Renewable Energy and Distributed Generation Task Force

ACTION PLAN

Version 4

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Contents

Introduction

At its inception, membership of the Asia Pacific Partnership on Clean Development and Climate (APP) was made up of six countries — Australia, China, India, Japan, the Republic of Korea, and the United States of America. Canada joined the APP in July 2007. APP member countries are cooperating to meet both their increased energy needs and associated challenges, including those related to air pollution, energy security, and greenhouse gas intensities.

The Partnership has established public-private Task Forces in eight key sectors: (1) cleaner fossil energy; (2) renewable energy and distributed generation; (3) power generation and transmission; (4) steel; (5) aluminium; (6) cement; (7) coal mining; and (8) buildings and appliances. The Task Forces are designed to meet Partnership goals through international cooperation to facilitate the development, diffusion, deployment, and transfer of existing, emerging and longer term cost-effective, cleaner, more efficient technologies and practices among the Partners through concrete and substantial cooperation so as to achieve practical results.

Inaugural Action Plans which contained an initial set of priority activities for implementation were created by each Task Force in 2006. It was recognized that Action Plans and the project initiatives outlined in them would need to be further refined or elaborated, and that financial resources would be required for project implementation. Partner countries resolved to continue to work on mobilizing funding from both the public and private sectors in order to bring about full implementation of the projects identified in the Action Plans, and to continue developing and implementing new projects which could be added to Action Plans on a continual basis.

Prior to coming into effect, the Task Force Action Plans are endorsed by the Policy and Implementation Committee (PIC) which was established by the Partnership at its inaugural meeting held in Sydney in January 2006. The PIC governs the overall framework, policies and procedures of the Partnership and oversees the cooperative activities undertaken within the Partnership.

This third version of the Renewable Energy and Distributed Generation Task Force (REDGTF) Action Plan incorporates additional initiatives and actions agreed by the REDGTF subsequent to the development of the inaugural Action Plan together with descriptions of new projects developed and endorsed by the Partners.

Sector Review

The renewable energy and distributed generation (REDG) sector harnesses a wide range of resources and includes a diverse range of technologies at different stages of development. This diversity creates significant opportunities for the development and deployment of technologies and applications applicable to the specific needs of Partner countries. Because of the diverse technologies applicable to this Task Force, this Action Plan does not include a detailed sector review of each individual technology. Taking account of existing data and technology reviews, detailed sector reviews will be undertaken as future Task Force projects, if appropriate.

Renewable energy and distributed generation technologies will be critical to the future energy mix of all Partner countries. Energy access, energy security, poverty alleviation and environmental considerations combined with increasing fossil fuel prices are key drivers for

accelerating the uptake of affordable and reliable renewable energy and distributed generation.

Renewable energy technologies, such as hydro (large and small), solar, geothermal, wind and tidal can deliver power with virtually zero emissions. Distributed generation (including landfill waste methane-based generation) also has the potential to significantly reduce emissions and promote greater cost and network efficiencies. Advances in technology design, system planning and grid operations are demonstrating the financial viability of distributed utility applications.

The wide scale deployment of renewable energy and distributed generation technologies increases the diversity of energy supply, and can contribute to improving energy security and reducing fuel risks, particularly in remote and fringe-of-grid areas. These energy sources and distributed generation technologies, which are ideally suited to mid-sized and smaller scale applications can also assist in alleviating poverty by improving access to energy services, as well as increasing job opportunities and improving air quality and public health. In addition, alternative fuels such as biodiesel and ethanol potentially offer significant environmental benefits in the future. Similarly, these alternatives are also on the pathway to becoming cost-competitive and available for deployment on a large scale.

The emerging nature of many renewable energy technologies means that there can be market and technical impediments to their uptake, such as cost-competitiveness, awareness of technology options, intermittency and the need for electricity storage. The Task Force recognizes, and will complement, work that is currently being undertaken by many members of the Partnership and the broader international community to address these barriers to increase the wide-scale uptake of renewable energy.

A particularly important role for the Task Force is to identify barriers to technology transfer and financing associated with the deployment of REDG technologies. The Task Force will focus on the most promising and cost-competitive technologies and applications both on- and off-grid

Australia

The Australian economy has been built on access to low-cost energy underpinned by large reserves of coal. In addition Australia has large reserves of gas and uranium. This has created a challenging environment for the renewable energy sector, requiring a progressive approach to resolving cost and technology issues.

Renewable energy resources such as sun, wind, biomass, hydro and geothermal are plentiful and the Australian renewable energy industry has world leading expertise in the development of renewable energy technologies and project management. Australia is a world leader in the construction and integration of technologies that constitute a remote area power supply system and in the urban deployment of distributed generation technologies. The industry has developed international best practice standards for applications such as hydropower and wind and Australian expertise has resulted in the development of high-quality dependable systems capable of operating in the harshest and most remote areas, including the Antarctic and the deserts of central Australia.

In addition to these practical industry strengths, Australia's innovative research and development sector has proven skills in the development of next generation technologies such as high efficiency photovoltaics, bio-energy, control systems, and remote area power

systems. Australia has established a reputation for distinction in a number of areas of renewable energy research and development including photovoltaics and hot dry rocks.

The Australian Government has committed to a number of measures to support the development and demonstration of a broad range of renewable energy and enabling (energy storage) technologies to boost the uptake of renewable energy and help the domestic industry to grow. The Government is also working to remove impediments to, and promote the commercial uptake of renewable and distributed generation technologies and practices in the Australian energy market. Actions include a AUD$500 million Renewable Energy Fund, focussing on commercialising renewable energy technology, a AUD$150 million Energy Innovation Fund, a wind energy forecasting capability for the national electricity market, and supporting national work programs through the Ministerial Council on Energy to advance wind energy policy, develop a national Code of Practice for Embedded Generation and improve electricity grid accessibility for renewable and distributed generation.

The Government's legislated Renewable Energy Target commenced on 1 April 2001. The *Renewable Energy (Electricity) Act 2000* requires the generation of 9,500 gigawatt hours of extra renewable electricity per year by 2010, resulting in an investment stimulus of over $3 billion and a 50% increase in generation of renewable energy.

The Government is committed to ensuring at least 20% of Australia's electricity supply comes from renewable energy by 2020. As a key measure in delivering this commitment, the Government will increase the Renewable Energy Target (RET) to 45,000 gigawatt-hours in 2020.

The legislated RET encourages higher renewable energy uptake by creating supply and demand incentives, underpinned by legislation for the deployment of additional renewable energy generation capacity. A wide range of renewable energy sources, such as wind, solar and geothermal energy, will be eligible.

The Australian Government is committed to a target of reducing greenhouse gas emissions by 60% of 2000 levels by 2050. This will largely be achieved through the establishment of a national Emissions Trading Scheme. The Scheme will be a cap and trade system which will commence in 2010. The legislated Renewable Energy Target will be phased out after 2020, as Australia's Emissions Trading Scheme matures.

Renewable energy currently accounts for 2.5% of total energy supply and approximately 8% of electricity generation. Over 70% of renewable generation is from large-scale hydro, which is now largely exploited. The Asia-Pacific Partnership on Clean Development and Climate provides the opportunity for Australia to develop new markets and share its significant expertise in the renewable energy and distributed generation sector.

Canada

Canada's energy sector is an important contributor to the Canadian economy, employing more than 240,000 people per year and accounting for 6% of GDP and 19% of capital investments in Canada. The sector's energy mix is primarily fossil fuel based, with oil, coal and natural gas comprising over 70% of the country's energy mix. Renewable energies contribute 18% to the energy mix, of which hydro accounts for 11% of all energy production, biomass accounts for 6% and all other renewables (tidal, solar, wind, earth energy, waste energy, and landfill gas) account for 1%. Hydropower plays a major role in electricity generation, comprising almost 60% of generation. Canada's size also contributes to a unique energy mix, resulting in vast regional differences in electricity generation. For example the

province of Quebec is almost entirely powered by hydropower, while electricity in the province of Alberta is primarily generated with fossil fuels, particularly coal and natural gas.

Energy in Canada has traditionally been based on access to low-cost energy, particularly, large hydro, coal, oil and natural gas. However, increased concern over air pollutants and GHG emissions combined with increasing costs of fossil fuels and energy security issues have encouraged rapid growth in the renewable and alternative energy sectors. For example, over the last 5 years, Canada's installed wind energy capacity has grown, on average, by 52%/yr. In 2006 alone, Canada's installed wind energy capacity grew by 112%, and it is estimated that by 2015 there will be a minimum of 10, 000 MW of installed wind power capacity in Canada. Canada has significant capacity for renewable resource development, particularly in wind, hydro, biomass, solar and ocean energy, with wide variations in type from region to region.

Canada has developed some innovative renewable energy demonstration projects such as a hybrid wind-hydrogen system, a solar seasonal storage system, tidal turbine generators, and a deep lake water cooling system. Canadian R&D strengths include areas such as: production of ethanol from biomass, wind stand alone systems, technological innovation for remote locations and for cold climate conditions, resource mapping, and the management of meteorological data. Canada is also a world leader in the development of hydrogen and fuel cell technologies, particularly PEM fuel cells, and codes and standards development for the fuel cells industry. Canada also possesses national R&D and testing facilities for a number of renewable energies including solar, wind, ocean and bioenergy.

Over the years the Canadian government has encouraged development of renewable and alternative energy technologies through a range of incentives, programs and policy actions that span the innovation continuum from basic R&D through to commercialization. Many of these programs are delivered through Natural Resources Canada (NRCan), as well as Environment Canada and Agriculture and Agri-Food Canada. Current initiatives in Canada include the ecoENERGY Technology Initiative, which provides $230 million in research, development and demonstration funding for next generation clean energy technologies. Canada also offers incentive programs to encourage production of renewable electricity, to increase use of renewable thermal energy, and to increase production of renewable alternatives to gasoline. Additionally, Canada funds a wide range of academic and project based research through universities and federal organizations such as the National Research Council.

China

China's economy is growing rapidly, with energy consumption currently increasing at 9.5% per annum. Renewable energy currently accounts for 7% of China's total primary energy consumption. Renewable energy is important for promoting the growth of China's rural economy. Key renewable technologies in China include hydropower, wind generation, photovoltaic generation, biogas, ethanol and solar hot water. Priorities for action include technology advancement and industry development.

India

Per capita primary energy supply in 2003 stood at 0.52 TOE, which is one-third the global average. Just under 30% of this energy supply was met from traditional biomass sources, and another 3–4% from renewables, including large hydro. In the electricity-mix during 2005–06, the share of large hydro, other renewables and nuclear is 15%, 2.8% and 2.5% respectively, while the balance of 79.7% is fossil fuel based. In addition, crude oil supply growth rate is projected at over 4%.

While the medium term (2032) trend growth rate of the economy is 7%, energy supply is placed at 5.2%, and electricity at 7%. The aim is to triple the current share of renewable power to more than 8% by 2032, apart from contributions from large hydro. In addition, savings corresponding to just under 1% of electricity generated in 2032 are expected through installation of a 50 million sq m solar thermal collector area for hot water systems.

Biofuels are expected to substitute around 20% of diesel and kerosene consumption by 2032. Research and development work is in progress in alternate fuels and systems for the same target for stationary, portable and transport applications. Hydrogen-powered 2/3/4 wheeler systems would also be in demonstration phase by then.

These apart, renewable energy solutions for distributed generation and stand-alone systems are envisaged for supplementing rural, urban, industrial and commercial energy requirements. In this regard, solar, wind, small hydro and biomass including biofuel systems/devices are to be designed and developed for increasing their affordability, convenience and safety levels. Priorities for action include advanced biomass-based power generation. Conversion of biomass to gas and liquid fuels, development of engine designs for use of biomass based liquid fuels and gas, advanced solar cell efficiencies, and distributed generation systems. Development of viable business models for distributed generation systems, feasible systems for conversion of urban waste to energy, efforts to use materials other than silicon in solar technology are other objectives towards achieving energy security.

Japan

Japan's energy policy is based on three objectives: ensuring (1) energy security, (2) environmental protection, and (3) economic growth. Renewable energies are especially important from the point of energy security and environmental protection. The earliest legal instrument in this regard is the Law Concerning the Promotion of Development and the Introduction of Oil Alternative Energy (Alternative Energy Law), with main objectives of securing stable and adequate supply of energy, and providing a legal framework for the development/implementation of oil substitutes. For this purpose, the law capitalizes on various measures including, among others, active R&D activities through New Energy and Industrial Technology Development Organization (NEDO).

The policy initiatives to promote renewable energy were enhanced further in 1997, when the concept of "new energy" was introduced to accelerate the commercialization and market deployment of certain technologies under the Law Concerning Special Measures for Promotion of New Energy Use, etc. (New Energy Law). This law differentiates technologies by their economic potentials. It aims at providing financial assistances for technologies that are near commercialization but are facing difficulties from the point of cost and scale of the market. A relatively small amount of financial assistance given to these technologies is expected to help them penetrate into market and, as the market expands, to result in reduced cost and improved competitiveness. Currently, a variety of renewable technologies ranging from solar, wind, biomass, waste and temperature difference are applicable under this law.

In addition to the foregoing, a new law called the Special Measures Law on Use of New Energy, etc., by Electric Enterprises or the so-called Japanese version RPS (Renewable Portfolio Standards) was enacted in 2002 to increase the required contribution of renewables in electric power generation from 3.28 TWh in 2003 to 12.2 TWh by 2010. So far, all 38 electric power enterprises have achieved their obligations faster than expected.

The Long-term Energy Supply/Demand Outlook stipulated in the Alternative Energy Law is the primary tool to supervise these policies by investigating the historical performance and

future prospects of the various policy measures. In this regard, although the Japanese RPS has so far succeeded in achieving recent targets, a challenge remains as to the thermal utilization of renewables, which has yet to be investigated in order to increase the share of renewables. The use of biomass is one of the focuses currently on the table, especially with regard to increasing its contribution in terms of both biofuels and other forms of thermal uses. This challenge is represented, for example, in the "Biomass Nippon" initiatives.

Korea

Experiencing two oil shocks in 1970s, the Korean government recognized the necessity of promoting alternative energies to replace oil. However, the intensifying global and local movement of the environmental protection forced the government to take policy measures to promote new and renewable energies. In this context, in 1987 the Korean government enacted the Promotional Law of Alternative Energy Technology Development. Since then, the law has been revised several times and many relevant programs have supported R&D and deployment activities in new and renewable energies (NREs). Thanks to these governmental efforts, Korea supplied 2.13 % of total energy consumption with new and renewable energy in 2005.

In 2003, Korea launched "The Second Basic Plan of NRE" whose goal is to supply 5% of total energy consumption with NRE by 2011. To attain the goal, the Korean government has developed new policy tools: feed-in-tariffs, a Renewable Portfolio Agreement (RPA), and deployment of 100,000 solar PV systems. To promote R&D activities and dissemination of NREs with limited resources, a "Selection-and-Concentration Strategy" is being implemented. In this regard, PVs, wind power, and hydrogen/fuel cells are selected and a project management center was established for each one. T his integrated approach was proposed to expand a market for NRE, creating a critical mass of demand. In addition to policy making and institutionalization, the Korean government is raising funds for investment, mobilizing available financial sources.

The responsible government agency, MOCIE, with its policy implementing agency, the New & Renewable Energy Center, is currently leading all the R&D and deployment activities in Korea. In the public and the private sectors, many research institutes such as the Korea Institute of Energy Research (KIER), Korea Institute of Science and Technology (KIST), Korea Energy Economics Institute (KEEI), and Korea Electric Research Institute (KERI) are working in concert to ensure that technological opportunities are commercialized and exploited as soon as possible. In addition, business entities are encouraged to actively participate to expand the market and to foster the relevant industry.

United States of America

In 2005 the United States had 118 GW of renewable electric generating capacity, or 11.1% of the 1060 GW total. Of this, 98 GW was hydroelectric and 20 GW was from other renewable sources, corresponding to 9.2% and 1.9% of total electric generation capacity, respectively. Of the 20 GW non-hydroelectric capacity, wind power accounted for 9.2 GW, biomass power for 7.2 GW, and geothermal power for 2.8 GW. Solar PV and solar thermal electric accounted for 0.2 GW and 0.4 GW respectively. Of the 7.2 GW of biomass power, 3.6 GW are deployed as highly efficient combined heat and power (CHP) projects at 425 sites. In addition to this renewably fuelled CHP capacity, 75 GW of highly efficient CHP/clean DG is deployed in the United States at over 2500 sites.

Though the amounts are small relative to total electricity generating capacity, the United States ranks high relative to other countries in renewable capacity: second in hydroelectric (behind China), third in wind power (behind Germany and Spain), first in biomass and

geothermal, and third in grid-connected solar PV (behind Germany and Japan). The United States also produced 15 billion liters of ethanol (equal to Brazil's production) and 250 million liters of biodiesel in 2005 (behind Germany, France and Italy).

Growth in these technologies was robust in 2005, mainly as a result of renewal by the US Congress of the production tax credit for manufacturers. The United States ranked third in the world in overall renewable annual investment in 2005, led by the highest global investment in wind (resulting in 2.4 GW installed) and third highest in grid connected solar PV (resulting in 65 MW installed).

Besides the production tax credit, renewable energy deployment at the federal level has been stimulated on the demand side by tax credits for purchases by both individual and businesses, and by directives for the government to increase the percentage of renewables in the electricity used by federal facilities. There are also numerous provisions favoring renewable deployment at the state level, with renewable portfolio standards in effect for 19 states and the District of Columbia, net metering available in 40 states and the District, and state tax incentives in 19 states.

Objectives

As agreed in the Partnership Work Plan, the primary objectives of the REDGTF are to:

1. Facilitate the demonstration and deployment of renewable energy and distributed generation technologies in Partnership countries.

2. Identify country development needs and the opportunities to deploy renewable energy and distributed generation technologies, systems and practices, and the enabling environments needed to support wide-spread deployment, including in rural, remote and peri-urban applications.

3. Enumerate financial and engineering benefits of distributed energy systems that contribute to the economic development and climate goals of the Partnership.

4. Promote further collaboration between Partnership members on research, development and implementation of renewable energy technologies including supporting measures such as renewable resource identification, wind forecasting and energy storage technologies.

5. Support cooperative projects to deploy renewable and distributed generation technologies to support rural and peri-urban economic development and poverty alleviation.

6. Identify potential projects that would enable Partner countries to assess the applicability of renewable energy and distributed generation to their specific requirements.

Vision and Goals

At its first meeting, the following Vision was agreed by the REDGTF:

> *The Task Force Partner countries will collaborate to increase access to, and accelerate the uptake of, affordable and reliable renewable energy and distributed generation across the Partnership countries to achieve sustainable economic, social and environmental development.*

Three aspirational, non-binding, goals underpin this vision. Partner countries will take concrete actions:

- To achieve measurable outcomes that accelerate deployment of renewable energy and distributed generation over the next five years;
- To close the remaining gap between the cost of renewable energy generation and conventional generation; and
- To identify market and policy barriers, and implement mechanisms to overcome such barriers, to enable Partner countries to achieve their deployment goals.

The Partner countries recognize that achievement of these goals will rely on their collective and cooperative action.

The Task Force notes that following limited outreach by the Partner countries, the first set of projects under the Task Force Action Plan has the potential to achieve deployment of an additional 1.8GW of renewable energy and distributed generation capacity within five years. Based on a range of appropriate capacity factors, this represents an additional 54 Petajoules (15 TWh) of renewable and distributed energy.

The Task Force expects that new Action Plan projects and replication of outcomes of existing projects will drive deployment well beyond this first level of deployment.

Task Force Actions

To achieve its objectives, the Task Force is continuing to focus its activities in three key areas — deployment; research, development and demonstration (RD&D) projects; and market enabling projects— that accelerate the uptake of affordable and reliable renewable energy and distributed generation.

For deployment projects the REDG Task Force increases visibility and provides a facilitation process that may assist industry in overcoming barriers to the uptake of existing and emerging commercially available renewable energy and distributed generation technologies in Partner countries. Commercial deployment projects also provide a practical opportunity for the Task Force to identify areas that have the potential to impede market growth.

Collaborative RD&D projects will help close the remaining cost gap for technology and produce solutions to technical challenges. Demonstration projects will provide an opportunity to share expertise, increase awareness and capacity, and reduce the technical and commercial risks that currently limit increased development and deployment of renewable energy and distributed generation technologies. The Task Force is focusing on the most promising and cost-competitive technologies and applications both on- and off-grid.

A number of RE and DG technologies are technically proven, commercially viable and available for immediate large scale deployment. However, the emerging nature of many of these means that there can be market and technical impediments to their uptake. A particularly important role for the Task Force is to identify barriers to technology transfer and financing associated with the deployment of RE and DG technologies. Already, the Task Force is undertaking several cooperative market enabling projects focused on policy, regulatory, financial, technology transfer, attitudinal and educational barriers. Project outputs and best practices will be shared across the Partnership.

In addition to supporting cooperative projects, the Task Force has identified several specific issues for exploration by the Task Force collectively and by member countries individually to maximize the potential for deployment of renewable energy and distributed generation technologies. These issues include:

- Considering the potential for tariff reductions on clean energy technology goods and services;
- Considering the need for balance between technology transfer and the protection and enforcement of intellectual property rights;
- Considering the view of industry participants that the design of domestic emission trading schemes and market measures should recognise that commonality of approach and linkages between the measures is important to the deployment of renewable and other low emission technologies;
- Identifying priorities for distributed generation to address constraints and gaps in transmission systems;
- Examining the potential for engagement of Energy Services Companies (ESCOs) to leverage investment in renewable energy deployment; and
- Identifying and describing effective market conditions/institutional environments that support and encourage industry development and private sector investment in RE&DG technology deployment.

More generally, members agree that the Task Force has a role in influencing government to adopt appropriate mechanisms that support accelerated development and uptake of RE and DG in the near term. However, in doing so, the Task Force recognizes that the context and timing for the introduction of such mechanisms may vary from country to country.

Joint Activity with Other Task Forces

The Task Force recognizes that in addition to access and energy security, a major driver for REDG is the need to reduce greenhouse gas emissions from the energy sector. For example, the market deployment challenges faced by renewable energy and distributed generation technologies are similar to those faced by other Task Forces. Similarly uptake of REDG technologies will be facilitated by the widespread adoption of energy efficiency and other demand side measures to reduce on-site energy delivery requirements. These common challenges and opportunities may result in projects involving joint activity with other Task Forces, particularly in regard to identification of financial, policy and technology transfer barriers.

The Task Force will seek and respond to opportunities to collaborate with other Task Forces to meet the goals of the Partnership.

Evolution of the Action Plan

This Action Plan represents the current activities and projects of the Task Force. Regular monitoring of progress on project implementation and Task Force activities and review and update of the Action Plan will ensure that it remains relevant to Partner Countries.

Action Plan Framework

A project framework has been established to assist in the identification of projects for inclusion in the REDGTF Action Plan.

Projects are broadly interpreted to include any action of the Task Force including activities such as research development and demonstration, policy analysis and development, capacity building, deployment, etc. A Project Review Team (PRT) has been established to assist the REDGTF in its review and endorsement of projects for inclusion in the Action Plan. The project framework has been broken down into project categories, types and timeframe.

Project Category	Description	Link to Task Force objectives
Deployment Projects	Are focused on accelerating the up-take of existing, commercial REDG systems and services into Partner country markets.	Deployment projects broadly contribute to Task Force Objectives 1, 3 and 5.
Market Enabling Projects Technical Issues Market Issues Training and Education	Are focused on addressing policy, regulatory, attitudinal, financial, educational and other challenges to the uptake of REDG technologies.	Market enabling projects broadly contribute to Task Force Objectives 2, 3, 5 and 6.
Research Development & Demonstration Projects	Are focused on applied research, development and/or demonstration of new technologies to reduce their technical and commercial risk and increase stakeholder confidence.	RD&D projects broadly contribute to Task Force Objectives 1, 3 and 4.

Project Types

The Task Force has agreed that there will be two project types:

- *Endorsement projects*: Commercial projects, undertaken and led by industry, that significantly contribute to the Task Force's Vision and Goals.
- *Actionable projects*: Non-commercial projects (i.e. market enabling and RD&D) led by a Partner country-endorsed agency or company and supported by at least two (but generally more) Partner countries. Actionable projects would generally not occur without the active facilitation and financial support of the Partner countries.

Project Timeframe

The Task Force has agreed that projects will operate across the:

- *Short term*: within one to three years
- *Medium term*: within three to five years
- *Long term*: longer than five years.

Action Plan Projects and Project Procedures

Existing Projects

Projects have been included in this Action Plan based on a clearly demonstrated capacity to significantly contribute to the achievement of the Vision and Goals established by the Task

Force. Projects are subject to availability of funding from a variety of sources. Appendix A contains a listing of currently endorsed projects and project summaries.

New Projects

A number of project proposals consistent with the Vision and Goals of the Task Force currently remain under development. Once completed, these project proposals will be brought forward for review by the PRT on a continuous basis. Following endorsement by the REDGTF these projects will be added to the Action Plan. The process for review and endorsement is provided in Appendix B.

Monitoring and Review of Progress on Projects

The Task Force also monitors and reviews progress on implementation of projects. This is achieved through regular requests for project leaders to report on project progress. The current template for providing project progress reports together with the process for tracking project status and for removing cancelled projects from the Action Plan is provided in Appendix C.

Appendix A: Project Listing and Summaries of Individual Projects

Project #	Project Title
RDG-06-1	High Efficiency Solar Power Stations for Affordable Energy (AUS)
RDG-06-2	Commercial Demonstration of a PEM Fuel Cell for Power Generation – CANCELLED
RDG-06-3	Biofuel Promotion for Environmentally Sustainable Energy and Water Services – CANCELLED
RDG-06-4	Expanding Korea's Access to Solar Innovation (AUS)
RDG-06-5	Deploy CHP Systems in China That Utilize Coke Oven Gas for Fuel Feedstock (20 systems) (USA)
RDG-06-6	Renewable Energy Rural Business Hubs in China and India (USA) – CANCELLED
RDG-06-7	Facilitate Deployment of Highly Efficient CHP Applications, Including Fossil and Biomass-Fuelled Industrial, Institutional and District Energy CHP Projects in Partner Countries (USA)
RDG-06-8	Identifying High Value Geothermal Resources in China (AUS)
RDG-06-9	Identifying Optimal Legal Frameworks for Renewable Energy in India and China (AUS)
RDG-06-10	Pursuing Clean Energy Business in India (AUS) – COMPLETED
RDG-06-11	Development of Economic Indices for Renewable Energies and Distributed Generation in the Asia-Pacific Region – CANCELLED
RDG-06-12	Creating an Enabling Framework for RE Deployment in the Partnership (USA)
RDG-06-13	Quality Renewable Energy Training Program in China and India (AUS)
RDG-06-14	Building Expertise in Solar Energy Engineering (AUS)
RDG-06-15	Capacity Building in Renewable Energy Promotion Policies & Measures (JPN)
RDG-06-16	Feasibility Study and Development of Smart Energy Solution Using Various Renewable Energies (ROK, JPN)
RDG-06-17	Study on the Expansion Plan of Bio-Diesel for Transportation in Asia-Pacific Region – CANCELLED
RDG-06-18	Market Development for Renewable Energy (USA)
RDG-06-19	Public–Private Sector Partnership on Hydropower in the Partners (USA)
RDG-06-20	Commercialization of Distributed Power Generation Using Hydrogen Fuel in India, Promoting Clean Air, Energy Security and Sustainable Economic Growth (USA) – CANCELLED
RDG-06-21	Solar- enhanced Fuels for Electricity and Transport (AUS)
RDG-06-22	Improving the Cost-Effectiveness of Biomass Energy Generation (AUS)
RDG-06-23	Increasing Efficiency of Linear Concentrators to Capture Solar Energy (AUS)
RDG-06-24	Development of Materials and Interface Engineering Technologies for Dye-Sensitized Solar Cells (ROK) – CANCELLED
RDG-07-25	Design and Development of a Solar Biomass Hybrid Cooling and Power Generation System (AUS)
RDG-07-26	A Fully Integrated Process for Biodiesel Production from Microalgae in Saline Water (AUS)

RDG-07-27	New Generation Small Wind Turbines for Remote Power Systems and Grid Connection (AUS)
RDG-08-28	Bridging the Economic Divide through Renewable Energy Based Empowerment (USA)
RDG-08-29	Accelerating the Deployment of "Smart Minigrids" in APP Countries (AUS)
RDG-08-30	Accelerating Commercialization of Renewable Energy for DG in India (USA)
RDG-08-31	Collaborative Development and Demonstration of an Optimised Model for Remote Village Electrification Using Renewable Energy
RDG-08-32	Grid Connected Renewable Energy and Distributed Generation Partnerships (USA)
RDG-08-33	Development and Application of 10kW Proton Exchange Membrane Fuel Cell (PEMFC) Power System (China)
RDG-08-34	Introduce GE10 Technology to Achieve China Localization of Small Gas Turbine Packaging and Manufacturing (China)
RDG-08-35	SAIC-GM Cooperate to design/ build/ demonstrate the Roewe fuel cell Car for 2010 Expo (China)
RDG-08-36	Coking Oven Gas (COG) Combined Heat and Power Plant (China)
RDG-08-37	Technical Exchange with China on PV Module Reliability (USA)
RDG-09-38	Accelerate Distributed Generation–Combined Heat and Power Applications in China (USA)
RDG-09-39	Co-operation Research for Long Term Reliability of PV Modules in India and Japan (Japan)

Project Descriptions

RDG-06-1: High Efficiency Solar Power Stations for Affordable Energy

Project

Breakthrough photovoltaic concentrators producing ultra high efficiencies have been developed by Solar Systems (an Australian company) and deployed in a number of projects, on a relatively small scale in collaboration with the Australian Government.

The Australian developed and owned technology concentrates the sun's energy by using mirrors to reflect and focus sunlight into a small area called a solar receiver. Maximum daily sunlight is captured by the additional ability of the mirrors to track the movement of the sun across the sky. The solar receiver contains closely packed ultra high efficiency PV cells. When the sun's rays hit these cells electricity is produced.

Beginning with an AUD$425 Million, 154MW phase in Australia, this project aims to deploy at least 1GW of power stations' technology across Australia and other APP countries, all producing power for less than $1/6^{th}$ the cost of current solar power.

The project will require an investment of some AUD$2.4 Billion. 18% of this amount (AUD$425 million) is required for the first 154MW phase—this phase provides the initial momentum required to drive the costs down to a self-sustaining level. These funds are being sought from the Victorian and Australian Governments (AUD$130 million) and commercial partners. Private sector debt and equity funding will fund subsequent phases. Feasibility research done to date shows that private sector funding can be secured on a commercial basis backed by economic and market conditions in the three target countries. Over and above the financial assistance being sought from Australian Government bodies, the project will seek facilitation, planning and approval assistance from Partner Governments.

Participation

Project Manager: Solar Systems Pty Ltd
http://www.solarsystems.com.au/

The project was initiated by Australian company Solar Systems. Solar Systems has established relationships with private sector partners for manufacture of solar concentrators, construction, ownership and operation in Australia and other APP countries. Partners include: TRUenergy and China Light and Power.

Goals and Objectives

The Objective of this project is to demonstrate and optimize Solar Systems' zero-emissions Heliostat Concentrated Photo-voltaic (HCPV) technology on a large scale to enable cost-effective commercial 'roll-out' in Australia and in APP countries.

Manufacturing and deployment channels with the critical mass to be self sustaining, and the ability to deploy commercially competitive energy production systems will be established across the region. The success of the project will be demonstrated by the rate of deployment of power stations in the target locations. The first 154MW of the project will be financially supported by Australian Governments. Subsequent phases will be expected to support their own capital requirements by producing power at a commercially viable tariff.

Deliverables and Outcomes

- Construction, testing and evaluation of a 140kW and 0.5MW development facilities, and a 2 MW repeatable power station unit connected to Australia's national electricity grid.
- Establishment of Partnerships for manufacturing, deployment, ownership and operation in APP countries.
- Conditional commitment to: an additional 200MW in Australia and an initial 700MW in other APP countries.
- Commissioning of the first 154MW Australian HCPV system.
- Commencing manufacture and commissioning of initial systems in other APP countries.

Location

The initial 154MW in Australia will be deployed in northern Victoria with subsequent Australian sites likely in New South Wales. The specific sites for initial deployment in other APP countries have yet to be finalized, however areas in the south-west United States, including California, New Mexico, Nevada, Colorado and Arizona and the northern region of India are currently under consideration. Deployment sites in other Partner countries may be considered in the future.

RDG-06-4: Expanding Korea's Access to Solar Innovation

Project

This project, implemented by BP Solar and its partners, aims to install megawatt scale (MW) solar PV "units" at a number of roof-top and Greenfield locations across Korea via a number of business models ranging from basic supply, to turnkey and ultimately through a series of financed, managed, and delivered projects – to a range of customers in Korea. It is expected

that these projects will be implemented over the next 3 years. All these projects will be driven by the availability and attractiveness of the Korean Feed-in Tariff incentive.

BP Solar will leverage its presence and experience in five of the Partner countries to contribute to the Partnership's goal to accelerate uptake of REDG. BP Solar's major partner, S-Energy, will bring local expertise and the project will also seek the participation of the emerging Korea PV manufacturing industry to assist in technology transfer, capacity building and accelerate development. The total project aims to install up to approximately 25MW of PV installation, in 1-3MW units, over the 3 year period. As a distributed generator, this solar project will bring value to the electricity network in addition to the valuable technology transfer.

The total project aspiration is to generate up to 30GWh/year of electricity, power equivalent of 5,000 homes and avoid greenhouse gas emissions of 30,000 tonnes annually.

The project will receive Australian Government funding of AUD$395,000 and funding from BP Solar of AUD$680,384.

Participation

Project Managers: BP Solar (www.bpsolar.com.au) and S-Energy (http://www.s-energy.co.kr)

Participation:
BP Solar
S-Energy
Wider Korean solar PV industry
APP Partner countries through the sharing of best practice policy information

Goals and Objectives

Aspirational target for the total project is to generate 30GWh/year of clean PV-generated electricity, power equivalent 5,000 Korean homes, avoid 30,000 tonnes of CO_2/year and avoid approximately 6MW of peak network upgrades, and create new skilled installation and manufacturing jobs (assuming maximum 25MW scale).

Additional indicators of success include new domestic projects of this nature, the acceleration of the Korean solar PV industry and the expansion of feed-in tariff and other deployment policy across the Partner countries.

The project will use a staged project approach to develop differentiated supply, turnkey projects and fully financed kWh offers.

Location

The solar PV power plants will be located on a range of sites across Korea to broaden the visibility and economic benefit - with a focus on roof top and Greenfield applications.

RDG-06-5: Deploy CHP Systems in China That Utilize Coke Oven Gas for Fuel Feedstock

Project

Deploy CHP systems in China that utilize coke oven gas for fuel feedstock (20 systems of approximately 5MW each). It is the Partnership that will enable this project to go forward. While government finances are not anticipated to be required, the Partnership goals and the agreements that underpin this Partnership will provide a context to the value this project proposes to deliver.

Participation

Shandong Jinneng Coal Gasification Chemical Company, Ltd. is the leading example of one who owns, operates, and manages this type of combined hear and power plant.

Solar Turbines Incorporated will provide the prime mover gas turbine as part of a complete generator set. We can provide other hardware, installation, and operating service agreements, as needed

As part of the technology transfer element of the Partnership, Solar is prepared to work with appropriate Chinese entities to offer training on project management, operation and maintenance, and logistics support for these CHP systems.

Objectives

Fits the Chinese government objective of preventing both criteria pollutant emissions and greenhouse gases into the atmosphere, improvement to the local air quality and human health conditions, and energy conservation policy to convert waste to useful energy for the local citizens.

These plants will provide electrical power as well as thermal energy to the coking and chemical process in the plant, generating energy from waste gas. Useful energy not used by the on-site consumer can be delivered to the local community.

Burning coke oven gas in such a gas turbine cogeneration plant will result in tremendous energy savings for the nation and great improvement for air quality and human health.

The amount of coke oven gas generated each year in China is greater than the natural gas delivered by the West-to-East pipeline.

Calculations for greenhouse gas reduction can be completed as each site is taken through a feasibility review. Initial calculations based on a 5Mwe sized system indicates a 1,214,400 metric tonnes of CO2e in annual savings once all 20 systems are operational.

Milestones

A first of its kind existing gas turbine combined heat and power system was commissioned in March 2006, in Shandong Province. It has been in operation for about 1,500 hours.

Location

Shandong Jinneng Coal Gasification Chemical Company, Ltd. is located in Qihe County about 10 miles west of Jinan City, Shandong Province. Key provinces where coke ovens exist are Shanxi, Shandong, and Hebei to name a few.

Solar anticipates that there are similar technical opportunities wherever coke ovens have coke oven gas as a by-product. India is a logical country to partner with to deploy similar systems for the same greenhouse gas reduction and energy security values.

Resources

The price for a replicable system is approximately USD $5.2 million (2006 pricing, subject to change) and includes the major equipment of one gas turbine driven generator, one heat recovery steam generator, one fuel gas compressor, and one coke oven gas fuel polishing system. Other resources to be determined at site(s).

The Partner countries will be called upon to use their convening power to bring stakeholders together and work out agreements on details such as interconnection, feed-in structures for any excess electrons that can be delivered to the grid, and directives to the Coke Manufacturers to deploy CHP as a proven technology to cost effectively improve energy security and reduce environmental impact.

RDG-06-7: Facilitate Deployment of Highly Efficient CHP Applications, Including Fossil and Biomass Fueled Industrial, Institutional and District Energy CHP Projects in Partner Countries

Project

Combined Heat and Power (CHP) offers a cost-effective way to provide process heat and steam, increase electrical reliability and provide energy savings while decreasing the environmental impact of power generation and industrial or institutional operations. Despite the availability of CHP technologies and proven benefits and performance of these systems, projects often are not implemented, even when investment is compelling. Through collaborative education and outreach to energy users, utilities, policy makers and the design and construction communities, it is possible to identify and clear these barriers to efficient design of on-site energy systems.

Participation

Managed by EPA Office of Air and Radiation's CHP Partnership Program

Participation of NGOs (Invited): International District Energy Association, Korean District Heating Association (KDHA), World Alliance for Distributed Energy China (WADE China)

Participation of U.S. Agencies: CHP experts in U.S. Department of Commerce, U.S. Department of Energy to be invited, leveraging existing efforts of all 3 agencies.

Objectives

Goals: Promote and streamline the immediate and ongoing deployment of large and district energy-scale new CHP projects in Partner countries.

Performance indicators: 500 MW of new CHP within participating countries within 3 years. Collaborative networks of CHP stakeholders within each Partner country provided information, training, framework to address remaining market, utility or regulatory barriers to deployment. Increased investor awareness of CHP as a hedge against energy cost increases and as a best practice for design in new construction and retrofit applications in strategic industrial and institutional sectors leads to ongoing deployment of CHP applications.

Milestones

Year 1 Analyses/ reports on Partner country-specific technical, economic and strategic target markets and "low hanging fruit" opportunities for DG/CHP. Analysis of policy environment for CHP including utility, regulatory and economic impacts to projects in Partner countries. Interpretation of targeted CHP tools/ resources into two languages specific to Partner countries with highest level of opportunity/ interest, including CHP Catalogue of Technologies; Biomass Catalogue of Technologies, CHP Procurement Guide; CHP Emissions Calculator.

Year 2 Best practices workshops on CHP conceptual design, feasibility analysis, project development, policy framework and other interpreted Partnership tools for CHP collaborator community in all six Partner countries targeted at design/ engineering community, equipment manufacturers, industrial and institutional energy users and policy makers/ government officials.

Year 3 Workshops for ten identified strategic markets in major cities in Partner countries, to include CHP collaborator community in host country. Assistance with concept development for ENERGY STAR-style uniform performance thresholds and awards recognition program for exceptional performers.

Location

Multiple Partners, major urban or industrial centers.

Resources

$1,000,000 of U.S. funding will be required over the three-year period of the project.

In-kind participation of CHP stakeholders within Partner countries will be cultivated and is inherent to the project; success for the project would represent at least an additional $1 million of in kind people and resources from both the private and public sectors in each participating Partner countries.

RDG-06-8: Identifying High Value Geothermal Resources in China

Project

The aim of the project is to identify highly prospective geothermal energy sites in China, using unique techniques developed by Petratherm and the University of Adelaide (South Australia). The emphasis will be on geothermal prospectivity in the non-volcanic regions that comprise the bulk of China.

This project will receive Australian Government funding of AUD$75,000. funding from project proponents include Petratherm (AUD$80,145) and Geothermal China Energy Society (AUD$15,350)

Participation

Project Leader:

Petratherm Limited, Australia

Project participants include:

University of Adelaide, Australia
Geothermal China Energy Society, China
China Institute of Geo-Environment Monitoring, China
China Geological Survey, China
Chinese Academy of Science, China

Goals and Objectives

To identify and characterise the engineered geothermal resource potential for electricity generation in China.

A key output will be a portfolio of high prospect geothermal projects that have been ranked in terms of profitability, risk and "do-ability". Likely performance indicators are expected to include the number of high prospect sites identified, the quality of those sites and the total number of MW of generation capacity available from those sites.

Location
Adelaide, Australia and Beijing, China.

RDG-06-9: Identifying Optimal Legal Frameworks for Renewable Energy in China and India

Project
One of the key barriers identified in relation to the increased uptake of renewable energy is the lack of mature markets and favorable policy, regulatory and legal frameworks to encourage the development of and investment in renewable energy. The purpose of the project is to provide an overview of the regulatory and policy situation in two fast-developing APP countries (China and India) in relation to renewable energy projects, with case studies of priority countries, especially those that are already taking positive steps to promote increased investment in renewable energy markets. The ultimate aim of the project is to encourage and enhance the capacity for emission reduction efforts in China and India, by promoting legal and regulatory measures to create the enabling environments for the uptake of renewable energy.

The project received Australian Government funding of AUD$65,000 and US Government funding of USD$50,000

Participation
Project Manger
Baker & McKenzie

The proposed work will be carried out by the Renewable Energy and International Law (REIL) Project, an international partnership formed in association with the Renewable Energy and Energy Efficiency Partnership (REEEP), Yale's Center for Environmental Law and Policy and Baker & McKenzie's Global Clean Energy and Climate Change Practice.

Goals and Objectives
The major objective of the Project is to identify and assess ways to remove the unintended barriers to renewable energy that exist in the laws of China and India, whether purely domestic or as a result of the implementation of international treaty law, and to capture opportunities to use these laws to expand the renewable energy market further. The project will also examine other transnational and comparative policy and law to create a catalogue of domestic "best practices," and thereby promote the enabling environments necessary to increase renewable energy market penetration in the target Partner countries.

Deliverables and Outcomes
A written report setting out the results of the examination of existing regulatory and market frameworks in China and India. The report will provide detail on the legal, regulatory, institutional and policy frameworks in place, as well as the barriers and opportunities facing the renewable energy sectors in the target countries. In addition, the report will look at how tradeable renewable energy certificate schemes could be introduced in India under the model national renewable energy law. Target date: March 2008.

In-country workshops to complement the written report and disseminate its key findings. The workshops were coordinated around other Partnership workshops to maximize the exposure of these issues to the broader Partnership community. Completed: India – March and August 2007; China – November 2007.

Location

The work was primarily undertaken in Sydney, Australia, with workshops conducted in India and China. The workshops were run in conjunction with industry associations and other relevant groups such as TERI, WISE, CREIA and CRED.

RDG-06-10: Pursuing Clean Energy Business in India

Project

The project aims were to engage extensively with the private sector to identify the barriers and opportunities to accelerated investment in the development and deployment of renewable energy technologies in India and to determine areas of enhanced collaboration between APP partner nations; in particular Australia and India. The findings of the project were presented to the REDG Task Force in Bangalore in November 2007 and will help to inform the Task Force of private sector views to develop practical solutions to climate change by accelerating the development, transfer and deployment of clean energy technological solutions in India. The project is nearing completion with a final public report due out in March 2008.

The Australian Government funding for the project is AUD$200,000. Clean Technology AustralAsia has contributed an in-kind total of AUD$154,000.

Participation

Project Manager
Clean Technology Australasia Pty Ltd (CTA)

Project Participants
The Energy and Resources Institute India (TERI)
The project involved an extensive consultative process with input and contributions from key industry, finance sector and research and government representatives in India, Australia and other partner countries. India was a partner in the project.

Goals and Objectives

The key goals of the Project were:

- A clear understanding of the business risks and opportunities to accelerate increased investment in Clean Technologies between Australia and India;
- Identification of areas for enhanced bilateral partnerships for research and development projects and private sector joint ventures that address the need for deployment of clean technologies between Australia and India;
- Identification of market, technical and financial barriers for clean energy technologies that have particular relevance to Australian renewable energy industry expertise.

Deliverables and Outcomes

Key outcomes included:

- Obtaining contributions and input from a representative cross section of knowledgeable and credible leaders from industry, finance and government to contribute to the project;

- A report that identifies the issues, challenges and solutions to overcoming investment, development and deployment of clean energy technologies between Australia and India and informed the development of a strategic plan that addresses the barriers identified in the final report.

Location

The project was managed by Clean Technology AustralAsia, based in Melbourne, Australia. Consultations were conducted in Australia and India.

RDG-06-12: Creating an Enabling Framework for Re-Deployment in the Partnership

Project

This project will help to improve the quality of both the resource information and the tools for assessing the technical and economic potential for renewable energy development, which will greatly enhance opportunities for broad deployment of RE and DG technologies in the Partner countries. It will also develop improved tools for applying resource information together with other data (e.g. technology and system cost, load profiles, land-use, etc.) to provide more credible and accurate information on the economic potential and competitiveness of renewable energy relative to other alternatives. This will include a review of current integrated economic assessment methods and tools, ranging from screening analysis to modeling capabilities and collaborative work to enhance the quality of these tools in use across Partner countries.

Participation

This project will be managed by the Office of Energy Efficiency and Renewable Energy at the U.S. Department of Energy. It is anticipated that representatives from each Partner country will participate in this activity with a specific focus on relevant energy and planning Ministries and technical institutions and agencies with capabilities in the areas of renewable energy resource assessment, economic assessment and optimization tools, and policy formulation and evaluation.

Objectives

To improve the quality and access to resource and economic assessment information to inform renewable energy policy and project development and promote the use of renewable energy policy best practices. This will result in establishment of best in class resource and economic assessment methods and collaborative plans for their broad use across Partner countries by end of 2007 and availability of high quality renewable energy resource and economic assessment data and tools for priority regions across the Partner countries by the end of 2010. The overall project will help to establish a credible information base upon which viable, and sustainable, renewable energy markets can be fostered.

To promote the use of renewable energy policy best practices that will create effective enabling environments for renewable energy development. This will result in a common understanding and acceptance of policy best practices across Partner countries and initiation of work to implement these policy best practices by the end of 2007 and adoption of policy

best practices (to the extent possible as consistent with country priorities) across Partner countries by the end of 2010.

Milestones

Establish general agreement on best in class methods for resource and economic assessment among Partner countries. (December 2006)

A detailed summary of available resource and economic assessments (wind, solar, biomass, hydro, geothermal, CHP) across the Partner countries and the quality of these data. Report will also identify recommended near-term priorities to fill gaps in data and tools by country. (February 2007)

A detailed report on best-in-class resource and economic assessment methods and tools for optimizing resource use and implementation of improvements to these tools to better support policy and project development needs. (Six months for evaluation, 12 months for implementation activities after project initiation.) (September 2007)

Collaborative plans across Partner countries developed to disseminate and apply these best in class resource and economic assessment tools and methods (including training) to address key gaps and inform policy and investment decisions. (July 2007)

Report on renewable energy policy best practices for Partner countries. This report will be based on a review of the impacts and experiences with renewable energy policies and programs employed across the Partner countries. (September 2007)

Initiation of technical assistance for select high impact renewable energy policies and programs in Partner countries. (December 2007)

Location

This project is not site specific but it is anticipated that all activities will occur within Partner countries.

Resources

$2,000,000 from Partner countries.

RDG-06-13: Quality Renewable Energy Training Program in China and India

Project

China's and India's demand for energy is increasing rapidly. Renewable energy is seen by both the Indian and Chinese governments as an important component in satisfying future energy demand. Nevertheless, delivering affordable and reliable renewable energy services and achieving the contribution targets being set for RETs to future power generation will be challenging without an extensive pool of competent (knowledgeable and skilled) practitioners to design install and maintain RE systems and services. This project will progress the systematic development of national training competency standards in RE/DG in China and India, to achieve country-wide coverage and pave the way for future quality oriented training implementation within the mainstream vocational training sector.

Australian Government funding for the project is AUD$668,236. In-kind contributions from committee members is AUD$78,050.

Participation

Project Manager:
Mr. Geoff Stapleton, Managing Director, Global Sustainable Energy Solutions Pty Ltd.

Other partners in the project are: Institute for Sustainable Power Inc, USA; IT Power China Pty Ltd, China; IT Power (Australia) Pty Ltd, Australia; IT Power India Pty Ltd (India); Indian Institute of Technology Bombay (India), and Electrical Engineering Research Institute of The China Academy Of Sciences (China).

Goals and Objectives

The project has two separate streams for the two countries:

China
The overall goal of the project is to have ISP operating in China - thereby providing China with the framework for accrediting RE training courses.

India
The overall goal is a comprehensive strategy document addressing the implementation requirements for quality-oriented training in Renewable Energy and Distributed Generation in India, including milestones and deliverables for action over the proceeding five-year period.

Deliverables and Outcomes

The key indicators in China are: ISP China Office able to successfully undertake all activities required by an ISP Licensee and is self funding after 2 years time; and all required committees are operating. The Project Manager will work closely with China to determine appropriate implementation arrangements.

The key indicators in India are: completion of four workshops to introduce draft strategy to at least 50 Indian stakeholders; completion of a strategy document describing an approach for achieving quality-focused prioritised RE Training in India; a number of Indian Training Institutions offering quality-focused RE and/or DG training programs within five years from project completion.

Location

The project will be undertaken in China and India with coordination and management from Australia. A number of participatory workshops with stakeholders from across the country will be undertaken in key regional cities in China and India.

RDG-06-14: Building Expertise in Solar Energy Engineering

Project

The project comprises support for three areas of scholarship activity:

- A—Full tuition fees for 5 international PhD students from Partner countries to carry out research in the field of photovoltaics and solar energy engineering.
- B—50% tuition scholarships for two intakes of 40 Masters students from Partner countries to complete a Masters program.
- C—Tuition fees for two years (of a four year course) for three intakes of 20 undergraduate engineering students from a Chinese university.

Australian Government funding for the project is AUD$5,195,836. Potential funding of AUD$109,200 is from the China Scholarship Council. There is in-kind funding from the University of NSW (AUD$1,205,900) and participating Chinese Universities (AUD$1,309,200)

Participation

Project Leader
School of Photovoltaic and Renewable Energy Engineering, University of New South Wales (UNSW)

Participants include:
Sun Yat-Sen University, China
Nankai University, China
China Scholarship Council (potential)

Goals and Objectives

To educate and train postgraduate and undergraduate students in Photovoltaics Engineering in order to overcome barriers of insufficient expertise and therefore enable accelerated uptake of photovoltaics manufacturing and deployment across the APP countries.

Deliverables and Outcomes

Description	**Start Date**	**Milestone Date**
Establish shared (2+2) teaching arrangement with Chinese partner university	Aug 2007	Sept 2007
Students enroll in PhD program in Photovoltaics and Solar Energy	Mar 2008	Mar 2011
First Masters intake	Mar + Jul 2008	Apr + Sept 2008

First intake 20 undergraduate scholarship students	Mar + Jul 2008	Apr + Sept 2008
Second Masters intake	Mar + Jul 2009	Apr + Sept 2009
Second intake 20 undergraduate scholarship students	Mar + Jul 2009	Apr + Sept 2009
Third intake 20 undergraduate scholarship students	Mar + Jul 2010	Apr + Sept 2010

Location

The Project Manager, research training and UNSW teaching activities will be based at the UNSW Kensington campus, Sydney, Australia.

RDG-06-15: Capacity Building for Renewable Energy Promotion Policies and Measures

Project

This is a training and information exchange program targeted to China and India to assist formulation of renewable energy promotion policies and measures in consideration of best-matched practices in national and local context.

The training seminar would take place once or twice a year for one to two weeks at a time, including site tours.

The trainees would be primarily from China and India including those from local area.

Total number of the trainees would be 10-30 depending on the budget and the contents of the program.

Participation

Management
The Institute of Energy Economics, Japan
Inui Bldg., Kachidoki, 1-13-1, Chuo-ku, Tokyo 104-0054 Japan
Tel +81-3-5547-0214

Participation
Agency of Natural Resources and Energy, METI, Japan

Renewable energy related agencies of the five other Partner countries.

Objectives

Share the experiences and deepen the understanding of know-how to enhance the market of renewable energy from the point of social-economic significance and policy formulation.

Performance Indicators
Regional or local initiative to support renewable energies

Milestones

Training programs once or twice a year

Location

Japan and/or other hosting countries

Resources

USD 150,000 per one training seminar from Japanese government

In-kind (n/a)

RDG-06-16: Feasibility Study and Development of Smart Energy Solution Using Various Renewable Energies

Project

Japan – The feasibility study on the development of independent electricity supply system for the distributed region (Small scale).

Korea – The engineering study on the development of energy supply system including the electricity and the heat considering connection with utility grid.

The development of Smart Energy Solution (SES) management system will be sought as well.

Participation

Management

New Energy Foundation, Japan
Shuwa Kioi-cho Park Building 6F, 3-6 Kioi-cho, Chiyoda-ku, Tokyo, 102-8555, Japan
Tel: (03) 5275-9824, hydropower@nef.or.jp Mr. Tetsuya Kawamura, **Director International Affairs Dept. Hydroelectric Power Development Centre**

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8F, Bangbae Bldg. 1006-2, Bangbae-Dong, Seocho-Ku, Seoul, 137-850, Korea,
Tel: +82-2-707-4320, hslee@hyosung.com Dr. Lee Hahk-Sung, Vice President

Participation

Agency of Natural Resources and Energy, Japan

China or India

Renewable energy related agencies of the five other Partner countries

Objectives

Feasibility study of the best combination of various renewable energies (Japan).

The draft manual that makes it possible quantitatively to assess the potential of various renewable energies (Japan).

The draft manual for Smart energy solution system considering demand side requirements including heat and electricity (Korea).

The general-purpose smart energy solution management system that makes various distributed generators operated and managed (Korea).

Milestones

Year 1	Smart Energy Solution Project commencement
Year 2	Detailed system design for the electric system only and the CHP system Development of a Smart Energy Solution Management system Reporting draft manual for feasibility study
Year 3	Reporting draft manual for total smart energy solution system Demonstration of SES management system.

Location

Korea, Japan and other participants' places

Resources

Total 0.66M USD (Korea: 0.44M USD, Japan: 0.22M USD)

Total Cash: 0.48M USD, Total in-kind: 0.18M USD

* Budget is to be allocated among participants and may vary according to the participants' consultation.

RDG-06-18: Market Development for Renewable Energy

Project

Transmission and distribution losses estimates for India are as high as 30-50%, and the many communities that currently receive poor quality and unreliable power provide a key opportunity for intervention. Increasing the share of distributed generation in the total electricity mix will have a significant impact on both clean energy supply, as well as emissions reductions. In addition, locating power generation closer to the consumer reduces technical losses and may result in commercial loss reduction as well. Utility restructuring taking place throughout the world is changing the way electricity is generated and distributed. Consumers are bypassing centralized power generators/suppliers to generate their own power through distributed generation for higher power reliability and better power quality. These distributed power generation systems have significant potential for reducing T&D losses and GHG emissions, especially when cleaner, alternative fuels and technologies are used. This project plans to introduce new concepts and technologies in India to support the distribution reforms being implemented by the GOI. These new concepts and technologies will focus on promoting widespread installation and use of smaller, more efficient distributed power generation systems, closer to the users. The tapping of India's renewable energy resources (small hydropower, wind, biomass cogeneration/gasification, solar) has been meager to-date, but conditions are ripe for market expansion, which could be stimulated through the financing and establishing green power projects. Policy and regulatory frameworks to advance green power development in Indian states is of considerable interest to the Government of India (GOI) and could help to develop the market. In addition, other potential technologies include fuel cells, microturbines, and municipal waste product utilization.

Participation

- The private sector (TBD) will be a major player in the supply of equipment and services, and will work very closely with the various stakeholders.
- Financial institutions will play in funding pilot projects and subsequent commercial projects.
- Other potential partners may include current USAID/India partners (e.g., Winrock International India, the International Institute for Energy Conservation) and the Bureau of Energy Efficiency.
- Collaboration with the U.S. Foreign Commercial Service.
- USAID/India would provide contract activity management.

Goals and Objectives

Goals

Enhance the market for renewable energy and distributed generation technologies in India.

GHG emissions reductions following establishment of market conducive to deployment of clean, RE & DG technologies.

Objectives

Facilitate market development for effective penetration of clean energy/environment industry in evolving Indian market.

Identify niche areas advantageous to clean energy deployment in Indian market.

Undertake preparation of required financial documentation for bankable projects.

Identify appropriate clean energy technologies that can be effectively implemented in Indian context.

Support projects for deployment of renewable energy and distributed generation technologies.

Deliverables, Outcomes and Milestones

- Support for market transformation; including analytical and technical support, financial analysis, and information for decision making;
- Support pilot projects for demonstration of new clean energy/renewable energy technologies;
- Sustained intervention of clean energy and environment industry in India; and
- Estimated emissions reductions and other benefits, such as cost and service quality.

Location

Three states in India to be determined.

Resources

$2 million over a three-year period to support consultants, host training events, support study tours, and seed fund capital costs of demonstration projects.

$5 million during the three-year period is expected to be leveraged (based on current leveraging success of USAID/India activities in the energy and environment sector).

RDG-06-19: Public Private Sector Partnership on Hydropower in the Partner Countries

Project

This project will support the Renewables and Distributed Generation Task Force in its effort to create an enabling environment for renewable and DG technologies in the Partner countries. The project will focus across Partners on identification of specific barriers impeding investment in hydropower in each of the member countries. Partner countries have identified more than $200B in hydropower investment that will be necessary in their efforts to expand energy generation. Since far less hydropower has come on line than has been planned over the last several years, this effort will take a unique private public sector view and seek to find solutions. This effort will identify and review the specific reasons for the shortfall, and will serve to meet the ultimate mission of the Task Force to put megawatts of power on line. Industry believes that barriers inhibiting investment can be resolved by high level government and private sector involvement—and believes Partner countries can offer this power to convene the requisite parties.

Participation

This project will be managed by the US Hydropower Council and its India office, with support from the US Department of Commerce, and the U.S. Department of Energy, (may include the USAID India mission) and may include other trade groups and or industry members from other Partner countries. It is anticipated that US Hydropower's Advisory Board in India will participate to ensure that relevant ministries and institutions in India are also aware of this effort. Invitations to the Advisory Board for public and private sector representatives have begun, and it is anticipated that the Partnership may be helpful getting key representatives to participate. An inaugural event will take place in Delhi in October 2006 and stakeholder events will take place in key states September to December 2006. Plans for a hydropower initiative in China will be developed in the 2007-2008 timeframe.

Objectives

The project will focus on public/private sector work in three areas.

- Identifying priority hydropower projects in the public and private sector in each of the Partner countries' markets.
- Use public and private sector input to identify the main barriers to project investment/deployment.
- Use a pilot project in India that focuses on hydropower projects and priority projects already in the pipeline to help remove barriers facing projects in key states.

Milestones

Phase 1 By working with the current pipeline of hydropower projects in key states in India that are being inhibited, this project will help to identify specific barriers and work with public and private sector to develop solutions to the barriers. Outreach to the private sector in all Partner countries will add additional projects that will require this support and advocacy.

Phase 2 Add additional key states with projects in the pre-feasibility stage and work with them to achieve financial closure.

Phase 3 Identify other Partnership priority projects and define similar plans to be replicated in those markets.

Location

The first phase of this project will take place in key states in India. A second phase will incorporate additional Indian states. This project will be replicated in China.

Resources

The total U.S. Government budget for this effort is $2,000,000. Industry will contribute investment for the projects and it is anticipated that in-kind resources in the form of time from the private sector and Partner government personnel may also be provided to support this effort.

RDG-06-21: Solar-enhanced Fuels for Electricity and Transport

Project

This project aims to vastly increase the deployment of solar energy in the Asia-Pacific region by demonstrating improved cost effectiveness of solar technology. It will build on work already conducted by the key Partner countries in the area of solar reactors and solar tower design and construction. The technology of choice is concentrated solar energy to enable solarization of fossil fuels. At present solar reforming reactors use steam and natural gas to produce syngas (SolarGas™) or hydrogen for gas turbine fuel. However, in most instances when gas is extracted from the ground, CO_2 is also extracted and released as a waste product. This project will develop new reactors and catalysts that are able to use CO_2 as one of the reactants, thus making use of a waste stream and minimizing water use. This will mean coal seam methane (also known as coal bed methane) can be solarized. A demonstration plant will be constructed using a multiple array of solar towers. The precursor to this project—the solar tower SolarGas facility at CSIRO—has been accepted as an IPHE-accredited project.

The project has Australian Government funding of AUD$3.35 million.

Participation

Project Leader

Commonwealth Scientific and Industrial Research Organisation (Australia)

Other Participants

Tokyo Institute of Technology (TIT).

Goals and Objectives

To demonstrate the complete process of solar energy to end-use application in an actual working environment, such that no significant further work would be required to begin substantial deployment of the technology.

Deliverables and Outcomes

The project will deliver:

- Improvements to the critical components that affect the technical feasibility and financial viability of the SolarGas system, such as :
    - specifications and test results for heliostats that demonstrate improved cost performance, and
    - a CSIRO SolarGas reactor scaled up to accept between 200-400 kW concentrated solar input.
- An operating modular solar thermal system that will demonstrate the technical performance and commercial viability of solarised fuel, be of a scale large enough to enable robust cost predictions to be made for mass deployment, and be available to investors to witness operation.
- A bankable report that evaluates technical performance and cost-competitiveness of the technology to enhance fossil fuels with solar energy, that demonstrates the greenhouse savings of the SolarGas process, that maps a path for SolarGas cost reduction and performance improvements, and demonstrates the potential for deployment across the APP.

Expected outcomes from the project include:

- Demonstration that solar thermal technology for the production of solar-enhanced fuels is a cost-competitive renewable energy technology for a variety of applications, including electricity, liquid transport fuels and/or hydrogen separation.
- Demonstration that international R&D collaboration can lead to improved technologies resulting in lower cost solar-enhanced fuels for electricity and transport.

Location

The majority of the early work in this project will be carried out at CSIRO's National Solar Energy Centre in Newcastle, NSW, Australia, with specific component development also being conducted at TIT.

RDG-06-22: Improving the Cost-Effectiveness of Biomass Energy Generation

Project

Many biomass gasification technologies currently being developed or demonstrated are largely based on the experience of coal gasification. These gasifiers will often be operated at high temperature (and high pressure), incurring capital and operating costs higher than those for coal gasification. These large gasifiers would also require the biomass fuels to be collected and transported to centralized locations. However, aside from some special cases of relatively densely populated biomass resources, biomass fuels are often distributed in rural areas. The costs of collection and transportation of (wet) biomass are often another important factor limiting the economic competitiveness of this renewable energy source. Considering the special thermochemical features of biomass fuels, this project aims to develop a flexible biomass gasification technology to separate the whole gasification into 2 steps: pyrolysis (the initial step of gasification) and subsequent reforming/gasification. The mild pyrolysis of biomass acts as a fuel pre-processing step to convert biomass into bio-oil and char, which can be much easier and cheaper to transport than the original bulky biomass. The subsequent reforming of bio-oil and gasification of char will then produce gaseous fuel suitable for (solid oxide) fuel cells or gas engines for distributed power generation. Representing a paradigm change in biomass utilization philosophy, the technology will be applicable for both distributed and densely populated biomass resources. In particular, this technology will greatly reduce the transportation costs and will be particularly suitable for distributed power generation in rural areas where biomass fuels are grown.

The project has Australian Government funding of approximately AUD$2.145 million.

Participation

Project leader
Department of Chemical Engineering, Monash University, Australia

Other participants
Curtin University of Technology, Australia
Hokkaido University, Japan
Bioenergy Research Centre, KIER, Korea
Hunzhong University of Science and Technology, China

Goals and Objectives

The ultimate aim of this project is to demonstrate the key technological aspects of the proposed biomass gasification technology for distributed power generation, to speed up the commercial uptake of biomass as a reliable and cheap renewable energy source across the Partner countries.

Deliverables and Outcomes

The project will deliver:

- Proof of concept of the key aspects of the flexible biomass gasification technology (pyrolysis, reforming of bio-oil and gasification of char and bio-coke),
- A model to allow process simulation, economic analysis, process scale-up and process optimization, and
- Demonstration and commissioning of a lab-scale demonstration facility.

Expected outcomes include:

- An assessment of the technical and commercial feasibility of a flexible biomass gasification technology
- An increased understanding of the reactions which occur during biomass gasification
- Building and expansion of strategic collaborative research among the partner institutions

Location

The project will be carried out in laboratories of the participants. The demonstration facility will be constructed in Australia.

RDG-06-23: Increasing Efficiency of Linear Concentrators to Capture Solar Energy

Project

The aim of this project is to develop improved solar photovoltaic linear concentrators that are commercially competitive in a wide variety of markets. The technical goals are to reduce the cost and increase the efficiency of linear photovoltaic concentrators, and to resolve some significant technical impediments. Potential markets include (1) the supply of solar concentrator photovoltaic (CPV) electricity from large ground-mounted parabolic trough arrays and (2) the supply of both solar concentrator heat and photovoltaic electricity (CHPV) from parabolic trough systems mounted on the roofs of buildings, in which circulating water that removes excess heat from the solar cells is used to provide hot water and space heating within the building.

The project has Australian Government funding of approximately AUD$ 1.6 million.

Participation

Project leader:
Australian National University

Project participants:
Tianjin University, China
Anna University, India
Industry partner

Goals and Objectives

The key objective is to resolve the remaining barriers to the widespread deployment of photovoltaic trough concentrator systems. Principal barriers include (1) the difficulty of supply of high-performance, low cost solar cells suitable for parabolic trough concentrator systems, (2) the technical problem of moving shadows cast by gaps between mirrors and structural elements on strings of solar cells, and (3) the integration and qualification of the system.

Deliverables and Outcomes

The project will deliver:

- a solution to the problem of the supply of high-performance, low-cost solar cells for parabolic trough concentrator systems,

- low-cost shadow-tolerant CPV and CHPV receivers incorporating these cells,
- integration of these receivers with low-cost parabolic trough solar concentrators,
- demonstration of retrofitting of CPV and CHPV receivers to existing parabolic trough solar thermal concentrator systems,
- extensive performance and qualification testing,
- a Commercialisation Plan, and
- technology transfer to other Partner countries for use in demonstration systems.

Outcomes will include:

- Resolution of technical, scientific and engineering impediments to deployment of photovoltaic linear concentrator systems, such as the supply of suitable linear concentrator solar cells, and the problem of moving shadows from gaps and structural elements cast upon series-connected solar cells.
- Facilitation of the transition of photovoltaic linear concentrator systems from the R&D stage through to commercialization.
- Facilitation of collaborative education and training opportunities between the Partner institutions.

Location

R&D will take place in Australia at the premises of the Australian National University (Canberra). Testing and demonstration will initially occur in Australia, and later in China.

RDG 07-25: Design and development of renewable cooling and power generation systems

Project

The project will design, fabricate and test solar cooling prototypes targeting both residential airconditioning and remote rural food refrigeration applications.

The prototypes will utilise several existing technologies including solar thermal collectors, sorption cooling, biomass gasification, and gas engines. The developments will focus on the integration of these systems by employing expertise from India and Australia. In Australia the work will focus on sorption cooling. In India it will centre on solar collectors and refrigeration, especially for storage of agricultural produce in rural areas.

The project has Australian Government funding of AUD$750,000.

Participation

Project leader

CSIRO (Australia)

Other participants

TERI (India)

Thermax Pty Ltd, (India).

Sustainability Victoria (Australia)

Rinnai Australia Pty Ltd (Australia)

Goals and Objectives

The project aims to develop and demonstrate solar cooling prototypes. Applications for these systems will include:

- cooling and heating for air-conditioning; and
- cooling for food refrigeration

Deliverables and Outcomes

Key deliverables include:

- Component equipment product review
- System modelling and optimisation
- Prototype construction
- Prototype test reports
- Commercial design packages finalised

The results of this work are expected to provide a sound basis for assessing the application suitability and economic viability of the technology. This will provide the necessary impetus for future commercialisation activities.

Potential benefits for India include

- Reduce wastage of agricultural produce,
- Improve livelihood of villagers through food-processing activities, and
- Enhanced overall socio-economic conditions

Potential benefits for Australia include:

- Reduced energy bills for home owners
- Reduced peak electricity demand for electricity utilities

Location

Project activities will be undertaken in both Australia and India.

RDG 07-26: A fully integrated process for biodiesel production from microalgae in saline water

Project

This project will demonstrate the technical and commercial feasibility of a fully integrated process for the production of oils from microalgae, as a feedstock for biodiesel production. Before algae oil production for biodiesel can be established commercially it is necessary to develop, optimize and integrate all the steps (algae production, harvesting, extraction etc) in the process. The project will use elite algae strains grown in saline water in open ponds, and will incorporate novel design and operational features. It will encompass the entire process of microalgae oil production including species selection, culture system design, construction and operation for reliable long-term sustainable high-oil yields, harvesting, media recycling, oil extraction and biomass disposal and/or use.

The project will undertake a preliminary economic feasibility assessment of the process, and an assessment of the total greenhouse gas emissions based on small-scale studies, detailed engineering design and commercial-scale algae production experience. A full pilot-scale

demonstration will then be constructed and operated over a 12 month period to allow for detailed assessment of commercial feasibility and total greenhouse gas emissions.

Activities in Australia will be paralleled in China and India under local conditions; the modelling will also be carried out for conditions in each country. The project will be guided throughout by an analysis of economic feasibility.

The project has Australian Government funding of AUD$1.89 million.

Participation

Project Leader:
Murdoch University, Australia

Project participants:
University of Adelaide, Australia
Agri Energy Ltd, Australia
Z-Filter Pty Ltd, Australia
South China University of Technology, China
Parry Neutraceuticals, India

Goals and Objectives

To assess and demonstrate the technical, commercial and emissions-reduction feasibility of producing oil for biodiesel by the large scale culture of microalgae in Australia, India and China. To integrate algal culture, algal harvesting and dewatering, oil extraction and purification and disposal/use of remaining algal biomass in developing an oil production process that is viable in Partner countries and further afield.

Deliverables and Outcomes

The proposed project deliverables over 4 years include:

- A new technology taken to scale-up demonstration stage, including detailed analyses of economics and life-cycle greenhouse gas emissions
- Design and engineering plans for an algae production system
- Optimised and integrated algae harvesting process and oil extraction process
- Process manuals for algae production, harvesting and extraction
- Detailed criteria for site selection for algae production plants and identification of key sites in Australia, India and China.
- Plans for commercialisation in Australia, India and China

Outcomes will include:

- Development of a new, commercially viable and sustainable process for producing an additional feedstock for biodiesel production, complementing other feedstocks such as tallow and canola oil and reducing competition with agriculture for limited resources such as fresh water and arable land.
- Technological and engineering improvements in very large-scale culture of microalgae which can be applied to other algal species and algal products.

Location

Project activities will be implemented in Australia, China, and India. Possible locations with optimal climate for large-scale algal culture have been identified in Western Australia, India (the Rann of Kutch) and China (Hainan Island).

RDG 07-27: New generation small wind turbines for remote power systems and grid connection

Project

This project will build, install and test an advanced design for a small 5 kW wind turbine suitable for use in remote localities and in extreme weather conditions. The prototype turbine is technologically advanced, with good performance under low wind conditions, high efficiency of power extraction and low noise levels, and has been designed for mass production. Turbine blade design and controller have been patented and the technology can be scaled up to potentially 150kW.

Five turbines installed at locations in Australia and China will allow (i) refinement of controller design (ii) testing and demonstration of performance in a remote power system not connected to the electricity grid, in combination with an existing photovoltaic system; (iii) testing under typhoon conditions; (iv) testing with grid connection under extreme temperature and dust conditions and local training in operation and maintenance; and (v) comparative performance testing with other wind turbines and photovoltaic systems and overall system appraisal.

Test results will lead to design modifications for enhanced power generation and use, safety, reliability and cost reduction. The potential GHG emission saving is estimated at 10-30kg/CO_2 per day for a 5 kW turbine producing 10-30 kWh electricity per day.

The project will receive Australian Government funding of AUD$450,000.

Participation

Project Leader:

Aerogenesis, Australia

Project participants include:

University of Newcastle, Australia
University of Wollongong, Australia
Jiangsu Changdong Machinery Ltd, China
Beijing Xingaoyuan Science & Technology Development Co. Ltd, China
Guangzhou Institute of Energy Conversion, China

Goals and Objectives

The primary objective of this project is to build and test relatively low-cost 5kW wind turbines suitable for remote power systems away from the electricity grid, and for grid connection, with a view to deployment in rural villages and communities. The potential for developing interactive systems with other renewable energy sources such as photovoltaics will also be investigated.

Deliverables and Outcomes

The proposed project deliverables over 3 years include:

- Improved and significantly cheaper small wind turbine design for use in remote power systems and distributed generation.
- Development of safety methodologies for small turbines in typhoon and hurricane areas.

Outcomes include:

- Detailed operating experience in a wide variety of climates, including extreme winds and temperatures.
- Increased knowledge and awareness of these systems through the provision of manuals, short courses, and web-based material.
- Increased capability to design optimum remote power systems which combine a range of renewable resources.
- Improved public awareness of the reliability and capacity of small wind turbines.

Location

Project activities will be implemented in Australia and China. Project management, system design, testing and demonstration will be conducted in Australia. System manufacture and testing in various locations will be undertaken in China.

RDG 08-28: Bridging the Economic Divide through Renewable Energy Based Empowerment

Project

The focus of the approach is on stimulating development of rural India by ensuring viable economic activity based on local resources (biomass, agri-produce, minerals). Uninterrupted power supply to value adding enterprises will be provided by biomass/biogas power generation systems at scales ranging from 25kW to 500kW. This project aims to promote green power and clean technologies and demonstrate sustainable growth through the concept of Renewable Energy Zones (REZs). The concept of REZs revolves around biomass-based RE and DG systems. Around these assured power supply zones, economic activities will be encouraged, based on traditional skills and waste utilization. The project will focus on stimulating viable economic activity based on local resources such as biomass, minerals, wastes and local skills.

Goals and Objectives

Develop a portfolio of connected businesses coupled with necessary support services
Demonstrate the institutional and financial viability of renewable energy infrastructure for power starved micro-enterprise clusters.
Build partnerships for leveraging policy support and financial investments to accelerate widespread deployment of RE zones.

Deliverables and Outcomes

- Through resource mapping in designated rural entrepreneurship areas, the businesses will be selected with scale appropriate for the market.

- A portfolio of connected businesses and necessary support services will be formulated.
- Detailed business plans will be developed.
- Construction and building REZ's under TARA
- Setting up a management model to develop and operate REZ
- Market development and product/service promotion cell will be developed with stakeholders
- Strategic partnership's will be developed to advocate policies that will enhance this business model

Resources

Total: $669,870 USD

Participation

Project Leader:
Development Alternatives, United States

Project Participants Include:
Development Alternatives, New Delhi, state governments, Department of Industries, Government of Orissa/Jharkhand/Madhya Pradesh, Technology and Action for Rural Advancement (TARA), as a potential technology provider , Ministry of New and Renewable Energy, Government of India, through whom the project will leverage a subsidy for the gas engine, Local potential /existing entrepreneurs (India)

Location

Central India and Orissa

RDG 08-29: Accelerating Deployment of Smart Minigrids in APP Countries

Project

This project will develop technologies for the reliable and efficient operation of minigrids, prove their technical and commercial viability and prove their ability to efficiently integrate renewable energy. The project will design and develop a pilot smart mini-grid in Australia and use this experience as the basis for designing and commissioning a minigrid deployed in India .

Participation

Project Leader:
CSIRO – Energy Technology

Project Participants:
University of Wollongong
The Energy and Resources Institute ,India
Hyosung, Korea

Goals and Objectives

To demonstrate the reliability and efficiency of a renewable-energy powered "smart" minigrid system in Australia and India and improve community, government and industry acceptance of the technology, thereby accelerating renewable and smart minigrid deployment in partner countries.

Deliverables and Outcomes

The objectives of this project include:

- A successful pilot smart minigrid in Australia designed with input from Japanese and Korean research teams and Indian energy experts;
- Sharing operational knowledge and experiences from the pilot minigrid with project leaders of the Japanese/Korean project '*Feasibility study and development of smart energy solution under various renewable energies'* [RDG-06-16];
- An international workshop with invitations to researchers in the USA, Korea, India and Japan, discussing minigrid research, sharing experience in this area and helping drive the direction of the planned minigrid deployment;
- Increase in the technology capability of Australia and India in the design, deployment and operation of smart minigrids;
- A design, simulation and value-case for a minigrid in a specific area of India (remote or semi-urban community); and
- An India led deployment of the minigrid in India with Government and Industry partners, with Australian (CSIRO) involvement in commissioning and initial monitoring.

Location

- The design, implementation and operation of a pilot smart minigrid, with the involvement of Indian experts, will be undertaken in Australia.
- Work will be undertaken in Korea and Japan with the cooperation of the CSIRO's Intelligent Energy research group to identify how Australia's experience and expertise can complement and provide input to Korea and Japan's smart grid research.
- Following completion of the design and simulation and confirmation of industry support, TERI will lead the deployment of a smart minigrid on the ground in India, with CSIRO involvement in commissioning and initial monitoring.

RDG 08-30: Accelerating Commercialization of Renewable Energy for DG in India

Project

This project focuses on accelerating the commercialization of larger solar photovoltaic (PV) systems in India for DG. The project has three components. First, assistance in the development of new companies in new markets by using a franchised approach to sales, installation, and service of solar energy systems and energy efficient appliances. Second, the utilization of a bank guarantee to achieve better finance terms by facilitating partner banks to improve their current terms of financing, such as by lowering down payments and extending loan periods, as well as attracting new private sector banks who can offer a one-two day loan

approvals. Third, improvement of the product and product cost by reducing the landed costs of a high efficiency inverter from $230 to $100 per unit over three years through in-country assembly. In addition, the grant will be used to test and improve other related PV components, and map wind regimes for deployment of solar-wind hybrid solutions.

Participation

Project Lead:

Orb Energy, India

Project Participants:

Local Indian entrepreneurs/Equity investors
Zouk
Renewable Capital
Singh Family
National Syndicate Bank
Karnataka Bank
Canara Bank
Bajaj Finance
ICICI Bank
Inverter
Manufacturer Studer
Orb Energy
USAID

Goals and Objectives

This project will develop products and set up in-country assembly to reduce the installed price per watt of solar energy systems. To accelerate the commercialization of solar and other renewable energy systems for distributed generation through:

- identifying new franchisee partners in new markets to reach rural/peri-urban customers currently suffering up to 10-13 hours of power cuts per day
- developing more accessible longer term financing packages to make solar energy systems affordable
- providing improved products and costs

Deliverables and Outcomes

The project deliverables include:

- Market Scoping Exercise in four states (North Karnataka, South Maharashtra, North Kerala, Eastern Andhra Pradesh)
- Better Terms of Finance – Working with Banks on improved lending terms
- Improved Products and Costs – Inverter Assembly, New product sourcing, Wind Area Mapping
- Development and training of 20 franchisees in new, under-developed markets for PV solutions

Location

India

Resources
Total: $1,000,000

RDG 08-31: Development and Deployment of Model for Remote Village Electrification Using Renewable Energy

Project

This project will bring together experience from the Australian Bushlight program, and that of a range of Indian technical, and grassroots development agencies to collaboratively develop an optimised model for the electrification of remote villages in India using renewable energy. The development of a readily replicable, quality implementation model for community sized solar (PV) and other renewable energy technology systems has great potential to affect positive change and development in both the renewable energy and rural electrification sectors in India.

Participation

Project Leader:
Centre for Appropriate Technology

Project Participants:
Gram Vikas, India
Development Alternatives, India
West Bengal Renewable Energy Development Agency
TATA BP Solar India Ltd

Goals and Objectives

The primary objective is to collaboratively develop and demonstrate a highly replicable model for the implementation of sustainable, reliable renewable energy systems (solar PV and other technologies) for remote village electrification in India. The work will be undertaken through a partnership between Bushlight in Australia, and an integrated network of Indian based community organisations and renewable energy industry participants.

Additional objectives include:

- To develop a network of civil society organisations and businesses in Australia and India through which partners can share experiences and skills related to the development and implementation of decentralised renewable energy systems for rural power.
- To implement a cooperative project to deploy renewable and distributed generation technology to support economic development and poverty alleviation in remote rural communities of India.
- To build capacity within India's renewable energy technical service provider network to improve technical support for (and to increase the sustainability of) decentralized generation renewable energy systems.

Deliverables and Outcomes

The project deliverables include:

- A collaboratively developed, replicable renewable energy system implementation model;

- An established, standardised, renewable energy system design model, with functionality and capacity appropriate to local needs;
- A pre-approved component list and local system production process;
- The deployment of up to three community renewable energy systems in rural villages;
- The establishment of a multi-level community and renewable energy system support network and delivery of multiple levels of training (community members, support agency, technical support network);
- Full documentation of the renewable energy system implementation model;
- The development of conditions favourable to improved economic development in target villages.

Location

Project activities will be undertaken in Alice Springs, Australia (including initial development of resources and system designs) and in Delhi, Kolkata and Bangalore, India (including local production and development of systems and resources). Actual site selection in India will focus mainly on remote areas of West Bengal, Orissa and Madhya Pradesh.

RDG 08-32: Grid Connected Renewable Energy and Distributed Generation Partnerships

Project

Working with experienced U.S. regulatory commissions, electric utilities, and renewable energy/distributed generation companies, USEA will establish regulatory and utility partnerships, with participation by the central organizations. The purpose of this project is to help overcome Indian utility organizations' resistance to the adoption of RE and DG projects by identifying and removing policy, technical and operational barriers to more efficiently deploy RE and DG technologies in India. This project will help close the existing gap between RE and DG and conventional generation. Geographically, it will focus on three major states that have the greatest potential for RE and DG successful project implementation.

Participation

Project Lead:
United States Energy Association (USEA)

Project Participants:
Power Grid Corporation of India
The Central Electricity Regulatory Commission
Bihar State Electricity Board, West Bengal State Electricity Board
Pennsylvania Public Utility Commission
New York Public Service

Goals and Objectives

Focusing on proven practices and technologies, systems that have been implemented, and interconnecting clean energy projects to the grid, this project will include a peer assessment by U.S. executives, site visits in the U.S. and other APP countries, and workshops in India.

Deliverables and Outcomes

The project deliverables and outcomes include:

- Handbook on best practices for the successful deployment of renewable energy and distributed generation in India
- Workshops on accelerating grid connection of renewable energy and distributed generation projects
- RE and DG technology providers and potential investors and developers engaging in successful development toward financial closure of deals and commissioning of grid interactive RD/DG proposals
- Site visits to allow for transfer of information on these topics

Location

India

Resources

Total: $450,000

RDG 08-33: Development and Application of 10kW Proton Exchange Membrane Fuel Cell (PEMFC) Power System

Project

PEM fuel cell engines hold the capability to fundamentally change not only the way energy is produced and consumed, but also the way greenhouse gas emissions are produced or avoided. The aim of this project is to take the lead in global commercialization of fuel cell engines.

Shanghai Shen-Li High Tech Co., Ltd was founded in June, 1998, and is aiming to commercialize PEM fuel cell technology by utilizing registered capital of over 30,000,000 RMB. Supported significantly by the Ministry of Science and Technology of the People's Republic of China as well as the Shanghai Government, Shen-Li High Tech has become the industry-leading fuel cell company in terms of technology development and commercialization scale, possessing its own advanced level of fuel cell technology intellectual property rights. Shen-Li High Tech possesses the entire PEM fuel cell and system integration technology and initiated efficient and safe fuel cell operation under low air pressure and hydrogen conditions – this operation is low in costs, reliable and long-lasting and specially suits future commercial development.

In June 2007, Shanghai Shen-Li and Infintium Energy found a way to produce fuel cell systems (the first and second generations of the 10kW fuel cell system prototype) which are much simpler and cheaper than conventional fuel cell systems. The performance of these two generations of fuel cell systems have reached expectations. The subject of the current project – a third generation prototype -- is expected to again reach system design, cost and reliability expectations. The project system could potentially replace the traditional ICE or contaminating Lead-Acid typically used as the power source in industrial vehicles (forklifts, for instance) and stand-alone stationary power generators, as well as emergency back-up power systems and portable power systems.

In 2011, production is targeted to exceed thousands of the 10kW fuel cell power system. Shen-Li and Infintium expect to begin manufacturing fuel cell systems for a wide range of small-scale power applications at a fraction of the cost of conventional fuel cell systems – this should allow these companies to penetrate markets world-wide. Massive production of these fuel cell power systems could thoroughly eliminate CO2 emissions. According to estimates, the annual reduction of CO2 emissions could be 2000 tonnes by way of this project.

Goals and Objectives

The following are the project objectives:

- To develop a fully functional prototype of a 10 kW fuel cell power module, capable of dispersive power generation at a level of 10MW
- To integrate the project into a modular power generation system for industrial vehicles
- To integrate the project into a scalable stand-alone stationary power generation system
- The number of technicians receiving performance and maintenance training to be up to 450

- To reduce CO2 emissions by 2000 tons per year
- To increase sales income by up to 200 million once project is completed
- To receive 20 intellectual property rights (patents, specialized technologies, etc.)
- To generate a product which has the potential to become inexpensive, durable and reliable, and which can be mass-produced on a global scale by 2011
- The ultimate goals of this project are to create fuel cell power generation systems with zero emissions under massive production, to eliminate green house gases and finally, to set an example for the future growth of industrialized countries

Deliverables and Outcomes

- System design and volumetric modelling by September 2007
- Prototype production and testing by November 2007
- Power module improvement, delivered to USA partner by February 2008
- Small-scale production and testing by June 2008
- Delivery for customers and highly accelerated lifetime testing by September 2008
- Manufacturability, cost, safety and a certificate by December 2008
- Hundred-scale production and production base construction by December 2009
- Thousands-scale production by December 2011

Location

Shanghai, China and Texas, USA

Resources

The funds for the project are $3,000,000, including: $400,000 financed by Shanghai Shen-Li and $600,000 financed by Infintium.

RDG 08-34: Introduce GE10 Technology to Achieve China Localization of Small Gas Turbine Packaging and Manufacturing

Project

The Chinese government strongly encourages the development of technology which will utilize biomass from straw for power generation – small gas turbine technology has thus been developed to utilize burnable biomass for renewable energy. GE Oil & Gas is the global leading supplier of small gas turbines. The GE10 (10MW) small gas turbine has the advantages of high efficiency, low emission production, high reliability and availability, a small footprint, fast installation and easy maintenance, and is suited well to the application of decentralized power generation and renewable energy.

China Aviation Gas Turbine Co., Ltd. （CAGT） is a subsidiary of China Aviation Industry Corporation I (AVIC1), and is the only company in China which has rich experience with providing gas turbine packaging, gas turbine installation and commissioning services, and non-standard equipment design and manufacturing. CAGT and GE Oil & Gas have signed a frame agreement for the technology license and supply of GE10 gas turbine packaging, which built up a cooperation foundation for GE10 gas turbine technology, packaging manufacturing, and supply. CAGT plans to leverage AVIC1's strong manufacturing, testing and R&D capability, to introduce from GE Oil & Gas the GE10 small gas turbine packaging technology, to evaluate and ultimately achieve (subject to CAGT and GE Oil & Gas reaching and finalizing appropriate working and contractual arrangements and provided certain conditions are met, including, but not limited to, obtaining any required export / custom clearance, regulatory / governmental approval, compliance with any applicable legal / regulatory framework) localization packaging and batch production of GE10 small gas turbines. This will provide a market assessment and policy recommendations report on China small gas turbine decentralised power generation and renewable energy market, and will ultimately construct a state level small gas turbine CCPP decentralized power generation demonstration project, and further develop application technology to suit the Chinese situation. By evaluating how to reduce cost of packaging, manufacturing and service of small gas turbine, with the ultimate goal of achieve localization in China, decentralized power generation and renewable energy application by utilizing GE10 small gas turbine in China will provide considerable benefit to AP6 partnership countries and the rest of world. Meanwhile, CAGT will start work on early preparation and a feasibility study of the GE10 core engine China localization plan.

Goals and Objectives

- Introduce from GE Oil & Gas the GE10 small gas turbine technology, explore opportunities of localization of packaging batch production of GE10 small gas turbine, provide market assessment and policy recommendations report on China small gas turbine decentralised power generation and renewable energy market
- Start working on early preparation and feasibility study of GE10 core engine China localization plan, in order to evaluate how to reduce the packaging, manufacturing and service cost of small gas turbine, to promote application of GE10 small gas turbine locally packaged in China, with advance technology, high efficiency, high reliability, low emission and low cost, promote application of decentralized power generation and of renewable energy by utilizing small gas turbine technology, to better serve China, AP6 partnership countries, and the rest of world
- Based on fast growth of natural gas (NG) and liquefied natural gas (LNG) availability in China, to promote GE10 small gas turbine technology, with high efficiency and environment friendly, in China emerging decentralized power generation market.
- Promote application of GE10 small gas turbine technology in high pollution and high energy-consumption steel and coke industry, to recover and utilize waste emission of coke oven gas (COG) and blast furnace gas (BFG) with middle & low BTU for decentralized power generation
- Construct state level small gas turbine CCPP decentralized power generation demonstration project, and further develop application technology to suit China situation
- Promote application of GE10 small gas turbine in coal industry, to utilize coal bed methane (CBM) for decentralized power generation
- Promote application of GE10 small gas turbine in the countryside, to utilize burnable biogas for power generation and extend utilizing scope of renewable energy.

Deliverables and Outcomes

- Introduce, absorb, and further develop the GE10 small gas turbine packaging technology - December 2008
- Provide market assessment and policy recommendations report on China small gas turbine decentralised power generation and renewable energy market - December 2008
- Construct state level small gas turbine CCPP decentralized power generation demonstration project - December 2009
- Work on early preparation and feasibility study of GE10 core engine China localization plan - December 2010

Location
China

Resources
The funds for the project are $9,000,000, including: $4,000,000 financed by AVIC1(confirmed) and $2,000,000 financed by CAGT (confirmed).

RDG 08-35: SAIC-GM Cooperate to design/ build/ demonstrate the Roewe fuel cell Car for 2010 Expo

Project
The Shanghai World Expo will be held from May 1, 2010 to October 31, 2010. According to the past World Expo Park traffic trends, attention has gradually shifted towards global energy and environmental problems. The Expo transportation tools always are used to display high-tech and environmental protection requirements. Therefore, the Shanghai World Expo will plan to realize "zero emissions" at the expo park by using fuel cell buses, fuel cell cars and other new energy vehicles

SAIC and GM as the 2010 Shanghai World Expo automotive joint partners, will be dedicated to provide advanced automotive products and technologies for the Expo. SAIC plans to provide 10 fuel cell cars as a fleet for VIP. It is a good opportunity to show SAIC'S idea and image on environmental protection and technology innovation.

The 2010 expo will be lasting 184 days. The fleet will face bad situations such as continuous high temperature in summer weather conditions. Otherwise, Expo is expected to traffic more than 70 million passengers during the expo. To guarantee the fleet safety, reliability is the first principle. SAIC'S strategic partner, GM has fuel cell technology leadership in the world and there is thus Chinese potential for taking part in the fuel cell vehicle market. SAIC and GM will therefore cooperate to develop the fuel cell car fleet for the 2010 expo.

Goals and Objectives

- Complete one Proof of concept vehicle for the design certification (2007.06-2008.11)
- Build and optimize the 9 vehicle demo fleet (2008.12-2009.12)
- Successful operation of the VIP vehicle for six month during the 2010 Expo (2010.05-2012.10)

- Statics and dynamic exhibition beyond the 2010 expo (2010.10-2012.12)

Deliverables and Outcomes

- Delivery of hardware: 10 units based on the GM 4.6-generation FCPS ROEWE fuel cell cars; Equipment, fixture, etc.; spare parts
- Delivery of technical documents: Product Description Book(PDB); Description SOW tasks; BOM (parts list); 3D Mode and drawings; simulation analysis report (dynamic, crash, CRFM); Parts redesign Document; Vehicle - Power System CIS; vehicle & Key system specification; vehicle assembly process documents; operation and maintenance manual; FCPS & Key subsystem performance data; hydrogen safety design Concept; high-voltage safety design Concept; test reports; project management documents; FCPS 3D Mode; Other technical documents

- Project initiation 2007.08.22

- Project review 2007.09.21

- Envelop & Interface Freeze 2007.10.22

- Design Complete 2008.01.22

- Full Status 0 2008.03.21

- Ready for Shipping Glider/Vehicle parts to MK 2008.05.22

- MRD for all vehicle Parts(including FCPS) 2008.06.20

- Vehicle Ready for Start up 2008.09.22

- Vehicle Ready for Proving Ground 2008.10.22

- Vehicle Ready for Test and Optimization 2008.11.21

- Test Ride 2009.12.10

- Vehicle Ready for Demonstration 2009.01.22

- Fleet Build－Vehicle 1 Complete 2009.07.30

- Fleet Build－Vehicle 2 Complete 2009.08.15

- Fleet Build－Vehicle 3 Complete 2009.09.15

- Fleet Build－Vehicle 4 Complete 2009.09.30

Location
Shanghai, China, Michigan USA

Resources

The total budget for the project is 33.8 million, including 26.8 million charged by SAIC,which has been approved by BOD
- plan to get 4 million support from Shanghai government

RDG 08-36: Coking Oven Gas (COG) Combined Heat and Power Plant

Project

The fundamentals of the Chinese energy and environment domain are simple combustion of high quality fuel, inefficient use of mid-temperature thermal energy, the significant loss of low-temperature heat, and energy use mode of treatment after pollution. The Distributed CCHP system is a new kind of terminal system based on the cascade utilization of energy and the integrated cogeneration of power, cold and heat. This Distributed CCHP system can achieve more than 20% of energy-saving ratio, and at the same time has the advantages of being environmentally-friendly, reliable, cost-efficient, and flexible.

The Distributed CCHP system has been termed one of four cutting-edge energy technologies in the Chinese "State Science and Technology medium and long-term development planning". This technology is expected to play an important role in the construction industry, chemical industry, metallurgy industry, as well as in the efficient utilization of coke oven gas, coal bed methane, and other gas by-products. If the distributed CCHP system can be used in gas by-products utilization, more than 100 million tons of coal can be saved per year, and CO2 emssions can be reduced by about 250 million tons. Thus, it is a promising technology to meet the needs of China's major energy-saving initiatives.

Coke production output of China is very high, and its by-product of coke oven gas can reach 20 billion cubic meters each year. Most of Chinese coking plants, however, do not pay sufficient attention to the use of by-product coke gas. In some plants, the coke gas is emitted to the atmosphere directly or after flaring – these plants lose billions of dollars due to this activity. The Distributed Energy Supply System can achieve the efficient use of coke gas with a wide range of potential market demand and promotion.

Shanxi is the Chinese province of largest coke production with energy and environmental problems. The project is based in Shanxi Province, and a representative coke plant with annual output of 600,000 tons of coke has been chosen, to demonstrate a distributed cogeneration system of power and heat based on coke oven gas. The by-product coke oven gas in the coking process is recovered, and is provided to a distributed CHP system as fuel.

Based on AP6 international cooperation projects, the advanced gas turbine technology of the Solar Turbines International Company will be adopted. Based on the integration methods of energy cascade utilization, the distributed CHP system of coke oven gas cogeneration are set up and the demonstration project is built as a typical case of promotion of CDM. China Aviation Gas Turbine Co., Ltd. (CAGT), is one of the best small gas turbine packager in China. As potential partners, Solar Turbines and CAGT will mutually promote the cooperation opportunity with Solar turbines.

Goals and Objectives

There are significant demands of gas turbine technology and utilization of coke oven gas in China. An advanced distributed combined heat and power (CHP) system of gas turbine with the feedstock of coke oven gas can be built based on a coking plant with the capacity of 600,000 tons per year. The installed capacity of electricity is 18 MW. The ratio of electricity

to heat can reach 1.27. The energy consumption of the CHP system can be reduced by 50% in comparison with that of a steam power plant with the same feedstock of coke oven gas. The output of electricity per year is about 141 million kWh and the steam is about 168 kiloton per year. Obvious benefits can be achieved through the new system. Domestic corporations will benefit from the projects introduction of digest and imbibe advanced gas turbine technology, and from the break through key technology of system integration in the distributed CHP system with the feedstock of coke oven gas. Therefore, it can promote the utilization of the distributed CHP system not only in Coke Oven Gas use but also towards other by products, such as coal bed gas.

Deliverables and Outcomes

- Step 1 – Start up: 2008.6.1-2008.6.15 The kick-off meeting: on basis of defined timetable and the schedule of activities, the roles of each partner would be clearly defined and the related contracts will be signed. Project Managing: A steering committee composed of the leaders from each partner organization will be set up, which is in charge of project managing like decision making, internal evaluation, harmonizing between partners and propagandizing.
- Step 2 – Detailed Feasibility Study: 2008.6.16-2008.10.15 Feasibility Study: on basis of the pre-feasibility study, the feasibility study of the project will be carried out by the applicant, which will give the detailed optional schemes, technical-economic and environmental evaluation of the proposed schemes. Selection of optional schemes: a steering committee meeting will be organized, in which a technical scheme that is preferred by all partners will be selected. The detailed plan for plant construction and possible difficulties will be discussed.
- Step 3 – Detailed Plant Design: 2008.10.16-2009.5.15 Huadian group will take the duty of detailed plant design based on feasibility report. The detailed plant design report and construction drawing will be proposed.
- Step 4 – Plant Construction: 2009.5.16-2010.11.30 Technically assisted by other partners. Hongda and Huadian group will take the duty of plant construction.
- Step 5 – International Evaluation: 2010.12.1-2011.1.15 The progress of the project implementation will be evaluated and reported to the NDRC of China and the AP6 committee. The problems encountered in the project implementation will be located, and solutions will be proposed. The possible adjustment actions in the next phase will be discussed and agreed upon.
- Step 6 – Check and Accept: 2011.1.16-2011.1.31 The host and the third-party auditing firm will take the procedure of checking and accepting. An evaluation meeting will be held, in which the technical, environmental and economic benefits of the project will be affirmed.
- Step 7 – Reporting and disseminating the project results: 2011.2.1-2011.2.28 Reporting and disseminating the project results to outside of the consortium particularly to the target groups. Via the published results/outcome or internet, the demonstrable effects of the project will be propagandized to the places where the solutions of this project may be applicable. A concluding meeting will be held, to which other similar hosts, the potential investor and managers from local government will be invited.

Location
China

Resources

The funds for the project are $15580‘000, including:, $5790‘000 financed by Lucheng Longyuan Coke Making Plant Co., Ltd (confirmed), $3900‘000 financed by Guangdong Hongda Engineering & Trade Group Co., Ltd (confirmed) and $1890‘000 financed by Solar Turbines, Incorporated (expected)*.

* Solar will contribute this amount, and more as “in-kind” funds. Much of the funds will be spent to ensure completion of the “project achievement” goals outlined above.

RDG 08-37: Technical Exchange with China on PV Module Reliability

Project

Over a period of two years, U.S. partners will engage with Chinese manufacturers and qualification/certification experts in a phased project that emphasizes quality control through the value chain, as well as reliability R&D. The National Renewable Energy Laboratory (NREL) and Sandia National Laboratory (SNL) will take the lead to provide technical assistance and training. Other partners, such as U.S. universities, Regional Experimental Stations (RESs) FSEC/SWTDI, UL, and ASU, will also be involved in reliability and testing workshops as a part of the overall project. US DOE laboratories will engage Chinese manufacturers and test laboratories to fully apprise them of photovoltaic module qualification standards and methodologies currently being used in the US, Japan, and the EU. Most of this information is based on IEC procedures.

Goals and Objectives

To ensure that world photovoltaic manufacturers embrace and adopt state-of-the-art reliability practices, US DOE R&D National Laboratories and RESs (FSEC, SWTDI), in partnership with UL, ASU and academics, will act as a technical resource to assist Chinese PV industry and test agencies to develop quality assurance and reliability practices compatible with world markets.

Deliverables and Outcomes

- 1- or 2-day educational training workshop in China
- 2- or 3-day technical training and consultation workshop in U.S.
- Organize and execute a 1- or 2-day follow-up conference in Asia
- Project review summary

- Prepare and Execute a 1-2 –day educational training workshop in China – Sept. 2008
- Organize and execute a 2- or 3 day technical training a consultation workshop in U.S. - March 2009
- Organize and execute a 1 – or 2 day follow-up conference in Asia – Nov. 2009
- Project review summary report – Feb. 2010

Resources

Total: $125,000 US DOE

RDG 09-38: Accelerate Distributed Generation–Combined Heat and Power Applications in China

Project

This project will provide Chinese stakeholders, including policymakers, utilities, engineers, and energy users, and others, with the necessary information, tools, and experience from other programs to enhance the effectiveness of their efforts to promote CHP and other forms of clean distributed generation. The proposed effort builds upon work recently completed for the U.S. Environmental Protection Agency (EPA) to identify barriers to and opportunities for CHP in China. It also builds on past work undertaken by WADE members to evaluate the benefits of CHP and clean distributed generation to China and other countries, as well as to support deployment of efficient CHP in China and other growing economies.

The project is intended to develop policy options, action plans, and stakeholder commitment at the provincial level to increase the deployment of CHP and clean distributed generation (DG) in China by:

• The Team will first develop a more detailed and comprehensive understanding of the potential for CHP and DG in China.

• This baseline evaluation will be conducted at the provincial level and will develop a detailed understanding of the technical potential for CHP, an analysis of the local fuel resources and supply outlook, and an estimate of potential energy and CO2 savings benefits attributable to CHP and clean DG.

• A detailed, quantitative analysis of the CHP opportunity will be completed for five target provinces using the proprietary WADE Distributed Energy model.

• The Team will work with the National Development and Reform Commission (NDRC) and national associations to develop a more complete understanding of current national policies and incentives for CHP and clean DG, and explore additional steps that could be taken to encourage further development.

As a direct result of the proposed project, collaborations between private sector business, government technocrats and other interested parties in China trying to implement clean, efficient CHP and DG will improve. The establishment of CHP baselines, quantitative estimates of potential opportunities, the exchange of ideas through the workshops, and the ability to publicize successes and analyse problems should result in the development and adoption of favorable rules and policies designed to promote the further deployment of distributed generation and CHP in China. Specifically, the project will:

• Increase the number of MW (up to 1000 MW, 200 MW per province) of clean energy produced or developed as a result of the workshops and handbook;

• Increase the number of institutions who will be aware of CHP and renewable and DG; • Increase the number of citizens (up to 500,000) who will have access to modern clean energy services

• Encourage the development of policy frameworks for cooperation on one or more aspects of clean energy within China based on U.S. principles,

• Promote confidence among stakeholder to proceed effectively on a path to sustainable clean energy development; and

• Develop specific solutions to remove barriers to clean energy and DG. Efforts will be made to reach out and develop synergies with the other APP Task Forces such as steel, cement and pulp and paper which represent high priority CHP targets in China.

Goals and Objectives

The project is intended to develop policy options, action plans, and stakeholder commitment at the provincial level to increase the deployment of CHP and clean distributed generation (DG) in China

Deliverables and Outcomes
(1) Handbook for each province translated into Chinese
(2) Laying groundwork for policy change
(3) Workshops "best practices" and tech transfer w/in each province
(4) U.S. site visit

Resources
- U.S. DOS $963,000 Approved
- WADE USA $970,000 Approved
- Exergy, USA - Exergy Partners is providing strategic direction to public and private sector clients on cooling, heat and power technologies. EXERGY has ten years' experience in China working with CHP.
- ICF, USA - ICF is currently the lead technical support contractor to the EPA CHP Partnership and this project will build upon this knowledge base, leveraging many of the resources and tools developed for the EPA program.
- Broad Air conditioning – China - Broad Air Conditioning will provide valuable in-country knowledge, thermal technology reviews and support services in every major city in China. CECIC Biomass – China - China Energy Conservation Investment Co. Biomass Company will provide valuable in-country knowledge, fuels and biofuels insight and in-country support services in every major city in China.
- Solar Turbines, USA - Solar Turbines will provide valuable information, analysis, review and other support services.

RDG 09-39: Co-operation Research for Long Term Reliability of PV Modules in India and Japan

Project
AIST, SEC and NPL propose the project entitled "Researches of long-term reliability of photovoltaic modules in India and Japan" which relates to the long-term outdoor PV module exposure test, performance and degradation analysis, the precise meteorological data acquisition in India, and the fabrication of anti-degradation PV devices suitable for hot and humid conditions like India will be conducted. The outcome of this project will encourage the developments of Indian PV industries to produce more suitable PV modules for hot and humid conditions and more reliable PV modules in such severe conditions.

In this project, the precise measurements of meteorological data not only the global irradiance, ambient temperature, humidity, etc. but also the wide range spectrum (350-1700nm) will be conducted in India. Nowadays, there are many kind of photovoltaic devices, and some new devices have the wider band spectral absorption characteristics compared to the traditional Si devices which are commonly used around the world. So, it is needed to collect the precision meteorological data to evaluate the new device performance. Those precise meteorological data will help the PV device design suitable for Indian condition.

Moreover, to evaluate the long-term reliabilities of PV modules, those modules must be operated under the same conditions as when they are used; that is, those modules should be exposed under the maximum power point tracking control (MPPT control). To conduct the exposure test under MPPT control, the switcher unit that switches the MPPT operation to I-V measurement operation by certain intervals not the seasonal but the hourly should be developed. Here, the devices under test are not the module but the array or string under MPPT operation. This interval I-V measurements result in not only the long-term durability test but also the PV energy rating test under the Indian climate. To evaluate those I-V performance results, those measurement equipments including MPPT/IV switcher and the PV arrays are installed both in India and in Japan as like twins. To clarify the degradation mode of PV modules, the accelerated exposure test, the degradation analysis, and the fabrication on the anti-degradation modules will be conducted at Indian institutes.

Participation
Solar Energy Centre(SEC)
Ministry of New and Renewable Energy (MNRE)
INDIA & National Physical Laboratories (NPL)
CSIR, INDIA

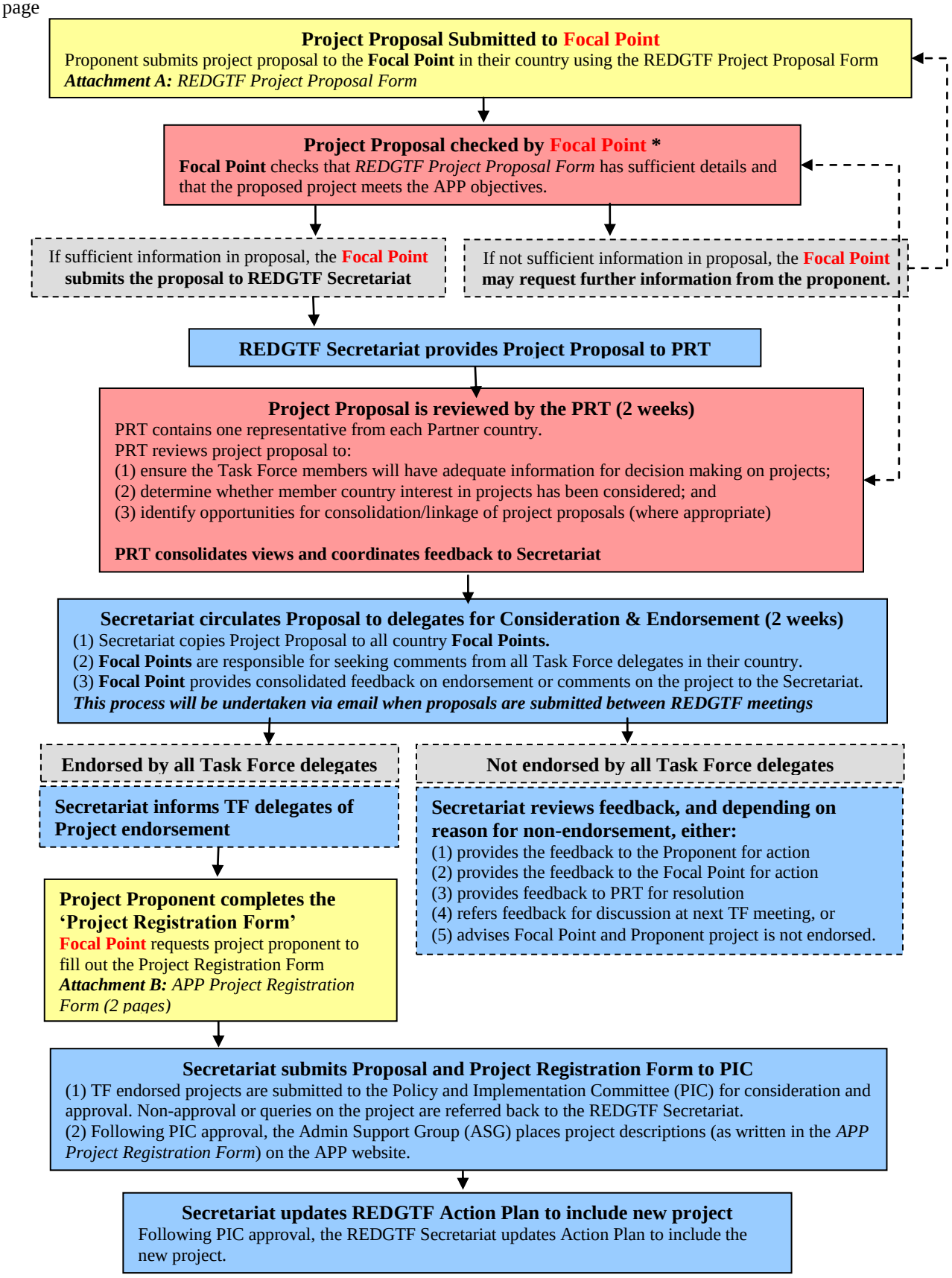
Goals and Objectives
The project is intended for development of anti-degradable PV module (life more than 35 years) to perform under the harsh environmental conditions of India and Japan.

Deliverables and Outcomes
(1) A detailed report on the process of field degradation,
(2) Method and process of fabricating a anti-degradable PV module
(3) A detailed report containing the data of environmental parameters of India and Japan

Resources
JPY 69,720,440 NEDO , JAPAN (Approved)

Appendix B: Project Proposal Review Process

A diagrammatic overview of the project proposal review process is provided over the page



*Good practice would be for the Focal Point to contact the governments of the proposed Partner countries so that they have been consulted prior to submission of a proposal to the Secretariat for review by the PRT

Asia Pacific Partnership on Clean Development and Climate

Renewable Energy and Distributed Generation Task Force

PROJECT PROPOSAL

Application for APP Project Endorsement and Inclusion in the REDGTF Action Plan

Key Information

Project Title: *Please provide a clear and descriptive Project title (30 word maximum).*

_____

___

Lead Country: _____

Project Contact Details

Organisation: _____

Project Manager:

Title: _____

First Name: _____

Surname: _____

Position: _____

Phone Number: _____

Email Address: _____

Postal Address: _____

_____

_____

Project Description

Project Purpose: *Please provide a clear statement of the purpose or aim of the Project (more detailed project outputs should be listed in Part 4 of the Project Details).*

_____

_____

_____

Rationale, Background and Project Description:

Describe the opportunity or the problem that is driving the need for this Project. You may wish to provide some background and any other information to demonstrate 'why' this Project is important, and how it will contribute to addressing the identified need (1 page maximum).

Appropriateness for the APP Programme:

Please answer the following questions:

How will this Project increase access to or uptake of affordable and reliable renewable energy or distributed generation across Partner countries? (i.e. Explain with rationale, the potential of the project to contribute to an affordable, practical and sustainable renewable energy or distributed generation product or innovation).

_____

_____

_____

_____

_____

_____

_____

_____

_____

What is the potential for the Project to deliver permanent greenhouse gas emission reductions? If relevant, provide details on the amount of CO_2 equivalent reduced over time.

_____

_____

_____

_____

Project Details

1. Timing:

Estimated Project Start Date:

Estimated Project End Date:

Project Duration:

2. Project Location:

Please list Project locations and key activities to be undertaken at each site.

Location (site, city/region, country)	Activity at Site

3. Project Methodology:

Please explain the Project methodology and provide details of each Project step and estimated timing, in the table below.

Project Steps		Estimated Date for Achievement
No.	**Description**	
1		
2		
3		
4		

Additional information on Project methodology (if applicable):

4. Project Outputs:

The Project will deliver: *(Please list the outputs to be delivered by this Project.)*

(1)
(2)
(3)

Examples: capacity of newly-deployed REDG systems; number of people trained for operation and maintenance; a report; a new technology taken to proof-of-concept, prototype or scale-up demonstration stage; a new mechanism for local financing of REDG systems, etc.

5. Additional Information (optional)

Please provide any additional information that you would like to bring to the attention of the Task Force (e.g. intellectual property issues, risk management).

Partnerships

List all Partners participating in the Project and describe their role in Project delivery.

Organisation / Agency	Country	Role in Project	Partnership Status (expected or approved)

Explain links (if any) with other REDGTF projects:

Resources

Please provide the estimated total cost of the Project and specify details of funding contributions (cash and/or in-kind) from various sources (including contributions from the applicant). Examples of in-kind resources: provision of people's time, access to facilities or land.

Exchange rate used: 1AUD = USD

Funding Source: Agency/Organisation	Country	Cash (US$ '000s)	In-kind (US$ '000s)	Total Contribution (US$ '000s)	Funding Status (expected or approved*)
Government Agency / Organisation					
Private Sector / Industry					
Non-Government Organisation (NGO)					
Other					
Total Project Funding					

*If funding has been approved, please attach documentary evidence to this application.

Office use only *(not to be filled out by applicant)***:**

Project Type	Endorsement	Actionable	
Category	Deployment	Market Enabling	R&D and Demonstration
Timeframe	Short-Term	Medium-Term	Long-Term

Ready for review by REDGTF:	Linked with existing, already endorsed projects	

Attachments to this Project Proposal:

Description	Name
Eg. Evidence of funding support	

Appendix C: Tracking the Status of Projects in the REDGTF Action Plan

Goal:

To ensure that tracking of the status of projects in the Renewable Energy and Distributed Generation Task Force (REDGTF) Action Plan is consistent and accurate across the Task Force, and to provide information for the Action Plan to be updated with any significant changes in project progress.

Action:

Determine the status of each project included in the REDGTF Action Plan according to the following categories:

1. **Active-** Projects that have achieved results or have made tangible (contract signed, received funding, established partners, etc) progress toward achieving their stated goals.

2. **Developing-** Projects that are likely to receive funding or make progress within six months, and are anticipated to be categorized as 'active' in the next reporting period.

3. **Inactive-** Projects that are not making progress due to lack of funding, delays in partnership arrangements or other obstacles, or require significant further development and revision, but which the Task Force believes should remain in the Action Plan because of potential progress in the mid- to long-term.

4. **Cancelled-** Projects that are not making progress due to various obstacles, and are not expected to make any progress in the mid- to long-term. Lead and Partner countries will be asked to outline the reasons why previously endorsed projects have been cancelled. Following PIC approval, cancelled projects will be removed from the Action Plan.

Process and Updates:

The status of each project will be proposed by the project's lead country as part of the REDGTF Secretariat's semi-annual request for project progress reports. Explanations will need to be provided for any changes to project status, especially if requesting cancellation. The REDGTF will approve the status, or changes to previous status. If a project is categorized as 'cancelled' and intended to be removed from the Action Plan, this recommendation will be submitted to the PIC. Following PIC endorsement, the 'cancelled' project will be removed from the Action Plan.

Asia-Pacific Partnership on Clean Development and Climate

Renewable Energy and Distributed Generation Task Force

PROJECT PROGRESS REPORT

This report will be used to provide an update of the project to the REDGTF meeting in XXXXX on XXXXXX (one page limit).

Key Information

Project Title: _____

Project Number: _____ **Lead Country:** _____ **Partner Countries:** _____

Project Contact Details

Organisation: _____

Project Manager: _____ **Email:** _____

Project Status

Please tick (✓) appropriate box – see below for definitions of each category							
Active		Developing		Inactive		Cancelled	

Achievements

Achievements	*Please tick (✓) appropriate box*			
All international partnerships confirmed	*Yes*		*Partnership arrangements still under development*	
Agreement/Contract for project funding signed	*Yes*		*Application for funding submitted/ under review*	
	N/A		*Contract negotiations underway*	
Project commenced	*Yes*		*Project scope/details still under development*	

Please provide information on achievements or progress made to date (e.g. status of funding for participants, project initiated, status of milestones).

_____

_____

_____

_____

Issues

Please provide details on any current issues, problems or risks faced in undertaking the project.

Project Status – Definitions of Categories

Active - Projects that have achieved results or have made tangible (contract signed, received funding, established partners, etc) progress toward achieving their stated goals.

Developing - Projects that are likely to receive funding or make progress within six months, and are anticipated to be categorized as 'active' in the next reporting period.

Inactive- Projects that are not making progress due to lack of funding, delays in partnership arrangements or other obstacles, or require significant further development and revision, but which the Task Force believes should remain in the Action Plan because of potential progress in the mid- to long-term.

Cancelled- Projects that are not making progress due to various obstacles, and are not expected to make any progress in the mid- to long-term. Lead and Partner countries will be asked to outline the reasons why previously endorsed projects have been cancelled. Following PIC approval, cancelled projects will be removed from the Action Plan.