



[REPORT TASK I.9.1] STUDY ON BASELINE SCENARIOS AND MITIGATION OPTIONS FOR THE CEMENT SECTOR OF VIETNAM

EXECUTIVE SUMMARY

The report “Study on Baseline Scenarios and Mitigation Options for the Cement Sector of Viet Nam” is developed as one milestone deliverable of the Nordic Partnership Initiative’s “Pilot Programme for Supporting Up-scaled Climate Change Mitigation Action in Viet Nam’s Cement Sector. This study summarizes the key contents of the already finalized products and sub-products relevant to baseline and mitigation options, and compiles the information pertaining to: Emission trends; baseline scenarios; data status (availability, needs and gap); MRV status (needs and gaps); mitigation potential, costs and barriers; and preliminary lessons learned from consultations with relevant stakeholders.

The approach to development GHG emission scenarios and identify mitigation options for the NAMA in the cement sector of Vietnam is suggested to go through five steps:

1. The establishment of sector database would be carried out through data collection; surveys; plant visits; focus group discussions with managers, operators, and financial planners of cement companies, as well as with relevant government agencies, research institutes, and professional organizations.

2. The development of possible GHG emission scenarios would be based on the Master Plan for Development of Cement Industry in Vietnam (Decision 1488) with consideration of policies regulating the energy consumption and GHG emissions from the sector. Key Performance Indicators (KPIs) of the sector would be important inputs reflecting the current status of the sector regarding to technological and operational practices in Vietnam.

3. The selection of appropriate “Best available technology and practice” (BATP) would be done with referring to international experience, taking into account the current status and the trend of development of the sector. It is expected that a list of appropriate mitigation options would be proposed for further consideration.

4. The cost-benefit analysis (CBA) and the assessment of mitigation potential should be conducted for each of the selected BATPs. The mitigation potential would be calculated utilizing IPCC Good Practice Guidance, CDM methodologies, energy saving potential, and related industry data (gathered from the sector database). Costing of BATP solution was performed in accordance to national/sector

practices, with referring to international figures and expert judgement whenever domestic data are not available.

5. The prioritization of mitigation action would be done using Marginal Abatement Cost Curve (MACC) analysis, and for each scenario identified in (2).

6. Based on the results of (4) and (5), estimation of financial needs for NAMA Cement would be made. Beside actual costs of implementation of mitigation actions, costs of supporting activities would be included.

In the first step, a "Viet Nam cement sector energy and CO₂ database" has been developed using the WBCSD/CSI Cement CO₂ and Energy Protocol: CO₂ and Energy Accounting and Reporting Standard for the Cement Industry and a simplified version of its Excel based tool, with similar functions as the "Getting the Numbers Right" (GNR) database of the Cement Sustainability Initiative (CSI), which ensures that the Viet Nam database system is compatible with the global cement industry standard and practice, with the ISO 14064 standard and the Measurement, Reporting and Verification (MRV) system used in the European Union's Emission Trading System (EU ETS). Only the direct and indirect emissions that fall under Scope 1 and Scope 2 would be covered.

The third version of the Energy and CO₂ database includes the data and calculations covering the five years of historical data (2009-2013) of 47 cement plants. This version accounts for 85% of 55 operating rotary kiln cement plants in total in Viet Nam as of September 2015. The total design clinker capacity of 47 cement plants is 180,700 ton clinker/day, which represents 87% of total clinker capacity of the industry.

In the second step, four possible GHG emission scenarios have been developed in consideration of the approved Master Plan for Development of Cement Industry in Vietnam (Decision 1488) and the KPIs from the sector database. Three cement productions per capita is projected based on

projection studies for population and cement production from international and national organisations (ADB, MOC, GSO) and analysis from international experience. Those scenarios imply a production as of:

- (1) Business-as-Usual Master Plan or 1'200 kg cement per capita per year;
- (2) A 23% more than today's level, or 800 kg cement per capita per year;
- (3) Today' level, or 650 kg cement per capita per year.

In the third step, a list of "Best available technology and practice" (BATP) has been developed from the three key BAT reference documents: the CSI/ECRA's 33 Technology Papers (TPs), the European Union BAT Reference document dated 26 March 2013 (EU BAT 2013), and the two UNEP's BAT reference documents on co-processing of hazardous wastes in cement kilns (UNEP/CHW, 2011 and UNEP/SC, 2011). consultations with relevant stakeholders and in-depth assessments have been carried out to ensure the applicability and technical appropriateness of these mitigation options to the Vietnam's context. The assessment shows that, among more than 30 possible options, only 12 mitigation options are feasible and appropriate, and those options have been selected for further analysis, as illustrated in the table below.

In the forth and fifth steps, each mitigation option identified in the step above has gone through an in-depth cost-benefit analysis (CBA), using a number of general and specific assumptions related to KPI of plants, emission factors, economic parameters, energy prices, applicability and penetration, energy performance target, investment rate, etc. These detailed analyses provide different perspectives i.e. from policy making and from private investment, to see how to compromise between different expectations and needs.

Using the inputs from CBA, four Marginal Abatement Cost Curves (MACC) covering all 12 selected options have been developed reflecting four scenarios, to name it, (i) “business-as-usual” with regard to the Master Plan 1488 (VN-BAU-1200), (ii) “best available technology and practice” with regard to the Master Plan 1488 (BATP-1200), (iii) “best available technology and practice” with the retaining 800 kg cement per capita (BATP-800), and (iv) “best available technology and practice” with the conservative 650 kg cement per capita (BATP-650). Except the VN BaU-1200 scenario, which represents the status quo, all BATP scenarios could be considered as either a) a more ambitious and "dynamic" baseline scenario, or b) a domestically funded mitigation scenario, or c) a domestically and internationally supported mitigation scenario.

With regard to the mitigation potential and the investment need, the MACC analysis shows:

- Under VN-BAU-1200 scenario the total emission reductions potential would be 4.9 million tCO₂ by 2020 and 40 million

tCO₂ by 2030, respectively, with a total initial investment required for all 12 options would be around USD 253 million.

- Under BATP-1200 scenario, the total emission reductions potential would be 20 million tCO₂ by 2020 and 164 million tCO₂ by 2030, respectively, and the total initial investment required for all 12 options would be around USD 906 million.

With two remaining scenarios, beside the “direct” emission reductions potential estimated at 17 million tCO₂ by 2020 and 138 million tCO₂ by 2030 (BATP-800), or 16.7 million tCO₂ by 2020 and 136 million tCO₂ by 2030 (BATP-650), the mitigation potential would be added up by the “avoided” emissions of 33 million tCO₂/y (BATP-800) or 44 million tCO₂/y (BATP-650) from reducing clinker production. The total initial investment required for all 12 options would be around USD 906 million for both cases.

The report was developed under the framework of the Nordic Partnership Initiative Pilot Programme for Supporting Up-scaled Climate Change Mitigation Action in Vietnam's Cement Sector.

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