, and so addressing such effects is paramount in developing agreements. The acceptability of an international agreement will depend on how it is treated within the domestic legal framework and the implications of non-compliance. The ability of a nation to comply will depend on both the feasibility as well as the domestic political will to achieve the requirement. For example the success of the Montreal Protocol depended on there being a sufficient number of countries willing to participate, and on the cooperation of all affected industry participants to achieve the creation of effective new substitutes for ozone-destroying substances and enable their widespread deployment. There must be engagement by society commensurate with the political will that would be needed to achieve an agreement's objective, if the prospects for compliance are to be favourable. Given the enormous challenge of providing for global energy demand with low GHG emissions, greater engagement is called for in considering actions that would be consistent with the development of international agreements.

Clean development opportunities

- The transfer of technology worldwide presents the greatest near-term potential for reducing emissions and improving living standards. Strong institutions and sound governance that encourages economic freedom have generally been associated with both higher economic growth and the rapid diffusion of superior technologies. Among the possible steps to improve the climate for foreign direct investment include reducing market distortions, removing import barriers, and the protection of intellectual property. Project-based mechanisms like the Clean Development Mechanism of the Kyoto Protocol hold the promise of encouraging the diffusion of technology and cost-effective reductions in GHG emissions. However, CDM approvals thus far have been complicated and uncertain; there is a paucity of approved projects and the magnitude of real emissions reductions per project is small¹⁵. In many cases, without fundamental reforms, even cost-effective technologies for improving energy efficiency and emissions will not be viable.

Competitiveness

- Policies that are capable of significantly affecting global emissions will also impact global energy and economic markets and can affect the competitiveness of one nation's industry relative to others. This issue is acute for GHG emission-intensive industries when costs

¹⁵ Less than 300,000 tonnes CO₂ per year. Statistics as of 13 July 2006 with 241 projects registered and 70,839,038 tonnes on an average annual basis. <http://cdm.unfccc.int/Statistics/>



cannot be passed to consumers and where competing firms in other nations have more favourable treatment. Competitiveness is currently in the forefront for industry in countries with emission targets under the Kyoto Protocol or the European Emissions Trading Scheme, which can be at a disadvantage relative to industry in countries without GHG emission limits.

The movement of emission intensive activities to other nations can decrease the global environmental effectiveness of climate policy. Unintended consequences of the competitiveness issue further diminish the environmental effectiveness of climate policy if it pushes industry to countries that use energy less efficiently. The economic ideal of a global market-based mechanism, such as a global carbon tax or global cap-and-trade, does not currently exist and this may have consequences for both the economic and environmental effectiveness of current climate policy.

Alternatively, there has been recent interest in sectoral policy which treats each sector of the economy separately and recognizes the inherent differences between sectors. The perceived advantages of applying sectoral targets, over national and international emissions targets, are that they may reduce competitive distortions, encompass all players within a sector and that it may be possible to form voluntary industry agreements. While sectoral agreements do exist as voluntary initiatives by business and industry and also as part of national climate policies, it remains unclear how such agreements might function as part of an international agreement among nations.

International trade

Trade is a profound form of international cooperation and can promote the efficient use of resources and economic growth. The opening of trade is a priority, and is being addressed in negotiations and trade agreements. It is important to understand the effects that policies may have on international trade, and ensure climate change policies that are developed do not hinder delivery of the benefits of trade. Different climate policies in different nations may present trade advantages or disadvantages. Such differences may arise as a side-effect of a policy, but may also arise from non-participation or non-compliance with an international agreement. While there may be a tendency to offset such differences with trade mechanisms such as border taxes, or to link trade and climate negotiations, the added complexity may form a barrier for both trade and climate change risk management.



TRANSITIONS IN POLICY ARCHITECTURES

Energy trends and policy architecture

- Projections of energy supply and demand show strong correlation with significant growth in emissions over the next several decades. Fossil fuels are expected to continue to dominate global energy supply for decades to come in all projections. A particularly strong role for fossil fuels is seen in the provision of developing world power generation and global transport needs. A major shift in the expected trajectory for developing world emissions will be needed as a component of any future climate-risk reduction strategy. At the current time and into the foreseeable future, emissions intensity is still comparatively higher overall in the developing countries than those in the industrialized countries.
- Further, there is no sign from the rapidly developing economies that they will commit to binding emissions reduction targets at any point in the foreseeable future. Notwithstanding this tension, there continues to be interest in approaches that improves energy efficiency (e.g. using existing superior technologies) and access while addressing climate change.

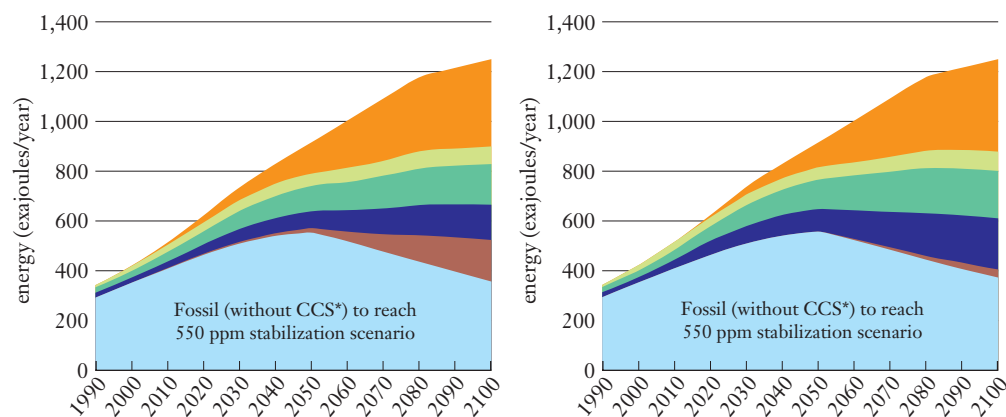
Technological progress

- Improvement of energy technology is essential to managing the risk of climate change.
- Improvement includes the development of new superior technology options, and the deployment of existing technologies at a pace commensurate with the risk of climate change.

Figure 6: Examples of gap technologies in emission mitigation scenarios (primary energy by fuel)

Gap technologies required to reach 550 ppm stabilization (see also Figure 1):

energy use reduction biomass renewables nuclear fossil (with CCS*)



Source: Edmonds et al., 2005¹⁶

*carbon capture and storage

¹⁶ Clarke, L., Lurz, J., Wise, M., Kim, S., Placet, M., Smith, S., Izaurrealde, C. and Thomson, A., 2006, *Climate Change Mitigation: An Analysis of Advanced Technology Scenarios*, Technical Report PNNL-16078, Pacific Northwest National Laboratory. (See also [Jae Edmonds' presentation](#) on accompanying CD-ROM.)



Figure 6 illustrates two different scenarios of what technology classes might be used to bridge the gap between the emissions of the reference scenario (emissions that might occur if climate change did not exist) and a mitigation scenario that results in an assumed stabilization level (550 ppm CO₂). Between each scenario, the pace and emphasis of technology classes differ; we have a limited ability to predict which technologies will be successful. Given our limited ability to determine which technologies will, in the long run, be winners, it is important to follow a portfolio of technology options for R&D for new technologies. And given the diversity of energy needs and situations, there will be deployment of an evolving portfolio of existing technologies at any given time. Governments have a role in providing education and scientific research that is a foundation for innovation, and in providing rules that enable the efficient use of technology. The private sector, subject to the risks and rewards of developing and deploying technology, is well suited to managing competitive technology. Understanding how climate policy will influence, and can promote, technological progress is important in the development of an international architecture.

Policy architectures and risk management

For international policy to significantly affect global emissions, it will need to involve all major countries. Nations, however, have differing circumstances, priorities and legal systems, and are implementing a diversity of policies to address the climate change and energy challenges. It appears that international climate change policy will continue to be a decentralized network of policy regimes and international frameworks for the foreseeable future. This network will continue to evolve, and improved information on climate change risk and its management will continue to emerge. It is, therefore, important that the policy architecture be able to adapt to improved assessments of risk and ability to manage global climate change risk.

Portfolios and policies

Will a future international framework evolve from the current network of policies and actions or become a more monolithic framework? Future international-policy-architecture proposals will likely be assessed using a broad range of attributes, including:

- consistency with social and economic development priorities;
- ability to improve access to an open and reliable energy market;
- ability to accelerate the pace of capacity building and technology transfer (e.g. by enabling foreign direct investments).

A parallel set of approaches may emerge, perhaps including some form of targets, emissions trading and market-based mechanisms but also using technology and/or sectoral agreements. These approaches may grow from regional and domestic initiatives or other arrangements between countries with complementary goals. Such diversity of the climate change policy portfolio may become beneficial to addressing development priorities while managing the climate change risk.

WORKSHOP PROGRAMME

Introduction

- Introduction and Workshop goals
Arthur Lee (Chevron, IPIECA CCWG Chairman)

Workshop scene-set

- Haroon Kheshgi (ExxonMobil, Workshop Chair)

Session 1: Key elements of climate change risk management

- Energy, Emissions and Investment Trends
Fatih Birol (International Energy Agency)
- Risk Management and the Economics of Actions
Henry Jacoby (Massachusetts Institute of Technology)
- Technological Progress and Climate Change
Sozaburo Okamatsu (Research Institute of Economy, Trade and Industry)
- Adaptation and Capacity
Lin Erda (China Agricultural Science Institute)

Session 2: Policy architectures

- Introduction, Frede Cappelen (Statoil)
- Overview of Possible International Architectures
Cédric Philibert (IEA)
- Architectures to address development, adaptive capacity, and mitigation
Kilaparti Ramakrishna (Woods Hole Research Centre)
- Future Actions within FCCC and Beyond
Yvo de Boer (Netherlands Ministry of Environment)
- Alternative Approaches to National Commitments
Jonathon Pershing (World Resources Institute)
- Bottom-up Approaches
Robert Reinstein (Reinstein & Associates International)
- Panel Session: Intersection of Issues/Opportunities with Policy Architectures
Panel Chair: John Shinn, Chevron, USA
Panellists: Collins Gardner
James Edmonds
Robert Reinstein

Session 3: Issues and opportunities

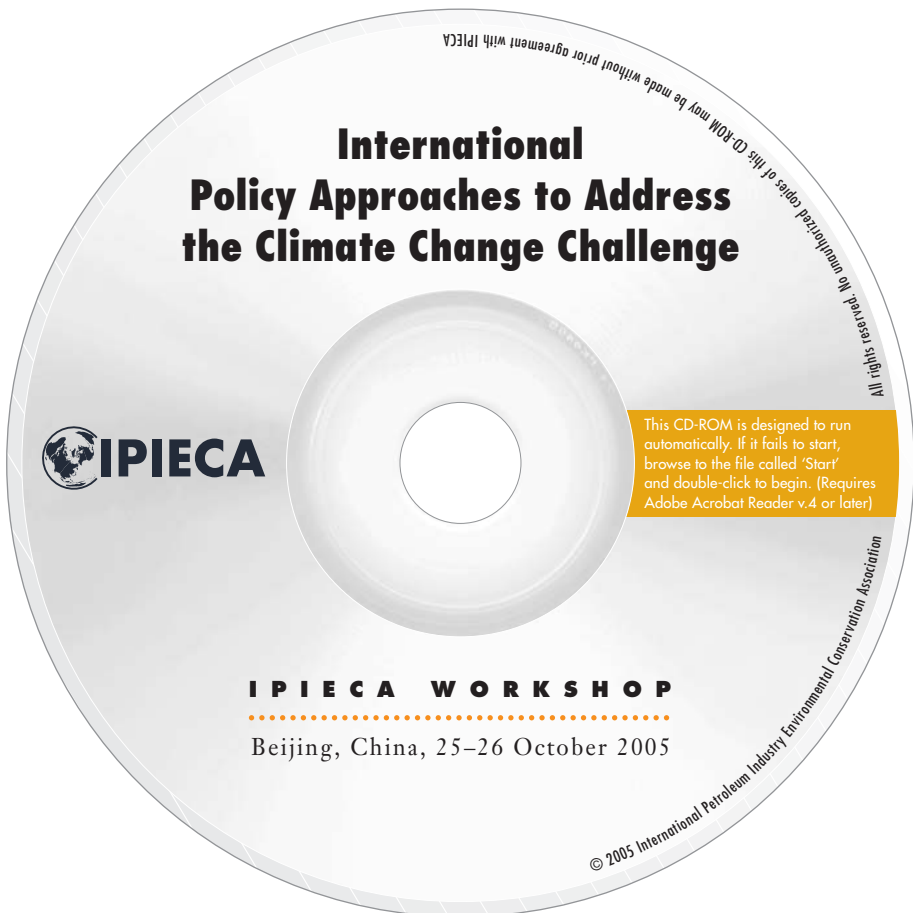
- Introduction, Rick Hyndman (CAPP)
- International Agreements and Compliance
Dan Dudek (Environmental Defense)
- Clean Development Opportunities
David Montgomery (Charles River Associates)
- Perspectives: Industry
Nick Campbell (Union of Industrial and Employers' Confederations of Europe)
- Perspectives: Rapidly Growing Economy
Chow Kok Kee (Malaysian Meteorological Service)
- Panel Session: Trade and International Architecture
Panel Chair: Bob Greco, API
Panellists: Kejun Jiang
David Hone
Nick Campbell

Session 4: Transitions in policy architectures

- Introduction, Brigitte Poot (Total)
- Energy Trends and Climate Change
David Hone (WBCSD)
- Chinese Energy; Supply and Demand until 2020
Kejun Jiang (Energy Research Institute, China)
- Transitions in Technology
James Edmonds (Pacific Northwest National Laboratory)
- Transitions in Policy Architectures and Risk Management
Henry Jacoby (Massachusetts Institute of Technology)
- Panel Session: Evolution of Policy Architecture for Risk Management
Panel Chair: Bruce Wilcoxon, ConocoPhillips
Panellists: Cédric Philibert
David Montgomery
Chow Kok Kee
Jonathon Pershing

THE IPIECA WORKSHOP ON CD-ROM

The CD-ROM included with this report contains the Workshop speakers' presentation slides in PDF format (requires Acrobat Reader). The disc is designed to start automatically when you insert it into your PC. If it fails to run, browse to the file called 'Start' and double-click to begin. This file provides an introduction to the CD-ROM, a list of contents and instructions on how to navigate the disc. Acrobat Reader is available for free download from the Adobe website at: www.adobe.co.uk/products/acrobat/readstep2.html



IPIECA

The International Petroleum Industry Environmental Conservation Association (IPIECA) is comprised of oil and gas companies and associations from around the world. Founded in 1974 following the establishment of the United Nations Environment Programme (UNEP), IPIECA provides one of the industry's principal channels of communication with the United Nations. IPIECA is the single global association representing both the upstream and downstream oil and gas industry on key global environmental and social issues including: oil spill preparedness and response; global climate change; health; fuel quality; biodiversity; social responsibility; and sustainability reporting.

Climate Change Working Group

Formed in 1988, the IPIECA Climate Change Working Group (CCWG) monitors, analyses and informs the membership of key developments in the issue, especially those taking place at the UNFCCC and IPCC. The CCWG encourages the development of policy options that strike a balance between the projected consequences of potential climate change and the estimated costs of response options to mitigate or adapt to climate change. The CCWG sponsors dialogues and workshops addressing key aspects of the ongoing negotiations, and provides a technical publication series as a means of constructive input to the process.

Publications in the IPIECA Climate Change series include:

Long-Term Energy and Carbon Management: Issues and Approaches

A Guide to the Intergovernmental Panel on Climate Change

Buenos Aires and Beyond—a Guide to the Climate Change Negotiations

Technology Assessment in Climate Change Mitigation—an IPIECA Workshop

Opportunities, Issues and Barriers to the Practical Application of the Kyoto Mechanisms

Long-Range Scenarios for Climate Change Policy Analysis

Critical Issues in the Economics of Climate Change

Climate Change: a Glossary of Terms

Development and Climate Change: Issues and Approaches in Asia

Energy, Development and Climate Change: Considerations in Asia and Latin America

Petroleum Industry Guidelines for Reporting GHG Emissions

Carbon Dioxide Capture and Geological Storage: Contributing to Climate Change Solutions

Transportation and Climate Change: Opportunities, Challenges and Long-term Strategies

Workshop Taskforce

Haroon Kheshgi (ExxonMobil; Taskforce Chairman) • Mark Akhurst (BP) • Frede Cappelen (Statoil) • Robert Greco (API) • Rick Hyndman (CAPP) • Arthur Lee (Chevron) • Brigitte Poot (Total) • John Shinn (Chevron) • Bruce Wilcoxon (ConocoPhillips) • Tim Stileman (IPIECA) • Luke Warren (IPIECA)



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