

**U.S. DEPARTMENT OF STATE**  
**Bureau of Oceans, Environment and Science**

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**FACT SHEET**

**Asia-Pacific Partnership on Clean Development and Climate**

**Renewable Energy and Distributed Generation Task Force  
Summary of Action Plan and Projects**

*The Asia-Pacific Partnership on Clean Development and Climate is a unique public-private initiative among government and private sector partners from Australia, China, India, Japan, the Republic of Korea and the United States. In remarks delivered to experts representing all Partner nations gathered at the American Electric Power facility in Columbus, Ohio, Under Secretary of State for Democracy and Global Affairs Paula Dobriansky today announced that the Partnership has begun a new implementation phase with the start of a series of multifaceted programs designed to promote cleaner, cost-effective energy technologies and practices among the Partner nations. The Partnership is identifying policies and deploying technologies that reduce greenhouse gas emissions, promote healthier air quality, advance sustained economic growth, and reduce poverty. It is now embarking on implementing voluntary practical measures to create new investment opportunities, build local capacity, and improve economic and energy security. The Partnership involves countries that account for about half of the world's population and more than half of the world's economy and energy use.*

**Summary of Renewable Energy and Distributed Generation Task Force Action Plan**

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

Renewable energy technologies, such as hydro (large and small), solar, geothermal, biomass, and wind, can deliver power with virtually zero emissions. Distributed generation (smaller generators that produce power locally apart from centralized grid) also has the potential to significantly reduce emissions and promote greater cost and network efficiencies. Both renewable energy and distributed generation lend well to promoting energy security and are financially attractive options under certain circumstances. The first set of projects approved by the Task Force has the potential to achieve deployment of an additional 1.8GW of renewable energy and distributed generation capacity within five years. The Task Force is working to promote investment

in these technologies and address any market and technical impediments that may prohibit their adoption.

### **Transforming Markets in Renewable Energy and Distributed Generation**

A particularly important role for the Task Force is to identify barriers to technology deployment and financing associated with the deployment of REDG technologies. Australia, the Republic of Korea and the United States are working together to analyze regulatory barriers in Partner countries and create an enabling framework for renewable energy deployment.

The Republic of Korea is taking a comprehensive look at smart grid integration of distributed generation sources, working in cooperation with Japan, China, and India.

The United States is working to commercialize distributed power generation using hydrogen-fueled generators in India. This project is targeting identified rural communities in India that can benefit from stable sources of electricity and will potentially increase by 1,000 to 2,000 the number of homes or small businesses with access to clean, reliable electricity.

### **Sharing Best Practices in Renewable Energy and Distributed Generation**

The Republic of Korea is working with China and Japan to study the expansion of biodiesel for transportation in Partner countries. Ultimately sharing best practices on how to build the infrastructure for distribution of biodiesel will enable solutions that increase biodiesel's market share as a transportation fuel.

### **Facilitating Investment in Renewable Energy and Distributed Generation**

The Partnership is helping provide customized power solutions based on local fuel sources in rural parts of India and China by partnering industry with U.S. government. Deployment of gasified biomass-fueled engines will provide power to some of the almost 400 million rural residents who lack adequate and/or reliable power supplies, and will power schools, health clinics, small industry, and agricultural production.

The United States, in public-private partnership, will deploy combined heat and power systems in China that use petroleum coke oven gas for electricity and thermal energy.

Australia is facilitating investment in a Mega Solar Project in the Republic of Korea that will both broaden the visibility of solar photovoltaic technology and contribute added capacity to help with peak load reduction.

## **Summary of Renewable Energy and Distributed Generation Task Force Projects**

### ***Project 1. Building Critical Mass for Ultra-High Efficiency Solar Power Stations***

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. Beginning with an AUD\$424 million, 154MW phase in Australia, this project aims to deploy 1GW of power stations technology across Australia, China and the United States, all producing power for less than 1/6<sup>th</sup> the cost of current solar power. In addition to Solar Systems and other private equity investors, it is anticipated that the Australian Greenhouse Office, the Energy Bureau of the National Development and Reform Commission of the People's Republic of China and the U.S. Department of Energy will play facilitation and coordination roles.

### ***Project 2. Commercial Demonstration of a PEM Fuel Cell for Power Generation***

The chlor-alkali industry is one of the largest chemical industries in India and is expected to grow along with the growing Indian economy. The proton-exchange membrane (PEM) fuel cell product captures hydrogen produced in the chlor-alkali industry to create onsite electricity, thereby creating electricity savings. Additionally, it will displace the use of coal-fired power plant generation, leading to significant CO<sub>2</sub> emission reductions. India and the United States will both participate in this industry changing project.

### ***Project 3. Biofuel Promotion for Environmentally Sustainable Energy and Water Services***

The success of power sector reform in India will rely in part on groundwater management improvements in the agricultural sector. Unreliable power supply and subsidized tariff structures lead to excessive water pumping by farmers who tend to pump water based on the power supply made available to them. Over-pumping contributes to higher energy consumption and rapid depletion of the groundwater table. Together these undermine development and cause higher greenhouse emissions. USAID will work with the Water Authority in the State of Andhra Pradesh in India to address this situation ensuring efficient energy and water co-management through mutually complementing interventions such as biomass-based distributed generation and energy-efficient water management activities. Interventions will take place at appropriate levels throughout this linked system. Multiple stakeholders (U.S. and Indian agencies, interest groups, private sector and investors) will be involved to support deployment of biofuels based distributed generation systems. Farm families will be encouraged to increase on-farm energy and water efficiency through education, extension, and incentives. Communities will integrate water conservation programs as part of planning processes and outreach campaigns. The activity can be replicated if successful

#### ***Project 4. Asia-Pacific Partnership Mega Solar Project***

BP Solar and S-Energy of the Republic of Korea aim to create a landmark endorsement project, the ‘Asia-Pacific Partnership Mega Solar Project’. This project aims to install megawatt scale (MW) solar PV units at a number of locations across the Republic of Korea through a series of financed, managed, and delivered projects. 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. S-Energy will bring local expertise and the project will also seek the participation of the emerging Korean PV manufacturing industry to assist in technology transfer and accelerate development. The project is scalable from 10MW to 100MW over a multiyear period. As a distributed generator this solar project will bring value to the electricity network and local economy across the country in addition to the valuable technology transfer. The project aspires to generate 120GWh/year of clean electricity, power 20,000 Republic of Korean homes, avoid 120,000 tonnes of CO<sub>2</sub>/year and 25MW of network peak upgrades, and create new skilled installation and manufacturing jobs (assuming maximum 100MW scale).

#### ***Project 5. Deploy Combined Heat and Power (CHP) in China that Utilize Coke Oven Gas for Fuel Feedstock***

Combined Heat and Power systems offer significant energy efficiency opportunities in Partner countries. Solar Turbines, Inc., a division of Caterpillar, has committed to providing the key turbine component as part of a complete generator set to Shangdong Jemin Coal Gasification Chemical Company, along with training in these systems. Solar Turbines estimates a savings of 1.2 million tons of CO<sub>2</sub> per year once all systems are operable.

#### ***Project 6. Renewable Energy Rural Business Hubs in China and India***

Currently, 56 percent of India’s 700 million rural residents lack adequate and/or reliable power supplies. USAID is partnering with General Electric Company (GE) to increase access to cleaner, more affordable energy services in rural India. The initial combined effort will cover up to four pilot sites, with the intention of creating a business model that will result in an ongoing flow of commercial projects. Seven other distributed generation plants based on a “rural business hub” model and totaling 25 MW are also in development. These projects are expected to employ over 4000 people. USAID is contributing \$600,000 to this program, while GE and its worldwide network of experts, technology centers and partners will invest up to \$2.7 million in direct and indirect funding. If this model is successful, the Partnership will replicate it elsewhere in India and potentially China through the identification of additional potential private sector and government partners interested in promoting and investing in such projects.

***Project 7. Facilitate Deployment of Highly Efficient Combined Heat and Power (CHP) Applications, Including Fossil and Biomass-Fueled Industrial, Institutional and District Energy CHP Projects in Partner Countries***

Despite the availability of CHP technologies and proven benefits and performance of these systems, projects often are not implemented even when investment is compelling. EPA will build on its CHP Partnership Program to identify and clear barriers to efficient design of on-site energy systems. The project will promote collaborative education and outreach to energy users, utilities, policy makers, and the design and construction communities, if possible. It will also promote and streamline the immediate and ongoing deployment of large and district energy-scale new CHP projects in Partner countries with the aim of implementing 500 MW of new CHP within participating countries within 3 years.

***Project 8. Identification of High-Prospect Geothermal Energy Projects in China***

This project would focus on the identification of highly prospective geothermal energy projects in China with assistance by Petratherm Limited, an Australian company. The emphasis will be on geothermal prospects in the non-volcanic regions that comprise the bulk of China. The primary goal of the proposed co-operative project is to produce a portfolio of high prospect geothermal projects that are ranked in terms of profitability, risk and “do-ability.”

***Project 9. Analysis of Regulatory Barriers to Renewable Energy Uptake in Partnership Developing Countries***

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 Partner developing countries (China, India, and Republic of Korea) 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 the target developing countries, by promoting legal and regulatory measures to create the enabling environments for the uptake of renewable energy.

***Project 10. Barriers to Clean Technology Investment and Deployment between Australia and India***

The project will identify the market and policy barriers to enhanced collaboration between Australia and India in the investment, development, and deployment of Clean Technologies. The challenges and opportunities presented by the need for clean coal technologies, renewable energy, and distributed generation will be addressed. The findings of the project will serve to develop practical solutions to addressing clean energy

and climate goals by accelerating the development, transfer, and deployment of clean technological solutions between the two countries.

***Project 11. Development of Economic Indices for Renewable Energies and Distributed Generation (REDG) in the Asia-Pacific Region***

As the current oil price hike is expected to continue in the future, renewable energies is gaining their market share, reflecting the improved economic feasibility. However, most renewable energies, except for wind, hydro, biomass, are still costly energy options, compared to the conventional energy sources. In this regard, developments of economic indices are under consideration which can be referred to as criteria in prioritizing development and deployment of renewable energy R&D and deployment. Economic indices can also be used in developing and implementing cost-effective policy tools for each member country and the Asia-Pacific region as a whole.

***Project 12. Creating an Enabling Framework for Renewable Energy Deployment in the Partnership***

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 renewable energy and distributed generation 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. The project will be led by the National Renewable Energy Lab and establish “best in class” resource and economic assessment methods and collaborative plans for 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.

***Project 13. Quality Renewable Training Program in China and India***

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 renewable energy technologies to future power generation will be challenging without an extensive pool of knowledgeable and skilled practitioners to design install and maintain renewable energy systems and services. Australia will collaborate with China and India on this project to progress the systematic development of national training competency standards in China

and India, to achieve country-wide coverage and pave the way for future quality oriented training implementation within the mainstream vocational training.

***Project 14. International Scholarships for Photovoltaics and Solar Energy Engineering at University of New South Wales***

This project aims to bring international research and undergraduate students from Partner countries to UNSW's premier photovoltaic research group by providing scholarships for tuition. Additionally, this project will assist in enhancing the photovoltaics knowledge and teaching resource base in Partner countries, improve the quantity and quality of photovoltaics teaching manufacturing and research in Partner countries.

***Project 15. Capacity Building for Renewable Energy Promotion Policies and Measures***

Japan will undertake 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. Training seminars would be once or twice a year for one to two weeks long, including site tours. The total number of the trainees would be 10-30 depending on the budget and the contents of the program.

***Project 16. Feasibility Study and Development of Smart Energy Solution Using Various Renewable Energies***

As the result of the feasibility study on the development of independent electricity supply system for "Feasibility Study and Development of Smart Energy Solution Using Various Renewable Energies" the distributed region, elected Distributed Generators (DG) are integrated into a smart energy solution that will allow several different DGs to be operated as a microgrid that can optimally balance the supply and demand of energy, including electric power and heat while exchanging information and operating in harmony with the existing utility infrastructure. Japan, China and India will be participating in this study along with various renewable energy related agencies from Partner countries.

***Project 17. Study on the Expansion Plan of Bio-diesel for Transportation in Asia-Pacific Region***

Due to the concerns over stable supply of rapeseed and soybean oils for conventional biodiesel, study of biodiesel production using the conventional raw materials such as *Jatropha* is ongoing. A significant gap exists among the countries in Asia-Pacific region in infrastructure for biodiesel use and distribution. The Republic of Korea will lead on this project to strengthen infrastructure through analysis of conventional and advanced biodiesel, standardization of measurement criteria, standard preparation, etcetera.

### ***Project 18. Market Development for Renewable Energy***

Transmission and distribution loss 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. USAID will lead a project 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. Tapping 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 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 and could help to develop the market. Other potential technologies include fuel cells, microturbines, and municipal waste product utilization.

### ***Project 19. Public-Private Sector Partnership on Hydropower in Partnership***

This project will support the Task Force in its effort to create an enabling environment for renewable and distributed generation technologies in Partner countries. The project will focus on all Partner countries in order to identify specific barriers impeding investment in hydropower respective their country. Partner countries have identified more than \$200 billion in hydropower investment necessary for them to expand energy generation for estimated increased energy consumption. Industry believes that barrier inhibiting investment can be resolved by high level government and private sector involvement, which the Partnership can help to rectify. The project will be managed by the U.S. Hydropower Council and its India office with support of the United States.

### ***Project 20. Commercialization of Distributed Power Generation Using Hydrogen Fuel in India, Promoting Clear Air, Energy Security and Sustainable Economic Growth***

This project will focus on commercialization of distributed power generation using hydrogen fuel in India by installing hydrogen fuelled generators. Additionally, the project aims to increase the number of homes or small businesses with access to clean and reliable electricity by 1,000 to 2,000, resulting in less air pollution and promoting sustainable economic growth. The project will be located in rural communities in India with hydrogen fuel partners nearby. This project will assist India in establishing a

renewable energy infrastructure that will provide its rural areas with clean and efficient power generation.

***Project 21. Demonstration of Solar-Enhanced Fuels for Electricity and Transport Applications***

This project aims to demonstrate improved cost-effectiveness of solar technology by using concentrated solar energy in a new “solarization” process to reform natural gas with steam and CO<sub>2</sub> to produce syngas which can feed a gas turbine. This project will build on work already conducted by key Partners, China, Japan, and Australia, that will ultimately develop new reactors and catalysts able to use CO<sub>2</sub> as a reactant, thus making use of the waste stream and minimizing water use. By demonstrating the complete process of solar energy in a working environment this project expects to launch the process of construction of one or more successive plants. This demonstration project is capable of providing Partner countries a new technology that will be both effective and clean.

***Project 22. Flexible Biomass Gasification Technology for Distributed Power Generation***

The ultimate aim of this R&D 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 Partnership countries. Australia will be managing this project with participation of Japan, the Republic of Korea, China and India. This technology will greatly reduce the transportation costs associated with biomass gasification while being particularly suitable for distributed power generation in rural areas where biomass fuels are grown.

***Project 23. Solar Photovoltaic Linear Concentrator Systems***

The aim of this R&D project is to develop improved solar photovoltaic linear concentrators that are commercially competitive in a wide variety of markets including reducing the cost and increase efficiency associated with this technology. The project will be managed by the Australian National University with assistance by India. The key objective of this project is to resolve the remaining barriers to the widespread deployment of photovoltaic trough concentrators to all Partner countries.

***Project 24. Development of Materials and Interface Engineering Technologies for Dye-Sensitized Solar Cells***

During the past decade, refinements in the chemical components of the cells, improvements in cell physics, and device engineering having led to remarkable enhancement of dye-sensitized solar cell performance. These enhancements can potentially provide low-cost, large-area, flexible and high efficiency solar cells for all Partner countries. The basic research goal of this project is to develop materials and

interface engineering technologies for dye-sensitized solar cells through international collaborations between Partner countries.