



**Institute of Meteorology,
Hydrology and Climate
Change of Vietnam**



Nationally Appropriate Mitigation Action (NAMA) Programme for the Solid Waste Sector of Viet Nam

“Waste-to-Resources for Cities in Viet Nam”

May 2016

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1. Background and rationale

The **management of solid waste**¹ is one of the priorities of Viet Nam's national government.² Sustained economic growth and increasing consumption are pushing up solid waste generation rates, which have increased 10-16% on an annual basis since 2000. As of 2010, approximately 26,000 ton of solid waste were generated per day in Viet Nam, with most of it being disposed in open dump sites and unsanitary landfills without any prior treatment. This has led to severe environmental stress, including soil, water and air pollution, negatively impacting livelihoods. At the same time, local government authorities are incurring increasingly higher costs just to collect and transport waste, with little or no direct monetary value derived from these activities. Ongoing waste management practices are also major contributors to global climate change, with the decay of organic matter from disposal sites leading to the emission of methane, a greenhouse gas.

The government of Viet Nam recognizes the need to shift from current waste management practices to more sustainable approaches that focus on the recovery of resources from waste.³ A number of policy documents have been approved by the national government to support such approaches. Amongst these, the **National Strategy for Integrated Management of Solid Waste up to 2025 and Vision towards 2050** stands out as the most far-reaching national policy, proposing ambitious targets for the collection and treatment of waste. Among other elements, it proposes that 90% and 100% of urban waste are collected by 2020 and 2025, respectively, and that during these years, 70% and 90% respectively of the collected waste is recycled, reused or recovered for use as an energy source or for the production of organic fertilizer.

National level documents on climate change are also supportive of “waste-to-resource” approaches and a wider adoption of the principles of Reduce, Reuse, Recycle (3R). Such documents include the **National Climate Change Strategy** (2011) and the **Intended Nationally Determined Contribution** (INDC) of Viet Nam to the new climate change treaty that was agreed in Paris in December 2015. In spite of the ambition of existing policies and strategies, for which the national government should be commended, several barriers and challenges are hindering the implementation of “waste-to-resource” initiatives in Viet Nam:

- **Lack of guidelines and regulations**, especially at provincial and city level, to stimulate and/or enforce the implementation of the targets laid out in national policy documents;
- **Insufficient policy, regulatory and market incentives** for stimulating investments in solid waste management infrastructure that are in line with “waste-to-resource” approaches and 3R principles;
- **Institutional arrangements** for the climate change and waste sectors in Viet Nam are complex, often unclear, and suffer from overlapping roles and responsibilities among participating actors;

¹ In the scope of this work, solid waste pertains to domestic waste streams originating from households, markets, commercial centers, offices, research facilities, schools, etc., generated both in urban and rural areas. This excludes e-waste, as well as industrial, medical and construction wastes.

² In 2012, the Prime Minister of Viet Nam issued Decision No. 1775/QĐ-TTg on the approval of the management of GHG emissions and management of carbon trading activities to the world market. Priority sectors include energy, agriculture, land use, forestry and waste. The document proposes for the waste management sector a 5% reduction of GHG emissions in the period from 2005 to 2020.

³ The National Environmental Protection Strategy until 2020 and vision to 2030 encourages waste recycling. It also proposes measures for implementing development plans for recycling capacity, to provide support for the establishment of the recycling businesses.

- **Limited availability of funds** to finance “waste-to-resource” projects and initiatives at the local level;
- A generalized **lack of capacity, know-how and expertise** along the development cycle of “waste-to-resource” projects, from initial conceptualization to “on-the-ground” operation.

In this context, the government of Viet Nam, through the Ministry of Natural Resources and Environment (MoNRE), recognizes the opportunity to develop a national solid waste sector programme in association with an international climate financing mechanism, **Nationally Appropriate Mitigation Actions (NAMAs)**.

NAMAs refer to strategies, programmes and projects that developing countries can adopt on a voluntary basis in order to support greenhouse gas (GHG) emission reduction initiatives that are in line with national sustainable development priorities. NAMAs are expected to instill a “transformational change” in specific economic sectors, and benefit from international support in the form of finance, technology, and capacity building. In view of the importance and challenges of the solid waste sector, MoNRE has tasked the **Institute of Meteorology, Hydrology and Climate Change of Vietnam (IMHEN)** to develop a **NAMA programme** for the solid waste sector of Viet Nam, which has been titled **“Waste-to-Resources for Cities in Viet Nam”**. The key elements of this NAMA programme – henceforth referred to as “Waste-to-Resource NAMA”; “NAMA programme”, “programme”, or “NAMA” – are laid out on this Summary Brief.

2. The Nationally Appropriate Mitigation Action “Waste-to-Resources for Cities in Viet Nam”

2.1 NAMA Development Process

The development of the “Waste-to-Resource” NAMA was led by IMHEN and had the technical and financial assistance of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). The development phase consisted in formulating the detailed design elements of the programme through the undertaking of a **“NAMA-design study”**. The elements and different components of the proposed NAMA are distilled in this brief, while the background analysis and details of the programme can be found in the study. Pending formal endorsement by the national government, the NAMA would “graduate” from a “proposal” to a “full-fledged” programme. Subsequently, the NAMA could be further detailed out in some of its components, piloted through specific activities on the ground, and finally, fully deployed nation-wide.

2.2 Purpose of the NAMA and Expected Benefits

The **overarching goal** of the “Waste-to-Resource” NAMA is to support Viet Nam in reducing GHG emissions from the solid waste sector through the implementation of waste management practices that are in line with the principles of 3R and the recovery of resources from waste, while at the same time contributing to sustainable development goals in Viet Nam.

The NAMA will address the barriers hindering the solid waste sector of Viet Nam through the **establishment of a policy and institutional framework** that will:

- **Encourage cities to voluntarily propose their own targets for reusing, reducing and recycling** solid waste, based on those laid out on the National Strategy for Integrated Management of Solid Waste up to 2025 and Vision towards 2050;
- Establish a **NAMA Management Board** to operate as a “one-stop shop” and steering committee for the activities to be implemented under the NAMA, and as a coordinating entity among ministries with a stake in the solid waste sector. It is proposed that the **Department of Science, Technology and Environment (DSTE)**, under the Ministry of Construction, take this role;
- Set-up a **dedicated financing vehicle** to mobilize and channel funds from international and national sources to city and provincial governments, and other entities, including the private sector, that implement measures aligned with those endorsed by the NAMA. It is proposed that the **Viet Nam Environmental Protection Fund (VEPF)** assume these functions;
- Create **incentive schemes at national, provincial and city level** that enable the financial and economic viability of “waste-to-resource” initiatives. Incentives would include, but would not be restricted to, the payment of tipping fees to waste treatment plant operators, the set-up of local programmes for the purchase of compost, tax rebates on equipment, etc.
- Provide **technical, operational and managerial support** to officials and practitioners in the form of training programmes, “on-site” assistance by technical experts, and the sharing of good-practices.

The implementation of the NAMA will result in **several benefits for Viet Nam**. It will lead to a cleaner and healthier environment through the adoption of improved waste collection and treatment methods, create business opportunities along the waste management value chain, and contribute to the improvement of the living conditions of communities throughout the country, including informal waste pickers. The NAMA will also support Viet Nam in achieving several **Sustainable Development Goals (SDGs)**, especially SDGs 11, 12 and 13, on more sustainable cities, increased sustainable consumption and production patterns, and enhanced climate action, respectively. SDGs 1 (poverty elimination) and 3 (improved health and well-being) will also be strongly supported by the implementation of the NAMA.

2.3 Eligible Measures and Scope of the NAMA Programme

All cities in Viet Nam are eligible to be part of the NAMA as long as they voluntarily implement some of the measures endorsed by the programme. **Eligible measures** of the “Waste-to-Resource” NAMA, which will be subject to some type of **monitoring, verification and reporting (MRV)** procedures when implemented in cities, are as follows:

- i) Reduction of solid waste generated and implementation of waste segregation practices, preferably at source;
- ii) Diversion of waste streams from final disposal sites, with diverted waste being treated applying the following approaches:

- a. Biological treatment of the organic component of waste, particularly through composting and anaerobic digestion;
- b. Recovery, reuse and recycling of inorganic waste;
- c. Physical methods for treating waste, including the production of refuse-derived fuel and related briquetting techniques;
- d. Implementation of integrated and sustainable waste management approaches in line with the principles of 3R, including “good practices” identified in Viet Nam such as the **Integrated Resource Recovery Centre (IRRC)** model⁴;
- e. Strategies and policies designed at city or provincial level for “**zero waste**” or a “**carbon neutral waste sector**”.

The eligibility of measures that are in line with 3R principles and “waste-to-resource” approaches but are not included in any of those laid out in this study will be considered on a case-to-case-basis by the NAMA Management Board noted above. A toolkit of eligible measures has been prepared – and can be found as an annex to the NAMA-design study – to provide additional guidance to practitioners on how “waste-to-resource” initiatives can be recognized as part of the NAMA.

2.4 How the NAMA Programme Works

The “Waste-to-Resource” NAMA is proposed to operate along the following steps:

1. The “Waste-to-Resource” NAMA is formally endorsed/enacted at national level by relevant ministries;
2. The NAMA Management Board is established;
3. Provincial and city authorities are informed about the NAMA and its operational methods, as well as other actors with a stake in the solid waste sector;
4. Cities that agree to be part of the NAMA prepare a detailed implementation plan that should include, but is not necessarily restricted to, the following elements:
 - a. Voluntary target(s) for the adoption of 3R measures, including targets for waste reduction, waste diversion and recycling of organic and inorganic waste;
 - b. Detailed description of the initiatives that the city proposes to implement, including how they support and are aligned with the “Waste-to-Resource” NAMA;
 - c. Estimation of the total cost of the plan, including an indication of the share of the budget that would be supported by the local government, and the share that would require additional support from the national government and/or through international climate financing opportunities.

⁴ IRRCs consist of waste processing facilities that can treat waste in a decentralized manner and process the different waste streams into resources such as compost, recyclables and biogas. In Viet Nam, this model was piloted in the cities of Quy Nhon and Kon Tum with the support of ESCAP.

5. City-specific plans are submitted to the NAMA Management Board and are assessed by its staff, who would deliberate whether the initiatives proposed by cities fall under the NAMA and, if so, which require the support of the national government and/or international donors. This step may include back and forth communication with local government authorities.
6. Activities considered eligible under the NAMA are communicated to the local government by the NAMA Management Board. For the activities that need additional support from the national government and/or international donors, the Board will request line ministries (e.g. MoC, MoNRE) or the Vietnam Environment Protection Fund (VEPF) to mobilize the necessary funds. Both local and national level contributions will be considered part of the “domestic NAMA”. The NAMA Management Board will also appraise the capacity building requirements of the local government, and deliberate on the type of support to assign.
7. Based on the funds mobilized, both from national and international sources, the local government initiates the activities proposed under the NAMA, which would be subject to MRV procedures.

The **MRV arrangements** of the “Waste-to-Resource” NAMA are proposed to be built based on the national inventory system of Viet Nam and existing monitoring procedures under the Clean Development Mechanism (CDM) framework. MRV arrangements shall also be in line with the institutional framework for a nation-wide MRV system for NAMAs under joint preparation by IMHEN and GIZ. The specific MRV elements of the “Waste-to-Resource” NAMA are proposed to consist of a simplified mechanism for taking records of waste inputs (e.g. quantity/volume of waste processed per day; composition) and outputs generated in the form of resources (e.g. quantity of compost generated, electricity fed into the national grid, etc.). Such data are to be compiled by cities and provinces, within their respective jurisdictions, and then aggregated at the national level for the calculation of GHG emission reductions. These procedures are proposed to be adopted in parallel with a tool for quantifying/measuring “co-benefits”. The specific details of the MRV system of the NAMA are proposed to be further elaborated as one of the activities of the piloting phase.

2.5 Contribution to Climate Change Mitigation

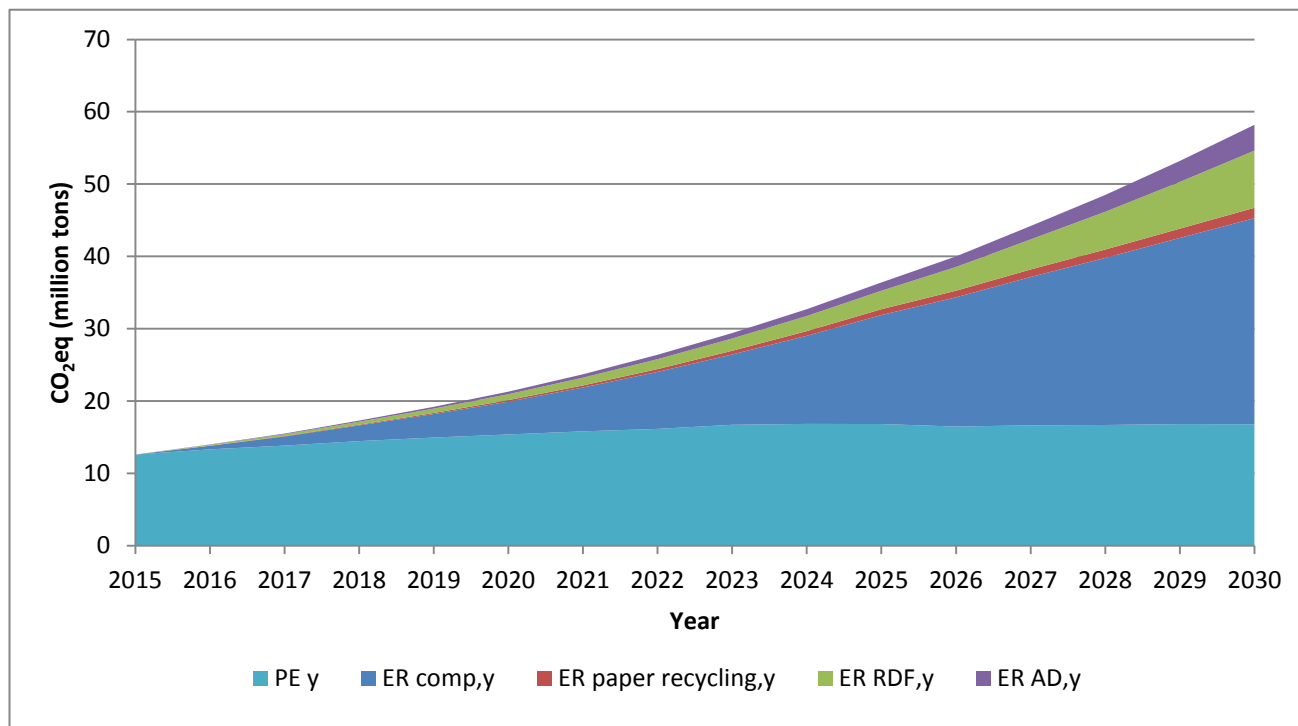
A **baseline** and **emission reduction (NAMA) scenarios** were modelled to assess the GHG emission reduction impacts of fully implementing the NAMA programme. That is, the emission reduction scenario proposes a **complete transformation of Viet Nam’s** solid waste sector whereby all waste generated by 2030 is collected and treated through the methods and technologies endorsed by the NAMA.

The NAMA scenario assumes that of the waste generated in Viet Nam in 2030, 60% is treated through composting, 20% is recycled, 10% is processed through anaerobic digestion, and the remaining 10% is recovered for the production of refuse-derived fuel.

The baseline – or business-as-usual – scenario assumes that currently practiced methods of disposing and not treating of waste continue unchanged, with waste generation rates increasing annually by 10% and waste composition remaining the same over the 2010-2030 period. Under this scenario, it is expected that the solid waste sector of Viet Nam could be generating 58.2 million ton of carbon dioxide equivalent (CO₂eq) by 2030,

up from 14 million ton CO₂eq in 2016. Through the full implementation of the NAMA, it is expected that GHG emissions from the solid waste sector could be **reduced by 71% by 2030**, i.e. by 41.4 million ton CO₂eq in relation to the business-as-usual scenario⁵.

The results of the modeling are presented in the following graph:



Graph above – Total emission reductions (expressed in million ton of CO₂eq) from the “Waste-to-Resource” NAMA. Legend: PE: project emissions, ER: Emission Reductions; comp: composting; RDF: refuse-derived fuel; AD: anaerobic digestion.

2.6 Financing the NAMA

The implementation of the measures and targets proposed by the NAMA is estimated to require **an average minimum investment of 110 million USD (2.4 trillion VND) per year**⁶, until 2030, in solid waste treatment facilities. This excludes costs associated with establishing the institutional arrangements, capacity building initiatives, and other diverse supporting activities, such as awareness raising campaigns or the need for

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