

NS-280 - Clinker substitution at cement production

Republic of Moldova

NAMA Seeking Support for Implementation

A Overview		
A.1 Party	Republic of Moldova	
A.2 Title of Mitigation Action	Clinker substitution at cement production	
A.3 Description of mitigation action	The overall objective of the NAMA on Clinker Substitution at Cement Production in the Republic of Moldova is to replace the conventional cement production technology (Ordinary Portland Cement – OPC) with a new cement production technology called “Solidia technology” by 2030, which allows to reduce the carbon footprint up to 30% compared to the OPC in the entire process – from production to end use. Currently the OPC technology is used in the country and the share of clinker in total cement production is 81% on average. Clinker production is a high energy-intensive technology leading to around 830 kg CO₂ emissions per tone of produced cement, compared to 170 kg CO₂ / tone of clinker in the process of calcination. In Moldova there are two cement production plants – one owned by Lafarge, French company, situated in Rîbnița and the second is situated in Rîbnița city and owned by a Russian company. During the last 15 years cement production in Moldova has been permanently growing with an average by 6% per year. Given this trend, in 2030 cement production output can reach more than 2,300,000 tones generating more than 1,000,000 tones of CO₂ from the calcination process only. Therefore switching from the OPC technology to “Solidia Technology” which is less energy intensive, produces less chemical emissions, cures with CO₂, rather than water and needs less time, will allow to emit 30% less of CO₂, use 30% less energy and the CO₂ footprint associated with manufacture and use of cement can be reduced by up to 70%. Preliminary estimates indicate that replacing the OPC with “Solidia Technology” by 2030 will lead to 300,000 tones of CO₂ emissions reduction due to the calcination process and 176,000 tones of CO₂ due to fuel savings. In addition, the new technology will act as CO₂ absorber and will reduce water consumption by 80%. Moreover, fuel consumption will reduce by 30% and the cement curing time will reduce from 28 days to one day, resulting in time, storage and inventory space savings for cement and concrete producers. To reach its target, this NAMA will follow a two phases approach: a) Preparation Phase (2018-2024) - to extend the national regulatory framework to support cement clinker substitution using one common approach to standardize cement types, as it has been done in Europe, and set standards for cement types, to ensure provision of quality cement to buyers by replacing the OPC with the Solidia Technology; b) Phase II (2025-2030) – to effectively replace the Solidia Technology.	
A.4 Sector	☐ Energy supply ☐ Residential and Commercial buildings ☐ Agriculture ☐ Waste management ☐ Other ☐ Transport and its Infrastructure ☒ Industry ☐ Forestry	
A.5 Technology	☐ Bioenergy ☐ Energy Efficiency ☐ Hydropower ☐ Wind energy ☐ Carbon Capture and Storage ☐ Land fill gas collection ☒ Other ☐ Cleaner Fuels ☐ Geothermal energy ☐ Solar energy ☐ Ocean energy ☐ Low till / No till	
A.6 Type of action	☐ National/ Sectoral goal ☐ Strategy ☒ National/Sectoral policy or program ☐ Other ☐ Project: Investment in machinery ☐ Project: Investment in infrastructure ☐ Project: Other	
A.7 Greenhouse gases covered by the action	☒ CO₂ ☐ N₂O ☐ PFCs ☐ Other ☐ CH₄ ☐ HFCs ☐ SF₆	
B National Implementing Entity		
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B.1.9	Contact Person 3	
B.1.10	Address	
B.1.11	Phone	
B.1.12	Email	
B.1.13	Comments	

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C Expected timeframe for the implementation of the mitigation action

C.1	Number of years for completion	12
C.2	Expected start year of implementation	2018

D Currency

D.1	Used Currency	EUR
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Conversion to USD: 1

E Cost

E.1.1	Estimated full cost of implementation	81,402,500 Conversion to USD: 105,307,245
E.1.2	Comments on full cost of implementation	The calculation of total investment was based on 3 steps: 1) Development of appropriate legislative framework and training programs, techniques for relevant Estimated investment for this step is EUR 540,000; 2) Capacity building for specialists, site workers, students and other categories. Estimated investment for EUR 3,510,000; 3) Technology implementation. This step includes 3 sub-components: refurbishing the cement production plants – EUR 10,0 mln., refurbishi concrete components production units – EUR 40,0 mln., organizing the marketing process – EUR 30,0 mln. The investments will be made in two phases: Phase I(2018-2024) - EUR 0,5 mln; Phase II (2024-2030) - EUR 80,6 mln. The investment portfolio is the follow International grant – 49,7%; Central Government budget – 0,52%; international loan (zero% interest rate) – 39,85%, and cement producers – 9,96%.
E.2.1	Estimated incremental cost of implementation	 Conversion to USD: 0
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	72,831,250 Conversion to USD: 94,218,952
F.1.2	Type of required Financial support	☒ Grant ☐ Guarantee ☐ Loan (sovereign) ☐ Equity ☐ Loan (Private) ☐ Carbon finance ☒ Concessional loan ☐ Other
F.1.3	Comments on Financial support	It is planned that a Grant and a Concessional loan will be contracted for this NAMA implementation, including the international gra 40.4 mln and the international loan (zero % interest rate) of EUR 32.4 mln.
F.2.1	Amount of Technological support	50,000,000.00
F.2.2	Comments on Technological support	The new cement production technology requires modernization of some equipment at the two cement production plants operating in Moldova. The required in these equipment is estimated to be EUR 10,0 mln. Additionally, it is necessary to install new equipment at concrete components production units. The investm refurbishment is estimated to be EUR 40,0 mln.
F.3.1	Amount of capacity building support	862,500 Conversion to USD: 1,115,783
F.3.2	Type of required capacity building support	☒ Individual level ☒ Institutional level ☐ Systemic level ☐ Other
F.3.3	Comments on Capacity Building support	Capacity building will be provided in the form of trainings, workshops and demonstration tools and by way of informing the potential beneficiaries and stakeho financial and environmental benefits from the implementation of the new cement production technology, new type of cement, and by enhancing the local staffs to scale up implementation of the "Solidia technology". The capacity building activities are planned for the entire duration of project implementation (12 years). have at least 10 workshops annually and train 20 persons in each workshop. It is estimated that about 2400 persons will be trained during the entire period.

G Estimated emission reductions

G.1	Amount	1.12
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G.2 Unit	MtCO2e										
G.3 Additional information (e.g. if available, information on the methodological approach followed)	To estimate the emission reductions and the trends in cement production until 2030, both data from the National GHG Inventory Reports and macro-economic fi Industry sector were used. It has been identified that cement production features 5% growth per year. The GHG emissions were estimated according to the UN methodology (IPCC 2006 Guidelines). The emission factor for clinker was calculated as 0,5491. It was assumed that in 2025 only one cement production plant the new technology "Solidia technology" (60% of total production). The second cement production plant will switch to the new technology "Solidia technology" i										
H Other indicators											
H.1 Other indicators of implementation	This NAMA implementation evaluation and monitoring indicators are: - Amount of new type of cement produced, - Fuel savings, - Water savings, - Number of jobs created and - Investments made for the new technology implementation, including as a grant, loan, budget support and beneficiary equity.										
I Other relevant information											
I.1 Other relevant information including co-benefits for local sustainable development	The replacement of the existing cement production technology (OPC) with the Solidia Technology will create a lot of benefits, including: 30% reduction of fuel cor reduction of cures to full strength in 24 hours instead of 28 days required according to the OPC technology leading to time and financial resources savings; inven reduction for cement and concrete producers, decreasing the limestone used, etc. The replacement of the OPC technology with the Solidia Technology will resu new jobs, reduction up to 80% of water consumed during the concrete manufacturing processes. Concrete produced from the new type of cement has higher p including higher durability, ensuring higher building reliability.										
J Relevant National Policies strategies, plans and programmes and/or other mitigation action											
J.1 Relevant National Policies	The Energy Strategy of the Republic of Moldova until 2030 approved by the GD no. 102 of 05.02. 2013 provides for improving energy security and energy efficiency. This NAMA enhances efforts to improve energy efficiency and increase energy security of the country due to the decrease of the amount of fossil fuel for cement production. The Low Emission Development Strategy (LEDS) of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD no. 1470 of 30.12.2016. http://lex.justice.md/index.action=view&view=doc&lang=1&id=369528 . According to conditional NDC, 56% of GHG emissions reduction should be reached in the Industry sector by 2030 compared to 1990. Implemen NAMA is listed in the LEDS among measures to reach this target. The National Energy Efficiency Program 2011-2020, approved by the GD no. 833 of 10.11.2011 and the draft Action Plan on Energy Efficiency 2016-2018 provides for promotion of efficien including best cement production technologies.										
J.2 Link to other NAMAs	(none)										
K Attachments											
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