Asia-Pacific Partnership on
Clean Development and Climate

Cement Task Force

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Chair of Cement Task Force

APP PIC meeting, Vancouver, Canada

29-30 Oct, 2008

Outline of presentation

1. 6th Task Force Meeting in Japan

2. Progress of CTF Projects
   - -Flagship projects
   - -Other projects
3. Next steps

6th Task Force Meeting in Japan

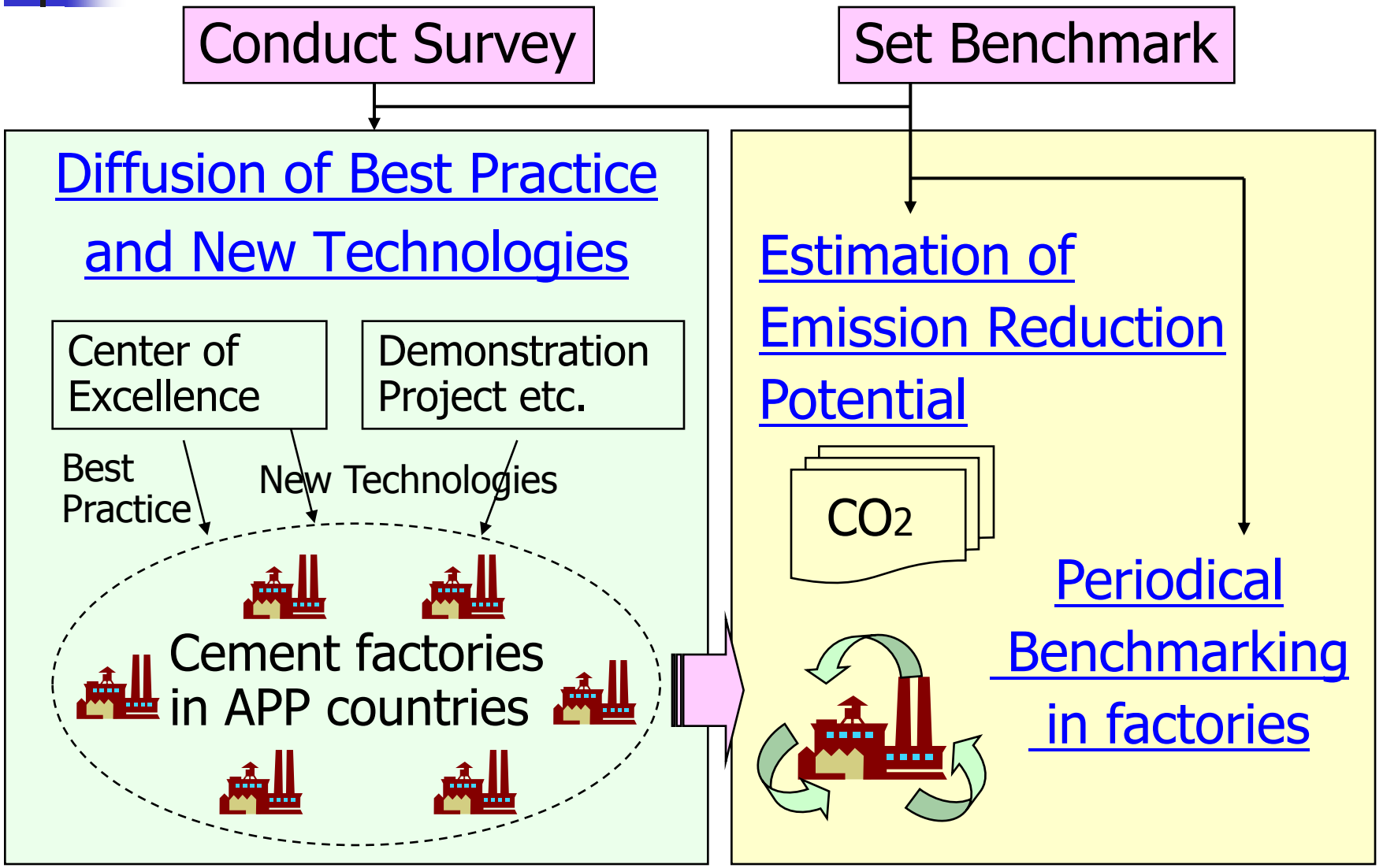
- October 23-24, 2008, in Tokyo, Japan
- Participation by 50 governments and private members from all 7 partners

- Tokyo

Activity and Purpose of Cement Task Force Meeting

- Holding a Seminar or Workshop
- Sharing information on other relevant activities(IEA,CSI)
- Discussion of opportunities for APP CTF partners to identify common issues of concern and options to address them
- Cement Plant Visit

Two major streams of Cement Task Force Activity



Flagship Projects of Cement TF

1. Centre of Excellence (CMT-06-05)

2. Hazardous Wastes (CMT-07-07)

– Best Practices for Co-Processing and Management in Cement Kilns

3. Performance Diagnosis (CMT-07-10)

Flagship(1) :Centre of Excellence

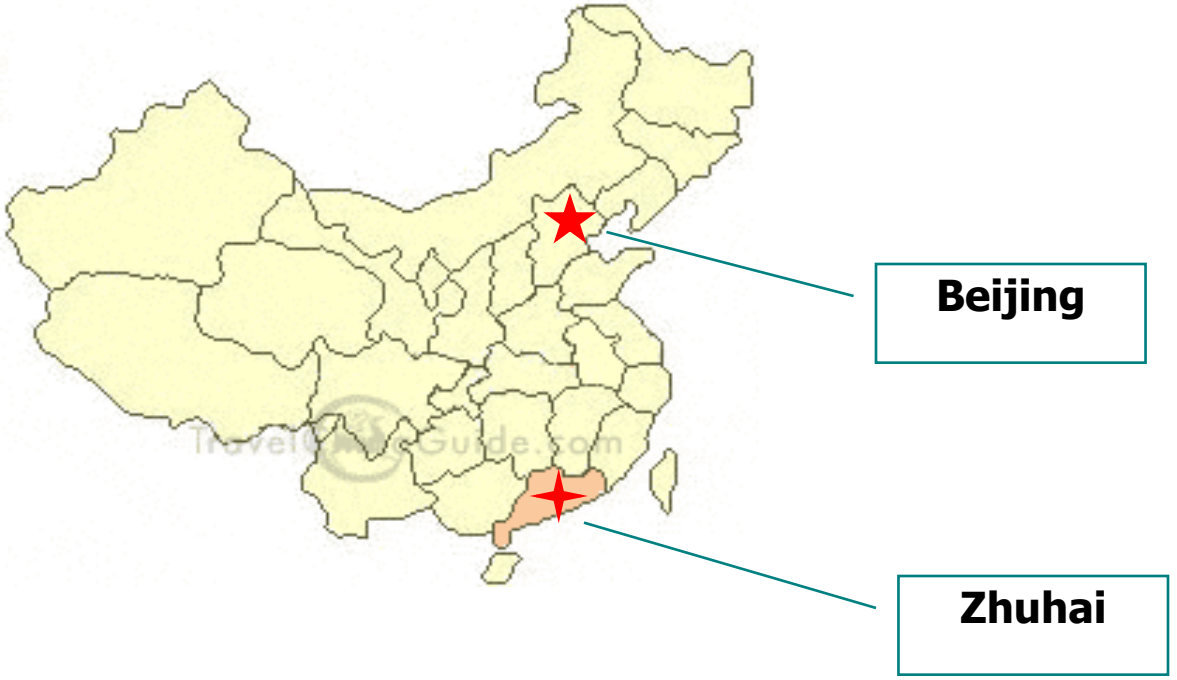
Technology Diffusion through COE

- Jan 2008:
  CSI protocol training
- June 4th-23rd, 2008:
  Seminar on Cement Cleaner Production for Developing Countries
- Oct 8th-13th, 2008:
  The 2nd International Workshop on Cement & Concrete Technology for Sustainable Development

Flagship(1) :Centre of Excellence

Capacity Building By COE

- 2nd CSI protocol Training Workshop will be held from Nov. 18th to 20th, 2008 in Zhuhai, China.



Flagship(2) :Hazardous Wastes

Sub-Project	Lead partner
sub1 - Hazardous Waste Co-Processing in India	IND
sub2 - Solvent-Based Fuels in Cement Kilns in Australia	AUS
sub3 – Utilising Biosolids in Cement kilns	AUS
sub4 - Best Practices for Management and Co-Firing of Hazardous and Other Industrial Wastes in Cement Kilns in US → Completed on May 2008 By the delivery of the trade expo and two Reverse missions at CTF-5	US

Flagship(2) :Hazardous Wastes

Solvent-Based Fuel Project(sub2)

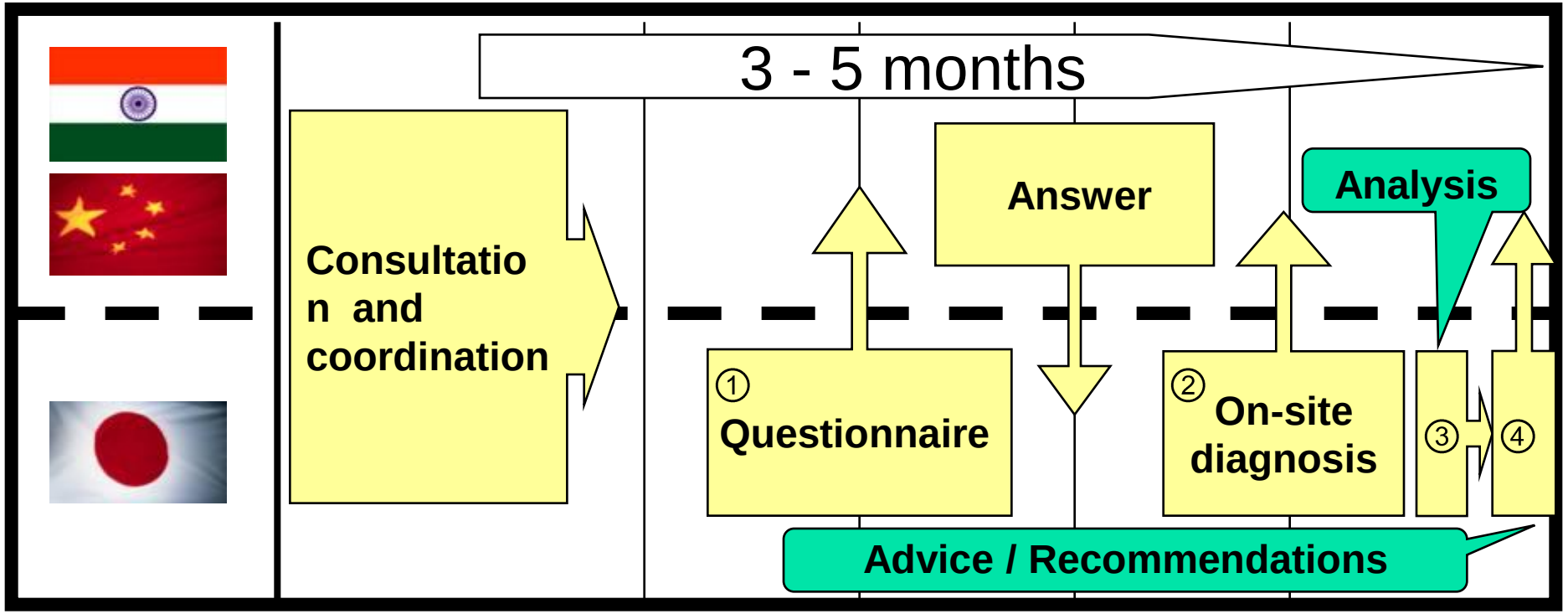
- Completion of the detail design for the relevant technology

Utilising Biosolids in Cement Kilns(sub3)

- Project not at full implementation stage but substantial progress already achieved by proponents

Australian government has vigorously promoted these projects through its funding.

Flagship(3) :Performance Diagnosis

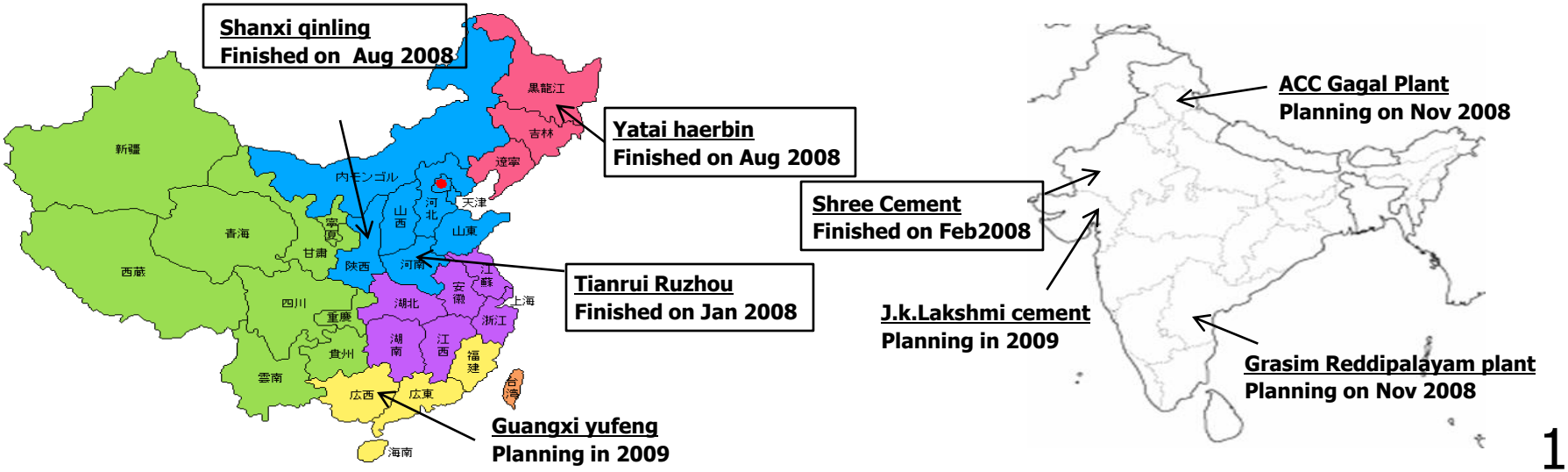


Case Study, Best Practice

All APP partners
(through CTF meeting, COE etc.)

Flagship(3) :Performance Diagnosis

- 4 factories were selected by Chinese and Indian government, respectively.
- **Carried out 2nd performance diagnosis in China (Aug. 2008) and explanatory meeting for 1st performance diagnosis in India (May. 2008)**
- Make other diagnoses respectively by mid. 2009.
  Hold a COE seminar in mid 2009 to APP members to disseminate outcomes of diagnoses carried out by then.



Flagship(3) :Performance Diagnosis

<observation for 2 factories which carried out 2nd diagnosis>

- Because of introducing the most up-to-date equipments, the energy efficiency level of both factories in China are high.
- However, further energy saving will be possible by introduction of facilities for higher energy efficiency etc.

Yatai Haerbin Cement

Shanxi Qinling Cement

Flagship(3) :Performance Diagnosis

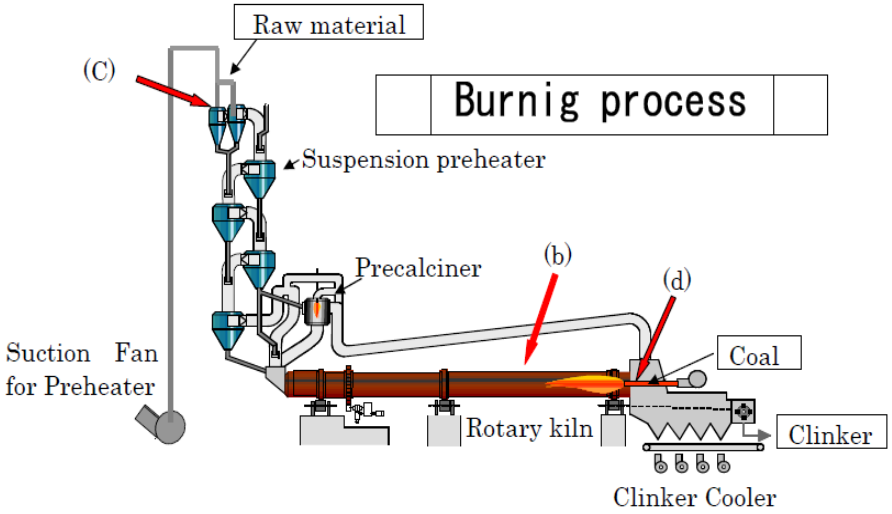
Recommendation for 2 factories which carried out 2nd performance diagnosis in China

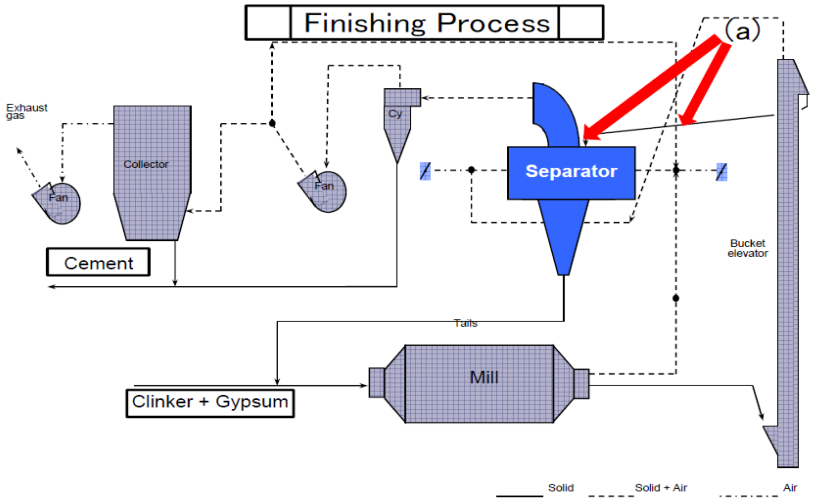
(a)Use of Pre-grinder and High-Efficiency Separator in Finishing Mill

(b)Improvement of Combustion Operation in a Kiln

(c)Use of Low-Pressure-Drop Type Cyclone as the Pre-heater Top Cyclone

(d)Introduction of New kiln Burner



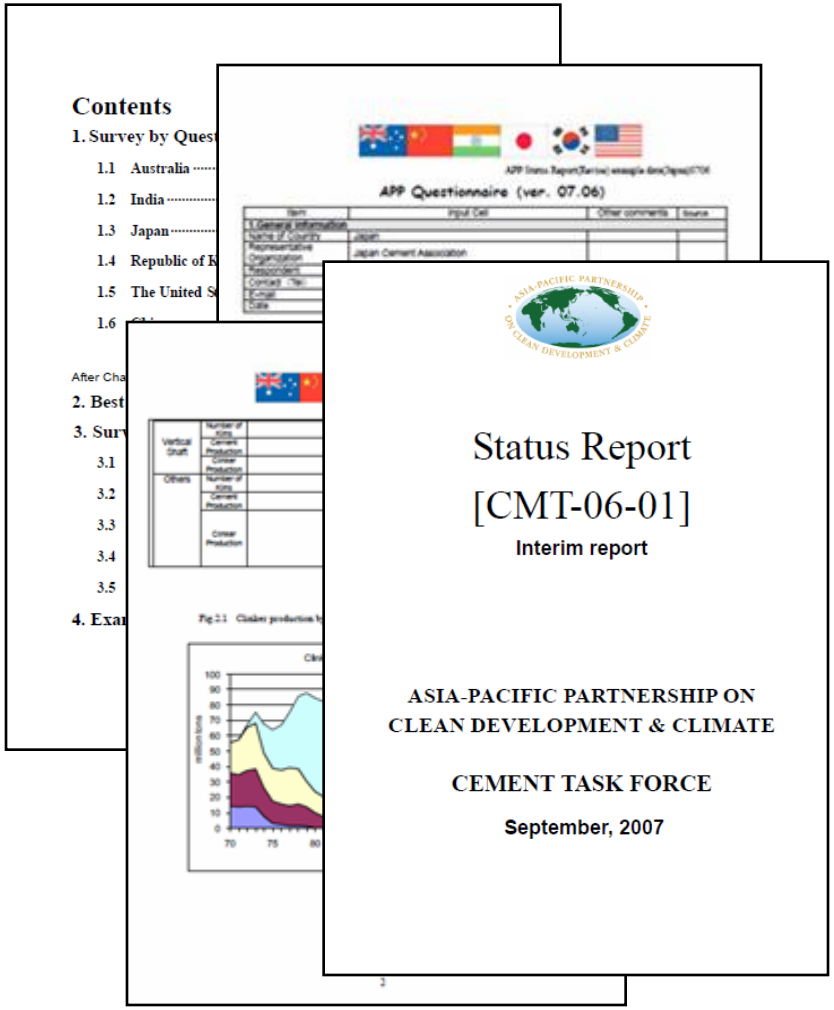


Flagship(3) :Performance Diagnosis

Equipment for Saving Energy and Environmental Protection	Factory	Effect on Saving Energy	Effect on Reduction of C02 Emissions
(a)Use of Pre-grinder and High-Efficiency Separator to Finishing Mill	Yatai Haerbin Cement	3,080MWh/y	2,862t-CO2/y
	Shanxi Qinling Cement	7,280MWh/y	6,764t-CO2/y
(b)Improvement of Combustion Operation in a Kiln	Yatai Haerbin Cement	38,080Gcal/y	18,409t-CO2/y
	Shanxi Qinling Cement	40,960Gcal/y	17,060t-CO2/y
(c)Use of Low-Pressure-Drop Type Cyclone as the Pre-heater Top Cyclone	Yatai Haerbin Cement	164MWh/y	153t-CO2/y
	Shanxi Qinling Cement	201MWh/y	187t-CO2/y
(d)Introduction of new Kiln Burner	Yatai Haerbin Cement	2,450Gcal/y	1,020t-CO2/y
	Shanxi Qinling Cement	9,590Gcal/y	3,994t-CO2/y
Total			50,449t-CO2/y

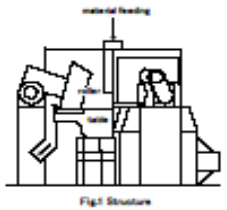
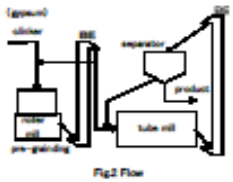
Other Projects(1) :Status Report

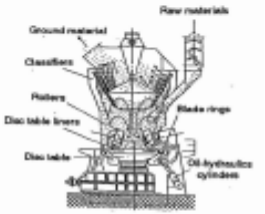
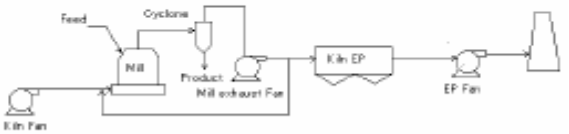
- Published and Uploaded the Status Report on APP Website
  http://www.asiapacificpartnership.org/APPProjects/Cement/CMT-06-01(Interim%20Report)071004.pdf
- CTF members agreed to submit their updates to the Chair by the end of Nov 2008



Other Projects(1) :Status Report

Best practice and technology booklet

Item	Pre-grinding of roller mill system	Application process	Introduced time
		Finishing process	1980s (latter half)
Background	For the purpose of decreasing the specific electrical power consumption in the finishing process, this installs a vertical roller mill for pre-grinding of clinker in the upstream of the tube mill. The roll press system preceded as pre-grinding system, but there are many machinery troubles (flake and crack of roll surface, damage of roll shaft and bearing) for high pressure. This system was developed on the vertical roller mill which has achieve satisfactory results. It was introduced from the latter half of the 1990s, and the introduction rate in 2000 is 13%.		
Technical contents	This system installs a vertical roller mill (of high grinding efficiency) for a pre-grinding in the upstream of the tube mill. Clinkers are milled the turn table and 2~4 rollers. The basic structure is the same as vertical roller mills for raw materials or cement. But the roller mill for pre-grinding have no classifier and air sweep. Pre-ground clinkers were discharged outside mill. Fine particles are separated from pre-ground clinkers with vibrating screen, and they are fed to finishing tube mill. The structure (Fig.1) and the flow (Fig.2) are shown below.  Fig.1 Structure  Fig.2 Flow [Note] 1) To decrease the specific power consumption in finishing process sufficiently, it is required to make the size of balls in finish mill smaller.		
Introduced effects	1) Grinding capacity of finish mill increases about 30~60%. 2) Specific power consumption in finishing process decreases 10~20%.		
Equipment cost	About 500~1000 million yen for production capacity about 100 t/h including associated facilities and installation		
Relative items	1) Introduction of raw material pre-grinding roll crusher		
References	1) Cement Manufacturing Technology Symposium, No.46, p.21 (1989) 2) Cement Manufacturing Technology Symposium, No.44, p.56 (1987)		

Item	Introduction of a vertical roller mill for raw materials	Application process	Introduced time
		Raw material process	Around 1980s
Background	The grinding of raw materials requires enormous energy. Formerly, tube mills were mainly used for the grinding of raw materials. But energy efficiency of tube mill is only a few %, so introduction of grinding equipment which has high energy efficiency was desired.		
Technical contents	The vertical roller mill has a high grinding energy efficiency and the area for installation is smaller compared with tube mills. In recent years, the vertical roller mills have been extensively adopted. A) Structure (1) The rollers are hydraulically pressed against a disc table and the feed is ground between the rollers and the disc table. (2) The classifier is housed above the roll ers. B) Feature (1) The specific power consumption of grinding is lower than that of tube (ball) mill. (2) The residence time of raw materials in this type of mill is much shorter than that in tube (ball) mill; therefore, the crushing section has a good response to the needs of the raw material mixing section and hence contributes to stable quality. (3) The area for installation is small and the noise level is low. (4) This type of mill can crush lumps too large to be fed into the tube (ball) mill. (5) The feed may be dried by using the flue gas from the kiln.  Fig.1 Vertical roller mill  Fig.2 Schematic process flow of vertical roller mill for grinding of raw materials Vertical roller mills are adopted in 20 cement plants (44 mills) in Japan. [Notes] Height of dam ring on disc table must be adjusted properly to keep high efficiency. Life of roller is 3,000 to 4,000 hrs and that of disc table liner is 5,000 to 6,000 hrs.		
Introduced effects	Table1 Energy saving effect of the vertical roller mill Ball mill / Vertical roller mill / Effect(%) Production: % — 100 / 160~180 / 60~80(increase) Specific power consumption: kWh/t-RM — 20~26 / 14~18 / About 30 (Reduction) The reduction of power consumption(*): kWh/y — / / 2,240,000 Note : The case of capacity: 200t/h at operation of 7,000h/y		
Equipment cost	About 1500 million yen for a vertical roller mill of about 200ton/hour including associated facilities and installation cost.		
Relative items			
References	Cement Manufacturing Technology Symposium, No.37, p.6 (1980)		

Other Projects(1) :Status Report

GHG Emission Reduction technology

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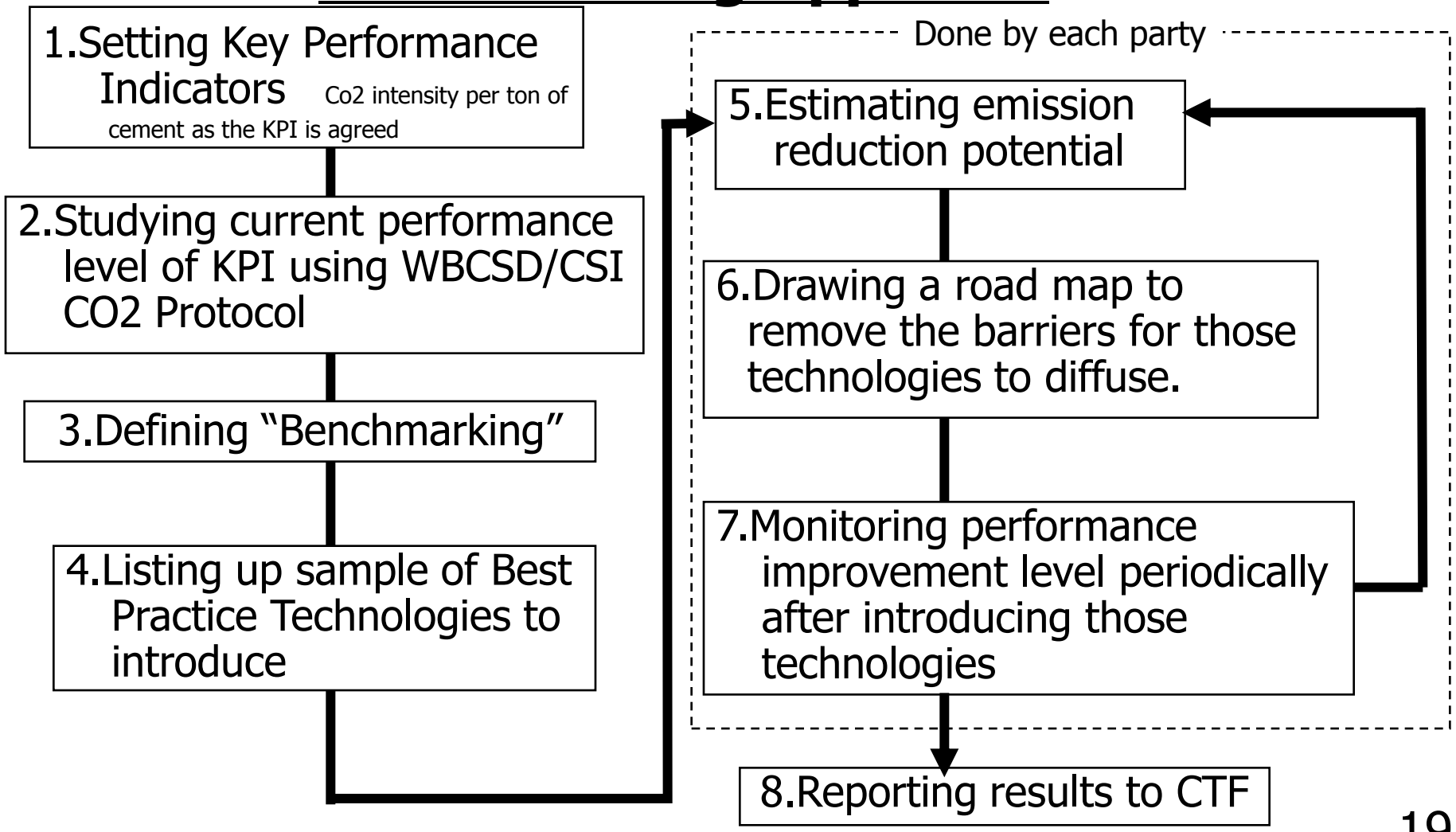
Foster GHG Emission Reduction Technologies in the Indian cement industry

Confederation of Indian Industry

Other Projects(2): Benchmarking Development

Benchmarking Approach



Other Projects(2): Benchmarking Development

- A prototype Chinese version of the cement sector-specific decision support tool, "Benchmarking Energy Efficiency Savings" (BEST-Cement), was demonstrated by the US Lawrence Berkeley National Laboratory (LBNL) at CTF-5 in May, 2008
- The prototype version was circulated to CTF members requesting it.
- After review and comment by CTF members, the prototype was revised and has been published in final form(<http://china.lbl.gov/best-cement-china>)
- In July 2008, LBNL, with colleagues from China's Energy Research Institute, China Cement Association, CBMA, Tianjin Cement Industry, Design & Research Institute, One Carbon/Azure, and Schneider Electric, conducted three workshops in Shandong Province, Hebei Province and Shanxi Province.
- A total of 140 cement plant staff from 109 cement facilities were trained in the use of BEST- Cement
- The next BEST-Cement training workshop will take place in Chengdu (Sichuan Province) October 24-25, 2008.

Other projects
Legal regulatory issues

- The US Portland Cement Association has completed Phase 1 of Project 3, to identify barriers to and drivers of cement plant energy efficiency and greenhouse gas emission reductions in the US.

- US Environmental Protection Agency has published the resultant report, “Cement Sector Trends in Beneficial Uses of Alternative Fuels and Raw Materials”, focuses on the use of 10 alternative fuels and raw

- In Phase 2, the US intends to consult with other members to collect information about their country-specific barriers

Other Projects (4): Lifecycle Evaluation of Concrete Building Construction as a Strategy for Sustainable Cities

- Task 1 – Literature Search has been completed on schedule and Task2 – Collection of Lifecycle Data and Data Synthesis, is underway (completion expected Fall 2008).
- Project was recently supplemented with an expansion of the literature search to include an analysis of pavement lifecycle work.
- Canada has expressed interest in co-leading Project 4 with the US

Other Projects (6): Cement Kiln Cogeneration

- Feasibility studies for the use of low temperature waste heat cogeneration at the Boral plant at Berrima, New South Wales, were completed (Phase 1 study, November 2007; Phase 2 study, June 2008)
- Current financial outlook for technology not viable
- Project will not proceed to implementation
- Study has delivered valuable information for future consideration of cogeneration in cement plants in Australia

Other Projects (8): Biomass as Alternative Fuel

- CMT-07-08-sub1: Technical and Economic Opportunities for Using Biomass Fuels for Reducing Greenhouse Gas Emissions from Cement Production
- At CTF-5 in Charleston (May 2008), LBNL presented their findings for a report about the feasibility of using biomass wastes as alternative fuels in China
- Draft report has been circulated to CTF members for comment and will be published on the LBL website when finalized
- CMT-07-08-sub2: Industrial Recycling of CO2 from Cement Process into High-Energy Biomass Coal Equivalent Fuel
- An Australian company has recently bought a license for a process to feed microscopic algae with CO2 from a powerplant.
- Australia is now considering a cement plant pilot using the licensed process, and will begin to move the project forward in State 1.

Other Projects (9): The Effect of Cement Concrete as a CO2 Sink

- Project inception has been delayed pending identification of funding support
- Memoranda of agreement to cooperate with Korea on Project 9 are sought from participating countries

Next Step for further progress

- CTF partners have agreed to prepare a timeline with milestones to be achieved by each project they lead
- Figure out the APP7 aggregated CO2 reduction potential and evaluate progress in achieving milestons
- Complete a technology booklet by the first of 2009
- Focus technical diffusion and capacity building through COE
- Facilitate outreach in cooperation with WBCSD/CSI, IEA etc.
- Holding the next TF meeting in Korea in 2009

Future direction

CTF Member discussed about future direction of Cement Task Force in 6th meeting.

- Discussion about the sectoral approach based on cooperation with European organization such as Cembureau.

- Introduction of the round-table conference to deepen the discussion.

- Strengthen the information exchange about innovative technology.

Thank you for your attention.

Cement Task force