Introducing Vietnam's Emission Reduction Target (NDC)
&
Preliminary Findings and Recommendations of the Low Carbon Technology Assessment

MONRE/DMHCC
JICA SPI-NAMA/
Low Carbon Technology Assessment

13th May, 2017

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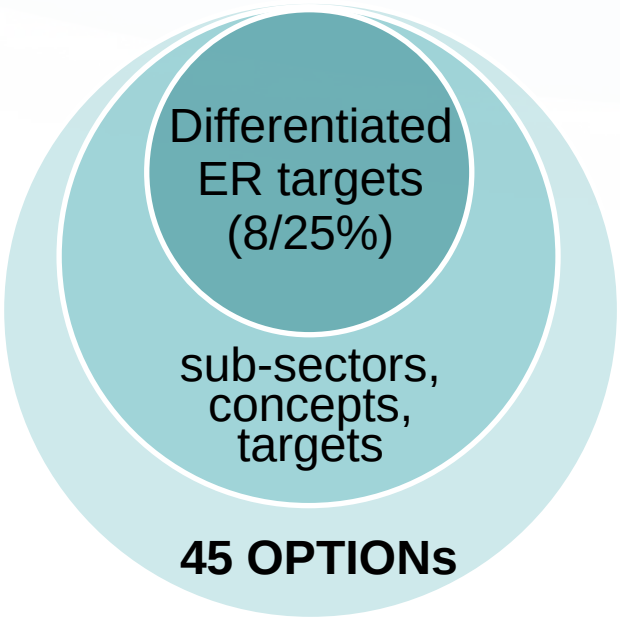
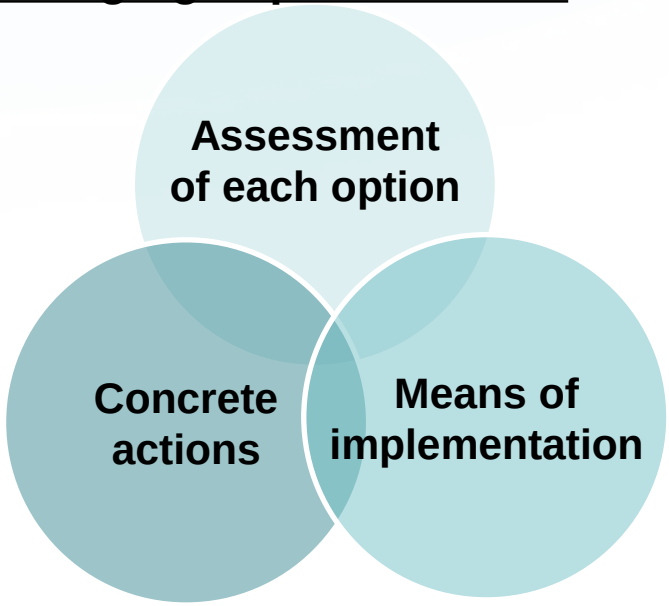
1. Objectives

Viet Nam's NDC at Glance



Bridging 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. Three expected outputs in SPI-NAMA / LC-Tech

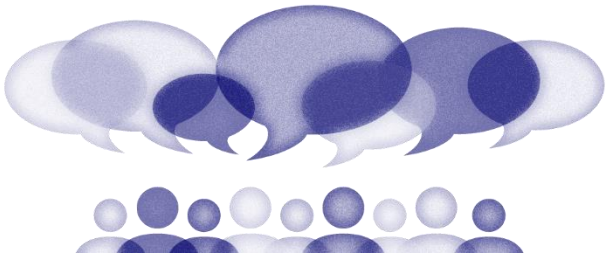
1. **Development of a technology shortlist**

2. **Priority technologies**

3. **Deployment of the priority technologies**

JICA study team for the SPI-NAMA/low carbon technology assessment developed the **technology shortlist** corresponding to the Viet Nam's NDC.

Priority technologies in each sector will be identified after **evaluations**, using **criteria** built consensus by the multiple stakeholders.



Deployment of the priority technologies will be supported.

2. Mitigation options in (I)NDC and its implementation

INDC

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!

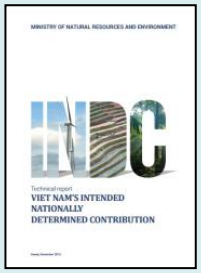
F-gas

- 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.

Provide information on low carbon technology → **Implementation**

3-1. Technical sheet of the LC technologies for the NDC Sectors and the F-gas sector (HFC refrigerant)

1. 45 Mitigation options in INDC technical report



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2. Existing credited technology lists

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3. Possible mitigation options suggested by JICA study team

- Discussion with LM for sectoral strategy
- Interviews with private sector
- Interviews with technology owners

Technology element

Selection

Bottom up approach to collect information will be assured.

External review for quality control and objective

Securing of quality, objectivity by the outside review

Development of technology shortlist

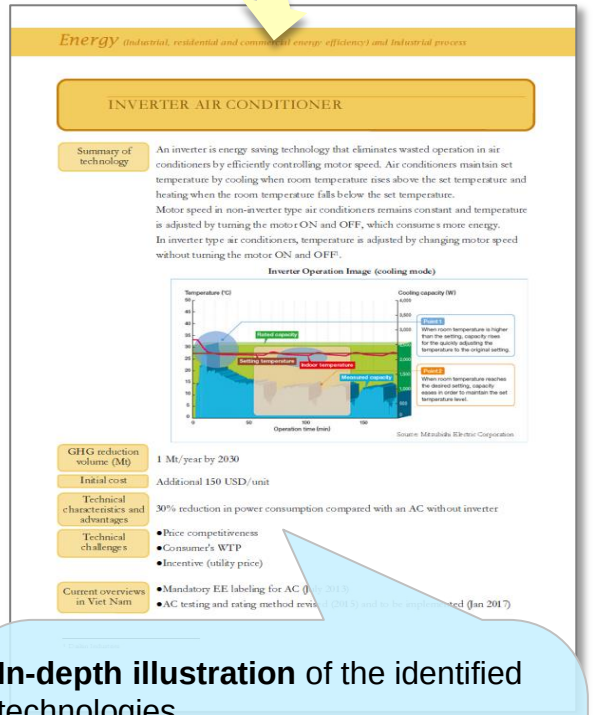
Energy (Energy efficiency):
Energy (Power generation):
Transport, Agriculture
LULUCF, Waste, F-gas

3-2 Development of the LC technology list relevant to the (I)NDC

Identifying Low Carbon Technologies for Each NDC Options

	INDC options	Identified Technologies
Residential and commercial	High efficiency air conditioner for Household **(E1)**	■ Inverter air conditioner ■ Constant-speed air conditioner
	High efficiency residential Refrigerators **(E2)**	■ Inverter compressed type (Insulator/ Insulation type)
	High efficiency residential lighting **(E3)**	■ LED ■ CFL (Bulb, F tube)
	Solar water heaters **(E4)**	■ Hot water tank ■ Heat collection unit
	High efficiency commercial air conditioning **(E10)**	■ Building multi air conditioner
	Green building	■ Building multi air conditioner ■ LED ■ Pair glass ■ High efficiency insulator
Industry	Cement-making technology improvements **(E5)**	■ Waste heat recovery ■ Dry kilns with multistage pre-heaters and vertical calcination
	Brick-making technology improvements **(E6)**	■ Vertical shaft brick kilns (replace traditional brick kilns)
	Pulp and paper	■ Efficient debarking ■ Batch digester modification (indirect heating)
	Steel	■ Coke dry quenching ■ WHR-based power generation, etc.
	Refinery	■ Online furnace cleaning, etc.
	Beverage	■ Pasteurizer heat pump system ■ Cascade cooling system ■ CO_2 recovery
	Fertilizer	■ Calcium silicate insulation of high pressure steam pipe line ■ Isothermal CO conversion reactor

Technology sheet


Energy (Industrial, residential and commercial energy efficiency) and Industrial process

INVERTER AIR CONDITIONER

Summary of technology

An inverter is energy saving technology that eliminates wasted operation in air conditioners by efficiently controlling motor speed. Air conditioners maintain set temperature by cooling when room temperature rises above the set temperature and heating when the room temperature falls below the set temperature.
Motor speed in non-inverter type air conditioners remains constant and temperature is adjusted by turning the motor ON and OFF, which consumes more energy.
In inverter type air conditioners, temperature is adjusted by changing motor speed without turning the motor ON and OFF[1].

Inverter Operation Image (cooling mode)

GHG reduction volume (Mt): 1 Mt/year by 2030

Initial cost: Additional 150 USD/unit

Technical characteristics and advantages: 30% reduction in power consumption compared with an AC without inverter

Technical challenges: •Price competitiveness •Consumer's WTP •Incentive (utility price)

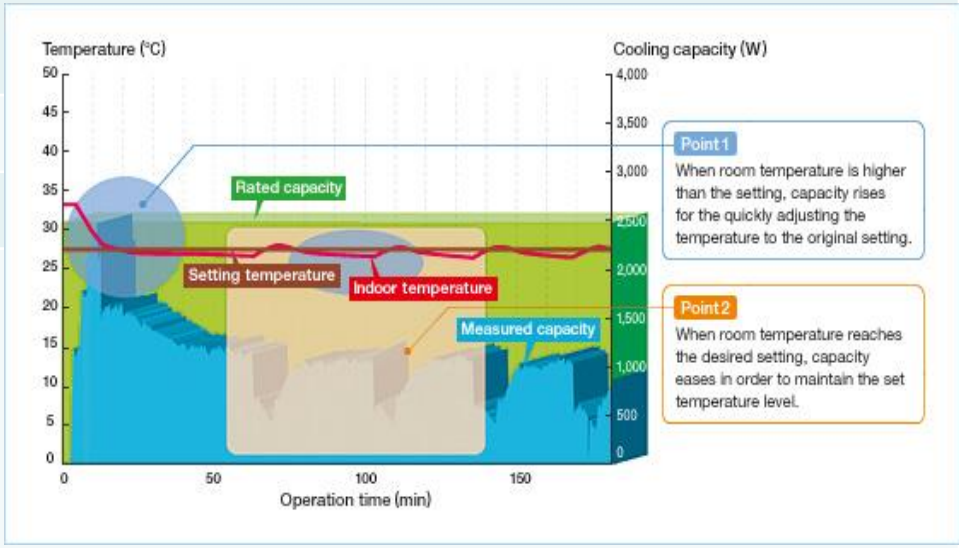
Current overviews in Viet Nam: •Mandatory EE labeling for AC (July 2013) •AC testing and rating method revised (2013) and to be implemented (Jan 2017)

In-depth illustration of the identified technologies

- ✓ **Summary of technology**
- ✓ **GHG Reduction Potential (tCO_2eq)**
- ✓ **Cost (Initial)**
- ✓ **Technical Features & Strengths**
- ✓ **Barriers**
- ✓ **Current overview/conditions in Vietnam (policy, market)**

Air conditioner with Inverter

Summary of technology	• Eliminates wasted operation in air conditioners by efficiently controlling motor speed. • Motor speed in non-inverter type air conditioners remains constant and temperature is adjusted by turning the motor ON and OFF, which consumes more energy. • In inverter type air conditioners, temperature is adjusted by changing motor speed without turning the motor ON and OFF. -30% reduction in power consumption compared with an AC without inverter.
GHG reductions	1 $MtCO_2$/year by 2030
Initial cost	Additional 150 USD/unit
Pros and cons	(Pros) 30% reduction in power consumption compared with an AC without inverter. (Cons) Price competitiveness, Consumer's willingness to Pay, incentive (utility price)



3-3.Transport: Overview of LC technology

Mode Shift

- Passenger mode shift (E8), freight mode shift (E9)

Energy Efficiency

- Road, railway, inland waterway and maritime, aviation

Fuel switching

- Biofuel (E7), gaseous fuel, electricity

* E7, E8, E9 indicate mitigation option number in the INDC report

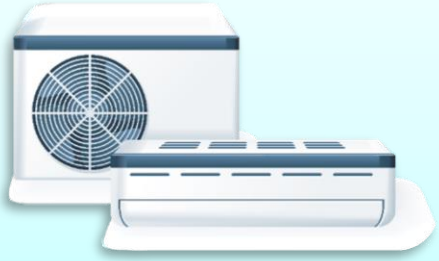
Urban railway (Metro, LRT, monorail, AGT)

Summary of technology	• Metro, LRT, tram, monorail, AGT, etc. • Promote modal shift from passenger cars, etc. • More efficient than private cars, buses, etc., in terms of GHG emissions. • Related technologies: Light weight vehicle, VVVF inverter, regenerative braking system.
GHG reductions	38,267 tCO_2/year (Hanoi Line 1), 41,579 tCO_2/year (Hanoi Line 2), 88,678 tCO_2/year (HCMC Line 1)* * JCM/BOCM FS report: Promotion of Modal Shift from Road-based Transport to Mass Rapid Transit (MRT) System, Mitsubishi Research Institute, 2013.
Initial cost	1,455 million USD(Hanoi Line 1), 1,363 million USD (Hanoi Line 2), 2,182 million USD (HCMC Line 1)*
Pros and cons	(Pros) High capacity, high speed, less travel time, travel time reliability, fewer accidents, less local air pollutants. (Cons) National/local plans, land acquisition, environmental/ social impact assessments, long planning/ construction period, higher investment cost

3-3. F-gas: Overview of LC technology

F-gas destruction

- F-gas destruction at cement kiln



Change refrigerant

- Air conditioner – household sector
- Air conditioner – commercial sector
- Car air conditioner
- Refrigerator – household sector
- Refrigerator – commercial sector

Maintenance

- Leakage inspection and maintenance

Destruction of F-gas at cement kiln

Summary of technology	• A number of destruction methods of F-gas, such as rotary kiln method, waste combustion method, etc. • Holcim Vietnam (cement factory) has pilot project experience of F-gas destruction with cement kiln method. • 3 steps for F-gas destruction: (1) recovery of refrigerant, (2) refilling and transport of F-gas cylinders, and (3) thermal destruction at destruction site.
GHG reductions	Decomposition of over 99.9% of F-gas.
Initial cost	Low (Requires attachment cost of pipes and flowmeters for sending F-gas to cement kiln.)
Pros and cons	(Pros) Utilize existing facilities of cement kiln. (Cons) Secure collection and transport of F-gas to destruction site is essential to implement project.

4. Criteria for evaluation to be identified by stakeholder consultation

Criteria suggested by JICA study team

- Economic performance
- GHG reduction impact
- Easiness of applying /operationalization
- Other environment impacts(positive/negative)
- Vietnamese context

Criteria suggested by LMs and stakeholders

- Energy (EE): (ex) Timeframe
- Energy (PG): (ex) Interests of technology user
- Transport: (ex) Implementation cycle
- Agriculture: (ex) End-user
- LULUCF: (ex) Biodiversity
- Waste: (ex) Cooperation with municipalities
- F-gas: (ex) Tendency of consumption

Sector specific criteria

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Evaluation

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Priority technologies

5. Steps forward to NDC implementation (SPI-NAMA)

LC technology pilot projects and sites selection

- Site examination
- Information collection

Technical workshop on low carbon technologies

- Exchange information and valid opinion among the stakeholders

Project outcomes and outreach activity

- A project visibility
- Brochures introducing the project
- Outreach at relevant international conferences

Final Workshop

- Enabling an implementation of the NDC
- Further development of the NDC
- Continuous dialogue mechanism between key stakeholders

Thank you for your attention

Contents of event

Objectives

- Inform national GHG emission reduction target of Vietnam and Government's effort and in preparation for NDC implementation;
- Identify how technology options, devices, facilities could contribute to GHG emission reduction target of Vietnam
- Identifying possible avenues for Private Sector's engagement in Vietnam's NDC implementation;

Participants

- Government officials (MONRE, DONRE), Policy makers, Academic, Private sectors

Co-organizers

- MONRE/DMHCC, VCCI/VBCSD, JICA

Outline of this event

Opening Remarks	MONRE/DMHCC VCCI/VBCSD, JICA
Photo Session	
PRESENTATION 1: Introducing Vietnam's Emission Reduction Target (NDC) and Preliminary Findings and Recommendations of the Low Carbon Technology Assessment	MONRE/DMHCC JICA SPI-NAMA
PRESENTATION 2: Introducing Municipality Effort for Climate Actions – Ho Chi Minh City's Climate Change Action Plan 2017-2020 and opportunities	Climate Change Bureau, Ho Chi Minh City
PRESENTATION 3: Recommendation for evidence-based Research to Sophisticate and facilitate low emission sustainable development (Comparative assessment of mitigation planning at municipality of Vietnam)	ISPONRE
PRESENTATION 4: Case studies and lessons from LC technology deployment and GHG emission reduction efforts by private sector	Daikin Vietnam
Q & A	
Coffee Break and Networking	
Roundtable Dialogue: **Short presentations by Panelist:** Case Studies and Lessons from LC Technology Deployment and GHG Emission Reduction Efforts Financing options for CC mitigation in Vietnam (5 min each) Key Guiding Questions (Key Discussion Points)	Co-Facilitators: IMHEN, ISPONRE and JICA SPI-NAMA

Key Guiding Questions
(Key Discussion Points)

- What is benefit/incentive for private sector to participate in climate national/regional measures?
- What are the available finance sources for CC implementation?
- What is major barrier to access to appropriate financial scheme?
- How can we mobilize appropriate cooperation among ministries, development partner, private sector and NGO?