UNIVERSITY OF CAMBRIDGE
PROGRAMME FOR INDUSTRY

Cambridge Climate Leaders

Reference Guide

2nd Edition

Acknowledgements

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For more information on the
Cambridge Programme for Industry
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or email **info@cpi.cam.ac.uk**

All web-links were correct at time of going to press, however, organisations may choose to change or remove content from their websites at any time.

Cambridge Programme for Industry brings together leaders from across the world to attend events which address global sustainability issues. These events inevitably have environmental impacts of their own. We are committed to minimising these impacts, firstly by considering journey distance and means of travel to venues for our programme team, faculty and contributors, secondly through working to source organic and locally produced food and drink at our events, and finally through minimising our use of hard copy materials and communications. We realise that in spite of these efforts, our programmes still have a carbon footprint. To address this, we offset the carbon footprint of the venues we use, as well as programme team, faculty and contributor travel. We encourage participants to offset the carbon impact of their own travel to and from our events. If participants opt not to offset their carbon, we will do so on their behalf.

Contents

Foreword

Climate change represents one of the greatest challenges for society and our economic prosperity. The evidence for urgent action to tackle and prevent the worst effects of unconstrained greenhouse gas emissions is mounting. As governments and society are beginning to call for and set long term emission reduction targets it is important to understand what these targets mean for the day to day running of organisations. Climate change is now firmly on the political agenda, from the UK's Climate Change Bill and Europe's energy policy to California's emissions reduction target.

This issue should now be high on the agenda for all organisations and businesses across the globe are beginning to consider the impact of climate change in their investment decisions, procurement policies and risk and strategy modelling.

The Cambridge Climate Leaders Reference Guide is designed to give leaders an introduction to climate change and the complexities associated with it.

The four broad themes are:

The Science of Climate Change
The Economics and Technology of Climate Change
Policy Responses to Climate Change; and
Business Responses to Climate Change.

Together, they cover the most important aspects of the climate change debate. Within each theme, we provide one page summaries of three of the key documents, as well as profiling four key websites and listing additional resources. A web-link is provided for every document and website referenced in order to allow readers to follow up with the full reports and websites in their own time. The Guide will be periodically updated and is available for reference or download at **www.cpi.cam.ac.uk**.

We hope that you find this guide a useful introduction to the field of climate change.

Polly Courtice
Director, University of Cambridge Programme for Industry

The Science of Climate Change

Climate Change 2007: 4th Assessment Report (Physical Science Basis) – IPCC

Climate Change and the Greenhouse Effect – The Hadley Centre

The Climate Change Challenge: Scientific Evidence and Implications – The Carbon Trust

Key Websites

Other Online Resources

Climate Change 2007: 4th Assessment Report (Physical Science Basis)

Intergovernmental Panel on Climate Change (IPCC), February 2007

Description

This Report on the physical science basis of climate change is the first of four reports[1] due out in 2007 by the IPCC and represents the most up to date international scientific consensus[2].

Contents

- Human and natural drivers of climate change
- Direct observations of recent climate change
- Understanding and attributing climate change
- Projections of future changes in climate

Source

www.ipcc.ch/SPM2feb07.pdf

[1] The other three reports due to be published by the IPCC in 2007 are 'Impacts, adaptation and vulnerability', 'Mitigation of climate change' and 'Synthesis report'.
[2] The consensus and production process of the Climate Assessment Report means that the data used is at least two years old.

Summary of the Report

Global atmospheric concentrations of greenhouse gases (GHGs) have increased markedly since 1750 as a result of human activities. Ice-core records spanning thousands of years show that concentrations today far exceed recent historical levels, with carbon dioxide (CO_2, the most important GHG) growing from 280 parts-per-million (ppm) in pre-industrial times, to 379 ppm in 2005. This exceeds the natural range over the last 650,000 years. Moreover, the rate of increase in CO_2 concentration has been faster in the last decade than at any point since measurement began. This is mainly due to fossil fuel use, although changes in land-use are also a big factor. Other GHG concentrations (e.g. methane) have also been increasing.

The climate system is now definitely warming. Eleven of the 12 years to 2006, were among the 12 warmest since records began. Long-term trends (1900-2005) indicate significantly increased precipitation in areas such as northern Europe and drying in areas like the Mediterranean. Longer, more intense droughts have been seen since the 1970s and there have been widespread changes in extreme temperatures over the last 50 years. This is very likely (greater than 90% chance) that these changes in the climate system are human caused and are a result of the increase in GHG concentrations.

The 100-year linear trend shows a 0.74°C increase in temperature in the century to 2005 (which is larger than the 100-year trend of 0.6°C reported in 2001). New data indicate that losses from the ice sheets of Greenland and Antarctica are very likely (greater than 90% chance) to have contributed to sea level rises in the period 1993-2003 in addition to thermal expansion.

Overall, the sea level is estimated to have risen by 0.17m during the 20th Century. A warming of 0.2°C per decade over the next 20 years is predicted and there is a greater than 90% chance that climate changes during the 21st Century will exceed the previous century. The best estimate for the average temperature rise is 1.8°C-4.0°C by 2100, the likely range being 1.1°C-6.4°C.

Note that the models used do not presently include uncertainties in climate-carbon feedback; nor do they include the full effect of changes in ice-sheet flow, because these are not well-established enough in the published literature.

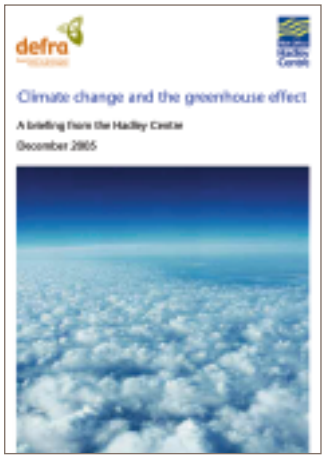
Specific predictions are also possible. For example, snow cover is expected to decrease and permafrost regions to see increases in thaw depth. There is a greater than 90% chance that temperature extremes, heat waves and heavy precipitation events will continue to become more frequent. Tropical cyclones are likely to become more intense. The higher latitudes will likely see more precipitation (greater than 90% chance) and most subtropical regions less (greater than 66% chance). Models show a greater than 90% chance that the meridional overturning circulation (ocean conveyor belt) will slow during this century, though it is unlikely (greater than 10% chance) to undergo a large, abrupt transition. In addition, there is a greater than 50% chance that human activities have increased the risk of heat waves.

Climate Change and the Greenhouse Effect

The Hadley Centre, 2005

Description

The Hadley Centre for Climate Prediction and Research is part of the UK's Met Office. The material in this December 2005 briefing is a collection of 60 slides used in presentations, with detailed notes, and followed by FAQs. The document gives a thorough picture of the state of the climate and projections for the future. The paper version is accompanied by a CD-based PowerPoint presentation of the slides. There is no Contents or Index page, nor is the briefing formally divided into sections. However, it can be roughly divided into five categories, as laid out below.



Contents

- Basics on climate (slides 3-11)
- Human contribution (12-24)
- State of knowledge on climate change (25-38)
- Patterns and projections (39-62)
- Frequently Asked Questions (63-68)

Source

www.metoffice.gov.uk/research/hadleycentre/pubs/brochures/2005/climate_greenhouse.pdf

Summary of the briefing

The 'basics' section explains the greenhouse effect and influences on the earth's temperature. It explains such phenomena as solar radiation and the greenhouse effect (simply, then more rigorously), then sets the long-term context by examining effects of the earth's orbit, energy from the sun and volcanic aerosol.

In 'human contribution' the document describes the anthropogenic greenhouse gas emissions and the impact this has on climate effects. It starts with an overview of the evolution of CO_2 emissions since 1950 and a graphic explaining both the natural and human carbon cycles. It then discusses a range of relevant issues, such as the role of CO_2 emissions in climate change, what drives this, and other greenhouse gases. Then it shows how human greenhouse gases dominate the change in climate effects, before moving to discuss stages in predicting climate change. It also discusses the role of aerosols, which have a cooling effect. The section ends with a description of how the Hadley Centre's climate model continues to improve.

The 'state of knowledge' section sets out what is known for certain about climate change. It starts with observed global warming trends. It debunks myths about climate – such as that warming trends are due to urbanisation, or that purely natural factors are causing warming – to show that climate change is both real and human-induced. It then moves to a short description of already-observed impacts, such as a greater number of 3-day rainfall events, retreat/shrinking of glaciers and ice, and a rise in sea levels over the 20th Century.

'Patterns and projections' is the final set of slides. This presents scenarios on emissions, warming trends, and impacts; drawing on both the IPCC and the Hadley Centre's own research. The Hadley Centre predictions are typically made for events or impacts 'by the 2080s' (e.g. patterns of annual temperature and precipitation changes, and North Sea storm surges), while the IPCC tends to go up to 2100 (e.g. range of emissions and warming, or estimates of global mean sea level rise). Predictions cover not only temperature, rainfall and sea level, but also ocean acidification, cloud cover (the 'biggest cause of uncertainty in predictions'), West Antarctic and Greenland ice sheets, and a number of slides on ocean circulation.

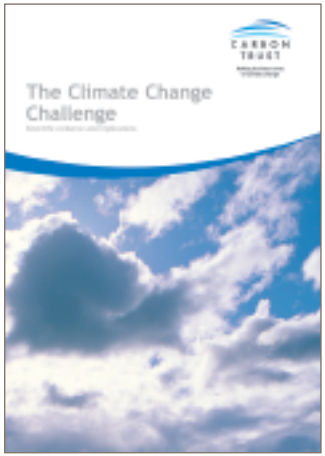
The Frequently Asked Questions (FAQs) section addresses the same issues as are dealt with in the slides, but in question-and-answer form. Some examples illustrate. Q1: How do we know that the climate is changing? Q7: As natural emissions of carbon dioxide are very much greater than those from human activities, surely the effect of man is insignificant? Q10: How reliable are climate models? Q16: Isn't another ice age due soon? And won't it counteract global warming? Q20: Will increased CO_2 in the atmosphere stimulate plant growth? Q23: How will climate change impact on our lives in the UK?

The Climate Change Challenge: Scientific Evidence and Implications

The Carbon Trust, November 2005

Description

This report summarises the nature of the climate change problem, explains the fundamental science and evidence, and sets out potential impacts and uncertainties.



Contents

- Is climate change real?
- Other observed indicators and impacts of our changing climate
- Projecting climate change
- Specific impacts and human risks
- Long-term trends and planetary risks
- How has the world responded and what are the options?
- Can we just adapt to climate change?

Source

www.carbontrust.co.uk/publications/publicationdetail?productid=CTC502

Summary of the report

The first sections present evidence that climate change is happening and what this is likely to mean, mostly based on the IPCC's 2001 Third Assessment Report. It also explains the science of climate change. Briefly, heat-trapping greenhouse gases (GHGs) act like a blanket around the earth, keeping the temperature of the surface and lower atmosphere about 33°C higher than it would otherwise be. The result is a good balance that permits life. Putting more CO_2 into the atmosphere – e.g. by burning fossil fuels – increases the density of the blanket and thus the amount of heat trapped. As the rapid economic growth of many developing countries relies on fossil fuels, there is therefore significant potential for global emissions growth (per capita CO_2 emissions in the industrialised world are presently as much as ten times the average of many developing countries).

The next sections essentially explain why global warming is a problem. There are numerous likely impacts. These can be understood in five categories:

1. Risk to unique and threatened systems;
2. Risks from extreme climate events;
3. Risks to specific regions;
4. Aggregate impacts on the global economy; and
5. Risks from future large-scale discontinuities.

Regional illustrations provide a flavour. For example, in the Mediterranean, heatwaves and summer drying could lead to further stress on water supplies, worsening existing political tensions, and possibly driving migration into northern Europe. Further afield, Bangladesh and north-eastern India could face a more variable monsoon and changing patterns of river flow. The report also cites a study predicting the 'commitment to extinction' of about a quarter of the world's known animals and plants by 2050.

The section on the political history of climate change shows that this stretches back about a generation. It can be traced from its beginnings in the late 1970s, to the formation of the IPCC in 1988, the Rio Summit in 1992 (where the UN Framework Convention on Climate Change was opened for signature), the adoption of the Kyoto Protocol in 1997, its 2005 entry into force, and the start in the same year of the European Union's Emissions Trading Scheme. The timeline shows a significant increase in activity from the turn of the century.

Finally, adaptation is not enough. It is essential to take anticipatory action to reduce the severity of climate change effects. However, not all effects can be predicted. Even when prediction is possible, it may be impossible to take significant action; such as against coastal deltas being swallowed by the sea, or bleaching of coral reefs through warmer waters. Moreover, taking an 'adapt-only' policy may store up greater impacts for the future, as the climate system is dynamic and greater effects are therefore possible. For these reasons, mitigation is also essential: this means tackling the problem by addressing rising global emissions.

Key Websites on The Science of Climate Change

Tyndall Centre for Climate Change Research

The Tyndall Centre works to develop sustainable responses to climate change, both nationally and internationally. It has seven research programmes, each with its own sub-site: international policy, energy, adaptation, international development, coasts, cities, and integrated modelling. Each sub-site contains a clear, concise summary of the issues and of the Centre's approach, as well as the tasks the Centre has set itself, plus links to any relevant Centre publications. For example, work on cities involves defining policy questions not defined by others, so as to provide a vision of future urban strategies and model the effectiveness of alternative policies, which is in turn cut into five specific tasks. The Centre also reacts to the big topical climate policy issues. For example, it held a workshop on 'Moving Beyond Stern' in February 2007, details of which are available to read, hear and watch via the website.

www.tyndall.ac.uk

UK Climate Impacts Programme – Impacts Section

The UK Climate Impacts Programme (UKCIP) is designed to help organisations assess how they could be affected by climate change and so engage in adaptation. This review focuses on the 'Impacts' section of UKCIP's website. Here, the website provides information on likely effects of climate change in two ways – by 'Activity' and by 'Area'. Eight activities are profiled: agriculture, biodiversity, built environment, business, gardens, health, local authority and water & coasts. The sub-site for each makes only a small amount of information available, but registered users can access a great deal more (registration is free). The same pattern holds for the 'Your location' part of the website. Here, readers click on the UK region of interest and are provided with a few very general examples of possible impacts; they are implicitly invited to register in order to gain access to more detailed information. Another feature of the website is a series of tools, available in the 'Resources' section, which help with risk assessment and adaptation strategy. An example is the 'Adaptation wizard', designed to help move from understanding the issues to integrating climate risk into decision-making. Users do not need to register to use the tools.

www.ukcip.org.uk/climate_impacts/

BBC – Section on Climate Change

The BBC climate change website is both comprehensive and accessible. It has great depth, with detailed subsections on evidence, impacts, adaptation, policies and links. The 'Evidence' section provides information on the greenhouse effect, the different greenhouse gases and scenarios for the UK, among others. It has less detail on 'global climate change', but links to the IPCC and the UK Climate Impacts Programme. The 'Impacts' section discusses six features of climate change – such as water, agriculture and opportunities – each of which has deeper levels. The website is peppered with audio and video snippets, as well as text and illustrations. Another feature is the BBC's climate change experiment, which was conducted throughout 2006 using thousands of volunteers' computing capacity. The results for the UK are a potential 4°C rise by 2080. This part of the website has subsections on the experiment, the results (in some detail), what they mean and tips for personal action.

www.bbc.co.uk/climate/

Wikipedia on Global Warming

Wikipedia has a series on 'Global warming', which collectively provides a formidable amount of information. The main page gives an introduction to the subject in some detail and the reader will get a good overview of climate change from it. However, its main function is to act as a portal, allowing the reader to access a great deal more information. For example, the page contains a subsection on 'Causes' of climate change, providing a simple, five-paragraph overview, complete with an illustrative graph. The reader wanting greater detail can then visit one of the two main Wikipedia articles on the subject – 'Attribution of recent climate change', or 'Scientific opinion on climate change' – by following the links provided at the start of the subsection. As is usual with Wikipedia, the text is littered with links to further information. Other issues dealt with on the main page include, for example, expected effects, mitigation and ocean acidification. The page ends with a series of links for further information, both from within the Wikipedia suite of articles and also from external sources. Wikipedia is an open-source online encyclopaedia to which the public can contribute information.

http://en.wikipedia.org/wiki/Global_warming

Online Resources on The Science of Climate Change

Avoiding Dangerous Climate Change. Department for Environment, Food and Rural Affairs, UK, January 2006
Avoiding Dangerous Climate Change is the Report from the Scientific Symposium on Stabilisation of Greenhouse Gases organised by DEFRA. The conference built on the IPCC's Third Assessment Report by asking questions about stabilising GHG concentrations in the atmosphere at levels that would avoid dangerous climate change.
www.defra.gov.uk/environment/climatechange/research/dangerous-cc/index.htm

Climate Change 2001:
Synthesis report. IPCC. 2001
Part of the IPCC's Third Assessment Report. Provides a general overview of the entire Assessment, by posing and answering a series of nine questions covering the full range of issues, from evidence for climate change, socio-economic and other consequences to options for reducing GHG concentrations.
www.grida.no/climate/ipcc_tar/vol4/english/pdf/spm.pdf

Facts and Trends to 2050:
Energy & Climate Change. WBCSD. 2004
The World Business Council for Sustainable Development produced this overview of key facts and societal challenges related to economic development, energy demand and the impact of that demand.
www.wbcsd.ch/web/publications/Basic-Facts-Trends-2050.pdf

Inside the Greenhouse:
The Impacts of CO_2 and Climate Change on Public Health in the Inner City. Harvard Medical School. 2004
This report examines the direct impacts of CO_2 and climate change on urban centres. It looks at synergies between air pollution & climate change and climate change & emerging infectious diseases.
http://chge.med.harvard.edu/publications/documents/green.pdf

Extinction Risk from Climate Change:
Letters To Nature. 8 January 2004
Based on a sample of land plants and animals covering 20% of the world's land surface, the authors predict that 15-37% of all land plants and animals could be committed to extinction by 2050. The first paragraph is free; the full article requires payment.
www.nature.com/nature/links/040108/040108-1.html

What Do People Think About Climate Change?
Tomorrow's Climate, Today's Challenge Website
This part of the UK government's Tomorrow's Climate, Today's Challenge website provides results of numerous surveys on public attitudes in the UK to climate change: among youth, the general public and by region.
www.climatechallenge.gov.uk/communicate/what_do_people_think.html

Royal Society Climate Change Website
The Royal Society Climate Change science issues site brings together the latest scientific thinking on climate change and includes a section on 'Facts and Fictions about Climate Change' and articles by leading scientist and experts.
www.royalsoc.ac.uk/landing.asp?id=1278

The Economics and Technology of Climate Change

Stern Review on the Economics of Climate Change – HM Treasury, UK

Pathways to 2050: Energy & Climate Change – WBCSD

World Energy Outlook 2006 – IEA

Key Websites

Other Online Resources

Stern Review on the Economics of Climate Change

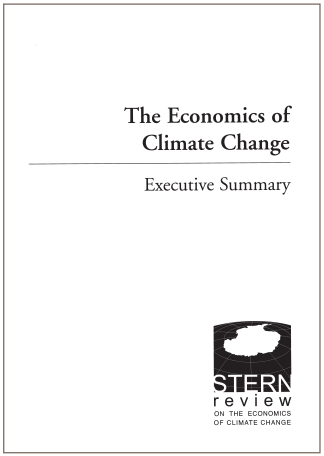
HM Treasury, UK. October 2006

Description

The Stern Review was commissioned to assess the evidence and build understanding of the economics of climate change.

Contents

- Climate change: our approach
- The impacts of climate change on growth and development
- The economics of stabilisation
- Policy responses for mitigation
- Policy responses for adaptation
- International collective action



Source

www.hm-treasury.gov.uk/media/999/76/CLOSED_SHORT_executive_summary.pdf

Summary of the Review

The report first examines the evidence on the economic aspects of climate change and the economics of stabilising greenhouse gas (GHG) levels. It then moves to considering the complex policy challenges involved in managing the transition to a low-carbon economy and in ensuring that societies can adapt to those effects that are already unavoidable. The evidence examined in the Review leads to one main conclusion: the benefits of strong, early action on climate change far outweigh the economic costs of not acting.

The cost of action to reduce GHGs and avoid the worst impacts of climate change can be limited to about 1% of global GDP per year. This could be lower if there were major gains in efficiency, or if co-benefits of action were measured (e.g. from lower air pollution). Taking action will also create significant business opportunities, which could become highly valuable: no trade-off therefore needs to be made between averting climate change and promoting development. Indeed, tackling climate change is promoted as the pro-growth strategy for the longer-term.

By contrast, failure to act will damage economic growth. Inaction would result in a persistent annual loss of 5% of global GDP. If a wider range of impacts and risks is considered, this could be as high as 20% of GDP, or more. Even moderate global warming will have serious impacts. Action is needed now, as investments made over the next 10-20 years will strongly influence the climate after 2050.

The worst risks can be avoided by stabilising GHG emissions at 450-550ppm CO_2 equivalent (CO_2e). Doing so requires emissions to be at least 25% below current levels by 2050, and possibly far more. In the end, stabilisation will require a more than 80% reduction compared with current annual emissions. Achieving stabilisation at 450ppm CO_2e will be expensive and difficult and delaying action may make it next to impossible to achieve even a 550ppm CO_2e stabilisation.

The Review categorises climate change as “the greatest market failure the world has ever seen.” It proposes three policy components to overcome this market failure. First, carbon pricing, via tax, trade or regulation. Second, policy to support innovation and deployment of low-carbon technologies. Third, removing of barriers to energy efficiency and informing, educating and motivating people about what they can personally do.

National or regional action is important, as is the Kyoto Protocol, but existing policies are not sufficient by themselves. An international response is required that has shared long-term goals and agreement on an action framework. This must have four key elements: emissions trading, technology cooperation, action to reduce deforestation and international support for adaptation.

Pathways to 2050: Energy & Climate Change

World Business Council for Sustainable Development (WBCSD). November 2005

Description

The WBCSD presents an overview of potential routes to CO_2 emissions reductions by 2050. Each 'pathway' has a 'checkpoint' in 2025, by which stage real signs of change should be apparent.

Contents

- Global trends and pathways
- Power generation
- Industry and manufacturing
- Mobility
- Buildings
- Consumer choices
- USA & Canada
- EU-25
- China
- Japan

Source

www.wbcsd.org/web/publications/pathways.pdf

Summary of the document

The starting point is that CO_2 emissions need to be stabilised at no more than 550ppm. There are many ways to achieve this, though all need big changes in energy production and use. The WBCSD calls the large shifts needed in the five major sectors (see below) 'megatrends'. Taken together, they would lead to slower emissions growth until 2025 than under business as usual, followed by decreasing CO_2 emissions going forward to 2050.

Power generation

By 2050 the sector can produce low-carbon electricity from a range of sources. There are three key policy developments by 2025: commercialisation of carbon-capture-and-storage has begun; many nuclear plants presently operating are replaced and new capacity installed; and 18 times more electricity is generated from renewable sources, such as biomass, than in 2002. The trend is for electricity to become the energy carrier, displacing fossil fuels in end-use.

Industry and manufacturing

By 2050, the sector sees substantially higher output, particularly in developing countries. To compensate, it shifts towards renewable electricity and biomass fuels, increases use of best available technologies, further improves energy efficiency and fuel conservation, and invests heavily in research and development for new low-energy/low-carbon technologies.

Mobility

Transport demand is increasing, so new technologies and behaviour change are needed to achieve significant emissions reductions. Success will come from: highly efficient vehicles; a good balance between public and private transport modes; and a larger range of fuel choices. By 2025, zero-emissions technology (e.g. fuel cells) starts to be widely deployed, high energy efficiency vehicles are widespread and road transport uses more than 5% advanced biomass fuels.

Buildings

The way forward is in improved building designs, together with renewable sources for heating and electricity and more energy efficient appliances.

Consumer choices

Members of society need to become more aware of the CO_2 implications of everyday choices. Awareness raising is a key and will require making the energy impact of goods and services fully transparent.

Four regions

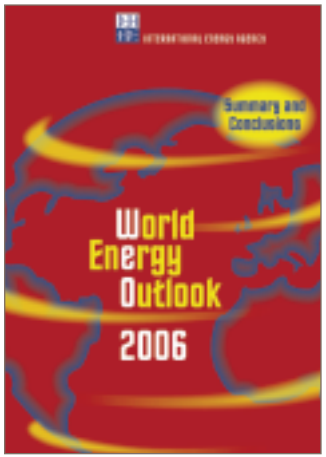
The USA and Canada, the EU, China and Japan are considered. All are urged to become more energy efficient and to shift to less carbon-intensive processes. For example, the EU's 'pathway' is to use less energy, from different sources (including large-scale use of renewables) with electricity taking over as the major end-use energy source. All regions are envisaged using more nuclear power.

World Energy Outlook 2006

International Energy Agency (IEA), 2006

Description

A meeting of leaders of G8 countries with leaders from several major developing countries and heads of international organisations asked the IEA in 2005 and 2006 to 'advise on alternative energy scenarios and strategies aimed at a clean, clever and competitive energy future.' The *Executive Summary* is available for free; the full 600 page report requires purchase.



Contents

- Part A: Reference scenario
  • Key assumptions • Global energy trends • Market outlook in four sectors: Oil, Gas, Coal, Power
- Part B: Alternative policy scenario
  • Mapping a new energy future • Assessing the cost-effectiveness alternative policies • Deepening the analysis: Results by sector • Getting to and going beyond the alternative policy scenario
- Part C: Focus on key topics
  • Impact of higher energy prices • Current trends in oil and gas investment • Prospects for nuclear power • Outlook for biofuels • Energy for cooking in developing countries • Focus on Brazil
- Annexes

Source

www.worldenergyoutlook.org/summaries2006/English.pdf

Summary of the document

The world faces two energy-related threats: not enough reliable, affordable energy; and the environmental damage caused by using too much of it. The predictions under the *reference scenario* – business-as-usual (BAU) – are as follows:

- World primary energy demand increases by 1.6% annually on average. Nearly half of this increase is for generating electricity, and one-fifth for transport.
- Average imported crude oil prices fall to $47/barrel in real terms early next decade, then rise steadily to 2030. Natural gas follows this trend.
- Non-OPEC production of crude oil and natural gas peaks within 10 years, concentrating production in fewer countries – e.g. Russia – and increasing their ability to raise prices.
- OECD countries import 2/3 of their oil needs by 2030 (56% today).
- Oil demand becomes increasingly insensitive to price, accentuating the potential impact of supply disruption on the oil price; which still matters to global economic health.
- Meeting increasing demand requires massive energy-supply investment: just over $20 trillion a year (in 2005 dollars). There is no guarantee that this investment will happen: there are some doubts as to whether investment in certain areas is sufficient to maintain current levels.

Under BAU, energy-related CO_2 emissions increase by 1.7% annually: a 55% jump from 2004 to 2030; developing countries accounting for over 3/4 of the increase.

Under the *alternative policy scenario*, governments implement the policies and measures on improving energy security and reducing CO_2 emissions they are presently considering with the following resullts:

- By 2030, world primary energy demand is 10% lower than under BAU, and OECD oil imports level off by about 2015, then fall.
- Energy-related CO_2 emissions stabilise and then fall before 2030, ending up slightly higher than 2004, but well below BAU.
- Most of these savings come from policies encouraging more efficient energy production and use. New policies and measures pay for themselves: overall financial savings far exceed initial extra investment cost for consumers.
- Nuclear energy could make a major contribution to reducing CO_2 emissions, assuming public concerns are met. Biofuels can also contribute, but rising food demand will compete for arable and pasture land, constraining production potential.

There are major obstacles to moving beyond BAU: considerable political will, as well as private-sector support and international cooperation, will be needed. But each passing year has a disproportionately larger effect on emissions. Keeping global CO_2 at current levels would require much stronger policies, the tools for which are within our grasp. Finally, 2.5 billion people rely on traditional biomass for their daily energy needs: under BAU, this rises to 2.7 billion by 2030. Action to encourage efficient and sustainable use of biomass is urgently needed, as is help to switch to modern cooking fuels and technologies.

Key Websites on The Economics and Technology of Climate Change

Stern Review Website

This is the website of the Stern Review, hosted by the UK Treasury. In addition to the report itself (and executive summary), it contains a wealth of information, with documents going into great technical detail. For example, the 'Supporting commissioned research' link takes you to the research Stern commissioned for his paper, where you can download about three-dozen research reports. Extra papers have been published online since the release of the Review, containing updates (January and February 2007). The documents available to download from Stern (as PDF documents), are generally of three types: reports, reflections/responses, and presentations (often both transcript and slides are made available). The latter are available via the 'Background to the review' link on the homepage. The site also has a good FAQ section. In fact, there are two FAQ options: one on the web page, the other to download as a PDF. They are different; perhaps the web version is updated more frequently.

www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

Princeton Stabilisation Wedges

The 'stabilisation wedges' concept illustrates the scale of greenhouse gas emissions cuts needed to deal with climate change over time, and provides a common unit for comparing the carbon mitigating capacities of various technologies. The idea was first published in *Science* in August 2004 (and in *Environment* in December 2004). The concept is to allow a wedge to represent an activity that reduces carbon emissions to the atmosphere (beyond business-as-usual); starting at zero today and increasing linearly over 50 years, when it ends up reducing carbon emissions by 1GtC/year. Using 2004 figures, one would need seven such 'wedges' to stabilise emissions (more if emissions increase). Both the *Nature* and *Environment* papers are available on the website; as is more detailed information on 15 possible wedges (usually 2-3 pages), available as PDF downloads under 'Wedge calculations'. You can also watch a Flash movie introducing the concept, and download a guide to the wedge strategy game. The 'Wedges' site is part of the 'Resources' section of Princeton University's Carbon Mitigation Initiative, a project with Princeton, BP and Ford.

www.princeton.edu/~cmi/resources/stabwedge.htm

E3G

E3G is an independent not-for-profit organisation, established in 2004, that works in the public interest to accelerate the global transition to sustainable development. The core of E3G's approach is to reframe the climate change debate around how to deliver the scale and pace of investment needed to preserve a stable climate, and to animate new coalitions and propositions to help achieve this outcome. The website works with tabs (Home, About, Programmes, Concept, Archive) and sub-menus are clearly visible, making navigation very easy. Each page provides good information in easily accessible form. E3G's work on climate and energy security is one of four programme areas. Activities include (for example), working with EU institutions, governments, businesses and NGOs to accelerate plans to build a Carbon Capture demonstration plant in China. The core of the approach is to reframe the climate change debate around how to deliver the scale and pace of investment needed to preserve a stable climate, and to animate new coalitions to achieve this outcome.

www.e3g.org/index.php/programmes/climate/

UK Energy Research Centre

The UK Energy Research Centre was established in 2004. Its mission is to be the UK's pre-eminent centre of research, and source of authoritative information and leadership, on sustainable energy systems. UKERC undertakes research addressing whole-systems aspects of energy supply and use, while developing and maintaining the means to enable cohesive UK research in energy. It works on six themes (such as energy systems, and demand reduction) across four functions (e.g. research register), and the Research Programmes page contains detailed information on the Centre's various activities. The Technology and Policy Assessment function seems particularly promising for policymakers, as it has been established to provide independent, policy-relevant assessments on key issues in the energy field. The Energy Research Atlas seems useful for policymakers and researchers wanting to review the current status of UK energy R&D, and identify key research challenges. Also for researchers, the NERN link leads to the National Energy Research Network.

http://www.ukerc.ac.uk/

Online Resources on The Economics and Technology of Climate Change

Climate Change 2001: Mitigation. IPCC. 2007
Part of the IPCC's Fourth Assessment Report, this discusses the nature of the mitigation challenge, the options available, the costs and ancillary benefits of mitigation, and ways and means for achieving it.
http://www.ipcc.ch

Climate Change 2007: Impacts, Adaptation & Vulnerability. IPCC. 2007
This part of the IPCC's Fourth Assessment Report sets out the likely impacts of climate change on natural and human systems (e.g. water and food security) and gives an overview of different regions' vulnerabilities.
http://www.ipcc.ch/SPM13apr07.pdf

Clearing the Air: The Myth & Reality of Aviation and Climate Change. CAN and T&E. 2006
Two environmental NGOs operating at EU level ask two types of questions associated with aviation: the impact of aviation on climate change, and the (cost) effectiveness of policies under consideration.
www.transportenvironment.org/docs/Publications/2006/2006-06_aviation_clearing_the_air_myths_reality.pdf

The International Energy Agency
The International Energy Agency (IEA) acts as energy policy advisor to 26 Member countries in their effort to ensure reliable, affordable and clean energy for their citizens. Current work focuses on issues like climate change.
www.iea.org

International Climate Change Taskforce
This website provides findings from a joint project by the Institute for Public Policy Research, Centre for American Progress and the Australia Institute, which worked together in 2004-2005.
www.ippr.org/ipprcommissions/index.asp?id=2373

Hadley Centre
This website provides copies of reports produced by the Hadley Centre, including analysis of the impacts of climate change on the energy sector and coastal risks. These are usually comprehensive yet accessible.
www.metoffice.gov.uk/research/hadleycentre/pubs/brochures

Policy Responses to Climate Change

The Kyoto Protocol – UNFCCC

Limiting Global Climate Change to 2 Degrees Celsius: The Way Ahead for 2020 and Beyond – European Commission

UK Draft Climate Change Bill – DEFRA

Key Websites

Other Online Resources

The Kyoto Protocol

United Nations Framework Convention on Climate Change (UNFCCC), 11 December 1997

Description

The Kyoto Protocol is an international treaty on climate change with the objective of "stabilis[ing] greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." It significantly strengthens its parent, the UNFCCC, by committing industrialised countries to individual, legally-binding targets to limit or reduce their greenhouse gas emissions. The Protocol also has provisions for "flexible mechanisms", which involve both developed and developing countries in GHG emission reductions.

Contents

The Protocol sets out:

- The definitions needed to enable a legal framework to be established
- The legal framework for emissions limits and cooperation between countries
- The methodology under which signatories will operate

Source

http://unfccc.int/resource/docs/convkp/kpeng.html

Summary of the Protocol

The Kyoto Protocol aims to lower emissions of greenhouse gases. 'Annex 1' appears in the original UNFCCC. Annex 1 countries are industrialised and must reduce their emissions by an average of at least 5% by 2008-2012, compared with 1990. Note that, compared to emissions levels that would be expected by 2010 without the Protocol, this represents a 29% cut.

Principles

Kyoto is an inter-governmental treaty, governed by global legislation enacted under the UN's aegis. In keeping with the UNFCCC, the Protocol places climate change within a sustainable development framework. Although climate change is global, the Protocol acknowledges differences: 'Parties have common but differentiated responsibilities.' There are therefore two categories: industrialised (Annex 1) countries have specific commitments (listed in Annex B); and developing (non-Annex 1) countries do not.

Commitments

Annex 1 countries have many specific commitments, such as promoting sustainable agriculture, and progressively phasing out market imperfections that prevent emissions reductions. The most important, however, are the individual, legally-binding targets set out in Annex B. Commitments range from an 8% reduction (e.g. Switzerland) to a 10% increase (Iceland). The European Union is the only regional body to sign the Protocol – committing to an 8% reduction – and all EU member states (EU15 in 1997) formally committed to -8%. However, the Protocol allows regional burden-sharing, so the reality is rather different (e.g. Germany: -21%, UK: -12.5%, France: 0%, Portugal: +27%). Note that international shipping and aviation are excluded from the Protocol's scope.

International cooperation/flexibility

Annex 1 parties are free to fulfil their commitments jointly, if they wish, as exemplified by the EU approach. Also, there are three 'flexible mechanisms', designed to allow Annex 1 countries to meet their commitments by obtaining their reductions from elsewhere. These can be bought from financial exchanges (such as the EU Emissions Trading Scheme), or though projects that reduce emissions: in non-Annex 1 countries under the Clean Development Mechanism (CDM), or in other Annex 1 countries under Joint Implementation. The CDM has a number of safeguards to prevent overseas development assistance simply being spent differently. In addition, the Protocol takes tentative steps to encourage non-Annex 1 countries to take action such as starting to develop emission reduction programmes.

Methodology: Evaluation, information & reporting

Annex 1 countries have obligations to provide information on a regular basis, which is then subject to review. The Protocol itself is intended to be reviewed periodically. Moreover, a number of the trickier issues could not be decided when the Protocol was finalised. It therefore defers such decisions (e.g. the issue of sanctions for non-compliance). The Protocol was to enter into force three months after at least 55 parties had ratified, representing at least 55% of 1990 emissions in Annex 1. This threshold was reached in late 2004, with Russia's ratification and it came into force in 2005. 171 countries have now ratified. Australia and the US are the only major emitters not to ratify.

Limiting Global Climate Change to 2 Degrees Celsius: The Way Ahead for 2020 and Beyond

European Commission, COM(2007)2, of 10 January 2007

Description

The European Commission proposed an integrated strategy on energy and climate in January 2007. The EU is seeking to fight climate change as an integral part of its energy policy and the Communication reviewed here goes into some detail on how to achieve this. It is addressed to the 2007 Spring Summit, which is the March meeting of EU leaders to discuss and give guidance on the initiatives being suggested.

Contents

- The climate challenge: reaching the 2°C objective
- The costs of inaction and action
- The benefits of action and relationship with other policy areas
- Action in the EU
- International action in the global fight against climate change

Source

http://europa.eu/press_room/presspacks/energy/com2en.pdf

Summary of the proposed strategy

The Communication's starting point is that the EU must ensure that global temperature increases do not exceed pre-industrial levels by more than 2°C on average, thus limiting the impacts of climate change and reducing the risk of massive, irreversible disruptions of the global ecosystem. It shows that this is both technically feasible and economically affordable if swift action is taken. It sets out proposals for action within the EU, as well as for the rest of the international community (in which the EU is to take the lead).

The international approach is as follows. In negotiations, the EU should pursue a 30% greenhouse gas (GHG) reduction by developed countries by 2020, compared with 1990 levels. By 2050, global GHG emissions need to be reduced by up to 50%, which for developed countries means reductions by 2050 of 60-80%. Developing country emissions will overtake the developed world's by 2020. By then, the rate of overall developing country emissions should start to fall, followed by an overall absolute reduction from 2020 onwards.

Market-based instruments, such as the EU Emission Trading Scheme (ETS), will be essential for Europe and elsewhere. The post-2012 framework should enable inter-operability of comparable domestic trading schemes, with the ETS as the pillar of the future global carbon market. The ETS will stay open to carbon credits from the flexible mechanisms of the Kyoto Protocol after the commitment period ends in 2012.

Within the EU, the headline proposals are as follows. Until there is international agreement, the EU should make a unilateral commitment to cutting its own GHG by 20%, by 2020. It will achieve this through market mechanisms like the ETS, as well as through other policies and actions in its energy policy. The ETS should be strengthened: 45% of the EU's CO_2 emissions are presently covered by the scheme, and this proportion should be increased from 2013.

The Communication makes a range of other 'domestic' proposals. On transport, it suggests limiting emissions by (for example) including aviation in the ETS and strengthening demand-oriented measures. For housing, one proposal is to expand the scope of the existing directive on energy performance of buildings. It also suggests developing a series of proposals on non-CO_2 GHGs and early use of the €8.4Bn (£5.7Bn) EU budget for environment, energy and transport research.

UK Draft Climate Change Bill

Department for Environment, Food and Rural Affairs, UK. March 2007

Description

The UK Draft Climate Change Bill, published on 13 March 2007, is the UK government's policy response to climate change, setting out a legal framework to manage future emissions.

Contents

The Bill

- Makes challenging carbon dioxide reductions targets for 2020 and 2050 legally binding;
- Introduces a system of 'carbon budgeting' capping emissions over five-year periods – with three budgets set ahead to help businesses plan and invest with increased confidence;
- Creates a new independent body to advise on the setting of carbon budgets and to report on progress;
- Contains enabling powers to make future policies to control emissions quicker and easier to introduce;
- Introduces a new system of Government reporting to Parliament including on climate change adaptation policies.

Source

www.defra.gov.uk/environment/climatechange/uk/legislation/

Summary of the Bill

Targets

This Bill puts into statute the UK's targets to reduce carbon dioxide emissions through domestic and international action by 60% by 2050 and 26-32% by 2020, against a 1990 baseline. Five-year carbon budgets, which will require the Government to set, in secondary legislation, binding limits on carbon dioxide emissions during five-year budget periods, beginning with the period 2008-12. Three successive carbon budgets (representing 15 years) will always be in legislation. Emission reductions purchased overseas may be counted towards the UK's targets, consistent with the UK's international obligations. This ensures emission reductions can be achieved in the most cost effective way, recognising the potential for investing in low carbon technologies abroad as well as action within the UK to reduce the UK's overall carbon footprint.

Committee on Climate Change

A Committee on Climate Change will be set up as an independent statutory body to advise the Government on the pathway to the 2050 target and to advise specifically on: the level of carbon budgets; reduction effort needed by sectors of the economy covered by trading schemes, and other sectors; and on the optimum balance between domestic action and international trading in carbon allowances. It will take into account a range of factors including environmental, technological, economic, fiscal, social and international factors, as well as energy policy, when giving its advice.

Enabling Powers

The Bill contains enabling powers to introduce new trading schemes through secondary legislation. This increases the policy options which Government could use to stay within budgets and meet emissions targets.

Reporting requirements

The Committee on Climate Change will have a specific role in reporting annually to Parliament on the UK's progress towards achieving its targets and budgets. The Government will be required to lay before Parliament a response to this annual progress report. Every five years, the Committee's report will contain an explicit review of the UK's performance over the last budget period, and the implications of this for keeping on track to meet future targets and budgets.

Reporting Progress on Adaptation

The Bill will also allow Parliament to monitor the Government's proposals and policies for integrating adaptation to climate change into its work by establishing regular reporting to Parliament.

Key Websites on Policy Responses to Climate Change

Department for Environment, Food and Rural Affairs (Defra) – Climate Change Section

Defra's online portal function makes it a useful source on UK climate change policy. One feature is the 'Latest information' section, which provides climate change news from all relevant Government websites; for example, the announcement of the planned dissemination of Al Gore's film 'An Inconvenient Truth' to all English secondary schools. The Defra website also hosts announcements on Government consultations relating to climate change; for example the current consultation on a code of best practice for carbon offsetting by UK customers (launched in January 2007). Finally, the website has a useful section on 'Action in the UK', which contains information on policies, by sector (e.g. transport) and area of interest (e.g. adaptation).

www.defra.gov.uk/environment/climatechange/

Sustainable Development Commission – Climate Change Section

The Sustainable Development Commission (SDC) is the UK Government's independent watchdog on sustainable development. It deals with a range of sustainability issues, including climate change. This section of the website is simple and clear. It contains a short overview of the problem, a summary of the SDC's policy views, a list of relevant SDC publications and a series of external links (many profiled in this Guide). One recent addition to the website is SDC's response to the UK's Climate Change Programme.

www.sd-commission.org.uk/pages/climatechange.html

Cool Mayors for Climate Protection

The Cool Mayors website is designed for mayors of towns and cities in the US who want to take action on climate change, as the slogan suggests: “A Cool Mayor acts to do whatever it takes to bring about climate change protection, piece by piece, solution by solution.” It provides a combination of practical information (available via the ‘Good News’ and ‘Taking Action’ pages), fact-sheets (available at ‘Tools’) and best practice examples (via the ‘Successes’ page). The Cool Mayors link provides profiles of a few ‘stars’ and allows the user to search a database listing all participating mayors (more than 400 to date). At the bottom of the home page (and on all other pages on the right of the page) are three links. ‘Get Cool’ takes the user off-site to the Seattle mayors’ site, and information about signing up. The ‘Mayor’s Powerkit’ is not yet available. Finally, ‘Build a City Plan’ provides a description of Cities for Climate Protection, which is the implementation mechanism for cities that are signatory to the US Mayors Climate Protection Agreement. The page also provides a link to ICLEI (Local Governments for Sustainability), which can provide further help.

www.coolmayors.org

Institute for Public Policy Research (ippr)

This is the ippr Sustainability Programme website. Here you will find information on several current climate change projects – such as the Low Carbon Programme and the International Climate Change Task-force – as well as related projects, such as one on road user charging. Similarly, clicking on the ‘Articles’ or ‘Publications & Reports’ links will reveal a number of relevant documents, such as on reducing the risk of climate change. Socially just environmental sustainability is one of ippr’s core values, and it is concerned that public policy should ensure long term sustainability of ecosystems on which human welfare depends, and promote fair distribution of access to natural resources.

http://www.ippr.org.uk/research/teams/?id=86&tid=86

Online Resources on Policy Responses to Climate Change

Emissions Trading Scheme:
European Commission
CO_2 emissions allowances have been traded since 2005 in the European Union's Emission Trading Scheme, the world's largest multi-country, multi-sector Greenhouse Gas trading scheme.
http://ec.europa.eu/environment/climat/emission.htm

Building a Greener Future:
Towards Zero Carbon Development. DCLG. 2006
This consultation paper by the UK Department of Communities and Local Government aims to put climate change at the heart of the planning system and the way new homes are built.
www.communities.gov.uk/pub/173/BuildingaGreenerFutureTowardsZeroCarbonDevelopment_id1505173.pdf

Communication:
An Energy Policy for Europe. European Commission. 2007
The European Commission announced an energy and climate change package on 10 January 2007, in several documents. This link is a partner of the Communication on limiting climate change to 2°C.
http://eur-lex.europa.eu/LexUriServ/site/en/com/2007/com2007_0001en01.pdf

Second European Union Climate Change Programme
The European Climate Change Programme (ECCP) is the European Union's main instrument to discuss and prepare the further development of the EU's climate policy.
http://ec.europa.eu/environment/climat/eccpii.htm

Sustainable Energy. Netherlands Environmental Assessment Agency. 2006
Subtitled "Trade-offs and synergies between energy security, competitiveness, and environment", this short report discusses a policy mix that would help achieve the multiple goals alluded to.
www.rivm.nl/bibliotheek/rapporten/500116001.pdf

Nottingham Declaration on Climate Change
The Nottingham Declaration is a one page document for UK local authorities to voluntarily make a public commitment to tackling climate change locally.
www.est.org.uk/housingbuildings/localauthorities/NottinghamDeclaration

The Big Ask
This is a campaign by Friends of the Earth, set up to generate political will for legislation on climate change. Now that a bill has been announced, the campaign is moving to pressing for strong measures.
www.foe.co.uk/campaigns/climate/big_ask/

Greenpeace UK
The Greenpeace campaign on climate change focuses on three solutions: decentralised energy, renewables and efficiency. It argues strongly against nuclear energy and urges readers to take action.
www.greenpeace.org.uk/climate/

Business Responses to Climate Change

Carbon Down, Profits Up (3rd Edition) – The Climate Group

A Call for Action – US Climate Action Partnership

Getting Ahead of the Curve: Corporate Strategies That Address Climate Change – Pew Center on Global Climate Change

Key Websites

Other Online Resources

Carbon Down, Profits Up (3rd Edition)

The Climate Group, 2006

Description

This comprehensive report features corporations, cities and regions in some detail. Each section comes with a brief overview, including a 'name and fame' of the top three performers. It then lists the best performing firms/cities/regions, giving: sector/country, carbon footprint, actions taken, emissions reductions, any benefits, measures undertaken and targets. The hope behind the report is that showcasing successful role models will inspire others to take action also.

Contents

- Overview: Carbon profitability
- Corporates: Leading in a competitive climate
- Cities: Innovation and collaboration
- Regions: Building positive momentum

Source

http://theclimategroup.org/assets/resources/cdpu_newedition.pdf

Summary of the report

This third edition of *Carbon Down Profits Up* appears a year after the second edition. In the intervening time, climate change and energy security have become priorities, and there has been unprecedented growth in the number of corporations and governments reporting action to reduce greenhouse gas (GHG) emissions. Until recently, many firms dealt with emissions as a risk, or an optional component in their Corporate Social Responsibility (CSR) strategies. Three factors have changed this: advances in science, significantly higher public awareness (media-driven), and a growing acceptance of the inevitability of stronger policy frameworks. Carbon strategy is fast becoming a competitive strategy in corporate boardrooms and political parties. The Climate Group surveyed over 1,500 organisations for this report, selecting for inclusion only the 137 most impressive in terms of carbon reduction. These organisations come from a diversity of sectors (e.g. oil & gas, real estate, hi-tech), and they continue to achieve significant cuts: over 25% in many cases. They realise significant financial and economic returns from their actions. The fundamental message of the report is clear: "greenhouse gas emissions reduction is a straight business proposition".

In this edition, the performance of 84 corporations, 36 city, and 17 regional governments are profiled. Climate change mitigation cannot be achieved without cost, but together the profiled organisations show that there is great scope for reducing emissions and reaping financial rewards.

These organisations have cut their emissions by an average of over 14%, translating to over 497 million tonnes CO_2E (CO_2 equivalent). The star performers are Catalyst Paper, Dupont, AstraZeneca, and the governments of Seattle and Woking: each has cut emissions by at least 60% (against 1990 levels). The most frequently implemented single measures across all sectors are: energy efficiency (92%), renewable energy (73%) and waste management (56%). Nearly three quarters (74%) use five or more different measures.

None of the companies listed in this report has experienced a negative economic impact from their actions in reducing CO_2. Thirty three of the 84 firms profiled are able to demonstrate financial gains from these actions; totalling approximately $9.3 billion (e.g. Dow Chemical reduced CO_2E emissions by 32% between 1994 and 2005, saving about $4 billion in the process). Competitive collaboration – sharing best practice within an industry, and setting viable targets, while also competing – is benefiting a number of industries. There is also clear evidence that monitoring and reporting of GHG emissions in large firms has increased dramatically. The most important message from the data is that emissions reductions are possible for a wide range of businesses, but successful measures vary from firm to firm.

A Call for Action

US Climate Action Partnership, January 2007

Description

The United States Climate Action Partnership (USCAP) is a group of businesses and leading environmental organisations that have come together to call on the federal government to quickly enact strong national legislation to require significant reductions of greenhouse gas emissions. The group believes that there is now sufficient knowledge to take action; that although the challenge is great the US can prosper in a carbon-constrained world; and that a mandatory-yet-flexible climate programme is required. This document sets out the group's thinking in greater detail.

Contents

- A Call for Action
- Our Design Principles
- Our Recommendations
- Our Commitment

Source

http://www.us-cap.org/ClimateReport.pdf

Summary of the document

USCAP is a new alliance of major businesses and leading climate and environmental groups. After a year of dialogue and collaboration, the group produced a set of principles and recommendations to guide the formulation of a regulated economy-wide, market-driven approach to climate protection. The group believes that swift legislative action on its proposals would bring a range of benefits for the US: encourage innovation; enhance energy security; foster economic growth; improve balance of trade; and provide critically needed leadership. The report lays out a blueprint for US climate legislation.

Principles

USCAP's call for a mandatory economy-wide, market-driven approach to climate protection is based on six principles:

- Account for the global dimensions of climate change. This means getting commitments from all major emitting countries, and the US should become involved internationally.
- Recognise the importance of technology. Both existing and developing technology need promoting.
- Be environmentally effective. Legislation and incentives must have teeth.
- Create economic opportunity and advantage. Use the power of the market.
- Be fair. Take account of the disproportionate effects of legislation and of impacts on certain groups.
- Encourage early action. Reasonable effort to reduce emissions before legislation enters into force should be rewarded.

Recommendations

These principles lead to a number of specific proposals, both for the economy as a whole and for specific sectors (such as transport). Examples include: cap and trade; complementary policies and measures; the scope of coverage; short- and medium-term targets; emission offsets; and policies and measures for technology. Overall, the US policy framework must include the following:

- Mandatory approaches to reduce greenhouse gas emissions from the major emitting sectors, including from large stationary sources, transportation, and energy use in commercial and residential buildings (phased in over time, with attention to near, mid and long-term time horizons);
- Flexible approaches to establish a price signal for carbon that may vary by economic sector, and could include, depending on the sector: market-based incentives; performance standards; cap-and-trade; tax reform; incentives for technology R&D, and deployment; or other appropriate policy tools; and
- Approaches that create incentives and encourage actions by other countries, including large emitting economies in the developing world, to implement GHG emission reduction strategies.

Commitment

The members of USCAP pledge to work with political decision-makers and other stakeholders to ensure the creation of a climate change programme as soon as possible that is: environmentally effective; economically sustainable; fair; and in line with their principles.

Getting Ahead of the Curve: Corporate Strategies That Address Climate Change

Pew Center on Global Climate Change. October 2006

Description

This Pew Center report on corporate climate change strategy is mainly a 'how to' manual for companies. It is also of value to others: investors and analysts can use it to evaluate corporate strategies, and policymakers can find insight into corporate views on issues around climate change and its regulation.

Contents

- Stage I: Develop a climate strategy
- Stage II: Focus inward
- Stage III: Focus outward
- Six case studies

Source

www.pewclimate.org/global-warming-in-depth/all_reports/corporate_strategies/index.cfm

Summary of the report

The report is based on substantial research, as well as Pew's experience of working with companies in its Business Environment Leadership Council. The report has two main sections: a synthesis report, and a case studies section, featuring the six case studies in some individual detail.

It is worth noting that one major motivation for early action on climate change is the threat of greenhouse gas (GHG) emissions controls: 90% of firms in the report believe that government regulation is imminent, and two thirds believe it will take effect in 2010–2015 (this in the US context). The report describes eight specific steps that firms can take on climate change, grouped into three stages.

Stage 1: Develop a climate strategy.

- **Assess emissions profile:**
  e.g. what sort of direct & indirect GHG emissions are being created?
- **Gauge risks and opportunities:**
  e.g. what products could flourish under carbon constraints?
- **Evaluate action options:**
  e.g. what options are available, how can they add to the bottom line?
- **Set goals and targets:**
  e.g. how can targets be connected to business strategy?

Stage 2: Focus inward.

- **Develop financial mechanisms:**
  e.g. what instruments are available to support reductions?
- **Engage the organisation:**
  e.g. how can buy-in be achieved from top management?

Stage 3: Focus outward.

- **Formulate policy strategy:**
  e.g. what are the options and how can they affect business?
- **Manage external relations:**
  e.g. which stakeholders are important and how to engage them?

Finally, four overarching themes emerge:

1. **Strategic timing:** recent changes in the external environment (e.g. greater public awareness on climate change, consumer demand) make it imperative to act now. Well-timed strategies can prepare firms for regulation and create flexibility for longer-range options.
2. **Appropriate level of commitment:** firms in the report are industry leaders, but some caution against going too far ahead, as there are many uncertainties. Early action is justified on other grounds, from 'doing the right thing' to generating low-risk short-term cost benefits.
3. **Influence policy development:** any regulation of GHGs will entail a major market shift and will favour certain actors, firms and industries. Early action is a way to have some control over the future business environment.
4. **Business opportunities:** companies that integrate climate change into their core business strategies will be best placed to take advantage of emerging opportunities and gain competitive advantage in the changing market environment.

Key Websites on Business Responses to Climate Change

Carbon Trust

The Carbon Trust is an independent company funded by the Government, designed to move Britain towards a low-carbon economy by helping business and the public sector reduce carbon emissions. The reader can find extensive information on saving energy, managing carbon, developing technology and understanding climate change, as well as on the Carbon Trust's commercial arms and tools. Each subsection links to more information and publications. The website also informs on its products, services, and its range of events, as well as publications and a resources sub-site. The 'Carbon management' part of the website is meant for large organisations and identifies the risks and opportunities associated with climate change. In addition to particular briefings, the carbon management part provides sub-sites for the private sector, NHS, local government and higher education. In all cases except the NHS, the information is accompanied by one or more brief case study videos.

www.carbontrust.co.uk

Corporate Leaders Group on Climate Change

The Corporate Leaders Group on Climate Change (CLG) brings together business leaders from major UK and international companies who believe that there is an urgent need to develop new and longer-term policies for tackling climate change. The first output from the group was a letter to the UK Prime Minister in the run up to the G8 Summit in Gleneagles. The letter argued that investing in a low-carbon future should be "a strategic business objective for UK plc as a whole" and pointed out that at present "the private sector and governments are in a 'Catch 22' situation with regard to tackling climate change, in which governments feel limited in their ability to introduce new climate change policy because they fear business resistance, while companies are unable to scale up investment in low carbon solutions because of the absence of long-term policies". The group is currently working in partnership with the UK Government towards strengthening domestic and international progress on reducing greenhouse gas emissions. They have also launched an EU CLG to work on policy change in Europe.

www.cpi.cam.ac.uk/bep/clgcc

Stop Global Warming

This is a campaigning, US-based, website, claiming over 650,000 supporters. It has the usual information on climate change and its impacts, but the 'News' section features news media items on global warming, rather than campaign news. The main vehicle is a virtual march, to which people can sign up. The website makes available a range of video clips, from the serious (trailer for 'An Inconvenient Truth') to the satirical (impersonation of George W. Bush talking on climate change). The 'Take action' and 'Classroom' sections both have specific, wide-ranging suggestions for action. Examples for schools include: writing to the local mayor to urge action, using energy-saving light bulbs, and 'educating parents'. The 'Take action' section also has links to further information, and includes a 'carbon and cash savings' calculator.

www.stopglobalwarming.org

We're in this Together

The 'We're in this Together' campaign was launched in April 2007 and involves eight consumer facing businesses (B&Q, Barclaycard, British Gas, Marks & Spencer, O2, Royal & SunAlliance, BSkyB and Tesco). The campaign aims to reach every UK household by continuing to increase the number of brands in the partnership and the number of initiatives offered to consumers. Partners provide either products, services or advice for consumers to actively facilitate the reduction of their household emissions. The website also provides further examples for individual action and is intended to allow people to see how these individual actions, along with the actions taken as a direct result of the products and services, will result in a significant collective reduction of greenhouse gases.

www.together.com

Online Resources on Business and Public Responses to Climate Change

Climate Change and Shareholder Value.
Carbon Trust. 2006
Companies across a wide range of sectors are exposed to the physical risk and mitigation costs of climate change. This report develops a way of analysing shareholder value at risk from climate change.
www.carbontrust.co.uk/publications/publicationdetail?productid=CTC602

The Confederation of British Industry on climate change
Provides the CBI position, news releases on climate change, and a January 2007 interview with the BBC, in which Richard Lambert, CBI Director-General, discusses business playing a constructive role.
www.cbi.org.uk/climate

Climate Change and Insurance:
An Agenda for Action in the United States.
Allianz & WWF. 2006
WWF and Allianz jointly published a comprehensive report on insurance and climate change. Although US-centric, many of its lessons and policy ideas are relevant, given the global nature of the problem.
http://assets.panda.org/downloads/allianz_wwf_climate_change_and_insurance_embargoed_oct_2006.pdf

50 Climate Top Tips. Friends of the Earth
This is a document providing tips on reducing CO_2 emissions. Other tips can be found on the Energy Saving Trust's 'Save your 20%: 10-point checklist'.
www.foe.co.uk/resource/briefing_notes/50_climate_top_tips.pdf

Live Earth
Live Earth will use the global reach of music to engage people on climate change. It is to be a 24-hour concert on 7 continents, on 7/7/2007, with over 100 musical acts and a global audience of over 2 billion.
www.liveearth.org/

Woking Borough Council on Climate Change
Woking Council is one of the leading local authorities in the UK on climate change and has received international recognition for its work. The comprehensive climate change strategy is available online.
www.woking.gov.uk/environment/climatechangestrategy

Emissions Calculator
This is one of several websites giving members of the public the chance to calculate their car, flight and household energy-use emissions, and offering the chance to buy carbon offsets.
www.climatecare.org/

I Count
The Stop Climate Chaos Coalition launched the 'I Count' campaign in October 2006. The 'Climate chaos' section provides four short on-screen fact-sheets about climate change. This may be useful for employee awareness and involvement in climate issues.
www.icount.org.uk/

Cambridge Programme for Industry and Climate Change

UNIVERSITY OF CAMBRIDGE
PROGRAMME FOR INDUSTRY

The Cambridge Programme for Industry

CPI's work in the field in climate change is being brought together under the **Cambridge Climate Leaders** Network, which will allow for sharing of best practice and experience in this area, as well as research into climate leadership.

Climate Leadership Programme

The recently launched Climate Leadership Programme is a partnership between The Climate Group, Duke University and CPI. Its executive seminars will help senior leaders understand how to seize the business advantage inherent in addressing global climate change. This programme combines the universities' world class knowledge on climate science and policy with insight into business leadership to provide participants with a vision for how to succeed in a world moving towards a low carbon economy. The first European programme will be held 1st-4th October in Cambridge.
See **www.cpi.cam.ac.uk/climate**.

The Climate Project (UK)

CPI is running a climate leaders training initiative in partnership with Al Gore's initiative *The Climate Project*. The training brings together UK leaders from business, government and civil society in an intensive 24 hour training session with Al Gore. The training aims to help leaders in the UK communicate the challenges of climate change and explore ways of taking further effective action.
See **www.cpi.cam.ac.uk/gore**.

Corporate Leaders Group on Climate Change

Our facilitated dialogues bring together leaders from across all sectors to develop responses to the challenges of sustainability. The largest of these initiatives is the Prince of Wales's Corporate Leaders Group on Climate Change – a group of 18 business leaders from some of the UK's largest companies. The group is currently working in partnership with the UK Government towards strengthening domestic and international progress on reducing greenhouse gas emissions. The group has recently engaged with further companies from across Europe to work with the EU President to encourage further action on climate change by the Commission.

Corporate Leaders Group Members include:

ABN AMRO
Anglian Water Group
B&Q
BAA
BskyB
Centrica
E.On
F&C Asset Management
John Lewis Partnership
Johnson Matthey
Reckitt Benckiser
Shell
Standard Chartered Bank
Sun Microsystems
Tesco
Thames Water
Unilever
Vodafone

See **www.cpi.cam.ac.uk/bep/clgcc**.

Sector Initiatives on Climate Change

Organisations from across the UK insurance sector are working together with CPI through the Association of British Insurers (ABI) to consider the role they might play in encouraging more environment-friendly behaviour both within the industry and amongst its customers. A working group has been established that will report in mid 2007 on its findings. Other similar initiatives are being developed with the pensions and retail sectors.

The Cambridge Programme for Industry

The Cambridge Programme for Industry (CPI) provides executive learning programmes and dialogue facilitation services in sustainable development. CPI is a non-profit, self-financing organisation within the University of Cambridge. We have offices in Cambridge, Cape Town and Melbourne and have staff based in Brussels and in the US. CPI has been in operation since 1988.

Our expertise lies in understanding how people learn and in the development of learning processes that can help restructure systems and influence attitudes in ways that will move society towards sustainability. Our programmes draw on world-class contributors from academic, policy and practitioner circles and active alumni networks provide a vehicle for ongoing debate and activity. Our work is underpinned by our research into sustainability leadership.

President Barroso meets with representatives of the European Corporate Leaders Group on Climate Change in December 2006

For examples of our work, see the following links

The Prince of Wales's Business & the Environment Programme
www.cpi.cam.ac.uk/bep

Postgraduate Certificate in Sustainable Business
www.cpi.cam.ac.uk/pcsb

The Postgraduate Certificate in Cross Sector Partnership
www.cpi.cam.ac.uk/pccp

The Business and Poverty Leadership Programme
www.cpi.cam.ac.uk/emerging

Chronos
www.sdchronos.org

Sustainable Consumption and Production Business Taskforce
www.cpi.cam.ac.uk/scptaskforce

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