ASIA-PACIFIC PARTNERSHIP

On Clean Development and Climate

CEMENT TASK FORCE

OVERVIEW

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Top photo: A cement kiln co-processing and management site, where hazardous wastes from cement production can be reduced.

Bottom Photo: APP member country engineers visit an efficient cement plant during a Task Force meeting in Seoul, Korea.

Front Cover: A worker checks on a cement kiln. Enhanced performance diagnosis at cement plants has led to improved efficiency in many APP member country production sites.

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 will 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.

CEMENT TASK FORCE

Cement is an essential material for social infrastructure and has played a vital role in economic development around the world. The production process for cement is energy intensive and requires a large amount of natural resources for fuel and raw materials. Consequently, the aggregate amount of carbon dioxide CO_2 emitted from the global cement industry has reached about 2.2 billion tons, accounting for approximately five percent of global man-made CO_2 emissions.

Energy makes up 40 percent of the cost of cement production. An increase in energy efficiency therefore has great potential to reduce costs. In addition, the majority of pollutants generated by cement production are due to fuel combustion in the kiln, which means that increasing energy efficiency is the most cost-effective way to reduce pollution in this sector.

Partner countries account for 61 percent of global cement production. The Cement Task Force therefore has significant potential to reduce CO_2 emissions and conserve energy by sharing information on clean technologies and by cooperating further to diffuse such technologies. In addition, the Partnership's emphasis on public-private cooperation will catalyze sectoral improvement.

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Representative Cement Task Force (CMT) activities include:

Status Report

The Cement Task Force has identified, as a first priority, addressing the lack of basic data among Partner countries that is crucial to the development and success of the Task Force's future work and efforts to reduce emissions in this sector more broadly. Examples of such data include emissions and emissions intensity of CO_2 and air pollutants, energy consumption and intensity, and usage of alternative fuels and raw materials. The information acquired from this work will contribute to a greater understanding among Partners regarding their current energy consumption levels, emissions and practices for this sector. The data collected will also be the basis for the Task Force's development of benchmarks and best practices.

Lifecycle Evaluation of Concrete Building Construction as a Strategy for Sustainable Cities

In addition to improving the Partners' cement production processes, the Task Force seeks to identify and draw attention to ways in which concrete can mitigate climate change impacts. The Task Force is evaluating applications of concrete that mitigate climate change impacts; undertaking collaborative research into life cycle energy efficiency of concrete applications; and identifying further steps that governments can take to encourage sustainable development using concrete products. This effort may include evaluation of energy efficient structures, urban heat island mitigation, vehicle fuel efficiency, and structural durability. Partners will summarize existing literature and programs to evaluate applications of concrete and identify potential research projects and make recommendations on further steps that governments can take to encourage sustainable development using concrete products.

Centre of Excellence

Globally the cement industry emits about 2.2 billion tons of CO_2 per year. Cement production is a highly energy-intensive process: energy constitutes 40 percent of production costs. The need to reduce greenhouse gas emissions, together with commercial drivers to reduce fuel costs by increasing efficiency and by utilizing waste materials as fuels, have spurred the growth of novel responses, some of which have general applicability. These approaches include the use of waste and contaminated oils as kiln fuel, the development of novel cement varieties, efficiency improvements in grinding technologies, and the development of sophisticated energy accounting tools. The APP Centre of Excellence provides a mechanism to disseminate information about novel and best available technologies and customized cement industry energy analysis tools among APP Partners so as to enhance their wider adoption and further development. Partners' technical workshops, scholarships and skilled worker exchanges will help spread best practices and best emerging technologies in reducing cement plant greenhouse gas emissions.

Cement Kiln Cogeneration

This project, a cement kiln electricity cogeneration demonstration plant, will facilitate the demonstration and deployment of energy-efficient and cleaner production formulation technologies in Partner countries. The demonstration plant will document the economic and energy efficiency gains obtained by utilizing cement plant waste heat to generate electricity. The Project combines two established technologies, cement kiln operation and co-generation technology, in a novel manner to reduce the greenhouse gas emission intensity from cement production, increase cement kiln energy use efficiency, reduce kiln energy consumption, and generate electricity. In addition, this project seeks to demonstrate the technical and engineering challenges involved in retrofitting waste co-generation facilities utilizing cement kiln heat; characterize the energy efficiency gains obtained from the installation of cogeneration facilities in a typical cement plant; disseminate the expertise of Partner countries on cogeneration technology; and encourage and facilitate deployment of cogeneration technology to Partners.

Hazardous Wastes - Best Practices for Co-Processing and Management in Cement Kilns

This is an umbrella project that is expected to provide cement kilns with a reliable, affordable supply of renewable energy, while serving as a clean, safe destruction technology for waste management in the APP member counties. It will do this by promoting the use of hazardous and other industrial wastes as a reliable alternate, renewable source of energy for clinker production in cement kilns. This project is expected to increase awareness of options for using alternative fuels, promote installation of enabling

technologies, and reduce emissions from fossil fuels.

High Energy Biomass Fuels for Cement Production

This project is intended to promote biomass fuels as an alternate, renewable source of energy for clinker production in cement kilns. In addition to processing existing biomass waste materials, new technologies are now available to capture CO_2 from stack emissions and convert the carbon into high-energy biomass algae through cultivation in enclosed photo-bioreactor systems. This algae can then be harvested and fed directly into the kilns as fuel, or processed further into high-value products. This project will explore the feasibility of using various types of biomass as a reliable source of renewable energy.

The Effect of Cement Concrete as a CO_2 Sink

It is not widely known that concrete absorbs CO_2 over time and APP Partners identified this phenomenon as one on which further research should be conducted. This project will conduct the needed research and develop an "estimation model" of CO_2 absorption from concrete structures and used concrete. It will suggest a revision of the calculation protocol of CO_2 emissions to the IPCC.

Performance Diagnosis

The performance diagnosis project will play a role in diffusing best practice technologies or new technologies to Partner countries through detailed communications. Experts have diagnosed operations in multiple cement plants, provided advice on energy saving and environmental management to plants in India and China, and have future visits planned to additional plants. The short-term and medium-to-long term advice provided will serve as input into Partners' decision making for effective future measures to be taken by cement plants. The results of the periodic diagnoses are reported to the Task Force and also shared among relevant organizations including the APP Cement Task Force's Centre of Excellence project.

CURRENT CEMENT TASK FORCE PROJECTS

Status Report n Benchmarking (Benchmark Development) ■ Legal/Regulatory Issues ■ Lifecycle Evaluation of Concrete Building Construction as a Strategy for Sustainable Cities ■ Centre of Excellence ■ Cement Kiln Co-Generations ■ Hazardous Wastes-Best Practices for Co-Processing and Management in Cement Kilns ■ High Energy Biomass Fuels for Cement Production ■ The Effect of Cement Concrete as a CO_2 Sink ■ Performance Diagnosis

For more information on these projects and the Cement Task Force, please visit:

www.asiapacificpartnership.org