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

9:15-	Outputs of the assessment work of prioritized LC technologies
10:10-	Brief introduction on identified technology in each sector
11:00-	Comments by technical advisors
12:00	Open discussion

Lunch will be served for all participants

Outreach event on Low Carbon Technology

14:00-	Opening remarks
14:10-	Setting a scene: Framing efforts to promote private sector's actions
15:10-	Promote LC-Tech (Presentations from the private sector)
16:10-	Open discussion
16:45-	Wrap up of discussion

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

Expected Outputs

1. Report on the progress of assessment of prioritization of low carbon technologies in the 7 sectors.

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!

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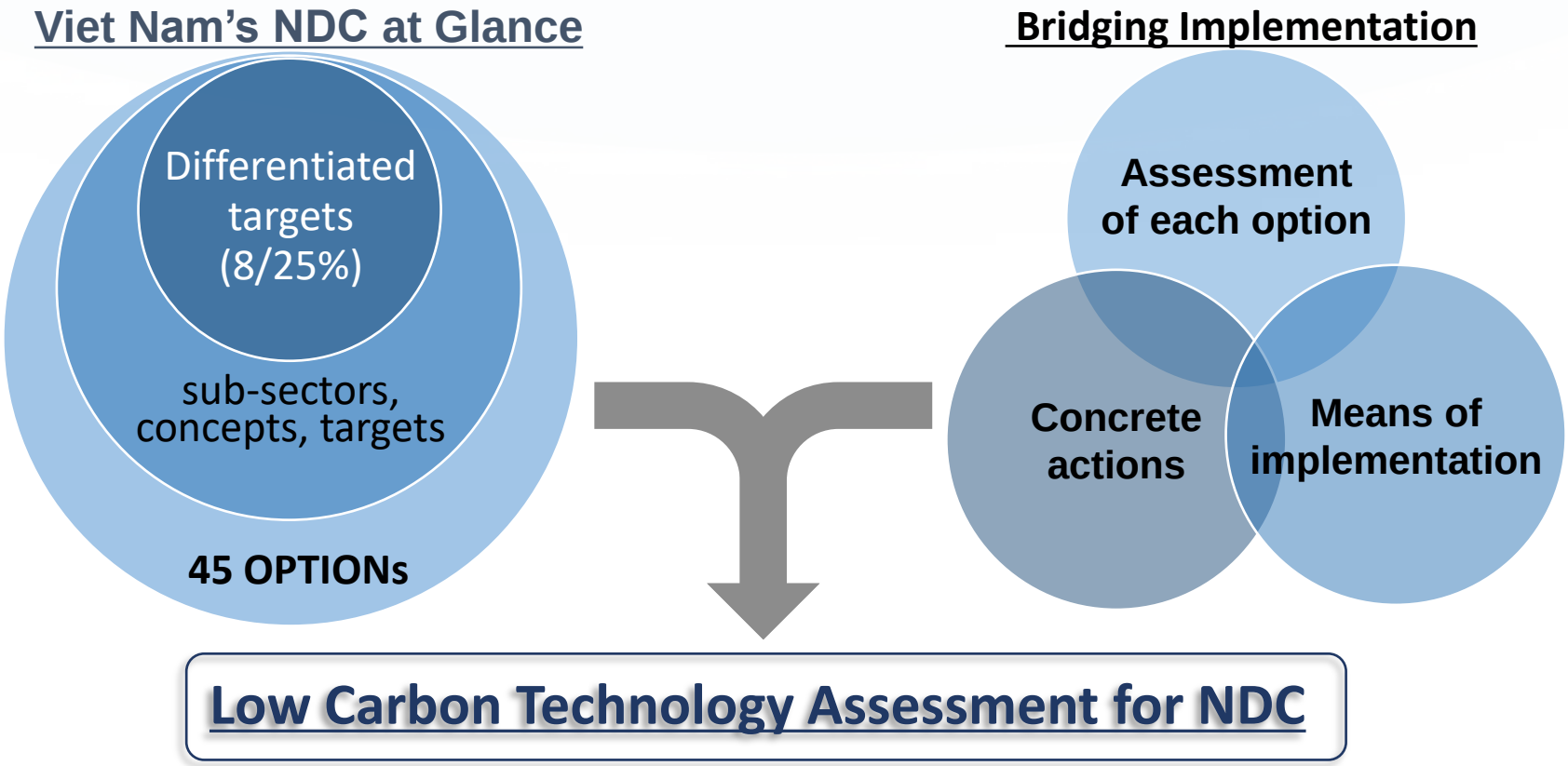
1. Activity Flow of SPI-NAMA LC Tech Assessment, Objectives



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**

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.
- It reflects National Target Programme on Energy Efficiency (2006), Law on Economical and Efficient Use of Energy (2010) as well as the Power Development Master Plan No. VII (2011).

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”.

Added!

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.

Implementation →

Low Emission Development

Expected outputs in SPI-NAMA / LC-Tech assessment

1. **Development of a technology shortlist**

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

2. **Priority technologies**

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

3. **Consideration of deployment of the priority technologies**

Prototype projects will be considered with a view to deployment of the priority technologies.

Development of a technology shortlist

	(I)NDC /Additional options		Identified Technologies
Residential and commercial	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

Elaboration of shortlist into technology sheet

E3 High Efficiency Residential Lighting

Baseline Technology	Suggested Low Carbon Technology(ies)
Incandescent lamp	■ LED (Light-Emitting Diode) ■ CFL (Compact Fluorescent Lamp)

Photo Image[23]

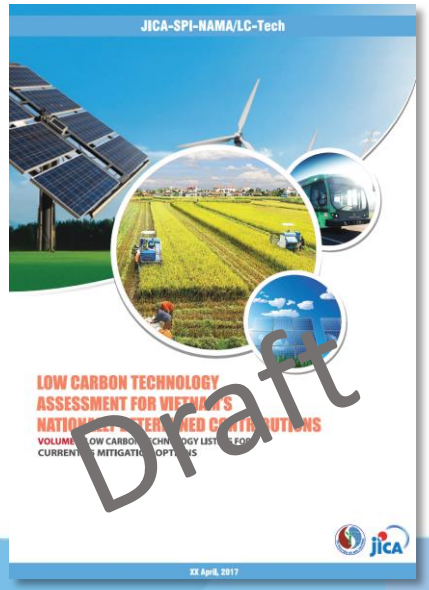
LED

CFL

Summary of Technology	**LED:** Electricity is passed through a semiconductor, which produces photons. LED can produce more useable white light per unit of energy than metal halide, sodium vapor, and fluorescent and halogen light sources. **CFL:** Fluorescent lamps contain mercury which causes the tube to produce light mostly in the UV region of the spectrum.
Technical Advantages	■ 50% reduction in electricity consumption by CFL and 80% reduction by LED compared with incandescent lamp. ■ Their small size, durability, long operating lifetime, wavelength specificity, relatively cool emitting surfaces, and linear photon output with electrical input make these solid-state light sources ideal for use places in such as plant lighting designs.
Mitigation Potential	0.04 tCO_2eq/year/unit (Incandescent to LED) 0.02 tCO_2eq/year/unit (Incandescent to CFL) (Cumulative: 29.3 $MtCO_2eq$ in 2010-2030[24])
(Initial) Cost	LED: 5 USD/unit, CFL: 2 USD/unit
Viet Nam's Context	■ Electricity consumption of lighting accounts for larger percentage of the total household electricity consumption.
Existing Policy & Measures	**Legal Framework** ■ Law No.50/2010/QH12 (2010) **National Technical Standards** ■ TCVN 8249: 2009 ■ TCVN 7451-1: 2005 ■ TCVN 7451-2: 2005 ■ TCVN 7896: 2008 ■ TCVN 8248: 2009 ■ TCVN 7897: 2008
Current State of Market and Production	N/A

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.

Low Emission Development in Viet Nam

Accelerated implementation

Initial implementation

Early actions

Several steps taken by:
- ✓ **Removing barriers**
- ✓ **Promoting/harnessing coordination with stakeholders**
- ✓ **Partially supported by International cooperation**

Pre-2020 | **2020** | **2030** | **Further**

Methodological Approach

Prioritized mitigation options Universal/sector specific criteria

		Indicator							Evaluation
Sector		Energy Efficiency	Power Generation	Transport	Agriculture	LULUCF	Waste	Fgas	
Common Criteria	Policy Priority	Evidence in policy documents (decision, circular, etc.)					Evidence in policy documents and measure	Evidence in policy documents (decision, circular, etc.)	High Middle Low
	Economic Performance	Initial Cost (US$/unit)	Initial cost (US$/kWh) Operation Cost (US$/kWh)	Initial cost		Initial absorption cost/unit	Processing cost (US$/ton)	Initial cost Operation cost	
	GHG Reduction	Absolute amount	Power generation rate (g-CO2/kWh)	Absolute amount		Absolute amount Absorption potential	Emission reduction per 1t of waste (tCO2/t of MSW) Marginal abatement cost	Absolute amount, Global warming potential (GWP)	
	Versatility	Maintenance support and operation techniques		Versatility for deployment, Maintenance support and operation techniques		Technical adaptability and capacity	Versatility for deployment, Condition of volume and quality	Maintenance support Versatility for deployment	
	Economical, Social and Environmental impact	Economic, social and other environmental impacts							
	VN context	Market share	Implementation rate	-	Easiness of utilization	Job creation	-	Market share	
Sector specific criteria		Energy efficiency rate	Implementation goal by 2030	Adaptability, Timing of implementation, Linkage of other measures	Food security, Productivity	Adaptation	Locality	Support availability, Adaptability, Timing of implementation, Linkage with other measures, Benefit to other sector	=

Items considered by sector in evaluation

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.

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

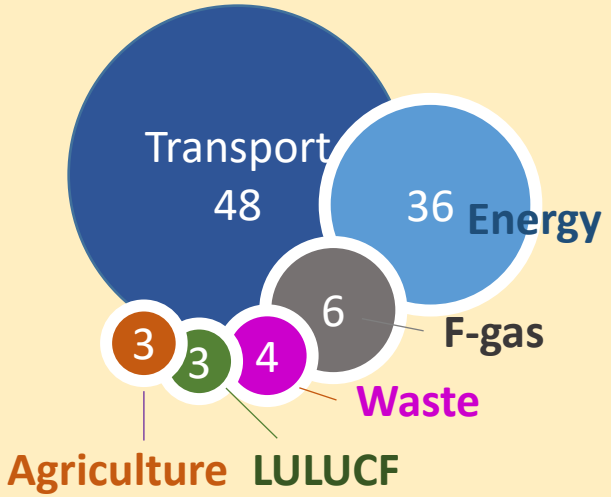
4. Evaluation of Low Carbon Technologies

- 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

Preliminary Results and Findings 1

✓ More than half of mitigation options are newly suggested.

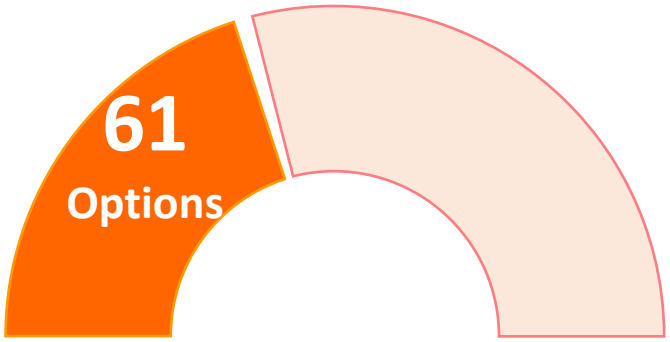
143
Mitigation options



Number of additional technologies by sector

Preliminary Results and Findings 2

✓ 61 options have relatively smaller barriers



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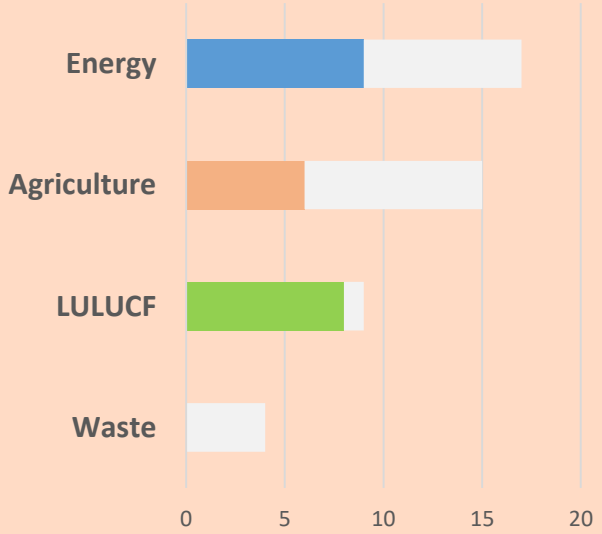
Mitigation options

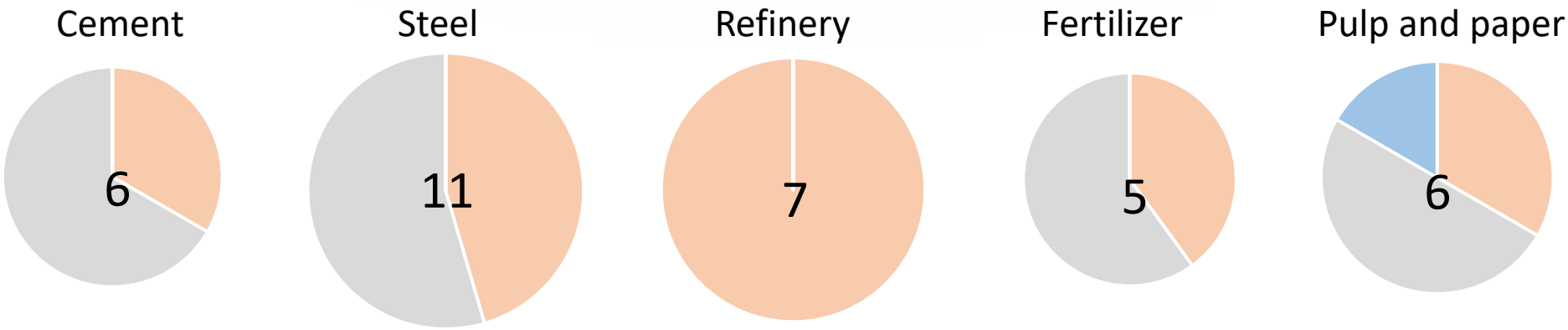


Prioritized technology options that are listed in NDC

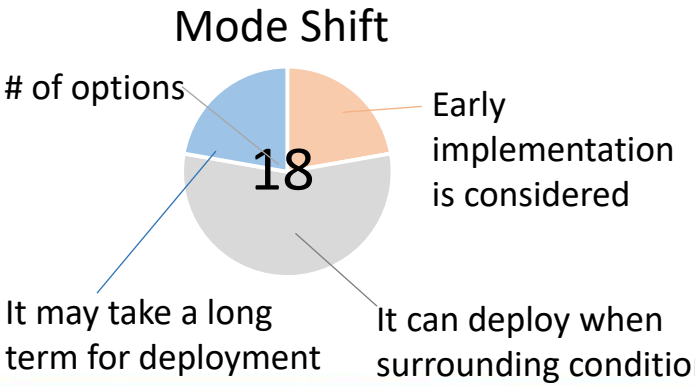
Analysis in sub-sectoral aspects

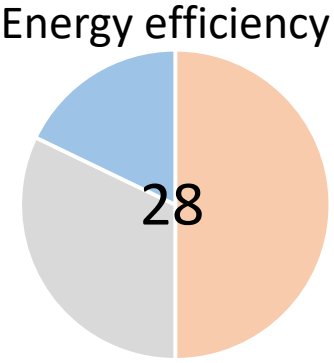
Energy Efficiency/industry

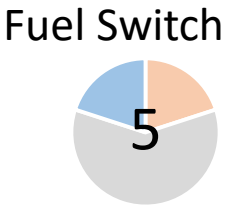
✓ Refinery might be less barrier to implement in EE/Industry



Transport







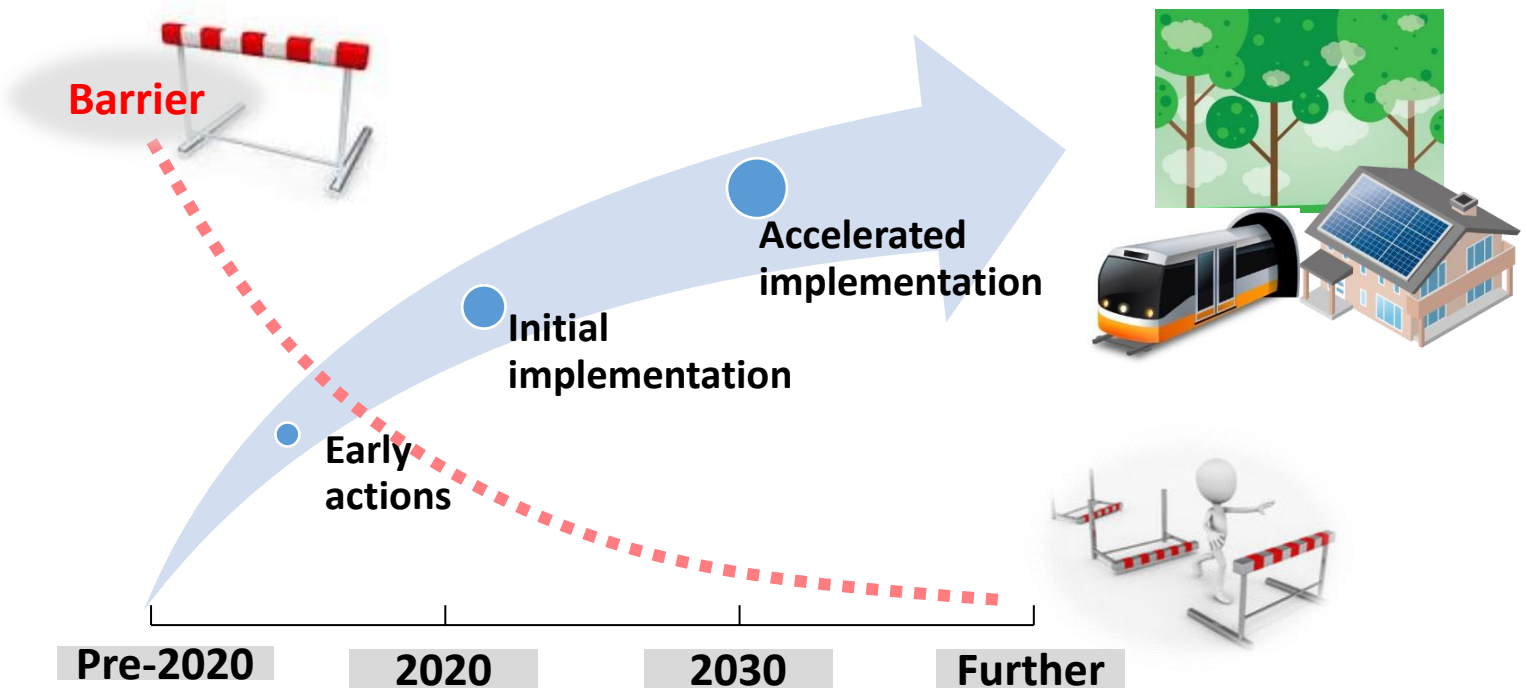
✓ Energy efficiency might be less barrier to implement

Barrier Analyses

	Policy	Investment
Energy	• No mandatory energy efficiency standard and labeling • No environmental standard for CH_4	• 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