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PROJECT TITLE	Climate Change Sector Reform Performance Contract in Ethiopia
FUNDED BY	European Union
IMPLEMENTED BY	Stantec consortium
DURATION	2019 - 2023
BUDGET	€2,835,700
MAIN OBJECTIVE	Transform Ethiopia's economic structure towards a climate resilient and green economy
SPECIFIC OBJECTIVES	Improve climate change mitigation in forestry and industry sectors Improve climate actions monitoring and climate integration in public finance

IMPACT REPORT ON OUTPUT 2	Improved energy efficiency, energy management and reduction of fossil fuels in cement industry																		
RESULTS	<p><b>I. GHG emissions reductions in the cement manufacturing</b></p> <p>The EU performance indicator project aimed to reduce GHG emission in Cement manufacturing in the form of GHGs avoided in cement manufacturing from the baseline 0.667 tCO<sub>2</sub>e per ton of cement produced in Ethiopian Fiscal Year (EFY) 2012 (2019/2020) to 0.646 tCO<sub>2</sub>e per tonne of cement produced. The achieved results in this regard are shown in the table 2 below.</p> <table border="1"> <thead> <tr> <th>Indicator</th> <th>Baseline</th> <th>Target for EFY 2012 (2019/2020)</th> <th>Actual</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>2.2.1: Reduction of GHG emission In Cement manufacturing</td> <td>0.667 tCO<sub>2</sub>e</td> <td>0.646 tCO<sub>2</sub>e</td> <td>0.6140 tCO<sub>2</sub>e</td> <td>249.73%</td> </tr> </tbody> </table> <p>The target reduction, obtained by the difference between the baseline and target, was 0.0214 tCO<sub>2</sub>e/tonne cement. The achieved GHG reduction was obtained by calculating the difference between the baseline and actual reduction, and it amounted to 0.0534 tCO<sub>2</sub>e/tonne of cement. The result was 249.73% of the targeted reduction.</p> <p>Similarly, for the Performance Indicator 2.3.1.: Reduction of GHG emissions in cement manufacturing, the target was to reach an emission level of 0.628 tCO<sub>2</sub>e per ton of cement produced in EFY 2013 (2020/2021), table below:</p> <table border="1"> <thead> <tr> <th>Indicator</th> <th>Target for EFY 2013 (2020/2021)</th> <th>Actual</th> <th>Achieved performance</th> </tr> </thead> <tbody> <tr> <td>2.3.1: Reduction of GHG emission In Cement manufacturing</td> <td>0.628 tCO<sub>2</sub>e</td> <td>0.651 tCO<sub>2</sub>e</td> <td>96.48%</td> </tr> </tbody> </table> <p>The achieved GHG emission level for the indicator 2.3.1 was 0.651 tCO<sub>2</sub>e and is about 96.48 % performance (Table above).</p>	Indicator	Baseline	Target for EFY 2012 (2019/2020)	Actual	Score	2.2.1: Reduction of GHG emission In Cement manufacturing	0.667 tCO <sub>2</sub> e	0.646 tCO <sub>2</sub> e	0.6140 tCO <sub>2</sub> e	249.73%	Indicator	Target for EFY 2013 (2020/2021)	Actual	Achieved performance	2.3.1: Reduction of GHG emission In Cement manufacturing	0.628 tCO <sub>2</sub> e	0.651 tCO <sub>2</sub> e	96.48%
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<p><b>II. Fossil fuel usage reduction in the Cement Manufacturing</b></p> <p><i>Pilot alternative fuel production plant:</i> A pilot project to replace coal with alternative fuels (prosopis Juliflora biomass, in Afra and Somali region) in the cement manufacturing industry (national Cement SC) has been implemented. This would have a carbon emission reduction potential in cement industry, for example, a cement plant with a daily capacity of 3000t of clinker production could reduce its CO<sub>2</sub> emissions by around 120,000 tCO<sub>2</sub>/year when the pilot alternative fuel production plant is fully operational.</p>																			

There has been a significant improvement in the key partners' ability to conduct fuel switching and industrial energy efficiency actions. One of the key results is that the Ministry of Industry is now better equipped to plan and carry out important mitigation activities in the industry sector as a result of the support provided during the implementation of a pilot fuel-switching project in the cement sub-sector. This has been made possible by methodological support, capacity assessments of the implementing partners, and high-level expert opinions and recommendations.

The topic of industrial sector mitigation efforts, including as fuel switching, alternative fuel project development, and producing funding sources, is gaining traction among a wide range of stakeholders. Furthermore, coordination between industry and the private energy efficiency sector was improved, resulting in increased information and knowledge sharing among cement-producing enterprises, as well as national and international energy and industry/cement experts.

*Capacity building training on fuel combustions in cement industry:* About 50 cement industry specialists have participated in knowledge sharing, training on fuels & combustion, and usage of alternative fuels. In addition, through knowledge exchange missions to green industries in Austria, Turkey and Belgium project implementing partners were supported to apply best practices in reducing fossil fuel use, emphasizing the need for sustainable, alternative energy sources.

*Creation of local jobs:* The government trained and hired 16 locals as operators to work at the Prosopis Juliflora harvesting and collection site, while more than 55 local youngsters began farming on the cleared land.

*Feasibility Study for Refused-Derived Fuel (RDF) Production:* A feasibility study was conducted to create Refused-Derived Fuel (RDF) from wastes in Koshe, Addis Abeba. RDF is a waste-derived fuel that potentially replace coal in the cement manufacturing industry. The feasibility analysis found that an RDF fuel of 70-250 t/day could be generated while considering various investment scenarios. Based on the assumption that only the dumped waste volumes (638 t/day) would be used for RDF production and excluding combustible recyclables, then the annual reduction on coal consumption and CO<sub>2</sub> emission are estimated as 32,000 and 48,000 tonnes respectively. This would save more than \$19 million otherwise spent to import coal from abroad.

**III. Energy efficiency in cement industry**

*Energy Audits in cement manufacturing industries:* The TA project have supported the implementation of energy efficiency audits in 9 Ethiopian Cement Manufacturing factories.

*CO<sub>2</sub> emission reductions measures and projects:* Numerous initiatives and projects to reduce CO<sub>2</sub> emissions and conserve energy have been identified. Post-audit follow-ups and the execution of determined energy reduction measures were supported. Annual CO<sub>2</sub> emission reduction potential has been estimated to be around 200,000 tCO<sub>2</sub>.

*Training:* Government cement professionals have received capacity-building training on energy audits, energy efficiency, energy management systems, and fuel combustion. Over 160 professionals took part.

Improvements in capacity were made in conducting energy audits in the industrial sector/cement sub-sector. The Ministry of Industry and other relevant stakeholders are now equipped with energy audit methodology and approaches to be used for specific manufacturing industry energy audit implementation. Their capacity was enhanced to apply best practices of an energy audit in cement plants, conducting good preliminary and detailed energy audits, implementation of comparative analysis, energy survey, and analysis, carrying out on-site measurements and data collection, analysing energy data, identifying no-cost alternatives, and identifying no-cost alternatives.