

Renewable Solutions **Solutions Renouvelables**

**Options for moving the global transition
to renewable energy forward**



Renewable Solutions: Options for moving the global transition to renewable energy forward

Produced by the Canadian Renewable Energy Alliance

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Contributors:

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Introduction

If we are to reduce fossil fuel dependence, greenhouse gas emissions and the energy-poverty gap, then we must find solutions for maximizing the full potential of renewable energy and energy efficiency. More than 1.6 billion people live without access to electricity and 2.4 billion lack modern energy services for cooking and heating. Millions more are connected to the grid but experience poor power quality and frequent power outages. Access to reliable, clean energy services is essential for sustainable development and poverty eradication, and can provide major benefits in the areas of health, literacy and equity. At the same time, in order to avoid severe climate change, deep reductions in global carbon emissions are essential. If the industrialized countries are to achieve targets to reduce greenhouse gas emissions in the magnitude required to minimize the risk of dangerous climate change, they will have to achieve their maximum potential for renewable energy and energy efficiency. Simply put, the developing world needs more access to energy services while at the same time the world as a whole needs to rely on less polluting energy sources and improve conservation and efficiency.

There is significant momentum continuing to build worldwide around renewable energy. Since the struggles to bring renewable energy into the international arena in 2001 at the Genoa G8 meeting and at the Ninth Commission on Sustainable Development (CSD), and the heated negotiations around setting global renewable energy targets and timelines at the 2002 World Summit on Sustainable Development (WSSD), there has been a series of international conferences tasked with increasing renewable energy globally. Germany hosted the first international renewables conference in Bonn in 2004 with outcomes including a political declaration, international action plan and policy recommendations. A follow-up conference was held in Beijing in November 2005 that focused on sharing lessons learned, the need for South-South cooperation and a reporting mechanism for commitments. While the next two years at the CSD will focus on energy generally, there is a push to develop a viable review mechanism for renewable energy that assesses achievements, barriers and lessons learned, as well as further commitments.

The eleventh Conference of the Parties (COP 11)/First Meeting of the Parties (MOP1) provided an additional opportunity to advance renewable energy strategies by creating linkages with climate change mitigation and adaptation. Mechanisms within the Kyoto Protocol, such as the Clean Development Mechanism and Article 4.5 outlining technology transfer, could be useful tools for the deployment of renewable energy in developing countries if effectively implemented.

*Renewable Solutions*¹ was an NGO Conference on Renewable Energy and Climate Change held amidst the international climate change negotiations of COP 11/MOP 1 in Montreal. The conference provided an opportunity to discuss options and develop recommendations for moving the global transition to renewable energy forward. This transition would meet the world's energy needs in a sustainable manner while at the same time providing deep cuts in

¹ *Renewable Solutions* was organized by CanREA in collaboration with CURES, Stichting Natuur en Milieu and HIVOS and support from Climate Action Network, Canadian Environmental Network, Canadian International Development Agency, Environment Canada, Foreign Affairs Canada – CDM/JI Office, Natural Resources Canada, Oak Foundation and the Netherlands Government. For detailed information visit: www.canrea.ca.

emissions. The question is no longer why, but how – that is, how can we increase the current global energy portfolio from the existing two per cent mix of renewables *with a sense of urgency*² in both the developing and industrialized world? How can we reach the 2.4 billion people currently without access to modern energy services? How can we finance both large-scale renewable energy and energy efficiency measures and small off-grid decentralized systems? In other words, how can we overcome the barriers (such as costs, perverse subsidies, institutional capacity, financial risks, insufficient technology transfer) to substantially increase the global renewable energy portfolio today?

The rapid scale-up of renewable energy will require answers to these questions, which we have attempted to address in this paper. International cooperation and individual country action to maximize all renewable energy applications - power generation, hot water and space heating, transportation fuels – and energy efficiency, must begin now using a variety of policy and market instruments, regulatory and voluntary measures, and public education strategies. Renewable energy is still an emerging field and the sharing of information and setting of review mechanisms are still key missing components at the international level. To date there is also a gap in who has benefited from renewable energy technologies. With few exceptions (in particular China, Brazil and India), the main beneficiaries have been countries in the developed world. Despite these shortcomings, many lessons learned in deploying renewable energy already exist – concluding that market development depends on long-term coherent, predictable and supportive political and legal frameworks; innovative financing mechanisms; technology transfer and capacity building; setting national and international targets; and international coordination. This Options Paper analyzes these issues and presents recommendations to policy makers in the context of the UNFCCC meetings on climate change and other relevant international deliberations.

In summary, there are several options, opportunities and lessons learned to promote renewable energy to increase energy security, decrease greenhouse gas emissions, and improve access to energy. Political will and leadership are needed. The general conclusion of the paper is that we need to maximize renewable energy and energy efficiency to their full potential by setting and monitoring national targets and timelines for all renewable energy options and sustainable development, implementing proven support mechanisms, improving technology cooperation and establishing a supportive international financing framework.

Section 1. International and National Targets and Timelines

The creation of legally binding targets for the production of renewable energy is one of the most effective mechanisms to speed up their introduction. This, along with a rapid increase in the efficiency of energy use, is essential if there are to be meaningful reductions in CO₂ and other greenhouse gas emissions.

The importance of establishing targets was widely recognized by participants of the International Conference for Renewable Energies in Bonn in 2004 as the Policy

² Johannesburg Plan of Implementation Paragraph 20 e).

Recommendations Paper stated '*Governments should formulate clear targets (including target dates)*³'.

The setting of targets is a fundamental part of the support mechanisms for renewable energy as they:

- Create stability for renewable energy manufacturers, producers and financiers to facilitate longer-term investments.
- Generate greater certainty of markets which leads to greater investment confidence and through that reduced costs, economies of scale, and greater access to finance. These in turn make renewable energy technologies more affordable.
- Assist in developing a larger market, which leads to greater dynamism, innovation and further dissemination of the technology to other markets and sectors.
- Increase government and industry accountability on programmes to increase the use of renewable energy and act as an incentive to change rules and policies which act as a disincentive to invest in renewables.
- Help guide further energy, economic, environmental regulation and planning.
- Create the basis for the trading of renewable energy certificates among countries.

The introduction of legally binding targets can and does create a 'virtuous' cycle which stimulates renewable energy production over and above the specific target.

Binding targets are further necessary as they help ensure that renewable energy technologies are able to enter the energy market which might otherwise be closed to them due to lack of fair competition (such as through rules and mechanisms for accessing grids and pipelines). Targets should also be used to encourage technological innovation by requiring the use of a variety of different renewable energy sources. This would require different targets for electricity, biofuels and for heating/cooling to stimulate developments in each sector.

The setting of targets helps to counter the funding bias that has favoured and continues to favour other more traditional technologies. For example, other technologies have or continue to receive considerable financial subsidy through research and development financing, direct or indirect subsidies, or fail to include the economic impact of external environmental costs.

International Targets

The early drafts and negotiating positions for the political declaration at the Johannesburg WSSD in 2002 proposed global targets for the use of renewable energy. This included a proposal from the EU for a global 15% target by 2010 and an even more ambitious initiative from Brazil for a 10% share of 'modern' renewable energy within a decade. The Latin American and Caribbean Environment Ministers meeting prior to the Summit (May 2002) adopted a goal that renewable energy should meet a 10% share of total energy consumption in the region by 2010. However, the final WSSD communiqué did not include global targets.

Although targets and timetables for global shares of RE were not adopted, the WSSD Plan of Implementation recognizes "*with a sense of urgency, substantially increase the global share of*

³ Policy Recommendations for Renewable Energy (22nd May 2004 Version), International Conference for Renewable Energies, Bonn, June 2004.

*renewable energy sources with the objective of increasing its contribution to total energy supply, recognizing the role of national and voluntary regional targets as well as initiatives, where they exist, and ensuring that energy policies are supportive to developing countries' efforts to eradicate poverty*⁴.

The European Union has adopted a target for the overall consumption of renewable energy and is the only regional or international body with a renewable energy consumption or production target at this time. The 2001 legislation requires that by 2010 21% of the Union's electricity comes from renewable sources⁵ - an increase from 13.7% in 1997 - and that 5.75% of transportation fuels consist of biofuels. Wind is the prime candidate to supply electricity since it is already competitive in some countries. Promotion of biofuels in Europe aims more to protect local agriculture than to properly disseminate alternative transportation fuels from renewable sources. Other barriers are import "quotas" for biofuels, which are energy commodities that can be easily transported and stored. In 2007 the EU will adopt post-2010 targets. The Union's targets require each Member State to adopt a separate indicative target for the use of renewable energy by 2010.

An international agreement may be needed to provide a framework for binding national commitments and targets. This agreement could be used to develop a set of international definitions related to renewable energy and a set of common metrics for measuring progress. It could also be used to set out commitments for technology-collaboration, capacity building and development aid to support achievement of targets in developing countries.

National Targets

Each Member State of the European Union has a target for the use of renewable energy by 2010. However, some states have introduced additional targets, such as the UK, which has set a 2015 target and 2020 'aspiration'. Furthermore, outside the European Union, there are currently 19 countries that have national targets for the production of renewable energy (see table 1). Most national targets are for shares of electricity production, typically 5 to 30 percent. EU country targets (by 2010) range from 3.6 percent in Hungary to 78 percent in Austria, with most of these targets providing a 5-10 percent increase in the share from renewables compared to 1997. Other targets around the world are for shares of total primary energy supply, specific installed capacity, biofuels blending in gasoline or total amounts of energy from renewables. Most targets aim for the 2010-2012 timeframe.

The European Union has targets for renewable electricity (22.1% by 2010) and for biofuels in transport (5.75%, same year). Wind is the prime candidate to supply electricity since it is already competitive in many countries. Promotion of biofuels in Europe aims more to protect local agriculture than to properly disseminate alternative transportation fuels from renewable sources. Other barriers are import "quotas" for biofuels, which are energy commodities that can be easily transported and stored.

⁴ JPOI Paragraph 19e

⁵ Directive 2001/77/EC of the European Parliament and of the Council of 27th September 2001 on the promotion of electricity production from renewable energy sources in the internal electricity market. Official Journal of the European Communities, 27th October 2001.

State/Provincial Targets

On a more localized level, 18 U.S. states and 9 Canadian provinces have targets despite the fact that their national governments have not adopted targets⁶. The state and provincial approaches have been largely through renewable portfolio standard mechanisms, which set a target or requirement for a percentage of an electricity provider or system operator's (either utility, energy company, province, state) overall generating capacity or electricity sales to come from renewable sources. These targets, their rules and implementation, vary considerably among the states and provinces that use them⁷.

Table 1: National Renewable Energy Targets (Excluding EU Member States)⁸⁹

Country	Renewable Energy Targets
Australia	9.5 TWh of electricity annually by 2010
Brazil	Additional 3300 MW from wind, small hydro, biomass by 2016; 2% of biodiesel blend to diesel in 2006
China	60 GW of renewable energy by 2010, contributing 10% of the countries installed capacity ¹⁰ . At the Beijing International Renewables Conference in November 2005, it was announced that the plan was now to have 15% of power production by 2020
Dominican Republic	500 MW of wind capacity by 2015
India	10% of added electric power capacity during 2003-2012 (expected 10 GW)
Israel	2% of electricity from renewable energy resources by 2007 5% of electricity from renewable energy sources by 2016
Japan	1.35% of electricity by 2010, excluding geothermal and large hydro
Korea, Republic of	2% of total energy consumption from new and renewable energy, including solar, wind and biomass energy by 2006: 7% of electricity by 2010, including large hydro, and 1.3 GW of grid connected solar PV by 2011
Malaysia	5% of electricity by 2005
Mali	15% of energy by 2020
New Zealand	30 PJ of new capacity (including heat and transport fuels) by 2012
Norway	7 TWh from heat and wind by 2010
Philippines	4.7GW total existing capacity by 2013
Singapore	Installation of 50,000 m ² of solar thermal systems by 2012 Complete recovery of energy from municipal waste
South Africa	10 TWh added final energy by 2013
Switzerland	3.5 TWh from electricity and heat by 2010
Thailand	8% of total primary energy by 2011 (excluding traditional rural biomass)
Turkey	2% of electricity from wind by 2010

⁶ Renewables 2005 Global Status Report. Paper Prepared by the Renewable Energy Policy Network for 21st Century by Eric Martinot of World Watch Institute, November 2005. Available at www.ren21.net

⁷ The Effectiveness of Different Policy Regimes for Promoting Wind Power: Experiences from the States. Fredric C. Menz and Sephan Vachon. Energy Policy, article in Print 2005.

⁸ Renewables 2005 Global Status Report. Paper Prepared by the Renewable Energy Policy Network for 21st Century by Eric Martinot of World Watch Institute, November 2005.

⁹ Global Renewable Energy Policies and Measures Data-base, International Energy Agency, accessed November 2005

¹⁰ Formulating National Renewable Energy Development Strategy and Plan, Final Draft of the International Action Programme, International Conference for Renewable Energies, Bonn, June 4th 2004.

Key Recommendations for Targets

The setting of binding national targets for the production of renewable energy is one of the most effective mechanisms to accelerate their introduction. For developing countries, any encouragement to set binding targets would have to be accompanied by international commitments for overseas development assistance, technology-collaboration and capacity building to support achievement of their targets. We recommend that:

- All governments set and achieve nationally binding short- and long-term renewable energy targets for each sector (efficiency, electricity, heating/cooling and biofuels).
- Countries work collaboratively to meet their national targets through international alliances that facilitate the development of regional markets and trade.
- In supporting access to energy in developing countries, international funding agencies and ODA countries give priority to renewable energy projects that support national targets, greater energy security, capacity building, poverty reduction and maximize local benefits.
- Countries work cooperatively to develop a set of internationally agreed metrics for the setting of comparable targets and the measuring of progress on renewable energy deployment.

Section 2 – Financing sources and mechanisms for renewable energy and energy efficiency

In addition to setting targets, developing and implementing supportive and effective renewable energy policies is key to achieving them.

A global transition to renewable energy will require huge investments in national and local renewable energy infrastructure and measures to maximize energy efficiency in every country. While some new money will be required, much of this investment could come from diverting current investment flows that are financing fossil fuels, nuclear energy, and other environmentally unsound energy technologies. While investment in renewable energy by governments, the private sector, and financial institutions is increasing, it still lags far behind conventional energy investments.

Experience shows that new technologies are usually expensive when first introduced but their costs fall as accumulated production grows. This effect can be represented by learning curves, as shown in Figure 1 and Table 3.

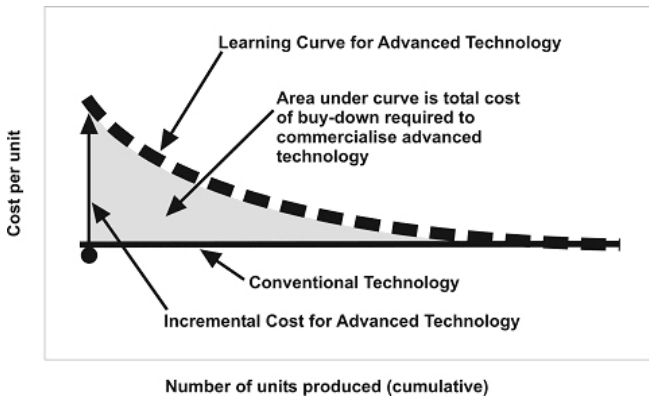


Figure 1 – Learning curve

An observation applicable to renewable energy technologies is that cost per unit of power falls approximately 20% every time the accumulated production doubles. Therefore, Annex I countries should be encouraged to meet a substantial portion of their greenhouse gas reduction targets by increasing their use of renewable energy and thereby achieve significant global price reductions on renewable energy systems.

Subsidies have been, in part, the most important driver for the adoption and penetration of renewables in industrialized countries since cost is a major barrier for these emerging industries. UNEP has stated that the *'global estimates of fossil-fuel consumption subsidies have been placed at around \$230 billion'* per year¹¹. Renewable energy and energy efficiency are unique in that they require much higher up-front investment than conventional energy sources, while at the same time providing multiple benefits that are not reflected in their cost. Innovative strategies and policies are therefore needed to increase investment, spread cost over the life cycle, and reflect the multiple benefits of renewable energy and energy efficiency.

Policy instruments used by governments to meet targets for renewable energy and energy efficiency also leverage investment by the public and private sectors. These include government procurement targets, renewable portfolio standards (RPS), "feed in" laws, and tax credits for renewable energy; and tax credits and minimum performance standards for efficiency. These policies can be customized for different renewable energies. For example an RPS can be used to set legal requirements for renewable power, fuels, or heat, and encourage investment in these technologies or it can be combined with feed-in tariffs.

The following table summarises the learning curve coefficients compiled by McDonald and Schrattenholzer for selected technologies. The learning rate is the percentage reduction of costs for each doubling of the cumulative volume of production:

Table 3: Learning rates for selected energy technologies

Technology (and source of estimate) estimates are based	Period for which %	Learning Rate
Wind:		
• OECD	1981-95	17
• US	1985-94	32
• California	1980-94	18
• Denmark	1990-94	8
Solar PV:		
• EU	1985-95	32
• World	1976-92	18
Ethanol (Brazil)	1979-95	20
Electrolytic Hydrogen from renewables (engineering studies)	-	18
Compact Florescent Lamps (US)	1992-98	16
Gas Turbine Combined Cycle Power Plants:		
• OECD	1984-94	34
• EU	n.g.	4
Gas Pipelines:		
• Onshore	1984-97	4
• Offshore	1984-97	24
Oil Extraction from the North Sea	n.g.	25
Coal for Electric Utilities	1948-69	25
Nuclear Power (OECD)	1975-93	6
Electric Power Production	1926-70	35

Source: Except for electrolytic hydrogen, which is based on Ogden's review in the 1999 *Annual Review of Energy and the Environment*, the estimates are quoted from McDonald and Schrattenholzer (2001), who give estimates for several other technologies and from other sources. n.g = not given.

¹¹ Energy Subsidies: Lessons Learned in Assessing their Impact and Designing Policy Reforms. UNEP 2003.

Countries such as Germany, Spain, and Denmark are leading the world in the implementation and manufacturing of renewable energy systems (in particular wind turbines and solar systems) and provide clear examples of what can be quickly achieved if the right policy mechanisms are in place. Their leadership and success is based on a set of common factors: very active political commitment for renewable energy; supportive education initiatives for R&D, training and public awareness; strong incentive systems to achieve wide public participation; and implementation of supportive policies such as renewable energy feed-in tariffs (REFIT).

Other policy options such as tax credits have also been used elsewhere albeit with much less success than REFITs. For example the US federal production tax credit has been applied to more than 5400 MW of wind power installed between 1995 and 2004 leading to uneven year to year development, less market stability than in Germany and Spain, and limited manufacturing capabilities. Starting at 1.5 cents/kWh in 1994, the US credit increased through several expirations to 1.9 cents/kWh by 2005, and now extended until 2007.

Multilateral and other development banks have a key role in providing the financing for renewable energy and energy efficiency, working with the Global Environmental Facility (GEF) to provide the additional funding that reflects the environmental benefits that renewable energy provides.

The World Bank and the European Investment Bank have adopted targets for their renewable energy portfolios, namely:

European Investment Bank¹²:

- *A doubling, from 7-15%, of the share of renewable energies in the overall EIB energy sector financing over the five years 2002-7.*
- *50% of the Bank's total financing for new electricity generation capacity in the EU between 2008-10.*

World Bank¹³:

- *Commit to an average 20%/year growth of our renewable energy¹⁴ and efficiency investments over the next 5 years.*

These targets are significant but would still not make renewable energy their primary focus. Other International Financial Institutions (IFIs), such as the European Bank for Reconstruction and Development and the Asian Development Bank, have no such targets despite the call by the Bonn Political Declaration for "*International Financial Institutions, including the World Bank and the Regional Development Banks [to] significantly expand their investments in renewable energies and energy efficiency and [to] establish clear objectives for renewable energies in their portfolios*". While the setting of targets is important, they must be meaningful and lead to a real change in the lending portfolios of the IFIs. The World Bank target is criticized for only requiring a percentage increase, when due to its current low level of investment, would not

¹² The European Investment Bank and Renewable Energy, June 2004.

¹³ Towards a Renewable Energy Future: A World Bank Plan for Action, Anil Cabraal Lead Energy Specialist Energy & Water Department, The World Bank, GTZ, Eschborne, Germany, 20th October 2004.

¹⁴ Target applies to solar, biomass, wind, geothermal, hydro (up to 10 MW)

result in significant funding for renewable energies especially when compared to its fossil fuel lending portfolio¹⁵.

One option for focusing more attention on renewable energy investment and a global transition would be to set up a new multilateral bank dedicated to this purpose – A Global Renewable Energy Investment Bank.

Type 2 global partnerships such as the Renewable Energy and Energy Efficiency Partnership (REEEP) and the Global Village Energy Partnership (GVEP) also have important roles to play in the financing of energy efficiency and renewable energy – especially the new infrastructure that will allow developing countries to leapfrog the fossil fuel economy and meet community energy needs with clean, reliable resources. These partnerships provide a network of practitioners that can identify local needs, develop innovative financing mechanisms, and mobilize sources of finance.

Finally, innovative approaches are needed at the national and regional levels to allow the up-front costs of renewable energy to be spread over the lifetime of the technology, and to monetize the multiple benefits of renewable energy and energy efficiency. Providing revolving funds for micro-finance and renewable energy technology and service providers; bundling of programs into larger investments; guarantees to reduce loan risk; and providing long term purchase agreements for renewable power, heat and fuels, are all ways that would help to spread up-front costs over a period long enough to provide a positive cash flow.

The multiple co-benefits of renewable energy and energy efficiency include greenhouse gas reductions, air quality improvements, fixed prices in an era of rising prices, reliability in areas where weather plays havoc with grid and fuel infrastructure, distributed economic development and employment creation, and security of energy supply. The benefits of greenhouse gas reductions are being partially monetized in the expanding markets for emission reduction credits like the Clean Development Mechanism (CDM) and the European Union Emissions Trading System (see section 5 below). Other environmental benefits are captured in various green certificate programs around the world that have developed because of RPS and other legal requirements to meet targets, or because of a voluntary demand for “green” (renewable) energy. The current price of GHG credits under the CDM is not sufficient to level the playing field for renewable energy technologies and the availability of other cheaper greenhouse gas reduction options such as landfill gas capture and large hydro means that the CDM cannot be relied upon to deliver large renewable energy projects. Other instruments will be needed to reflect the multiple benefits of renewable energy including expanded certificate programs and targeted technology transfer and collaboration initiatives.

Key Recommendations to Increase Investment and Financing of RE and EE

Given that an active political commitment to renewable energy with adequate financing mechanisms has multiple benefits such as economic development, job creation, energy security and reliability, we recommend that:

¹⁵ World Bank Spins Renewable Energy Conference. Bankwatch Network and others, 3rd June 2004. <http://www.bankwatch.org/press/m2004.html>

- International Financial Institutions set meaningful and ambitious renewable energy targets. Part of the funding should be geared toward the development of energy commodities export markets in least developing countries.
- A new Global Renewable Energy Investment Bank be established. The grant capacity of the Global Environmental Facility (GEF) to finance environmental and other benefits of renewable energy should be increased and be attached to the new RE Investment Bank.
- Developed countries commit to precise and ambitious targets for ODA for the development of renewable energy and this funding must be made more accessible to community level projects.
- All levels of government develop renewable energy policy and financing mechanisms for renewables and efficiency that are coherent across all areas of government.
- All national governments develop coherent, predictable, political and legal frameworks that are "loud, long and legal" in order to create long-term certainty and accelerate renewable energy market development.
- Governments implement incentive mechanisms such as feed-in tariffs, renewable portfolio standards (RPS), renewable energy certificates, standards and codes taking into account the technology's relative position on the cost curve and social value.
- Conventional energy investment flows are diverted into renewable energy, especially at the local level.
- Investment policies and programs be comprehensive (all sectors and end-uses) and customized to different target groups. Particular emphasis should be placed on innovative community scale financing mechanisms such as micro credit and leasing.
- Governments set national renewable energy investment strategies that include targets and establish new revolving funds that rapidly increase investment and debt financing of renewable energy. Governments should also require export credit agencies to allocate a large portfolio to renewable energy and energy efficiency technologies.
- Industrialized countries support capacity building initiatives that focus on the financing of local energy needs as a way of meeting the Millennium Development Goals.
- Governments actively participate in and finance partnerships that promote the financing of renewable energy and energy efficiency (including REEEP and GVEP), technology transfer and collaboration.
- Develop a renewable energy investment "attractiveness" index for all countries that includes sustainable and local development values in its metrics.
- Trade is stopped in low-efficiency second-hand equipment.

Section 3. Establishing Fair and Equitable Renewable Energy Markets

Some energy sectors are liberalized, so that the different sectors (production, generation, transmission, distribution and retail) are separated. Others remain as one entity – a monopoly - usually under government/public control. Liberalized markets tend to have a number of competing entities (i.e. different utilities or generators).

Liberalization began in the 1980s and has been promoted by international institutions around the world with the rationale that increased competition would lead to lower energy prices and more choice for the consumers. However, in many cases following the initial wave of new market actors, the same multinational and cross utilities companies have become dominant players across the world. Thus national monopolies in some cases have been replaced by international oligopolies – a process called market concentration. In 2004 the global energy mergers and acquisitions market was \$123 billion, up from \$43 billion in 2003¹⁶. The process of market concentration has been seen by some as detrimental to competition¹⁷. The three largest oil and gas companies in the world (BP, Exxon and Shell) now have annual revenues that are larger than the budget revenues of all but six countries in the world. While the three largest utilities (Electricité de France, Eon and RWE) would rank around the 20th largest¹⁸. Consequently, these super utilities have increasing market power and influence relative to both the regulator and other energy producers and increasingly influence national policy. Furthermore, many of the advantages that liberalization was supposed to bring (increased competition, greater transparency of costs) are being lost as utilities re-integrate different sections of the energy market (i.e. by owning both distribution and generation).

The current energy market further discriminates against and fails to support renewable energy and energy efficiency in a number of ways, including:

Distorting the Market

The centralizing tendencies of the energy markets can disadvantage renewable energy as:

- Smaller energy producers (who are the majority of new renewable energy producers) often have to bear proportionally higher transaction and connection charges than larger sources.
- Renewable electricity producers are usually distributed generators – do not use the high voltage transmission networks - but still may be required to pay the same network charges.
- Accessing the networks may be limited or disproportionately expensive.

¹⁶ Power Deals 2004 Annual Report, Mergers and Acquisitions Activity Within the Global Electricity and Gas Markets, PriceWaterhouse Coopers,

<http://www.pwc.com/extweb/pwcpublishations.nsf/docid/63A2C46A51CEA74285256FA8005B592C>

¹⁷ Communication from the Commission to the Council and the Parliament, Report on progress in creating the internal electricity and gas market. The European Commission 15th November 2005.

http://europa.eu.int/comm/energy/electricity/report_2005/index_en.htm

¹⁸ Forbes top 100 companies and 2004 CIA World Fact Book.

- New market entrances, especially at new locations, may be required to pay for new connections or network reinforcements, whereas incumbent energy sources are already connected and were never required to pay connection fees.

External Costs

It is well known that conventional energy sources, those from fossil fuels or nuclear power, do not pay the economic cost of the pollution that they create. It is difficult to quantify what the financial cost to society of this pollution is, however, in the 1990s a joint project between the EU and United States was launched to assess the economic cost of different environmental pollutants resulting from the production and use of energy - the ExternE project¹⁹. On the basis of the report, the European Commission stated the "*cost of producing electricity from coal or oil would double and the cost of electricity production from gas would increase by 30% if external costs such as damage to the environment and to health were taken into account*"²⁰.

However, many believe that the costs reached by the ExternE study actually under-estimate the real cost of climate change. A report by an insurers group for the UNEP financial services initiative estimates that the cost of climate change may reach \$300 billion per year if current trends continue unabated²¹.

In Europe an Emissions Trading Scheme was launched in 2005, which caps the total emissions allowed from fixed sources and allows companies to trade CO₂ permits. Currently, under this scheme the CO₂ price is €22/tonne (\$26 US), however, analysis undertaken by the British Government suggest that the social cost of carbon in 2002 was actually around £70/tonne²² (\$114 US). Therefore market mechanisms alone are currently unlikely to reflect the true external cost of energy production and use.

Similarly, one way that nuclear power fails to pay its full environmental and economic cost is that it does not have to carry insurance coverage for the costs of an accident. If the world's largest nuclear generator, Electricité de France, was required to fully insure its power plants with private insurance to cover the full cost of a worst case scenario accident, it would increase the insurance premiums to 5 c€/kWh, thus increasing the cost of generation by around 300%²³. In addition, in many countries nuclear utilities do not have to pay the full cost of managing their radioactive wastes.

Germany is widely seen as having the most successful support programme for renewable energy for electricity production. The cost of this support programme in 2003 was around €1.1 billion, however, the avoided external costs associated with the use of renewable energy is over €1.2 billion. Therefore, renewable energy direct support is cheaper than paying the external

¹⁹ <http://externe.jrc.es/overview.html>

²⁰ New Research Reveals the real costs of electricity in Europe. 20th July 2001.

<http://europa.eu.int/comm/research/press/2001/pr2007en.html>

²¹ Impact Of Climate Change To Cost The World \$Us 300 Billion A Year UNEP February 2001.

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=192&ArticleID=2758&l=en>

²² Estimating the Social Cost of Carbon Emissions, Richard Clarkson, Kathryn Deyes, H.M. Treasury, Department of Environment, Food and Rural Affairs, Government Economic Service Working Paper No 10, January 2002.

²³ Environmentally harmful support measures in EU Member States, Report for DG Environment, CE, Solutions for Environment, Economy and Technology, January 2003, page 132

costs of conventional generation²⁴. Also Germany's investment in renewable energy has created a strong new economic engine, export opportunities, and over 100,000 new jobs.

Energy Equity

Access to basic, clean and affordable energy services is essential for sustainable development and poverty eradication. Currently 2.4 billion people in the world do not have access to energy services. Increasing the market's control of the energy sector will not automatically increase the availability of energy. Rather market concentration is significantly increasing the control of the energy sector by a handful of multinational utilities, whose primary interest is shareholder value and not a requirement to provide adequate affordable energy requirements.

In addition, in low-income countries many millions of people cannot afford to pay for adequate energy services. As long as the world remains addicted to the dwindling supplies of fossil fuels, the price increases and fluctuations will increase the number of people unable to pay for their basic energy services. The only mechanisms to address this are investment in energy efficiency and renewable energy, neither of which are susceptible to decreasing reserves or global instabilities. Investing in locally produced renewable energy, especially in rural areas, can also act as a driver for the local economy.

Energy Subsidies

All governments give financial support to their energy sectors and in particular to specific technologies. The extent of these subsidies is highly difficult to quantify because of data deficiencies and the sheer scale of the exercise. However, UNEP has stated that the *'global estimates of fossil-fuel consumption subsidies have been placed at around \$230 billion'* per year²⁵. This includes through:

- Direct financial transfer (grants to producers and consumers)
- Preferential tax treatment
- Trade restrictions
- Energy related services provided directly by government at less than full cost
- Regulations of the energy sector

Research and Development (R and D)

Government R and D funds are a vital mechanism to speed up the introduction of new technologies. Priority should be given to technologies that can rapidly become technically and economically viable, that have widespread global applicability, that do not contribute to global warming or cause long term and widespread environmental harm and that do not increase resource conflicts. It is widely recognized that more R and D funding should be allocated to renewable energy technology. The political declaration at the International Renewables conference in Bonn stated that *"Ministers and Government Representatives emphasize the need for additional targeted research and development"*.

²⁴ Wolfram Krewitt, Joachim Nitsch German Aerospace Center (DLR) Institute of Technical Thermodynamics, System Analysis and Technology Assessment Stuttgart, Germany Workshop on Long Term Energy Prospects and the Role of Renewable Energies Brussels, European Parliament 18th March 2004, Forecast Scenarios for the Potential Role of Renewable Energies

²⁵ Energy Subsidies: Lessons Learned in Assessing their Impact and Designing Policy Reforms. UNEP 2003.

This need for immediate action is highlighted by:

- Between 1974-2002, nuclear (fission and fusion) received \$169 billion in Government R and D grants from countries in the International Energy Agency, compared to \$24 billion for renewables²⁶.
- In 2002, Japan allocated more funding for nuclear fission (\$2.8 billion) than all the countries of the IEA combined allocated for energy conservation and renewable energy (\$2.4 billion)²⁷ during that same year.
- In their first 15 years of commercial operation, nuclear and wind technology produced a comparable amount of electricity in the United States, but the subsidy to nuclear was 40 times greater than that given to wind (\$900 billion to \$39.4 billion)²⁸.

Key Recommendations for Establishing Fair and Equitable RE Markets

In order to maximize the full potential of renewable energy, the markets needs to be redesigned to support its development. We recommend that:

- All subsidies and tax credits for fossil fuel and nuclear power are phased out and support redirected to efficiency and renewable energy development. In order for a just transition, a parallel supply of renewable energy must be made available to those end-users facing hardship.
- Renewable energy producers be given priority access to the networks at reasonable and fair prices.
- Market mechanisms be created to ensure that poor people and communities reap the benefits that renewable energy can bring.
- The environmental impact and scale of technologies are given adequate consideration when awarding planning consents developed with supportive planning legislation and a streamlined planning approval process.
- Research and Development funding be diverted from nuclear fission and fusion and fossil fuels to renewable energy and energy efficiency.
- All costing for energy products and services be required to include the full environmental and social costs to present and future generations of all their activities.
- To ensure transparency, energy companies supply consumers with information on their energy sources and their environmental impacts.

²⁶ A Level Playing Field for Power in EU. Christian Kjaer, Policy Director, European Wind Energy Association, presented at Energy Intelligence for Europe, Copenhagen September 2005. http://www.energyintelligenceforeurope.dk/conf_p5.html

²⁷ Research and Development Budgets Data-base, International Energy Agency. <http://www.iea.org/Textbase/stats/rd.asp>

²⁸ Federal Subsidies: Not All Technologies are Created Equal, Marshall Goldberg, published by Renewable Energy Policy Project, July 2000. <http://www.repp.org>

Section 4 - Technology transfer/collaboration and capacity development

As shown in Table A, most of the present expansion of the use of renewable energies today is taking place in industrialized countries. For wind, 92% of the operating capacity is located in Spain, Germany, the United States, United Kingdom, Japan, Netherlands and China. For photovoltaics (PV), 88% has been installed in Germany, Japan, Spain and the United States. These facts clearly indicate that better technology transfer initiatives and enhanced international collaboration are greatly required.

Table A - Status of renewable electricity generation in 2004

	Operating capacity (GW)	Capacity factor percent	Investment costs (US\$/kW)	Current energy cost (c/kWh)	Main countries	Grid connected
Wind	47	20 - 40	1,000 - 1400	0.004 - 0.06	Spain, Germany, US, UK, Japan, Netherlands and China	92%
PV	1	06 - 20	3.000	0.03 - 0.4	Germany, Japan, Spain and US (California, Arizona, New Jersey)	88%
Geothermal	13	45 - 90	800 - 3,000	2 - 10	France, Ireland, Indonesia, Kenya, Philippines, Russia and US	-
Biomass	40	25 - 80	500 - 6000	4 - 12	US, China, India and Brazil	-
Solar thermal	0,4	20 - 35	2500 - 6000	12	US and Spain	-
Large hydropower	725	35 - 60	500 - 4500	2 - 10	Mainly in industrialized countries	-
Small hydropower	25	20 - 90	700 - 8000	2 - 12	Mainly in industrialized countries	-
Fossil	2280	52	300 - 1300	4.5 - 6.0	All over the world	-
Nuclear	369	78	-	4 - 8	Mainly in industrialized countries	-

Source: WEA (2004), updated from BIREC²⁹ (2005)

The expectation is that costs will decrease along "learning curves" so they will also become attractive in developing countries were these activities are incipient but can potentially increase

²⁹ REN 21 Renewable Energy Policy Network (Martinot, Eric). 2005. "Renewables 2005 Global Status Report". Washington, DC: Worldwatch Institute.

significantly. In these countries one faces the barriers of capacity development and technology transfer.

Capacity development can be stimulated by demonstration projects involving local people who will become in due time the managers and entrepreneurs of the new technologies as they come into widespread use. This is the classical method of "technology transfer" through which multinational companies operating in developing countries become gradually "nationalized", frequently as joint ventures.

Governments through bilateral agreements between industrialized and developing countries are attempting to accelerate this process.

Although Official Development Assistance (ODA) represents a shrinking fraction of net resource flows³⁰, support should target isolated community renewable energy projects in developing countries through well-funded portfolios. Very large projects (such as dams) may consume all ODA resources available before the works are complete. On the other hand, micro-scale, demonstration projects "for poverty relief" must be realistic in order not to be attached to demonstration experiments which will not necessarily work, or that will soon be replaced by centralized energy systems.

At the 2002 Johannesburg World Summit on Sustainable Development many voluntary Type-2 Partnerships³¹ were established by multi- and bilateral- funds to be used to stimulate the introduction of renewables in developing countries. These commitments were reviewed two years later in Bonn at the Renewables 2004 Conference. This year, these initiatives were again discussed at the BIREC Conference in Beijing. There is however an important difference between partnerships and commitments like the ones contained in the Kyoto Protocol: while the first are grassroots, "bottom-up" approaches, the latter can be mandatory and "top-down".

One issue that comes up frequently as some renewable energy technology becomes more popular is the question of technology transfer on "concessional terms" - language that permeates most of the international conferences on the issue. This argument is usually dismissed as a "non-starter" because renewables energy technologies are not in the hands of governments but in private companies that charge royalties or try to keep technologies under tight control.

However, governments and international organizations can play an important role in many aspects of technology transfer such as: facilitating training and education opportunities; enhancing local capacity development; increasing public awareness; sharing policy expertise; providing adequate financial support; and collaborating in research and development.

Furthermore, in many cases, South-South collaboration can provide significant benefits in terms of technology transfer and capacity building. There are also increasing examples of countries in

³⁰ ODA fell about 20% in real terms in the 1990s. In 2004, ODA provided by the OECD countries were equivalent to 0.25% of these countries gross national income.

³¹ Type-2 Partnerships are voluntary multi-stakeholder initiatives contributing to the implementation of Agenda 21, Rio+5 and the Johannesburg Plan of Implementation.

the South looking to 'leap-frog' the North with more efficient and appropriate technologies; thus avoiding the technological and policy errors made in the North.

Problems of technology transfer tend to disappear as the technology matures and spreads out; this is what happened one century ago with water pumping windmills which covered not only the United States but South Africa, Argentina and many other developing countries in the world. One hopes the same will happen with "modern renewables".

Key Recommendations for Technology Transfer and Capacity Development

Better technology transfer initiatives and enhanced international collaboration are needed to maximize renewable energy development. Technology transfer together with capacity development should address community and grassroots needs.

We recommend:

- Improve the technology transfer mechanism of the UNFCCC (Article 4.5) to facilitate and increase the adoption of renewable energy projects in developing countries.
- Design and implement new international, regional, national and community collaboration efforts focused on training, education, and local capacity development.
- Promote policy mechanisms to encourage and support renewable energy community power initiatives.
- Provide incentives to set up manufacturing plants of renewable energy equipment in developing countries, the goal of which is to build up local capital, engineers and technicians and thereby personnel capable of installing and maintaining equipment.
- Communities must be able to manage, control, and own renewable energy technologies to reduce dependency.
- Industrialized countries must facilitate the development of low impact technologies through funding community driven initiatives on an urgent basis, and technology transfer between developing countries and between EIT countries must be encouraged.
- Given that women bear a disproportional amount of the negative social, economic and environmental impacts of traditional energy sources, the development and deployment of renewable technologies must address gender inequity.

Section 5 - Carbon Financing (including and beyond the CDM)

It is now clear that the Clean Development Mechanism (CDM) will play a major role in helping Annex 1 countries meet their requirements to reduce greenhouse gases (GHG) during the Kyoto Protocol commitment period of 2008-2012. Because progress has been slow and only modest when it comes to reducing domestic GHG emissions, many countries will now need to purchase significant numbers of international credits through the CDM, Joint Implementation (JI) and international emissions trading (IET).

However, the Clean Development Mechanism is not providing the sustainable development benefits expected. CDM projects have involved technologies such as hydro fluorocarbon (HFC) destruction and landfill gas capture that do not provide development benefits. Most projects are

also in a few larger industrializing countries. As noted in the previous section, these technologies require lower carbon prices than renewable energy technologies. Without some changes to the CDM and intervention by buyers of CDM credits, the CDM will not benefit renewable energy to the extent expected.

Under any circumstances, carbon financing will not provide more than 20% of the financing for a renewable energy or energy efficiency project, and must be seen as complementary to conventional financing. It reflects one out of the many multiple benefits of renewable energy and efficiency. Other mechanisms are needed to monetize the other benefits (see section 4).

While there are signs that some smaller-scale renewable energy and energy efficiency projects are being registered with the CDM, the emissions reductions from the projects are mainly being purchased by a small number of buyers willing to pay a premium for these credits. Opportunities to use the CDM to finance renewable energy and energy efficiency projects that are part of larger programs are also being lost because of the strict application of project-based criteria by the Executive Board.

The value and future of the CDM beyond 2012 is uncertain, for a number of reasons:

- Time is short: the project window closes by the end of 2006 unless there is a clear signal that a post-2012 regime will buy emission reductions from developing countries; there is no financial sense to develop large projects in such a short period.
- Due to the late entry into force of the Kyoto Protocol (and the first phase of the European Emissions Trading Scheme), there is a significant delay in obtaining governmental authorization within the OECD to purchase emission reduction credits.
- The CDM approval process by the Designated National Authorities often lacks coordination at the local level and guidance at international levels in terms of characterizing "baselines", "additionality" and "leakage". The project-based approach of CDM reduces its potential.
- Several alternatives to the CDM are being proposed, such as cooperation on alternative technologies instead of national commitments for emission reductions as proposed by the United States and endorsed by Australia, China, India, Japan and South Korea. Not by coincidence, the majority of these countries opposed global targets and timetables for RE at the 2002 WSSD. Relying on the "improved" use of coal, nuclear power and other fossil fuels, they advocate that advanced technologies such as carbon sequestration and hydrogen are the pathway to sustainability. Such technologies are even more expensive than renewable energies. They are also uncertain in terms of success considering the increasing costs and risks associated with the storage and transport of carbon to deposits located far away. The nuclear industry is also trying to jump into the bandwagon of renewable energies, claiming that energy production from this source emits very little amounts of carbon, poses no security risks, results in radioactive waste that can be properly managed, and faces no constraints from existing uranium supplies.

Two types of changes are needed to the CDM if it is to benefit renewable energy and energy efficiency. First, the operation of the CDM itself has to be strengthened in terms of its technical capacity and scope. The most important of these changes will be to increase the capacity of the CDM Executive Board, set clear but effective additionality rules, and affirm that sectoral and other programs can be included in the CDM. Secondly, Annex 1 countries must show leadership in the ways they use and support the CDM. They should commit to significant and long-term funding of the CDM process; agree to purchase CERs from CDM projects beyond 2012; support the development of smaller-scale CDM projects with high sustainable development value; and agree to purchase significant numbers of credits from these projects. These changes would also pave the way for a seamless transition to an expanded international carbon market that supports sustainable development in the post-2012 climate change regime.

The EU Emissions Trading Scheme (ETS) is also an important carbon financing initiative. However, the ETS has a limited scope – applying only to certain large industrial processes, not covering yet the important sector of transport. Other countries such as Canada are introducing a domestic carbon offsets program which has the potential for providing additional financing for renewable energy and energy efficiency, but renewable energy and energy efficiency projects will still have to face competition from other low cost GHG reduction and removal technologies and measures.

Beyond carbon offset and trading schemes, the only other carbon financing mechanism being discussed is carbon taxes, which countries like Switzerland and the Netherlands are introducing. In Switzerland, an additional tax of one percent of the cost of fossil fuels will be collected as the carbon tax and will be committed to RE/EE programs.

There is some support for an International Carbon Development Bank (CDB) where a portion of funding (leveraged and phased) provides investment funds for renewables and energy efficiency. As discussed in the *Renewable Solutions* conference, options to simplify the system would have intermediaries working with the fund and providing access to NGOs, companies and small projects. Criteria would be developed to ensure sustainable development (avoiding additionality). Governments would also be able to act as intermediaries to the funds to address adaptation to climate change. To ensure transparency and resource efficiency, independents (including NGOs or project developers) would also be intermediaries if they met the criteria. To maintain a development linkage and rationale for the new CDB, polluters would be the contributors to the fund, as renewable energy and energy efficiency can effectively lead to zero carbon. Under this model, polluters pay for the pollution they create, as opposed to the CDM where polluters were essentially buying the right to continue polluting. Polluters would be identified according to elaborated principles of the contraction and convergence model on a country basis, also considering historical responsibility, equity and capacity to pay. The price of carbon credits would be fixed to reflect evolving estimates of global emission limits and tie them to final results.

Key Recommendations for Carbon Financing

Following are both recommendations on how to improve the Clean Development Mechanism (CDM) and recommendations on exploring other options simultaneously that supports greater North/South collaboration. We recommend to:

- Ensure Certified Emissions Credits (CERs) have some value beyond 2012.
- Annex 1 countries should only purchase CERs from projects that deliver significant sustainable development benefits at the local level (using the criteria set by the Gold Standard³²).
- Expand the resources, professional skills, and effectiveness of the CDM Executive Board and their ability to reject non-additional projects.
- Institutionalize the concept of “additionality” through the adoption of guidelines, sectoral baselines, and a positive list of approved technologies that includes all low-impact renewable energies.
- Introduce tools and mechanisms that allow the aggregation of small-scale projects and reduce transaction costs.
- Continue to exclude controversial and temporary projects, plantation sinks, carbon storage, nuclear power, and others.
- Consider carbon taxes at both the national and international levels (such as an international treaty) to dilute additional costs embedded in certified “environmentally preferable products”.
- Simplify and make CDM returns/methods quicker for end users, avoiding mistakes made by previous large-scale projects.
- Establish an actual price or “real” value for the CERs.
- Build a consensus to create an international carbon development bank with a portion of funding (leveraged and phased) provided for renewables and energy efficiency.

Section 6. International Coordination of Renewables Programmes

Through the frameworks of the United Nations, the G8 and European Union a number of international bodies have been charged with supporting and co-coordinating the development of renewable energy and energy efficiency. This includes:

The World Bank and G8’s Framework for Clean Energy and Sustainable Development

At Gleneagles, the G8 agreed a Communiqué and Plan of Action on Climate Change, Clean Energy and Sustainable Development. This has been called the Gleneagles Dialogue and included specific roles for the World Bank and International Energy Agency. The communiqué confirmed that *“the World Bank will take a leadership role in creating a new framework for clean energy and development, including investment and financing”*³³. This is expected to³⁴:

³² For more information, visit: <http://www.cdmgoldstandard.org/>

³³ Climate Change, Clean Energy and Sustainable Development, G8 Summit Statement July 2005.

- Develop a framework for energy investment to accelerate the adoption of technologies which enable cleaner, more efficient energy production and use;
- Work with interested borrowing countries with significant energy requirements to identify less greenhouse gas intensive growth options; and
- Develop local commercial capacity to develop and finance cost effective projects that promote energy efficiency and low-carbon energy sources.

However, still to be clarified is what “lower carbon energy” systems are being considered? The World Bank’s September 2005 document (cited above) does not contain a single reference to renewable energy. Furthermore, there are clear intensions that the clean energy framework will include “clean” coal and even reports that this might include nuclear power³⁵.

The World Bank will present its findings at its Spring Meetings in 2006.

International Energy Agency (IEA)

The IEA is the other main partner of the G8 clean energy partnership. They have been asked to play a major role in delivering a plan of action in the following six areas³⁶:

- Alternative energy scenarios and strategies
- Energy efficiency in buildings, appliances, transport and industry
- Cleaner fossil fuels
- Carbon capture and storage
- Renewable energy
- Enhanced international co-operation

As part of this programme they have established a global data-base of policies and measures that support renewable energy³⁷, which was launched in November 2005. This initiative is sponsored by the Johannesburg Renewable Energy Coalition (JREC). The IEA produce an annual report on the global investment needs of the energy sector. This report is influential in discussions within other international bodies. As well as including a business as usual scenario, the report produces an alternative scenario which highlights the possibility for significant increases in renewable energy and energy efficiency³⁸.

G8

Russia holds the presidency of the G8 from 1st January 2006, with an emphasis on education and energy security. Prior to the Summit taking place in St Petersburg July 15-17th 2006, nine Ministerial meetings will be held in Russia. Details of the policy initiatives of the Russian presidency are not available, but it seems that the Summit is likely to be directed towards the use of private business in securing further traditional energy reserves, especially important for Russia given its strategic importance in this area.

³⁴ Climate Change, Energy and the World Bank: Status Report on the Follow-up to the G-8 Plan of Action on Climate Change. World Bank, 16th September 2005; DC2005-0019

³⁵ Reforms can boost India's inspiring growth: World Bank chief, Indo Asian News Service, 20th August 2005

³⁶ Climate Change, Clean Energy and Sustainable Development, IEA's G8 Gleneagles Programme.

http://www.iea.org/g8/g8_Leaflet_WEB.pdf

³⁷ <http://www.iea.org/textbase/pamsdb/grindex.aspx>

³⁸ http://www.iea.org/Textbase/press/pressdetail.asp?PRESS_REL_ID=163

Commission for Sustainable Development

The fourteenth session of the UN Commission on Sustainable Development (CSD-14) will meet in New York from 1-12 May 2006. This is part of a two-year process and will review the following areas:

- Energy for Sustainable Development
- Industrial Development
- Air pollution/Atmosphere
- Climate Change

The CSD is expected to use the conclusions of the WSSD's Johannesburg Plan of Implementation as the framework for its programme. Specifically related to renewables this includes the objective to:

Develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable and, with a sense of urgency, substantially increase the global share of renewable energy sources.

International Conferences on Renewable Energy

In 2004, the First International Conference on Renewable Energy was held in Bonn. This was attended by representatives of 154 countries. The meeting created a focus for dialogue, actions and commitments for the further development of renewable energy around the world. Specific outcomes included: A Political Declaration; Policy Recommendations; and the creation of an International Action Plan, which contained 197 proposals for the further development of renewables and energy efficiency projects. Analysis undertaken on these projects suggested that if these were all implemented as proposed it would by 2015 result in: 163 GW (electrical) of new capacity, requiring approximately \$326 billion in investment and result in a saving of 1.2 billion tonnes of CO₂ per year³⁹.

In November 2005, the Beijing International Renewables Conference was held as part of the follow-up process to the Bonn conference. The meeting produced a political declaration that states:

We agree to take further actions at the national, regional, and international levels to accelerate the market uptake of renewable energy technologies and increase investment in research and development (R&D), especially by developed countries, in order to enhance efficiency and reduce up-front costs. We also agree on the need for strengthened support for the commercialization and transfer of technologies through North-South and South-South cooperation.

In addition, the declaration called upon the European Commission to consider an effective arrangement to review and assess progress towards substantially increasing the global share of renewable energy as foreseen in paragraph 20(e) of Johannesburg's Plan of Implementation⁴⁰.

A follow-up to the Beijing conference has yet to be confirmed but a potential host includes the United Arab Emirates.

³⁹ Content Analysis of the International Action Plan of the International Conference on Renewable Energy, 1-4th June 2004, 15th January 2005, prepared by Uwe R. Fritsche and Sidse Kristensen (both of the Oeko-Institut, Germany). http://www.renewables2004.de/pdf/IAP_content_analysis.pdf

⁴⁰ Beijing Declaration on Renewable Energy for Sustainable Development available at www.birec2005.cn

Also in November 2005, the World Renewable Energy Assembly (WREA) was held in Bonn with a theme of “World Renewable Energy Acceleration: No more time to waste”. The Assembly, organised by EUROSOLAR and attended by more than 450 representatives from politics and parliaments, from science and industry as well as NGOs and social movements, resulted in a call for the human right to renewable energy. The concurrent 2nd annual parliamentary forum on renewable energies, with representatives from over 50 countries, expressed support for the formation of an International Renewable Energy Agency (IRENA). Furthermore, in November 2005 the German Coalition Agreement committed the new German Government to the initiation of IRENA.

Johannesburg Renewable Energy Coalition (JREC)

Following the 2002 WSSD this multi-national initiative, which now has 90 Government partners, was launched to:

- Promote renewables on the national level on the basis of concrete, ambitious and agreed objectives.
- Focus on regional and international political initiatives that foster the establishment of a global policy framework, in particular through actions aimed at guiding investments and developing renewable markets.

The JREC is co-chaired by the European Commission and Morocco, with a small Secretariat hosted by the European Commission⁴¹. As part of its initiative on investment funding the JREC is proposing to start a Global Renewable Energy Fund of Funds (GREFF). This is expected to be launched in 2006, with an initial investment target of €75 million⁴².

The JREC Secretariat and members are involved in the preparation of CSD 14.

Renewable Energy and Energy Efficiency Partnership (REEEP)

REEEP is a public-private partnership that was launched by the United Kingdom along with other partners at the Johannesburg WSSD. REEEP aims to accelerate the marketplace for renewable energy and energy efficiency⁴³. Its goals are to:

- 1) Reduce greenhouse gas emissions.
- 2) Deliver social improvements to developing countries and countries in transition, by improving their access to reliable clean energy services, and by making REES more affordable.
- 3) Bring economic benefits to nations that use energy in a more efficient way and increase the share of indigenous renewable resources within their energy mix.

The partnership is funded by a number of governments including: Austria, Canada, Ireland, Italy, Spain, The Netherlands, The United Kingdom, The United States and the European Commission. In November 2005 REEEP announced a fourth call for tender for Sustainable Energy Policy, Regulation and Innovative Finance Projects, to which NGOs can apply for funding⁴⁴.

⁴¹ http://europa.eu.int/comm/environment/jrec/energy_fund_en.htm

⁴² http://europa.eu.int/comm/environment/jrec/documents_en.htm

⁴³ <http://www.reeep.org/>

⁴⁴ <http://www.reeep.org/index.cfm?articleid=1251>

Key Recommendations for International Coordination

Through the frameworks of the United Nations, G8 and European Union, a number of international bodies have been charged with supporting and co-ordinating the development of renewable energy and energy efficiency. We recommend that:

- CSD cycles 2006-2007, in addition to sharing lessons learned from renewable energy projects, should set timetables for the establishment of national binding targets for the use of renewables. An effective, mandatory review mechanism that improves international data collection and assesses results should also be established.
- The World Bank led Framework for Clean Energy and Sustainable Development must introduce substantial new money for renewable energy and energy efficiency and exclude support for coal or nuclear projects.
- The G8, at the St Petersburg Summit, must give priority to increasing the efficiency of the existing oil and gas infrastructure rather than the further exploration and exploitation of fossil reserves. Existing oil and gas income should be reinvested into renewable technology.
- Multinational agencies working on renewable energy and energy efficiency must develop a mechanism to co-ordinate their activities.
- The international community build consensus around the establishment of a new series of international institutions dedicated to bringing about a global transition to renewable energy, which might include an International Renewable Energy Agency (IRENA), an International Renewable Energy Development Bank, and Carbon Development Bank.

Conclusion

There are several options for maximizing renewable energy and energy efficiency in the global transition to a post-carbon society. Close to 100 NGO participants from 40 countries met December 1-3, 2005 at the *Renewable Solutions* conference to discuss and agree on the recommendations above. In order to be effective, it was recognized that many of the recommendations need to be taken together. Setting a national target without establishing a supportive policy and financial framework will do little to meet the goal. For effective technology transfer, capacity development and financing mechanisms also need to be incorporated.

The COP 11/MOP 1 international climate change meeting was an opportunity to discuss these options and opportunities for moving forward with a sense of urgency. While post-2012 scenarios might offer future opportunities for binding policy measures that promote renewable energy while mitigating climate change in both developed and developing countries, policy instruments must be implemented today to reduce the energy-equity gap and greenhouse gas emissions. Action from the top down is required as much as from the community level up. This Options Paper is an attempt to move the discussion forward on how to overcome the barriers to substantially increase the global renewable energy portfolio today. The benefits are many and the opportunity to act is now.