



Transforming Construction in Mongolia using Supplementary Cementitious Materials

NAMA Profile # 2

Seeking support for implementation

May 2015

One dilemma that developing countries face is that the process of improving basic infrastructure often also leads to an increase in greenhouse gas (GHG) emissions. For example, cement production techniques are responsible for a high percentage (5-10%) of global CO₂ emissions.

In Mongolia, vast grasslands and erratic climates have historically defined and determined nomadic traditions. When the weather would change, herders could pack up everything and move to more friendly pastures. However, in recent years, the unpredictable climate has become consistently hotter and drier, leaving much of the grasslands unsuitable for grazing. As a result, herders are leaving their nomadic culture behind and moving to cities in search of new livelihoods. Together with cultural changes, Mongolia is experiencing a rapid economic transformation generated by mineral discoveries, and, in 2012, the

country's GDP growth was 12.3%, one of the highest rates globally for that year. In addition, the country is undertaking its largest infrastructure investments ever, including spending US\$40.5bn on energy, housing, rail, roads and industry, much of which requires cement production. Cement production, which as mentioned above, is extremely GHG intensive, emitting approximately one ton of CO₂ per ton of cement on average (in Mongolia 1.2 tCO₂e). Cement production makes up 25% of total coal consumption in Mongolia.



NAMA description

The proposed NAMA aims to initiate the transformation of Mongolia's construction sector towards a less carbon intensive development path through introducing supplementary cementitious materials (SCMs) and replacing up to 70% of the cement used in concrete. The proposed NAMA represents an extremely innovative approach because it will introduce an environmentally sound alternative to portland cement, thus leading to a transformation of the building materials sector.

Supplementary Cementitious Materials (SCM)

SCMs are produced by a mechanical process, which consumes 90-95% less energy compared to the manufacture of cement. SCMs can be produced from a variety of raw materials, including volcanic ash, fly ash and steel slag. Compared to traditional portland cement production, SCMs combine low investment costs, low energy consumption, low operating costs, higher quality construction material, low GHG emissions and superior economic performance.

Intended impact and output

This NAMA will establish a 350,000 t/y SCM production facility, and help with the design of supportive policies and management of the standardization process. The project will recycle fly ash from local coal-fired power plants as raw material, and is expected to result in a reduction of approximately 420,000 tCO₂ emissions annually.

Potential for transformational change and sustainable development benefits

This NAMA is likely to provide a valuable boost to the construction sector by addressing environmental, economic and performance improvements. In fact, shifting from portland cement production to SCM technology will positively affect the sector as described below.

Environmental benefits:

- The project uses either fly ash recycled from coal-fired power plants or very abundant natural resources (volcanic ash) as raw material, while portland cement production consumes depleting natural limestone reserves.
- The project reduces coal-based energy consumption by 90% and water demand in concrete by 40% compared to portland cement-based concrete.
- Avoid harmful emissions of mercury and particulate matters associated with coal consumption can contribute to reduced atmospheric pollution.

Performance benefits:

- SCM concrete delivers stronger and longer-lasting concrete.
- SCM concrete improves mitigation of alkali-silica reactivity, reduces hydration heat, reduces concrete permeability, and improves protection from chloride and sulphate attacks.
- SCM concrete road paving significantly increases paving productivity and road surface durability, as well as reduces petrol consumption by about 5%.
- By extending the structural life, SCM concrete extends the replacement cycle, while reducing maintenance costs.

Economic benefits:

- Total cost of SCM plant construction is ten times less than that of a portland cement plant.
- Replacing the energy-intensive portland cement process with mechanically activated SCMs results in lower operational and maintenance costs.
- Superior returns on investment are realized due to a combination of lower capital and operational expenditures.

Relevancy of the NAMA in the national policy context

In order to address climate change-related challenges, Mongolia has developed the National Action Programme on Climate Change (NAPCC), which was approved by the State Great Khural (Parliament) in 2000 and updated in 2011. The action programme includes the country's national policy and strategy to tackle the adverse impacts of climate change and to mitigate GHG emissions. The NAPCC is aimed not only at meeting the country's obligations under the UNFCCC, but also at setting priorities for action and integrating climate change concerns into other national and sectoral development plans and programmes.



Source: NAMAnews.org

The proposed NAMA will help to ensure the effective implementation and achievement of climate change mitigation strategies, and lead to transformational changes to existing environmental regulations, social and economic or other sectoral development policy documents, and other related laws. Additionally, the NAMA will: provide a new opportunity for policymakers to accelerate energy efficiency for long-term policy planning in Mongolia; and promote a market transformation in the construction sector towards a less carbon intensive development path.

Salient features of the Proposed NAMA

Sector : Industry

Technology : Energy Efficiency

Type of action : National/Sectoral goal

GHGs covered by the action : CO₂

Expected timeframe for the preparation : 4 years

Implementing entity : Ministry of Environment and Green Development

Total estimated cost of implementation : €15 million

Required support for implementation of the action : €15 million

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<https://process.unfccc.int/>

This series of NAMA profiles is produced by the NAMA and Registry Unit of the Non-Annex I Support Sub-Programme of the Mitigation, Data and Analysis Programme (MDA) of the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat, based on the information recorded by Parties in the NAMA Registry. The objective of the NAMA profiles is to enhance the visibility of NAMAs, which increases the probability of obtaining international support and encourages similar mitigation actions in other developing countries.

The NAMA Registry is a dynamic, web-based platform to record NAMAs in developing countries, as well as support available and/or provided by Parties and entities for such mitigation actions. Furthermore, the Registry aims to facilitate the matching of NAMAs with available support. Participation is voluntary and the Registry contains only information that has been submitted specifically for recording purposes. For any queries or assistance regarding the NAMA Registry, please contact: NAMA-registry@unfccc.int or NAMA-support@unfccc.int

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