NS-91 - Transforming construction in Mongolia using Supplementary Cementitious Materials

Mongolia

NAMA Seeking Support for Implementation

A Overview

A.1 Party	Mongolia
A.2 Title of Mitigation Action	Transforming construction in Mongolia using Supplementary Cementitious Materials
A.3 Description of mitigation action	Mongolia is experiencing a rapid economic transformation generated by mineral discoveries. GDP grew 12.3% in 2012, one of the highest rates globally. Alongside, the country is embarking on its largest infrastructure investments ever, including spending $40.5bn in energy, housing, rail, roads and industry. Cement production is highly GHG intensive, emitting approximately 1 ton of CO2 per ton of cement on average (in Mongolia 1.2 tCO2e), and is responsible for 5-10% of total emissions globally. Cement production shares 25% of total coal consumption in Mongolia. The objective of the proposed NAMA is to initiate the transformation of Mongolia's construction sector towards a less carbon intensive development path through the introduction of supplementary cementitious materials (SCM) that can replace up to 70% of cement in concrete. SCM are produced by a mechanical process that consumes 90-95% less energy compared to cement manufacture. The envisaged measures consist of the establishment a 350,000 t/y SCM production facility, the design of supportive policies and management of the standardization process. The proposed NAMA is a very innovative approach because it will introduce an environmentally sound alternative to Portland cement, thus leading to transform the building materials sector. Moreover, the project will recycle fly ash from local coal-fired power plants as raw material. The NAMA is expected to result in some 420,000 tCO2 emissions reductions annually.
A.4 Sector	☐ Energy supply ☐ Residential and Commercial buildings ☐ Agriculture ☐ Waste management ☐ Transport and its Infrastructure ☒ Industry ☐ Forestry ☐ Other
A.5 Technology	☐ Bioenergy ☒ Energy Efficiency ☐ Cleaner Fuels ☐ Geothermal energy

A.6 Type of action	☐ Hydropower ☐ Wind energy ☐ Carbon Capture and Storage ☐ Land fill gas collection ☐ Solar energy ☐ Ocean energy ☐ Low till / No till ☐ Other ☒ National/ Sectoral goal ☐ Strategy ☐ National/Sectoral policy or program ☐ Project: Investment in machinery ☐ Project: Investment in infrastructure ☐ Project: Other ☐ Other
A.7 Greenhouse gases covered by the action	☒ CO2 ☐ N2O ☐ PFCs ☐ CH4 ☐ HFCs ☐ SF6 ☐ Other

B National Implementing Entity

B.1.0 Name	
B.1.1 Contact Person 1	Saruul Dolgorsuren
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B.1.3 Phone	976-11-311086
B.1.4 Email	saruul@mne.gov.mn
B.1.5 Contact Person 2	Dagvadorj Damdin
B.1.6 Address	Government Building-2, United Nation's street-5/2, Ulaanbaatar-15160
B.1.7 Phone	976-11-311173
B.1.8 Email	dagvadorj@mne.gov.mn
B.1.9 Contact Person 3	
B.1.10 Address	
B.1.11 Phone	
B.1.12 Email	
B.1.13 Comments	The “Climate Change Coordination Office” (CCCO) was established in 2011 under the administration of the Special Envoy for Climate Change, at the Ministry of Environment and Green Development of Mongolia. It was established in accordance with the concept of National Security and the decision of the Government. The main purpose of the office is to bear main responsibility for the climate change related activities nationwide, to formulate and implement climate change related government policies, strategies and programs, provide inter-sectoral coordination on climate change activities and support implementation of international agreements, conventions, and protocol on climate change within the country. Role of the CCCO with this purpose for the project will be: -Promotion and coordination of the activities within sectors and between organizations

-Reporting on the implementation of project activities

-Cooperation with international and regional organizations on the project issues and making arrangements for the implementation the project

-Providing public and private entities as well as general public with proper information of the project through seminars and also through an official web-site with updated information.

C Expected timeframe for the implementation of the mitigation action

C.1	Number of years for completion	4
C.2	Expected start year of implementation	2015

D Currency

D.1	Used Currency	AED Conversion to USD: 1

E Cost

E.1.1	Estimated full cost of implementation	15000000
E.1.2	Comments on full cost of implementation	Mongolia published a list of envisaged non-binding Nationally appropriate mitigation actions in Appendix II of the Copenhagen Accord of 18 December 2009. The industry sector is addressed in section 8 “Industry – Energy Efficiency Improvement in Industry“. It is recommended to change the wet-processing of cement to dry processing to potentially save 40% coal consumption and achieve 147,000tCO2e emissions reduction annually. Moreover, in a 2011 World Bank document called ’carbon finance in Mongolia‘, various potential GHG abatement measures for the cement industry are reviewed at project level in consideration of economic profitability and carbon abatement volumes. However lack of financing resources for the initial investments is a significant obstacle to implement mitigation measures. Mongolia therefore will take advantage of any possible financial sources such as NAMA to implement its mitigation strategy and projects to meet UNFCCC obligations. It is observed that due to prohibitively high investment costs, projects aiming at changing kiln systems from wet to dry type have not been implemented. Such measures (not contemplated under this NAMA) would require investment costs of 38 Million USD for a GHG emission reduction potential of 112,000 tCO2/y. Meanwhile, investing in a 350,000t/y SCM production plant would require 15 Million USD for a GHG emission reduction potential of 420,000 CO2e/y. Hence, the project is in line with Mongolia’s energy efficiency improvement goals for the industry sector and represents the most cost effective GHG abatement option in the sub-sector. It addresses the earlier recognized need to improve performance in the cement sector, but does so in a more cost-effective

	manner with higher mitigation impact than originally envisaged through the following alternatives: - Change kiln system from wet to dry type - Use of waste heat from rotating kilns - Fuel switch - Improvement of sealing of dust system
E.2.1 Estimated incremental cost of implementation	
E.2.2 Comments on estimated incremental cost of implementation	

F Support required for the implementation the mitigation action

F.1.1 Amount of Financial support	15000000
F.1.2 Type of required Financial support	[X] Grant [ ] Loan (sovereign) [X] Loan (Private) [ ] Concessional loan [ ] Guarantee [X] Equity [ ] Carbon finance [ ] Other
F.1.3 Comments on Financial support	Lack of financial resources for the initial investments is a significant obstacle to implement mitigation measures in Mongolia. Mongolia therefore will take advantage of any possible financial sources such as NAMA to implement the identified mitigation strategies and projects to meet UNFCCC obligations. Mongolia was one of about 50 developing countries till September 2012 which submitted a list of NAMAs for international support after the Copenhagen climate conference. NAMA will offer an opportunity to accelerate the use of additional funding sources to overcome a financial barrier due to the high initial cost of the GHG mitigation projects.
F.2.1 Amount of Technological support	
F.2.2 Comments on Technological support	
F.3.1 Amount of capacity building support	
F.3.2 Type of required capacity building support	[ ] Individual level [ ] Institutional level [ ] Systemic level [ ] Other
F.3.3 Comments on Capacity Building support	
F.4 Financial support for implementation required	[ ]
F.5 Technological support for implementation required	[ ]
F.6 Capacity Building support for implementation required	[ ]

G Estimated emission reductions

G.1 Amount	420000
G.2 Unit	MtCO2e/yr

G.3 Additional imformation (e.g. if available, information on the methodological approach followed)	In absence of the proposed project, ordinary Portland Cement would be used in concrete production. Portland Cement production is GHG intensive and US EPA states that total CO2 emissions from the cement pyroprocess depend on energy consumption and generally fall in the range of 0.85 to 1.35 t of CO2 per t of clinker. In Mongolia, introduction of a 350,000 t SCM plant is expected to result in some 420,000 tCO2 emission reductions (1.2 tCO2 / t SCM product) due to existing inefficient wet type kiln system. Over the 20 years lifetime, the project would reduce 8.4 million tCO2e. In other countries in which the production of Portland Cement uses more efficient production processes, the amount of emission reductions would be lower but still significant (0.8-1.0 tCO2 / t SCM product). Additional GHG emission reductions may also be achieved in case SCM-based concrete is used for paving roads as it would result in 5% reduction in petrol consumption compared to using PC based concrete paving (source: third party test reports). According national newspaper UB Post, 6000km of roads require restoration.

H Other indicators

H.1 Other indicators of implementation	The project will use recycled fly ash from local coal-fired power plants as raw material and will have positive impact on concrete quality for end-users. Mongolia's strategy in the sector implies transformational change in energy mix as almost the entire energy production is based on coal combustion. Therefore, the reduction of coal consumption is extremely important, not only to mitigate GHG emissions but also to support the country's sustainable development strategies. The wider introduction of SCM in concrete mixing has been hindered by a variety of barriers, including interest from entrenched Portland cement companies that wish to protect their traditional production technologies, difficulties in getting initial projects funded, as well as ensuring that the use of SCM would meet national standards (which are geared towards the use of Portland cement). Some support is needed to ensure SCM would have a market. The NAMA will help overcome these barriers by designing supportive policies and appropriate national standard for SCM and allowing for concrete users to consider SCM based on performance (e.g. strength, setting time, CO2 per ton), not on chemical composition which might be different from ordinary Portland cement. The project can be replicated and applicable in other regions, countries and internationally. In other words it encourages innovation, not polluters and will contribute to the transfer of advanced technology and know-how into the host country. After the success of demonstration, the project will attract more local small/medium private investors.

I Other relevant information

I.1 Other relevant information including co-benefits for local sustainable development	SCM can be produced from variety of raw materials, including volcanic ash, fly ash and steel slag. It is a technology that compared to traditional Portland cement production combines low investment costs, low energy consumption, low costs, higher quality, low GHG emissions and superior economic performance. The project brings the following co-benefits: <u>Environmental</u> - 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 (PC) production consumes the depleting natural reserves of limestone; - The project reduces coal-based energy consumption by 90% and reduce water demand in concrete by 40% compared to PC-based concrete; - Avoided harmful emissions of mercury and particulate matters associated with coal consumption can contribute to reduce atmospheric pollution. <u>Performance</u> - SCM delivers stronger and longer-lasting concrete; - SCM concrete improves mitigation of alkali-silica reactivity, reduces heat of hydration, reduces concrete permeability, improves protection from chloride and sulphate attacks; - SCM concrete road paving significantly increase paving productivity and road surface durability as well as reduce petrol consumption by about 5%; - By extending the life of structures, SCM concrete extends their replacement cycle while at the same time reducing maintenance costs. <u>Economic</u> - Plant construction costs is 1/10th of PC plant; - Replacement of energy intensive PC process with mechanically activated SCM means low O&M costs; - Competitive market price, at most similar to ordinary PC; - Superior return on investment due to a combination of lower CAPEX and OPEX.

J Relevant National Policies strategies, plans and programmes and/or other mitigation action

J.1 Relevant National Policies	In order to address challenges relevant to climate change, Mongolia has developed its National Action Programme on

	Climate Change (NAPCC) and the programme was approved by the State Great Khural (Parliament) in 2000 and updated in 2011. The action programme includes the national policy and strategy to tackle the adverse impacts of climate change and to mitigate greenhouse gas emissions. NAPCC is aimed not only at meeting the UNFCCC obligations, but also at setting priorities for action and to integrate climate change concerns into other national and sectoral development plans and programmes. Mongolia's Nationally Appropriate Mitigation Actions outlined in Appendix II of the Copenhagen Accord of 18 December 2009 and reiterated in Mongolia's Second National Communication (SNC) with UNFCCC in 2010 indicates policies and measures on mitigation of GHG emissions which are non-binding but have been officially communicated and national objective for the industry sector is to implement energy efficiency improvements. It is recommended to change the wet-processing of cement to dry processing to potentially save 40% coal consumption and achieve 147,000tCO2e emissions reduction annually. The outlined project will contribute to ensure the effective implementation and achievement for climate change mitigation strategies. The climate change concerns will be integrated into other national and sectoral development plans and policy documents and lead to transformational changes to the existing environmental regulations, social and economic or other sectoral development policy documents, and other related laws. The outlined project also provides a new opportunity for policymakers to accelerate energy efficiency for a long-term policy planning in Mongolia. In addition, the outlined project will promote the market transformation in construction sector towards a less carbon intensive development path.
J.2 Link to other NAMAs	

K Attachments

K	Attachments	**Title Description**
K.1	Attachment description	
K.2	File	Browse...

L Support received

L.1 Outside the Registry	NA
L.2 Within the Registry	**Support provided SupportType Amount Comment Date**