

## TERMS OF REFERENCE

Title of project:	Promotion of Non-Fired Brick (NFB) Production and Utilization in Viet Nam
Name of assignment:	Survey, assess the state of the use of ash and slag in production of non-fired building materials and recommend solutions to increase its effectiveness
Contractor selection form:	National Individual Consultants
Duty location:	Ha Noi and other provinces
Duration:	55 working days during 2 months, starting from Apr 2020
Direct supervisor:	Building Material Specialist

### 1. Background:

On 29 August 2008, Decision No. 121/QĐ-TTg approving the “Master Plan on development of building materials up to 2020” was issued by the Government. Later on, this was replaced by Decision No. 1469/QĐ-TTg dated 22 August 2014 of the Prime Minister on “Master Plan on building materials development up to 2020 with vision to 2030”.

To motivate the development of Non-Fired Bricks (NFB), Decision No. 567/QĐ-TTg dated 28 April 2010 on NFB development program up to 2020 (Program 567) was issued by the Prime Minister. Major objectives of the program are as follows:

- Market share of NFB will increase by 20%-25% by 2015 and 30%-40% by 2020, respectively;
- Utilization of around 15-20 million tonnes of industrial wastes (Ash) from coal-fired power generation and other industries to produce non-fired building materials, saving around 1,000 hectares of agriculture land annually; and
- All traditional fired clay brick (FCB) making plants will be gradually replaced by NFB production facilities.

On 19 September 2014, the Prime Minister issued Decision No. 1686/QĐ-TTg on approval of Project “Promotion of Non-Fired Brick (NFB) Production and Utilization in Viet Nam” which is funded by the UNDP and the GEF, the Ministry of Science and Technology is the executing entity, the Ministry of Construction is the co-implementing entity.

The objective of the NFB Project is to reduce the annual growth rate of GHG emissions by displacing the use of fossil fuels and the usage of good quality soil for brick making through the increased production, sale and utilization of non-

fired bricks in Viet Nam. This objective will be achieved by removing barriers to increase production and utilization of NFBs through 4 components:

- (i) Component 1: Policy support for NFB technology development.
- (ii) Component 2: Technical capacity building on NFB technology application and operation and use of NFB products.
- (iii) Component 3: Sustainable financing support for NFB technology application.
- (iv) Component 4: NFB production technology demonstration, investment and replication.

The Project will be implemented over a 5-year period and is expected to generate GHG emission reductions through the displacement of coal-fired clay brick kilns. Direct GHG reduction is estimated at 383 ktonnes of CO<sub>2</sub>. Indirect emission reduction is estimated at 13,409 ktonnes of CO<sub>2</sub> that is cumulative for a 10-year period after the end of the Project.

Treatment and use of ash, slag and gypsum including gypsum recovered from the flue gas of thermal power plants, abbreviated as FGD gypsum (Flue Gas Desulfurization) and gypsum discharged from chemical, fertilizer plants, abbreviated as PG (Phosphogypsum) is a very urgent issue, requiring the Prime Minister to issue Decision No. 452/QĐ-TTg dated 12 April 2017 approving the proposal to boost treatment and use of ash, slag and gypsum discharged from thermal power plants, chemical and fertilizer plants for production of building materials and for use in construction works.

The use of ash, slag, FGD gypsum, PG gypsum as raw materials for production of building materials and in construction works aims to protect the environment, save land areas for dumping and reduce the use of mineral resources for production of building materials, that ensures sustainable development.

The program aims to treat and use ash, slag and gypsum to reach about 52% of the total accumulation by 2020 (About 75 million tons, including 56 million tons of thermal ash, slag; 2.5 million tons of FGD gypsum and 16.5 million tons of PG gypsum).

In fact, the amount of ash and slag used annually to produce non-fired building materials is still very modest. Up to now, there have not been any researches or projects of any organizations or individuals that has reported, assessed the state of use, reliable data on the amount of ash and slag used to produce non-fired building materials, the positive and negative sides of the policy mechanism to take remedies, the barriers to the use of ash and slag to be removed, which usage trends and treatment technologies will be effective, research directions to solve existing problems and to remove barriers that are urgent issues.

In order to solve the above issues, it is recommended by UNDP to carry out the following task: “Survey, assess the state of the use of ash and slag in production of non-fired building materials and recommend solutions to increase its effectiveness”.

## 2. Objective:

To propose solutions and research directions aiming at increasing the effective use of ash and slag to produce non-fired building materials through surveying and assessing the state of the use of ash and slag in production of non-fired building materials, reviewing incentive policy mechanisms and barriers to the use of ash and slag.

## 3. Deliverables:

The report on surveying, assessing the current state and recommending solutions to increase the effective use of ash and slag in production of non-fired building materials includes the following contents:

No.	Contents	Requirements
1	State of ash and slag emissions from thermal power plants and chemical plants.	Amount from 2015 to 2019 and estimation from 2020 to 2025, including the content of ash and slag quality, backlog ratio and cause.
2	Assessment of the use of ash and slag of the enterprises producing non-fired building materials.	Determined amount of ash and slag being used in the production of non-fired building materials from 2015 to 2019 and estimation from 2020 to 2025. The ratio of ash and slag used in total discharged ash. The ratio of ash and slag used in the total input of raw materials for production of non-fired building materials and building materials, focusing on enterprises that have been involved in the NFB Project and businesses close to coal thermal power plants (Absolute amount and percentage as compared to total ash and slag). Possibility of increasing ash and slag utilization rates, advantages, disadvantages and solutions.
3	Trends of using ash and slag to produce building materials.	Overview of international trends and possible integration with the circular economic model (If available); Forecast for some trends in Viet Nam.
4	Specific policy solutions to promote the use of ash and slag.	Including incentive policies, human resource training, standards, technical regulations, norms, instructions on use of ash and slag, etc.
5	Science and technology solutions.	Including research recommendations to increase the effective use of ash and slag in production of non-fired building materials.

No.	Contents	Requirements
6	Conclusions and recommendations.	Consistent with the contents of the report.

Note: The report is translated into English after the Vietnamese report is approved by the Project.

#### 4. Scope of work:

The consultant is responsible for accomplishing the above objectives with the following key activities:

- Determine the objectives, contents of the task, objects and the survey methods suitable to each object;
- Prepare outline and detailed workplan for implementing the task, including survey outline ..
- Study, consult, collect documents related to the state of the discharge and use of ash and slag for production of building materials in general and non-fired building materials in particular, main policy mechanisms and international experiences related to rights, responsibilities and obligations of entities: State management agencies, discharge owners, disposal units, enterprises using ash and slag for production of building materials. Refer to domestic and foreign ash, slag and gypsum treatment technologies, domestic and foreign standards and technical regulations on treated ash and slag products up to the standards used as raw materials for production of building materials.
- Survey, analyze, assess and synthesize results.
- Prepare draft report with the contents as stated in Section 3.
- Consult the PMU for the draft report.
- Receive, explain and finalize the draft report according to the comments.

#### 5. Methodology:

- From the objective of the task as “Survey, assess the state of and recommend solutions to increase the effective use of ash and slag in production of non-fired building materials”, consultants should develop a research and survey method (Object, method, scale, content) that performs the task appropriately, practically and effectively.
- Apply the latest analysis and assessment methods in researching, surveying, collecting and processing data for implementation of the task.
- Use domestic and international experiences in setting sanctions, responsibilities and interests of the entities: State management agencies; organizations and individuals discharging ash and slag; organizations and individuals treating and using ash, slag and gypsum; technology, standards and technical regulations on quality of treated ash and slag products as reference for the assessment results, based on that recommend solutions to

increase the effective use of ash and slag in production of non-fired building materials.

- Research methodology: Collect information from the researches, projects, documents, policies related to ash and slag to assess the positive and negative sides, barriers to the use of ash and slag in production of non-fired building materials.
- Select appropriate survey methods and objects: Field survey, interview, survey by questionnaire, consultation with experts.
- Consult and closely coordinate with the NFB PMU in the process of detailed planning and task implementation.

## **6. Implementation plan:**

The consultants should submit a detailed roadmap to perform the task. The PMU requires the consultants to meet the following key milestones:

- 20 Apr 2020: Submit the outline and workplan. The outline should include questionnaire and interview (If any) for the target groups: Enterprises discharging wastes; Enterprises using ash and slag as raw materials for production of building materials; Corporations; Experts.
- 15 May 2020: Complete the draft report.
- 25 May 2020: Complete the Vietnamese report.
- 28 May 2020: Complete the English report.

## **7. Required expertise and qualification:**

- The consulting contractors must have at least 5 years of experience in one of the following fields: Scientific research in using ash and slag for production of building materials; Developing, disseminating and supervising the implementation of legal documents in the field of building materials or related fields;
- The proposed team members must include at least experts in the following fields: Building materials, silicate, mechanics, electricity, automation, chemicals, legislation, construction;
- The team members must have at least engineer qualifications, preferably those with doctoral or master degrees, who have 5 years of experience in: Research, management of science and technology; Drafting, appraising and disseminating legal documents: Laws, Government's Decrees, Prime Minister's Decisions, Circulars of Ministries, sectors, people with technology knowledge and experience in treatment of ash and slag of thermal power, chemical plants;
- English level C.

## 8. Payment conditions:

- The remuneration is paid on the basis of the capacity and professional experience of each consultant involved according to the Cost Norms that were issued by the United Nations Organizations in Viet Nam, the Delegation of the European Union in Viet Nam and the Ministry of Planning and Investment.
- Other expenses are applied according to the HPPMG and Cost Norms that were issued by the United Nations Organizations in Viet Nam, the Delegation of the European Union in Viet Nam and the Ministry of Planning and Investment.

### Expected progress and number of working days to perform the task:

No.	Deliverables	Number of days	Deadline
<b>1</b>	<b>The report on surveying, assessing the state of the use of ash and slag in production of non-fired building materials and recommending solutions to increase its effectiveness</b>	<b>50</b>	<b>25 May 2020</b>
	- State of ash and slag emissions from thermal power plants and chemical plants.	18	
	- Assessment of the use of ash and slag of the enterprises producing non-fired building materials.	18	
	- Trends of using ash and slag to produce building materials.	8	
	- Policy solutions.	3	
	- Science and technology solutions	3	
	- Conclusions and recommendations.		
<b>2</b>	<b>Translate the report into English</b>	<b>5</b>	<b>28 May 2020</b>
	<b>Total working days</b>	<b>55</b>	