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POST-BALI: FROM RECOGNITION TO PRACTICE

Roger Williamson

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1. Where are we now? The Japan G8 meeting and other associated events

As well as the substantive discussion, the Japan meetings sought to be an environmental showcase, backed up with carbon offsetting. The aspiration was to provide an eco-friendly summit meeting, for example, including using clean energy shuttle buses for conference transport. The substantive discussions chaired by Japan had a set of objectives going into the meeting.[1] These were to design a framework on climate change to involve:

- the participation of all major emitters, including developing countries;
- achieving flexibility and diversity;
- achieving compatibility between environmental protection and economic growth and establishing a 'Cool Earth Promotion Programme' embracing the post-2012 framework, international environmental cooperation and innovation.

Key elements of the G8 Summit conclusions include:[2]

- establishing the long-term goal of 50% reduction by 2050 (para 23);
- establishing mid-term goals and national plans, including sectoral approaches (para 24);
- emphasising sectoral approaches (para 25);
- emphasising a mid-term aspirational goal for energy efficiency (para 26);
- stressing cleaner energy, including renewable energy and nuclear energy (paras 27 and 28);
- stressing the importance of adaptation (paras 29-30);
- noting the required technologies, including a 'technology roadmap', carbon capture and storage, observation systems, etc. (para 31);
- noting the necessary financial mechanisms, including multilateral funds and official development assistance (para 32) complimenting these with market mechanisms including emissions trading schemes, tax incentives and regulations (para 33);
- noting the need for the WTO round to be concluded and to address tariff and non-tariff barriers.

The Major Economies leaders meeting consisted of the G8 plus the G5 plus Australia, Korea and Indonesia and the European Community.[3] Their declaration stressed shared visions (paras 1-3), long-term goals (para 4), mid-term goals (para 5); forests (para 6), adaptation (para 7), technologies (para 8), finance (para 9), other issues and future dialogues (paras 10 and11).

[1] For the text of the conference documents, see: http://www.g8summit.go.jp/eng/index.html

[2] See: http://www.g8summit.go.jp/eng/doc/doc080714__en.html

[3] See: http://www.g8summit.go.jp/eng/doc/doc080709_10_en.html

Other notable recent meetings included the fourth session of the Gleneagles Dialogue[4] involving the G8 and five outreach countries which account for 80% of global greenhouse gas emissions. The G20 Chiba dialogue helped feed into the G8 meeting.[5] Its emphases were on technology, finance and investment, as well as the post-2012 climate change framework. It involved an honest and frank exchange of the opinions on the post-2012 framework. In addition, the G8 environment ministers met in Kobe on May 24-26th. This included the Kobe Call for Action for Biodiversity [6] and the Kobe New Action Plan toward a Global Zero Waste Society.[7] As well as contributing towards the emerging consensus on long-term goals (low carbon societies), the approach to the post-2012 framework expressed a need for effective mid-term targets in line with the findings of the IPCC, the need for development for emissions trading, carbon offsetting, etc. and cooperation among developing and developed countries.

The Kobe initiative to follow up the meeting of environment ministers stressed the following;

- international research network on low carbon societies;
- analysis of sectoral mitigation potentials;
- promotion of the benefits of relevant policies;
- capacity-building for support for developing countries on inventories and data collection, in line with making climate policy measurable, reportable and verifiable.

The Kobe action plan also suggested reduction of disposable plastic bags and other single-use consumer products. The June G8, China, India and Korea energy ministers' meeting emphasised setting energy efficiency goals and formulating action plans, working on development of sectoral approaches and agreeing to establish the International Partnership for Energy Efficiency Cooperation. [8] It also stressed promotion of lower carbon energy, carbon capture and storage (CCS) and noted the growing number of countries expressing interest in nuclear power as a means to addressing climate change and energy security. It suggested increased research and development funding. The Africa initiatives by Japan including the Tokyo International Conference on African Development (TICAD IV) meeting highlighted the doubling of Japan's ODA to Africa and special attention of forests.[9] The April G8 development ministers' meeting emphasised adaptation and scaling-up of mitigation and adaptation. G8 finance ministers' meeting in June in Osaka stressed enhancing the financial provision for clean technologies e.g. the Clean Technology Fund and the

[4] See: http://www.berr.gov.uk/administration/page13625.html

[5] See: http://www.env.go.jp/earth/g8/en/g20/index.html

[6] See: http://www.env.go.jp/en/focus/attach/080610-a3.pdf

[7] See: http://www.env.go.jp/en/focus/attach/080610-a6.pdf

[8] See: http://www.enecho.meti.go.jp/topics/g8/ipeecsta_eng.pdf

[9] See: http://www.ticad.net/

Strategic Climate Fund,[10] the use of private-based large scale investment into the low carbon future and the role of market mechanisms, including the ETS and tax incentives. [11]

The Japanese initiative of the 'Cool Earth Partnership' is intended to assist developing countries making efforts to reduce greenhouse gas emissions and achieve economic growth in a compatible way.[12] Japan has already pledged US$10 billion over the next five years. Initial work has begun with countries such as Indonesia, Tuvalu, Senegal, Madagascar, Nigeria, Guyana and Gabon. In summary, the high level of diplomatic activity on climate change and technology issues indicates a raising of the international profile of climate change as a challenge. The key issue still remains - how to find a post-Kyoto mechanism which introduces all major emitters into a system which has measurable, reportable and verifiable targets, does not adversely impact economic growth, and simultaneously is radical enough to reduce greenhouse gas emissions as fast as the science suggests is necessary.

2. The Washington International Renewable Energy Conference

This major initiative (March 4-6 2008) was a ministerial level conference with nearly 9000 representatives from 125 countries, including 103 ministers.[13] It was built around the following themes:

- Technology/research and development;
- Agriculture, forestry and rural development;
- Market adoption and finance;
- Sub-national and national partnerships.

The conference emphasised the importance of research and development in the area of renewable energy technology and recommended the following:

- The need for stable and predictable policies and regulations to ensure industry-university-government partnership;
- The need to commit 3% of total investment in renewable energy to sustain innovation;
- The need for human resource development;
- The need for infrastructure and support of renewable energy strategy;
- The need to integrate renewable energy sources into existing energy systems and
- The necessity of establishing into disciplinary centres for worldwide research and development.

[10] See: http://www.mof.go.jp/english/if/su080614a.pdf

[11] See: http://www.summit2008osaka.jp/english/index.html

[12] See: http://www.kyomecha.org/pdf/kickoff_cool.pdf

[13] See: http://www.wirec2008.gov/wps/portal/wirec2008

The conference also served as a forum for collecting voluntary pledges. Of the 145 pledges made, many indicated a readiness for a wide range of actors to take challenging steps in the renewable energy field. The interplay between mandatory and voluntary approaches is particularly notable. Many of these pledges were also very far-reaching in terms of a 10-20 year timeline.

3. US Government initiatives on renewable energy

New domestic initiatives are regularly introduced into the policy mix in the United States. Most recently, renewable energy was given a major push in the Energy Independence and Security Act (December 2007).[14] The overall goal is to increase renewable fuels to 36 billion gallons of bio-fuel annually by 2022, an increase of about five times on current levels and an estimated 15% of projected supply. Vehicles are to be made more efficient and incandescent light bulbs phased out. The Federal Facility Requirement aimed to reduce energy consumption 30% by 2015 and make new federal buildings carbon neutral by 2030. The Executive Order aimed at strengthening federal government management aims at reducing oil consumption in vehicles by 2% per year, increasing the use of renewables by 10% per year and improving energy efficiency by 30% over a ten-year period. More renewable energy will also be used. In the 2009 budget, $8.6 billion is allocated for climate changes programmes, $3.2 billion is allocated to the Advanced Energy Initiative,[15] hydrogen fuel and advanced batteries for plug-in hybrid vehicles are also emphasised, as are new ethanol production methods. In total, it is estimated that this package of measures could reduce CO^2 emissions by more than 6 billion metric tonnes through to 2030.

The US government is also seeking to develop innovative international technology partnerships, such as:

- The Carbon Sequestration Leadership Forum with 22 members focused on CO^2 capture and storage;[16]
- The International Partnership for the Hydrogen Economy with 17 members - aimed at producing effective hydrogen RD and D programmes;[17]
- The Generation IV International Forum has ten members devoted to research and development on the next generation of nuclear systems.[18] In addition the ITER, Methane to Markets[19] and the Asia Pacific Partnership on Clean Development and Climate[20] and the Global Nuclear Energy Partnership are also

[14] See: http://www.whitehouse.gov/news/releases/2007/12/20071219-1.html

[15] See: http://www.whitehouse.gov/stateoftheunion/2006/energy/index.html

[16] See: http://www.cslforum.org/

[17] See: http://www.iphe.net/

[18] See: http://www.gen-4.org/

[19] See: http://www.methanetomarkets.org/

[20] See: http://www.asiapacificpartnership.org/Charter.pdf

being developed.[21] The ITER initiative works on fusion energy and involves six nations and EURATOM.[22]

Since 2001, the US has been involved in a number of global action programmes which have produced the following initiatives:

- The Asia Pacific Partnership involves seven nations accounting for almost 50% of global population and 50% of global GDP, energy use and greenhouse gas emissions. 110 projects are already under way;
- Under the G8 Gleneagles dialogue, Methane to Markets involves 20 nations and the EC projected to remove 180+ million tonnes of CO^2 equivalent by 2015.
- The Renewable Energy and Energy Efficiency Partnership (REEEP) involves 17 nations and there are fifteen bi-lateral agreements on climate change, science and technology.[23]

Other initiatives in tropical forest conservation and stopping illegal logging have also been carried forward. The Group on Earth Observations (GEO) involves 70 nations plus the EEC, plus 52 intergovernmental international and regional organisations.[24]

The US position on post-Kyoto arrangements is positive on the Bali Action Plan[25] and its approach is consistent with, and supportive of, the Major Economies Meeting Process.[26] The US emphasis is on the changed circumstances since 1992 and also stresses managing the expectations on developing country demands and a focus on the "real world" circumstances.

4. Challenges for EU climate policy

EU climate policy has shifted up a gear - at least, at the rhetorical level, judging by the speeches of EU leaders at Commission and Member State level. There is, however, reality behind the rhetoric. The Spring 2007 Council's endorsement of the Commission's proposals on greenhouse gas emission reductions and promoting renewable energy by EU heads of state and government represents a concerted initiative to address climate change.[27] Informed observers argue that it is the most ambitious initiative so far by any major international player. The Commission's 2008 (January) package of proposed follow-up legislation also moves in the same direction. [28] That said, it is also true that the competition to the EU for the 'leadership

[21] See: http://www.world-nuclear.org/info/inf117_gnep.html

[22] See: http://www.iter.org/

[23] See: http://www.reeep.org/

[24] See: http://www.earthobservations.org/

[25] See: http://unfccc.int/files/meetings/cop_13/application/pdf/cp_bali_action.pdf

[26] See: http://www.state.gov/g/oes/climate/mem/

[27] See: http://ec.europa.eu/energy/energy_policy/

[28] See: http://ec.europa.eu/energy/climate_actions/index_en.htm

role' in climate initiatives is not strong. Whereas the EU as a whole was aiming at 15% reductions by 2010 relative to 1990, the burden sharing among Member States agreed before Kyoto only added up to a 9% for the EU as a whole. The current position to a commitment to a 20% reduction in greenhouse gas emissions by 2020 is, on the face of it, a more ambitious target. Three points can be made in this regard. First of all, an additional 5% over 10 years is generally judged to be too little with respect to the most recent IPCC Assessment Report. Secondly, the commitment applies to the EU 27 and most new member states have emissions far below their 1990 levels because of the collapse of the industrial sectors in the post-communist era. This is estimated to be a free 5% reduction in the overall EU level. Thirdly, the 20% target can also be reached by using by flexible mechanisms if the Commission's proposal is adopted as drafted. This could effectively be another 5% reduction. The EU is further committed to a 30% reduction if other major economies accept comparable binding targets. Even where the far-reaching proposals from the Commission are watered down by the Member States by the Council, these initiatives do serve as a stimulus. An example can be given of the 'failure' to reach agreement with the car industries to reduce CO^2 emissions from new cars to 140g/km by 2008 has helped to make cars more fuel efficient than might otherwise have been expected.

The EU Emissions Trading Scheme (ETS), adopted in 2003, is the most visible policy development within the range of EU climate policies.[29] Given that it is such an innovative instrument, it is not surprising that an initial 'learning period' from 2005-2007 had to be built in. The ETS has now entered its second phase of 2008-2012. The ETS is the most extensive example of a market-based instrument being used to address an environmental problem. DG Environment has opted for a genuine financial instrument which allows trading to be based on freely tradable allowances thereby creating an open CO^2 market like any other commodity market, including trading in futures and the possibility for unrestricted speculative trading. With regard to the initial over-allocation of allowances in the 2005-2007 period, the Commission has tried to exercise more discipline for the 2008-2012 period but has been challenged by a number of Member States, which have gone to the Court to have the Commission's decisions overturned. Against this background, it seems that the Commission's proposal for the post-2012 period, that the allocation of allowances be agreed at EU level, is necessary. The Commission's proposal for the post-2012 ETS is proposing that the 'windfall profit' which energy companies have enjoyed, should be eliminated through auctioning the allowances of the power sector. Given that the energy companies are able to pass on most of the price rise to consumers, it is not surprising that the electricity sector has been supportive of the Commission's proposals for a revision of the ETS. Given the lack of external competition and the price in elasticity in the power sector, consumers will pick up the bill for the price rise.

Electricity generators have an interest in significant emissions reductions and the highest possible price for CO^2 allowances to be auctioned. There are still major challenges to the addressed if the ETS is going to generate cost effective reductions in greenhouse gas emissions to enable the EU to meet its current commitments and

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[29] See: http://ec.europa.eu/environment/climat/emission.htm

put it on track for more stringent commitments in the future. Key arguments relate to application of the ETS to energy intensive industries and to aviation. In addition, the question of the role played by CDM projects in allowing the European Commission countries to meet their targets more easily is potentially problematic. Detaching support to developing countries from the internal EU commitments to reductions would be a step forward in this regard. In the 2006 spring council response to the Commission's Green Paper on energy policy, the EU heads of state and government took the relatively unusual step of proposing to the Commission to 'consider' an overall renewable target of 15% by 2015 and an 8% target for bio-fuels. The response from the Commission in its 2007 energy policy package recommended a binding 20% renewables target for 2020 and 10% bio-fuels by the same date. These are ambitious but achievable targets. The target of increasing the share of motor fuels for road transport to 10% (currently around 2%) by 2020 is likely to be the most controversial part of the Commission's proposals. When serious discussion of these targets began, from 2000 onwards, it was estimated that the initial target (5.75% by 2010) could be covered by crops cultivated on 'set aside' land.

There has been considerable controversy about the impact of production of bio-fuels, particularly in the light of rising fuel prices. Four conditions need to be fulfilled for bio-fuels to be acceptable:

- They should deliver at least 50% CO^2 emission reduction compared to conventional motor fuels on the basis of a life cycle analysis;
- Whether produced in the EU or imported, they should be produced sustainably;
- They should not be based on raw materials used for food unless significant impact on global food prices can reasonably be excluded;
- Production of bio-fuels must respect the usual energy efficiency criteria in order to ensure responsible use of biomass resources.

Waste material, e.g. from slaughterhouses or recycled cooking oil, obviously fulfil these criteria. In the view of some informed observers, the present Commission could improve its performance on energy efficiency considerably. In the view of some informed observers, the Energy Efficiency Action Plan of 2006 was not sufficiently convincing as a follow up to the green paper.[30] Historically, the Commission has done better than nearly all of its member states on energy efficiency. However, the Commission could do more to keep up the pressure, both for concerted EU action and action by the Member States.

The EU has built a dynamic challenge into its current position on greenhouse gas emissions. It has committed itself to 20% reduction by 2020 in relation to 1990 emissions, but has agreed to commit to a 30% reduction in greenhouse gas emissions by industrialised countries if this can be agreed by the countries concerned. The key, obviously, is the United States and the new administration. It already looks as though the negotiating timetable for 2009 will be very challenging. There are obvious 'policies and measures' which could be helpful to move discussions forward. A ban on new coal-fired power plants without carbon capture

[30] See: http://ec.europa.eu/energy/action_plan_energy_efficiency/index_en.htm

and storage is one obvious case. Improved energy efficiency of cars and alternative motor fuels is another. CO^2 free energy is also a candidate, although there are likely to be different opinions on nuclear energy, and quantity targets on renewables could be agreed. The EU could also proceed with measures to improve energy performance of buildings, both new and existing. Benchmarking of certain industrial types of production (steel, cement, pulp and paper) could be supportive of ambitious reductions in energy intensive industries as well as helping to contribute to the reduction of suspicion of competitiveness problems between EU states.

A key problem in the achievement of a successor regime to the Kyoto Protocol is that of developing country commitments. The current impasse must be broken if an agreement is to be reached. The US has many times stressed that an agreement has to cover emissions by all the major emitting countries. Many countries, not only developing countries, are reluctant to accept any restriction on their energy use. Under these circumstances, an approach based on 'policies and measures' might help to engage major developing countries constructively in the process. To take China as an example, China is unlikely immediately to stop building coal fired power stations. If OECD countries could commit to an ambitious policy using the most efficient technology, it is possible that China could follow suite in the future. Similarly, China has good domestic reasons to increase transport efficiency given its dependency on oil supplies and the problems with air pollution. This would be a national priority rather than being seen as imposition of a standard which would keep China at lower levels of car ownership than the most developed countries. Furthermore, China has already, for its own domestic reasons, adopted strong renewable energy targets.

Whichever approach is taken, the 'common but differentiated responsibilities' will have to be respected in the negotiating process. The EU has played a positive and creative role in these negotiations and is likely to seek to do so in the future.

5. Low carbon technology transfer: key policy considerations

Following the G8 Gleneagles meeting of 2005, the UK Government and Government of India decided to collaborate on a study to assess the barriers to transfer of low carbon technologies between developed and developing countries. The study has identified that technology transfer relates not only to the capital goods, services and designs, but also the skills and know-how for operation and maintenance of the technology and also an understanding of the expertise behind the technology. This latter element adds to the accumulation of technological capacity. The following key considerations are central:

- There is no 'one policy fits all' solution;
- The stage of technological development is key;
- Technological change in capacity-building are key elements to develop;
- Knowledge flows are central;
- International property rights issues need to be sorted out;
- Absorptive capacity is important;
- The level of integration of the transfer arrangement is essential;
- The National Policy Environment; and

- The International Policy Environment also requires attention.

In all of this, there is tension between the urgency for action on a vital issue and the need for long-term effectiveness.

6. The work of the Expert Group on Technology Transfer (EGTT)[31]

One of the significant outcomes of Bali has been the recognition of the need to enhance the implementation of the Technology Transfer Framework.[32] The mandate for EGTT emerges from UNFCCC Article 4.5 and the 'Technology Transfer Framework' from Marrakesh 2001. Both the global environment facility and key committees of the UNFCCC (Subsidiary Body for Scientific and Technical Advice - SBSTA[33] and Subsidiary Body for Implementation - SBI) indicate a new level of seriousness on the issue. Once again, the approach of measurable, reportable and verifiable initiatives is stressed for linkages between mitigation actions by developing countries and support through technology, financing and capacity-building. There are high expectations on the EGTT which is intended to play a catalytic role in facilitating the implementation of the technology transfer framework. It is tasked with developing a medium-term (2008-2012) and long-term (beyond 2012) strategy, including sectoral approaches for technology transfer. It has to develop performance indicators and identify and analyse existing and potential new financial resources.

The framework provided by the EGTT concentrates on the technological needs of developing countries and needs assessments, information on technologies, the importance of enabling environments, capacity-building and mechanisms for technology transfer. As in other areas, it is recognised that a range of technologies are required.

The carbon price signal provides a basis for financial decisions. Technology development and diffusion requires additional tools, both at national and international level. Helping to create markets for transactions is the key and capital and risk hedging tools are required.

International standards on energy efficiency and relevant national regulations are important. Diffusion also requires a package of financial assistance to developing countries and information sharing and awareness building. In many of the key areas, international cooperation is essential. Consideration is also being given to a possible new UNFCCC mechanism for the development and transfer of technologies to over come many of the issues, such as the 'valley of death' which haunts viable technologies unable to break through into widespread commercial diffusion.

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[31] See: http://unfccc.int/essential_background/convention/convention_bodies/constituted_bodies/items/2581.php

[32] See: http://unfccc.int/meetings/cop_13/items/4049.php

[33] See: http://unfccc.int/resource/docs/2004/sbsta/08.pdf

For the future work of the EGTT, the value added by the EGTT should be in laying out the overview of the technologies in different adaptations sectors. Furthermore, understanding of the possibilities of public and private financing is essential.

7. UNIDO perspectives on technology transfer

UNIDO is the specialist UN agency which has been particularly involved in technology transfer for over forty years.[34] The presentation at the conference emphasised the manufacturing sector, particularly small and medium enterprises (SMEs). It also emphasised energy efficiency. A paradigm for the kind of transfer being sought (measurable, reportable and verifiable actions) is the Montreal Protocol.[35] However, it deals with a much more circumscribed area of technology transfer and incentives. The key task is to identify which technologies are really key for the least developed countries. A recent analysis of the Clean Development Mechanism (CDM) projects in the pipeline suggest that about 40% of projects claim some element of technology transfer. Could the CDM be refashioned to focus more on technology transfer? The biggest problem for small and medium enterprises is the transaction costs. Might a sectoral approach work better within the CDM?

Often, energy efficiency loses out strategically to efforts to increase capacity and bring new products to market. Energy efficiency needs to have a higher priority. How could this best be done? Through mandatory targets? Or sectoral agreements? Or government-industry context? Or through the UN's Global Compact?

In many instances, the industrial structure in developing countries is wrong. The presence of large numbers of small scale, energy-inefficient plants in developing countries in e.g. the iron and steel industry, cement, pulp and paper (in China) and iron and steel as well as pulp and paper in India. For sustainable technology transfer, there has to be rationalisation in these sectors or an alternative would be a 'cluster' approach. Removing obstacles to technology transfer has to take into account the long lifetimes of equipment in energy intensive industries, as well as the difficulties with loans (high interest rates and lack of collateral). By and large, the financial sector is not interested by industrial energy projects. So, for success to be achieved, a favourable cost equation needs to be gained through a mixture of "sticks and carrots" (penalties and incentives). The "sticks" would be taxation on energy and removal of energy subsidies, the "carrots" would be grants, favourable loans, reduced taxes on energy efficient equipment, accelerated depreciation, tax credits and tax deductions. There are further obstacles through lack of information about technologies and lack of management, both of technology and management of systems (what you do not measure you cannot manage). The perceived wisdom is that a focus on a few sectors would produce results. According to IPCC data, cement, steel, petroleum refining and aluminium account for about 50% of industrial CO^2 emissions. An alternative approach would be to focus cross-sectorally. Motor systems account for about 15% of final manufacturing energy use; steam systems

[34] See: http://www.unido.org/index.php?id=9

[35] See: http://www.unep.org/OZONE/pdfs/Montreal-Protocol2000.pdf

account for up to 38% of the final manufacturing end use. The approach of focusing on systems could pay dividends. Most components are now well designed and only 5-10% more savings are possible. Most energy systems are not well designed and 30-50% more savings are possible.

UNIDO experience in China has generated a number of projects with a two-year payback period or less. Improved end use efficiency could account for 60% of avoided emissions by 2030. Electricity end use efficiency could generate 29% savings, as could fossil fuel end use efficiency according to an IEA Alternative Policy Scenario.[36] The systems approach plus energy efficiency could result in energy management standards. Such approaches are already used in e.g. the US, Ireland, Sweden, Denmark and the Republic of Korea. Similar instruments are being developed in the Netherlands, China, Germany and Spain. UNIDO has proposed the development of an international energy management standard. ISO has agreed and launched the project committee to develop the standard (ISO 5000). [37]

8. Low carbon technology centres

The proposal for development for low carbon technology centres is intended to help developing countries meet their millennium development goal (MDG) targets, and respond to climate change both at the levels of adaptation and mitigation, as well as contributing to energy security.[38] According to the IEA, developing countries will need to invest $165 billion per annum over the next thirty years to provide electricity to the 1.6 billion people currently lacking access. An additional $30 billion per annum would be required for this to be provided through clean energy development. Less than half of this funding has been identified leaving a financing gap of $100 billion per annum. There are many obstacles to the development of low carbon technologies for the third world. The 'easy option' is to focus on lower cost, fossil fuel alternatives. Inevitably, this risks 'lock in' e.g. if coal-fired power stations are built. There are additional problems, including lack of finance, lack of government and regulatory support, limited capacity and absence of a national focal point to champion low carbon activities. A network of Low Carbon Technology Centres in developing countries could help to accelerate low carbon development and deployment by addressing issues such as:

- high or uncertain costs of new technologies;
- limited or uncertain suitability of technologies for local conditions;
- limited business capacity or skills to identify, adapt, install and maintain technologies for local use;
- uncertain market demands;

[36] See: http://www.worldenergyoutlook.org/2007.asp and http://www.iea.org/g8/index.asp#alt

[37] See: http://webstore.ansi.org/RecordDetail.aspx?sku=ISO+5000%3a2005&source=google&adgroup=iso6&keyword=iso%205000&gclid=CIS9hd34h5UCFQNrMAodXWs1qw

[38] On the work of the Carbon Trust from whom this proposal emanates, see: http://www.carbontrust.co.uk/default.htm

- limited access to capital;
- unfavourable regulatory and political climate (e.g. distortions and subsidies in favour of fossil fuels).

Such centres could help with the following priorities:

- applied research and development and technology accelerators;
- business incubator services;
- enterprise creation;
- easy stage funding for low carbon ventures;
- deployment of existing energy efficiency technologies;
- skills and capacity-building ;
- assisting with national policy and market insights.

Initial costings suggest that five national centres could be established and run for between $1-2.5 billion over five years. One of the strengths of the approach would be that it would provide an additional source of funding which could leverage private sector involvement in low carbon energy generation.

9. Capacity-building for mainstreaming renewable energy technologies

Since Bali, the IPCC has had a scoping meeting on renewable energy sources.[39] At national level, the Government of India has engaged on a national action plan on climate change including the dimension of solar power.[40] If far-reaching greenhouse gas emission reductions are to be achieved by 2050, some commentators have predicted that the share of renewable energies would need to be up to 70% for global electricity generation, or up to 65% in global heat supply. This obviously constitutes a major challenge. A key challenge is to move from centralised power generation to distributed utilities using renewable and low carbon technologies. Renewable energy can both serve as a substitute for fossil fuels and as a way of developing decentralised power generation solutions. For this to be effective, a large number of small systems will have to be developed. Production will mostly be in small and medium sized enterprises, raising such questions as quality control and a sustainable supply chains for repair and maintenance. Sustainable supply chains must be created for biomass with profits at all levels. There is a real challenge to finance the large number of small users.

A key issue is the funding needs for transition from the prototype to the commercial product. Often, this is not recognised or is underestimated as a problem. Particularly in developing countries, there are considerable human resource development needs at all levels, from semi-skilled workers to trained engineers. There is a considerable gap between demand and production of technicians and diploma holders in the growing wind and solar industries. Institutes such as the Energy and Resources Institute are actively working on international cooperation to provide courses to meet this need.[41] As in other areas of development, there is a real urban-rural divide. The high growth rate in development of renewable energy often hides these gaps.

[39] See: www.ipcc-sh.de
[40] See: www.pnindia.nic.in
[41] See: http://www.teriin.org/

10. Financing mechanisms for renewable energy

The key issue here is not shortage of capital but the lack of project viability. Approximately 80% of private sector flows are taking place outside the framework convention, but projects (particularly small and medium sized projects) may not be supported because there are other considerations such as protection of intellectual property rights, legislative predictability and currency risks. The private sector would aim for a power purchase agreement locked in at an affordable price. Currently, without government support systems such as feed-in-tariffs, renewable portfolio standards (driven by the need for public goods such as energy security or to create level playing fields), there is still a differential between what the private sector expects as returns on investment and what the market is able to provide. There is particular concern about bio-fuels, namely the issue of food versus bio-fuels. This has led to a flattening out of investment. Sustainability criteria for bio-fuels also need to be taken seriously to avoid these problems.[42]

There is a role for international mechanisms for bringing renewables to developing countries. International organisations such as the UN are the favoured vehicles as far as the developing countries are concerned but are currently not well funded. Significant clean technology funds (US$10 billion per year) or extensions of the carbon market to allow for bundling of projects may provide additional funding.[43]

11. The Climate Technology Initiative

The Climate Technology Initiative (CTI) emerged from the first conference of the parties in Berlin during 1995.[44] Since 2003, it has been an Implementing Agreement under the International Energy Agency (IEA)[45] in support of the UNFCCC. Its objectives are *'to promote more rapid development and diffusion of climate friendly and environmentally sound technologies through multilateral and international cooperation between the public and private sectors and between and among developed and developing countries.'*

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[42] See above in the EU section: "Four conditions need to be fulfilled for bio-fuels to be acceptable:

- They should deliver at least 50% CO^2 emission reduction compared to conventional motor fuels on the basis of a life cycle analysis;
- Whether produced in the EU or imported, they should be produced sustainably;
- They should not be based on raw materials used for food unless significant impact on global food prices can reasonably be excluded;
- Production of bio-fuels must respect the usual energy efficiency criteria in order to ensure responsible use of biomass resources."

[43] Global trends in sustainable energy investment 2008 (UNEP and REN21)

[44] See: http://www.climatetech.net/about/

[45] See: http://www.iea.org/

The Initiative currently has ten member countries, Austria, Canada, Finland, Germany, Japan (Vice Chair), Norway, The Republic of Korea, Sweden, UK (Vice Chair) and US (Chair). The CTI works with governments, the IEA and UNFCCC, international organisations and business and financial sectors. The operation of the CTI to date underlines the following experience:

- The absence of sufficient public resources to make a meaningful impact on the technology needs of developing countries;
- The importance of partnerships and engaging the relevant stakeholders;
- The need for targeted capacity-building to create an enabling environment;
- The essential role of the private sector.

The CTI has been responsible for workshops on Innovative Options to Financing Technology Transfer held in Montreal (2004)[46] and Bonn (2005). [47] The surprising conclusions were that finance is available i.e. there is not a shortage of money, but there is a shortage of good projects and financing proposals that meet the standards and criteria of the private sector financing communities. As a result of this, the Private Financing Advisory Network (PFAN) was born.[48] It is an informal network of private sector companies and individuals who offer a free consulting service to project sponsors and developers to help them access private sector finance. In effect, it acts as a 'matchmaking' service engaged in contacts, brokering and introductions. Its objective is to support the UNFCCC through capacity-building, financing the transfer of knowledge and know-how and helping to get more renewable energy and climate friendly projects to the stage of financing. PFAN services are provided free to the project developer or sponsor, with part of the cost absorbed by CTI and part through provision of services being subsidised by the PFAN members. PFAN members also then get the right of first offer to provide services or financing (non-binding and on fully competitive terms).

The pilot phase was completed at the end of 2007. The US contribution, according to a Memorandum of Understanding between the CTI Chair and USAID, is US$500k.

The first project has already reached financial acceptance in July 2007, a small hydroelectric power station in Mexico (8.5 megawatts). The second project closing is imminent, a bio-diesel refinery in Brazil (66k tonnes per year). The expansion plans for 2008 include:

- expanding the PFAN network and processing capacity to between 100-125 projects with the ability to leverage between US$515-714 million of financing;
- to establish new regional networks;
- expand and formalise the project identification selection processes and
- examine and test mechanisms to make the programme self-sustaining.

[46] See: http://www.iisd.ca/climate/cciod/

[47] See: http://unfccc.int/ttclear/pdf/Workshops/Bonn/Agenda.pdf

[48] See: http://www.resourcesaver.com/file/toolmanager/O105UF1955.pdf

The network of USAID Missions and Bureaus will be extensively used. The PFAN methodology will be used to facilitate implementation of key projects in target areas and other priority sectors such as water, agriculture/bio-diversity and adaptation and energy efficiency. The target project size will be between US$1-30 million of total investment. The typical project type will be mitigation projects for the generation of power or production of bio-fuels (e.g. wind, solar, geo-thermal, biomass, bio-fuels and/or small hydro). It will support proven technologies.

12. Energy efficiency in buildings

According to the IEA World Energy Outlook 2004, final energy use at 33% for buildings, compared with 32% for industry and manufacturing, 28% for transport and others at 7% is the single most important sector. The World Business Council for Sustainable Development, with its 200+ member companies and its regional network in sixty countries, is recognised as the voice of business leadership on sustainable development. The Energy Efficiency in Buildings (EEB) network has fourteen participating companies.[49] They have set as their target a world in which buildings consume only as much energy as they produce - or zero net energy buildings. The energy efficiency in buildings project has now produced its first summary report entitled 'Energy Efficiency in Buildings: Business Realities and Opportunities'.[50] The project was reviewed by a high-level assurance group. The main conclusion is that companies underestimate the impact of energy use in buildings and overestimate the cost of energy efficiency measures. Professionals working in the field wish to generate eight positive mental associations with green buildings:

- Building attractiveness;
- Supportive corporate environment;
- Personal commitment;
- Economic demand;
- Positive climate impact;
- Pragmatic involvement;
- Business community acceptance, and
- Personal know-how.

In terms of the energy use of a building over its entire life cycle, for example, for a multi-family dwelling, it has been calculated that 83% of the energy consumption has been the regular use (heating, cooling, hot water, lighting) as opposed to 13% for materials for construction and 4% for maintenance and eventual demolition. According to the 2007 report by McKinsey *'Reducing US Greenhouse Gas Emissions: how much and at what cost?'* insulation improvements are identified as

[49] See: http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MjU5MTM

[50] See: http://www.wbcsd.org/DocRoot/kPUZwapTJKNBF9UJaG7D/EEB_Facts_Trends.pdf

the most cost effective of all measures, assessed at marginal cost of abatement. [51] The EEB project has created tools for evaluating the feasibility of achieving emissions goals and the business opportunity for doing so. It tests policy packages, evaluates the costs to owners and to government, and estimates total energy usage based on adoption preferences and building systems. The approach taken builds further on the UNEP/SBCI [52] studies and addresses control and regulatory instruments;

- Economic and market based instruments;
- Fiscal instruments and incentives;
- Support, information and voluntary action.

The EEB has indicated that it will release the first ever quantitative study which measure the impact of policy packages in terms of CO^2 emissions, energy consumption, business opportunity and costs to owners and government. A business manifesto is expected in 2009.

13. Scaling up energy efficiency financing[53]

One of the most significant barriers to global implementation of clean and proven energy efficiency technologies is lack of commercially-viable financing. The problem is not a lack of available funds *per se*. The problem is obtaining access to available funds through local financial institutions. There is a disconnect in current lending practices through local financial institutions and the needs as shown by energy efficiency and renewable savings based projects (ESPs). The reasons for the disconnect are typically that local financial institutions will only provide 70-80% of the asset value of lending to projects. They tend not to believe or acknowledge the cash-flow from ESPs, often because they are not familiar with the details of ESPs and what they can offer. They do not have the internal capacity properly to evaluate the risks and benefit of ESPs and are unwilling to invest in building capacity due to the relatively small size of ESPs.

The 'perfect' structure for financing ESPs would contain the following elements:

- No collateral requirement beyond the energy efficiency cash-flow from the developer or 'credit worthy' hosts;
- A minimum seven-year plus construction period term;
- Construction finance provided;
- Repayment in local currency;
- The all-in costs must relate to market rates;

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[51] See: http://www.mckinsey.com/clientservice/ccsi/greenhousegas.asp

[52] Assessment of policy instruments for reducing greenhouse gas emissions from buildings. For a major UNEP/SBCI report on buildings, see: http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=502&ArticleID=5545&l=en

[53] See the presentation by Thomas K. Dreessen at the conference: http://www.wiltonpark.org.uk/documents/923%20PDF%20Presentations/Dreesen%20-%20EE%20Financing%20Scale-Up%20at%20REEEP%2071608FINAL1.pdf

- It must be possible to measure and verify the savings involved.

For scaling up energy efficiency financing, it is necessary to provide training for local financial institutions to accurately assess the benefits and risks and to understand the intricacies of financing ESPs. A good approach is to provide new energy efficiency performance and credit risk guarantee products to local financial institutions that promote their willingness to finance ESPs from savings. If multiple ESPs can be aggregated or bundled, standardised documentation can be used and other methods employed to reduce transaction costs and increase the financed amounts. The Efficiency Valuation Organisation (EVO) needs to develop an international energy efficiency financing protocol which becomes a blueprint for LFIs to finance ESPs around the world. [54] This should follow the International Performance Measurement and Verification Protocol (IPMVP) grass roots consensus.

The IPMVP was developed and is currently managed by the EVO. [55]It was created by an international energy engineering- based committee to reduce uncertainty to measure and verify end-use energy savings. The IIEFP has been developed and the Asian Pacific Economic Cooperation (APEC) provided funding for initial development into APEC developments (Mexico and Thailand).

Energy performance services are attempting to develop a US$100 million energy efficiency fund for China investing in 'paid-from-savings' ESPs for ESCOs in China. Such schemes are intended to enhance implementation of energy efficiency and reduce the energy efficiency market barriers. They constitute market-based, sustainable commercial lending for the sector which finances energy efficiency. Such schemes also act as capacity-building within LFIs to finance ESPs.

14. Case studies - national

14.1 Development of renewable energy resources in China

China is heavily dependent on energy imports and suffers from a shortage of non-renewable energy. The total *per capita* coal reserves are only 41% of the world average even though coal is still the dominant energy. Per capita oil reserves are 11% of the world average and the national gas reserves are only 4% of the world average. Coal still accounts for almost 60% of China's total consumption of renewable energy, with oil 26%, natural gas 6% and hydro and nuclear power 10%. This has led to considerable environmental impact, in particular low air quality in many cities. The Chinese government has a concerted approach to encouraging renewable energy including:

- The Renewable Energy Law;
- The Medium and Long Term Programme for the Development of Renewable Energy and

[54] See: http://www.evo-world.org/

[55] See: www.efficiencyvaluation.org

- The International Science and Technology Cooperation Programme on New and Renewable Energy.

The Chinese government is committed to 10% of total energy consumption being from renewables by 2010, equalling 300 million tons of coal equivalent. In overall figures this means:

- installed capacity of 190 million kilowatts of hydro-electric power;
- 10 million kilowatts of installed wind-power capacity;
- 5.5 million kilowatts of installed biomass power capacity;
- 300,000 kilowatts of installed solar power capacity;
- 19 billion cu metres of bio-gas;
- 150 million sq metres of collector area of solar water heaters;
- 2 million tonnes from ethanol from non-grain materials;
- 200,000 tonnes of bio-diesel oil.

Further objectives include:

- increasing the number of rural households with bio-gas pools from 18 million to 40 million;
- increasing the annual output of biomass briquette fuel to one million tons;
- 4700 medium and large size bio-gas power projects in livestock and poultry farms;
- 50 model counties for utilising green energy.

Together this adds up to a sizeable programme based on a renewable energy technology innovation system with relatively strong research and development capacity. It also involves considerable experience of innovation and domestic capacity for manufacturing most of the requirements for renewable energy. Hydro power and the equipment and solar water heaters made in China have become internationally competitive. Wind power equipment manufacturers are capable of producing generators for the capacity of more than 1500 kilowatts. Regional initiatives are also occurring. In 2007, the government of Jiangsu province declared that it would put development of renewable energy at the top of its agenda, even if this risked reducing the rate of economic growth. Hunan province declared as its primary objective to ensure resource saving and an environmentally friendly society by strengthening the use of renewable energy. In rural areas, in particular, the rural reconstruction policies act as a strong driver for the use of renewable energy. The ‘new countryside’ policies emphasise the need for better productivity increasing living standards for rural residents, the tidy appearance of villages and more democratic management of rural affairs. There still remain barriers to further development of renewable energy including the subsidies of fossil fuels. The state monopoly in the energy sector is also a consideration. Government responsibilities for the development of renewable energy are divided between two many different government departments. They remain expensive to develop and find it hard to compete against subsidised fossil fuels. In spite of this, China has given a strong policy lead on renewable energy.

14.2 Energy efficiency: the approach of Singapore[56]

As a small country, seeking to respond to climate change, Singapore has emphasised national programmes for energy efficiency in the power, industry, transport, buildings and household sectors. Energy efficiency is the key strategy in mitigating greenhouse gas emissions. The national plan for energy efficiency promotes the adoption of energy efficiency technologies and measures through a sectoral approach; builds capacities to drive and sustain energy efficiency and raises awareness to stimulate energy efficient behaviour. Energy intensity has improved 15% from 1990 to 2005. The new energy market was introduced in January 2003. GENCOS has switched from natural gas and adopted combined cycle generation technology in anticipation of market competition.[57] Generation efficiency improved from 38% in 2000 to 44% 2006. Competition is expected to continue to drive improvements in generation efficiency.

The Energy Efficiency Improvement Assistance Scheme funds up to 50% of the cost of engaging an energy services company (ESCO) and is proving efficient. Each dollar spent on an energy appraisal saves between $5 and $10 on annual costs. The identified energy efficiency investments have an average payback period of less than three years. Current public transport usage is 63% and it is intended to increase this to 70% in the next ten to fifteen years. This will require enhancing public transport infrastructure, improving public transport services and raising public awareness. Green vehicle rebates and the fuel economy labelling scheme, which provides information on a vehicle's fuel economy at the point of sale are additional measures taken. In the area of energy efficiency for buildings, it needs to be noted that energy cost is often the largest element of the building's operating costs. The public sector is taking the lead. All government buildings with more than 15,000 sq m of air conditioned space is to be audited by 2010. Air conditioning forms a large part of electricity demand for buildings. The relevant regulations were revised in January 2004. Under the Energy Smart Building Labelling Scheme, recognition is given to the top 25% energy efficient buildings in Singapore. This covers offices and hotels. In addition, the green building rating system evaluates a building for its environmental impact and performance. In the domestic setting, the energy labelling scheme requires that all refrigerators and air conditioners supplied in Singapore must be energy labelled. This will be extended to clothes driers in April 2009. The 10% energy challenge seeks to get households to reduce household electricity consumption by at least 10% and to educate households on simple energy saving measures and practices. Households are, for example, told to use a fan instead of an air conditioning system to keep cool. This can save approximately $650 per year. Capability development is also being addressed through the Singapore Certified Energy Manager Programme.

The South-west District, spanning a third of the land area of Singapore with about 733,000 residents, has been particularly active. Through its 3P partnerships (public,

[56] See: http://app.mewr.gov.sg/web/Common/homepage.aspx

[57] See: http://singapore.usembassy.gov/uploads/images/HSbwG5-3repeibywG8Howw/ElectricityGas_Jun04.pdf

people and private) in the Citizen, Community and Corporate Partner schemes, the South-west District has sought to bring forward its sustainability plan. This includes the 'switch off' campaign to set air conditioners at 25ºC. It has also encouraged the planting of native plants through gardening clubs.

14.3 Developing policies in the carbon market: the Pakistan example

Pakistan ratified the Kyoto Protocol in 2004. The immediate task then was to establish the policy and institutional framework to make this operative. The Prime Minister's taskforce was established to raise the profile and ensure inter-ministerial linkages and a specialist CDM cell with the technical expertise to maximise efficient operation. The CDM strategy has elaborated objective standards for sustainability incorporating economic, social and environmental criteria. Awareness raising and marketing, both domestically and internationally, and a strategy to involve both the public and private sector have been evolved. In the private sector, the first project had a budget equivalent to that of the entire environment ministry. It would also lead to the saving of the equivalent of a billion tonnes of carbon per annum. The 'pipeline' of projects is developing fast with forty projects identified and six host country approvals already. They represent a diversity of sectors, including fertilizer, textiles, small hydro, wind and waste. In the public sector, there are huge latent opportunities but the civil service has a lower motivation for the internalisation of these projects. In addition, it requires new ways of working. Revenue earning development is a new concept. One of the most promising projects is the 12 billion (Pakistan Rupee) mega forestry project initiative has been budgeted in Pakistan. There are considerable opportunities in Pakistan for energy in the forestry sector through:

- Renewables (wind, solar, small hydro, waste);
- Energy enhancement (transport, buildings, industry);

The benefits anticipated from these are to lower the rate of increase of the fuel import bill, mitigate national power shortages, put the country on a lower carbon trajectory, provide cheap electricity in off-grid locations and address priority issues such as rural development, poverty reduction and job creation.

Pakistan has over one thousand kilometres of coastline and comparable conditions to India which is much further ahead with 3000 MW of wind power. The wind mapping has already been carried out and confirms the possibilities.

Solar energy is also very promising as Pakistan has one of the maximum solar radiation intensities anywhere in the world. The cost of solar cells is increasingly becoming competitive. The independent, secure and cost effective nature of the energy source is ideal for remote areas of Pakistan and off-grid locations. Micro-hydro, particularly in the northern areas of Pakistan, has considerable potential. Carbon capture and storage is also being considered. Forestry is also a priority area as the deforestation rates are among the highest in the world and the area under forest among the lowest in the world. These are opportunities for carbon sequestration. The positive news is that there are many opportunities for relevant projects. This provides the opportunity for appropriate technology transfer, linkage with local environmental issues and an opportunity for encouraging foreign direct

investment. There are also, however, a number of barriers that need to be overcome. These centre around the need for sustained political commitment, not just an initial enthusiasm; the economic motivation and also the ability to carry through these projects.

The existing barriers include the lack of supportive financing framework, impediments to technology transfer, developing the latent carbon capitalisation, which is a steep learning curve for government and a need for 'matchmaking' between the private and public sectors.

CDM has so far been heavily called upon by China, India and Brazil, but few other countries have been able to benefit as yet. Almost 80% of the projects are in these three countries. In addition, with the uncertainty in the post-2012 arrangements, the 'certainty window' is closing. Pakistan, however, remains well placed to benefit should the arrangements beyond 2012 be satisfactory.

14.4 Developing the potential of small and medium enterprises in Mexico

In developing countries, emission offset markets have created a new industry. Mexico has 8% of the total. There are four major problems with regards to emissions trading at present:

- The reduction targets from the Kyoto Protocol are insufficient. It remains to be seen whether more ambitious targets can be set for the next phase. Targets set for the period beyond 2012 need to be more far-reaching;
- The current regulations have loopholes as some industries find it more attractive to relocate to countries without caps rather than reduce emissions;
- The current policies promote over-investment. The use of CERs from developing countries is capped in Europe limiting cost reduction opportunities in CO^2;
- CDM project types are restrained by the current mechanisms. Certification processes for emissions reduction projects are limited by the development of new certification mechanisms.

The current CDM projects are usually large projects because high transaction costs limit the implementation of small scale projects. Most of the small scale projects are hydro-electric developments and methane reduction in the agricultural field. Emissions are growing faster in developing countries than in developed countries. Small and medium enterprises represent an important proportion of the emissions in developing countries and would be good candidates for reduction of emissions through the carbon markets. Governments can help to play a role in the promotion of development of CDM projects for small and medium enterprises. This could make available significant sources of international funds to finance clean technologies and increase productivity. Governments can assist in helping to ensure that cleaner technologies are available to SMEs. Governments in developing countries can help the development of the SME sector and help them gain access to global carbon markets. Functions which government needs to assist with include identification of projects from sub-sectors which have large enough emissions to make a significant difference through introduction of better technologies; development of verification

methodology which is internationally acceptable; identification players which have an economic incentive to be involved and assistance, e.g. with credit guarantees to improve access to capital, and assistance with the implementation of the projects.

15. Case studies: thematic

15.1 Energy justice: biomass use and energy justice

2.5 billion people use biomass as their primary source of cooking and heating. This accounts for between 10-14% of the worlds primary energy use. 1.6 million people, mostly women and children, die premature deaths as a result of biomass pollution. Dung, crop residues and wood, in descending order are the most polluting forms of indoor energy use. Black carbon found in soot is a dominant absorber of solar radiation. It is caused by open biomass burning for cooking and a significant contributor to global warming.[58] More efficient stoves for cooking can be made relatively cheaply. There are a number of problems such as the unorganised production, little marketing and PR efforts, weak distribution channels, a lack of government support or certification and limited availability of consumer financing. There is therefore a market for an efficient stove which burns traditional biomass materials more efficiently and safely. It needs to be clean, efficient, high quality, durable, 'aspirational' and scalable.

15.2 Financing small integrated development projects

The example presented at the conference comes from the work of the La Guardia Foundation[59] In the semi-arid north east of Brazil, among a population of 25 million, about 1 million houses are without electricity. 50% of the households have an income of less than US$90 per month. In 60% of the municipalities, the illiteracy rate among adults is 35-60%. The Brazilian average is less than 5%. Much of the land is being deforested because of agriculture and cattle raising, production of firewood and charcoal and irrigation projects. The Chilli Pepper project in Baixas, in the municipality of Sao Jose Da Tapera in the state of Alagoas is an example of an income generating and environmentally sound project. The community project grows chilli peppers in racks of connected coca cola bottles and produces a chilli vinaigrette and a chilli paste for local use. The project uses photovoltaic electricity for pumping and circulating water and a solar drier for the chilli peppers. The production generated (85 kg of peppers four months after the installation) significantly raises the income of the participating growers. In addition, the project is attracting attention and is also networked with other social production firms. It serves as an example of an environmental project with significant developmental dimensions, albeit on a small scale.[60]

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[58] For the article in Nature Geoscience published on line 23 March 2008 See: http://ucsdnews.ucsd.edu/newsrel/science/03-08BlackCarbonPollution.asp; http://www.nature.com/ngeo/press_releases/ngeo0308.html

[59] See: http://laguardiafoundation.org/index.php?option=com_content&task=view&id=43&Itemid=33

[60] See: http://www.mosaiconetwork.org/downloads/irrigation.doc

16. The Renewable Energy and Energy Efficiency Partnership (REEEP)

Growth in clean energy investment in the period 2004-2007 has been very rapid. Expanding from 33.4 billion in 2004 to 148.4 billion in 2007, clean energy investment has posted above 50% growth for three years running. Global cumulative installed capacity for wind energy has increased by a factor of 15 between 1996 and 2007. China, which was the country eighth in terms of installed capacity in 2005 was in sixth position by 2006 and will shortly be the largest user of wind energy.[61] Europe, North America and Asia account for almost all of wind energy, with very low levels of usage in Latin America, Africa and the Middle East and Pacific. India and China have a large number of wind CDM projects in the CDM project pipeline. It is within this context of expansion that REEEP operates.

REEEP currently has 260 partners, including 40 governments, many businesses and NGOs. It is currently funded by 12 of these governments. The aims of REEEP are to reduce greenhouse gas emissions and increase wealth for the poor. It seeks to do this through:

- reducing market barriers and financial obstacles for renewables and energy efficiency systems;
- delivering action on the ground via project activities that are targeted on policy improvements and innovative finance mechanisms;
- improving access to sustainable affordable energy for the poor.

The network provides a wide range of added value for different partners, including the following:

- It is a channel to expand national energy policy priorities to the international level;
- A vehicle to help governments meet climate change commitments and at the same time reduce ODA responsibilities;
- A facility which provides access to best practice, international and south-south expertise and financial resources;
- An independent, flexible and fast-acting organisation meeting regional needs;
- A facility which provides access to project finance - it is a grant organisation for innovative solutions and targeting actions;
- It is a marketing facility for best practice solutions and achievements;
- A promotion vehicle for the carbon market (CDM activities and the voluntary market);
- A vehicle facilitating the linking of project developers and the finance community.

It currently has 43 regional projects, a range of services including the information gateway (REEGLE),[62] its website,[63] various toolkits and capacity-building information.

[61] On the work of the Global Wind Energy Council, see: http://www.gwec.net/

[62] See: http://www.reegle.info/

It also has a range of networks of a strategic nature. Of the project portfolio of 84 projects in more than 40 countries, a high percentage have been successfully completed or are under implementation. REEEP also encourages honesty in reporting where there are difficulties. The project portfolio is well balanced between the thematic and sectoral shares. 49% are finance related and 51% policy related. 43% are energy efficiency projects and 57% renewable energy. From its initial phase, REEEP has learnt lessons and it intends to increase its output and impact. REEEP seeks to employ both the bottom up process for identifying priorities and projects and also to keep the opportunity of commissioning projects. It seeks to focus on integrated models using both renewables and energy efficiency. It also seeks to generate a coherent narrative through targeted interventions and develop toolkits from the lessons learnt. It also works directly with governments and financial institutions.

In the financial area, some of the priorities for REEEP include improving access to adequate financial resources through integrating the investment criteria of ETF, CEF and GEEREF into the REEEP programme priorities;[64] assisting governments in the private sector and developing innovative finance mechanisms; supporting the development of the carbon market and supporting the Nairobi Framework to increase the share of Africa in the carbon market.[65]

In the policy and regulation field, governments have been helped in the formulation of their national legal frameworks for integrating renewables and energy efficiency in countries including Argentina, Guatemala, Kazakhstan, Liberia and Mexico. Sectoral approaches have also been emphasised in more than 30 projects. Buildings and appliances in China and India, the power sector in India and Latin America Caribbean and industry and agriculture in China.

Looking forward to Copenhagen and Poznań, REEEP is hoping for clear commitments and targets on greenhouse gas reductions both in the long-term and shorter term. It is looking for reform of the carbon market, with special consideration for Africa and increased access to CDM projects for Africa, enhanced investment in technology development for energy efficiency and renewable energy. REEEP is also further looking for an expansion of activities and best practice through international organisations, finance facilities and NGOs. Finally, it is hoping for reform of the climate change financing mechanisms to facilitate easy and fast access to mitigation action.

16.1 The REEEP Energy Efficiency Coalition

REEEP currently is conducting thirty regional projects which address energy efficiency. Examples are three workshops on energy efficiency in buildings and three energy efficiency investment fora. An energy efficiency investment forum is planned for November 2008 in Singapore. The global review on energy efficiency is a project

[63] See: http://www.reeep.org/

[64] See: http://www.thestreet.com/story/10240792/1/etfs-vs-closed-end-read-the-fine-print.html

[65] See: http://cdm.unfccc.int/Nairobi_Framework/NF_partner_agencies.pdf

for 2008. REEEP also hosts the Energy Efficiency Coalition. Examples of activities include use of financial and market-based mechanisms to improve building energy efficiency in China, an efficiency power plant implementation in Jiangsu, and support for Panzhihua's pilot action towards becoming a sustainable energy city. The REEEP Energy Efficiency Coalition is planning a step-by-step approach focusing first on energy efficiency in buildings, then on industrial energy efficiency and finally, on all energy efficiency sectors, eventually including transport. The network has a strong emphasis on capacity-building. The Global Status Report on Energy Efficiency 2008 has also been prepared.[66] The network, through its activities and publications seeks to ensure that best practice is shared, mentoring is provided for local initiatives and that the voice of energy efficiency is increasingly heard.

16.2 Strategic development of REEEP in the Pacific region

An initial study was undertaken by the REEEP South East Asia and Pacific secretariat supported by the Australian Department of the Environment, Water, Heritage and the Arts (DEWHA) and IT Power Australia. REEEP is looking to increase its activities in the region. AusAID has committed $1.5 million for the next programme cycle. Many of the key issues which have emerged as a result of detailed evaluation have included the vast distance involved in the Pacific region, low population density except in Papua New Guinea, low level of electrification, high dependence on imported oil and high losses in electricity utilities. There is an awareness of climate change but a disconnect with the energy and budget processes. The skills in regional organisations are present, but elsewhere through the region the necessary skills need support and capacity-building. Donor funding is significant but expensive to access and not well aligned to the needs. The study recommended the need for:

- coherent energy policy;
- capacity-building and skills transfer;
- co-ordination of donors and investors with active review of donor influence.

Furthermore, energy efficiency needs to be more widely implemented to assist in reduction of oil imports and decrease oil dependency. Electrification at village level needs to be supported through micro-finance and existing organisations and programmes for delivery need to be strengthened.

17. Summary and Conclusions

In the area of climate change negotiations, all eyes are on the US Presidential election, as 2009 is the year when the post-Kyoto framework has to be negotiated. To achieve agreement in the Copenhagen meeting at the end of the year, the new administration must hit the ground running.

The conference heard that, for the first time, all G8 major industrial nations had accepted the goal of reducing CO2 emissions by 50% by 2050. When other major economies joined the G8 Japan discussions, however, the measure of the difficulties

[66] See: http://www.reeep.org/index.php?assetType=project&assetId=30

which have to be addressed if we are to get an inclusive climate deal became clear. Major economies such as India and China are emphasising development and economic growth and insist that the industrialised countries, which have had the benefit of economic development using fossil fuels, should take the lion's share of the restriction on greenhouse gas emissions.

As the conference heard, renewable energy sources and energy efficiency are set to play an increasing role in the energy mix. Energy efficiency for buildings is an obvious way in which savings can be made and emissions reduced. Taking a systems approach can bring ready results. In the renewable energy field, off-grid solutions can bring development to rural areas, whether in China or Africa. A major source of pollution and health problems is the use of firewood indoors for cooking in much of the third world where there is no access to modern energy sources.

The conference also addressed issues of technology transfer, which should not be thought of only as the transfer of particular pieces of equipment, but rather the integration of innovation and skill to use the necessary equipment and adapt energy systems.

The role of the private sector is also important. It is unrealistic to think that the energy needs of either the developed or the developing world will be met from government sources, taxation and overseas development assistance. The private sector has already demonstrated its capacity to finance improvements to energy systems through financing packages which are repaid through savings. In this regard, it is important to encourage, support and institutionalise activities such as the Private Financing Advisory Network (PFAN) which improve access to existing and emerging financing sources, both inside and outside the UN Framework Convention on Climate Change (UNFCCC); to reaffirm the importance of the essential enabling environments to engage and retain domestic and foreign business and finance communities and the need for targeted capacity-building as a key tool in assisting developing countries to establish the necessary enabling environments along with the capability to adopt, operate, maintain and diffuse environmentally sound technologies.

The conference also heard of the challenges of establishing the necessary policy environment to get maximum benefit from available technologies. As well as the climate negotiations for the post-Kyoto framework, there are many initiatives and financing instruments available. Increasingly there is an awareness that no single solution is available and that advances must be made in energy efficiency, cleaner use of carbon technologies and increased commitment to renewable energy.

Participants shared their hopes and aspirations at the conference. These included the need:

- for further development of the carbon market and carbon trading
- to use all clean and wasteless technologies
- for careful analysis of developing country requirements, particularly using indigenous experts in the technological needs assessments
- for national and local ownership of commitment to cleaner development
- to achieve agreement at Copenhagen

- for increased investment in appropriate technologies and in enabling environment for business.

In addition,

- improving access to funding is required;
- understanding that the developing world wants the benefits of development and needs access to good technologies is essential;
- all are concerned about the quality of life, but there is a wider spread reluctance to consider limitations on economic standard of living;
- much can be done through education and awareness raising;
- implementation is the key;
- in order to make the difficult negotiations for palatable, formulation of credible visions of the “good life” by 2050 is needed;

It was even suggested that the time has come for an energy equivalent of the IMF to provide a safety net and expert advice for countries on their energy policies, and to provide energy security. As well as a sense of urgency, the participants stressed that there is a need for long-term structural transformation of energy use and that good decisions based on expert analysis and the latest scientific information are required.

In summary, the high level of diplomatic activity on climate change and technology issues indicates a raising of the international profile of climate change as a challenge. The key issue still remains - how to find a post-Kyoto mechanism which introduces all major emitters into a system which has measurable, reportable and verifiable targets, does not adversely impact economic growth, and simultaneously is radical enough to reduce greenhouse gas emissions as fast as the science suggests is necessary.

According to the IEA, developing countries will need to invest $165 billion per annum over the next thirty years to provide electricity to the 1.6 billion people currently lacking access. An additional $30 billion per annum would be required for this to be provided through clean energy development. Less than half of this funding has been identified leaving a financing gap of $100 billion per annum.

It is clear that energy efficiency and renewables will both have an increasing role to play in the energy priorities and climate change policies of industrialised and developing countries.