



[REPORT TASK I.7.2, I.7.3, I.7.5] DEFINITION OF NAMA FINANCING NEEDS, ANALYSIS OF MARKET MECHANISMS TO FINANCE THE NAMA AND SETTING UP A NAMA FINANCIAL PLAN

EXECUTIVE SUMMARY

The key objective of this report is to design a financial plan for the Nationally Appropriate Mitigation Actions (NAMA) in the cement sector in Vietnam.

Each NAMA is a combination of concrete measures taken by several stakeholders. Such measures can be of mainly two types: mitigation actions and enabling activities. **Mitigation actions** are all physical interventions, usually requiring capital or operating expenditures (capex/opex), which have a direct, quantifiable impact reducing greenhouse gas (GHG) emissions. On the other side, **enabling activities** are interventions that help to create or establish the necessary, favourable or conducive conditions for the uptake of the mitigation actions (this could include policy and regulatory measures, the design and establishment of various financial incentives, knowledge and technology transfer, etc). Enabling activities have an indirect impact on GHG emission reductions (so it can also be very difficult to measure/quantify it appropriately), but their leverage potential can be very high. In many times enabling activities are prerequisites for the achievement of the mitigation actions (meaning

that if the enabling activities are not met and the conditions are not there, the mitigation actions won't be able to succeed).

The implementation of the NAMA measures, at the required scale, is associated with investments, operational or material costs that have to be assessed and financed.

In order to develop a financial plan for the NAMA, it's important to answer the following questions:

- 1) What are the overall funding needs for the implementation of the NAMA and funding needs for the specific mitigation actions and enabling activities (**NAMA funding**)? – This question is answered in Section 3.
- 2) How these funding needs could be met, i.e. where the money, resources and other forms of support could originate from (**NAMA financing**)? – This question is answered in Section 4.
- 3) Which policy and financial instruments can help catalyze the finance (**NAMA**

incentive structure)? – This question is answered in Sections 4 and 5.

- 4) How the mechanism for aggregating the funding from different sources, disbursing and monitoring, reporting and verification (MRV) of financial flows should operate **(Institutional arrangements for NAMA financing and MRV of support)?** – This question is answered in Section 7.

GHG emission reduction scenarios and mitigation actions for the cement NAMA

In reports I.3 and I.5 under this project, the Consultant team has presented four production and efficiency scenarios for the Vietnamese cement industry: three scenarios assuming application of the ‘Best Available Technologies and Practices’ (BATP) and one Business-as-Usual (BaU) scenario with a slight improvement of efficiency, in line with the current cement Master Plan 1488. These scenarios are linked to the implementation of a mix of 12 low-carbon technologies and practices aimed at energy efficiency (EE) improvement, use of alternative fuels and raw materials (AFR) and reducing the clinker content in cement (see Table A).

In terms of cement capacity, the Master Plan envisages an expansion of cement production in Vietnam up to 1,200 kg cement per inhabitant per year (kg/inh/y) by 2030 (assumed under BaU-1200 and BATP-1200 scenarios). BATP-800 scenario suggests that the cement production expansion is capped when the sector capacity reaches 800 kg/inh/y; and under BATP-650 scenario, the capacity is maintained at today’s level (i.e. 650 kg/inh/y).

NAMA finance assessment

The first objective of this report is to determine the overall financial needs for implementation of the future cement sector NAMA. In order to estimate financial requirements of the NAMA, one has to take into account the potential costs of both mitigation actions and enabling activities.

The four production and efficiency scenarios provided the required input data for calculation of the NAMA funding needs in relation to the cement production volumes and targeted number of installations that need to apply each mitigation technology or practice. The related costs and savings (e.g. from reduced coal consumption) of individual mitigation actions were taken from the MAC tool described in the report I.5.

The Consultant team also assessed the potential costs associated with the implementation of the required enabling activities for the cement NAMA that were recommended in the previous reports under this project.

The actual calculations of the NAMA financial requirements have been carried out in the **NAMA Finance Assessment Matrix** (see the separate excel file).

The consolidated financial figures are summarised in the Table C below. As these figures are based on the MAC tool, they are bound to the same assumptions, estimations and uncertainties as the MAC. For example, it’s assumed that the deployment of each technology and practice will be gradual during 2016-2030, but all of them, applicable to the certain scenario, will be rolled out in parallel starting from 2016.

Even though these figures are neither accurate nor precise up to the last digit, they give a sufficiently reliable big picture of what is financially at stake when implementing GHG mitigation actions in the Vietnam’s cement industry and what is the structure of the funding needs for the NAMA.

Key observations from the NAMA funding needs assessment are the following:

- **10 out of 12 mitigation technologies show negative MAC (i.e., they are profitable) under the four different scenarios.** Therefore, **the cement NAMA as a whole can be considered profitable**, even if the high-cost options are included into its scope. Provided the simultaneous

rollout of all 12 mitigation technologies in 2016, the break-even point for the NAMA can be reached between 2020 and 2025. Some no-cost/low-cost no-regret mitigation actions aimed at improving operational performance for energy efficiency or blending pozzolana or limestone to reduce the clinker content in cement, can start bringing economic benefits already during the first years of their introduction under all scenarios.

- The absolute cost savings of the BATP scenarios are much higher considering the reduced coal consumption due to the use of alternative fuels, not envisaged in the BaU-1200 scenario, as well as more ambitious energy efficiency improvements.
- The cost savings and the improvement of the total variable cost (in absolute units as well as cost per ton cement) are better for the BATP-1200 scenario than for the BATP-800 and 650 scenarios because of three reasons: 1) larger volumes of clinker substitution, and especially substitution of additional clinker capacity; 2) the initial investments can be spread and amortised over a larger cement volume and 3) there are more revenues from a larger volume of alternative fuels. This doesn't however mean that the BATP-1200 scenario would be economically more attractive. Indeed, multi-billion dollar investments in additional new clinker capacity must be added to the BATP-1200, but not to the other BATP scenarios. Furthermore, provided market demand will be smaller than the 1200 kg/inh/y capacity, it would lead to severe erosion of prices, margins and profitability.
- **The capital investment per ton cement to progress from the current BaU to BATP performance ranges between 0.1 and 1.0 USD/ton cement, which is less than 1% of the capital investment needed for a new**

clinker-cement installation (173 USD/ton). Aggregated over the total annual cement production, this capital investment ranges between is USD 18 and 64 million per year. Though this is not a small amount of money, it is just a fraction of the USD 200 to 1,000 million that would be needed annually to 2025 for the capacity expansion for the 1,200 kg/inh/y scenarios.

- The change of variable production cost per ton cement is – averaged over the entire sector and all mitigation levers – negative and ranges between 2.5-4.5 USD/ton cement (with extremes up to as high as 7-9 USD/ton cement). This is a **very significant (10-18%) reduction of the operational cost** compared to a typical 25 USD/ton variable cement production cost. Combined with the mentioned investment cost per ton cement, this means that these energy and CO₂ mitigation actions are economically attractive for the Vietnamese cement sector.
- As most of the proposed mitigation options for the cement NAMA are, in fact, profitable with a break-even point to be reached in a short-term period (so called “no-regret” investment options), **the cement companies themselves should finance capital investments. International and domestic public support should be considered and requested mostly to cover the costs of NAMA enabling activities.**
- The cost for the enabling activities consists of several parts: 1) an initial ‘readiness budget’ of around USD 3 million over 2016-2017, 2) annual NAMA O&M costs of around USD 0.3 million per year until 2030, and 3) USD 10 million for the pilot phase of the carbon procurement mechanism (2018-2020). **While the overall budget for readiness**

activities (USD 15 million) is very small compared to the capital investments into mitigation actions, its leverage potential for CO₂ mitigation is very large. The size and the effects of this readiness budget for enabling activities make it certainly very adequate to be funded by international donors (with some funding from the domestic public sector).

In order to interpret the financial needs for the NAMA cement in Vietnam, the Consultant took into consideration various ongoing NAMAs in the cement and waste sectors (with waste-to-energy component) around the world.

The key outcome of this comparison is that in case all mitigation actions are fully implemented, **the cement sector NAMA in Vietnam would be one of the most ambitious among all NAMAs around the world in terms of the total avoided GHG emissions and required investments.** However, as the Vietnam's cement NAMA is economically feasible and will be able to bring considerable cost savings for the cement companies, it can be majorly financed by the industry itself. **The financial support from external sources would be needed mostly to develop incentives for such investments through enabling activities.** The requested support in the assessed NAMAs ranges between USD 2.42 to 30 million, which is in line with financial needs for the enabling activities (USD 15 million) under the cement NAMA in Vietnam.

NAMA financing plan

Section 4 of the report suggests the origin of finance for different mitigation actions and enabling activities. Table D summarises the mix of financing sources and instruments to catalyze implementation of mitigation actions and enabling activities for the cement sector NAMA in Vietnam. All sources and instruments are phased-out over the short-term (2016-2020) including the readiness stage (2016-2017), mid-term (by 2020) and long-term (by 2030) time periods.

The main conclusion is that **the cement NAMA will need international support only over the short term (by 2020), with the major injections needed during the first years of readiness (2016-2017).** International finance will be crucial for the initial enabling activities that will incentivise the investments into low-carbon technologies and practices by the cement plants. After the first 2-3 years, NAMA operational costs can be covered through one of the cost recovery options as described in Section 4.1.2.3. The Ministry of Construction (MOC) has also expressed the willingness of the Government of Vietnam to fund 50% of the NAMA operating costs after the readiness phase (if there is a net cost that is not covered through repayment mechanism).

Due to the considerable amount of savings that could be generated through the cement NAMA, the Consultant predicts that already in the mid-term (starting from 2021), the NAMA could be fully funded by domestic sources (primarily, the cement companies).

Suggested market mechanism for the NAMA

The majority of the mitigation actions could be implemented in the absence of additional financial incentives provided by the market mechanisms. However, market mechanisms could be used to overcome barriers other than financial, such as technology availability, capacity building, institutional set up, and so on to scale-up the application of these technologies and practices.

The Consultant proposes the introduction of a results-based crediting mechanism (see Section 4.1.2), based on carbon reduction targets (ton CO₂/ton cement), under which credits will accrue directly to the cement companies that actually improve their energy or emission performance. Credits could be issued also to the partner companies that implement energy efficiency (or carbon reductions) measures at cement plants (e.g. energy service companies, ESCOs). Other actors that don't implement mitigation actions to achieve the targets will not receive any penalty, but would slowly lose ground in competing with the companies that would benefit from the

trading mechanism (i.e. the latter would probably develop a better resource management and optimization system, get additional revenues from the credits, better position themselves in the market highlighting the environmental efforts to the customers and so on).

The payments will be made only after the project is actually implemented, monitoring has been performed, and actual reductions are verified. The credits verified by a third party will then be allocated to each cement company that improved its energy/carbon intensity.

A second component of this mechanism would be the establishment of a Facility for Purchasing Credits (FPC), open for finance from public, private and international sources. FPC would buy the credits generated by a cement company. This would ensure a financial reward to those companies that implemented mitigation measures, incentivizing them to bear the initial investments that would reduce GHG emissions.

The Consultant proposes to establish FPC either as a vehicle managed by the NAMA Operating Unit under MOC, as a joint vehicle between MOC and Ministry of Industry and Transport (MOIT) to incentivise actions in a range of industrial sectors, or as a new programme managed by the already existing Vietnam Environment Protection Fund (VEPF).

Institutional arrangements for NAMA financing and MRV of support

The ongoing mitigation projects and programmes in Vietnam that are related to the cement sector are segregated and there is no comprehensive institutional framework for the mobilization, disbursement, replenishment, cash flow management and coordination of the financial flows for climate projects in the sector.

The Consultant recommends to coordinate and MRV the financial flows (commonly referred to as “MRV of support”) that are meant to incentivise the implementation of mitigation actions under the future cement NAMA in a centralised manner.

Under the current regulations, the ultimate authority to do such a financial management role rests with the Ministry of Planning and Investment (MPI). In fact, MPI has established a Climate Finance Task Force (CFTF) to develop mechanisms to mobilise financial sources for climate-related projects and programmes in Vietnam and to coordinate the related financial management issues. The Department of Science, Education, Natural Resources and Environment (DSENRE) of MPI leads the CFTF and acts as its chair and secretariat (MPI 2015).

MONRE and MPI play a crucial role in endorsing and prioritizing NAMAs. MPI approves domestic funding from the state budget. MONRE, as a national focal point for NAMAs, evaluates and approves NAMAs for funding based on the selected criteria that are aligned with the Vietnam’s Green Growth Strategy and Action Plan. Ministry of Finance (MOF) would need to approve the design of domestic fiscal instruments and capital investment facilities that catalyze international support.

The cement NAMA is likely to be financed by various sources; it is then the responsibility of the MOC NAMA Operating Unit to ensure that the overall funding is adequate, that it is effectively allocated and its use is reported transparently to those that provided funding to increase the trust among stakeholders.

Potential risks and proposed risk mitigation actions

Section 6 of the report provides a list of potential risks related to NAMA financing and suggests risk mitigation actions. Among these risks the following are the most relevant:

1. **Ability to secure international support for the NAMA**, considering the competitive ‘NAMA market’ in Vietnam (at last count, the team has identified 28 NAMA proposals) and relatively small number of international NAMA donors. The Consultant notes the initiative by MOC to highlight the strategic relevance

of the cement NAMA and its contribution to key development priorities (also referred to as co-benefits) to MONRE within the context of Vietnam's INDC stakeholder consultation process. The INDC submission could in fact play an important role in initiating a wider discussion on the inter-sectoral impacts and benefits of this NAMA and is thus conducive to inter-ministerial cooperation. Going forward, the MOC should take a more pro-active role in the Inter-ministerial Steering Committee, introduce the proposed NAMA design to its members and request for inter-ministerial coordination and cooperation with the related line ministries for the cement NAMA at the earliest convenience. In addition, a NAMA Steering Board under MOC's supervision would facilitate coordination between the key cement NAMA stakeholders.

2. **Material relevance of the provided incentives to catalyze pro-active engagement of the cement industry.** The Consultant proposes to maintain the ongoing consultation process with the cement companies to validate on an ongoing basis that the design of the proposed financial incentives stays relevant to them.
3. **Double counting of carbon credits.** An issue that must be considered is related to the interaction amongst the proposed NAMA carbon market mechanism and the ones that already exist. From a broader point of view, one of the main requirements for new market mechanisms (especially when considering potential for international linkage and scaling up) is the set up of an appropriate accounting system: accounting is intended as the set of rules necessary to compare mitigation results with a country's emission targets. This implies the consideration of the rules for GHG

inventory, how new crediting systems should be included in the GHG inventory (and ultimately in the National Communications and the BURs), how to ensure that each credit cannot be used for more than one target, traceability of the information of each credit issued and how these information can circulate among different systems, nature of the credits and GHG covered by each mechanism.

Recommendations

As the next steps the Consultant recommends the following activities:

Inter-ministerial cooperation process

MOC shall initiate a coordination process with other relevant stakeholders who will be involved in co-financing and implementing the actions outlined here. These are MOIT, MONRE, MPI, MOF, MARD (regarding wastes from agricultural sector). The Consultant suggests using the inter-ministerial NAMA Steering Committee as a platform for this coordination process.

The cooperation process needs to ensure that the relevant stakeholders are aware of:

- How they will benefit from the implementation of this NAMA,
- What their expected contribution/support to facilitate its implementation and operation is,
- Which functions they are expected to perform.

The outcome of this coordination process is an agreed NAMA regulatory & institutional framework design that outlines the respective roles of the key stakeholders and an agreed process by which they receive this mandate (i.e. ministerial level circulars).

Budget for NAMA support proposal

Considering the advanced preparation status of this NAMA and the domestic competition for NAMA support, the Consultant proposes to initiate a discussion on a roadmap and budgeting for the preparation of a concrete NAMA support proposal for international NAMA donors as early as possible and during the operational lifetime of this project.

As a first step, the Consultant, in cooperation with MOC and NDF, shall initiate a discussion on short-listing suitable support programs, using insights from the reports I.7.1 and I.7.4 (including NDF and associated NAMA support agencies in the Nordic countries, the NAMA Facility and the GCF) and assessing the funding needs for the preparation and submission of a high quality proposal (initially estimated by the Consultant team as USD 20,000 per proposal).

The Consultant recommends to integrate the preparation of such proposal(s) into this ongoing project to a) take advantage of the detailed documentation prepared by the Consultant team, and b) accelerate this process.

Business plans for NAMA Operating Entity and enabling activities

In order to have a detailed discussion with stakeholders, including supporters, an exact and agreed NAMA design including design of the

envisioned financial incentive mechanisms for this NAMA has to be completed. Such design needs to detail the following elements:

- The operating budget for the MOC NAMA Operating Entity and its activities,
- The contributions from domestic and international public stakeholders and the cement industry,
- The design of the refinancing mechanism,
- The design of the Facility for Purchasing Credits (FPC),
- The design of the new capex support facility and/or proposal to already existing WB/IFC investment support facility.

Strengthen NAMA visibility

Last but not least, the visibility of this cement NAMA shall be raised to make sure that key domestic and international stakeholders are aware of its strategic relevance and contribution to domestic sustainable development as well as climate mitigation policies. This will facilitate access to financing as well as collaboration with stakeholders.

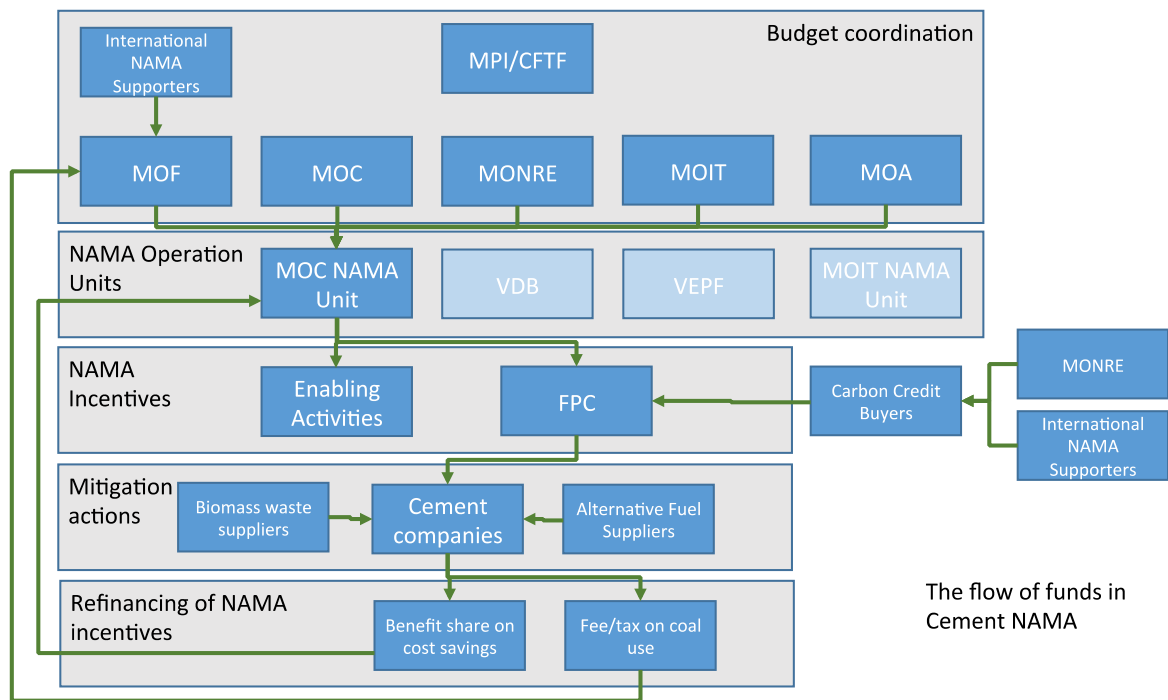
Annexes

Table A: Results of the MAC analysis for the selected mitigation actions

Category	Sub-category ¹	VN-BaU-1200		BATP-1200		BATP-800		BATP-650	
		USD/ tCO ₂	MtCO ₂ / year	USD/ tCO ₂	MtCO ₂ / year	USD/ tCO ₂	MtCO ₂ / year	USD/ tCO ₂	MtCO ₂ / year
Improving thermal energy efficiency of clinker production	1a) Process knowhow, control and management & 1b) Diagnostic energy audits	-16	0.44	-16	0.81	-17	1.02	-17	1.02
	2) Modern automation and control systems	-11	0.12	-11	0.12	-11	0.12	-11	0.12
	3) Clinker cooler modification	-10	0.29	-10	0.29	-10	0.29	-10	0.29
	4) Waste heat recovery (WHR)	-22	0.05	-22	0.19	-22	0.19	-22	0.19
	5) Adding a pre-calciner to existing pre-heater kiln	65	0.04	65	0.04	65	0.04	65	0.04
	6) Additional Pre-heater cyclone	19	0.09	19	0.09	19	0.09	19	0.09
Use of alternative fuels	7) BAT for Alternative fuels and raw material (AFR) - replacing fossil fuels	n/a	n/a	-4	2.81	-4	2.81	-4	2.81
	8) Retrofit to modern multi-channel burner	-11	0.14	-11	0.14	-11	0.14	-11	0.14
Reducing clinker content in cement	9) Blending: granulated blast furnace slag (GBFS) as cement constituent	-46	0.16	-38	0.66	-9	0.46	-7	0.45
	10) Blending: Fly ash as cement constituent	-47	0.40	-39	1.64	-10	1.15	-7	1.12
	11) Blending: Pozzolana	-57	0.40	-49	1.64	-19	1.15	-17	1.12
	12) Blending: Limestone	-61	0.64	-53	2.63	-24	1.84	-21	1.80
Sub-total			2.76		11.06		9.29		9.19
Balance capacity with demand	Avoided CO ₂ emissions		n/a		n/a		Up to 33		Up to 44
Total			2.76		11.06		42.3		53.2

¹ Hereinafter, the Consultant has used the same numbering for the 12 mitigation actions as in the report I.5.2-I.5.4 and MAC tool.

Figure A: Institutional arrangements to coordinate financial flows for the cement NAMA



Source: Authors' own elaboration

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.

The Nordic Partnership Initiative (NPI) established in December 2011 to support climate change mitigation efforts in developing countries and funded by Denmark, Finland, Iceland, Norway and Sweden. The budget of the NPI Programme in Vietnam is €1.6 million, and it is financed by Nordic Development Fund (NDF) and the Ministry of Construction of Vietnam. The implementation of the Vietnam cement sector Pilot Programme started in March 2014, by a consortium led by NIRAS A/S (Denmark) in collaboration with Perspectives GmbH, South Pole Group, VNEEC JSC and NIRAS Vietnam.

For more information on the project and the full report, please contact:

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