

Mid-Term Review of Environmentally Sound Management of Hazardous and Industrial Wastes in Cement Kilns in China– Phase II

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Mid-Term Review

of

Environmentally Sound Management of
Hazardous and Industrial Wastes in
Cement Kilns in China – Phase II

(CHN-2150; 09/059)

Final Report

29. October 2014



Preface

An independent review is part of the normal project cycle in Norwegian-supported projects. The Norwegian Embassy in Beijing and The Ministry of Commerce of the People's Republic of China (MOFCOM) decided to carry out a mid-term review of the project "*Environmentally Sound Management of Hazardous and Industrial Wastes in Cement Kilns in China, phase II*".

The Review team consisted of the following members:

- Ms Helle Biseth; Senior Adviser/Team Leader; Norad (Norway)
- Mr Torgrim Asphjell; Senior Adviser; Norwegian Environment Agency (Norway)
- Dr Jianguo Liu, Professor, School of Environment, Tsinghua University (China)

The field work was undertaken in September 2014. A draft report was submitted to relevant parties for comments on 14th October 2014. Norwegian Embassy in Beijing, MOFCOM, FECO (including CRAES and SCC-MEP) and SINTEF gave their comments to the draft report. The comments, including some feedback from the Review Team, can be found in Annex VII. The Final Report has incorporated the comments where relevant.

The Review Team will like to thank the Norwegian Embassy in Beijing, FECO and CRAES for excellent cooperation and facilitation of the review mission. We will also like to thank all the other people and institutions who have contributed by sharing information and insight. A special thanks to the management and staff of Liulihe Cement Plant and Huaxin Cement Plant for guiding us around their facilities and sharing their thoughts with us.

Last, but not least, we want to thank our interpreter Ms Lanny Jin for assisting us both with interpretation and with translation of some key documents.

Oslo, 29th October 2014
Helle Biseth
Senior Adviser (Team Leader),
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List of acronyms and abbreviations

Basel Convention	-	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes
BMSCC	-	Beijing Municipality Solid Waste and Chemical Management Centre
CBMA	-	China Building Materials Academy
CRAES	-	Chinese Research Academy of Environmental Sciences
EPB	-	Environmental Protection Bureau
FECO	-	Foreign Economic Cooperation Office under MEP
HPSWMC	-	Hubei Provincial Solid Waste Management Centre
HW	-	Hazardous Waste
IR	-	Inception report
MEP	-	Ministry of Environmental Protection (China)
MFA	-	Ministry of Foreign Affairs (Norway)
MOFCOM	-	Ministry of Commerce (China)
MSW	-	Municipal solid waste
NOK	-	Norwegian kroner
Norad	-	Norwegian Agency for Development Cooperation
POPs	-	Persistent Organic Pollutants
PMG	-	Project Management Group
RMB	-	Ren Min Bi (Chinese currency – Yuan)
SCC-MEP	-	Solid Waste and Chemical Management Centre under MEP
SINTEF	-	Foundation for Industrial and Scientific Research of Norway
SPSWMC	-	Shaanxi Provincial Solid Waste Management Centre
Stockholm Convention	-	Stockholm Convention on Persistent Organic Pollutants
The Embassy	-	Royal Norwegian Embassy; Beijing
The Project	-	The project "Environmentally Sound Management of Hazardous and Industrial Wastes in Cement Kilns in China, phase II". The project is also sometimes referred to as “the co-processing project” in the report.
The Team	-	The Review Team that conducted this Review
ToR	-	Terms of Reference
UNFCCC	-	United Nations Framework Convention on Climate Change

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Executive summary

The Review Team has assessed the relevance, design, progress, efficiency, outcome, impact and sustainability of the project *CHN-09/059 Environmentally Sound Management of Hazardous and Industrial Wastes in Cement Kilns in China, phase II*. The main project implementation partners are FECO and CRAES (China) and SINTEF (Norway).

The cooperation between Norwegian and Chinese environmental authorities is based on a MoU between the two countries. Safe disposal of waste, both municipal waste and hazardous waste, constitutes a major challenge for China. At the same time, China is the largest cement producer in the world and modern cement kilns are very suitable for co-processing of waste. Norway has long experience in using cement kilns for this purpose, and SINTEF has been in the forefront of developing the necessary technology. The *relevance* of this project is seen as high for both China and Norway.

The Team has pointed to some minor weaknesses in the project design, but as a whole the project document and the Inception Report form a good basis for project implementation. In the Inception Report, assumptions, main risks and possible mitigation measures are included and the project partners should be recommended for the thorough work on this.

The total financial contribution from MFA/the Embassy is NOK 18 610 000. Additional to this, SINTEF is co-funding the project through subsidizing its hourly rate and China provides co-funding by providing staff, facilities and some local travel. The cement plants chosen for the pilots invest their own funds in pre-treatment facilities and in upgrading their cement kilns to handle co-processing.

The Embassy transfers funds to FECO and SINTEF based on disbursement requests specifying the budget for the next 12 months. According to Norwegian public financial regulations, up-front disbursements should only be done for a 6-month period. In addition, the parties have requested amounts far above the actual expenditure resulting in funds accumulating in project accounts. The Annual Report should be one comprehensive report, not as the present report where the main body of the report is the Chinese report, but with an annex from SINTEF.

The Inception Phase was unnecessarily long. Experience from many similar projects show that the project partners must allocate enough time for the preparatory phase taking into account that contracts between the various parties have to be negotiated and signed.

As regards technical progress, the overall picture is that the project is making good progress towards contributing to environmentally sound co-processing of many different types of waste. Many of the technical challenges have been solved, and a number of official guides and standards have been produced or are in the pipeline. Close co-operation with the cement industry and recent work on a policydocument is paving the ground for co-processing on a large scale.

For the remaining project period, the Team recommends that the work on pre-treatment, dioxin, mercury and CO₂ is strengthened through increased integration of the activities already performed under these outputs. This implies that more documentation must be made

easily available to all participants and, if necessary, translated. Some of the general technical reports should be updated and complemented to reflect Chinese specific conditions in more detail. The work on a National Plan could be further strengthened by involvement of international experts.

One of the main achievements of the project is that it has provided a platform to share knowledge and experiences both within the industry and for public institutions, but most importantly an arena where the authorities and the industry can meet and share information and discuss challenges. Approved standards for co-processing have been important for the cement industry. SINTEF's expertise have been highly appreciated by all project partners, especially the expertise SINTEF has on hazardous waste and on pre-treatment.

The efficiency of the project is deemed satisfactory. The Chinese partners (CRAES, CBMA, SCC-MEP) are paid upon achieved results, and bearing in mind a delayed start on the actual implementation phase, the activities have been carried out within the agreed financial – and time frame. SINTEF delivers its technical input and training efficiently and no additional administrative services are invoiced the project.

Both the direct outcome and the wider impact of the project is deemed very satisfactory. Cross-cutting issues and sustainability elements have been assessed and no major challenges have been identified. However, the three main project partners must make sure that the knowledge is embedded in the institutions, not only with some key staff.

1 Introduction

1.1 Project Rationale

Safe disposal of waste constitutes a challenge for all countries, and this is particularly relevant for China with its huge and dense population and rapidly growing economy. Traditionally, waste handling in China has focused on landfills and has in recent decades been supplemented by incinerators – especially for hazardous waste. However, these solutions have proved to be insufficient due to scarcity of land and economic considerations.

China is the biggest cement producer in the world and modern cement kilns have characteristics that make them suitable for co-processing of waste. In this process, waste is fed into the kiln together with coal. Due to high combustion temperatures, many types of hazardous waste can be neutralized. In addition, energy rich waste can substitute coal, and some types of waste can even serve as useful raw materials for the cement production.

Phase I of the Project focused on environmentally sound co-processing of hazardous wastes like pesticides and polluted oils. Studies, capacity building and test burns were conducted. The purpose was to draft guidelines on co-processing to be used by Chinese authorities when issuing permits for co-processing in cement plants. In phase II, additional components related to handling of (energy rich) municipal solid waste and pre-treatment were added.

Norway has long experience in co-processing in cement kilns. Norway has chosen not to build specialized facilities for destruction of hazardous waste, instead the countries two cement plants are being used for this purpose. Waste is also used to substitute coal as energy; in the

cement plant in Brevik approximately 60 percent of the energy for the cement production is based on various types of waste. SINTEF has been in the forefront of developing the technology for pre-processing and co-processing and is therefore seen as an attractive technical partner for the Chinese environmental authorities and research institutions.

1.2 The framework for cooperation between China and Norway

The cooperation between Norway and China is based on a MoU between MFA and MOFCOM on technical cooperation stating that «projects in technologically and geographically most needed areas in China will be given priority, within the field of environment and climate...». The priorities for cooperation are further outlined in the MoUs between the Environmental Ministries of the two countries. The first MoU was signed in 1995 and then later replaced by a new MoU in 2008. The objective of the present MoU is “to promote cooperation between the Parties in the field of environmental protection and sustainable development on the basis of equality and mutual benefit.” The MoU outlines the following priority areas for cooperation on environmental policy and management: (main priority areas for this project corresponding with the MoU priorities in *italics*) (i) Water and air pollution; **(ii) Waste disposal and management; (iii) Chemicals and hazardous waste;** (iv) Nature conservation, biological diversity and natural resources; **(v) Climate change issues; (vi) The integration of environmental concerns into sector policy;** (vii) Public environmental awareness; **(viii) Environmental industry and technology;** (ix) Other areas as mutually agreed upon.

1.3 Specific Chinese priorities related to the project under review

In recent years, Chinese government has issued a series of guidance policies to promote the application of cement kiln co-processing of waste, which is used as a prominent tool to substitute both energy and raw materials in the cement production as well as deal with the challenge of waste disposal with regard to both municipal solid waste (MSW) and hazardous waste.

The success of the co-processing industry rely on suitable waste, mature technologies and environmentally sound management. The priorities of China in solid waste co-processing in cement industry is as follows:

- (i) to promote solid waste co-processing in cement industry through capacity building, information sharing, technological demonstration and policy or economic encouragement;
- (ii) to regulate solid waste co-processing in cement industry through standards (waste acceptance, pollution control and cement quality), specifications and guidelines;
- (iii) to evaluate the positive (high efficiency of pollutants destruction, energy saving, emission reduction, CO₂ reduction, etc.) and negative effects (possible extra emission, nuisance, cement quality, etc.) of co-processing based on full-scale application;
- (iv) to make a national strategy to promote and regulate solid waste co-processing in cement industry in China.

According to MOFCOM, the project has played an important role in the development of co-processing in China. The project is supporting the development of standards and technical guidelines based on the Chinese situation, and Chinese cement companies have increased

their own competence through the guidance of the project. The project has also acted as a platform to share the latest policies, knowledge and technology, and the project has linked relevant stakeholders as governmental authorities, research institutions as well as cement industries both within China and internationally.

Because co-processing of solid wastes has proved to be a win-win strategy for both cement industry and waste owners, there has been a considerable increase in cement plants involved in co-processing of solid wastes. However, the cement plants in China today mainly utilize ordinary industrial solid waste (such as fly ash from coal fired power plants, desulfurization gypsum, iron and steel furnace slag) as alternative raw materials. Different – and more challenging - waste categories are studied in the project (MSW, fly ash from MSW incineration, sewage sludge, POPs contaminated soil, etc.).

1.4 Specific Norwegian priorities related to the project under review

The Norwegian financing for the co-processing project is drawn from funds earmarked for support to technical cooperation in specific fields among them environment and climate change (MFA budget line “165.71 Technical co-operation”). The Norwegian Embassy in Beijing receives a total annual allocation of approximately NOK 60 million earmarked technical co-operation, and based on the MoU between the Ministries of Environment of the two countries, these funds have mainly been allocated to environmental cooperation.

The thematic area for the project under review is well aligned with the priorities outlined in the MFA’s Action Plan for the Environment in Development Cooperation (2006-2015) which covers hazardous substances.

Output 6 of the project; “A quantitative estimate of the CO₂-reduction potential which can be accomplished by the cement industry through co-processing and proposed measures for further emission reduction” is highly relevant given Norway’s (and China’s) high priority on reduction in CO₂ emissions and the upcoming climate negotiations in Paris in 2015.

1.5 Methodology

The methodology used in this Review is aligned with Norad’s guidelines for project reviews as outlined in the *Development Cooperation Manual* and the *Guidelines for Assessment of Sustainability Elements and for Result Management*. The Norwegian Embassy in Beijing prepared the Terms of Reference (ToR) with input from FECO and Norad. The ToR states that the main purpose of the review is to assess if progress have been made in accordance with the work plan and budget, and to assess the effectiveness and efficiency of the program. Some question related to issues specific to this project was also a part of the ToR. The ToR is enclosed as Annex I.

The review is based on a desk study of written documentation and on interviews with the main partners and stakeholders. The Team has not done a full peer review of the documentation, but the reports/manuals produced by the project have been assessed with a focus on their alignment with Chinese local conditions. A key question has been if the Chinese partners in the project have found them useful.

The Review Team met with the following institutions at national level in China:

- Norwegian Embassy, Beijing;
- Ministry of Commerce (MOFCOM) (e-mail exchange);
- Ministry of Environmental Protection (MEP);
- Foreign Economic Cooperation Office (FECO) under MEP;
- Chinese Research Academy of Environmental Sciences (CRAES)
- China Building Materials Academy (CBMA);
- Solid Waste and Chemical Management Centre under MEP (SCC-MEP);

The Review Team visited two of the pilot sites for the project;

- (i) Beijing Municipality: Liulihe Cement Plant, Eco-Island Environmental Technical Cooperation (pre-treatment), Beijing EPB, Beijing Solid Waste Management Centre;
- (ii) Hubei Province: Huaxin Cement Plant (Wuxue); Provincial, City and Local EPBs and Solid Waste Management Centre.

The two Norwegian members of the team have met with the Norwegian partner SINTEF.

The outline of the review report is as follows: The Project description and the Review Team's assessment on project design can be found in *chapter 2*. The qualitative assessment of the achievements and challenges of the project can be found in *chapters 3 and 4*, while *Annex II* gives a quantitative summary of the activities and products under the various outputs, and in *chapter 5* the main conclusions and recommendations are summarized. The list of documents reviewed can be found in *Annex III*, list of people met in *Annex IV*. The organisational set-up of FECO (*Annex V*) and a matrix produced by FECO showing the gender balance among personnel directly involved in the project and among participants in the main competence building activities (*Annex VI*) are also enclosed. The comments on the draft report received from the various stakeholders are enclosed as *Annex VII*.

2 Project description and comments on project design

2.1 Project background

The first phase of the project; *Capacity Building - Waste Management in Cement Kilns* ran from 2006 to 2010 and had a Norwegian Embassy contribution of NOK 14,5 mill. The main project partners (FECO, CRAES, and SINTEF) were the same, and planning of phase II started towards the end of phase I. All implementing institutions have expressed that they have been satisfied with the way they were included in the planning process.

Based on a project proposal dated 24th November 2010, the Agreement for the phase II project "*Environmentally Sound Management of Hazardous and Industrial Wastes in Cement Kilns in China*" was signed by the Norwegian Embassy in Beijing on behalf of the Ministry of Foreign Affairs on behalf of Norway and the Ministry of Commerce of the People's Republic of China (MOFCOM) on behalf of China on the 30th November 2010.

A contract between FECO and SINTEF was signed on the 19 January 2011. During the Inception Phase, the parties made detailed plans for project implementation, and FECO signed contracts with the various Chinese implementing institutions.

2.2 Project design

The goal, purpose, outputs and other project design elements are given in the project proposal, in the Agreement and in the Inception Report (IR). Both the numbering of the outputs and the wording used are slightly different in the various documents, and also what is referred to as “outputs” are identical to what is sometimes referred to as “activities”.

Below is the Goal, Purpose and Outputs based on Chapter 4 of the IR:

Project (Development) Goal:

China’s compliance with the Stockholm Convention and the Basel Convention is further strengthened through sound adoption of innovative ways of waste management.

Indicator: *The number of cement plants practicing co-processing has increased significantly from the 2010-level and that relevant standards and guidelines are used by EPBs and related enterprises in their daily management practice.*

The *Development Goal* is in the Team’s opinion relevant, but a clearer linkage between the projects output/outcome and the Development Goal could have been explained in the project proposal. The Goal could also have referred to the United Nations Framework Convention on Climate Change (UNFCCC) since co-processing of waste in cement-kilns in China can be important as a CO₂ mitigation measure.

The *indicator* should have been more closely linked to China’s fulfilment of its obligations under the Basel and Stockholm conventions. The present indicator is almost similar to the second indicator linked to the purpose (see below).

Purpose:

To continue to build capacity and to establish awareness about the possibilities and limitations of co-processing of waste materials in cement kilns through extensive information dissemination, to amend the technical information basis to cover pre-processing and pollution prevention, and to assist in practical testing of the guidelines and standards.

Indicators: *(i) The guidelines and standards have been tested together with EPBs and local industry; (ii) More than twenty cement plants are practicing co-processing after the project completion.*

The *Purpose* is in the Team’s opinion also well formulated and can be achieved by the project. The indicators are directly linked to the purpose. The number of cement plants doing co-processing in China can be calculated using different parameters and definitions of co-processing, so what we expect the project want to achieve is that “more than twenty” cement plants do co-processing of the types of waste that have been tested out under the project.

Outputs: (ref chapter 4.3 in the IR)

1. Further optimize Standards and Guidelines developed in the first phase so that they can meet the needs for environment management.
2. Guidelines for pre-processing and pre-treatment of wastes prior to co-processing have been developed and tested;

3. Co-processing of problematic high volume wastes such as fly-ash from waste combustion, sewage sludge, municipal solid waste (refuse derived fuel - RDF), POPs and POPs contaminated soil etc. have been systematically evaluated through pilot testing in practical projects, preferably in Western and Southern regions of China, and the results are evaluated and reported.
4. A quantitative estimate of the release contribution of dioxins and furans from co-processing of wastes in the cement industry and proposed measures for further emission reduction;
5. A quantitative estimate of the release contribution of mercury from co-processing of wastes in the cement industry and proposed measures for further emission reduction;
6. A quantitative estimate of the CO₂-reduction potential which can be accomplished by the cement industry through co-processing and proposed measures for further emission reduction;
7. Input and basis for a national plan and a strategy for the implementation of large scale co-processing in China;
8. Three study tours to other countries for in total 18 people;
9. Series of National technical conferences on the possibilities and limitations of co-processing of waste materials in cement kilns, disseminating and discussing the findings of project;
10. One International scientific high level conference focusing on sharing of experiences and building capacity;
11. Six papers on co-processing in National Chinese Technical Journals disseminated to the entire Chinese cement industry;
12. Three articles describing the findings of the Sino-Norwegian project in recognised international peer-reviewed Scientific Journals;
13. A practical and informative video explaining co-processing in Chinese and disseminated to the entire Chinese cement industry and relevant authorities.

The number of outputs are unnecessary high, and as said above, it creates confusion that they are sometimes also referred to as activities. In the Annual work plan annexed to the IR, the number of outputs (or outcomes(?), this is unclear to the review team) are reduced to 7. The Review Team will advise the partners – if a next phase of this project is agreed upon – to separate more clearly between “outputs” and “activities”, and to keep the number of outputs lower. Professional project planning assistance could be used. Project implementation as well as reporting is easier if goal, purpose, outputs and activities are logically formulated and consistent.

The list of indicators are almost identical to the list of outputs and of no real use. Apart from this, the result hierarchy is logical; i.e. if the planned outputs are delivered this will lead to the “purpose” being achieved.

In the IR, assumptions, main risks and possible mitigation measures are included. Thorough work seems to have been put into this, and the Review Team wants to recommend the project partners for this.

2.3 Participating Chinese and Norwegian institutions

The Review Team has found it useful to give some background information on the main project partners and their role in the project under review:

Ministry of Commerce (MOFCOM)

MOCOM is the Agreement partner on the Chinese side for the project. MOFCOM has delegated the responsibility for implementing this project to Ministry of Environmental Protection (MEP)/ Foreign Cooperation Office (FECO).

Ministry of Environmental Protection (MEP)

MEP is the technical responsible ministry for the project. The following departments have been actively involved in the project: Department of Pollution Prevention and Control, Department of Science, Technology and Standards and Department of International Cooperation.

Foreign Economic Cooperation Office (FECO)

FECO is an affiliated institution under MEP. FECO has several Project Management Divisions; Division V has the responsibility for the Stockholm Convention on POPs and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. FECO's Division V is in charge of the Project under review and has appointed one of its staff as project coordinator for this project.

Chinese Research Academy of Environmental Sciences (CRAES)

CRAES is the largest, multidisciplinary national environmental research institute in China. The research fields of CRAES include water environment, atmospheric environment, solid waste treatment and recycling, cleaner production and circular economy, ecology, climate change, and development of environmental standards. CRAES is the main technical coordinator for this project.

China Building Material Academy (CBMA)

CBMA is the largest comprehensive research, development and design conglomerate in China, covering cement, concrete, wall material, glass, ceramics, refractory and new materials. CMBA works closely with the cement industry and is an important technical supporting institution for this project.

Solid Waste and Chemical Management Centre (SCC-MEP)

SCC is an affiliated institution under MEP, responsible for technological support for industrial and hazardous waste, hazardous chemicals and contaminated site management at national level in China. SCC-MEP conducts national surveys and is responsible for drafting of the National Strategy under this project.

Environmental Protection Bureau (EPB)

The EPB is the administrative authority in charge of supervision and management of overall environmental protection issues in provincial and local level. In this project, the team met with the EPBs in Hubei Province and Beijing Municipality. The EPB has different divisions including air pollution control, water pollution control, solid waste and noise pollution control, ecology protection, radiation safety management, international cooperation, environmental monitoring, environmental impact assessment management, etc.

Beijing Municipality Solid Waste and Chemical Management Centre (BMSCC)

Beijing SCC is an affiliated institution under Beijing EPB, responsible for technological supporting for industrial and hazardous waste, hazardous chemicals and contaminated site management at municipal level in Beijing. Beijing SCC coordinates supports and supervises test burns in Beijing Liulihe Cement Plant and pre-treatment in Eco-Island Co. Ltd. under this project.

Hubei Provincial Solid Waste Management Centre (HPSWMC)

Hubei SWMC is an affiliated institution under Hubei EPB, responsible for technological support for industrial and hazardous waste, hazardous chemicals and contaminated site management at provincial level in Hubei. Hubei SWC coordinates supports and supervises test burns in Huaxin Wuxue Cement Plant under this project.

Cement industry

Several cement plants are involved in this project as demonstration or test plants. Beijing Liulihe Cement Plant, with clinker production capacity 4 500 ton/day, is the pilot plant for co-processing Municipal Solid Waste (MSW) incineration fly ash. Hubei Huaxin Wuxue Cement Plant, with clinker production capacity 10 000 ton/d, is the pilot plant for co-processing MSW and contaminated soil.

SINTEF

SINTEF is a Norwegian private, non-profit research group organized in the form of a foundation with a number of subsidiary companies. SINTEF has around 2 100 employees and out of them 1 360 are researchers. SINTEF had a NOK 2.9 bill turnover in 2013 and took part in a total of 9 000 projects in 67 countries. SINTEF has long international experience and valuable competence in co-processing of waste in cement kilns, and the institution has a wide network of useful industry contacts. SINTEFs Annual Report 2013 can be downloaded from www.sintef.com.

2.4 Inputs

2.4.1 Project input

The total financial contribution from MFA/Embassy is NOK 18.610.000. The various implementing partners receive the following amounts:

Institution	Amount (NOK)	Comments
SINTEF	9 727 000	To be paid from the embassy to SINTEF
FECO total	8 883 000	To be paid from the embassy to FECO
FECO's own implementation	2 839 000	
FECO -> CRAES	4 935 000	CRAES is subcontracted by FECO
FECO -> SCC-MEP	500 000	SCC-MEP is subcontracted by FECO
FECO -> CBMA	509 000	CBMA is subcontracted by FECO
CRAES -> HPSWMC	50 000	Hubei Province Solid Waste Mngm Centre
CRAES -> SPSWMC	50 000	Shaanxi Province Solid Waste Mngm Centre

Additional to the contribution from MFA, SINTEF *estimates* its own contribution to NOK 3 053 000. SINTEF charges the project a lower hourly rate than their standard rate. According to the contract between FECO and SINTEF, the hourly rate charged to the project is NOK 1 170 (increased to NOK 1 270 in 2013).

Additional to the contribution from MFA, FECO *estimates* the Chinese contribution to the project to NOK 6 030 000. This calculation is based on staff cost and facilities in FECO, in MEP and in the provincial EPBs.

The Cement industry uses its own resources to prepare for and take part in the pilots. 11 plants will take part in phase II, and these plants will need to construct or upgrade facilities for pre-treatment and co-processing. Various figures have been presented estimating the industry input, but the review team has not gone into detail on this issue.

2.4.2 Disbursements and Reporting

According to the Agreement, the embassy is to make semi-annual disbursements to the project. This is based on Norwegian Government Regulation stating that up-front disbursements should only cover 6 months anticipated spending. However, the actual disbursements have been as follows:

2010: One disbursement to each partner (SINTEF NOK 2 590 230, FECO NOK 2 000 000)

2011: One disbursement to each partner (SINTEF NOK 651 761, FECO NOK 925 000)

2012: One disbursement to each partner (SINTEF NOK 3 243 000; FECO NOK 3 255 000)

2013: No disbursement

2014: One disbursement to each partner expected late 2014

Project implementation started very slowly so funds were accumulating in the accounts of FECO and to some lesser degree SINTEF. Both FECO and SINTEF receive the funding before the actual activities are carried out, while FECO disburses funds to the three other implementing partners only after the activities have been undertaken and the agreed outputs produced.

The Review Team will emphasize that both project partners (FECO and SINTEF) must give as good an estimate as possible for their financial need for the next 6 months (NB not 12 months as today), and as part of the disbursement request the unspent funds from the previous period must be deducted. SINTEF must also report on accrued interest. FECO is supposed to report on interest according to the Agreement, but since all Norwegian embassy projects transfer funds to the same account, this is done through a special process where MOFCOM, FECO and the Embassy have to agree on its use. For the project partners it is important to be aware of that the project can apply for some of these interest funds for the benefit of the project if special needs arise.

The Review Team will also advise the Embassy to discuss the practice of up-front disbursements at the next Annual Consultations. In our opinion, SINTEF should invoice the Embassy for work that has been carried out. As for FECO, this is an issue that should be discussed in a broader setting because the mode of payment is relevant not only for this project, but just as much for the other Chinese-Norwegian technical cooperation projects. In a

possible new phase of the project, disbursements based on actual expenditure should be investigated both for financing to the Chinese partner and to the Norwegian partner.

The Norwegian Embassy receives Annual Reporting including financial reporting produced by FECO and SINTEF. The SINTEF report is an annex to the main report, and the financial reporting is also separate for the Chinese side and the Norwegian side. The Review team will strongly advise the project partners to merge their reporting into one consolidated report. The Annual Report must report on achievements compared to plans according to the agreed Inception Report, and highlight if there has been delays or other issues of special concern.

As for the financial reporting, only FECO reports expenditure according to the budget lines given in the approved Inception Report. The financial report from SINTEF only shows a split on man-hours and travel costs. The budget (also for SINTEF) is given with a breakdown of the 13 outputs. If possible, SINTEF should also do their financial reporting per output.

2.5 Project implementation structure

MOFCOM is the Agreement partner on the Chinese side, but as said in paragraph 2.3, the project management is delegated to MEP/FECO. In the SiNoPOP II mid-term review in October 2013, MOFCOM expressed concern regarding the management and the implementation of the SiNoPOP project in particular, but also a general concern over FECO's varying standard of project management. At the following Annual Consultation between MOFCOM and the Norwegian Embassy, these issues were on the agenda. The roles and responsibilities are now clearer and MOFCOM has expressed to the Review Team that they assess the management of the Co-processing project as satisfactory.

The contracts between FECO and the various implementing partners (and between CRAES and the Solid Waste Management Centres of two provinces) outline in detail the responsibility of each partner for the implementation of the project. A budget and a timeline is given for each activity or output, and transfers are normally done once a year based on deliverables. CRAES receives funds from FECO twice a year.

CRAES has entered into sub-contracts with a wide range of Certified Monitoring Centres (i.e. Zhejiang University –contract value 290 000 RMB for the Wuxue cement plant test-run) for technical services related to the pilots.

CRAES also enters into non-binding agreements when needed with the cement plants chosen for the pilots. The companies are not compensated for doing the tests, but the testing fees are paid by CRAES from project funds. The testing fee is used to pay monitoring institution(s) like Zhejiang University (ref above).

In the opinion of the Review Team, the project implementation runs smoothly and the responsibilities of each implementing partner is laid down in legally binding contracts.

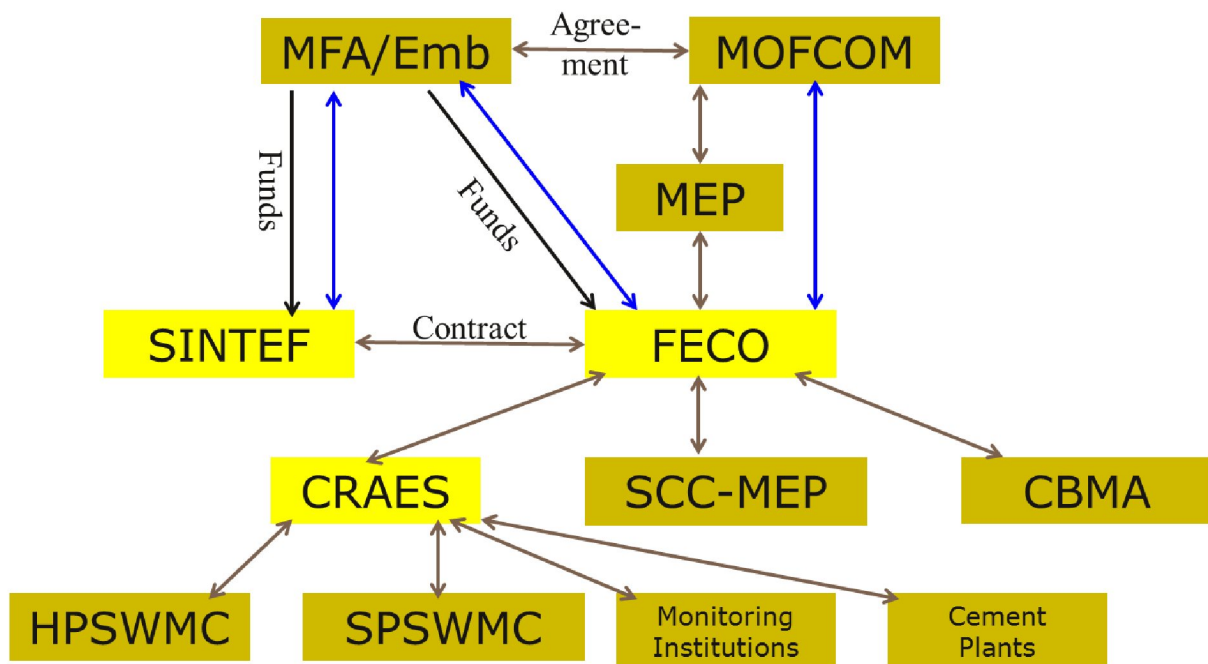
The management structure of the project is not described in the IR, but in the contract between FECO and SINTEF it is said that a *Project Management Group (PMG)* will be responsible for the detailed workplan of the project, assignment of tasks and the daily operation of the project. The PMG consists of

- FECO project manager

- SINTEF project coordinator
- Chinese technical coordinator (CRAES)

The Review Team found that the PMG is operating as a semi-formal structure. The members are in close contact with each other on phone and email, and the PMG will normally meet when the Norwegian project coordinator visits China. In our view, this mode of operation is functioning satisfactory especially because the three members (and their institutions) know and trust each other. However, if the focal point in any of the three institutions change, such a semi-formal mode of operations might become a challenge. The three institutions should be aware of this and seek to formalize contacts to a larger degree if this should be the case.

Below is a figure explaining the relationship between the different project partners. The 3 members of the PMG are in yellow color.



3 Project status assessment

3.1 Assessment of Project Progress and Status

This qualitative assessment of the status of the 13 Output Areas is based on the written material and on interviews with the Chinese and Norwegian project coordinators and staff at the participating institutions and companies.

A detailed quantitative presentation of achievements compared to plans is given in Annex II. This also includes a complete description of outputs, activities and indicators. To enhance readability we have grouped some of the outputs and simplified some of the descriptions in this section.

3.1.1 Status and assessment Output 0: Inception phase

The Inception phase ran from the Agreement between Norway and China was signed late 2010, but the kick-off of the detailed planning process was at a meeting in Beijing in March 2011. The final version of the IR was not completed before in April 2013. The Inception phase was unnecessarily long, but some activities under the other outputs started parallel with the work on the Inception Report.

One important activity in the Inception phase was to negotiate and sign contracts between FECO and the other implementing partners SINTEF, CRAES, CBMA and SCC-MEP. The time involved for contractual work is often underestimated. The process to identify cement plants for the pilots was also a time-consuming process. Some delays can also be because of change of personnel in FECO.

From experience from other Chinese-Norwegian projects, the Inception phase will necessarily take some time and this should be anticipated and planned for. Disbursement requests and transfers of funds from the embassy must be aligned to the actual start of project implementation.

3.1.2 Status and assessment Output 1: Official guidelines and standards

Under this output the official regulatory documents, which were core products of the first phases of the project, are to be optimized and finalized. MEP and the Chinese *General Administration of Quality Supervision* have officially issued one standard and one technical specification on environmental pollution control of cement kilns operation. One standard related to cement quality assurance and one technical specification on co-processing operation were also completed and issued in August 2014. The draft guidelines for co-processing are in the final rounds of drafting.

The above documents are of good quality and are based on European experience and Chinese practices and with reasonable first-hand supporting data. These standards are expected to play an important role in promoting and regulating solid waste co-processing in cement kilns in China. The work has been performed mainly by the Chinese project partners and all the drafts and final documents are Chinese language only. This confirms the strong commitment to the project from the Chinese side. Nevertheless, for the sake of internal project communication and international dissemination some translation might have been beneficial.

This output is almost completed, and key documents that provide a good basis for the government to promote and regulate co-processing have been produced. In the opinion of the Team, the results from this output are very important and of good quality.

3.1.3 Status and assessment Output 2: Longer term testing of co-processing

This output is a further development of the pilot demonstration tests on co-processing of hazardous waste, which were performed during phase I of the project. The present focus is on testing related to co-processing of specific waste categories on a more regular basis. The output includes activities on specific technical reports on co-processing of different waste categories. Six reports deal specifically with Chinese conditions and are of high technical standard, summarizing (i) the status of co-processing industries, (ii) the experiences and

problems of co-processing of problematic wastes, including MSW, fly ash from MSW incinerators, sewage sludge and contaminated soil in China, (iii) the test burn results of co-processing of MSW and POPs contaminated soil in pilot cement plants. Two reports deal with international experiences. These reports are both comprehensive, but one of them (the literature review) is relatively outdated. The reports are in English only and this may have hampered the wider dissemination of this information.

The test burn activities have been extensive, with sampling completed in 7 plants and 4 more planned within the next year. The Team got the impression that this work is well organized and that the participating research institutions and cement companies are enthusiastic and cooperate well.

The work under this output is well on track and when completed the results from the test burns should be adequate to provide a solid basis for planned guidelines on co-processing of MSW, fly ash, sewage sludge and contaminated soil.

3.1.4 Status and assessment Output 3: Pre-treatment of waste

Pre-treatment of waste prior to combustion is a topic that has increased focus in phase II of the project. This topic is important both regarding (local) environment and workers safety. A comprehensive and up to date report on experience on pre-processing in other countries has been produced by SINTEF as the first activity under this output. However, this report has not been translated into Chinese as planned.

Draft guidelines have been produced by the Chinese project partners, but these are rather general and are lacking in detail when it comes to problematic waste such as MSW, sewage sludge and fly ash - for which adequate pre-treatment is crucial for co-processing due to high concentration of moisture and volatile elements. The practical experiences from co-processing MSW and fly ash from MSW incinerators in cement kilns are very limited. Therefore, much more attention should be paid to pre-treatment to guarantee the safety and feasibility of co-processing of the above-mentioned waste categories.

The Team recommends that the work on the guidelines is prioritised to provide more complete guidance for the test burns, and that the translation of the SINTEF-report is completed as planned to assist this work.

3.1.5 Status and assessment Output 4-5: Emissions of dioxins and mercury

Dioxins and mercury are pollutants of high concern both locally and globally, and proper management of these emissions is crucial for the general acceptance of co-processing. In phase II of the project work on these emissions has been singled out as separate outputs. Emissions of these pollutants have been included in the extensive field testing performed under Output 2.

General background information on the industry and regulatory framework is provided by two reports in English. Both of these reports are comprehensive, but the report on dioxins is too old and none of them appears to be tailored towards Chinese conditions and needs. The Chinese reports focus on reduction scenarios and measures. The report on dioxin is too superficial and too general. Because of the dilution effect of cement kiln flue gas, compliance

with the emission standard alone is not enough and can result in underestimation compared to actual total dioxin emissions. The specific measures to prevent and control dioxin should be addressed. The report on mercury is somewhat more detailed and the control measures to reduce mercury input, to improve operation and to enhance retention are concrete.

In the opinion of the Team the work on dioxin, and to a lesser degree also the work on mercury, should be strengthened during the remaining project period. Increased integration between the different components of this output (general reports, test results and reports on reductions/measures) might be a way forward to achieve this.

3.1.6 Status and assessment Output 6: CO₂ –reduction measures

CO₂-reduction through substitution of coal by energy rich waste is a new project component introduced in phase II. This adds a new rationale to the project, which goes beyond the original focus on safe management of hazardous waste.

A report on sources and abatement (in English) is reported as completed, but the Team recommends that this work is reopened as some crucial data on the Chinese cement industry is missing. Field tests have been conducted in 4 cement plants and data on CO₂ reduction have been collected. At the time of review one test report was completed and of good quality. A 2013 annual progress report on this topic has been finalized and could be a good basis for producing relevant draft recommendations for Chinese policy on CO₂-reduction in cement industry.

The Team concludes that this work is well on track, but that some additional work should be undertaken to ensure that all relevant background information is available for the final drafting process.

3.1.7 Status and assessment Output 7: National plan and strategy

This activity focuses on the development of a National plan and strategy for large scale co-processing in China – something that, if implemented, will have important implications both domestically and globally.

Up until now, work on this output has been performed exclusively by SCC-MEP, while some inputs from SINTEF and other partners were planned for in the IR. Two survey reports on co-processing cement plants and dedicated hazardous waste incineration plants in China have been finalized by SCC-MEP. These reports include extensive statistics data/information and systematic analysis at national level. A draft outline of development strategy of solid waste co-processing in cement kilns in China is ready and could be a good basis for preparing the development strategy.

Although the work by SCC-MEP is of good quality and on track, the Team recommends that SINTEF or policy experts from other countries are included in the work to provide experience on strategies and policies in developed countries.

3.1.8 Status and assessment Output 8-10: Information exchange (study tours, conferences)

Two study tours, to Germany/Belgium and Mexico/USA, have been arranged as planned. Both tours were attended by 6 officials and in addition the cement industry was also represented. Participants the Team met, frequently referred to the study tours as very inspiring and well arranged. Both tours are documented by mission reports. Planning for a third study tour in 2015 is ongoing.

Three domestic events have been arranged. The Team assumes that these events all had a workshop like format primarily intended for a narrower audience. Although the Team is of the opinion that these workshops were well received, also one bigger national conference, as planned for in the IR, might be beneficial for the project. A session on co-processing is planned as part of an international POPs conference in China.

In addition, project partners have actively attended various external conferences and workshops. The Team is of the opinion that the information exchange activities are on track and on a high and appropriate level.

3. 1.9 Status and assessment Output 11-13: Dissemination (articles, video)

The IR planned for six technical papers to be published domestically and this has already been achieved. Eight articles have been published in international journals, which is far more than the three articles planned for in the IR. All articles have been published in peer-review journals and are of high technical quality and relevant to the Project. Some footage has been produced for the video on co-processing intended for the cement industry and the authorities. Final editing will start after the test burn are completed.

The Team concludes that the dissemination activities have been extensive - actually more extensive than what could be expected - and of high quality.

3.2 Specific issues raised in the ToR

The ToR raised some specific questions which are fully or partly answered in other parts of the report. For easy reference, the questions – and the Review Team’s findings/opinions – are listed below :

Q: *This project focuses on the optimization of standards and guidelines developed in the first phase. How is the progress in this aspect?*

A: A total of four official documents have been issued. Guidelines for co-processing are in the final rounds of drafting and will be formally approved in the near future.

Q: *What are the biggest challenges for China in the implementation of large-scale waste co-processing, technologically and policy wise? Has the project been able to produce the necessary inputs and basis for suggestions on how to meet these challenges in a national plan and strategy?*

A: Initially the challenge was to find out how to do co-processing in an environmentally

sound manner. The project has, through studies and practical testing, contributed to increased knowledge on this. In addition the project partners are also working on practical advice to the cement industry on how to do co-processing and pre-treatment of waste.

The project has already provided several official documents that will help the authorities to regulated co-processing. The plan is that the project will provide a complete set of documents that will enable issuance of permits to co-processing of many different waste categories in cement kilns. Consequently, the project is on its way to technically enabling large scale co-processing of waste in cement kilns.

Whether co-processing will actually be implemented on a large scale is partly outside the control of the project, however the promising work done on National plan and strategy (output 7) indicates that the project might provide a robust basis for this to happen.

Q: *The project has been extended to 2015. Has the extension generated any positive impact on the project implementation and fulfilment of its originally designed purpose?*

A: In the Review Team's opinion, the initial timeline was much too optimistic. In the Inception phase, the contract between FECO and SINTEF had to be signed as well as between FECO and the other Chinese implementing partners (CRAES, CBMA, SCC-MEP). The process to identify cement plants for the pilots was also a time consuming process. Some delays can also be attributed to change of personnel in FECO. Anyhow, when the actual project implementation started, the implementation has been on track; activities has been carried out according to schedule and the agreed outputs have been delivered.

Q: *How has the project contributed to Chinese authorities' technological know-how and policy formulation on waste co-processing?*

A: FECO and CRAES have been involved in the production of official documents on co-processing and these documents have been issued by MEP. Relevant administrative divisions of MEP, FECO, CRAES and SCC-MEP have participated on study tours. The work by SCC-MEP has made good progress on the work on policy. The EPBs have gained knowledge through active involvement in test burns and regulation of cement plants. To conclude, all the most relevant authorities on different administration levels appear to have been sufficiently involved.

Q: *Are all the relevant stakeholders, especially those at local level, adequately involved in the project implementation and shared with adequate information about the project?*

A: It is our impression that all relevant stakeholders at central level are adequately involved in the project implementation. The representatives from EPBs and cement plants also appeared to have adequate information about the project. Anyhow, to our knowledge, none of the documents produced by SINTEF have been translated into Chinese – this might have hampered information sharing among the wider group of stakeholders.

Q: *How has the project contributed to the public awareness raising about co-processing?*

A: The dissemination activities have been extensive. However, this has (as planned) been directed towards scientific publications and not mainstream media. During the field trips we got the impression that knowledge about on-going co-processing activities was low among nearby communities.

Q: *Has the Norwegian expertise being shared through the project activities been found relevant and useful for the project implementation and China's work in this arena? How can*

the Norwegian expertise and experience be utilized to tackle the relevant challenges in China at both national and local levels?

A: The Review team asked the various implementing institutions as well as representatives from the cement industry what sort of contact they had with SINTEF, and how useful they found their expertise. The response was that all institutions as well as the plants where pilots had been carried out had direct communication with SINTEF both when SINTEF has been in China, but also often through email. The respondents said that SINTEF was quick to answer and always helpful. A general opinion was that SINTEF had knowledge that was not easy to obtain from other open or easy available sources. More specifically it was said that they learned a lot from SINTEF on treatment of hazardous waste and pre-treatment while Chinese experts were more on the same level on MSW fly-ash. Anyhow, for China it is important to get the technology invented by the cement industry themselves on fly ash verified through well documented test-burns supervised by SINTEF.

3.3 Main achievements and main challenges

Project participants were asked what they considered the main achievements and - if any - the main challenges of the project. The Team finds it useful to present what we can call “insider’s opinion” of the project. The main achievements listed by most respondents were these:

-The project has provided a platform to share knowledge and experiences both within the industry and for public institutions on various levels, but most importantly the authorities and the industry have got an arena where they can meet and share information and discuss challenges. The project has been a catalyst in bringing the public bodies on board.

-Approved standards for co-processing has been important for the industry, they need – and have now got - clear directions from the authorities.

-The field testing has given large amounts of high quality data, which has been important input to transparent and environmentally sound regulation.

-Higher trust in this technology in general since a large number of articles have been published in peer reviewed journals.

-The study tours have been very useful because the participants have been able to study how pre-processing and co-processing is done in some of the world’s leading cement companies. The participants in these study tours have written good quality report from these visits.

Very few of the respondents saw any major challenges, also when asked about possible language problems and cultural differences. The one issue that was mentioned as a challenge was that participants are eager to start activities on new related fields, so it was sometimes a challenge to maintain focus on the core project activities.

4 Project efficiency, impact and sustainability

4.1 Project efficiency

Efficiency is a measure of productivity, meaning comparing inputs against outputs; a measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results/outputs.

For the sake of this Review Report, the Team has chosen to assess the results compared to the investment from the MFA (i.e. NOK 18 610 000) . As approximately one year of implementation is still left, not all activities have been completed, and not all outputs have been fully achieved. Anyhow, as concluded in other part of this report, the team is anticipating the project to produce outputs as planned and as a result of this also achieve the stated purpose.

The funds from MFA has brought about a considerable amount of co-funding. SINTEF has subsidised its hourly rate normally charged, and this contribution is calculated to be approximately NOK 3 053 000. The in-kind contribution from FECO and the local EPBs is calculated at NOK 6 030 000. But most importantly, the cement plants selected to take part in the pilots have all invested in facilities for pre-processing and co-processing. Of course, the companies expect these investments to be paid off since the relevant plants will be in the forefront of co-processing technology. In China today, there is an over-capacity in cement production and the plants will be able to use their ability to process waste as a means to survive in the tougher competition in the future.

In the view of the Review Team, SINTEF seems to deliver its various technical input efficiently. Only technical staff is invoicing the project, the overhead for administrative support is included in the hourly rates. Only technical staff travels to China, and often delivering technical input to several project outputs. The project also benefits from SINTEF experience from similar projects in other countries and its large number of contacts in international research institutions as well as in the cement industry on all continents. Anyhow, since SINTEF is not reporting costs per output, there is no way to assess the efficiency more exactly. Another factor is that SINTEF is to some extent sharing – or only adjusting - reports written as a part of other projects.

Review Team's assessment

The efficiency of the project as a whole is deemed as good especially because the project has been a catalysing factor for the cement industry to invest in new technologies. Anyhow, lack of detailed financial reporting from SINTEF makes it difficult to assess how efficient their technical input is delivered.

4.2 Outcome and Impact from the project

Outcome is the planned effect of the project.

Impact is a measure of all positive and negative consequences/effects/results of the Project, whether planned for and expected, foreseen or not foreseen, direct or indirect.

In a Mid-term Review it is not possible to fully assess the Outcome and Impact of a project, but the progress to date – and its wider implications – gives the Team a pretty good basis for assessment.

The purpose of the project: *“To continue to build capacity and to establish awareness about the possibilities and limitations of co-processing of waste materials in cement kilns through*

extensive information dissemination, to amend the technical information basis to cover pre-processing and pollution prevention, and to assist in practical testing of the guidelines and standards”; is as stated in Chapter 2 clearly within reach if all outputs are delivered. The Review Team is of the opinion that the project will deliver as promised on the various outputs as well as achieving the purpose of the project.

As for the Development Goal, reference is made to the Stockholm Convention (www.pops.int) and the Basel Convention (www.basel.int). Even as the Team clearly see the linkage between this project and the two conventions, there is no reporting directly linking the achievements in the project to China’s fulfilment of its obligations under these two Conventions. The Review team will recommend that this issue is preliminary reported on in the 2014 Annual Report being the last Annual Report before the Final Report of the project. In the Final Report, the partners should report thoroughly on how the project has contributed to achieving the development goal.

A positive consequence of the project has been that the cement industry, the local/provincial environmental authorities and the central level environmental authorities have been involved in a project where everyone has felt it to be a win-win situation.

As mentioned earlier, a clearer link to the UNFCCC could have been made. Substitution of coal with MSW and also other types of waste can contribute significantly to reduced emissions. At the recent High Level climate summit in New York, China made clear and concrete promises to cut the country’s CO₂ emissions. The Chinese partners should explore the possibility for a side event during the climate negotiations in Paris in 2015.

Review Team’s assessment

Both the direct outcome and the wider impact of the project is deemed very positive. The project partners should advocate the link to reduced emissions of CO₂ more explicit.

4.3 Cross-cutting elements and Sustainability issues

Sustainability is a measure of whether the positive effects (or assumed measurable effects) of the Project is likely to continue after the external support is concluded, meaning: will the project lead to long term benefits.

The relevant sustainability elements may vary from project to project. The team has assessed the following:

4.3.1 Gender issues

Both China and Norway have strict non-discriminatory policies on gender. The first question to be asked is if this specific project will affect women and men differently. In the view of the Review Team, this is not so, i. e. gender aspects are not relevant for the technical implementation of this project. Anyhow, it is important that men and women are given equal access to participate in project activities like being selected as participants from their institutions in the project or participation in training, workshops and study tours under the project. FECO has provided a gender breakdown for the main institutions and activities under the project, please refer to annex VI. From the figures provided, the Review team can

conclude that men and women are given equal access and opportunities within this project.

Review Team's assessment

Men and women have equal access to participate in project activities. Gender issues are not relevant for the technical implementation of this project.

4.3.2 Technical sustainability

No physical investments or technical equipment are directly financed under this project. The cement plants chosen as pilots are themselves financing huge investments in pre-processing facilities and to prepare the kilns for co-processing. In the project document, these investments are estimated at NOK 15 million, while FECO presented figures to the Review Team far above this. As for the two cement plants visited by the team, the investment cost at Liulihe Cement plant is estimated to NOK 80 mill and at Huaxin cement plant to NOK 107 mill. The Review team has not done any examination into these calculations done, but that the Cement Plants are investing huge amounts of their own funds into this project is clear. The cement plants see clear benefits for themselves in being in the forefront of co-processing.

The team found that there was adequate technical skills among both the relevant institutions and among the cement plants to benefit from the various project activities. Much of the work is now primarily driven forward by the Chinese project partners themselves. This illustrates that both technical qualifications and push is high and is an indication of good sustainability. The work on official guidelines and standards and on tests burns are good examples of this. For other areas more work remains, but also here there are strong indications that lasting result will be achieved through mainly Chinese activities. However, practical advice and background documentation from SINTEF still play an important role. In this respect, increased attention should be paid to updating, translation and dissemination of written documentation during the remaining project period to secure that this information is relevant and accessible for future work.

Review Team's assessment

All physical investments are done by the private partners that see clear benefits of co-processing. Sustainability as regards to technical training is good, but some of the written documentation improved.

4.3.3 Institutional sustainability

There are relatively stable workforces both in SINTEF and among the Chinese participating institutions both on central and local level as well as on the management level of the cement plants. The staff that has been trained under this project is likely to continue to work for their institutions or companies. Also the written documentation produced under the project will secure institutional memory. But what is most important is that official standards and guidelines have been issued securing stable and secure framework conditions for the industry.

The members of the Project Management Group - PMG (FECO, CRAES and SINTEF) are essential for the smooth implementation of the project. The focal points of SINTEF and CRAES have stayed the same as in phase I while there was a temporarily change in FECO. This stability has brought continuity to the project, but can also be a challenge especially in the case of SINTEF. The SINTEF project coordinator is also the main provider of technical

input to the project. Out of 1281 working hours charged to the project in 2013, 926 were provided by the coordinator and the remaining 355 hours were provided by the three other staff working on this project. In 2012, out of 1072 working hours charged to the project, 846 were provided by the coordinator and the remaining 226 hours were provided by the other staff.

Review Team's assessment

The institutional sustainability is satisfying, but the three main implementing institutions (FECO, CREAS and SINTEF) must ensure that the knowledge of the project coordinators is embedded in the institutions.

4.3.4 Financial sustainability

The project has not financed investments that will incur high costs for the public institutions in the future. On the other side, the cement plants have done investments in both equipment and personnel. The industry will require – and expect – that the government will give preferential treatment to the cement industry to process waste, both MSW and hazardous waste. The price policy (= price paid to the cement industry to handle various types of waste) will be important, the industry must be able to benefit economically from co-processing given the size of investments necessary especially for pre-processing of some types of waste.

Review Team's assessment

The financial sustainability is not an issue for the public institutions, but the cement industry will only be willing to invest in co-processing if the economic returns are positive – and predictable.

4.3.5 Anti-corruption

As stated in the agreement, MOFCOM is responsible for audits being done on the Norwegian funding to MEP/FECO. An independent auditor, Beijing Xinghua CPAs, LLP, has been commissioned. Audit reports for the years 2011, 2012 and 2013 have been shared with the Embassy as per agreement. The audit gives a clean audit opinion on the income and expenditure of funds, and the Review Team has checked the transfers reported by FECO with the MFA's project management and accounting system.

The auditors do not audit the funds transferred from FECO to the other implementing institutions, these transfers can only be found as “The subcontract fee” in the audit report. Anyhow, these institutions are paid upon activities conducted or outputs produced. The Review team will suggest that FECO in their annual financial reporting to the Embassy also reports the transfers per subcontracted institution.

SINTEF as an independent research institution is following Norwegian public financial rules and is being audited by external auditors, but no special audit is done for the co-processing project. SINTEF has a fully IT based system integrating financial control, allocation of resources, document filing and so on, and on their website the main financial figures can be found. SINTEF has a system where billable hours per employee is charged to relevant projects, and SINTEF reports hours billed per employee as part of their annual financial reporting to the Embassy. The invoices from SINTEF shows that approximately 85 per cent of the invoiced amount is for working hours, the rest for travel and accommodation. No goods

are being procured under the project. Norwegian government regulation for international travel is followed.

SINTEF is co-signing disbursement requests from FECO to the embassy; and FECO is co-signing disbursement requests from SINTEF.

The Review Team's assessment

The corruption risk is seen as low because in this project, partly because deliverables are closely linked to hours billed to the project, partly because payments to the subcontracted institutions are linked to deliverables. Another factor is that all the participating institutions have intimate knowledge of who is responsible for which deliverable.

The Review Team will recommend that FECO also reports to the Embassy on audits undertaken in the subcontracted institutions, and that SINTEF shares its Annual Report and audit with FECO and the Embassy.

5 Conclusions and recommendations

5.1 Technical issues

With regard to technical progress, the overall picture is that the project is making good progress towards contributing to environmentally sound co-processing of different types of waste including hazardous waste. The main technical aspects dealt with, and a number of official documents have been produced or are in the pipeline. Close co-operation with the cement industry and recent work on a National Policy is paving the ground for co-processing on a large scale.

The Team has the following specific conclusions and recommendations:

- Most work on official guidelines and standards, which are core products carried over from phase I of the Project, is finished and of good quality.
- The work on test burn has been extensive, both in terms of types of waste and pollutants covered, and provides a solid basis for environmentally sound regulation of co-processing.
- The work on pre-treatment should be strengthened to ensure that all types of waste are covered and that relevant international experience is taken into account.
- For dioxin, and to some degree also for mercury, specific measures to prevent emissions should be addressed – taking all relevant information that has been produced by the Project into account.
- The work on CO₂-reduction measures is generally well on track, but some useful background information is still missing.
- The work on a National Plan and Strategy is of good quality and on track, but might benefit from increased co-operation with international experts during the remaining project period.

-The output on conferences and study tours are on track and have been well received by the participants.

-The project has produced a large number of high quality technical papers.

-All Chinese project partners have shown strong commitment to the project and most work has been of high quality.

-SINTEF has provided relevant and high quality technical advice, although some of the written documentation could be more timely and China-specific.

For the remaining project period, the Team recommends that the work on pre-treatment, dioxin, mercury and CO₂ is strengthened through increased integration of the activities already performed under these outputs. The main parties must ensure that more documentation is readily available to all participants and, if necessary, translated. Some of the status reports should also be updated and adjusted to reflect Chinese conditions in more detail. The work on a National Plan could be further strengthened, and possibly by involving international experts.

5.2 Management issues

As stated above, the project implementation is now well on track. There are some minor weaknesses in project design, but these do not appear to influence negatively on the practical project implementation. The management of the project is seen as efficient, but the three main partners (FECO, CRAES and SINTEF) must be aware of the importance that both technical knowledge and knowledge with regard to project management is embedded in their institutions.

The Review Team will point to the following issues:

- According to the agreement between MFA/the Embassy and MOFCOM, the Embassy should disburse funds every 6 months. This is also according to Norwegian public sector financial regulation. Anyhow, disbursements have so far been done only once a year (apart from no disbursement in 2013). In the future, the disbursement requests must cover only the anticipated expenditure for the next 6 months, and the parties must take into account unspent funds in the project accounts.

- The Review team will suggest that SINTEF should be refunded for actual work carried out, not as today receiving up-front disbursements. SINTEF must report on accrued interest, but this will not be relevant if payments are done upon actual expenditure.

- SINTEF should share their Annual Report including audit with FECO and the Embassy, and FECO should report to the Embassy on how the subcontracted institutions are audited

- The parties should present one Annual Report (including Financial Reporting) to the Embassy. Today the main Annual Report is the “Chinese” report while SINTEF’s report is presented as an annex. The report must follow the outline of the Inception Report and highlight any delays or other issues relevant for the implementation of the project.

5.3 Recommendations not specific for the project

The Review Team will also raise some other relevant issues not directly – or not only – linked to the project under review:

- The achievements under *Output 6 CO₂ reduction measures* should be spread to a wider audience. Substitution of coal with various types of energy rich waste can contribute significantly to reduced emissions. A clearer link to China's commitment under UNFCCC should be made, and the Chinese project partners should explore the possibility for a side event during the climate negotiations in Paris in 2015.

- A possible new phase of this project was not a part of the ToR for the Review Team. Anyhow, the issue was raised several times during our mission. We will recommend that the partners write a short project outline that can form a basis for discussion with the Embassy, MEP and MOFCOM, possibly at the next Annual Consultations. It is important to be aware of that the annual budget allocation to the Embassy is limited and if new areas of cooperation is included less funds will be available for continuation of present projects.

- MOFCOM and MFA/the Embassy sign separate agreements on each project, also when the partners in Norway and China are the same or almost the same. The agreement partners should explore if several projects could be put together in a programme agreement and thereby save administrative capacity in MOFCOM and the Embassy.

- The Review Team will advise the Embassy to discuss with the parties a change from up-front disbursements to payment (refunds) according to actual expenditure. At present, FECO transfers funds to the other implementing partners based on actual deliveries. As for the Norwegian partners, payment upon actual expenditures should not cause a problem. If all project payments are in the form of refunds, the issue of dealing with accrued interest will not be relevant either.

Annexes

Annex I	Terms of Reference
Annex II	Assessment of outputs compared to plans
Annex III	List of Documents reviewed by the Team
Annex IV	List of people met
Annex V	Organizational set-up of FECO
Annex VI	Gender balance in main project activities
Annex VII	Comments received from stakeholders on the draft report
Annex VIII	Some photos from the mission

**TERMS OF REFERENCE FOR MIDTERM REVIEW
OF THE PROJECT**

**ENVIRONMENTALLY SOUND MANAGEMENT OF HAZARDOUS INDUSTRIAL
WASTE IN CEMENT KILNS IN CHINA, PHASE II**

PTA Programme/project CHN-2150 09/059

BACKGROUND FOR THE REVIEW

According to the agreement (Article X) for the project *Environmentally Sound Management of Hazardous Industrial Waste in Cement Kilns in China, Phase II*, the Parties may agree to carry out a review, an inspection and/or an evaluation of the Project. Based on further discussions between the Parties, a mid-term review will take place in September/October 2014.

DESCRIPTION OF THE PROJECT TO BE REVIEWED

Goal

The goal of the project is China's compliance with the Stockholm Convention and the Basel Convention is further strengthened through sound adoption of innovative ways of waste management.

Purpose

The purpose of the project is to continue to build capacity and to establish awareness about the possibilities and limitations of co-processing of waste materials in cement kilns through extensive information dissemination, to amend the technical information basis to cover pre-processing and pollution prevention, and to assist in practical testing of the guidelines and standards.

Outputs

1. Further optimize Standards and Guidelines developed in the first phase so that they can meet the needs for environment management;
2. Guidelines for pre-processing and pre-treatment of wastes prior to co-processing have been developed and tested;
3. Co-processing of problematic high volume wastes such as fly-ash from waste combustion, sewage sludge, municipal solid waste (refuse derived fuel - RDF), POPs and POPs contaminated soil etc. have been demonstrated through pilot testing in practical projects, preferably in Western and Southern regions of China, and the results are evaluated and reported;
4. A quantitative estimate of the CO₂-reduction potential which can be accomplished by the cement industry through co-processing and proposed measures for further emission reduction;

5. A quantitative estimate of the release contribution of mercury from co-processing of wastes in the cement industry and proposed measures for further emission reduction;
6. A quantitative estimate of the release contribution of dioxins and furans from co-processing of wastes in the cement industry and proposed measures for further emission reduction;
7. Input and basis for a national plan and a strategy for the implementation of large scale co-processing in China;
8. Two study tours to other countries for in total 20 people;
9. Series of National technical conferences on the possibilities and limitations of co-processing of waste materials in cement kilns, disseminating and discussing the findings of project;
10. One International scientific high level conference focusing on sharing of experiences and building capacity;
11. Six papers on co-processing in National Chinese Technical Journals disseminated to the entire Chinese cement industry;
12. Three articles describing the findings of the Sino-Norwegian project in recognised international peer-reviewed Scientific Journals;
13. A practical and informative video explaining co-processing in Chinese and disseminated to the entire Chinese cement industry and relevant authorities.

The total budget for the project is NOK 42.693 mill. The Norwegian grant for this project is NOK 18.61 mill. The Chinese side provides in-kind and direct-cost contribution of NOK 6.03 mill. SINTEF also provides a contribution of 3.053 million NOK. Industry input is estimated to be 15 million NOK, according to the signed agreement.

The time-frame for the project according to the agreement is 2010-2013. However, it was formally launched in 2011 and extended to 2015.

MOFCOM has the overall responsibility for the Project and MEP supervises the implementation of the Project. The main project implementing partners consist of the Norwegian Foundation for Scientific and Industrial Research (SINTEF) and China's Ministry of Environmental Protection (MEP)'s Foreign Economic Cooperation Office (FECO), with technical support and in cooperation from CRAES, CBMA, SWMC-MEP, cement industry and local EPBs.

PURPOSE OF THE REVIEW

The purpose of the review is to focus upon progress to date and the effectiveness of the project, i.e. the extent to which the goal and purpose is being achieved, and if the progress has been made in accordance with the work plan and budget. The Team should also comment on expected impact if possible.

SCOPE OF WORK

The timeframe for the review will be limited to ten working days (15 working days for the team leader). Fieldwork and interviews will take approximately three to four days. The following questions will be indicative for the work of the review team:

- This project focuses on the optimization of standards and guidelines developed in the first phase. How is the progress in this aspect?
- What are the biggest challenges for China in the implementation of large-scale waste co-processing, technologically and policy wise? Has the project been able to produce

the necessary inputs and basis for suggestions on how to meet these challenges in a national plan and strategy?

- The project has been extended to 2015. Has the extension generated any positive impact on the project implementation and fulfilment of its originally designed purpose?
- How has the project contributed to Chinese authorities' technological know-how and policy formulation on waste co-processing?
- Are all the relevant stakeholders, especially those at local level, adequately involved in the project implementation and shared with adequate information about the project?
- How has the project contributed to the public awareness raising about co-processing?
- Has the Norwegian expertise being shared through the project activities been found relevant and useful for the project implementation and China's work in this arena? How can the Norwegian expertise and experience be utilized to tackle the relevant challenges in China at both national and local levels?
- ...

The institutions to be interviewed in China will include: MOFCOM, MEP, FECO, CRAES, CBMA, SWMC-MEP, Beijing and Hubei EPBs. The review will visit Liulihe Cement Plant in Beijing and Wuxue Cement Plant in Hubei Province for site visits.

APPROACH, TIMING AND PLANNED RESULTS OF THE PROJECT REVIEW

The review will take place on 16-25 September of 2014. Interviews with relevant partners and institutions in Beijing, field visits to some project sites, and archive material will form the basis for a review report.

The draft report will be finalized by 30 Oct 2014 and the final report will be finalized by 30 November 2014. The report shall not exceed 20 pages (excluding annexes).

The Report should include:

- 0 Executive summary
- 1 Introduction
2. Project Description and comments on project design
- 3 Project status assessment
- 4 Project efficiency, impact and sustainability
- 5 Conclusions and recommendations

REVIEW TEAM COMPOSITION AND LEADERSHIP (to be updated)

Ms. Helle Biseth, Norad, team leader
Mr. Torgrim Asphjell, Senior Advisor, NEA
Mr. Liu Jianguo, Tsinghua University, Chinese expert

NORAD will take on the responsibility as team leader, and be overall in charge for the draft and final report.

Annex to ToR: Review Program

Date			Place	Activity	persons
16.09.2014	TUE	14:00	Norway Embassy, Beijing	Meeting between the review team and the Embassy	Helle, Torgrim Tor, Kristin, Yinglang
		15:00	Norway Embassy, Beijing	Meeting of review team	Norweigan side: Helle, Torgrim Chinese side: Chinese consultant, interpretator Peng Zheng, Yan Dahai
17.09.2014	WED	8:00-9:30	Beijing	Travel from Conrad Hotel to LIULIHE CEMENT PLANT	The review team
		9:30 - 10:30	LIULIHE CEMENT PLANT, Beijing	Meeting with Beijing EPB	The review team
		10:30 - 12:00	LIULIHE CEMENT PLANT, Beijing	Visit LIULIHE CEMENT PLANT (Fly ash disposal)	Norweigan side: Helle, Torgrim Chinese side: Chinese consultant, interpretator Peng Zheng, Yan Dahai, BJ EPB, BJ Mangrove Environment CO
		Afternoon	TBD	Team discussion	The review team
18.09.2014	THU	8:50-11:00	Beijing - Wuhan	Flight from Beijing to Wuhan; flight HU7187	Norweigan side: Helle, Torgrim Chinese side: Chinese consultant, interpretator Peng Zheng, Yan Dahai
		11:00 - 15:00	Wuhan - Wuxue	Travel from Wuhan to Wuxue by car/minibus	Norw. side: Helle, Torgrim Chinese side: consultant, interpretator, Peng Zheng, Yan Dahai, Hubei EPB
		15:00-17:00	Wuxue	Meeting with Hubei EPB	Norw. side: Helle, Torgrim Chinese side: consultant, interpretator, Peng Zheng, Yan Dahai, Hubei EPB
19.09.2014	FRI	8:30 - 11:30	Wuxue	Demonstrating plant visit	Norw. side: Helle, Torgrim Chinese side: consultant, interpretator, Peng Zheng, Yan Dahai, Hubei EPB
		11:30 - 15:30	Wuxue - Wuhan	Travel from Wuxue to Wuhan Airport by car/minibus	Norweigan side: Helle, Torgrim Chinese side: Chinese consultant, interpretator Peng Zheng, Yan Dahai

		16:35/16:05	Wuhan departure	Flight from Wuhan to Beijing CA1562 (Chinese side) Flight from Wuhan to Taiyuan CZ6287 (Norwegian side)	Norweigan side: Helle, Torgrim Chinese side: Chinese consultant, interpretator Peng Zheng, Yan Dahai	
22.09.2014	MON	9:00 -10:30	FECO	Meeting with FECO	Norweigan side: Helle, Torgrim Chinese side: FECO: Ding Qiong(Director), Ren yong(Deputy Director), Peng Zheng, Liang Shasha	
		10:30-11:45	FECO	Meeting with CRAES	Norweigan side: Helle, Torgrim Chinese side: Yan dahai(CRAES)	
		12:00 - 13:30	FECO	Lunch Break		
		13:30-14:45	FECO	Meeting with CBMA	Norweigan side: Helle, Torgrim Chinese side: He Jie(CBMA)	
		14:45-16:00	FECO	Meeting with NSWCMC	Norweigan side: Helle, Torgrim Chinese side: Sun Saofeng(NSWCMC), Xu Juan(NSWCMC)	
		16:00-17:00	FECO	Outcome material reviewing & Internal discussion (based on the need of the review team)	The review team	
23.09.2014	TUE		MEP & MOFCOM	Visit MOFCOM & MEP	Norweigan side: Helle, Torgrim Chinese side: Chinese consultant, interpretator	
24.09.2014	WED		Norwegian Embassy	Internal meeting of Review team	Norweigan side: Helle, Torgrim Chinese side: Chinese consultant, interpretator	
25.09.2014	THU	9:00-12:00	FECO	Wrap up meeting	Norweigan side: Helle, Torgrim, Embassy Chinese side: FECO: Ding Qiong(Director), Ren yong(Deputy Director), Peng Zheng, Liang Shasha, Yan dahai(CRAES),	

Assessment of outputs compared to plans

These tables contain a line-by-line assessment of status on outputs and activities by comparing plans in the IR (unless otherwise stated) with the situation at the time of review.

Descriptions and indicators (except for output 0) are taken from the IR (chpt 4.3, Project Outputs and chpt. 4.4 Indicators), while periods are a summary of the tables in Chpt. 3.1 to 3.13 in the IR.

The purpose of these tables is to provide a line-by-line compilation of the status of the outputs and the corresponding activities compared to plans.

The presentation is based on written documentation, in terms of annual reports and technical reports and papers, and supplemented by updated information from project partners.

This assessment is mainly of a quantitative character (fulfilled or not fulfilled). The qualitative assessment is given in chapter 3, where the quality of the written documentation is assessed and supplementary information from the interviews is used to give a more comprehensive assessment of the quality and progress of the different outputs.

Output 0: Inception stage

Description: A short and concise inception report will be prepared describing the main activities and schedules of the project, and the tentative timing of the national and international conferences and the study tours, as well as the article to be developed and published. To be able to attract foreign experts, the planned conference needs to be well prepared and announced in due time.

The last period of Phase I will be used to identify relevant provinces and cities, preferably in Western and Southern China to be included as the "demonstration" candidates in the Phase II. Agreements will be established with local EPBs and cement industry and relevant waste candidates will be identified. The agreed demonstration projects will be planned and reported in the Inception report. (Source: Project Proposal, page 19)

Indicator: A short and concise inception report have been issued six months after project start up describing the main activities and schedules of the project and tentative timing of the national and international conferences.

Period: March 2011 - May 2013 (Completed)

Activities	Review Teams assessment of fulfillment / expected fulfillment
A draft inception report	The draft Inception Report was finalized in November 2011.
Meeting in Beijing 22-24 March to discuss the draft inception report	An outline of Phase II activities was presented and discussed in a workshop at MEP/FECO Beijing 14 November 2011 (16 participants).
Develop "standards" for selecting CI demonstration plants	The "standards" for selecting CI demonstration plants have been completed.
Visit cement industry and local EPBs to investigate possibilities on demonstration activities	Visits were made to Huaxin in Wuhan and Sinoma in Nanning in April 2012. □ Visits were made to Nanjing, Wuhan, Huangshi, Wuhan, Luoyang, Sanmenxia, Xi'an, Chongqing, Guiyang, Nanning, Liuzhou and Beijing in April 2013 to finalize the selection of demo plants.
Identify stakeholders to be involved in the project (see Table 4) [Where is this table?]	
Manning and budgeting of Chinese activities. Agreements and contracts with Chinese institutions.	The implementation plan was drafted and finalized March 2013, in which, the activities, budget and subcontractors was defined. The contract between FECO and CRAES has been signed 20 May 2013. The contracts between FECO and CBMA and SWMC-MEP (now SCC) was signed in 2013.
Identify demonstration cement plant candidates.	The demonstration cement plant candidates were selected.
Topic, timing and location of national conferences in 2012	Topic, timing and location of national conferences were planned in 2012.
Topic, timing, location and organizing committee for the international conference	Topic, timing, location for the international conference were planned in 2013. The Final Inception Workshop of Phase II of the Sino-Norway Project was arranged at Xiyuan Hotel, Beijing, 14 March 2013 (55 participants). The Inception Report was finalized April 14 2013.

Output 1: Official guidelines and standards

Description: Further optimize Standards and Guidelines developed in the first phase so that they can meet the needs for environment management.

Indicator: The co-processing standards have been promulgated and serve as a reference for industry and relevant authorities at the end of project.

Period: 2011 - 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Guideline/standard verification test in cement kiln co-processing enterprises for normal hazardous waste	The “Standard for pollution control on co-processing of solid wastes in Cement kiln” and “Environmental protection technical specification for co-processing of Solid wastes in cement kiln” was revised in many rounds by CRAES.	Completed
Refining Standard for Pollution Control on Co-processing of Hazardous Waste in Cement Kiln.	The “Standard for pollution control on co-processing of solid wastes in Cement kiln” was co-issued by MEP and General Administration of Quality supervision , inspection and quarantine in March 2014 (GB 30485—2013, in Chinese, 10 pages).	Completed
Refining Standard for Pollution Control on Construct Materials Produced from Solid Wastes.	Test methods for leachable ions of heavy metals in cement are finalized and issued in August 2014. Technical specification for co-processing of solid waste in cement kiln is finalized and issued in August 2014.	Completed
Refining Environmental Protection Technical Specifications for Co-processing of Hazardous Wastes in Cement Kilns.	The “Environmental protection technical specification for co-processing of Solid wastes in cement kiln” was issued by MEP in March 2014. (HJ 662-2013, in Chinese, 27 pages).	Completed
Refining Guidelines for Co-processing Hazardous Wastes in Cement Kilns.	The draft Guidelines for co-processing of hazardous wastes in cement kiln have been revised in several rounds and are to be formally finalized by CRAES(in Chinese, 65 pages)	Ongoing

Output 2: Feasibility Evaluation for co-processing of typical wastes in cement kilns

Description: Guidelines for pre-processing and pre-treatment of wastes prior to co-processing have been developed and tested.

Indicator: Guidelines for pre-processing and pre-treatment of wastes prior to co-processing is available for testing one year after start up - final version at the end of the project.

Period: December 2013 – May 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Collect information on the technology develop and utilization status of co-processing MSWI fly ash, sewage sludge, MSW, POPs pesticide wastes and POPs pesticide contaminated soil in cement kilns in other countries, draft the State of Art report.	Report “Co-processing of Alternative Fuels and Raw Materials and treatment of Hazardous Wastes in resource and energy intensive industry – A literature Review” delivered by SINTEF in November 2011 (in English, 378 pages). Report “Co-processing of Municipal solid waste, incineration residues and sewage sludge – Current treatment and utilization practice in cement industry” completed by SINTEF in June 2014 (in English, 70 pages).	Completed
Collect information on the technology develop and utilization status of co-processing MSWI fly ash, sewage sludge, MSW, POPs pesticide, POPs pesticide contaminated soil in China, draft the State of Art report.	6 Reports reflecting Chinese conditions and pilots have been produced by CRAES (in Chinese): <ul style="list-style-type: none"> • Survey on status of co-processing of problematic waste by cement kiln (46 pages). • Survey on status of cement enterprise co-processing of hazardous waste (32 pages). • Test and evaluation report on co-processing of POPs pesticide (13 pages). • Test and evaluation report on co-processing of MSW in Huaxin cement (18 pages). • Test and evaluation report on co-processing of POPs contaminated soil (14 pages). • Guideline of co-processing of POPs waste by cement kiln (31 pages). 	Completed
Conduct co-processing testing of POPs pesticide and POPs pesticide contaminated soil in the demonstration plant candidates.	The following tests have been completed by cement companies, CRAES and SINTEF:	Completed
Evaluation co-processing results and draft the evaluation and test report of POPs pesticide and POPs pesticide contaminated soil co-processing.	<ul style="list-style-type: none"> • Contaminated soil at Heibei Yanxin Cement, Hebei November 2011. • Pesticides in Huaxin Wuxue November 2011. • POPs-contaminated soil in Huaxin Wuxue in November 2012. • MSW, RDF and Contaminated soil Huaxin Wuxue 26-29 November 2013. 	
Conduct co-processing testing of MSWI fly ash, sewage sludge, MSW in the demonstration plant candidates.	<ul style="list-style-type: none"> • Gold slag at Shanxi (Yaobai) Cement, Shanxi, Xian, 27-30 April 2014. • MSW at Sinoma Liyang Cement plant, July 7-10, 2014. • MSW at Tongling Conch cement plant 1-5 September 2014. 	
Evaluation co-processing results and draft the evaluation and test report of MSWI fly ash, sewage sludge, MSW co-processing.	4 more test burn are planned to conduct during next 12 months.	Ongoing
Draft guidelines if feasibility is confirmed for co-processing MSWI fly ash, sewage sludge, MSW, POPs pesticide, POPs pesticide contaminated soil in cement kilns.	7 Evaluation and Test reports will be completed during next 15 months.	Ongoing
Draft recommendations for a Chinese policy on co-processing MSWI fly ash, sewage sludge, MSW, POPs pesticide, POPs pesticide contaminated soil in cement kilns	4 separate guidelines on co-processing of MSW, fly ash, sewage sludge and contaminated soil will be formulated by the end of 2015.	Ongoing
	Draft recommendations shall be proposed by the end of 2015.	Pending

Output 3: Guidelines for pre-treatment

Description: Co-processing of problematic high volume wastes such as fly-ash from waste combustion, sewage sludge, municipal solid waste (refuse derived fuel - RDF), POPs and POPs contaminated soil etc. have been systematically evaluated through pilot testing in practical projects, preferably in Western and Southern regions of China, and the results are evaluated and reported.

Indicator: Problematic wastes such as fly-ash from waste combustion, sewage sludge, municipal solid waste (RDF), POPs and POPs contaminated soil etc. have been demonstrated in practical long term testing preferably in Western and Southern regions of China.

Period: December 2013 – May 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Collect information on methods and concepts for pre-processing and preparation of waste materials in other countries. Draft the State of the Art report.	A report "Introduction to pre-treatment of alternative fuels and raw materials in cement kilns" was finalized by SINTEF in June 2014 (in English, 172 pages).	completed
Translate the State of the Art report and make the information available to the Chinese cement industry	No translation has been made available to the review team	Not completed
Prepare Draft Guidelines for Waste Pre-treatment before Co-processing in Cement Kilns.	A report "Survey of waste pre-treatment before Co-processing in Cement Kilns" was completed by CRAES in 2012 (in Chinese, 18 pages)	Completed
Revise, elaborate and supplement Draft Guidelines for Waste Pre-treatment before Co-processing in Cement Kilns based on English version.	"Draft Guideline for preprocessing and pretreatment of waste for coprocessing by cement kiln" was developed by CRAES at end of 2013 (in Chinese, 18 pages).	Completed
The feasibility of the Draft Pre-treatment Guidelines to be tested in the demonstration activities	The draft guideline will be tested in Beijing Jinyu Mangrove Co. Ltd and Chongqing Neat Environment Engineering Co. Ltd	Ongoing
Prepare final Pre-treatment Guidelines	CRAES and SINTEF will cooperate to revise the guideline based on the test.	Ongoing
Prepare final recommendations for a Chinese policy on pre-processing of waste materials	Finally, the policy recommendation for pre-processing of waste materials will be worked out by September 2015	Pending

Output 4: Dioxins and furans reduction measures

Description: A quantitative estimate of the release contribution of dioxins and furans from co-processing of wastes in the cement industry and proposed measures for further emission reduction.

Indicator: A report with a quantitative estimate of the release contribution of dioxins and furans from co-processing of wastes in the cement industry and measures for further reduction is available two years after start up

Period: 2011 – May 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Collect information on methodology for estimating PCDD/PCDF-contribution from the cement industry and from cement industry co-processing AFRs and treating wastes from the Stockholm Convention and other sources	A report "Formation, release and control of dioxins in cement kilns" has been prepared by SINTEF (In English, 194 pages)	Completed
Collect information on policies, regulations and standards related to PCDD/F-reduction in cement industry.	A report "Study on Dioxin emission and control in cement industry" was prepared by CRAES in April 2013 (in Chinese, 15 pages).	Completed
Field testing of PCDD/Fs in candidate co-processing enterprises for normal hazardous, fly ash, MSW, Sewage sludge, POPs pesticide waste and POPs pesticide contaminated soil	Field testing of PCDD/Fs in normal hazardous waste, MSW, POPs pesticide and POPs pesticide contaminated soil were conducted in Hebei Yanxin, Huaxin Wuxue, Yaobai, Liyang and Tongling. The test reports on PCDD/Fs were included in the each of Test and evaluation reports.	Completed
Collect relevant information on cement production, waste availability and substitution scenarios in China as well as Chinese estimates on PCDD/PCDF contribution from the sector in general and from co-processing in particular.	4 tests on PCDD/Fs emission in combination with the 4 test burn will be conducted.	Ongoing
	4 test report on PCDD/Fs will be completed	Ongoing
Describe methods for PCDD/PCDF reduction in the cement industry	Briefly dealt with in report of "Formation, release and control of dioxins in cement co-processing hazardous wastes".	Partly completed
Describe PCDD/PCDF-reduction scenarios for the cement industry in China	Mentioned in report of "Study on Dioxin emission and control in cement industry".	Completed
Draft study report on PCDD/F-reduction measures in cement industry	Briefly dealt with in report of "Study on Dioxin emission and control in cement industry".	Partly Completed
Draft recommendations for a Chinese policy on PCDD/F-reduction in cement industry.	Draft recommendations will be worked out by CRAES by October 2015.	Pending

Output 5: Mercury reduction measures

Description: A quantitative estimate of the release contribution of mercury from co-processing of wastes in the cement industry and proposed measures for further emission reduction;

Indicator: A report with a quantitative estimate of the release contribution of mercury from co-processing of wastes in the cement industry and measures for further reduction is available two years after start up

Period: 2011 – May 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Collect information on methodology for estimating Hg-contribution from the cement industry and from wastes to be used from the UNEP Overarching Framework Global Mercury Partnership and other sources	A report "Mercury and cement manufacturing" completed in May 2014 (In English, 309 pages).	Completed
Collect information on policies, regulations and standards related to Hg-reduction in cement industry.	A report "Study on Mercury emission and control in cement industry" was prepared by CRAES in May 2013 (in Chinese, 27 pages).	Completed
Field testing of Hg in candidate co-processing enterprises for normal hazardous, fly ash, MSW, Sewage sludge, POPs pesticide waste and POPs pesticide contaminated soil	Field testing of Hg in normal hazardous waste, MSW, POPs pesticide and POPs pesticide contaminated soil were conducted in Hebei Yanxin, Huaxin Wuxue, Yaobai, Liyang and Tongling.	Completed
Collect relevant information on cement production, waste availability and substitution scenarios in China, as well as Chinese estimates on Hg contribution from the sector in general and from co-processing in particular.	4 tests on Hg emission in combination with the 4 test burn will be conducted.	Ongoing
	4 test report on Hg will be completed	Ongoing
Describe methods for Hg reduction in the cement industry	Mentioned in report of " Release of Mercury from the cement industry – possible abatement options".	Completed
Describe Hg- reduction scenarios for the cement industry in China	Mentioned in report of "Study on Mercury emission and control in cement industry"	Completed
Draft study report on Hg-reduction measures in cement industry	Mentioned in report of "Study on Mercury emission and control in cement industry"	Completed
Draft recommendations for a Chinese policy on Hg-reduction in cement industry.	Draft recommendations will be worked out by CRAES by November 2015.	Pending

Output 6: CO₂ -reduction measures

Description: A quantitative estimate of the CO₂-reduction potential which can be accomplished by the cement industry through co-processing and proposed measures for further emission reduction.

Indicator: A report with an estimate of the CO₂-reduction possible to accomplish by the cement industry through co-processing and measures for further CO₂-reduction is available two years after start up

Period: December 2013 – May 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Collect information on methodology for estimating CO ₂ -contribution from the cement industry and from wastes to be used from the IPCC and other sources	A report "Greenhouse gas sources and abatement options in cement production" was prepared by SINTEF in June 2014. (In English, 95 pages).	Completed
Collect information on policies, regulations and standards related to CO ₂ -reduction in cement industry through co-processing and other measures.	"Annual progress report on assessment on CO ₂ emission from waste co-processing" by CBMA (In Chinese, 25 pages)	Completed
Collect relevant information on cement production, waste availability and substitution scenarios in China, as well as Chinese estimates on CO ₂ contribution	Report "Evaluation report on carbon emission of Huaxin cement plant" was prepared by CBMA in 2014 in Chinese, 12 pages)	Completed
Describe methods for CO ₂ reduction in the cement industry	The further evaluation on carbon emission from co-processing of MSW in Liyang and Tongling and co-processing of sewage sludge will be worked based on the test burn.	Ongoing
Describe CO ₂ -reduction scenarios possible to accomplish by co-processing in China	The report will be drafted by CBMA by the end of 2014	Ongoing
Draft study report on CO ₂ -reduction measures in cement industry	The report will be drafted by CBMA	Ongoing
Draft recommendations for a Chinese policy on CO ₂ -reduction in cement industry.	The report will be drafted by CBMA	Ongoing
	The report will be drafted by CBMA	Ongoing
	The report will be drafted by CBMA	Ongoing
	The report will be drafted by CBMA	Ongoing
	The recommendations will be drafted by CBMA	Ongoing

Output 7: Basis for a National plan and strategy

Description: Input and basis for a national plan and a strategy for the implementation of large scale co-processing in China.

Indicator: The basis for a national plan and a strategy for the implementation of large scale co-processing in China has been made available for the authorities at the end of the project

Period: December 2013 – May 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Select some co-processing cement plants to investigate the status and problems of co-processing in cement kilns in China.	“Survey report on co-processing cement plants in China” completed by SCC In December 2013 (in Chinese, 47 pages).	Completed
Investigate the economic feasibility of hazardous waste co-processing in cement kilns and compare with hazardous waste incinerators.	“Survey report on high temperature incineration plants in China” completed by SCC in December 2013 (in Chinese, 16 pages).	Completed
Collect regulations, standards, programming, and study reports on co-processing in cement kilns in US, EU, Japan and other developed countries.	“Survey report on co-processing cement plants in China” completed by SCC In December 2013 (in Chinese, 47 pages).	Completed
Collect regulation, standards, study reports and guidelines on co-processing in cement kilns in China.	“Survey report on co-processing cement plants in China” completed by SCC In December 2013 (in Chinese, 47 pages).	Completed
Finish the study report outlines on national plan and strategy basis of promoting solid waste co-processing in cement kilns in China.	“Outline of development strategy on co-processing of waste by cement kiln in China” produced by SCC December 2013 (in Chinese, 9 pages).	Completed
Finish the study report outlines on policies of solid waste co-processing in cement kilns in China.		Ongoing
Organize workshops and seminars to discuss the outlines with EPBs, associations, and co-processing cement enterprise.		Ongoing
Analyse and summarize the outputs of other activities of this project and abstract relative policies recommendations.		Ongoing
Finish the study report on national plan and strategy basis of promoting solid waste co-processing in cement kilns in China.	The national plan and strategy basis will be completed by SCC by September 2015.	Pending
Finish the study report on policies of solid waste co-processing in cement kilns in China.		

Output 8: Study tour

Description: Three study tours to other countries for in total 18 people.

Indicator: Two study tours to other countries for in total 20 people have been conducted

Period: December 2012 - 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Identify country, places and activities to visit. Make initial requests for specified time-window, booking of tickets, accommodation and transport; visa application formalities etc. for the 1st study tour.		Completed
1st study tour.	A Study tour to Germany and Belgium was organised for 6 officials from MEP,EPB, CRAES and FECO during 22-26 July 2013.	Completed
Draft the report of 1st study tour.	Mission reports have been prepared by FECO. Report "Comparative study on cement kiln co-processing between China and EU and its inspiration to China" produced by CRAES (in Chinese, 55 pages).	Completed
Identify country, places and activities to visit. Make initial requests for specified time-window, booking of tickets, accommodation and transport; visa application formalities etc. for the 2nd study tour.		Completed
2nd study tour.	A Study tour to Mexico and USA was organised for 6 officials from MEP, EPB,and FECO during 18-22 August 2014.	Completed
Draft the report of 2nd study tour.	Mission reports have been prepared by FECO. Report "Comparative study on cement kiln co-processing between China,US and Mexico " produced by FECO (in Chinese, 28 pages).	Completed
Identify country, places and activities to visit. Make initial requests for specified time-window, booking of tickets, accommodation and transport; visa application formalities etc. for the 3rd study tour.		Ongoing
3rd study tour.		
Draft the report of 3rd study tour.		

Output 9: Domestic conferences

Description: Series of National technical conferences on the possibilities and limitations of co-processing of waste materials in cement kilns, disseminating and discussing the findings of project.

Indicator: Serious of technical conferences on co-processing with more than 120 participants from industry and authorities have been arranged in four large Chinese cities by the end of the project

Period: 2012 - 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	
<p>Identify conference topic, date and place in 2012. Decide about speakers to be invited and make initial request. Make initial announcement</p> <p>Conference in 2012</p>	<p>The following domestic conferences/workshops have been organized by the project:</p> <ul style="list-style-type: none"> • Workshop on pretreatment technology of cement kiln co-processing , MEP-FECO , 24 April 2012, Beijing, China (25 participants) • Inception Conference on Sino-Norwegian project on Co-processing. Beijing 13 March 2013, China (55 participants) • Workshop on Waste Management in China. 28-29 November 2013, Wuhan, Hubei, China (40 participants) 	
<p>Identify conference topic, date and place in 2013. Decide about speakers to be invited and make initial request. Make initial announcement</p> <p>Conference in 2013</p>	<p>Two training workshops will be held later in 2014 and mid of 2015.</p> <p>In addition project partners have given presentations on the following workshops or conferences:</p> <ul style="list-style-type: none"> • WS on Hazardous Waste Management in Ministry of Environmental Protection. Beijing 6 July 2011. • Workshop on Hazardous waste management, Ministry of Environmental Protection. Beijing, China 14 November 2011. • 10th Anniversary Conference on the Stockholm Convention. Beijing, China 12 November 2011. • 7th International Conference on Waste Management and Technology. Tsinghua University, 7 September 2012, Beijing, China. • "2012 Technical Coordination Group Meeting under Strengthening Institutions, Regulations and Enforcement Capacities for Effective and Efficient Implementation of the National Implementation Plan in China". 12-13 November 2012, Guangzhou, China. 	
<p>Identify conference topic, date and place in 2014. Decide about speakers to be invited and make initial request. Make initial announcement</p> <p>Conference in 2014</p>		
<p>Identify conference topic, date and place in 2015. Decide about speakers to be invited and make initial request. Make initial announcement</p> <p>Project wrap-up Conference in 2015</p>		

Output 10: International conference

Description: One International scientific high level conference focusing on sharing of experiences and building capacity.

Indicator: One high level international scientific conference with call-for-papers have been arranged by the end of the project

Period: December 2013 – December 2014

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Identify conference topic, date and place. Constitute an Organising Committee. Decide about speakers to be invited and make initial request. Make announcement and call for papers Formal invitation of speakers Book place of venue Conference Prepare Conference Proceedings and Journal Publication	Planned in coordination with the 2014 POPs annual conference 11 November 2014.	Ongoing

Output 11: Technical papers on co-processing

Description: Six papers on co-processing in National Chinese Technical Journals disseminated to the entire Chinese cement industry.

Indicator: Six technical papers on co-processing have been published in Chinese cement technical Journals and disseminated to the entire Chinese cement industry by the end of the project

Period: 2012 - 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Article # 1	The following articles have been published (in Chinese) :	Completed
Article # 2	1. Bai Jingjing, Zhang Zhengqiang, Yan Da-Hai, 2012. Study on the removal of chlorine and heavy metals in incineration fly ash during water-washing process, Environmental Engineering, April 2012.	
Article # 3.		
Article # 4	2. Bai Jingjing, Yan Da-Hai, Li Li, 2012. Process conditions of Pb and Zn removal from washing solution of MSW incineration fly ash by CO, Research of Environmental Sciences, July 2012.	
Article # 5		
Article # 6	3. Tang Yandong, Chen Kun, Wang Shutang, Yan Da-Hai, 2012. International experiences on co-processing in cement kilns, Environmental Protection, July 2012.	
	4. Cai Mulin, Li Yang, Yan Da-Hai, 2013. Plant test of co-processing of DDT waste in cement kiln, Journal of Environmental Engineering Technology, September 2013. Plant test of co-processing of DDT waste in cement kiln, Journal of Environmental Engineering Technology, September 2013.	
	5. Cui Jingxuan, Yan Da-Hai, Li Li, 2013. Volatilizing characteristic of lead and cadmium during co-processing in cement kiln, Chinese Journal of Environmental Engineering, December 2013.	
	6. Cui Jingxuan, Yan Da-Hai, Li Li, 2013. Volatilizing characteristic and dynamics research of arsenic during co-processing in cement kiln, China Environmental Science, submitted December 2013.	

Output 12: International Journal articles on co-processing

Description: Three articles describing the findings of the Sino-Norwegian project in recognised international peer-reviewed Scientific Journals.

Indicator: Three articles describing the findings of the Sino-Norwegian project have been published in recognised international peer-reviewed Scientific Journals by the end of the project;

Period: 2013 - 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
Article # 1	The following articles have been published:	Ongoing
Article # 2	1. Yan Da-Hai, Karstensen, Kåre Helge, Peng Zheng, Tang Yandong and Guo Xin, 2012. Co-processing in China – status and experiences". JOURNAL ARTICLE. International Cement Review, December 2012. ISSN No. 0959-6038.	
Article # 3	2. Karstensen, K. H., 2012. Destruction of POPs in developing countries by using local cement kilns. Success stories Stockholm Convention 2001-2011. UNEP and Secretariat of Stockholm Convention, July 2012. www.pops.int. ISSN No. 0013-936X.	
	3. Yan Da-Hai, Karstensen, Kåre Helge, Peng Zheng and Zuguang Wang, 2013. Coprocessing of Municipal Solid wastes in China. Journal Article. JOURNAL ARTICLE. International Cement Review, October 2013. ISSN No. 0959-6038.	
	4. Da-Hai Yan, Zheng Peng, Kåre Helge Karstensen, Qiong Ding, Kaixiang Wang and Zuguang Wang, 2014. Destruction of DDT wastes in two preheater/precalciner cement kilns in China. JOURNAL ARTICLE. Science of the Total Environment, 476-477 (2014) 250-257. ISSN No. 0048-9697.	
	5. Yan Da-Hai, Karstensen, Kåre Helge, Xu Juan and Peng Zheng, 2014. Stricter Emission Limits for Cement Kilns in China and new Standards for Co-processing of Solid Wastes. JOURNAL ARTICLE. International Cement Review, March 2014. ISSN No. 0959-6038.	
	6. Juan Xu, Shao Feng Sun, Kåre Helge Karstensen, Da Hai Yan and Zheng Peng, 2014. Co-processing Hazardous Waste in the Chinese Cement Industry -Status 2014. Submitted to the Proceedings of the Ninth International Conference on Waste Management and Technology October 2014	
	7. Dahai Yan, Zheng Peng, Lifeng Yu, Qiong Ding, Kåre Helge Karstensen, Yong Ren, Chen Jiang, Christian J. Engelsen, Monica Nodland Malmedal, 2014. Distribution of Hg, As and Se in material and flue gas streams from preheater/precalciner cement kilns and vertical shaft cement kilns in China. Submitted to Chemosphere, September 3, 2014.	
	8. Karstensen, Kåre Helge and Yan Da-Hai, 2014. Permitting requirements for co-processing of wastes in China and India. Environmental Handbook for Cement Plants - International Cement Review. November 2014.	

Output 13: Video

Description: A practical and informative video explaining co-processing in Chinese and disseminated to the entire Chinese cement industry and relevant authorities.

Indicator: An informative video explaining co-processing in practice has been developed and disseminated to Chinese cement companies and other stakeholders by the end of the project.

Period: June 2013 – May 2015

Activities	Review Teams assessment of fulfillment / expected fulfillment	Status
<p>Identify detailed video contents and producing plan.</p> <p>Investigate the availability of videos on co-processing in the cement industry and collect materials which can be used as references in the video producing.</p> <p>Collect the materials during the demonstration activities</p> <p>Produce and disseminate the video</p>	<p>Some examples of videos are collected. Editing of final video still pending. The final editing will start after the test burns are completed.</p>	<p>Ongoing</p>

List of documents reviewed by The Team

The documents being part of the outputs and listed in Annex II are not repeated here apart from documents used actively in the Review (e.g. the Inception Report)

Project Proposal (23 September 2010)

Decision Document from the Norwegian Embassy (no date on copy received)

Agreement between MFA and MOFCOM (30th November 2010)

Agreement between FECO and SINTEF (December 2010)

Inception Report 2011-2015, (14 April 2013)

The Contracts between FECO and CRAES/CBMA/SCC-MEP and between CRAES and SPSWMC and HSSWMC (all in Chinese) were summarized in English by the Team's interpreter for the benefit of the Norwegian Team members

An example of the contracts between CRAES and one of the monitoring institutions, and between CRAES and one of the cement plants (both in Chinese) were also summarized in English by the Team's interpreter for the benefit of the Norwegian Team members

Annual Reports for 2011, 2012 and 2013

Audit Reports for 2011, 2012 and 2013

List of people met

Norway

Dr. Kåre Helge Karstensen, Chief scientist, SINTEF
Dr Christian John Engelsen, Senior Research Scientist, SINTEF
Ms Monica Nodland Malmedal, Scientist, SINTEF
Dr Serina Ng, Scientist, SINTEF

Royal Norwegian Embassy in Beijing

Mr. Tor Skudal, Counsellor (Environment), Royal Norwegian Embassy
Ms. Yinglang Liu, Programme Officer, Royal Norwegian Embassy
Mr, Jan Wilhelm Grythe, Councillor, Royal Norwegian Embassy

Beijing (national level partners)

Mr. Vasco Peng Zheng, Program Officer, FECO Division V
Ms Chen Haijun., Deputy Division Chief, FECO Division V
Mr. Kang Bingjian, Division Director, Dep. of Int. Trade & Economic Affairs, MOFCOM (e-mail contact)
Ms. Zhang Jialing, Director, Division of Solid Waste Management, Department of Pollution Prevention and Control, MEP
Ms Gu Xuejing, Division of Standard, Department of Science, Technology and Standards, MEP
Ms. Xu Juan, SCC-MEP
Mr. Yan Dahai, CRAES
Ms. He Jie, CBMA

Beijing (Beijing city)

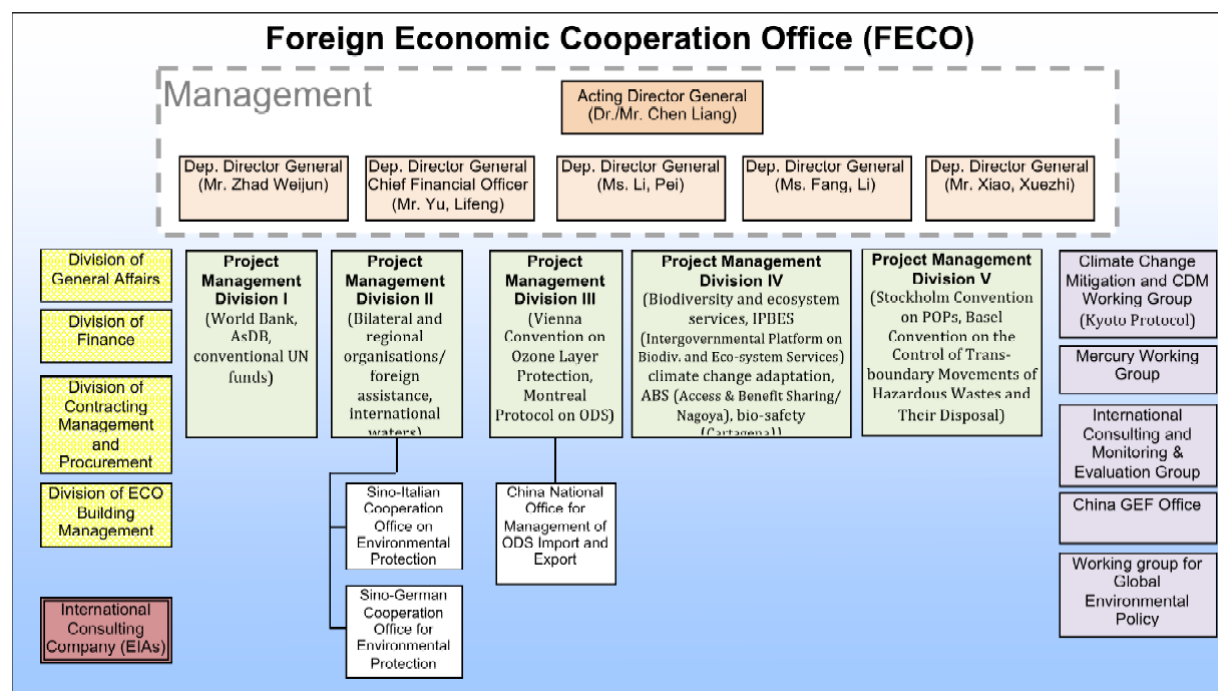
Mr. Zhou Yunsong, Division of Pollution Control, Beijing EPB
Mr. Xiao Xiaofeng, Center for Solid Waste and Chemicals Management, Beijing EPB
Mr. Teng Weiguo, vice general manager, BBMG Eco-Island Co. Ltd.
Mr. Zhou Zhiping, vice general manager, BBMG Liulihe Cement Plant Co. Ltd
Ms. Jiang Yusheng, chief engineer, BBMG Eco-Island Co. Ltd.

Hubei Province

Mr. Zhou Zhiyong, director, Hubei Provincial Solid Waste Management Centre
Mr. Yang Lihui, engineer, Hubei Provincial Solid Waste Management Centre
Mr. She Tao, vice director, Division of Monitoring and Supervision, Huangshi City EPB
Mr Liu Huijun, vice director, Wuxue EPB
Mr Guo Zhengwei, branch chief, Wuxue EPM
Mr. Zhangjiang, chief technology officer, Huaxin Environmental Engineering Co. Ltd.
Mr. Zhang Jian, marketing manager, Huaxin Environmental Engineering Co. Ltd.
Ms. Li Yongmei, business development manager, Huaxin Env. Engineering Co. Ltd.
Mr. Liu Hui, executive general manager, Huaxin Env. Engineering (Wuxue) Co. Ltd.
Mr. Du Yuefei, administration manager, Huaxin Env. Engineering (Wuxue) Co. Ltd.
Mr. Lu Jia, technical manager, Huaxin Environmental Engineering (Wuxue) Co. Ltd.

Organizational set-up of FECO

This figure is taken from the Review Report (2013): Biodiversity and Climate Change, Peoples Republic of China (CHN-2148 09/057). Credits to Mr Tore Laugerud



Gender balance in main project institutions or activities

Produced by FECO

Institution or activity	Male	Female
FECO project implementation staff	2	3
CRAES project implementation staff	3	2
CBMA project implementation staff		3
SCC-MEP project implementation staff	1	1
Inception workshop	39	16
Training workshop (Wuhan)	28	12
Two study tours	6	8

Comments received from stakeholders on the draft report

MOFCOM

On behalf of Mr. Kang, thanks for your hard work on the midterm review of the project Environmentally Sound Management of Hazardous and Industrial Wastes in Cement Kilns in China – Phase II. Mr. Kang was very glad to have a positive and constructive meeting with your delegation while in Beijing, both sides agreed to make the implementation of project smooth and achieve the expected goals. We appreciate your hard work on preparing the report and agree with the comments raised in it. Looking forward to keeping work with you in this regards.

Norwegian Embassy, Beijing

Thanks for sending us draft report. After reading it, we found it of good quality, comprehensive and in line with the TOR. From the Embassy side, we found no major factual mistakes in it and appreciate your hard work in given timeframe.

FECO

From the report, the overall rating for the project is satisfactory. In respect with the all the outputs designed in accordance with the inception reports, the most of the expected outcomes were achieved, specially for the standards and technical specifications, there are further two relevant standards were issued lately, which is resulted from crosscutting effects. The catalytic function of this project play very important role in not only in co-processing industry development, legislation establishment, capacity building and awareness raise in China, but also a series of scientific data and conclusions on Dioxin, Mercury and CO₂ emission for the world.

Under the performance base, we wonder if the overall rating for the project could be revised to higher rating.

Comments from the Team: Please refer to our more detailed feedback to the comments from CRAES below. In general, the project has not been given “ratings”, but a more qualitative feedback. Some minor adjustments to our assesments have been done based on the input from CRAES. The assessment under para 4.2 discussing outcome and impact has been changed from “positive” to “very positive”.

CRAES

I basically agree with this report. Some minor mistakes are listed below:

(1) In the 3rd paragraph of page 7 and 4th paragraph of page 10, the report related that the number of the cement plants doing co-processing in China until now is about 200. I think this figure is not correct. Just as we discussed before, nearly all cement plants in China have utilized normal industrial slags (coal fly ash, tailings, sulfate slage, etc)as alternative raw materials, therefore, If the normal indusrtrial slags are counted, the number should be thousands. But if only hazardous wastes, MSW, sludge, contaminated soil and solid waste containing organics, the number should not be larger than 100 even 50. By the way, the statics data from local EPBs is not truely trustable. Because many staff of local EPBs have not enough competence to distinguish all kinds of solid waste and raw materials.

Comments from the Team: The text is slightly adjusted and no exact number is given (ref para 1.3 and para 2.2 , the page numbers have changed)

(2) In the first answer of chapter 3.2, the report related that " Two documents have been issued and another two are awaiting final approval." Acturally, the "another two" also have been issued in August

of this year.

Comments from the Team: This has been corrected.

Besides the above, I have some explanations like below:

(i) The report related several times we should made the translation for the documents. I want the Review Team know that the translation work will be conducted at the end of the project because at that time, we have collected all the materials and shall know what is suitable for translating and disseminating. But in this stage, the mid-term, we think it is not the right time to translating and translating all the documents without selecting may be a waste of resources.

(ii) The report related the output 3 (pre-treatment) and 4-5 (dioxin and mercury emissions) are lacking in detail. I want the Review Team know that according to the inception report and implementation plan, in this stage, the mid-term, we only need finish the reports on general aspects, the specific and detailed contenctcs shall be complemented at the end of this project, that is , when all the tests are finished and all the data are available.

Comments from the Team: Some minor adjustments to the text have been made, but the Review Team has not changed its recommendations.

I still have one suggestion for the fund disbursement. The Review Team advised a change from up-front disbursements to payment (refunds) according to actual expenditure. I aggre with that. But the embassy need pay a initial fund when the contract is signed for implementing the planed work of the first year or the first half year.

Comments from the Team: Yes, this is one option.

I did not seen the overall rating in the report but ratings of each aspect. I think the ratings are rational. If the Review Team can give higher ratings related to output 3-5 and translating works after considering what I explained, that will be better.

Comments from the Team: The recommendations from the Team on each output should be seen as "recommendations" that can assist the project in achieving the planned output and outcome.

SCC-MEP

The draft report of mid-term review of Environmentally Sound Management of Hazardous and Industrial Wastes in Cement Kilns in China – Phase II had evaluated the whole work highly exactly. We basically agree with the contents of the report. It is possible for us to accept the team recommendation of involved other countries experts in the Chinese cement co-processing strategies and policies work. Although it is very difficult to investigate the whole country's situation and establish the national strategy plan, we had worked very hard and very well carry out the research results to support the strategic plan. As for the whole project, the issue of two standards and one technical specification had strongly stimulated the development of cement co-processing industry. It means for the environmental aspect the cement co-processing industry has its own standards and the EPAs had a good management focus point. In summary, we think our whole work group had contributed our best efforts to the project and the outputs are in large quantities which should be met the highly satisfaction requirements and we will still work hard on this project for the rest of the time

SINTEF

SINTEF's feedback was in Norwegian language; in their opinion the report gave a correct and balanced view of the project.

Photos from the Review Mission



Liulihe Cement Plant.



Storage of fly ash at Mangrove Environment Company for co-processing in Liulihe Cement Plant.



Huaxin Cement Plant.



Kiln and control room at Huaxin Cement Plant.



The Team, FECO and CRAES project focal points as well as local representatives in Hubei.