Progress to date and Multi-criteria Assessment for prioritizing low carbon technologies for NDC options

JICA SPI-NAMA/
Low Carbon Technology Assessment Team

28 Aug, 2017
Consultation on Low Carbon (LC) Technology Assessment and Outreach Event on LC-Technology

### Consultation on LC-Tech Assessment

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:15</td>
<td>Outputs of the assessment work of prioritized LC technologies</td>
</tr>
<tr>
<td>10:10</td>
<td>Brief introduction on identified technology in each sector</td>
</tr>
<tr>
<td>11:00</td>
<td>Comments by technical advisors</td>
</tr>
<tr>
<td>12:00</td>
<td>Open discussion</td>
</tr>
<tr>
<td></td>
<td><strong>Lunch will be served for all participants</strong></td>
</tr>
</tbody>
</table>

### Outreach event on Low Carbon Technology

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>14:00</td>
<td>Opening remarks</td>
</tr>
<tr>
<td>14:10</td>
<td>Setting a scene: Framing efforts to promote private sector’s actions</td>
</tr>
<tr>
<td>15:10</td>
<td>Promote LC-Tech (Presentations from the private sector)</td>
</tr>
<tr>
<td>16:10</td>
<td>Open discussion</td>
</tr>
<tr>
<td>16:45</td>
<td>Wrap up of discussion</td>
</tr>
</tbody>
</table>

You can download presentation materials from the following URL: https://drive.google.com/drive/u/2/folders/0B8XgSuMsFfvrcUhIcERzTkZTVk0

2. Discuss and collect views on sector’s actions, with a view to applying to the prioritized technologies.

3. Present analysis on barriers identified from current options and discuss what solution can be applied.

To achieve the above outputs, participants are invited to speak out, and interactive discussion is suggested!
1. Activity Flow of LC Tech Assessment
2. Multi-Criteria Assessment - Objectives
3. Methodological Approach
   - Universal criteria across sectors
   - Sector-specific criteria
   - Sector-based stakeholder consultation workshops
4. Evaluation of Low Carbon Technologies
   - Preliminary Results and Findings
1. Activity Flow of SPI-NAMA LC Tech Assessment, Objectives

Viet Nam’s NDC at Glance

- Differentiated targets (8/25%)
- Sub-sectors, concepts, targets

45 OPTIONS

Bridging Implementation

- Assessment of each option
- Concrete actions
- Means of implementation

**Low Carbon Technology Assessment for NDC**

Objectives

1. Identifying and Assessing Low Carbon Technologies applicable to each mitigation option of INDC & F-gas (HFC)
2. Explores concrete Opportunities for Technology Transfer / Deployment
1. Activity Flow of LC Tech Assessment

NDC implementation toward Low Emission Development

**NDC**

**A national climate change action strategy aiming to GHG emission reduction**

**Energy/Transport**

- 17 options are identified, 10 options from Energy efficiency and industry, 7 options from Power generation, 3 options from transport sector.

**Agriculture**

- 11 out of 15 options are higher priority.
- It mainly consist of crop production subsector related activities, followed by irrigation, livestock and fisheries subsectors.

**LULUCF**

- 9 options including protection national/coastal forest, plantation of coastal forest, national forest regeneration are described.
- It reflects the goal that Viet Nam will reduce its GHG emissions by 8% by 2030 compared to the BAU scenario.

**Waste**

- 4 options are identified namely organic fertilizer production, landfill gas recovery, recycling of solid waste and anaerobic treatment of organic solid waste.
- Mitigation measures are identified in the policy document of the waste sector in Viet Nam, i.e. “Decision No.2149/QD-TTg”.

**F-gas**

- F-gas sector is not included in the INDC, yet it has high potential for GHG emission reduction.
- There is no regulation is developed in Viet Nam.
1. Activity Flow of LC Tech Assessment

Expected outputs in SPI-NAMA / LC-Tech assessment

1. Development of a technology shortlist

2. Priority technologies

3. Consideration of deployment of the priority technologies

JICA assessment team for the SPI-NAMA/LC tech developed a technology shortlist corresponding to the Viet Nam’s NDC.

Priority technologies in each sector are identified after evaluations, using multi criteria agreed by key stakeholders.

Prototype projects will be considered with a view to deployment of the priority technologies.
## Activity Flow of LC Tech Assessment

### Development of a technology shortlist

<table>
<thead>
<tr>
<th>(I)NDC /Additional options</th>
<th>Identified Technologies</th>
</tr>
</thead>
</table>
| **E1** High efficiency air conditioner for Household | ■ Inverter air conditioner  
■ Constant-speed air conditioner |
| **E2** High efficiency residential Refrigerators | ■ Inverter compressed type (Insulator/Insulation type) |
| **E3** High efficiency residential lighting | ■ LED  
■ CFL (Bulb, F tube) |
| **E4** Solar water heaters | ■ Hot water tank  
■ Heat collection unit |
| **E10** High efficiency commercial air conditioning | ■ Building multi air conditioner |
| **Additional** Green building | ■ Building multi air conditioner  
■ LED  
■ Pair glass  
■ High efficiency insulator |
Activity Flow of LC Tech Assessment

Elaboration of shortlist into technology sheet

In-depth illustration of the identified technologies
✓ Summary of technology
✓ Technical advantage
✓ Mitigation potential
✓ (Initial) cost
✓ Vietnamese context
✓ Current status of market and production, policy
✓ Barrier (in Chapter 3)
2. Multi-Criteria Assessment - Objective

Toward full implementation of NDCs, LMs are expected to take actions step-by-step.

Results of prioritization assessment is expected to inform LMs of key facts to organize their decision making.

* Evaluation criteria will assure objectiveness of decision making for prioritization.

Several steps taken by:
- Removing barriers
- Promoting/harnessing coordination with stakeholders
- Partially supported by International cooperation
<table>
<thead>
<tr>
<th>Sector</th>
<th>Energy Efficiency</th>
<th>Power Generation</th>
<th>Transport</th>
<th>Agriculture</th>
<th>LULUCF</th>
<th>Waste</th>
<th>Fgas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Priority</td>
<td>Evidence in policy documents (decision, circular, etc.)</td>
<td>Evidence in policy documents (decision, circular, etc.)</td>
<td>Evidence in policy documents (decision, circular, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Performance</td>
<td>Initial Cost (US$/unit)</td>
<td>Initial cost (US$/kWh) Operation Cost (US$/kWh)</td>
<td>Initial cost</td>
<td>Initial absorption cost/unit</td>
<td>Processing cost (US$/ton)</td>
<td>Initial cost</td>
<td>Operation cost</td>
</tr>
<tr>
<td>GHG Reduction</td>
<td>Absolute amount</td>
<td>Power generation rate (g-CO2/kWh)</td>
<td>Absolute amount</td>
<td>Absolute amount</td>
<td>Absorption potential</td>
<td>Emission reduction per 1t of waste (tCO2/t of MSW)</td>
<td>Marginal abatement cost</td>
</tr>
<tr>
<td>Versatility</td>
<td>Maintenance support and operation techniques</td>
<td>Versatility for deployment, Maintenance support and operation techniques</td>
<td>Technical adaptability and capacity</td>
<td>Versatility for deployment, Condition of volume and quality</td>
<td>Maintenance support Versatility for deployment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economical, Social and Environmental impact</td>
<td>Economic, social and other environmental impacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VN context</td>
<td>Market share</td>
<td>Implementatio n rate</td>
<td>-</td>
<td>Easiness of utilization</td>
<td>Job creation</td>
<td>-</td>
<td>Market share</td>
</tr>
<tr>
<td>Sector specific criteria</td>
<td>Energy efficiency rate</td>
<td>Implementatio n goal by 2030</td>
<td>Adaptability, Timing of implementation, Linkage of other measures</td>
<td>Food security, Productivity</td>
<td>Adaptation</td>
<td>Locality</td>
<td>Support availability, Adaptability, Timing of implementation, Linkage with other measures, Benefit to other sector</td>
</tr>
</tbody>
</table>
The sector based dialogue, the Technical Advisory Committee and other consultation steps identified items for consideration for evaluation. Some of them are described in below.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (EE)</td>
<td>EE for residential/commercial and industry process should be evaluated by using different indicator taking into account their different aspects in nature.</td>
</tr>
<tr>
<td>Energy (PG)</td>
<td>Economy performance should be evaluated by initial cost (US$/kW) and operation cost (US$/kWh) in order to reflect on substantive operation.</td>
</tr>
<tr>
<td>Transport</td>
<td>The linkage with other measures is an important aspect in terms of the transport sector yet its quantitative analysis is a challenge.</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Eradication of poverty should be incorporated analysis of social impact, including living standard of farmers.</td>
</tr>
<tr>
<td>LULUCF</td>
<td>Economic performance in LULUCF sector is perceived different from those from other sectors because it mostly comprises of project plan.</td>
</tr>
<tr>
<td>Waste</td>
<td>Local conditions (big/middle/small city, village and mountain area) are important factors since they affect selection of waste treatment actions.</td>
</tr>
<tr>
<td>F-gas</td>
<td>100% of incremental cost is applied in F-gas sector. It should be valued a linkage with other measures when evaluating economy performance.</td>
</tr>
</tbody>
</table>
4. Evaluation of Low Carbon Technologies

- 143 technologies out of approx. 150 are subjected to evaluation.
- Evaluation was done by six common criteria and sector specific criteria.
- Outputs are categorized in three groups, namely:
  - Technologies early implementation;
  - Technologies for deployed when surrounding condition is consolidated;
  - Technologies which may take a long term for deployment.
- Expert judgement will be applied on overall evaluation in each sector.
- Inter sectoral evaluation are not subjected.
- Details are provided in the publication (Oct, 2017)
- Consecutive domestic consultation can make improvement of assessment work.
More than half of mitigation options are newly suggested.

- **Transport**: 48 options
- **Energy**: 36 options
- **F-gas**: 6 options
- **Waste**: 4 options
- **Agriculture**: 3 options
- **LULUCF**: 3 options

- Total number of mitigation options: 143
- Total number of new options: 100
✓ 61 options have relatively smaller barriers

4. Evaluation of Low Carbon Technologies

Preliminary Results and Findings 2

61 Options

143 Mitigation options

Prioritized technology options that are listed in NDC

- Energy
- Agriculture
- LULUCF
- Waste
4. Evaluation of Low Carbon Technologies

Analysis in sub-sectoral aspects

Energy Efficiency/industry

- Cement: 6
- Steel: 11
- Refinery: 7
- Fertilizer: 5
- Pulp and paper: 6

✓ Refinery might be less barrier to implement in EE/Industry

Transport

- Mode Shift: 18
- Energy efficiency: 28
- Fuel Switching: 5

✓ Energy efficiency might be less barrier to implement
## 4. Evaluation of Low Carbon Technologies

### Barrier Analyses

<table>
<thead>
<tr>
<th>Policy</th>
<th>Investment</th>
</tr>
</thead>
</table>
| **Energy** | • No mandatory energy efficiency standard and labeling  
• No environmental standard for CH₄ | • Low incentive for energy efficiency measure (Industry)  
• Subject to payment for forest ecosystem service (Power) |
| **Transport** | • Standard not yet available for bioethanol | • Demand Risk, to secure the planned demand to fulfill project profitability (modal shift) |
| **Agriculture** | • Cross sectoral issue may occur between livestock and food security. | • High initial investment cost required |
| **LULUCF** | • Land use prioritization | • Limited financial resources |
| **Waste** | • Strategy for commercializing compost products should be in place | • Limited demand (Anaerobic treatment of organic solid waste) |
| **F-gas** | • No policy framework  
• Low awareness of stakeholders | • Price competitiveness of low GWP refrigerant |
Challenge and the way forward

- Elimination of various barriers.
- Linkage with national commitment for the emission reduction target
- Efficient coordination among relevant stakeholders
- Understanding of low carbon technology and its benefit
Thank you for your attention