



ASIA-PACIFIC PARTNERSHIP

On Clean Development and Climate



POWER GENERATION AND TRANSMISSION TASK FORCE

OVERVIEW



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The Asia-Pacific Partnership on Clean Development and Climate (APP) brings together the governments and private sectors of Australia, Canada, China, India, Japan, Korea, and the United States in an innovative effort to promote and create an enabling environment for the development, diffusion, deployment and transfer of existing and emerging cost-effective, cleaner technologies and practices, through concrete and substantial cooperation so as to achieve practical results. The Partners also cooperate on the development, diffusion, deployment, and transfer of longer-term transformational energy technologies that promote economic growth while enabling significant reductions in greenhouse gas intensities. In addition, the Partners share experiences in developing and implementing our national sustainable development and energy strategies, and explore opportunities to reduce the greenhouse gas intensities of Partner economies.

The APP leverages the expertise of public and private partners in five key energy-intensive sectors – aluminum, buildings and appliances, cement, coal mining, and steel – and three energy supply sectors – cleaner fossil energy, power generation and transmission, and renewable energy and distributed generation. Together, APP partners are promoting a cleaner energy future by identifying and taking advantage of opportunities for international collaboration to commercialize and deploy cleaner technologies, particularly in Partners China and India.

APP Partner Countries account for more than half of the world's economy, population and energy use.

Power Generation and Transmission Task Force

The seven Partner countries produce approximately 54 percent of the world's electricity. Improvement in power generation and transmission efficiency in Partners thus has the potential to reduce the emissions of millions of tons of CO₂ and pollutants. This share of power will likely continue to grow given both China and India's goals to increase access to modern energy services throughout their rural regions and the need for increased generation capacity in all Partners. A stable and affordable supply of electricity is indispensable for economic growth in Partner countries. With this increasing electrification, the power generation sector is and will continue to be the largest emitter of emissions. Modeling indicates that accelerated adoption of world-best practice for thermal power generation alone would reduce global emissions by 1.5 percent by 2010, as well as reduce air pollution significantly.

The Power Generation and Transmission Task Force developed activities under four categories of priority interest to Partners: best practices for power generation, best practices for transmission and distribution, best practices for demand side management, and information sharing.



Top: Task Force members at an American Electric Power site visit, November 2006.

Middle: The ability to integrate renewable energy into the electric grid will help generate clean growth.

Bottom: APP members at a site visit to a wind power plant near San Francisco in March 2009.

Front: Implementing best practices in power distribution and transmission reduces energy loss and decreases CO₂ emissions.

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Representative Power Generation and Transmission activities include:

Best Practices for Power Generation Activity Plan

The goal of the Task Force best practices for power generation activities is to help power generators learn from each other about how to improve generating efficiency, control and reduce air pollutants, and implement practices, and technologies in their own power plants as applicable. Task Force Partners' power generators host Partner country representatives, including plant engineers, at site visits to highlight good and best practices that visiting engineers can employ at their power plants to improve operating efficiency, and share appropriate knowledge and practices to control air pollutants, e.g. SO₂, from power plants. Six site visits have occurred to date. Site visit topics of emphasis have included combustion optimization methods for coal-fired power plants, SO₂ reduction technologies in power plant flue gas, and intelligent soot blowing systems for steam generator efficiency improvement. Each site visit includes follow-up reports that document the practices and technologies demonstrated, whether or not the practices or technologies that the participants have learned have been implemented at the generator facility visited; and efficiency improvements resulting from that implementation. Peer review activities are being implemented during the site visits to build on the Task Force's "best-of-kind" handbook of operation, maintenance, and management practices of each Partner countries' same-generation power plants, as well as identification of opportunities for improvement. The handbook contains a coal-fired power plant efficiency improvement checklist which is used in

each peer review and builds upon each subsequent training with power plant operators and managers. The peer reviews have enabled operators to effectively upgrade critical components of their facilities resulting in more efficient energy production.

Best Practices for Transmission and Distribution Activity Plan

Many commonalities exist between Partner countries in the transmission and distribution (T&D) of electric power, and key issues faced by one Partner may have already been faced by other Partners. Identification of best practices achieved in Task Force Partner countries help to build a knowledge base that can be applied as appropriate to improve transmission and distribution, including reducing technical losses, connection standards and equipment, system upgrades, and grid planning and operation, including power quality. The overall goal of these activities is for Partner countries to improve T&D efficiency for local power generators, resulting in significant mitigation of greenhouse gases and air pollutants. These best practices are compiled and incorporated into a handbook in addition to best practices in power generation.

Best Practices for Demand Side Management Activity Plan

The Task Force's demand side management (DSM) activities aim to provide Partner countries with best practices to improve end-use efficiency associated with power generation. DSM programs manage the energy demand, quantity or patterns of energy use consumed by end users, such as actions to reduce energy supply during periods of peak demand, when energy-supply systems are con-

strained. APP Partners are raising awareness among their utilities of the potential contributions that DSM has in managing available capacity, reducing the need for additional capacity, and controlling energy costs. Partners are also working together to institutionalize DSM in energy planning and operations and build management capacity to administer or oversee such programs. As a result of extensive training and workshops since the project began in September 2007, in April 2008 the Maharashtra Electricity Regulatory Commission (MERC) approved a large budget for Demand Side Management (DSM) initiatives in conjunction with four major utility companies in the state. This was the first budget for DSM to be implemented in India and will make a significant contribution to energy efficiency in the state.

Energy Regulatory and Market Development Forum

To facilitate collaboration between Partner countries, information detailing key issues concerning the power generation and transmission sectors in Partner countries' needs to be effectively communicated and shared within the Task Force. This better understanding allows the Task Force to more efficiently achieve its objectives. One such instance is the Task Force's Energy Regulatory and Market Development Forum, established to provide an ongoing mechanism for information sharing, capacity building, and cooperative development of the regulatory arrangements conducive to efficient energy market development. The Forum furthers understanding of the regulatory framework governing power generation and transmission operation.

Hydroelectric Generation Best Practices

Partner countries have participated in information sharing sessions concerning processes for improving hydro-efficiency and capacity that can be shared with and replicated by utilities. In the long term, relationships that are established by these interfaces will facilitate further information exchange regarding engineering concepts and technologies, hydroelectric upgrade approaches, outage planning techniques and grid interfaces to avoid CO₂ emissions. The Task Force's information sharing sessions provide a forum for exploring the Partners' respective policy approaches relevant to addressing interlinked development, energy, environment, and climate change issues within the context of clean development goals, and for sharing experiences in developing and implementing respective national development and energy strategies.

Combustion Optimization in Coal-Based Power Plants

Combustion optimization in coal-fired steam generators is one of the most important processes to be able to operate at maximum efficiency. Without optimization, performance can be adversely affected, resulting in increased unburned carbon in fly ash, distorted oxygen profiles, and uneven steam temperature. The Task Force is currently working to identify the necessary upgrades required in the combustion process to develop state-of-the-art systems for optimizing the cycle heat-rate. Combustion optimization assists steam generators to operate at maximum efficiency while also reducing emissions.

Risk Evaluation and Prioritization (REAP) for Maintenance and Renovation and Modernization (R&M) of Power Plants

In any power plant, various pieces of equipment work together to generate power. Failure of a single link can lead to a loss in generation. The frequency and costs of these failures varies, and depends on equipment, location, operational parameters, and construction features. The Task Force is examining how to prioritize the replacement of equipment based on overall cost, down time cost, frequency of occurrence of such failures, and other factors to improve plant availability, reduce forced outages, and facilitate the implementation of renovation and modernization of power plants.

CURRENT POWER GENERATION AND TRANSMISSION TASK FORCE PROJECTS

Best Practices for Power Generation Activity Plan ■ Best Practices for Transmission and Distribution Activity Plan ■ Best Practices for Demand Side Management Activity Plan ■ Energy Regulatory and Market Development Forum ■ Trade Exhibitions/Conferences and Trade Missions ■ Hydroelectric Generation Best Practices ■ Combustion Optimization in Coal-Based Power Plants ■ Implementation of Artificial Intelligent Soot Blowing System for Improving the Steam Generator Efficiency by Increasing the Effectiveness of Soot Blowers ■ Risk Evaluation and Prioritization or Maintenance and Renovation and Modernization of Power Plants ■ Life Extension and Remaining Life Assessment of Power Plants ■ Site visit of Energy Conservation and Environment Protection Technology-Application of Plasma Ignition Technology in Power Generation ■ Generator Transformer Programs (Inspection Procedures, Diagnostic Tools and Maintenance)



For more information on these projects and the Power Generation and Transmission Task Force, please visit:

www.asiapacificpartnership.org