DEDICATED TO MAKING A DIFFERENCE

The WBCSD Focus Area

Energy & Climate

A contribution to the dialogue on long term cooperative action

November 2006

World Business Council for Sustainable Development

The World Business Council for Sustainable Development (WBCSD) Focus Area Energy and Climate offers the following thought piece as a contribution to the dialogue on long-term cooperative action on climate change.

This document offers some initial thinking on possible options for action within a revised international framework after 2012, but is not meant to lay out a set of "must do" policy approaches. A more comprehensive assessment will be presented in a forthcoming WBCSD publication "Policy Directions to 2050".

Energy is the fuel for growth, an essential requirement for economic and social development. By 2050, energy demand could double or even triple as population rises and developing countries expand their economies. With the prospect of such increases in energy demand giving rise to further increases in greenhouse gas (GHG) emissions, action on climate change is now a high priority for society. Government is seeking approaches to stabilize the concentration of GHGs in the atmosphere in an equitable and an economically responsible way. The focus must be on improving energy efficiency within the global economy and managing emissions from the energy we use. In broad terms this will require:

- Increased societal awareness and understanding of energy and carbon emission issues leading to greater demands for energy efficiency along the energy value chain;
- Better utilization of established low emission energy technologies now (e.g., wind, hybrid vehicles, heat pumps, combined heat and power generation, hydro electricity, nuclear);
- Development and deployment of advanced low-carbon technologies (e.g., hydrogen for mobility, fuel cells, carbon capture and storage (CCS), next generation nuclear power) over the next two decades;
- Marked improvement in energy efficiency in power generation, mobility, manufacturing, buildings, goods and services.

The solution must encompass both developed and developing economies and give business the confidence to invest in low-carbon energy projects. For many low- and zero-carbon technologies to take their firm place in the market, a long-term value for GHG reductions is needed. In certain cases, such as CCS, there is no genuine business case without it.

Before business invests, it evaluates the future. It gauges long-term supply and demand for its products, assesses the prevailing economic conditions including tax structures and policy frameworks and decides on an investment strategy.

The investments required for managing GHG emissions challenge this model. The absence of clear long-term policy may mean no future demand for a given product or could leave a higher cost, early technology project without the needed incentives. Business needs to articulate its requirements, and in response government needs to provide clear signals as to where we are headed. Under the right conditions, and given the right tools, technologies can develop and be deployed quickly – leading ultimately to a fall in emissions.

What is needed?

Energy policy is set at the national level against a backdrop of prevailing financial, security and environmental signals. A climate change policy framework must recognize the sovereign nature of energy policy decisions but, at the same time, provide clarity and context within which such decisions are taken. The framework should provide the tools to optimize GHG emissions management and direct capital towards low and zero GHG emissions technologies.

Outlined below are some key concepts that would collectively form the basis of a flexible and diverse framework aimed at supporting GHG emissions reduction efforts (specific components of the revised framework are detailed in the following sections). Elements include:

- Establishing by 2010 a quantifiable, long-term (50-year) goal for the management of global GHG emissions and actively disseminating its meaning through all levels of society.
- Encouraging the development and deployment of leading-edge technologies through partnerships and incentives and an approach to mitigate long-term market risk and deliver secure benefits for large-scale, low-carbon, new technology projects.
- Including ideas and lessons learned from current approaches and in particular building on existing GHG reduction markets.
- Modifying the existing international framework so that it builds progressively (bottom up) from local, national, regional or sector programs that contribute to the quantifiable long-term international goal and catalyzing the implementation of such programs.
- Allowing industry sector participation across multiple facilities or technology platforms at the national level and across national boundaries, and enhancing GHG project mechanisms to allow them to cater for sector projects.
- The progressive inclusion of all countries – both developing and developed.

The points above are directed primarily at energy use and infrastructure. Further international frameworks will be required to deal with issues such as deforestation and adaptation to climate change.

Why is it needed?

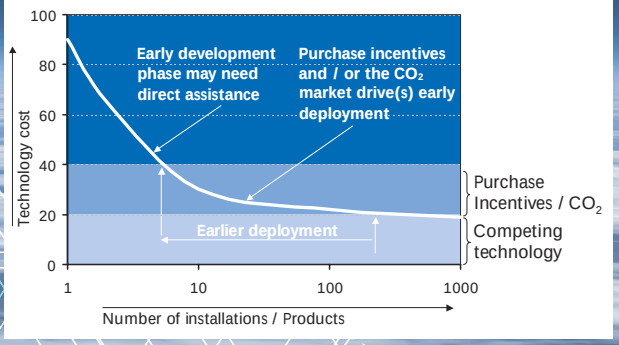
The principal existing international framework, the Kyoto Protocol, is broadly a 'top-down' approach. By contrast, energy production and use patterns develop largely 'bottom up' from local, national and regional policies coupled with the availability and security of energy resources.

Aligning a new international climate change framework with existing approaches to energy access and security issues would offer greater scope for encompassing the large-scale changes needed in the energy system.

A quantifiable long-term goal, established collectively by governments, scientific and technological organizations, business, and civil society, would assist in reducing current levels of uncertainty. The long-term goal becomes a point of reference for the development of national energy and climate policy and raises consumer awareness of the need for GHG emissions management.

All technologies face barriers of some sort. GHG emissions management technologies face additional hurdles posed by the uncertainty over long-term political action to address climate change. A diverse approach will allow business to better manage this additional risk and further encourage technological development and deployment.

Figure 1: Technology cost curve



How could it work?

The existing international framework would be revised and expanded as follows:

- To encourage technology development to introduce change into the energy system;
- To further develop approaches to foster deployment of current best practice and existing technology;
- To offer a more rapid deployment for new energy technologies than would otherwise be the case.

This approach is illustrated in Figure 1.

Long-Term Goal

The long-term goal should be expressed in terms of annual carbon emissions, derived from a longer-term trajectory and based on the most up-to-date results from climate science research, an understanding of the impact of climate change and recognizing social and economic drivers of national and regional importance. Such a goal should be in place by 2010.

The global goal would be revisited periodically, but certainly no later than 2020–25, as climate impact science continues to develop, to affirm or reset the rate of technology deployment that is required. Depending on the rate of technology development and the goal targeted, deployment depends on the early removal of existing capital stock or simply ensuring that all new developments use the new technology, with existing capital stock remaining to live out its life.

Technology Development

The introduction of a long-term goal should encourage new technology development and the implementation of medium to large-scale demonstration-projects. But the risk associated with activities where GHG emissions management is a key deliverable (e.g., CCS) is linked to the uncertainty of there even being a future market or demand for such a service. Two approaches could be used to overcome such risk;

1. Direct incentives for technology programs;
   a. At the international level, cooperative clean development networks can be established. These networks need to set aggressive targets for investment in, and commercialization of, key mitigation technologies through funded R&D, pilot demonstrations and near-commercial full-scale demonstrations.
   b. At the national level, policy can encourage the development of new technology through R&D assistance, capital allowances for new low- or zero-carbon infrastructure and early take-up incentives and consumer education programs designed to bring new products and services into the market more rapidly (e.g., CO_2 labeling programmes).

2. Managing long-term regulatory risk;
The long-term regulatory risk of a new technology project could be mitigated through the use of multilateral financing mechanisms such as the Global Environment Facility (GEF) or a mechanism that underwrites the long-term validity of the associated GHG reduction units. An approach could be developed as a special project mechanism allowing a limited number of large-scale demonstration projects to claim reductions up to 20 years into the future as current reduction units, issued once the project had started operating.

Technology Deployment

Signatories to the long-term international objective would be expected to develop national programs to manage GHG emissions or encourage industry sector programs in alignment with the agreed global carbon trajectory. In addition, cross-border industry sectoral programmes could be developed.

Cooperation on technology development could also lead to international agreement on technology codes and standards for industry and manufacturing, buildings, mobility and consumer products, thus hastening the adoption of new technologies globally.

Development and Expansion of GHG Market Mechanisms

International GHG markets would continue to play a role in a revised framework, directing energy investment capital in favor of low and zero GHG emissions projects. The market would be used to provide an outlet for project reduction units and link disparate national and international sector programs together.

Such national and sector programs need not be based on carbon trading for this to happen. For example, a carbon emissions change can be derived from a program designed to drive energy efficiency, or based on renewable targets or nuclear expansion.

These programs could then be voluntarily linked into the international GHG market, provided they meet certain criteria for entry (e.g., does the policy measure recognize the international goal and represent a realistic and tangible contribution to GHG reductions). A linked program becomes eligible for an allocation of tradable GHG allowances or is treated as a project and granted tradable GHG reduction units.

How any such GHG units are subsequently allocated to the industries involved in the sector becomes a function of national policy.

Key components of the revised framework

The revised framework would learn and build from existing international agreements and incorporates the new long-term goal. The evolution of national and sector programs into an international framework is shown in the adjacent diagram and is illustrated by a forward-looking case study in the power sector (see box). The framework would consist of the elements outlined below.

National / industry sector programs

To accommodate national interests and promote inclusiveness, nations can introduce individual "wedges" or sectors of the economy into the international framework – e.g., X gigawatts of renewable energy by 2050, X gigawatts of nuclear by 2050, X mega tonnes of CCS by 2050. This allows the flexibility to introduce segments by part rather than the whole nation entering all at once.

Industry sector programs would also be accommodated. A sector program might be structured around an energy efficiency goal, a 'best available technology' objective or a direct reduction in CO_2 emissions. Importantly, a sector program could cross national borders.

Projects

In the revised framework the project mechanism remains, but the definition of a project is broadened considerably such that a whole wedge or sector in one nation or across several nations could become an eligible project. Projects can be done in any signatory country but normally in sectors not covered by a specific program that may already be part of the framework. With projects taking a broader more expansive role, emphasis on streamlined approval processes with low transaction costs will be needed.

Technology Cooperation

Technology development is a key to success, but so too will be the rapid transfer of technology between nations as an enabler of the large-scale deployment required. Global cooperation through an international framework will be required to achieve this level of technology transfer.

GHG market participation

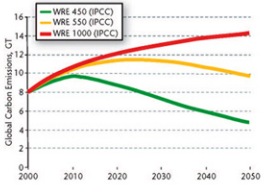
This allows international trading between parties, sectors and projects, facilitating the movement of capital to lowest cost abatement opportunities. Emission allowances could be issued at the international level against specific national or sector commitments and reduction units continue to be issued for projects (but both subject to scrutiny). For example, the USA might enter the scheme once it has a domestic trading program up and running with its own long-term targets. It would receive an allocation of international allowances equivalent to the objective of the trading program over the same period.

Many nations with developing economies and rapidly expanding energy demand (e.g., India, Brazil, China) may enter sectors into the scheme with a rising emissions profile, but with a policy program in place that delivers a relative improvement over time against some metric, such as population or GDP. For any given compliance period (e.g. 5-years), emission projections would be translated at the beginning into an absolute value for that period for allocation purposes. For reasons of economic development, the allocation would increase from period to period, but would represent a relative improvement in CO_2 emissions against the metric.

Industry sector programs would also be candidates for optional inclusion in the trading framework, either as a single project or as a national sector with allowance allocation.

Check-back

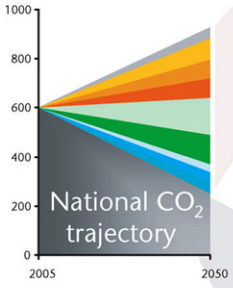
The attainment of the long-term goal requires significant international cooperation. A regular process of check-back at the international level will be required to follow the development of national responses and assess the likelihood of collective success in achieving the goal. This process should be referenced to the latest scientific information and include governments, business and civil society.



"Because climate change is a global problem, the response to it must be international. It must be based on a shared vision of long-term goals and agreement on frameworks that will accelerate action over the next decade, and it must build on mutually reinforcing approaches at national, regional and international level." (Stern Review, 2006)

2010 2015 2020 2025 2030 2050

A. Opportunity Wedges (National)
(Developed Country Example)



Adapted from S. Pacala and R. Socolow (2004)

B. A global carbon trajectory expressed in terms of carbon emissions per annum

C. International Framework

Technology
International partnerships to foster technology development, to set standards and to hasten technology transfer to developing countries

TOP RUNNER PROGRAM

Energy use per activity

Other country examples - illustrative only

Technology transfer through application of standards

Emissions, tonnes CO_2
Economy wide emissions Business as usual profile
Economy wide ETS
Net emissions

GHG Markets
Optimisation through international GHG markets

D. National/Sectoral Goals & Targets

Efficiency	Buildings Industry Domestic	xx % p.a. through to 20xx
Power Generation	Renewables CCS Nuclear	xx MW p.a. by 20xx xx tonnes CO_2 p.a. xx GW by 20xx
Mobility	Bio-fuels Choice	xx litres p.a. by 20xx Hybrid / Diesel uptake Mass transit

CCS demonstration

Emissions, tonnes CO_2 per tonne of cement
Cement industry Business as usual profile
Efficiency
Best available technology

National cement companies

National policy may set carbon targets or allocate to specific sectors through various market mechanisms

E. National Policies

Buildings – adopt new country building standards, design awareness
Industry – sector agreements, emissions trading, technology standards
Domestic – increased standards on products (e.g. standby energy use)
Renewable Energy – renewables targets
CCS – funding for infrastructure, tax cuts on capital investments, price signals for carbon
Biofuels – targets, renewable fuel standards, support for manufacturing, CO_2 labeling
Vehicle Efficiency - support technology, incentives, sector agreements
Mobility Choice - consumer incentives, promote public/private partnerships for transport networks
Consumer Awareness Programs - carbon labeling of electrical appliances

Emissions, tonnes CO_2
Power generation emissions Business as usual profile
Wind-power wedge
Net emissions

4th Generation Nuclear

Emissions, tonnes CO_2
Transport emissions Business as usual profile
Bio-fuel wedge
Net emissions

Global Technology Standard: Standby Power on Electrical Appliances

Stand-by power consumption is a surprisingly large contributor to energy demand in office buildings and residential homes. In the future it is possible that technology standards or policies targeting demand-side management such as one-watt power standby initiatives for appliances could evolve into globally applied technology standards.

Such initiatives could have wide application, particularly in government and business operations, and foster greater product innovation in the market place.

Carbon incentives still apply for individual projects in countries and sectors not covered by other programs

either / or

Allocation to participating developed countries based on submitted programmes

Allocation to participating developing countries based on submitted programmes

Projects (carbon incentives)

Increasing power sector emissions are a major challenge for rapidly growing economies

Carbon dioxide emissions from the power sector in rapidly developing economies could nearly double by 2018 and more than triple by 2050.

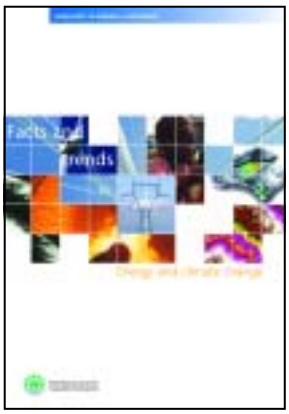
In some cases the process of establishing energy efficiency targets and ambitious plans for renewable energy and nuclear power generation has already commenced. Yet the challenge remains to manage the CO_2 emissions from coal-fired power generation. Given the scale of coal-fired power expansion, carbon capture and storage (CCS) will most likely be needed if emissions are to be stabilized. Within a revised framework, early demonstration projects could be funded by forward carbon reductions, international grants and direct financial assistance from the international community to demonstrate the feasibility of CCS with coal-fired power generation.

In time, an expanded Clean Development Mechanism could help generating companies begin the construction of large-scale Integrated Gasifier Combined Cycle (IGCC) power plants with CCS. By 2025, with sufficient economic incentives all new power plants could be low- or zero-carbon plants. Governments could further encourage implementation by introducing a single zero-carbon tradable certificate program that drives renewables, IGCC-CCS and nuclear. Specific 5-year targets would support the program.

On the back of such national programs, governments could enter their power sector (wedge) into the expanding international framework. For example, in 2018 the sector program could show a rising emissions profile for an initial 5-year period, which is then fixed thereafter. Governments could offer a two-way exchange program such that generators can meet their targets by purchasing credits from CDM projects and allowances from the EU-ETS (or other program that might exist) and swap them for local zero-carbon certificates or where a surplus exists sell local certificates directly into the international markets.

Regular check-back on delivery of the long-term goal through national and sectoral action.

Focus Area Energy and Climate Trilogy



Facts and Trends to 2050:

Presents key facts and trends related to energy and climate change and outlines corresponding dilemmas. Primarily designed for business, the issues are presented succinctly and illustrated by graphs and projections.

Pathways to 2050:

Builds on the WBCSD's 2004 *Facts and Trends to 2050*: Energy and climate change publication and provides a more detailed overview of potential pathways to reducing CO_2 emissions.

Policy Directions to 2050:

This forthcoming publication explores potential policy approaches and mechanisms that might be deployed to introduce the required changes in the energy system.

About the WBCSD

The World Business Council for Sustainable Development (WBCSD) brings together some 180 international companies in a shared commitment to sustainable development through economic growth, ecological balance and social progress. Our members are drawn from more than 30 countries and 20 major industrial sectors. We also benefit from a global network of 50+ national and regional business councils and partner organizations.

Our **mission** is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

Our objectives include:

Business Leadership – to be a leading business advocate on sustainable development;

Policy Development - to help develop policies that create framework conditions for the business contribution to sustainable development;

The Business Case - to develop and promote the business case for sustainable development;

Best Practice - to demonstrate the business contribution to sustainable development and share best practices among members;

Global Outreach – to contribute to a sustainable future for developing nations and nations in transition.

Disclaimer

This thought piece is released in the name of the WBCSD. Like other WBCSD publications, it is the result of a collaborative effort by members of the secretariat and executives from several member companies. A wide range of members reviewed drafts, thereby ensuring that the thought piece broadly represents the majority view of the WBCSD membership. It does not mean, however, that every member company agrees with every word.

Focus Area Energy and Climate

The Focus Area Energy and Climate Core Team includes 14 leading companies from a variety of industrial sectors and geographic regions. The Core Team is supported by an extensive working group of some 70 companies drawn from the WBCSD membership.

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