

Renewable Energy Regional Policy Analysis Report



Washington International Renewable Energy Conference (WIREC) 2008

**Prepared by:
Renewable Energy and Energy Efficiency Partnership
(REEEP)**



**renewable
energy
& energy
efficiency
partnership**

Introduction

This document was prepared for the Washington International Renewable Energy Conference (WIREC 2008). The Renewable Energy and Energy Efficiency Partnership (REEEP) was asked by the US State Department to carry out three regional preparatory meetings in Asia, Latin American and the Caribbean, and Southern Africa, in order to provide regional feedback to WIREC Ministerial Meeting. To achieve this REEEP's International Secretariat worked with its three secretariats in Asia, and its secretariats for Latin America and Southern Africa, to design a regional consultation strategy, which involved a questionnaire and workshops (held in Melbourne, New Delhi, Pretoria, and Singapore). REEEP's consultation process was designed to define the expectations of the various high-level regional Renewable Energy stakeholders with regard to the WIREC 2008 conference.

Following the overall Executive Summary of this overall report, the individual reports by the Regional Secretariats are alphabetically contained with this report:

	Pages
Asia	7-40
Latin America and Caribbean	41-56
Southern Africa	56-65

For more information, REEEP can be contacted at:

REEEP International Secretariat
Vienna International Centre
Room D1732
Wagramerstrasse 5
A – 1400 Vienna
Austria

Phone: +43 1 26026 3425

Fax: +43 1 21346 3425

Email: info@reeep.org

Website: www.reeep.org

Executive Summary

Greenhouse gas emissions caused by burning fossil fuels are leading to changes in the world's climate, which threaten economic growth, social stability, and human life. Renewable technologies create opportunities to decouple economic growth from greenhouse gas emissions.

The IEA estimates that US\$20 trillion will be spent in the energy sector between now and 2030, with much of this occurring in developing countries. Most of this money will come from the private sector, but governments of all levels (National, Federal, Regional, Local, State and City) have a responsibility in creating the right incentives and frameworks, through for example market regulation, public spending and fiscal policy, to ensure that this money is spent in a manner that will enable a stable, secure and sustainable global energy future.

Switching to a low-carbon economy will provide opportunities for the development of low-carbon technologies, like renewables. Sir Nicholas Stern in his review on *The Economics of Climate Change* quoted estimates of the market for such technologies growing to US\$50 billion by 2050. There would also be energy security benefits from a reduced dependence on fossil fuels, and benefits to the local environment (e.g. biodiversity, water, air).

The IEA, under their work for the Gleneagles Plan of Action, have demonstrated that technologies (including renewables and energy efficiency systems) already exist that can return global CO₂ emissions to current levels by 2050, and cutting the growth in oil demand by half. Renewable energy technologies are universally recognised as a part key of the overall solution to develop energy security and a sustainable energy future.

Following consultations with high-level stakeholders in Asia, Latin America and the Caribbean, and Southern Africa, this report endeavours to identify the main barriers to the uptake of an important form of clean technology - renewable energy; and offers solutions on how to overcome these barriers.

Strong global leadership is needed to ensure that the potential of renewable technologies is realised. Affordable technological solutions already exist, and as these regional reports will show, such technologies offer solutions to improve both social and economic development, and help countries to balance their energy demand with their energy supply portfolio, and provide this in a manner that is diverse, stable, secure and sustainable manner.

Unfortunately, many barriers to the implementation of renewable technologies still remain. The main barriers that the regional consultations identified were:

- ❖ Many national and regional energy plans lack long-term reliable policies and regulatory measures to encourage the deployment of renewable energy technologies. Unfortunately, this is compounded by the fact that some governments do not have the ability to enforce these legal structures or overall accountability within these plans.

- ❖ There is a lack of suitable finance and business models to provide attractive long-term investment environments for renewable energy.
- ❖ Investors often have a lack of knowledge about renewable energy projects, and the rates of return available. In addition, project developers often lack planning and business model skills. Both these problems result in a scarcity of capital, especially in the early stages of project development.
- ❖ Often there is a lack of a level-playing field between the development of renewables and conventional energy projects due to subsidies being applied to energy being produced through fossil fuels.

From the three consulted regions, stakeholders felt that the solutions to these barriers were for:

- ❖ **Governments at all levels** to develop and implement well formulated long-term policies and favourable regulatory frameworks, coupled with appropriate incentives, which work to remove uncertainty in the market and look to attract increased investment in renewable energy technologies.
- ❖ **Governments at all levels, and interested stakeholders**, to work together and collaborate with international and regional organisations who encourage clean energy regimes and increase skills and knowledge amongst local and national decision and policy makers.
- ❖ **Governments** to provide financial incentives, and encourage the enlargement of carbon markets to provide further support and promote renewable projects, which can act as catalysts in attracting funding from private sector sources.
- ❖ **Governments** to remove any existing market distortions between renewables and fossil fuel energy production.
- ❖ **Governments, financial institutions and development organisations** to encourage research and development by providing clear policy initiatives and research and development grants; “seed” funding; and the use of public/private partnerships to support start-up businesses.
- ❖ **Governments at all levels, and interested stakeholders**, to provide expertise, education and financial opportunities to further technological advancements and deployment.
- ❖ **Interested International and Regional Organisations** provide training to financial institutions and investors to gain a better understanding of renewable projects and the rates of return available.
- ❖ **International and Regional Organisations and financial institutions** to provide training for renewable project developers so that they can develop good business models and have better understanding of projects that will attract both public and private investment.
- ❖ **Project developers** to work with, and take advantage of these resources in the organisation and other individuals working in the renewables field to work together and share knowledge and develop best practices.

- ❖ **Collaboration between all the stakeholders** in the regions is the key to surmounting the barriers to renewable energy development. There is increasing political will within the region to embrace a clean energy regime, technology is improving and reducing in cost, levels of expertise are expanding and investment capital is available. The most beneficial way to take advantage of these resources is through collaboration and knowledge sharing aimed at the adoption of global best practices.

In removing the barriers associated with the deployment of renewable technologies, governments can work together and assist in the global aim of avoiding the worst impacts of climate change, whilst realising the goals of energy access, energy security, poverty alleviation, and in mitigation the economic and social effects of increasing fossil fuel prices.



Renewable Energy and Energy Efficiency Partnership

The Renewable Energy & Energy Efficiency Partnership's (REEEP) goal is to accelerate the global market for sustainable energy by acting as an international and regional enabler, multiplier and catalyst to change and develop sustainable energy systems. In accelerating the integration of renewables into the energy mix, and advocating energy efficiency improves a nation's energy security, whilst reducing carbon and greenhouse gas emission, and ensuring further socio-economic benefits by increasing the energy security, and reducing the energy poverty of a country.

REEEP works with Governments, Businesses, Industry, Financiers and Civil Society across the world in order to expand the global market for renewable energy and energy efficiency technologies. REEEP is uniquely placed to contribute to international, national and regional policy dialogues.

With an International Secretariat, a network of eight Regional Secretariats, and more than 200 partners world-wide REEEP has the ability to affect change worldwide – helping to provide access to best practice in policy and finance to promote renewable energy and energy efficiency. The partnership has funded more than eighty high quality projects in forty countries that remove market barriers to clean energy in the developing world and economies in transition. These projects are beginning to deliver new business models, policy recommendations, risk mitigation instruments and regulatory measures.

The partnership's overarching goals are to:

- ❖ Reduce greenhouse gas emissions
- ❖ Deliver social improvements to developing countries and countries in transition, by improving the access to reliable clean energy services, and by making Renewable Energy and Energy Efficiency Systems more affordable
- ❖ 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: Australia, Austria, Canada, Germany, Ireland, Italy, Spain, The Netherlands, New Zealand, Norway, The United Kingdom, The United States and the European Commission.

REEEP's work today, is tomorrow's sustainable future.

Asia

Renewable Energy Regional Policy Analysis Report



WIREC 2008

Prepared by:
**Renewable Energy and Energy Efficiency Partnership
(REEEP) South East Asia and Pacific Secretariat**

With support from:
REEEP East Asia Secretariat
REEEP South Asia Secretariat



February 2008

Contents

	Page
Introduction	8
Executive Summary	8
Background	13
Agriculture and Rural and Economic Development	14
Biofuels	14
Rural Electrification	15
Rural Employment	17
Technology, Research and Development	18
Accessibility of energy planning information	18
Education and skills	18
Regional collaboration to support R&D research centres	19
Government incentives to attract private investment for R&D	20
Government programmes to encourage technology transfer	21
Joint public/private projects to surmount IP issues	22
Finance and Investment	23
What drives investment	23
Renewable energy priorities in the region – financing small-scale projects	24
What business models have worked	27
Attracting and assisting cornerstone investors – managing risk profiles	28
Importance of carbon financing in attracting investment	29
Market Adoption and Development	30
Commercialisation of RE	30
Renewable Energy Deployment – Infrastructure	31
Effective promotion of business opportunities – innovative financing schemes	32
Effective implementation of renewable energy policies	33
Suggested Strategies for RE deployment for Governments	35
Effective/missing feedback mechanisms in improving market conditions	36
Conclusions	36
References	38
Annex 1	39

Introduction

REEEP's South East Asia and Pacific Secretariat which is financed primarily through funding by the Australian Government, with the support of REEEP East Asia Secretariat (hosted by CREIA) and REEEP South Asia Secretariat (hosted by TERI) designed a regional consultation strategy involving a questionnaire and workshops in Singapore, Melbourne and New Delhi that seeks to help define the expectations of the various RE/EE stakeholders in the Asian region with regard to the WIREC 2008 conference. The consultation process looked to gain the views of a reflective sample of high-level energy stakeholders within regional governments and business. Those organizations involved in this consultation can be found at Annex I.

Executive Summary

Decisions made by countries within Asia on how they meet the increasing energy needs of their populations will have a profound effect on the ability of the global community to arrest climate change and attain a stable, secure and sustainable energy future.

Although diverse, the countries of the region are all aspiring to provide their citizens with modern energy supply while striving to meet the demands of rapidly developing economies. To achieve these goals in a sustainable manner it is essential that Asian governments adopt clean energy and low carbon alternatives when developing energy systems and infrastructure.

While implementing a low-carbon, clean energy regime in Asia presents a number of challenges it also offers enormous business opportunities and has the potential to deliver substantial social and environmental benefits. In order to realize these benefits there will need to be an increased and rapid adoption of clean energy systems, which includes the development and growth of the renewable energy market. While recent growth in the renewable energy sector in Asia has been strong, there are still many barriers acting to restrict its potential to contribute to a sustainable energy future for the region.

This report endeavours to identify the main barriers to investment in the uptake of renewables in the Asian region and offers solutions as to how these barriers may be overcome.

This report identified that within Asia the three main **barriers** to the increased implementation of renewable technologies were:

1. **Policy and regulation:** Inadequate policy and regulatory frameworks are seen as a major impediment to the development and deployment of renewable energy projects. When this is tied into with questions as to a government's ability to enforce its legal structures, and its overall accountability, the ability of Renewable Project Developers to attract investment funds is severely reduced.

2. **Technology research and development:** The high capital cost of technology and a lack of government programs and financial incentives are seen as barriers to investment in technology development. In addition, this problem is compounded by a lack of investor project knowledge and deficient skill sets among developers and results in a scarcity of capital, especially at the early stage of development.
3. **Finance:** There are problems attracting investment at each stage of project development, this is especially true in respect of small-scale projects. There is a range of different factors working to discourage investors and specific measures need to be introduced to reduce or remove these.

Within Asia, there is awareness of the need to introduce renewable systems into the energy mix as quickly as possible and investment interest in the clean energy market is high. Overcoming barriers to the rapid uptake of renewable energy is vital in ensuring that this availability of finance is translated into positive clean energy outcomes.

Respondents to this consultation saw that the most appropriate **solutions** to these barriers were:

1. Political stability and well formulated long-term policy and favourable regulatory frameworks, coupled with appropriate incentives, work together to remove uncertainty and are pre-requisites for attracting investment in renewable energy. The key to attaining these objectives is national interaction and collaboration with international and regional organizations to encourage clean energy regimes and increase skill sets amongst policy makers.
2. Technology research and development, and deployment, can benefit from clear policy initiatives and direct government initiatives such as; research and development grants; “seed” funding; and the use of public/private partnerships to support start-up businesses. The use of the expertise and financial opportunities offered by regional institutions is crucial in providing the educational and funding initiatives required to attract the further investment needed to ensure technological advancements and deployment.
3. Financial incentives, and regulatory programs, should be used by governments to support and promote renewable projects, which can act as catalysts in attracting funding from private sector sources. Regional organisations have a strategic role to play in introducing innovative financing and investment schemes, providing risk mitigation products, encouraging private sector investment and facilitating regional technology and information transfer.
4. Collaboration between all the stakeholders in the region is the key to surmounting many of the barriers to renewable energy development. There is increasing political will within the region to embrace a clean energy regime, technology is improving and its cost is reducing, levels of local

expertise are expanding and investment capital is becoming available. To take advantage of these resources in the most beneficial way means like minded organisation and individuals working together and sharing knowledge so that the region can adopt global best practices.

Background

The development and growth of the renewable energy market is an integral part of achieving a sustainable energy future. The benefits of renewable energy range from a reduction in greenhouse gas (GHG) emissions, through energy security and commercial opportunities, to poverty reduction and social development. The high profile of climate change as a global issue and concern over rising oil prices have seen investment in sustainable energy increase markedly since 2005 and this upward trend is forecast to continue¹.

While most of this investment has so far been in the developed countries, it is the growing energy demand from Asia that is likely to attract increasing amounts of renewable energy financing. The challenges within Asia are daunting. There are still approximately 1 billion people without access to modern energy sources. Providing access to energy for these people and catering to the development demands of growing economies will see energy use in Asia increase by 89% by 2030, and with much of this increase in demand being met by fossil fuels, GHG emissions are expected to increase to 29% by 2030 from a level of just 9% in 1973.²

The Beijing International Renewable Energy Conference (BIREC) 2005 Declaration contained a statement affirming a commitment by the representatives to an increased uptake of renewable energy systems. Since BIREC, investment in, and the deployment of, renewable energy projects has increased dramatically along with an awareness of the role that renewables can play in a sustainable energy future, to the point that renewable energy has by some been identified a mainstream energy option. The current investor interest in renewable energy and the growth in the market reflect the favourable environment that exists at the moment and the growing maturity of the industry globally.

There still exist, however, a number of factors, many especially relevant to the Asian region, that are acting to inhibit investment and impede a more rapid and widespread uptake of renewable energy. These hurdles have the effect of slowing the development and deployment of renewable energy technology and systems, and these issues must be addressed if renewables are to play an effective role in a sustainable energy future for Asia.

Methodology

As part of the consultation process REEEP formulated and distributed a WIREC Asia Questionnaire designed to gain input from key stakeholders as to what is needed to accelerate the deployment of renewable energy technologies in the region. The areas the questionnaire covered were:

¹ SEFI/NEF, Global trends in Sustainable Energy Investment 2007: sustainable energy investment was US\$70.9 billion in 2006, an increase of 43% over 2005 and during the first quarter of 2007 the overall upward trend continued.

² J Carmody, D Ritchie, 'Investing in Clean Energy and Low Carbon Alternatives in Asia', (Asian Development Bank, 2007) pp.27,28.

- Overview of Renewable Energy in Asia: growth of the industry in Asia; benefits for Asia; how to increase the uptake; and drivers of investment.
- Policy and Regulation: key elements in existing frameworks to successfully promote RE; barriers to investment; access to planning information; types of education and skill development initiatives to improve deployment; effectiveness of regional fora in facilitating growth of RE in Asia.
- Finance: business models; innovative financing schemes and strategies to engage the finance sector; how to present and manage the risk profile of RE projects; role of carbon financing, especially with small scale projects.
- Future Developments: opportunities for RE in Asia; how to better coordinate carbon finance, policy and law in the region.

The questionnaire was distributed directly to targeted individuals within the Asian region as well as to representatives attending the WIREC Asia Consultation held either as part of the Singapore Opportunities for Investment in Renewable Energy Asia 2008 Conference in January 2008 or the Renewable Energy Business Roundtable in Melbourne in February, or the REEEP Project Developers meeting in New Delhi in February 2008. Identities of some of the contributors can be found at Annex I.

AGRICULTURE AND RURAL AND ECONOMIC DEVELOPMENT

In Asia there is still a large reliance on traditional biomass to produce energy. The introduction of renewable energy-based technologies to increase energy efficiency or replace old systems is seen as playing an important role in reducing unsustainable biomass consumption, and in addition greatly improves local environmental and health conditions. These technologies include efficient biomass stoves, and biogas, geothermal and solar applications for cooking, lighting and heating. The successful introduction of such small-scale renewable technology is often the result of a programmatic approach, involving the development of suitable technology (simple to use, efficient, affordable), government support (regional/ national) and investment (micro-finance).

a) **Biofuels**

The potential for biofuels to displace petroleum fuels has recently seen an increase in the number of countries introducing policies to promote and mandate the use of biofuels. While the benefits of biofuels, such as decreased vehicle emissions, improved energy security, reductions in GHG emissions and improved rural and agricultural employment opportunities have seen this growth replicated in Asia, there are a number of issues acting as an impediment to higher levels of investment in this area. These *barriers* include:

- A lack of policy structure, not only in respect of the biofuel industry, but also the broader issues of sustainability/ carbon concerns and the relationship between agricultural and energy institutions have created uncertainty as to how these matters will be addressed in the future.
- Concerns about policy stability are also acting to discourage potential investors.³
- The absence of national and regional biofuel standards and of coordinated technology support impedes investor knowledge and confidence in the sector.⁴

The concerns being voiced in respect of the agricultural, social, and environmental impacts of the palm oil industry in particular, and large-scale biofuel production in general, also need to be addressed.

Respondents to the consultation commented on certain *solutions* to these barriers:

³ In Thailand the Ministry of Energy reversed an earlier policy to phase out the fuel additive MTBE by January 2007, instead relying on market turnover of vehicles to change incompatible engine stock, a situation that could take around 10 years. This created a 'bad signal' to investors, compared to the previous government position. This, coupled with changes to the biofuel pricing formula effectively stalled or stopped most investment in the sector.

⁴ K Hamilton, 'Consultation with Financiers & Investors-Key Issues for Scaling Up Investment in Renewable Energy', Singapore, 13 June, 2007 (Chatham House, 2007): Note has been made of the absence, in Asia, of the equivalent of the Biodiesel Board, or Bioethanol Board, to support systems that can reduce costs, and move the overall sector in the right direction.

- APEC and ASEAN have both promoted the use of biofuels. Individual countries need to build on this support by formulating policy to encourage sustainable expansion of the biofuels industry. There are a growing number of policy and regulation models available to draw on in adopting individual and collaborative measures.
- The efforts of the agricultural and energy industries must be coordinated and government must also develop and implement assessment methodologies to determine not only the suitability of individual crops and production methods but also to monitor the impact the biofuel industry has on other areas of the economy.
- There is the need for collaborative research and development centres within the region to offer information and support to prospective investors.
- There is a need to foster domestic demand for biofuels where they can be grown for same price as imported fuels.

b) Rural electrification

There are an increasing number of renewable energy applications being developed in Asia to supply off-grid power to households, businesses and communities in rural areas. These include; small hydro; solar photovoltaic (PV); wind; micro/ mini-grid systems (solar, wind, biomass hybrid-wind/solar, wind/diesel, solar/diesel); battery charging stations (wind, PV); and household-scale appliances (solar home systems – lighting, refrigeration, water pumps). Despite the growth in rural electrification, a large proportion of the population within Asia still does not have access to electricity in their homes. Furthermore, electrification rates are not projected to keep up with the electricity demand expected from the growth in developing countries. This consultation found the following *barriers* to renewable energy technologies in this area:

- high capital costs of installation which deter investors but do not take into account ongoing low operation and maintenance costs and externalities such as environmental benefits;
- lack of education and training to ensure systems are maintained and operated on a sustainable basis (owner manuals and training, local service engineers and competent system operators);
- lack of technology and know-how transfer;
- lack of infrastructure and spare parts availability in remote areas; and
- the difficulty developing nations have in attracting investment because of concerns about political, economic, and legal stability.

Renewable energy services are often provided by local businesses and private enterprises. However, it is apparent that, especially in respect of larger scale projects, government intervention in the form of policy, regulation and incentives is required to ensure rural electrification takes place on a meaningful scale. Respondents to this consultation believed that in order to overcome these barriers the following *solutions* needed to be implemented:

- Government sponsored electrification programs combined with relevant subsidy approaches (capital, output-based, bulk power, etc) to attract investment.
- Collaborative research and development centres and training centres/workshops to develop technology and operation and maintenance models to ensure ongoing performance.
- The use of public/private partnerships to enhance technology transfer and market stability.
- Rural electrification in developing countries is best suited by taking a programmatic approach. Organisations like REEEP, working in conjunction with the local stakeholders, can encourage a system which incorporates clear government policy and programs, coupled with the identification and deployment of the effective technology while helping source and manage appropriate investment. In small rural communities it may often be local businesses, backed by technical support and training, supplying equipment to users being financed by micro-credit facilities.

CASE STUDY: Pacific Renewable Energy Kerosene Replacement Project

A key barrier to the uptake of renewable energy and energy efficient technologies in developing countries is the lack of financial capital of rural households. Micro-finance is used internationally to varying degrees of success to stimulate micro-enterprise in developing countries. The link between micro finance and the economic benefits of renewable energy are not widely understood. Another barrier to the uptake of renewable energy technologies in developing countries is the lack of understanding of the range of small-scale technology options available.

To address these barriers, REEEP, with the support of the Australian Government, has funded a project in the Pacific that will develop strategies for the rapid transformation of the kerosene lighting market towards more efficient electric lighting products, including the production of an awareness raising booklet of the economic benefits of small scale renewable energy for rural households and a guideline for integrating small scale renewable energy with micro finance. This project is implemented by an Australian company, Barefoot Power.

Pacific Island Countries (PICs) face a unique and challenging situation with respect to increasing the uptake of rural renewable energy systems. The key challenge is the wide geographic dispersion of PICs, and their island provinces, which creates isolated population centres that are difficult to serve.

“One important aspect to the project is to develop strategies and technical information that equip local small to medium enterprises in the Pacific to redirect a household’s kerosene expenditure towards renewable energy products. In Papua New Guinea, we estimate the kerosene market to be approximately US\$100,000 per year for lighting purposes alone,” states Mr. Andrews, director of Barefoot Power.

“The market in the Pacific is extremely dispersed, and thus it is important to engage households from a broad range of income levels. In other regions of the world with denser populations and more developed Photovoltaic markets, such as Kenya, traditional household renewable energy systems, costing more than US\$200, have only reached the more affluent members of a community. In the Pacific, a small business can not rely on a high-value low-turnover sales model because transport and marketing costs to achieve these sales are prohibitive.”

Expected impact of this project. The project will raise awareness of energy poverty within the microfinance sector in the Pacific. With increased awareness and functioning pilot projects, it is expected that investors can be attracted to this market and help transform the wasted capital spent on kerosene lighting, improving energy access via low cost market mechanisms. Confidence in the use of coconut oil for small (1-3kW) generators will be improved, possibly leading to commercial production of a biofuel generator.

Ability to replicate the project. Given the \$38 billion of cash expenditure by the world's poor on kerosene for lighting, there is high potential for rapid and regional/global scale-up of micro-energy products. It is estimated that 30 million clients spend \$1 billion/year on kerosene. The global loan portfolio of microfinance institutions (MFIs) is around US\$10 billion, and is delivered by over 3000 organizations. The industry is growing at around 36% per year. Even a small penetration of energy loans to existing MFI clients would result in millions of dollars redirected from kerosene to more sustainable energy sources.

Barefoot Power aims to scale-up by replicating the models presented in this project in approximately 23 countries by 2011. This would result in over 1 million households moving from kerosene to modern energy services and will create over 600 jobs.

The project has the potential to inspire other organisations to adopt similar approaches, particularly via the energy guide for microfinance and the guide to get off kerosene. The on-ground application of coconut biofuel generators will be a key low cost energy generation choice for the rural poor in many areas of South East Asia and the Pacific.

Contribution to the MDG. The two goals most likely to be impacted by this project are income poverty and sustainable use of environmental resources. The provision of lighting has been shown to extend the working hours of households and result in increased household incomes. The emergence of new energy businesses who are willing to distribute the products to villages beyond the road network, and via the informal market, will also be initial evidence of additional economic activity.

c) **Rural employment**

The ability of renewable energy to produce energy solutions in rural areas has the potential to alleviate a range of issues including environmental sustainability, poverty, welfare, health and education. Increased employment opportunities, both within the existing agricultural sector and in new renewable energy projects, have an obvious beneficial effect in local communities. These opportunities will only bring long-term benefits if they are sustainable. To ensure this, a multi-faceted approach needs to be taken when developing and implementing renewable energy projects. Respondents to this consultation felt that the *solution* to this was that:

- Governments need to have well conceived rural energy policies that encourage investment, not only in research and development and start up financing, but also in ongoing funding to ensure the long term development and success of projects.
- Governments need to coordinate the needs and development of the agricultural and energy sectors to ensure the best outcomes for all the stakeholders including local communities
- Energy projects should be replicable, and there needs to be methodology developed to assess such projects and create the programmes to replicate them

- There needs to be coordination between government, donors/investors, business and the local community to ensure good information flows and optimum outcomes for all stakeholders.
- Agencies such as REEEP should be promoted and utilized on matters of policy structure, investment opportunities, project selection and support, and future development.

TECHNOLOGY, RESEARCH AND DEVELOPMENT

a) Accessibility of energy planning information

Contributors to this report were split on the question of information accessibility; with half of respondents in Asia saying there was no or very little access, whilst the other half said there was adequate or good availability. This indicated that some countries and states were better at gathering and disseminating information than others but also that, while at times there was information available, its presence and the means of accessing it were not known to stakeholders. Respondents felt that to overcome this the following needed to be implemented:

- National, provincial and local initiatives to promote clean energy must contain information on where, and how to access energy planning information.
- Government agencies tasked with energy planning to have countrywide offices, and useful and active websites as points of reference for stakeholders.
- Provision to Project Developers of clear and detailed information – i.e. where targets are provided, background on why and how these target levels were reached.

b) Education and skills needed

Respondents to this consultation recognised that there were skill shortages in the clean energy sector at all levels. They felt that the barriers here were that there was:

- A lack of training and preparation in the design of policy and regulation lead to the enactment of inadequate energy policies and the slow implementation of enabling regulations and programs.
- Insufficient knowledge by policymakers of the various incentive measures available to support renewable energy, restricting the ability of government policies to attract investment.
- A lack of skilled personnel in the installation, maintenance and use of technology, especially in remote areas where system support is often difficult.

In the area of **finance** many developers are unaware of the types of finance available, and how to access these, whilst investors have a poor knowledge of the clean energy industry in general and specific projects in particular. There is a definite need to train the staff within financial institutions in the factors unique to clean energy projects. Respondents in this consultation expressed the views that Governments in Asia should:

- Undertake initiatives to ensure staff creating policy and regulatory frameworks have the best possible training and expertise. This can be done internally or in collaboration with regional bodies such as REEEP who can provide extensive modelling and experience.
- Provide support for training courses associated with the renewable industry, either through established institutions such as technical colleges or by way of wage and tax incentives for individuals undertaking training or apprenticeships
- In the early stage of a project/programme provide support for, and collaborate with, organisations that promote investment in the clean energy industry.
- Sponsor training courses in clean energy for banks and other financial institutions
- Led campaigns to promote clean energy options to consumers

c) Regional collaboration to support R&D research centres

Knowledge sharing and the creation of networks among multiple stakeholders is implicit in building capacity and ensuring the growth of institutional and personnel resources. This is especially true in respect of research and development stage, which is often seen as the critical in being able to generate growth in the renewable sector. The geographical spread of the Asian countries, and their differing stages of development, combined with a still immature but quickly growing renewable energy market, provide a scenario where research and development collaboration is invaluable in increasing the sustainable energy sector.

Problems can arise with collaborative research projects where there is shared ownership of the development outcomes, as it is often difficult to identify who is adding value to whom and in some cases researchers working together in the same area will end up as competitors. Also developers wanting to enter a market will sometimes feel compelled to share technology in order to be able to do business. Within this area respondents to this consultation felt that following were possible solutions:

- Government should support development with long-term favourable and stable policies and programmes - either broad-based policy supporting the renewable industry, such as the Chinese 11th Five Year Plan for Energy Development, or specific programs aimed at establishing the renewable industry are effective in attracting participation and investment in research and development.
- Government need to have an accountability and enforceable legal regime to protect intellectual property and contractual rights.
- Regional or national initiatives, which provide a regulated system, funding and incentives, and a stable environment to support renewable technology development and deployment.

- Government encouragement of bodies such as REEEP, REN21, and GVEP which can help to facilitate the dissemination of expertise within a region, including providing advice on effective policy and technology applications, methodology systems, training and support, and access to investment and finance models.

CASE STUDY: Singapore Government Initiatives

In 2007 Singapore announced plans to transform the city-state into a regional clean energy hub by creating a cluster of clean energy activities across the value chain.

The first step was the creation of the Clean Energy Programme Office (CEPO) to coordinate efforts and promote clean energy and the establishment of a S\$350m support program for R&D, test-bedding, bringing new technology to market and building expertise and manpower. This investment over 5 years is intended to generate some 7000 new jobs with a projected S\$1.7b value-added output in the industry by 2015.

Singapore offers a quality workforce, secure intellectual property protection, a strategic location and a stable political and economic environment. Through tax incentives, R&D subsidies and other packages the government has been able to convince a number of international firms to set up their regional headquarters in Singapore (Conergy, Vestas). Recently REC announced it will build the world's largest wafer, cell and module production facility in Singapore with a capacity of 1.5GW. Similarly Neste Oil plans to invest approximately €550 million in a 800,000 tons/per annum biodiesel plant and Rolls Royce is investing in a US\$100m solid oxide fuel cell R&D lab.

"Gardens by the bay" is a project to help start-ups test and showcase their technology. The entire new development will be powered with solar panels, fuel cells, cogeneration systems, and contain other clean energy initiatives. Singapore is also jointly developing the Tianjin eco-city in China, projected to be inhabited by some 300,000 residents. Several energy conservation measures have also been initiated including a green mark labelling for environment friendly buildings and an energy efficiency improvement assistance scheme to subsidize 50% of energy audit costs in the manufacturing and building sectors.

d) Government incentives to attract private investment for R&D

Comprehensive, long-term renewable energy policy and regulation regime will give private investors confidence to invest in R&D in renewable technologies. As the market has matured, and government commitment to renewable energy has been seen to strengthen, government and commercial investment in research and development has also grown⁵ although figures suggest that private sector spending is now decreasing and government spending stagnating.⁶

There is still a global lack of early stage research and investment facilities, incubators and human resource skills and this is especially true in Asia. Although commercial investment on research and development already outweighs that of governments, it will be necessary for the corporate sector to take on more of this burden as energy demand

⁵ SEFI/NEF, note 1, p.26: R&D spending on renewable energy and energy efficiency by governments and corporates rose from \$13billion in 2005 to \$16.3 billion in 2006 (corporate \$9.1, government \$7.2 billion)

⁶ UNFCCC, 'Report on the analysis of existing and potential investment and financial flows relevant to the development of an effective and appropriate international response to climate change', Fourth Workshop, Vienna, August 2007, p.3: government budgets for energy R&D and support for technology deployment need to double, increased expenditures in 2030 are expected at US\$10 billion and US\$30 billion respectively

increases. To increase R&D on renewables within Asia, respondents to this consultation agreed that following needed to be in place:

- Clear policy and regulatory regimes supporting renewable energy
- Public/private joint ventures
- Tax incentives, subsidies and packages targeted directly at R&D
- Specific programs with set goals and incentives to attract R&D
- Educational and training structures to build knowledge with promoters and investors
- Collaboration with, and support of, international and regional agencies working to build the sector

e) **Government programmes to encourage Technology Transfer**

Technology transfer from developed to developing countries has already played an important part in the uptake of renewable energy systems in Asia. However, with the projected growth in energy demand and increasing support for sustainable energy, access to effective and affordable renewable systems will be essential to maximize capacity building initiatives.

An important driver of technology transfer through commercial activity, especially to developing countries in Asia, and China in particular, has been the **Clean Development Mechanism (CDM)** vehicle under the Kyoto Protocol. Technology transfer impacts, not only the deployment of sustainable energy systems and the environmental and social benefits this delivers, but it also benefits areas such as employment through the growth of local manufacturing and servicing concerns in support the renewable industries.⁷

Global and regional organizations have played a role in promoting technology transfer, and facilitating the development and deployment of renewable energy systems. Often technology transfer results from a programmatic approach to projects whereby policy, research and development, financing, and education and training are all part of a comprehensive approach designed to deliver a sustainable renewable system. In Asia, there a number of bodies that support technology transfer including APEC, development banks such as ADB, other financial institutions, and organizations such as REEEP⁸. The regional Asia Pacific Partnership on Clean Development and Climate (APP) seeks to use technology transfer as one means of addressing climate change.⁹

There are a number of **barriers** that still act to limit the rate of technology transfer within Asia, many of which mirror the impediments to renewable energy uptake generally, such as lack of comprehensive policy, limited research and development, low technological support, and financial restraints. Primary barriers to transfer of clean energy technology include inadequate coordination of policies, unclear legal and arbitration systems, high

⁷ In China, through the payment of technical transfer fees, co-investment and co-development with foreign companies, and self development the market share of domestic manufacture of wind generation equipment has risen from 15.3% in 2003 to 45% in 2006. There were over 100 domestic manufacturers by the end of 2006.

⁸ USAID, 'From Ideas to Action, Clean Energy Solutions for Asia to Address Climate Change', May 2007, pp.124-126: lists the clean energy organisations working regionally in Asia

⁹ USAID, note 8, pp.82-83: launched in 2006 the partnership includes Australia, China, India, Japan, Korea and the United States

capital costs of technology, lack of protection of intellectual property rights, lack of coordinated technical standards, and lack of technical and financial information.¹⁰

Respondents to this consultation believed that following could be **solutions** to these barriers:

- Continuing to foster technology transfer, not only between the developed and developing countries, but also within the countries in the region.¹¹
- Collaboration between governments and the various regional organizations to coordinate policy initiatives and introduce common technical standards.
- Coordination between governments and regional financial organizations to provide funding and promote investment to offset the high capital costs of technology.
- Formation of industry associations to support the development and deployment of clean energy technology and services, and to distribute relevant technical and financial information.
- Coordination between governments on a future carbon price regime.

f) Joint public/private projects to surmount Intellectual Property issues

Among the risks that investors will consider when assessing a project are those of policy stability, government accountability, legal enforceability and managing intellectual property (IP). Intellectual property issues have been seen as one of the barriers to the transfer of technology and systems, to some developing countries, with the framework around IP being considered not very strong in many countries within Asia. Singapore is seen as a notable exception with a stringent IP regime and is ranked as the best within Asia, and top three in world.¹² Even when there is government policy addressing intellectual property rights, if there are questions of legal jurisdiction, legal processes and enforceability which will often be enough to deter potential investors.

Those consulted over whether the Singapore approach could be replicable within the region, felt that this was ‘not impossible’, but would require strong legal systems and confidence engendered through active enforcement. Enforcement issues at a provincial or local level, for example, were seen as making it impossible to import the Singapore regime to China. However, the fact that companies like Vestas are moving in to China ‘shows hope’, and highlights the fact that the problems are not necessarily IP, per se, but the need for manufacturers to bring in good management techniques to manage IP issues as well as the development of enforceable legal regimes.

Respondents to this consultation believed that following could be **solutions** to these barriers:

- The use of public/private partnerships. Partnering with a government body, sharing the financial risk, and developing risk management strategies, will often

¹⁰ USAID, note 8, p.68

¹¹ SEFI/NEF, note 1, p.37: currently 1,825 CDM projects in the pipeline and 64% renewable energy projects

¹² K Hamilton, note 4, pp.2,3

be enough incentive to encourage investors to place funds with projects in which they would probably not otherwise participate.¹³

- A national framework protecting intellectual property rights containing policy and legislation coupled with a system to implement and enforce these laws.
- Assistance for manufacturers to develop management techniques that address intellectual property issues

FINANCE AND INVESTMENT

a) What drives investment – matching funds to investment

Political stability and well formulated policy and regulatory frameworks, coupled with appropriate incentives, are pre-requisites for attracting investment in renewable energy. Investment is encouraged by political and regulatory interventions that remove uncertainty¹⁴ by supporting the implementation of clear policy and regulatory frameworks to be consistently applied over investment lifecycles.¹⁵ An example of such a policy regime is *The Renewable Energy Law for the People's Republic of China 2006*, which contains policy and regulatory frameworks to facilitate the successful promotion of renewable energy and the *11th Five Year Plan for Energy Development*, which contains annual development growth rates for renewable energy.

Allied to the policy requirements is the need for government accountability¹⁶ and a judiciary system that will allow for the enforcement of legal rights. Investors will also look at commercial market considerations such as development cost ratios, time frames (start-up and lifecycle), local capacity (technology, human resources), risk mitigation measures, market growth potential, and the need for local partners.¹⁷

The high profile of climate change as a global issue, the maturing of the renewable energy industry and the growing energy demand from Asia is attracting increasing investor interest to the clean energy sector in the region. However, a well-documented problem is matching prospective investors and suitable projects. In part, this is occurring due to a lack of knowledge and expertise by both project proponents and investors

Respondents to this consultation felt that the following we necessary to encourage investment:

¹³ J Carmody, D Ritchie, note 2, pp.38,44,76: Although a relationship with a government agency does not in itself guarantee protection of intellectual property rights, if a comprehensive partnership agreement is coupled with sound management techniques, and clarity as to ownership and jurisdiction in respect of intellectual property, the partnership should afford the investor some piece of mind

¹⁴ Perception of regulatory issues and risk may be different in different parts of the financial sector. Investment banks, for example, working in the higher yield end of the market may take more regulatory risk, compared with commercial banks, which have a lower risk threshold, focused on getting money paid back on time. For a higher perceived risk on an investment, investors/lenders will expect a higher return which translates into a higher cost of capital.

¹⁵ J Carmody, D Ritchie, note 2, p.16

¹⁶ An example where a negative message was given to investors was the change in the price setting clause in a Power Purchase Agreement (PPA) between a private actor and the Electricity Generating Authority of Thailand (EGAT), the latter unilaterally adopting a new arrangement in their favour.

¹⁷ In China, the importance of a local contract and guarantee was raised, and the need for a 'comfort letter' such that officials are on record supporting the project. Although local engagement is seen as crucial, this requires the legislative basis at central government level.

- Incentives such as tax incentives or a range of measures such as renewable portfolio standards, feed-in tariffs, government-administered auctions for renewable energy, preferred grid access and research and development grants.¹⁸
- Government accountability and enforceable legal rights.
- Availability of information and expertise to allow investors to fully evaluate commercial market considerations.
- Agencies equipped to provide assistance in matching investors and promoters. Organisations can range from government agencies tasked with supporting the renewable industry, public/private partnerships with a multi-lateral approach (REEEP) or private sector concerns that aim to connect capital with clean energy investment opportunities.¹⁹ [See Case Study: ReEX below].

CASE STUDY: ReEx Capital Asia

In 2006 REEEP and DEG, the development finance arm of German KfW Bank, seed-funded ReEx Capital Asia, an investment banking boutique based in Singapore, specializing in the Asian Clean Energy sector. ReEx Capital Asia's main business is capital-raising: originating investment opportunities, structuring deals and raising funds (debt/equity) for renewable energy infrastructure, biofuel production facilities, energy efficiency projects and green energy products/services companies.

Even though there is no lack of funds available and no lack of financially viable projects in Asia, the lack of transparency and still immature nature of the green energy market makes it difficult for entrepreneurs and financiers to find each other. ReEx Capital Asia (ReEx) aims at filling this gap by connecting capital with clean energy investment opportunities. ReEx helps companies and project developers to raise finance through matchmaking with commercial banks, corporate investors, clean energy private equity funds and carbon funds.

Today ReEx Capital Asia has 25 investment opportunities in its pipeline and several are undergoing due diligence by partnering investors/lenders. ReEx Capital Asia has had the advantage of having a strong advisory board with individuals from major institutions (REEEP, DEG, EcoSecurities, E+Co, CVC Group) giving the company a lot of credibility from its inception. Not only has ReEx received financial support from DEG and REEEP but also benefited from REEEP's marketing activities, which have promoted ReEx services.

The willingness of national governments, bilateral agencies or FI's to support the establishment of ReEx type operations on a risk shared (or grant) basis may be a key to its replication. Basing the operation in Singapore has provided an established and well-regarded business environment that has seen increasing governmental support for the clean energy industry.

b) Renewable energy priorities in the region – financing small-scale projects

Many of the developing countries within Asia are endeavouring to provide modern energy services to existing rural populations while positioning themselves to meet the

¹⁸ USAID, note 8, p.68

¹⁹ These agencies can provide project promoters with the necessary funding and skills to be able to convert projects into viable commercial propositions and can introduce them to available sources of finance. They can provide investors with data on renewable energy technology, explain the characteristics of sustainable energy projects and relevant policy, and then introduce them to suitable projects. At the development stage of renewable energy projects this information and facilitation aspect is as vital as are the issues of policy, regulation, and incentives, in driving investment in clean energy. Support and promotion of these organizations should be a priority of government in order to smooth the way for the anticipated growth in the sustainable energy sector.

future sustainable energy demands of their growing populations. While this will necessitate many large-scale projects, the nature of the region means that small-scale projects will be equally as important in providing a sustainable energy future. In the Asian region, small-scale renewable systems are an increasing feature of services being promoted in the developing countries and this is set to grow as the technology improves and the price decreases.

Globally, investment in small-scale renewable projects has continued to rise with much of this being driven by projects of the Organisation for Economic Co-operation and Development (OECD), although developing markets are playing their part, such as solar water heating in China.²⁰ It is anticipated that as the renewable industry grows in the developing countries the number of small-scale projects will increase. Significant opportunities in the shift towards this segment of the market could occur, especially as the price of new technologies decreases, although this would require clear regulatory support.²¹

Small-scale projects have some unique features which impact on their ability to attract funding. Project developers often need start-up finance due to the upfront costs of establishing decentralised infrastructure and relatively high transaction costs,²² and they often lack the skills or institutional track record necessary to attract prospective investors. The overall small total investment requirement of these projects, coupled with disproportionately high transaction costs, make them inherently less competitive than larger projects, and fund managers often prefer larger transactions because of their better visibility and economies of scale. A lack of knowledge of new technologies and clean energy systems adds to the perception of risk (regulatory, political, legal) and heightens the “high risk - low return” view that discourages investors.²³ This perception of project risk is also a factor in deterring commercial lenders who would otherwise be an important source of funding in the development stage of a project where both working and growth capital are required.

As the renewable energy industry grows, there is more information available to investors, and increasing evidence of the reliability and commercial viability of many of the clean energy technologies. This has improved investor confidence but there still remain impediments or “gaps” in obtaining funding for smaller scale renewable energy projects. In Asia, there is a clearly identified scarcity of investment capital at the early stages of projects and this barrier is seen as impeding the larger uptake of renewable energy within the region.²⁴

Barriers to investment include a lack of well formulated government policy and regulation, a lack of research and development and training facilities, a lack of replicability and/or programs to support this, a lack of maintenance and spares availability, and a lack of education and information for potential users and investors.

²⁰ SEFI/NEF, note 1, p.12: small-scale renewable projects increased from an estimated \$7 billion in 2005 to \$9.3 billion in 2006 (up 33%).

²¹ K Hamilton, note 3, p.5

²² L Parker, M Wilder, J Cameron (eds), ‘From Barriers to Opportunities: Renewable Energy Issues in Law and Policy, (Yale School of Forestry & Environmental Studies, Yale, 2007) p.54

²³ APEC, ‘APEC 21st Century Renewable Energy Development Initiative (Collaborative VIII)-Financial Roadmap for the APEC Region’, 2004, p.71

²⁴ J Carmody, D Ritchie, note 2, p.60

These factors, combined with high transaction costs, new technology risks and uncertain long-term prospects restrict the ability to attract finance for projects, especially at the start up stage.

The need for seed capital is followed in the next phase by working and growth capital requirements, which, in developing countries, are often very difficult to access from traditional commercial sources. At the end-user stage there is also the problem of a lack of access to suitable consumer finance.

Solutions to these barriers include:

- Seed capital - governments can ease this barrier through the supply of R&D grants, “seed” funding through government agencies and through public/ private partnerships designed to support start-up businesses, facilitation by agencies to match promoters and investors, and a grant/ loan from public/ private organisation can provide finance. [See Case study: ADB 1 below]
- Working/growth capital - business finance programmes (state-owned or commercial agencies using debt and quasi debt instruments), support of local banks by building lines of credit and credit enhancement, and facilitation by agencies to introduce senior debt are all methods of raising finance. [See Case study: ADB 2 in section Effective promotion of business opportunities – innovative financing schemes]
- End user capital - the use of micro-finance schemes, consumer loans (local bank with support), leasing/rental, and third party finance are methods of supplying consumer finance.
- Indirectly, governments can supply certainty through clear policy and regulation, and provide educational and training designed to equip both project developers and investors with the expertise needed to facilitate project development.
- Attract more early-stage investment from the private sector. Traditionally this investment will come from venture capital and private equity funding, although high net worth individuals can also fill this role.²⁵ The use of institutions to facilitate the matching of developers with these sources of finance is a critical aspect in promoting the rapid uptake of small scale renewable projects. Development finance institutions (DFIs) are well placed to provide a matching service using measures such as co-financing, loan, or direct equity co-investment to take direct involvement in a project. They can set up programs specifically designed to address problem funding areas, an example being the Seed Capital Assistance Facility (SCAF) set up by the Asian development Bank (ADB) and the United Nations Environment Program (UNEP) which will provide seed capital to renewable energy and energy efficiency projects in the Asia-Pacific region.
- Establishment of a small scale renewable energy support facility. The facility would provide funding and technical assistance and the operations group would become a knowledge centre on these measures. It would collaborate with various in-country sponsors and project partners and would work in coordination with

²⁵ J Carmody, D Ritchie, note 2, p.89: Angel capital investors: With increasingly favourable political environments private investors are adopting a more bullish approach, with venture capital investors favouring clean energy because of high rates of return, and investment banks now starting to show interest.

other organizations such as REEEP to identify projects in particular countries and markets.²⁶

- Access to local finance, which can be addressed by initiatives by policymakers and DFIs.

CASE STUDY: Asian Development Bank 1

A DFI solution to address lack of seed capital facilities

The Asian Development Bank (ADB) and the United Nations Environment Program (UNEP) are setting up the Seed Capital Assistance Facility (SCAF), which will be funded by a US\$4.2 million grant from the Global Environment Facility, to provide seed capital for renewable energy and energy efficiency projects in the Asia-Pacific region. The approach is that the SCAF will provide technical assistance to private equity fund managers and entrepreneurs to develop sustainable clean energy funds and financing for the early stages of such projects, share in the costs of development and transactions, and encourage investment in riskier portfolios by providing a seed capital return enhancement offered on a per-project basis.

Through sharing deal flow development and transaction costs and providing a seed capital return enhancement, the facility will help close the gap between what local renewable energy and energy efficiency entrepreneurs are able to offer in terms of returns on investment, and the requirements of the investment community. By bridging this gap, the facility will 1) help provide entrepreneurs with the enterprise development services and early stage risk capital they need to develop sustainable energy businesses and projects; 2) increase the scale and scope of these sorts of clean energy opportunities available to commercial investors; and 3) increase the volume of more commercially oriented capital available to the seed finance sector.

c) What business models have worked?

The basis for a sound financial model is a stable political environment with a clear and long-term policy and regulatory framework, backed by government accountability and established and enforceable legal procedures. Strong national legislation, allied to international and regional initiatives, and supported by provincial and local government law gives confidence in the renewable industry to investors. Strong and stable regulatory structures encourage the uptake of clean energy, promote the efficient use of power and attract investment into the sector.

Given the diversity of the Asian region, access to a range of development capital options, and broad project development experience, is essential to enable the growth of the different renewable systems and technologies needed by the countries in the region. A coordinated approach between global, regional and national organizations offers the best opportunity to deliver these educational and financial goals. As already discussed, DFIs have a range of strategies available for delivering funding and expertise to project developers. An organisation such as REEEP, working with DFIs, can use its network and experience to develop policy, identify business opportunities, bundle small projects, promote investment opportunities, facilitate CDM projects and replicate successful financing mechanisms to further enhance renewable outcomes.

²⁶ J MacLean, J Siegel, 'Financing Mechanisms and Public/Private Risk Sharing Instruments for Financing Small Scale Renewable Energy Equipment and Projects' (UNEP/GEF, 2007),p.77

Once a project has passed the development stage, and shown good investment fundamentals, it should then attract larger corporate and financial investors. There is still a strong case for initiatives to inform bankers and fund managers on the nature of renewable technologies and the potential of the clean energy markets, as the small scale of renewable projects and continuing risk perceptions act to discourage this class of investor. Private equity and infrastructure funds tend to enter at a relatively late stage in the project development life cycle and at this stage there is also the opportunity for renewable companies to enter the capital markets for equity capital.²⁷

d) Attracting and assisting cornerstone investors – managing risk profiles

As has already been discussed within this report, the key to increasing the uptake of clean energy projects within Asia is to increase the availability of capital at the early stage of these projects. One of the main disincentives to investors is the perception of risk. Thus risk mitigation products are seen as an important element in attracting investment capital. The perception of risk can be because many of the projects take place in developing countries with less developed political and legal structures, or because of the very nature of the projects themselves (remote location, lack of infrastructure, new technology, etc.). There are also factors such as the lack of sophistication and experience on the part of developers, which results in poorly prepared and presented projects. The lack of knowledge on the part of the investors is also an issue and often it is a combination of all of these factors.

As well as the normal risks associated with commercial projects (credit risks, construction and development risks, political risks, operating/commercial risks, and financial risks²⁸), renewable energy projects have their own set of characteristics that add to the risk profile. Investment is often based in some measure on government policy commitments, regulatory structures and fiscal incentives that support renewable energy, so any regime change that alters these arrangements can put the commercial success of the project at risk. Many projects are untried businesses using new technology in developing countries and therefore require innovative support and financial measures, while the need for a regular fuel and feedstock supply is an added risk for others. There are also considerations such as the fossil fuel price and the performance of carbon markets that can impact on the viability of renewable systems.²⁹

Respondents to this consultant believed the following solutions could help in reducing the risk profiles of renewable energy projects:

- A stable political environment with a clear, and long-term, policy and regulatory framework.
- Hedging facilities to mitigate financial risks, commercial political risk insurance products, and commercial project insurance to cover construction and property damage to assets.
- Specialised risk mitigation products that are designed for clean energy projects, such as financial risk management instruments for wind projects that could

²⁷ J Carmody, D Ritchie, note 2, p. 51

²⁸ APEC, note 23, p.

²⁹ J Carmody, D Ritchie, note 2, pp.72-74

include weather derivatives, turbine warranty insurance and certified emissions reduction futures contracts.³⁰

- Initiatives such as international and regional agreements on carbon markets, national and regional mandatory targets for clean energy, national regulatory support and incentives for R&D and capacity building, and the development of local capital markets also play a part in risk mitigation.
- Information and education. In many cases the perceived country risk of a country regularly does not match reality, and sound and profitable investment opportunities can be lost through failure to monitor improvements in the investment climate in countries in developing Asia.³¹ This is where regional organizations have a key role to play. DFIs are considered to be an effective vehicle for designing, promoting and delivering risk mitigation products, while an organisation such as REEEP with a global network and strong regional experience is well positioned to advise potential investors on the risk profile of particular projects and the risk mitigation products available. Increasingly private capital raising businesses are positioning themselves to connect capital with clean energy projects and managing risk profiles is a major factor in this process.

e) Importance of carbon financing in attracting investment

Carbon funds now total US\$11.8 billion with the private sector providing most of the new money coming into the market.³² In Asia much of the activity involves Certified Emissions Reductions (CERs) issued under the CDM of the Kyoto Protocol. Of the registered CDM projects globally over 60% are located in Asia and 68% are either renewable energy or energy efficiency projects. Although relatively small in Asia, the voluntary carbon offsets market, which uses a variety of standards, protocols and verification methods, is a growing alternative market to CDM projects.³³

While the CDM has been successful in creating GHG reductions and driving capital and technology flows from developed to developing countries, there has been some criticism that it favours low cost reduction options. This is shown by the fact that the overall share of reductions from renewable energy projects, compared to all CDM projects, stands at 26%, reflecting that many renewable energy projects are smaller than the average project and not as cost effective³⁴.

While to some carbon finance revenue is considered as “icing on the cake,”³⁵ consultations for this report indicate that it is an important driver for many investors when looking at potential projects, although the importance of the carbon income stream may vary from project to project and depend on the type of financial products being offered. However, it is also apparent that there is a need for capacity building within Asia, where there is a lack of specialists with knowledge of CDM registration

³⁰ UNEP, 'Assessment of Financial Risk Management Instruments for Renewable Energy Projects', UNEP 2007, p.1

³¹ J Carmody, D Ritchie, note 2, p.71

³² SEFI/NEF, note 1, p.10

³³ USAID, note 8, p.73

³⁴ REN21, 'Renewable Energy and the Climate Change Regime-Considerations from REN21 ahead of Bali COP13, 2007,p.4

³⁵ K Hamilton, note 4, p.5

requirements, and a low level of recognition of the opportunities under the mechanism by the financial sector.

A major problem is the uncertainty as to what form the carbon market will take at the end of the first commitment period of the Kyoto Protocol in 2012. This is now making most investors regard CDM income only as contingent revenue, thus leading to financial analysis of project cash flows being made without reference to CDM income.³⁶ As many renewable energy projects have relatively long lead in times, projects starting now would not be eligible to earn CERs until after 2012, and therefore CDM income is a largely unquantifiable element. The fact that the EU has proposed to restrict the amount of CER's entering the EU after 2012 has also added to the uncertainty as to the carbon price and further undermined carbon finance as a means of attracting investment.

MARKET ADOPTION AND DEPLOYMENT

a) Commercialisation of RE

Unequivocal support for renewable energy from government is the basis for the commercialization of the sector. A multi-pronged approach using policy and regulation, backed by programs offering financial and technology support coupled with training and educational initiatives should be successful in promoting project development interest, increasing investor confidence and growing consumer awareness.

A strong lead from government needs to be coordinated with other regional and national organisations to ensure that stakeholders have the ability to understand and take advantage of the opportunities available in the market. In particular public/private partnerships, DFIs, and niche businesses can play a significant role in growing the renewables market through the supply of financial products and the provision of expertise. REEEP has the ability to use its regional experience to promote clean energy systems and deployment by identifying projects, providing information and advice, facilitating investment, and collaborating with other key players. By taking a programmatic approach it is able to assist in the development and deployment of renewable projects while value adding at all stages. It can also encourage the formation of private sector initiatives that focus exclusively on the clean energy market. One such example is ReEx Capital Asia, a company with the core business of connecting capital with clean energy investment opportunities. REEEP and DEG, the development finance arm of German KfW Bank, seed-funded ReEx Capital Asia, have individuals on the ReEx advisory board and promote ReEx services through their marketing activities.

³⁶ J Carmody, D Ritchie, note 2, p.59

CASE STUDY: India

India now ranks 5th in the world in terms of primary energy consumption. It is the 6th largest GHG emitter globally, and the fastest growing one after China. The major challenge for the country is to provide adequate and clean energy to meet the needs of the billion plus population in a sustainable manner.

The Energy Conservation Act 2001 and Electricity Act 2003, backed by national policies on tariffs and rural electrification, have given impetus to the development of RE technologies and allowed State regulators to create Renewable Portfolio Standards (REPS). Renewables are competitive with many sources of conventional energy through fiscal and policy incentives such as accelerated depreciation, capital subsidies, concessionary funding and duty free import of technology.

India is seen as a country with large renewable energy resources and is considered by some as the "next frontier" for the large-scale development and deployment of renewable energy projects. The areas regarded as having the most potential are wind (this is the most developed sector so far), solar PV and solar heating, small hydro, biomass and geothermal. The government has set a goal of meeting 10% of the country's power supply through RE by 2012 and has ambitious plans for the distribution of biogas plants, solar PV applications and clean energy centres.

The barriers to the large scale uptake of RE are lack of policy and regulation, financial constraints, a lack of technology expertise and production capacity, infrastructure constraints, and uncertainty in the carbon market (India has the most number of projects registered with the CDM Executive Board). An example is the confusion at State level regarding the implementation of REPS which has caused disparities in the relative pricing of RE within and between different States and led to litigation and uncertainty among developers.

India has the energy demand, natural resources, and the developer and investor interest needed to facilitate the rapid growth of the renewable energy sector. Many of the barriers that have been identified are ones that are common to RE projects and have been experienced elsewhere. The key to India's successful uptake of RE will be the ability to access the knowledge base that has been built up and use it to integrate best practices into the RE regime. Collaboration with regional organizations and cooperation with other stakeholders will be the best way to achieve this and will enable India to take full advantage of innovative and effective initiatives that have already been developed.

b) Renewable energy deployment – infrastructure

One of the keys to the successful integration of renewable energy applications into the energy system is the provision of suitable infrastructure. Most existing energy infrastructure has been developed over a long period of time to deliver fossil fuel energy. This is often not appropriate or effective for delivering energy from renewable energy industries and the challenge is to develop infrastructure that will cater for the diverse range of new technologies and energy sources. A large scale restructure of energy infrastructure is a huge and expensive undertaking that requires committed financial and regulatory support from government as part of a core policy aimed at a sustainable energy future.

In some small-scale projects decentralized infrastructure requirements can be included as part of the overall system, but the costs of providing infrastructure, coupled with high transaction costs, can prove prohibitive.

Government policy and funding aimed at restructuring energy infrastructure to facilitate a move to a sustainable energy future, which is would be further helped by collaboration between government and the renewable energy sector to model and develop effective renewable energy infrastructure. In addition, financial support, from government and the financial sector, to enable the inclusion of decentralized infrastructure systems in small scale projects without threatening their viability would help in the successful deployment of renewable energy infrastructure.

c) Effective promotion of business opportunities – innovative financing schemes

The key to the growth of the clean energy industry is the attraction of sufficient investment to satisfy the demand for project funding at all stages of development. Given some of the barriers to clean energy investment there is a need to develop schemes tailored to encouraging the flow of capital to clean energy projects.

Governments have a range of policy options open to them to promote renewable energy and attract investment. They can use incentive tariffs, tax incentives, capital grants, R&D grants, fuel/carbon tax, concessionary finance, regulatory requirements (renewable portfolio standards and obligation systems), tradable certificates, voluntary programs (green pricing and net metering), consumer grants, third party finance, and preferred grid access.³⁷

In Asia there is a need for basic training among regional policy makers on the design of incentives, the relative merits of the different measures and the most effective methods of implementation, plus a need for a commitment by government to the funding of these schemes.³⁸

Regional organizations have a strategic role in promoting renewable energy opportunities through financial initiatives and knowledge sharing programs. APEC has been active in promoting access to finance through its Energy Working Group (EWG) and the five expert groups that operate under it³⁹. APEC funding is typically used to leverage financing from other sources as part of a larger long-term initiative and also adds value by encouraging regional cooperation and the sharing of expertise.⁴⁰

DFI's can introduce innovative financing and investment schemes to assist the development of projects and encourage the involvement of private sector investors. They can do this through such measures as support for specialized development corporations, the promotion of public/private partnerships, co-investment, technical assistance grants, guarantees, risk mitigation and loan products. The Asian Development Bank (ADB) has an Energy Strategy under which there are a number of initiatives and programs aimed at increasing the application of clean energy in its developing member countries.⁴¹

³⁷ L Parker, M Wilder, J Cameron, note 18, pp.61-64: list of measures and how they operate

³⁸ USAID, note 8, p.70

³⁹ Expert Group on New and Renewable Energy Technologies (EGNRET)-is one of the 5 expert groups and deals with new and renewable energy technologies, policies and finance))

⁴⁰ USAID, note 8, p.129: one measure is the 21st Century Renewable Energy Development Initiative (REDI)

⁴¹ USAID, note 8, p.81: It is projected that for the period of 2008-2010 the ADB will invest US\$2 billion in clean energy projects.

Public/ private bodies such as REEEP that are backed by government, business, banks and NGOs are ideally placed to coordinate the many initiatives taking place in the region and act as a conduit for information sharing between stakeholders. Their expertise and experience allows them to recommend policy initiatives, identify projects, advise on financing models, investment strategies and the available instruments, recommend risk mitigation measures, and strengthen education and training programs. The promotion of dedicated clean energy capital raising businesses adds another avenue for introducing investment into the clean energy marketplace.

CASE STUDY: Asian Development Bank 2

A DFI solution to address lack of dedicated clean energy private equity funds

There is an inadequate supply of adapted risk capital in Asia for clean energy projects initiated by private companies. Most private equity funds are not yet familiar with the clean energy space and, with large capital pools under management, they are restrained from investing in what the market has to offer today: relatively small deals.

A key ADB objective is to catalyze significant capital inflow in the clean energy sector by recruiting private equity fund managers to operate in the region. As a lead anchor investor, ADB's presence can help mobilize related investment. ADB has recently conducted a Call for Proposals and selected 5 fund managers who are setting up clean energy private equity funds to invest in developing Asia. ADB is investing a total of US\$100 million (~US\$20m per fund) and typically in the form of limited partner interests representing up to 25 percent of the total capitalization of a fund. The balance of each selected fund's capital is to be raised from other sponsors and investors.

It is these types of initiatives that the public sector is well placed to implement. Such schemes could be replicated by national governments, though the scale of domestic development may mean that at least initially a regional approach makes more sense. There is also a recognised shortage of skilled fund managers and fostering those who have been successful may be more realistic in the current market than attempting to create entirely new entities with limited skilled staff.

d) Effective implementation of renewable energy policies

At least 56 countries worldwide have some type of renewable energy promotion policy, including 21 developing countries, and policy targets exist in 58 countries, including 13 developing countries.⁴² In Asia, as the issues of climate change and energy security gain greater prominence, many countries are introducing clean energy policies, laws and programs to guide the expansion of the sustainable energy. China for instance has *The Renewable Energy Law for the People's Republic of China 2006* which contains policy and regulatory frameworks to facilitate the successful promotion of renewable energy and the *11th Five Year Plan for Energy Development* which contains annual development growth rates for renewable energy.

As has been well documented, it is the policy, regulatory, and institutional frameworks that determine the ability of a country to attract the capital flows necessary to fund the required growth in the clean energy sector. While policy indicates the direction a country

⁴² E Martinot, 'Renewables 2007 Global Status Report', (REN21, World Renewable Energy Assembly, Bonn, 2007)

intends to follow, it is the implementing regulations and programs that determine the effectiveness in achieving the policy goals. If these are not quickly developed, and backed up by suitable enforcement structures, stakeholder confidence in, and support for, the development of the sector will quickly reduce.

Well-designed institutional capacity is vital to ensure that a coordinated and efficient system is in place to produce optimized results. For instance, in the example of China, the State Council in charge of Energy carries out the management of renewable energy for the whole of the country. However, pricing is decided by the administrative department of the State Council, the plan for research and development is prepared by the administrative department of the State Council in charge of Science and Technology, and the special fund is determined by the administrative department of the State Council in charge of Finance. It appears that cooperation between the departments is poor and they are often in conflict, making the coordination function of the State Council in charge of Energy very difficult. This has the effect of weakening the implementation and effectiveness of the very ambitious policy initiative.

Collaboration between the various stakeholders to ensure the sharing of best practices in policy formulation, implementation and enforcement is the most effective way to promote the clean energy sector within Asia. There is already a network of organizations working in the region (APEC, ADB, REEEP, etc.) that have the capacity and expertise to advise on problems that may exist in the area of policy and regulatory frameworks. A greater emphasis on coordination between these bodies, in conjunction with active involvement and commitment by the policymakers in participating countries, can lead to a more systematic approach to the development of policy, standards, targets and finance initiatives.⁴³

Monitoring, evaluation and reporting systems are also an important element in building an effective knowledge base from which to determine best practices.

CASE STUDY: China

The introduction of the Renewable Energy Law 2006 has been a major driver for the growth of the renewable energy sector. It establishes a framework for the bidding process for grid-connection of renewable electricity, which allows the renewable energy generated electricity to be connected to the grid at favorable prices. By the end of 2006 renewable energy (primarily from hydro projects) accounted for 8% of primary energy consumption, which was up 0.5% from 2005.

Introduction of the law has driven increased investment flows from a range of bodies including domestic state-owned enterprises, national and international manufacturing groups, and venture and private capital operations. There are a number of renewable companies now listed on major stock exchanges and more are ready for listing. It has also contributed to a large growth in the manufacturing sector both within the domestic market and among international players, and increased collaboration between China and global and regional organizations on renewable energy initiatives.

While the combination of the 11th Five Year Plan and the RE Law is a good example of how government policy and regulation can promote the uptake of renewables, there are other elements of the Chinese system that can be improved to enhance renewable energy delivery:

- improve coordination between the various ministries and departments that administer

⁴³ USAID, note 8, p.86

energy policy. For instance, the State Council in charge of Energy oversees the management of renewable energy. However, pricing is decided by the administrative department of the State Council, the plan for research and development is prepared by the administrative department of the State Council in charge of Science and Technology, and the special fund is determined by the administrative department of the State Council in charge of Finance. It appears that cooperation between the departments is poor and they are often in conflict, making the coordination function of the State Council in charge of Energy very difficult. This has the effect of weakening the implementation and effectiveness of the very ambitious policy initiative.

- develop capacity building (local and national) in RE technology, policy design and integrated development,
- provide training of provincial institutions for RE on planning, exploration, development and financing,
- introduce more RE associations and technical consulting firms,
- introduce market reform
- share knowledge from international experience on policy design, technology development, and financing instruments and financial policies.

e) Suggested strategies for renewable energy deployment for the governments

National policy and regulatory frameworks that are clear and well-designed can be consistently applied over investment lifecycles, and it enables investors to achieve a rational risk-adjusted return that will attract more investment to the clean energy sector.⁴⁴ Measures such as renewable energy targets, fiscal incentives, and training and education programs operating under these frameworks make clean energy projects more attractive to investors and enable them to better undertake market feasibility studies. Carbon market interventions to ensure that GHG externality is priced into investment decisions is important, as is involvement in the process of determining the form of future global carbon markets.

Technology development and deployment is the key to the wide-spread uptake of clean energy within the Asian region. The transfer of technology from developed countries to developing countries plays a major role in this deployment and it is important that government enact policies, in coordination with other regional stakeholders, to overcome barriers limiting this trade. Equally important is the role of research and development, and there are a number of measures that government can take to attract commercial involvement in this sector. Research and development introduces new technology, leads to improvements in existing technology, results in cost reductions and generates an increase in market expertise. This in turn leads to growth in the industry resulting in the production of cheaper, improved products, which leads to higher demand and ultimately an increase in the clean energy uptake. A higher level of feedback and experience gained as a result of the increased technology deployment can then be fed back to the research and development stage.⁴⁵

Collaboration with other regional stakeholders is essential if governments are to access best practice processes for advancing clean energy systems. This involves having policy and programs that actively support regional organizations, and putting in place

⁴⁴ J Carmody, D Ritchie, note 2, p.16

⁴⁵ R Sellers, 'Increasing Renewable Energy Deployment: The importance of multiple policy approaches', (Renewable Energy Generators of Australia Forum, 2005).

institutional structures that can effectively employ the experience and know-how that flows from such relationships to increase clean energy uptake.

f) Effective/ missing feedback mechanisms in improving market conditions

As clean energy systems continue to become an integral part of the energy strategy of the countries in Asia, regional cooperation and the flow of information between stakeholders will be a vital factor in the rate and effectiveness of the uptake of renewable energy. As has been stated elsewhere in this report, collaboration, and the programs and structures to support this collaboration, need to be one of the key elements of clean energy policy.

There are now a number of global and regional organizations working within Asia with the mandate and resources to greatly enhance the ability of countries in the region meet their growing energy demands in a sustainable manner. ASEAN is one such entity. Within the ASEAN structure, the ASEAN Centre for Energy (ACE) is the body that initiates, coordinates, and facilitates regional, as well as joint and collective activities, and facilitates and coordinates the work of ASEAN's specialist organisations in energy.⁴⁶ As such, ACE is a good vehicle for encouraging information flows across the ASEAN countries. In respect of renewable energy this includes networking to provide advice on effective policy frameworks, ways to increase the share of renewables in the energy mix, and strategy for regional cooperation in biofuels.

The overall aim of these is to ensure that the best possible information is feed into the regional network to facilitate the most effective and timely uptake of best practice renewable energy.

CONCLUSION

The ability of Asia to move towards a clean energy and low carbon pathway will be a decisive factor in determining the ability of the international community to achieve a sustainable energy future. Under a business as usual scenario, providing the people of the region with access to modern energy sources, and catering to the demands of rapidly growing economies will see Asia account for 29% of global GHG emissions by 2030. To avoid such high emissions growth will require a major shift by the countries of the region towards the development and deployment of clean energy sources.

Renewable energy is seen as an integral part of the clean energy strategy for Asia. Many sources of renewable energy are now widely used, such as wind, solar and biomass, while others, like geothermal, are still to develop their potential. While the importance of renewables in contributing to a clean energy regime is recognized there are still barriers restricting their development and deployment.

Primarily the barriers to the uptake of renewables are:

1. Inadequate policy and regulatory frameworks;

⁴⁶ USAID, note 8, p.

2. Restrictions to technology research and development and deployment;
3. Impediments to investment.

These three themes are often interrelated and are common threads running through all facets of the renewable energy sector. The overall effect of these barriers is to stifle growth by limiting the potential for investment.

The key to overcoming these barriers is collaboration and coordination between the various stakeholders to facilitate technology and knowledge transfer. It is from these initiatives that clear, long-term policy and regulatory frameworks can be designed, proven and understood technology platforms developed, and appropriate financial incentives introduced. These are the basis for a growth in investor confidence and an increase in capital flows to the renewable sector.

References

- APEC (2004): APEC 21st Century Renewable Energy Development Initiative (Collaborative VIII)-Financial Roadmap for the APEC Region
- Carmody, J. and Ritchie, D. (2007): Investing in Clean Energy and Low Carbon Alternatives in Asia, Asian Development Bank
- Hamilton, K. (2007): Consultation with Financiers & Investors-Key Issues for Scaling Up Investment in Renewable Energy, Singapore, 13 June, 2007, Chatham House
- MacLean, J. and Siegel, J. (2007): Financing Mechanisms and Public/Private Risk Sharing Instruments for Financing Small Scale Renewable Energy Equipment and Projects, UNEP/GEF
- Martinot, E. (2007): Renewables 2007 Global Status Report, REN21, World Renewable Energy Assembly, Bonn
- Parker, L., Wilder, M. and Cameron, J. (eds) (2007): From Barriers to Opportunities: Renewable Energy Issues in Law and Policy, Yale School of Forestry & Environmental Studies, Yale
- REN21 (2007): Renewable Energy and the Climate Change Regime-Considerations from REN21 ahead of Bali COP13
- SEFI/NEF (2007): Global trends in Sustainable Energy Investment
- Sellers, R. (2005): Increasing Renewable Energy Deployment: The importance of multiple policy approaches, Renewable Energy Generators of Australia Forum
- UNEP (2007): Assessment of Financial Risk Management Instruments for Renewable Energy Projects, UNEP
- UNFCCC (2007): Report on the analysis of existing and potential investment and financial flows relevant to the development of an effective and appropriate international response to climate change, Fourth Workshop, Vienna
- USAID (2007): From Ideas to Action, Clean Energy Solutions for Asia to Address Climate Change
- Usher, E. and Touhami, M. (2006): Engaging the Banks- Financing small-scale renewables in the developing world, in Renewable Energy World

Annex I – Acknowledgements

REEEP South East Asia and Pacific would like to thank the following people for their participation in the Asia regional consultations and input to this report:

Adam Kirkman	Protiviti Australia
Adrian Williams	Geodynamics
Alex Beckitt	Hydro Tasmania
Alison Read	nabCapital
Amy Kean	REEEP South East Asia and Pacific
Andrew Richards	Pacific Hydro
Andy Sisk	US Consulate General
Carlo Botto	True Energy
Chris Cormack	AGL
Dave Foster	CBA
Dominique La Fontaine	Clean Energy Council
Eva Oberender	REEEP South East Asia and Pacific
Fiona McIntyre	nabCapital
Frederic Crampe	ReEX Capital Asia
Geoff Ball	Consultant
Greg Paxton	Knetic Energy
Hakim Zahar	Ecolonler International
Irena Bukhshtaber	Clean Energy Council
Kane Thornton	Hydro Tasmania
Keith Baker	Department of the Environment, Water, Heritage and the Arts
Kien Hoang	Dragon Capital
Li Junfeng	REEEP East Asia
Liu Xin	EED Consulting
Ma Lingjuan	REEEP East Asia
Mark Fogerty	Chair of REEEP South East Asia & Pacific, CBD Energy & CVC
Mark Siebert	nabCapital
Matt Groom	Roaring 40s
P.C.Maithani	MNRE
P Ramana Reddy	KfW
Pat Lennon	Hydro Tasmania
Peter Dreher	Rigby Cooke
Peter Rae	International Renewable Energy Alliance
Rachel O'Neill	National Australia Bank
Rob Jackson	Clean Energy Council
Sherrin Yeo	Garrad Hassan
Shireesh B. Kedare	Clique Developments
Shirish Garud	REEEP South Asia
Stephen Oxley	Department of the Environment, Water, Heritage and the Arts
Terry Reilly	Galbraith Sustainability
Thomas J Pullenkav	SELCO Solar Light
Wang Yanjia	Tsinghua University

Latin America and the Caribbean

Renewable Energy Regional Policy Analysis Report



WIREC 2008

Prepared by:
**Renewable Energy and Energy Efficiency Partnership
(REEEP) Latin America and Caribbean Secretariat**



February 2008

Contents

	Page
Introduction	43
Executive Summary	43
Sustainable Energy in Latin America and the Caribbean	45
Main obstacles to the Deployment of Renewable Technologies	46
Role of Energy Efficiency	47
Fostering Long term Integrated Energy Management Programs	48
Important Players in the Region	50
Conclusions	50
WIREC 2008 and Beyond	51
References	52
Annex I	53
Annex II	55

Introduction

REEEP's Latin America and Caribbean Secretariat, which is hosted by the Department of Sustainable Development of the Organization of American States (OAS/DSD), designed a regional consultation strategy (Annex I) that sought to define the expectations of the various RE/EE stakeholders in the Latin America and Caribbean region with regard to the WIREC 2008 conference. The consultation process looked to gain the views of a reflective sample of high-level energy stakeholders within regional governments and business. Those organizations involved in this consultation can be found at Annex II.

Executive Summary

The consultations within Latin America and the Caribbean showed that there are three main drivers for the deployments of renewable energy. In order of importance these are:

1. Social and Economic Development.

This is the main concern for policy makers and decision makers within the region. Reducing rural poverty and coping with rapid urban migration all entails an increase in energy demand, which in turn requires energy-importing countries to continually review their energy options and diversify their energy sources. Providing access to electricity for rural dispersed communities remains a key challenge for much of Latin America. It is estimated that as many as 50 million people in LAC—13% of the region's total population—lack access to electricity. Renewable Energy technologies, such as PV panels offer a solution in areas where extending the power grid is difficult and cost prohibitive. These dispersed approaches to electrification offer cost effective solutions for Countries working to improve the infrastructure for rural and indigenous communities, and thus reducing rural poverty,

2. Energy Security

For several decades, Governments within Latin America and the Caribbean have recognised that they need to balance their energy demand and energy supply portfolios. With the high costs and reliability issues of imported fuel, concerns about energy security, many countries have engaged in integration strategies such as interconnections and cooperation with fellow countries in the region, implementation of energy efficiency measures, and diversification of energy resources, which includes the increased use of renewables.

3. Climate Change and the Environment

Governments within the region are also moving to more cleaner, more sustainable technologies in order to reduce their own carbon dioxide and greenhouse gas emissions. Many areas and communities within the region, such as small Caribbean islands are vulnerable to the effects of climate change and policy-makers are looking at means to mitigate these effects by pursuing low carbon energy solutions. At a local level many governments are concerned about the effects of on natural

resources, and urban and household pollution, and are moving to cleaner renewable technologies as a means of reducing these concerns.

Conclusions

Responses to these consultations show that following good analysis of a country's natural resources and power generation portfolios with appropriate risk adjustment techniques renewable energy can provide the most economically viable and cost effective solutions to the problems and concerns within Latin America and the Caribbean. Within the region the focus must be on commercial technologies with proven performance, as countries within Latin America and the Caribbean cannot afford to be a test bed for unproven options. Solutions need to be matched to the local resource base and market conditions.

Unfortunately, currently, even in instances where renewable energy is the economically viable option - technical, institutional, financing, and market barriers hinder large-scale deployment. Therefore, favourable policies, market development, capacity building and other helpful measures still need to be deployed to remove these barriers. As currently, there is a lack of a levelled playing field between renewable and conventional energy due to the existing subsidies on fossil fuels. The removal of these existing market distortions will be the most valuable policy decision to occur within the region in order to promote the investment and deployment in economically viable renewable energy technologies.

Sustainable Energy in Latin America and the Caribbean

For several decades the countries of Latin America and the Caribbean region have attempted to address the deployment of modern and sustainable forms of energy. In many cases, power sector reforms were introduced with the intention of streamlining energy sectors to make them economically viable service providers. In many cases, Governments within the region attempted to replicate the model most common in the industrialized countries—centralised generating systems, complex distribution grids, conventional energy sources and a focus on electricity. In many cases, this model failed to meet the needs of large segments of the population, especially those of the poor and the people living in rural areas who have no access to on-grid electricity.

Here renewable energy technologies do offer some advantages over conventional energy sources. By their nature, they are suitable for use in rural areas and have a potential for local development of income-generating activities. They present an opportunity to break with the conventional centralized patterns of energy development that has failed to meet the needs of a large portion of the population of Latin American and the Caribbean. There are a number of successful strategies and tools that may be used to advance these solutions. They include public and private trust funds, public-private partnerships, sustainable energy incentives laws, tax incentives, capacity building activities, standards and certifications, and energy long term planning.

An example of this is within Brazil, where the Government plans to bring electricity to 10 million people by 2008 under its *Luz para Todos* program. Many of the citizens this program targets live in very small communities, distant from the nearest power lines. Therefore, the Government aims to serve over 200,000 people with off-grid solar power solutions. The newly electrified communities will use this power as an instrument for social and economic development and contribute in this way to the reduction of poverty and increased income. So far the program has helped generate 215,000 new jobs.

Another successful strategy is that of Mexico's Trust Fund for Electric Energy Saving (FIDE), which for over a decade has been promoting the efficient use of electricity in the municipal, commercial, and industrial sectors. Among its activities, FIDE provides financing for energy audits and assessments, facilitates the acquisition and installation of energy-efficient equipment including central air-cooling systems, and it has developed regional and national programs to reduce end-use energy consumption in the electric sector. To date, FIDE has supplied financial assistance to over 3,000 energy saving projects and has managed to encourage individuals, companies, and municipalities to match funding at almost four times the level of FIDE's initial investments. In the past 15 years, FIDE's domestic lighting program distributed over 9 million energy-efficient lamps. FIDE also has been instrumental in the replacement of over half a million inefficient refrigerators and 100,000 air conditioners, as well as an insulation project that has serviced nearly 20,000 homes in just three years.

Main Obstacles to the Deployment of Renewable Technologies.

This consultation showed that major bottlenecks that hinder the deployment of new RE projects in LAC are:

1. The lack of financial resources coupled with the high cost of developing such projects.
2. The lack of technical expertise in the region.
3. The lack of continuity in governmental energy policies that give long term signals to the development of renewable technologies as a viable and important form of energy production. Current energy policies are often impractical, fragmented, or at worst unrealistic.

Renewable energy development requires a range of market policies to increase the supply and demand of these technologies. The use of financial incentives is important as they account for externalities and diversification of renewable energy in power sector planning. However, in some instances there are countries that cannot afford to give major tax incentives to RE technologies given their limited financial resources. In other instances the national institutions in charge of energy lack the personnel, the financial means, or the technical capacity to implement a renewable energy program. In cases such as these, international funding has contributed to further the availability and use of RE in the region and launch new self-sustained programs.

Public private partnerships are valuable tools which may cover a full range of RE/EE projects and services. Their advantages include cost-reducing solutions that maintain the same or better levels of quality, and successfully leveraging of the increasingly limited resources of government agencies to complete high-cost, high need energy projects. In many cases, a partnership can save costs, while maintaining or even improving the quality when compared to pre-partnership performance benchmarks. Public private partnership should be considered and encouraged as successful strategies that promote sustainable energy. Non-governmental and grassroots organizations, and the private sector should be involved and engaged in the design of public policies that support renewable energy investments. A good partnership between utilities and consumers is helpful in promoting renewable projects.

Capacity building is a fundamental ingredient of a strategy meant to advance sustainable energy. The lack of technical knowledge at the government level has hampered the successful development of RE projects in several countries of the region, especially Central America and the Caribbean. There is a need for more and better information for planners, developers, professionals and technicians and for actual and potential users, including the finance community which sometimes lacks knowledge of, and therefore confidence in, RE technologies. Training activities and awareness programs should be taken into consideration for all these sectors. In this regard, a key lesson learned in the provision of modern energy services in the developing world (particularly in rural areas) is that the services must give rise to greater productivity if they are to be sustainable. The

facilitation of new productive activities is what creates sustainable livelihoods and makes the energy projects financially viable. Various RE options can be considered against the dual criterion of sustainability and affordability. The exchange of information on best practices at different levels, from consumer organizations to local governments, should be facilitated.

Lack of, or deficient, standards and certifications was mentioned as a barrier. Some RE technologies have a tarnished reputation not only among financiers but also among potential users. Failed projects have left a legacy of doubt as to the real potential of certain renewable energy technologies to replace conventional forms of energy satisfactorily. These standards and certification processes should be linked to the provision of incentives. Multi-objective analysis should be used to compare options and provide information to all stakeholders. This analysis should reflect in prices and tax incentives without adding burdens on the least developed sectors. Energy laws may be used to push for utility companies to promote renewables. In some industrialized countries, renewable energy projects actually bolster the grid functionality.

Finally the importance of long term planning was highlighted during the consultation. The government should have a long-term view on the balance of energy availability, including electricity generation. Specific targets for RE and fossil fuels should be put in place.

Role of Energy Efficiency

Respondents to the consultation recognized that although Renewable technologies have a crucial role to play in the economic development of the region, energy efficiency technology offered the fastest, cheapest, and cleanest solution for stretching the world's energy supplies and enhancing energy security in an environmentally-sustainable manner. The cost of saving energy through the particularly large, untapped demand side energy efficiency potential in developing countries is cheaper than the cost of adding new supply capacities. In emerging and developing economies with Latin America and the Caribbean, where the growth in energy demand is accelerating, energy efficiency has the potential to be an integral part of future energy supply strategies.

Despite profitable business opportunities for energy efficiency, and the substantial market potential, actual investments in the energy efficiency sector, both by public and private entities have been slow. The market remains relatively immature and successful experiences are limited.

Although multilateral banks, bilateral donors, and a number of those in the local private banking sector have promoted energy efficiency as a means of addressing growth in energy demand in developing countries, and improving the commercial viability for their clients, the real support still comes from the public sector. This will likely continue into the foreseeable future, despite a movement of the global market to privatization and private sector finance, until there is a more effective use of public funds to leverage private resources.

For energy efficiency measures to be successfully scaled-up there requires a government to provide supportive policies backed by strong local institutions, a robust private sector, educated consumers, and vibrant financial institutions (local, regional, and international), all of which contribute to the potential savings from both supply and demand side efficiencies. Most importantly, the roles, responsibilities, and accountability of each of the key stakeholders need to be clearly defined and understood.

Political will and commitment is key to the advancement of energy efficiency projects and programs. Policies need to be long-term in nature and encourage proper market and pricing signals. Legal and institutional frameworks need to be supportive and remove market distortions favouring conventional sources. Regulatory interventions are required to implement norms and certification programs; monitoring and enforcement is appropriate. Policies must consider both demand and supply aspects, and both mandatory and voluntary measures are working in the market. In many instances, state and local governments can be as important as the national government in putting in place policies and regulations to advance energy efficiency in their locales.

A range of policy measures can be used by Governments to accelerate deployment of energy efficiency, typically targeting a particular sector and end user group such as the industrial, residential, commercial, utility, and transport sector. Examples of the types of policy measures employed are energy efficiency codes, standards, and labelling; mandatory energy efficiency targets; financial incentives, such as tax incentives, low interest loans, and targeted subsidies (used judiciously, transparently, and with a clear exit strategy); bulk procurement programs and competitions; and voluntary agreements, among others. Cross cutting programs provide information and outreach, support ESCOs, and offer carbon market assistance.

Financing is required for energy efficiency projects to be successful. Funding sources are varied and include financing from end-users; ESCOs; utilities; local financial institutions; federal, states, and municipalities; bilateral and multilateral sources; carbon finance; equity through special purpose vehicles; venture capitalists; institutional investors; and others. Respondents were clear, ultimately, local financing sources will be key to the scale-up of the industry, as these sources understand their clients and markets, operate in local currencies, and can access local liquidities; yet public sources (multilateral and bilateral) are still important to leverage these funds. Bundling through financial and market intermediaries has also proven important.

Most successful energy efficiency projects have complementary technical assistance components to help ensure achievement of program objectives. Technical assistance support can include marketing, training, information dissemination, market/pipeline development, and consumer outreach.

Fostering Long Term Integrated Energy Management Programs

The sources consulted for this report highlighted the importance of adopting integrated approaches when dealing with energy at the national level. Human, social, economic, technological, cultural, and historic factors should be taken into account in energy decision- and policy-making in order to increase their effectiveness. Past experience has demonstrated clear factors for successful renewable energy policies:

1. Must be long-term and consistent in nature;
2. Provide a secure, fair and predictable payment mechanism;
3. Provide fair and open grid access;
4. Possess strong governance conditions, clear administration procedures, and low transaction costs;
5. Have strong public acceptance;
6. Provide enforcement
7. Be simple in nature.

An analysis of energy policies in Latin America and the Caribbean region shows that most countries do not have long term integrated energy management plans or programs. Integrated energy management techniques and approaches are not contemplated in legal frameworks either. Several laws regulate different aspects of energy, and were enacted at different periods in time - taking into consideration shifting circumstances and priorities, resulting in different aspects of energy governance are provided for by several different discordant laws and policies.

There is a further complication as several government agencies and ministries administer and enforce these laws and policies, each one discharging its duties independently from the others and according to its own vision. The outcome is an unarticulated management of energy resources where institutional mandates overlap. To secure a stable low-carbon energy future requires the implementation of long-term consistent policies based on adequate assessments of energy requirements, capacities and resources are required. Adequate information should be available to all stakeholders.

An example of this is the *Guidelines for a Long Term Sustainable Energy Policy* which have recently been approved in Guatemala. The development of the legal framework under this law is still pending, but if passed this will provide the country with an integrated approach to energy.

However, a second level of integration is required at the regional level. The countries within Latin America and the Caribbean need to join together to create conditions for implementing energy infrastructure works, projects and activities to promote supplementary trade as well as a more efficient use of available resources. A multilateral energy integration agreement negotiated and agreed upon by the countries of the region would ensure energy supply, minimize the cost of trading energy, and strengthen sustainable development. Within this the opportunities for the deployment of Renewable energy technologies should be seen as an as a crucial topic of integration.

Important Players in the Region

The respondents to this consultation explained the importance of having “*Renewable Energy Champions*” which are influential in determining the course of RE developments in the region. The extensive list includes professionals in charge of designing and implementing development plans and energy infrastructure, policy- and decision-makers (especially congressmen from energy and environment congressional committees), national grid administrators, national regulators, power utilities, NGOs active in sustainable energy, private and commercial financiers, local stakeholders managing alternative small-scale energy business, private businesses ready to deploy their skills in the region, national authorities and NGOs linked to agriculture and food policies, the sugarcane industry, petroleum companies, academic institutions, international development agencies, and the UN system specialized agencies. The following institutions were specifically mentioned:

- The World Bank;
- The Renewable Energy and Energy Efficiency Partnership (REEEP);
- The United Nations Educational, Scientific and Cultural Organization (UNESCO);
- The United Nations Environment Programme (UNEP);
- The Intergovernmental Panel on Climate Change (IPCC);
- The Global Reporting Initiative (GRI);
- The Latin American Energy Organization (OLADE);
- The Central American Commission on Environment (CCAD); and
- The Latin American Conference on Rural Electrification (Conferencia Latinoamericana de Electrificación Rural - CLER).

Additionally, respondents to the consultation agreed that banking and financing institutions play a fundamental role in promoting sustainable energy, and Development Banks such as Brazil’s National Bank for Development (BNDES) can also make an important contribution to the deployment of RE/EE technologies and solutions.

Conclusions

The Governments within Latin America and Caribbean, the business leaders and the public bodies must work together in partnership to define practical means to assist the rapid deployment of renewable energy technology in the region. Unfortunately, as occurs too private sector businesses and investors feel that renewable energy projects are not profitable enough or that their rate of return is insufficient to justify the initial investment. Such organizations need to work together to remove, or reduce, these misconception and look to promote viable and attractive Renewable Energy business. Attendees to WIREC could contribute to this objective by promoting a better understanding of the costs and benefits—environmental and financial—involved in the development of RE projects.

The exchange of successful experiences that are replicable in Latin America and the Caribbean region can be of help to disseminate successful sustainable energy models. These experiences should take into account the economic situation of the region—especially those of the poorest nations and the small island developing countries—, provide concrete options and ensure the commitment of all relevant stakeholders in order to find viable solutions to the financial barriers affecting renewable energy technologies in LAC. A greater collaboration between developed and developing countries and among the countries of the LAC region on renewable energy issues would also serve this purpose. Such collaboration is not to be based exclusively on the technology transfer model, but should also include cooperation in the field of research and development, all the way to the deployment of technology. This cooperation scheme is more effective at achieving results and leads to the increase of trade opportunities and private sector participation.

Those consulted agreed that multi-lateral organizations such as the World Bank or the Inter-American Development Bank (IDB) should take a more active role in the field of RE. Their engagement should not be limited only to small pilot-project-like contributions, but rather full-scale project development. Such multi-lateral and other international organizations have a tremendous influence on governments and policy-making. An integrated effort towards the widespread adoption of RE, would move forward the sustainable energy agenda. Such endeavour was undertaken in the 1990s, when both the World Bank and the IDB proactively supported the development of new electricity markets through the privatization and decentralization of the power sector.

RE technologies are effective at improving the quality of life of the poor and less favoured communities. Policy makers should be able to observe how the use of clean energies can be translated into social benefits. Sustainable off-grid rural electrification programs should be analyzed in combination with the productive use of energy.

There are many ongoing renewable energy developments in Latin America. Some experiences have been successful at moving forward the renewables agenda. Those consulted within this report stressed the importance of being able to get a real sense of what makes some policies, projects, or laws more successful than others in promoting RE. They felt that successful projects should be promoted highlighting the challenges involved and how these were dealt with and what were the lessons learned.

WIREC 2008 and Beyond

There is no one solution on how to advance the use of renewable energy and energy efficiency technologies. What instruments are selected should be based on specific energy sector goals and objectives. The effectiveness of a particular policy will rely on how well it is designed and enforced. Further, it is important that renewable energy and energy efficiency be incorporated as early as possible into broader energy sector planning and decision-making, and not be an after thought.

Renewable energy development requires a range of market push policies to increase supply of these technologies, and market pull to increase their demand. Push and pull policies are not mutually exclusive and working with a variety of policies may be best. Mega policies, to include renewable portfolio standards, feed-in tariff, can tendering, require mandatory access to grid and long-term secure payment. The use of financial incentives is important as they account for externalities and diversification of renewable energy in power sector planning. To deal with renewable energy incremental costs, these can be passed on to consumers, addressed thru a system benefit charge, or paid by a carbon tax.

Events such as WIREC, and this consultation will help in gaining a better understanding to the barriers to deployment but it will be up to the people of the Americas and to its leaders to make that final leap which will translate in a major scale up of renewable energy and take the region to the new era of sustainable energy.

References

Energy and Security Group (ESG), *Renewable Energy and Energy Efficiency Policy Analysis Report, Prepared for: The Sustainable Energy Policy Initiative - Department of Sustainable Development, Organization of American States* (February 2007).

Department of Sustainable Development of the Organization of American States and Energy and Security Group (ESG), *Sustainable Energy Policy Initiative Report for Latin America and the Caribbean* (April 2007).

Global Network on Energy for Sustainable Development (GNESD), *Renewable Energy Technologies and Poverty Alleviation: Overcoming Barriers and Unlocking Potentials* (2007)

Consultations made with energy specialists and government representatives throughout Latin America and the Caribbean region between the months of December 2007 and January 2008.

ANNEX I: Consultation Questionnaire

Washington International Renewable Energy Conference - WIREC 2008 - Virtual Consultation

The Regional Secretariat for Latin America and the Caribbean region of the Renewable Energy and Energy Efficiency Partnership (LAC REEEP RS) is carrying out a regional consultation for the Washington International Renewable Energy Conference (WIREC) (<http://www.wirec2008.gov/>), to be held on March 4-6, 2008. The consultation seeks to help define the expectations of the governments and RE/EE stakeholders in Latin America and the Caribbean region with regard to the WIREC conference. The inputs received during the consultation period will serve as feedback to the organizers of WIREC.

The LAC REEEP Regional Secretariat will prepare a report based on the inputs received from the region's RE/EE stakeholders. The report will be made available to the REEEP International Secretariat and the WIREC Conference organizers. If you wish to participate in this consultation, please fill out the questionnaire below and e-mail it to jmonticelli@oas.org.

It is vital to the success of WIREC that it be responsive to the needs of the region in terms of RE/EE, feeding into established processes, acknowledging prior work and providing added value to existing activities. Please submit your feedback to the Regional Secretariat on or before **January 31st, 2008**.

Please contact Mr. Mark Lambrides, +1.202.458.6261, mlambrides@oas.org or Mr. Juan Cruz Monticelli, +1.202.458.3745, jmonticelli@oas.org if you have any question.

Consultation Questionnaire

1. **The Washington International Renewable Energy Conference (WIREC 2008) will address the benefits and costs involved in the global deployment of renewable energy technology. In your opinion, what is the most important expectation for the LAC region regarding the WIREC conference?**
2. **Considering that the goal of WIREC is to advance renewable energy globally, what type of actions should be addressed, and what type of discussions should take place, during the Conference which would increase the availability and use of renewable energy in your country/region?**
3. **What types of RE/EE ideas, plans, or experiences do you think should be presented at WIREC?**
4. **In your opinion, what organizations other than those already engaged in WIREC should be invited to participate in this event?**
5. **Which private sector representatives from your country will play a fundamental role in promoting the goals of a sustainable energy future? How?**
6. **What kind of strategies do you think the government of your country should put in place in order to unify public and private interests in the promotion of sustainable energy? How can WIREC contribute?**
7. **In your opinion, what is your country/region lacking of that would allow it to forge lasting partnerships and develop effective policies in RE/EE?**
8. **What role should energy efficiency play in reducing greenhouse gas emissions?**

- 9. What type of measures would be adequate as a step toward a globally integrated approach to energy sustainability in your country/region? How can WIREC advance this?
- 10. How can WIREC effectively promote business opportunities and disseminate innovative financing schemes for RE/EE development in order to engage the banking sector?

Other Inputs/Comments (Optional)

Feedback submitted by:

Name:	
Title:	
Organization:	
Address:	
Phone:	
Fax:	
E-mail:	

ANNEX 2: List of Contributors

Organization	Name	Country
Biomass Users Network – Central America (BUN-CA)	José Blanco	Nicaragua
Comisión Nacional para el Ahorro de Energía (CONAE)	Israel Jauregui Nares	Mexico
Current to Current Mexico	Leopoldo Rodriguez	Mexico
Energy and Security Group (ESG)	Judy Siegel	USA
Fundación Bariloche	Gustavo Nadal	Argentina
Fundación Solar	Marta Rivera	Guatemala
Green Power Labs Inc.	Vlad Kostylev	USA
IRC-Dominica	Betty Perry-Fingal	Dominica
ISOFOTON	Jorge Alava	Bolivia
Ministerio de Minería y Energía	Josué Zapata	Unidad de Minería y Energía
NRGmanager	JB John Broughton	USA
Organización Latinoamericana de Energía (OLADE)	Byron Chilibingua	Ecuador
Organization of American States	Juan Cruz Monticelli	USA
Organization of American States	Mark Lambrides	USA
Policy Research International	Amitav Rath	Canada
RENOVE	Roberto Devienne Filho	Brazil
Saatvik Inc.	Jagannathan Viswanathan	USA
Secretaría de Economía, Planificación y Desarrollo	Juan Montenegro	Dominican Republic
United States Agency for International Development USAID/Mexico	Jorge Landa	Mexico

Southern Africa

Renewable Energy Regional Policy Analysis Report



WIREC 2008

**Prepared by:
Renewable Energy and Energy Efficiency Partnership
(REEEP) Southern Africa Secretariat**



**renewable
energy
& energy
efficiency
partnership**

February 2008

Contents

Introduction	Page
Executive Summary	59
Acronyms and abbreviations	59
Detailed Outcomes	60
Annex I	61
Annex II	

Introduction

REEEP's Southern Africa Secretariat (hosted by AGAMA Energy Ltd), supported by the U.S. Agency for International Development, hosted a one-day Workshop for WIREC on 7 February 2008 at the Innovation Hub, Pretoria. Thirty-eight stakeholders representing governments, regulators, financiers, industry, agriculture, R&D and civil society from seven countries (Angola, Lesotho, Malawi, Mozambique, Namibia, South Africa and Zambia) engaged in intense discussions regarding the acceleration of renewable energy within the region (see Annex I).

The REEEP Secretariat for Southern Africa gratefully acknowledges the financial support by the U.S. Agency for International Development, which was provided by World Learning. The opinions, findings, and conclusions or recommendations expressed herein are those of the author(s) and do not necessarily reflect the view of the U.S. Agency for International Development.

Executive Summary

Energy services are simultaneously both; critical inputs to the regional (and national) economies in Southern Africa and; significant contributors as a sector of their economy - including the distributed employment dimensions.

Key to accelerating the market uptake for RE in Southern Africa is regional co-ordination of activities and services for renewables by active organizations (Governments, Regional Institutions, City Mayors and Administrations, Business, Financial Institutions, NGO's and Partnerships, like REEEP. Such organizations should work together to develop common policy development and modes of implementation (including legislation); common regulatory approaches and frameworks; and, regional trading mechanisms for physical power and RE support mechanisms. In this it is crucial to recognize that Renewable Energy markets and resources do not begin and end at politically imposed borders.

Key institutional stakeholders within the region include: SADC Energy Programme Office; the Southern African Power Pool (SAPP); the Regional Electricity Regulators Association (RERA); the New Partnership for Africa's Development (NEPAD); the African Union (AU); the Development Bank of Southern Africa (DBSA); and, African Development Bank (ADB). National governments and other interested institutions need to show their commitment to regional co-operation for the increased deployment of renewables to occur. Lastly, key institutional stakeholders, such as the African Energy Commission (AFREC), the Forum of Energy Ministers of Africa (FEMA), the World Bank and the UN agencies are important stakeholders, which need to show both political and practical support this overall initiative for the overall deployment of Renewable Energy Technologies in Southern Africa to increase.

Acronyms and abbreviations

ACRONYM	Full Name
ADB	African Development Bank
AU	African Union
DBSA	Development Bank of Southern Africa
DME	Department of Minerals and Energy (South Africa)
IEA	International Energy Agency
IPP	Independent Power Producer
NEPAD	New Partnership for Africa's Development
O&M	Operation and Maintenance
R&D	Research and Development
RE	Renewable Energy
RERA	Regional Electricity Regulators Association
SADC	Southern African Development Community
SANERI	South African National Energy Research Institute
SAPP	Southern African Power Pool
TRECs	Tradeable Renewable Energy Certificates
WIREC	Washington International Renewable Energy Conference

Detailed outcomes

The key findings for each of the four thematic areas of WIREC 2008 are summarized and tabulated as follows:

Finance	Market Adoption and Deployment	Technology/ Research & Development	Agriculture and Rural Development
Opportunities/Actions Required			
<ul style="list-style-type: none"> - RE support mechanism(s) must be legislated by national governments. - Current support mechanisms such as feed-in tariffs and TRECs need to be reviewed and optimised. RERA and regulators can undertake this with government ministries. - Utilities should be required to sell and buy at (full) cost-reflective market prices. - Standard PPA's should be developed and applied. - CDM procedures should be simplified to make carbon funding more easily accessible. - Stability in the investment context is critical and leadership is required from governments and regulators to provide long-term confidence for investment. - RERA and national regulators should be more pro-active in guiding planning. 	<ul style="list-style-type: none"> - Communication and awareness of the market opportunity is required by regional and national governments. - The market for energy services is poorly understood. RE offers a long-term investment opportunity which is more attractive than some of the current energy service options. - Energy service decisions must be integrated into the planning and budgeting of line ministries / departments such as health, education, agriculture, etc. As an example, a policy decision in Malawi requires that certain infrastructure investments will not be approved unless the energy service needs are included. - Technology transfer is required by the private sector within the context of a stable market environment. - Skills development for, and by, governments is critical to ensure that there is a regional skills base for production, installation, O&M and administration. 	<ul style="list-style-type: none"> - Regional (and national) co-ordination and promotion of technology R&D is required by governments. The establishment of SANERI and the participation in the IEA's Implementing Agreements are examples. - Increased funding and financial support for R&D institutions from government, industry and international partners is required. - Open access to R&D outcomes should be encouraged to maximize the opportunities and efficacy of R&D investments. - Basic and continuing education at universities and regional / provincial energy institutes, is critical to encourage R&D. - Opportunities for practical and applied R&D include: increased efficiencies, better integration, local adaptation and production efficiency. 	<ul style="list-style-type: none"> - Big opportunities exist for farmers to become energy producers including biomass, wind, hydro and solar generation. - Energy production can diversify and stabilize rural economies. - Economies of scale are possible by getting community involvement and RE empowered. - Leasing the land to an IPP for the production of energy, e.g. wind. - Integration of different energy technologies for economic development.

Finance	Market Adoption and Deployment	Technology / Research and Development	Agriculture and Rural Development
<ul style="list-style-type: none"> - The off-grid electrification programme in SA has provided nearly a decade of service provision for >30 000 customers from RE based on government policy, regulation and equitable subsidization between grid and off-grid rural electrification - The current (and medium-term energy crisis in the region) is focusing governments and regulators attention to use full-cost accounting and portfolio planning 	<ul style="list-style-type: none"> - International commitments are required to supporting RE deployment in developing countries and emerging economies. - Define who has the responsibility to perform what activities in RE. - Experience with off-grid electrification, solar water heating and green building codes is attracting interest from developers and investors - The establishment of a Green Building Council of South Africa initially funded by the SA Property Owners Association 	<ul style="list-style-type: none"> - The establishment of SANERI in South Africa including the RE and Sustainable Energy Hub. - The initiation of RE R&D collaboration with the IEA through the Implementing Agreements under a mandate by the G8 Gleneagles Plan of Action. - The development of new or improved technologies include: <ul style="list-style-type: none"> ➤ Thin film CIGS_{Se} PV module developed at University of Johannesburg ➤ Integrated prepayment/charge controller and billing system for off-grid solar PV systems in SA 	

Annexes

Annex I: List of Participants

	Surname	First Name	Organisation
1	Felix	Sammeline	Electricity Control Board
2	Ylvisaker	Hans Terje	Norwegian Embassy, Mozambique
3	Sugrue	Annie	CURES
4	Madovi	Tawanda	International Power Control Systems
5	Nketsi	Mohau	DME
6	Gibberd	Jeremy	CSIR
7	Ndawonde	Sandile	Green Network
8	Herd	Ann	British High Commision, South Africa
9	Brajevich	Nikki	U.S. Embassy, South Africa
10	Mali	Thembakazi	SANERI
11	Nassiep	Kadri	SANERI
12	Thompson	Griff	US State Department
13	Sichone	Elijah	RERA
14	Watson	Gavin	E+Co
15	Seithheko	Jerry	Department of Energy, Lesotho
16	Silomba	Nkusuliwa	MEWD, Zambia
17	Manyuchi	Linda	City of Joburg
18	Tulleth	Ron	Trium Investment
19	Mrubata	Mmathabo	AFRICA
20	Dlamini	Moses	Department of Energy, Swaziland
21	Stange	Helge	Norwegian Embassy, South Africa
22	Purchase	Brian	UKZN
23	Eweg	Martin	Independent
24	Luxande	Amanda	REEEP-SA
25	Morris	Glynn	REEEP-SA
26	Forder	Stephen	Independent
27	Metzing	Christian	Trium Investment
28	Siegmann	Julian	Trium Investment
29	Osler	Rhys	Trium Investment
30	Modise	Maria	DME
31	Taylor	Tristen	Earthlife Africa
32	Langeni	Phumzile	DME
33	Tyatya	Sandile	DME
34	Britz	Petrus	Agricultural Research Council
35	Fedorsky	Catherine	Independent

Annex II: WIREC Southern African Questionnaire

The Washington International Renewable Energy Conference (WIREC 2008) will bring together government, civil society and private business leaders to address the benefits and costs of a major and rapid scale-up in the global deployment of renewable energy technology.

The Renewable Energy and Energy Efficiency Partnership (REEEP) is undertaking regional consultation to gain direct input from regional stakeholders to determine what is needed in a region to fully accelerate the deployment of renewable energy technologies. The information collected below will be presented at the high level Ministerial event in Washington happening on the 4th-6th of March 2008.

Instructions:

Please provide practical examples where possible.

In which countries do you undertake renewable energy activities?

Renewable Energy (RE) in Southern Africa

1. Have the benefits of a strong global economy been reflected in the growth of the renewable energy industry in Southern Africa?
2. How does renewable energy offer value in Southern Africa?
3. What is needed to increase the uptake of renewable energy technologies in Southern Africa?
4. What is currently driving investment in renewable energy technologies in Southern Africa?

Policy and Regulation

1. What are the key elements in existing policy and regulatory frameworks that have resulted in the successful promotion of RE?
2. What prevents further investment and deployment of renewable energy?
3. Can you access energy planning information at the appropriate levels?
4. What education and skill development initiatives should be undertaken to improve the deployment of renewable energy technologies?
5. How effective are the various regional fora (e.g. AFUR, AEF) in facilitating the growth of renewable energy in Southern Africa?

Finance

1. What business models work in promoting RE?
2. What can be done to engage the finance sector and innovative financing schemes for RE?
3. From an investors perspective what would be the best way to present and manage the risk profile of renewable energy projects in Southern Africa?
4. In deciding on whether or not to invest in renewable energy projects, especially in reference to smaller scale projects, what role does carbon financing play?
5. What are the key upcoming opportunities for renewables?
6. What do you think that Southern Africa could do to better coordinate the region in carbon finance, policy and law?

Please provide contact information
