Asia-Pacific Partnership on
Clean Development and Climate

Cement Task Force

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Chair of Cement Task Force

APP PIC meeting, Gold Coast, Australia

May 19-20, 2009

presentation Outline

1. Progress of CTF Projects
   - -Flagship projects
   - -Other projects
2. Future Plans

Cement Task Force meeting to date

1st meeting: 2006 Apr. U.S. (Berkeley)

28 participants from 5 countries

2nd meeting: 2006 Sep. China (Xian)

41 participants from 6 countries

3rd meeting: 2007 Apr. India (Delhi)

45 participants from 6 countries

4th meeting: 2007 Sep. Australia (Melbourne)

49 participants from 6 countries

5th meeting: 2008 May. U.S. (Charleston)

61 participants from 7 countries

6th meeting: 2008 Oct. Japan (Tokyo)

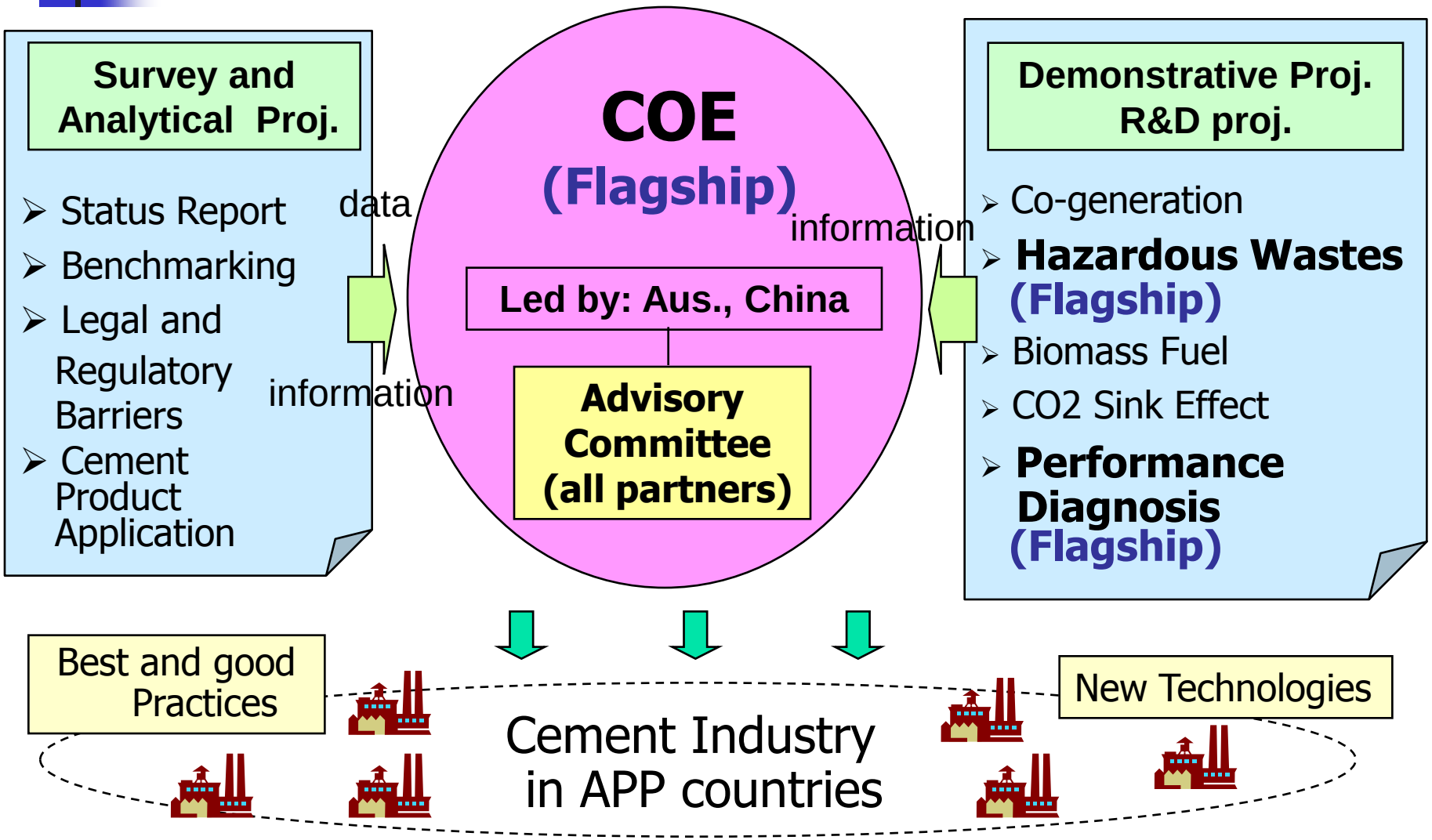
43 participants from 7 countries

Planned Meeting

7th meeting:2009 Jul. Korea

8th meeting:2010 Mar. Canada(Vancouver)

Project Formation of CTF



Flagship Projects of Cement TF

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

- To gather and disseminate data, information, know-how and experience obtained in each project.

2. Hazardous Wastes (CMT-07-07)

- To promote the use of hazardous and other industrial wastes as a substitution for fossil fuels in cement kilns.

3. Performance Diagnosis (CMT-07-10)

- To conduct the diagnosis in Chinese and Indian cement factories by Japanese experts and provide them advice related to energy saving and environment management.

Flagship(1) :Center of Excellence

Capacity Building by COE

Nov.18, 2008: Policy Seminar in Zhuhai, China

Nov.19-20, 2008: 2nd CSI Protocol Training Workshop in Zhuhai, China

- Experts from Australia, India, Japan, the U.S. and China
- About 30 participants attended

Flagship(1) :Center of Excellence

Capacity Building By COE

- the Next CSI protocol Training Workshop is scheduled for July 7-10 for 42 major Chinese cement companies.
  *In combination with Sino-US project on Energy Efficiency and Emission Reduction for China's Cement Industry, 42 Chinese cement companies will attend the workshop.

- The 3rd Int'l Workshop on Cement and Concrete Technology for Sustainable Development is to be held May 6 - 12 in China.
  *16 experts from the U.S., Canada, Norway, Japan, China will attend the workshop in 3 cities in China.

Flagship(2) :Hazardous Wastes

Sub-Project(outline)	Lead partner
sub1 - Hazardous Waste Co-Processing ➡ To facilitate introduction of international best practices on co-processing of hazardous wastes and to create an enabling environment for development of cost effective and efficient technologies for utilization of hazardous wastes.	IND
sub2 - Solvent-Based Fuels in Cement Kilns ➡ To develop and demonstrate techniques to scientifically transform hazardous wastes as a fuel for use in cement kilns, as a replacement for fossil fuels.	AUS
Sub3 – Utilizing Biosolids in Cement kilns ➡ To utilize contaminated biosolids as an alternative cement kiln fuel which can be substituted for fossil fuels and thereby demonstrate the value of biosolids as a renewable fuel.	AUS

Flagship(2) :Hazardous Wastes

Solvent-Based Fuel in Cement kilns(sub2)

Issue

- Automated emptying, cleaning and recycling of steel drums containing hazardous wastes.
- The separation of water from hazardous and flammable waste liquid material.
- The pre-processing, handling, transportation, storage and firing of sludge fuel at cement kilns.

・・・ etc.

Progress

- Completed detailed process design and cost estimate for the solvent dewatering plant.
- Commissioned the drum recycling system which is scheduled to be announced by the Australian Government.

・・・ etc.

Next!! (By June 2010)

- Commission the solvent dewatering plant.
- Commission the high CV Distillate(HCD)kiln system.
- Disseminate findings to member countries.

・・・ etc.

Flagship(2) :Hazardous Wastes

Utilizing Bio-solids in Cement Kilns(sub3)

Issue

- The pre-processing, handling, transportation, storage and firing of bio-solids.
- Use of fuel supplements to maximize the value of bio-solids as a fuel where this is shown to be viable.
- Management of the cement process to minimize emissions of heavy metals and reducing impact of bio-solids processing on cement quality・・・etc.

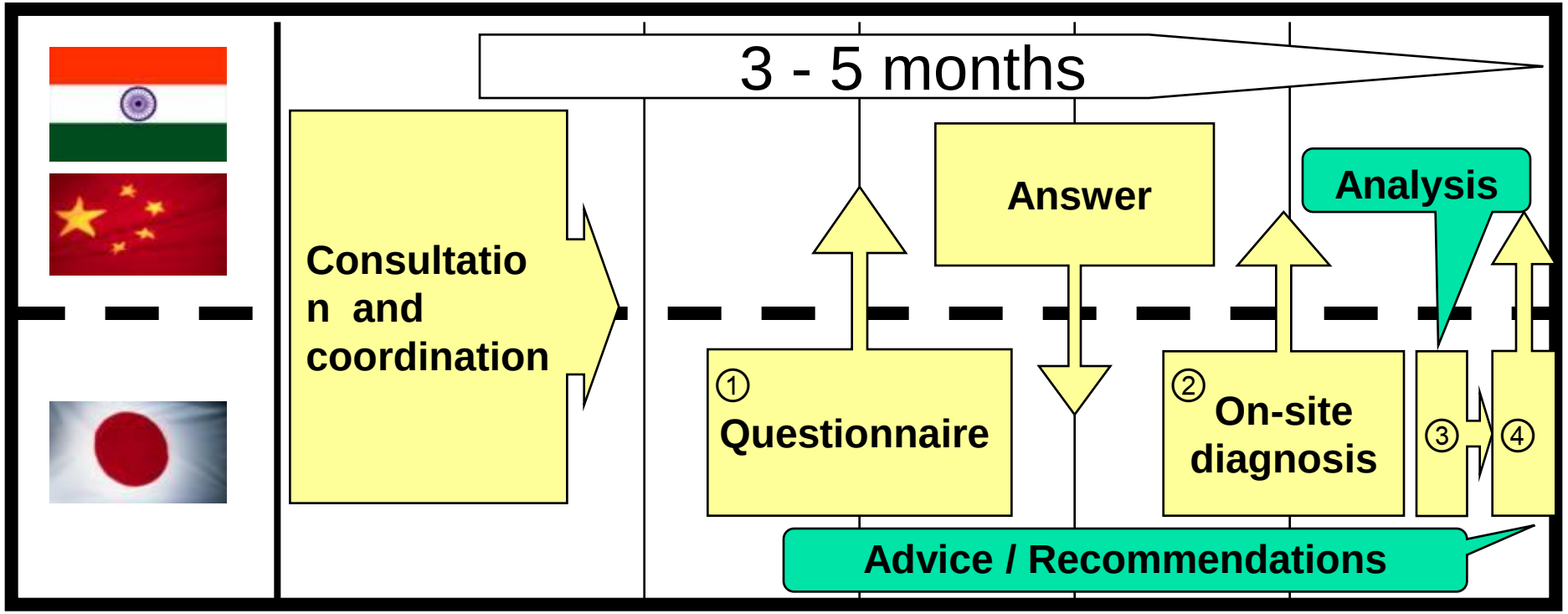
Progress

- Signed MOU agreement on Project development between two private companies.
・・・etc.

Next!!(By May 2010)

- Conduct a feasibility study concerning "bio-solids sampling", "facility design for both the supply and processing of bio-solids" and "identifying mercury emissions technology"
・・・etc.

Flagship(3) :Performance Diagnosis

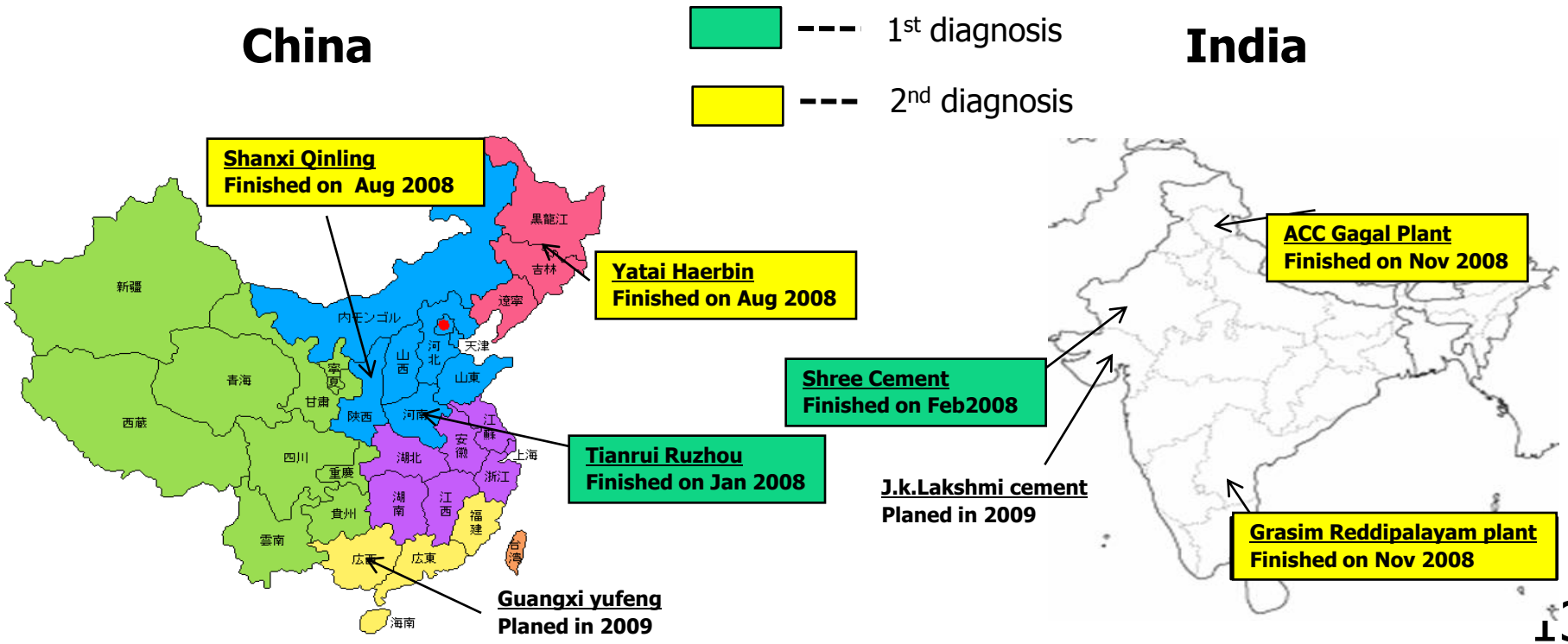


Case Study, Best Practice

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

Flagship(3) :Performance Diagnosis

- **Carried out the 2nd performance diagnosis in India (Nov. 2008) and explanatory meeting for the 2nd performance diagnosis in India (Feb. 2009)**
- Make other diagnoses respectively by end of 2009.



Flagship(3) :Performance Diagnosis

<Observations of 2 factories which carried out the 2nd diagnosis>

- The energy(fuel + power)efficiency is good, even compared with the Japan's cement industry.
  *Utilization of high percentage of substitute raw materials which proceed less energy intensity and two relatively modern cement plants seem to be contributing to this efficiency.

ACC-Gagal Cement Works

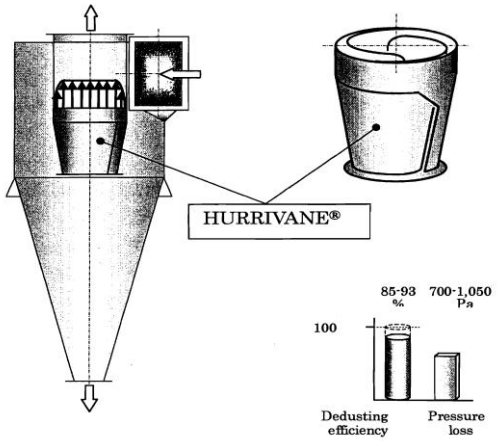
Grasim-Cement Division South Works

Flagship(3) :Performance Diagnosis

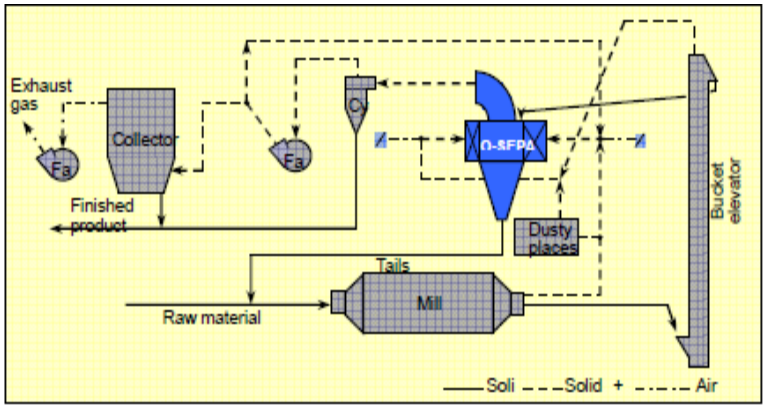
A common recommendation for these two factories

Further energy saving will be possible by introduction of the following facilities

- Adopting Low-Pressure-Drop top Cyclone for Pre-heater → **Expected generally effect:0.5kwh/t-clinker**
- Adopting High-Efficiency Separator for Cement Mill → **Expected generally effect:0.5-1.5kwh/t-cement**



Structure of Low-Pressure-Drop top Cyclone



Structure of High-Efficiency Separator

Flagship(3) :Performance Diagnosis

Conducting a review on all recipients of performance diagnosis for their views and opinions.

Survey Questions

1. Was the performance diagnosis good/effective to the energy conservation/environmental protection measures of your company?

   ・Good/effective
   ・Not good/not effective

   Please also provide reasons to justify your answer to the above in the space below.

2. After the performance diagnosis, were there any improvements on your company's energy conservation/environmental protection measures after implementing the advice provided by the Japanese experts? Or do you plan to implement any of the advice to effect improvement?
   Please list the improvements made after you implemented the advice, or the improvement(s) you plan to implement.

   ・Yes, there is an improvement
   ・No, there is no improvement

   Please list the improvement(s) made after you implemented the advice, or the improvement(s) you plan to implement in the space below.

3. Although the advice provided was appropriate, were there any instances where it could not be implemented successfully. Have you encountered this? If yes, please list the reasons why.

   ・Yes, there are instances where the advice could not be implemented successfully
   ・No, the advice worked very well

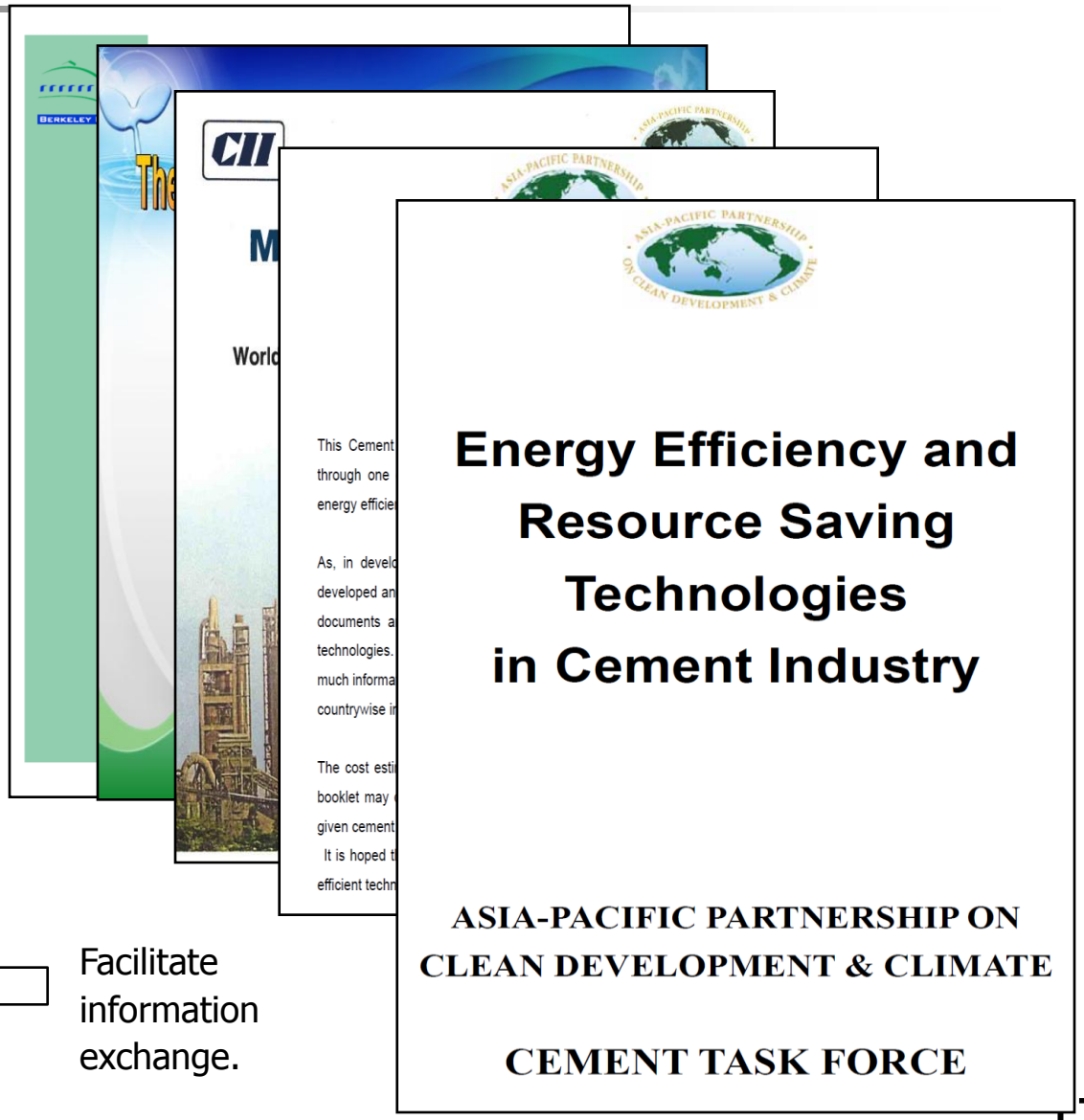
   Please list the reasons why the advice given could not be implemented successfully in the space below.

Thank you very much

Other Projects(1) :Technology Booklet

Compiled and uploaded the Technology booklet on APP Website

http://asiapacificpartnership.org/pdf/projects/cement/APP_Booklet_of_Cement_Technology/pdf



ECRA (European Cement Research Academy)submitted CSI(Cement Sustainability Initiative) the 33 technology papers upon CSI's request.

Facilitate information exchange.

Other Projects(1) :Technology booklet

About 100 technologies were compiled in the technology booklet

Item	Vertical roller mill for raw materials	Application process: Raw material process
Background	Grinding raw materials needs lots of energy. Tube mills had been used for grinding, but the energy efficiency level was lower. Therefore, the introduction of highly efficient grinding equipment was anticipated.	
Descriptions	The vertical roller mill has high energy efficiency and the installation space is smaller compared with tube mills. These days, the vertical roller mills have been widely 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 rollers. B) Feature (1) The power consumption level for grinding is lower than that of tube (ball) mill. (2) The remaining time of raw materials in this type of mill is much shorter than that in tube (ball) mill; therefore, the crushing process and mixing process became more harmonized and this contributes to quality control. (3) The installation space is smaller and this leads to lower noise level. (4) This type of mill can crush materials which are too large to be fed into the tube (ball) mill. (5) Ground materials are dried by the flue gas from the kiln.	
Results	Table Energy saving effect of the vertical roller mill	
Cost estimation	About 14million US$ [Newly-built] and about 230 million US$ [retrofitted], including the cost of supplemental facilities [200t-RM/h] [1US$=¥110]	
Related matters		
References		

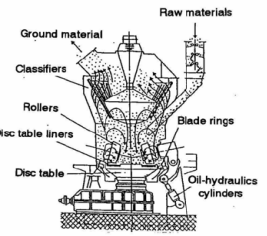


Fig.1 Vertical roller mill

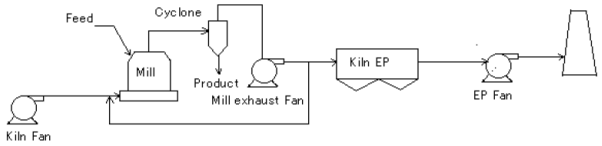


Fig.2 Schematic process flow of vertical roller mill for grinding of raw materials

Vertical roller mills are adopted in 20 cement plants (44 mills) in Japan.

		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

Item	The new suspension pre-heaters burning system	Application: Burning process
Background	Clinker burning system for has switched from wet-process kilns to more efficient suspension pre-heater (SP) type since 1965. But in an SP burning furnace, all materials were fully combusted at once and this gave damage to the refractory inside. Besides with the increasing cost for maintenance, adhesion troubles in the pre-heater arouse, and it hindered from long time operation or capacity expansion.	
Descriptions	To solve those problems, a separate pre-calciner was installed within suspension pre-heater, which enabled reduction of specific energy consumption per unit clinker by 50-60%. This technology was developed and applied in Japan. With SP type burning furnace, the raw materials were only 20-30% calcined at the kiln gate. While with the NSP type, it reaches over 90%. This reduces heat energy consumption in the rotary kiln for clinker production to approximately 40-50%, enhance production level, and mitigate damage to the refractory materials in the kiln. NOx emission levels are also reduced. These days, up to 320 days operation a year became possible thanks to this technology.	
Results	1. Max. output increment SP type burning furnace 4,000t/d; NSP type 10,000t/d 2. Reduction in average unit consumption of energy (in calorific value) SP type burning furnace 3,470~3,600kJ/kg; NSP type 2,930～3,350kJ/kg 3. Reduction in NOx emissions compared with SP type burning furnace, due to lower combustion temperature and two-staged combustions prevailing in a precalciner 4. Reduction of specific consumption of refractory SP type burning furnace 800～900g/t-cl; NSP type 500～600g/t-cl	
Cost estimation	About 273 million US$ for new facility from “Raw material process” to “Burning process” [4000t-clinker/d] [1US$=¥110]	
Related matters		
Reference		

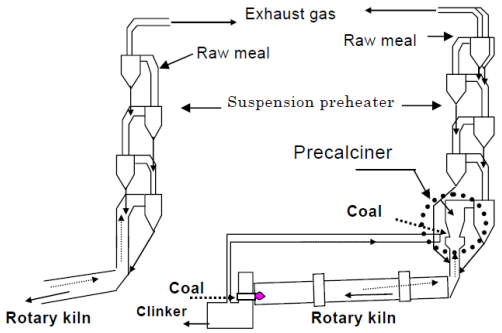
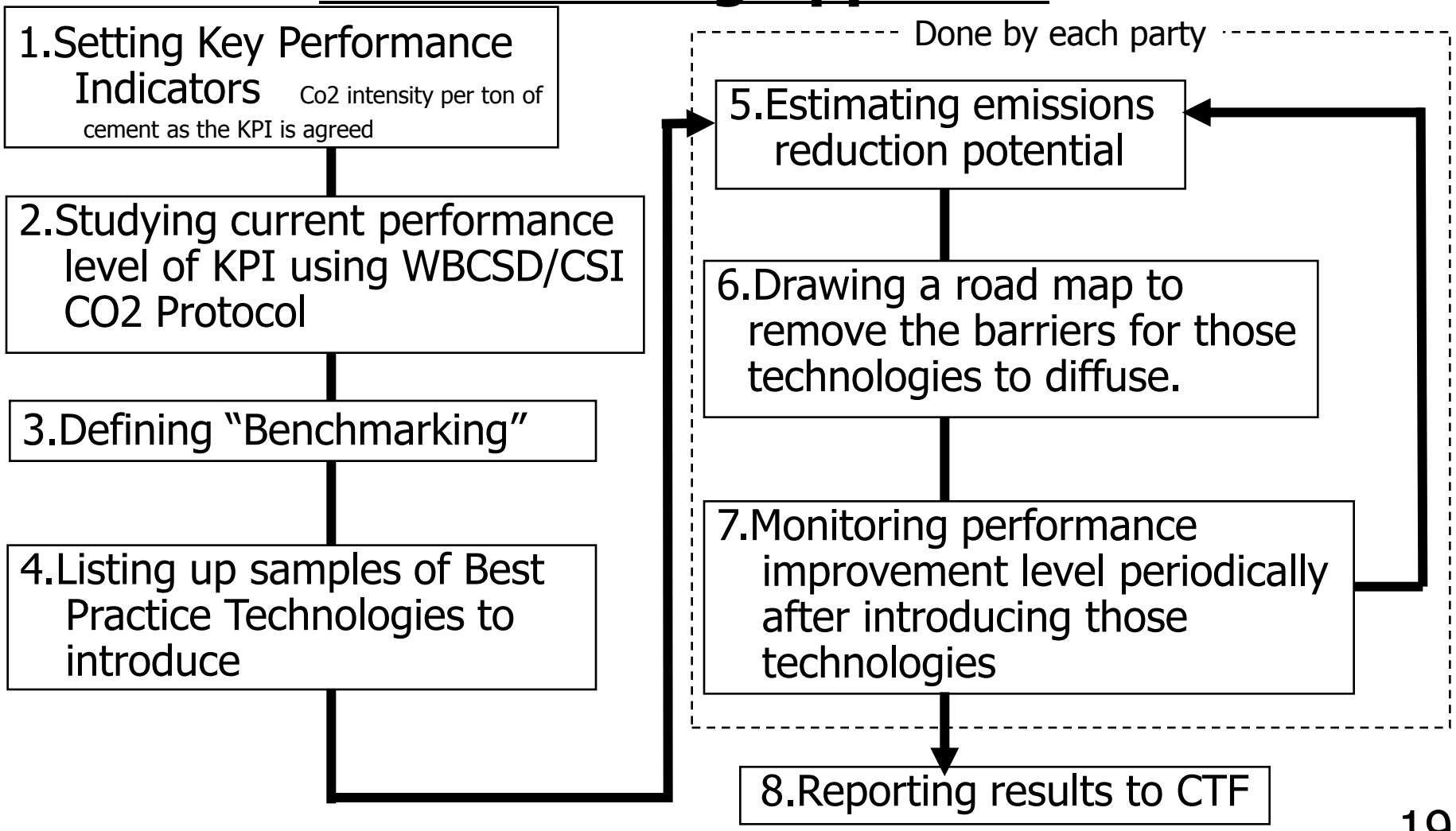


Fig.1 Suspension Preheater Fig.2 New Suspension Preheater

Other Projects(2): Benchmarking Development

Benchmarking Approach



Other Projects(2): Benchmarking Development

Best-Cement Program

-To evaluate the impact of selected energy efficiency measure-

Oct.2008: workshop in Chengdu, China

- Hosted by the Sichuan Provincial Economic Commission
- Experts from Lawrence Berkley National Laboratory, China's Energy Research Institute, China Cement Association, etc.
- About 30 participants attended.

***About 150 cement plant staff from nearly 100 cement facilities were trained in the use of Best-Cement program so far.**

Other Projects(9): The Effect of Cement Concrete as a CO_2 Sink

purpose

- To develop "estimation model" of CO_2 absorption from concrete structures and used concrete.
- To evaluate its sink effect.
- To suggest revision of CO_2 emissions calculation protocol to IPCC

Progress

- Nov.2008: Acquire financial support from the Korean Government grants. (Total:US$159,000/yr)
- Apr.2009: Start quantitative analysis and verification of CO_2 sink capacity by cement paste and mortar.

Next!!

- 2009-2011: conduct basis research in cooperation with partner countries for 3 years.

Future Plans

Next Step for further progress

- Action Plan is scheduled to be revised by each lead partner country and be approved by members at next CTF.
- Figure out the APP7 aggregated CO2 reduction potential and evaluate progress in achieving milestones.
- Focus technical diffusion and capacity building through COE
- Facilitate outreach in cooperation with WBCSD/CSI, IEA and CEMBUREAU, etc.
- Discussion on key themes(supplementary cementing materials, monitoring performance improvement, road maps for removing barriers, etc.)

Future Plan

Next Cement Task Force

Next Cement Task Force will be held in Korea,14-15 July.

Outline of Draft Agenda

- **Update and discussion on the projects of the CTF Action Plan**
- **Reporting on the "position paper on a Sectoral Approach to GHG management, " which was released by CEMBUREAU, JCA and PCA**
- **Discussion with relevant international organization such as IEA, CSI and CEMBUREAU**
- **Discussion concerning development of new technology with ECRA and equipment suppliers**

Thank you for your attention.

Cement Task force