"Project Formulation Survey" under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2012

Summary Report

Vietnam
Survey of Refining FA by C-CAS Technology for making high quality concrete products

March, 2013

Heigen and Recycle1 / Joint Venture

This report is a summary of a project formulation survey conducted by the contractor, under the Governmental Commission on the Project for ODA Overseas Economic Cooperation, commissioned by the Ministry of Foreign Affairs of Japan in Fiscal Year 2012. It does not necessarily represent the official views of the Ministry of Foreign Affairs of Japan.

□. Discription of the current situation and development needs of the concerned development issues in the Vietnam

1.1 Development needs in Vietnam

Vietnam realizes favorable economic growth by recent direct overseas investing. The enlargement of the coal-fired station is planned to meet with the growing electricity demand, therefore it is predicted that the discharge of the FA becomes 10 million tons in the future. The FA includes heavy metal, and environmental pollution by the FA is actualized in China. On the other hand, the FA can conjugate as resources. For the reduction of the environmental pollution risk and sustainable society, a recycling technology and system of FA are demanded.

Table1: Summary of the development problem in Vietnam

Background	Rapid development of Vietnam			
	Correspondence to electricity demand by the enlargement of the coal-fired station		Infrastructure maintenance such as a house, a road, the railroad	
	Mass discharge of the FA		Mass demand of building materials	
Current Situation	The FA is got rid of as form of slurry in an ash dumping place. There are environmental pollution risk.	The FA becomes the discharge of 10 million tons in 2030. Around 10-20% of recycling rates of the current FA.	With brick burning, CO2 discharge, air pollution, farmland destruction are actualized. MOC announces the policy to make the brick substitute product.	Capability for infrastructure maintenance is low because pre-cast product industry in immature.
Development Issues	Reduction of the environmental pollution risk from the FA	Construction of the structure of the FA recycling	Reduction of the environmental pollution from brick industry	Improvement of the ability for infrastructure maintenance
C/P	VEA、EVN	EVN 、Power Plant	VIBM 、VCA	MOC 、VIBM
Development Needs	It is thought that there is lack of recognition for the environmental pollution risk.	A thermal power station and B thermal power station have the needs that a gross quantity wants to recycle FA of 800,000 tons a year.	VIBM has support needs in a reforming technology and the development of the FA mixture product, product standard development	In other ODA items, the improvement of the spot construction power by the spread of pre-cast products is validated.

Ⅱ. Possible applicability of the SME's products and technologies, and prospects for future business development

2.1 Concept of the FA reforming business

The JV has the C-CAS reforming plant technology that Professor Matsufuji of Kitakyushu University invented and an FA utilization technology to produce concrete products of high quality using reforming FA. The JV utilizes the technique and is aimed for recycling society construction mainly on the FA and new industrialization in Vietnam.A removal technology of un-burned carbon during FA.(Controlled Coal Ash Slurry)

2.2 Issues and correspondence policies for the industrialization

There are five problems on developing FA reforming business and gathers it up about a correspondence policy at the present.

(1) Acquisition method of the FA

Fur rye thermal power station and Haiphong thermal power station confirm that they can purchase FA to up to hundreds of thousands of tons of levels as resources together. The price is 240 yen/t by taking care of of the form of slurry local with a thing.

(2) After raising an FA sample from the effective

fur rye thermal power station of the C-CAS technology for the Vietnamese FA and the Haiphong thermal power station, and demonstrating reforming using a C-CAS technology in Japan, under un-burned carbon 1% were able to remove it. It was around 6% of removal rates, and the reforming technology carried out development in Vietnam received an evaluation that a C-CAS technology was more dominant from VIBM.

(3) Setup possibility of the reforming business of the FA.

In Vietnam, the FA is defined as normal waste. Therefore it is the same as a normal manufacturing facility to run reforming business, and the special permission is unnecessary. We confirmed this in EVA.

(4) Needs by the concrete industry of the reforming FA, economy, business profitability.

The soft concrete factory and the pre-cast factory had needs of the reforming FA for reduction of the cement cost and the quality improvement of the product. When the price of reforming FA was 3,200 yen/t, at a fur rye thermal power station, we were able to confirm it.Because a stocking level of the FA was 240 yen/t, and sales price was 3,200 yen/t, the economy was able to confirm that it made ends meet enough.

(5) A business partner and an enforcement site.

We were related with candidate business partner of two companies.

1) Install a proof plant in cooperation with the pre-cast product factory which is near to the Haiphong thermal power station.

2) In cooperation with an existing FA reforming company, join in a technical tie-up in the construction of a new FA reforming plant in the future.

Ⅲ. Expected development impact and effect on business development of the proposing SMEs in Vietnam through proposed ODA projects

3.1 The consistency of a suggestion technology and the development concerned problem.

We think that the organization of the circulation use of the FA that utilized a C-CAS technology can greatly contribute to four development problem solution.We plan to undertake an enterprise from about 2016 by working on ODA technical cooperation in technical proof by the JV in parallel.

Table2: Contribution effect of our technique on four development problems

Development Issues	Reduction of the environmental pollution risk from the FA	Construction of the structure of the FA recycling	Reduction of the environmental pollution from brick industry	Improvement of the ability for infrastructure maintenance
Improvement Effect on Development Isseues	Elution of the heavy metal from FA is lowered in analysis detection limit by reforming FA, and mixing it with a concrete product.	As well as the concrete use, more products come to be able to recycle the FA including plastic and the ameliorant by letting you eliminate to less than carbon 2% by a C-CAS technology.	The reforming FA can conjugate as raw materials of a concrete product becoming the brick substitute. (e.g., foaming block).	I can plan shortening of the term of works, accident reduction by utilizing a pre-cast product on the site.

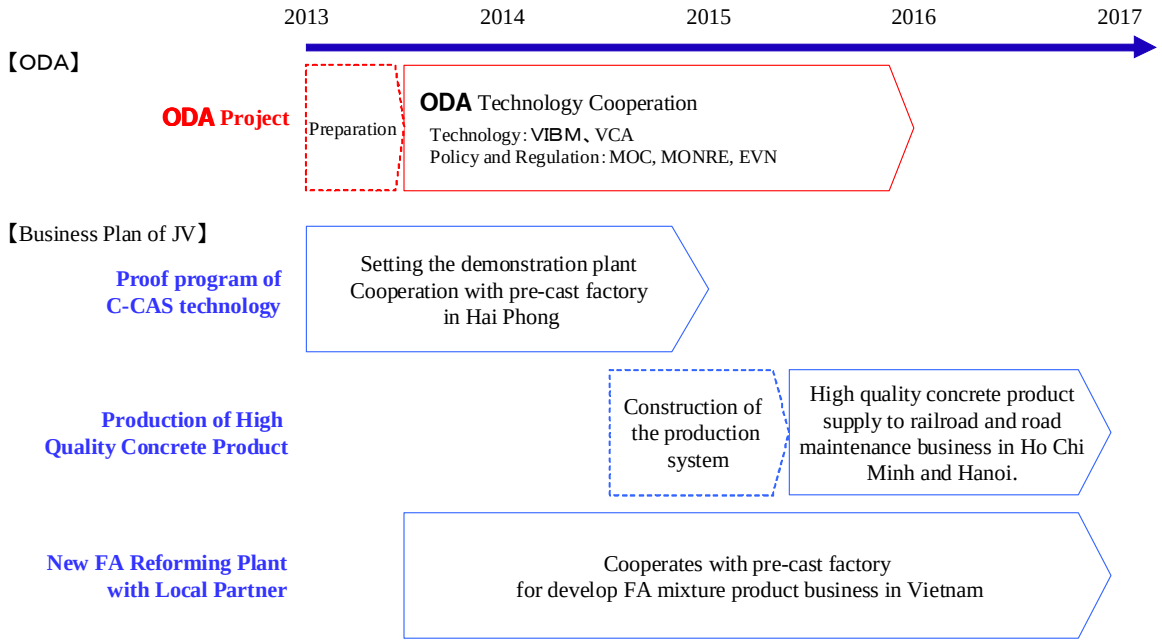

Figure1: ODA and business development design

Ⅳ. Proposals for formulating ODA projects

4.1 Needs grasp about two technical cooperation

For the making of society circulating FA, two technical cooperation of a technology cooperation and policy & regulation cooperation is necessary. Because there was a strong request about the technology cooperation in particular from VIBM, we realized the project.

Table3: Two kinds of ODA item suggestion of a technology cooperation

	Technology Cooperation	Policy & Regulation Cooperation
C/P	VIBM VCA EVN	MOC MONRE
Goal	The establishment of the industry base to circulate FA as resources.	The establishment of the legal system to circulate FA as resources.
Achivment	The making of the FA reforming standard. The standard making of the FA mixed pre-cast product. Standard making of the FA mixture soft concrete. The penetration of the FA reforming, production technology.	The countermeasure development to an environmental pollution risk of the FA. The penetration of the heavy metal elution restraint technique from FA. The development of reuse target of the FA, the plan. Development of FA use recommendation, the regulation according to the use.
Program	Proof examination of C-CAS demonstoration plant setting and the FA reforming / product production in Vietnam. Training program in Japan. Training of the FA reforming, visit of the FA mixture product factory Expert dispatch (various standard making, transmission of the usage of the reforming FA)	Training program in Japan - FA management system at Ministry of the Environment and the electric power company - FA product use recommendation system in the local government, the training of the environmental pollution risk of the FA Expert dispatch (various system making, FA measures support in each coal-fired station)

Outline of Survey

Japanese ODA Research Project in 2012 (Environmental Issues)
Refining FA by C-CAS Technology for making high quality concrete products

(FA : Fly Ash)

Profile of JV

- Joint Venture : Heigen & Recycle1
- Location : Tokyo, Japan
- Site, C/P: Vietnam (Hanoi, Hai Phong) , VIBM (Vietnam Institution of Building Materials)

Development Issues

- Mass non-processing FA are directly taken to disposal field.
- As for the FA of 3 million tons, only less than 20% are recycled now.
- MOC has a policy to develop alternative product of brick to control pollution caused by its industry.
- Pre-cast product is immature, and capability of infrastructure maintenance is low.

Technology

- C-CAS invented by professor Matsufuji of Kitakyushu University is the technology to separate unburned carbon from FA using spiral flow and micro bubble.
- Using C-CAS, ratio of unburned carbon will be 2% or less among total FA, and reformed FA improves quality of concrete product.

Expected development impact on business development of SMEs in Vietnam through proposed ODA projects

- Technology Cooperation: Cooperate with VIBM to develop product standard of FA mixed concrete product
- Policy & Regulation Cooperation: Cooperate with MOC & MONRE to develop Policy & Regulation for FA recycling.

Business Plan of SMEs

- We install demonstration plant of C-CAS around HaiPhong power plant by the end of 2013, and cooperates with pre-cast factory for develop FA mixture product business in Vietnam