Ministry of Natural Resources and Environment (MONRE) Department of Climate Change
JICA Project to Support the Planning and Implementation of NAMAs in MRV Manner (SPI-NAMA)

Executive Summary

# Low Carbon Technology Assessment for Viet Nam's NDC Implementation

## -Key Findings, Remaining Challenges and Opportunities for Further Elaboration-

## 1. Context

In September 2015, the Socialist Republic of Viet Nam submitted to the Secretariat of the United Nations Convention on Climate Change (UNFCCC) its Intended Nationally Determined Contribution (INDC), encompassing national GHG emission reduction target for the period of 2020 – 2030, as part of the global effort to reach an agreement on post-2020 climate regime. Taking into account the putting into force of the Paris Agreement, the next critical step for Viet Nam is to transform NDC into a set of implementable actions to realize the aspired GHG reduction amounts.

While Viet Nam's current NDC defines its national ambition, scope, areas and mitigation potentials through its 45 mitigation options across 4 Sectors (Energy/Transport, Agriculture, LULUCF, and Waste), to date, there is an observed gradation of maturity level and diverse scope across the identified options, and those options require further in-depth assessment to explore operational feasibility.

Against this backdrop, The Department of Climate Change, within the Ministry of Natural Resources and Environment (MONRE) of Viet Nam and JICA's Technical Assistance Project on Support to Planning and Implementation of Nationally Appropriate Mitigation Actions in a MRVable Manner (SPI-NAMA), have jointly embarked on a **Low Carbon Technology Assessment ("the Assessment")** to narrow the implementation gap by providing the means of implementation to Viet Nam's NDC from the perspective of low carbon technology – exploring what types of low carbon technologies are required or useful in enabling the implementation of the mitigation options proposed.

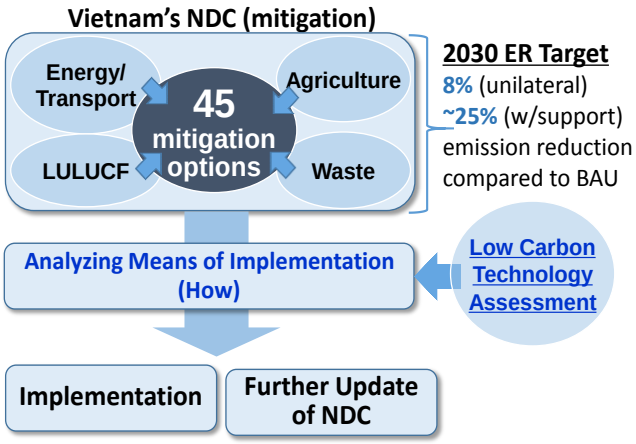


**Figure1.** Low Carbon Technology Assessment to explore Means of Implementation for NDC

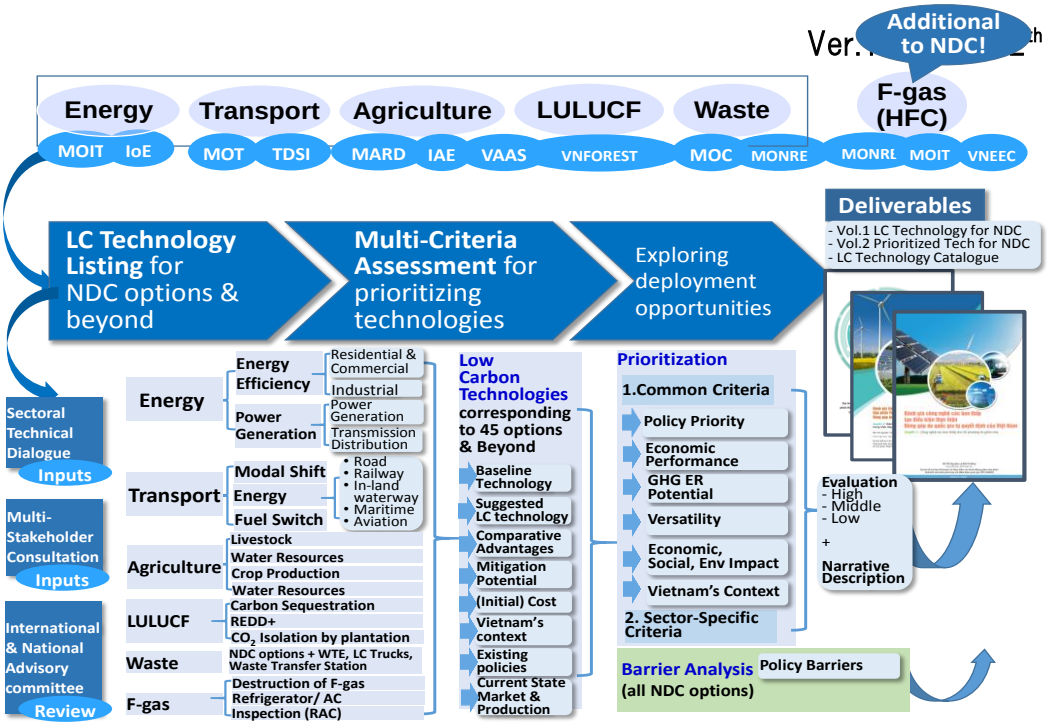


**Figure 2.** Implementation Framework and Steps

The Assessment has 3-folded objectives:

- ✓ **Bridging Implementation Gap for NDC:** In-depth assessment of individual NDC option from the low carbon technology angle and barrier analysis both foster better understanding of feasibility, and further policy and technical actions required to harvest mitigation potential which remains theoretical in figures. Such understanding provides a knowledge base for robust sectoral action plan and implementation framework to be developed by implementing agencies.
- ✓ **Capacity Development for NDC Planning, Coordination and Consensus Building:** The true value of the Assessment exercise lies within its process – providing both climate change focal point agency and line ministries in charge of sectors practical opportunities to lead multi-stakeholder dialogue, and enhance its capacity to coordinate with different layers of stakeholders, including among departments within ministries, across ministries, non-state actors, as well as collect a wide spectrum of views and practical suggestions as to how to best implement NDC options and to build consensus.
- ✓ **Direct Technical Input to on-going process:** In-depth assessment of the current 45 NDC options itself serves as a substantive review of NDC, and the findings of which directly inform the NDC update process currently undertaken by the Government, including, inter alia, suggested potential areas for further elaboration to contribute to ambition discussion.

This brief summarizes the essential findings and observations of the Assessment work in *Section 3*.

## 2. Methodological Approach and Steps

The Assessment has been undertaken extensively from the period of September 2016 to January 2018 with engagement of a wide range of stakeholders for each targeted sector, both national and international. Implementation framework and steps taken for the Assessment are summarized in **Figure 2**.

### Step1: LC Technology Listing corresponding to NDC mitigation options:

The Assessment began with exploring low carbon technology options corresponding to 45 NDC options in 4 Sectors along with F-gas (HFC) as a potential domain for future elaboration. The Assessment identified more than 150 technology options capturing the following list of information and were synthesized in the publication *Volume 1* and *the Technology Catalogue*;

- Technical summary
- Technical features and comparative advantages
- GHG Mitigation Potential
- Cost (Initial)
- Viet Nam's context
- Existing policy and measures
- Current state of market and production

### Step 2: Multi-Criteria Assessment for Prioritization:

The identified LC technology options corresponding to each NDC option were assessed for prioritization, based on evaluation criteria. The criteria, suggested and developed through sectoral dialogues with LMs

and key stakeholders, consist of a combination of common criteria across the sectors, and sector-specific criteria to accommodate sectoral specificities as displayed in **Table 1**. The results of this exercise were compiled in publication *Volume 2*.

**Table 1.** Criteria for Prioritization (e.g.Transport)

| Criteria | Indicators | | Evaluation |
|---|---|---|---|
| 1. Common | | | |
| Compatibility with policy priorities | Availability of policy document | High<br>Medium<br>Low | Law, Decree, A/P<br>Strategic doc only<br>No policy document |
| Economic Efficiency | Initial Cost | High<br>Medium<br>Low | Bottom 1/3 (low cost)<br>Middle 1/3<br>Top 1/3 |
| GHG ER Effect | Absolute ER amount | High<br>Medium<br>Low | Top 1/3 (larger volume)<br>Middle 1/3<br>Top 1/3 |
| Versatility | Technical ease for deployment (autonomous production & deployment) | High<br>Medium<br>Low | Relatively easy<br>Possible<br>Difficult at moment |
| | Operation and Maintenance Requirement | High<br>Medium<br>Low | Existing system<br>Only minor change<br>Major upgrade |
| Economical, social and environmental impact | Economical Impact | High<br>Medium<br>Low | Positive<br>Limited positive<br>Adverse w/ no action |
| | Social Impact | High<br>Medium<br>Low | Positive<br>Limited positive<br>Adverse w/ no action |
| | Environmental Impact (env regulation) | High<br>Medium<br>Low | Not sbj to reg (no consideration required)<br>Not sbj to reg (consideration required)<br>Sbj to regulation |
| 2. Sector-specific | | | |
| Compatibility to local needs | Compatibility by area | | Geographical area and locations targeted for deployment |
| Timing of Implementation | Lead time until the deployment | | Lead time (short-2rs, medium 3-5yrs, long >5 yrs) |
| Coordination with other options | Decree of synergies with other options | | Potential synergy for joint implementation with other options |

**Step 3: Exploring Opportunities & Early Actions for Technology Deployment:**

Field surveys and technical diagnosis on some of the potential technologies were deployed at some sites to explore feasibilities.

## 3. Key Findings & Observations

### Findings 1
### Policy/Technical Barriers surrounding NDC Options

The Assessment identified both policy/market and technical barriers associated with the current 45 NDC options which may hamper their smooth implementation. Findings are summarized as below.

ENERGY

- **Energy Efficiency** (E1-E54, E10) – Insufficient incentive for energy saving with the current utility price level remains a common challenge across EE options, along with voluntary nature of retrofit/renovation by energy end-users to more energy efficient appliances/devices. While various efforts are put in place to address initial investment cost barrier for such measures, **observed mismatch** between investment perceptions of manufacturers (payback period <2 years) with commercially available financial support scheme also hampers harvesting energy efficiency/mitigation potential.
- **Power Generation** – Improving enabling investment environment by setting more attractive **purchasing price**, **clarity over risk mitigation measures for investors** and **simplified procedures** for permit acquisition for power development projects remain a challenge. **Policy gap** for small-scale power generation, as exemplified by lack of provision for grid connection less than 1MW (biogas), and lack of QCVN standard for discharge of GHG to atmosphere, are yet to be elaborated.

TRANSPORT

- **Modal Shift** (E8, E9) displays common challenges, including, inter alia, **delayed disbursement of project budget** affecting timing of operationalizing infrastructure and realizing developmental benefit (equally harvesting GHG mitigation potential), securing projected demand to fulfill project profitability(**overestimation risk**), coordination with relevant plans and stakeholders/operators to secure **connectivity**, and also coordination among cargo owners and freight shippers to maximize efficiency.
- **Fuel Switch** (E7) – **Technical guidance** to ensure standardized quality and safety of bioethanol, and demonstrating clear **price competitiveness** are yet to be improved, along with **public sensitization** to effectively foster behavioral change.

AGRICULTURE

- Given NDC options for this sector are related to practices/management, securing **technical capacity/skilled labor** for operation and proper management remains a common challenge (e.g. A1-A3, A8-9, A13-14).
- From the financial standpoint, **high initial investment cost** for installing a system (e.g. pump for drainage system (A3/A9) or irrigation (A14), biomethanation and power generation system (A13), effluent treatment facility (A12)) also remains a common challenge.

LULUCF

- While forest management in Vietnam is relatively advanced, on-going effort to boost forest cover up to 45% by 2020 must be accompanied with **the enhancement of forest quality** as well. This includes access to good quality seeds and planting practice (F4, F8, F9), application of IT-based data management (F1, F6), as well as mapping technologies (F2, F3, F7).
- Aside from the above challenges, improvement of financial basis for the NDC options is key, and can be achieved by increasing state budget and also **maximizing ancillary revenues from agroforestry and aquaculture**.

WASTE

- Local circumstances manifest the effectiveness of mitigation options in the sector, and hence tailored approach to options remains crucial for optimizing the implementation. **Overestimation with regards to risk** of production amount (e.g. organic fertilizer), gas recovery potential and demand for consumption remains an operational challenge, and therefore careful assessment of the validity of the underlying assumptions set for each option is a must.
- From a financial standpoint, setting a proper enabling investment environment, including **standard price setting** (cost for recycling facility operation) is yet to be elaborated in order for the options to make business sense.

F-Gas

- Lack of **policy framework** to manage HFCs including technical guidelines, remains the biggest stumbling block to trigger bold actions in this domain. Recent inclusion of HFCs into national GHG Inventory (BUR2), and the Kigali Amendment of the Montreal Protocol might create additional momentum for future inclusion of HFCs into NDC with concrete measures.
- Aside from simple import control, both policy push to guide consumers to adopt lower-GWP HFCs alternatives, and technical capacity building are required to strengthen **proper gas management**. The latter includes O&M capacity (installation, re-charge, ejection or replacement) and proper accounting of the quantity of the gas emitted and destroyed from MRV standpoint.

Although non-exhaustive, the barrier analysis clarified areas requiring further policy push by the government, while providing an insight as to where resources should be directed to build technical capacities to enable implementation of the options.

On top of the further effort by line ministries in charge of the mitigation options to provide better enabling environment, addressing the identified policy gap could also be leveraged, for instance, by integrating into policy dialogue and SP-RCC work stream.

## Findings 2
## Coordination Requirement among NDC Options

While the current NDC options are proposed by sectoral experts, the cross cutting nature of options and their inter-relationship must not be overlooked. The Assessment identified the potential jurisdictional and functional overlap (among line ministries and sectors, central-local authorities, government non-governmental) as exemplified in **Figure 2**, which may create trade-offs for harvesting mitigation potential. Hence, careful coordination among the concerned stakeholders is required to clarify potential policy inconsistencies/incoherence and mutual exclusivity, and setting a proper implementation framework. Such coordination also includes demarcation of roles and responsibilities among stakeholders, data sharing arrangement and strengthening mutual communication. Those elements could be considered as additional requirement/cost for effective implementation of the options.

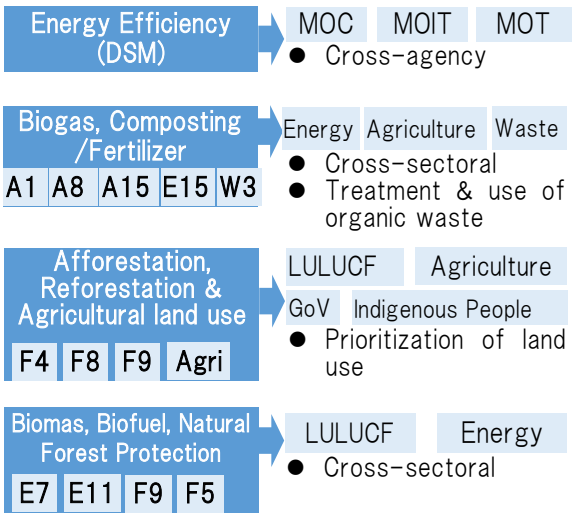


**Figure 2.** Examples of Cross-cutting coordination requirement for operationalizing NDC Options

## Findings 3
## Essence of Multi-stakeholder Dialogue and Needs

The Assessment was conducted in a multi-stakeholder environment through a series of sector-focused consultations to facilitate communications among policy makers and other key stakeholders in the sector. Such a setup was critical for engaging

private sector entities serving as the custodians of technological innovation, deployment and investment. The multi-stakeholder dialogue revealed the clear remaining needs and perspectives as displayed in Table 2 which needs to be fully taken into account when updating NDC.

**Table 2. Major topics discussed in 7 Sector-based Consultation Workshops**

| Sectors | Stakeholder views |
|---|---|
| Energy (Energy Efficiency), Industrial Process | ✓ Alignment with **energy benchmark** system being developed by MOIT<br>✓ Multiple and diverse technology options applicable to Industrial Process<br>✓ Relevance with green building concept |
| Energy (Power Generation) | ✓ **Cost/benefit** as the biggest decisive factor for investment. **Supporting polices** for investors (e.g. standards and administrative procedures; development of RE market, application of carbon pricing)<br>✓ Necessity of calculating **social cost** of power plant operation (e.g. internalizing environmental, health costs) |
| Transport | ✓ Necessity to break down options into **sub-sectors (road, railway, maritime, inland waterways, aviation)** for meaningful analysis<br>✓ **Baseline study** manifests relative priority of new technology options.<br>✓ **Measures against management/operation** (e.g. flight timing, reduction of traffic congestion at airports in aviation) |
| Agriculture | ✓ Indicating additional benefits to end-user can motivate to introduce technologies.<br>✓ **Further collaborations** to R&D and deploy carbon technologies among research institutes and private company |
| LULUCF | ✓ Aspiration to include **agro-forestry** (coffee - timber) and **forestry-aquaculture** (mangrove) to NDC options.<br>✓ Need for modifying **land use policy** to avoid developing scattered forest areas.<br>✓ **Co-benefits of adaptation** to climate change, avoiding land and coastal erosion |
| Waste | ✓ Primary focus on **landfill management** as the largest source of sectoral emissions<br>✓ **Price signal** - low utility price and waste collection fee are the key barriers for technology deployment |
| F-gas (HFC) | ✓ Strengthening **legal framework** surrounding F-gas management<br>✓ Enhancing **incentives** for end-users to choose/use alternative options to low or non- F-gas products<br>✓ Measures to address gas **leakage** |

Another significant aspect of the dialogue series is that the participated private sector entities in Viet Nam displayed strong interests and appetite in engaging in climate actions, sharing business aspirations for low carbon technologies with motivation for enhancing their commercial productivity and adding values to their products, and called for more frequent exchanges with the Government to ensure their contributions. Hence policy interventions for creating and improving an enabling environment for investment, coupled with strengthening G-to-B communication channel linking climate actions, competitiveness and domestic industrial growth aspirations, including inter alia, discussion on which low carbon technologies to own domestically, and which ones to borrow, are both deemed effective.

## Findings 3
## Raising Level of Ambition: Potential Areas for Further Elaboration for NDC

The Assessment also identified the potential areas/sub-sectors for further elaboration, as displayed in **Figure 3**. Those options are neither explicitly expressed in the current set of 45 NDC options, nor are overlooked in the past analytical process. Provided those options were expressed by Vietnamese stakeholders during the sector-based dialogues, integrating those mitigation potential into the new basket of mitigation options will not only help increase the ambition level for Viet Nam as a whole, but will also help converge climate and developmental objectives inherent to the mitigation options.

The suggested additional options provide new perspectives for an approach to constructing mitigation options. Taking Energy Efficiency's holistic or packaged approach to set a physical boundary to bundle various low carbon technology options as an example, could best tap onto the energy efficiency potential in a cost effective manner.

Such efforts strike policy coherence with other relevant policies. For instance, to improve building energy efficiency and connect with the on-going effort of energy audits guided by the Law of Energy Efficiency. In the same token, the selection of IP subsector should take into full account the feasibility and maturity of enabling the environment by aligning with the on-going, parallel efforts of setting and operationalizing industrial energy benchmarking.

## 4. Conclusion and Ways Forward

The Low Carbon Technology Assessment has been undertaken with the aim of bridging the current implementation gap for NDC mitigation options. Throughout the exercise it has become evident that further effort is required by the Government to provide a better enabling environment by setting a more robust supporting policy framework to facilitate

the implementation of NDC options, as well as the deployment of technological options. Such intervention can take in the form of revising existing policies and/or creating new policies and/or guidelines. Incorporating policy dialogue with sectoral ministries to track the progress of enhancing policy environment surrounding NDC options into the update process, may also prove useful. Likewise, the anchoring of NDC into a proper national legal framework is also critical forenhanced ownership and enforcement of NDC by connecting the options with the responsibilities of implementing entities. This ensures that the NDC is not perceived as someone else's problem, nor remains a mere aspiration.

Furthermore, in order for NDC options to inform sustainable development objectives, environmental, social and economic impact of mitigation options should be thoroughly assessed. The selection of NDC options not only contributes to GHG emission reduction but also addresses emerging developmental concerns facing Viet Nam as a middle income country, such as air pollution and traffic congestion. This may enhance the value and buy-in of the options.

Another important perspective shared during the stakeholder dialogue is approach to selection of NDC options. While technical analysis of emission reduction potential by individual NDC option along with possible technology options is useful, what is more important is to secure a space for collective, informed decision for society as a whole for the right basket of NDC options which optimizes sustainable dividend and social benefits. Some NDC options may be preferred orproposed by the climate community, but they may not receive the same level of respect by the sectoral or development community. Reconciling the priorities and preferences by both communities is therefore crucial.

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| | | |
|---|---|---|
| **1. Energy Efficiency** | | |
| | Building | ● Green building (package) |
| | Industrial Process (benchmark -based) | ● Paper and Pulp<br>● Steel<br>● Refinery<br>● Beverage/Food Processing |
| **2. Power Generation** | | |
| | Power Plant (Improved EE) | ● Natural Gas Plant |
| | Transmission /Distribution (Improved EE) | ● High Efficiency Transmission Line<br>● High Efficiency Transformer |
| **3. Transport** | | |
| | Energy Efficiency Improvement by Subsector | ● Road (e.g. vehicle, traffic control, LED lights, tunnel)<br>● Railway (e.g. vehicle, station, engine renovation)<br>● Maritime (port, vessel)<br>● Inland Waterways (vessel)<br>● Aviation (e.g. airport, aircraft) |
| | Fuel Switch | ● Biofuel<br>● Gaseous Fuel<br>● Electricity |
| **4. Agriculture** | | |
| | Agricultural practices | ● Mid-season drainage |
| | Livestock management | ● Improved processing technology & reuse of organic waste |
| | Fisheries (Improved EE) | ● Structural adjustment capacity of vessels |
| **5. LULUCF** | | |
| | Forest management | ● Scattered tree planting<br>● REDD+<br>● CO2 isolation by large scale plantation |
| **6. Waste** | | |
| | Landfill Operation | ● Introduction of semi-anaerobic landfill |
| | Waste Collection (Improved EE) | ● Low carbon fuel trucks for waste collection<br>● Waste transfer station |
| **7. F-gas (additional scope)** | | |
| | Improved Management during Use | ● Destruction of used gas<br>● Refrigerant (R/AC)<br>● Maintenance |

**Figure 3**: Potential Areas for Further Elaboration