

Milestone 4 Progress Report National Green Cooling Program

March 2024

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Technical Assistant overview (1)

“National Green Cooling Program: In-depth study and survey to develop the National Green Cooling Program” (NGCP)

The Technical Assistance (TA) NGCP is a key activity within the framework of cooperation in energy transition and greenhouse gas (GHG) reduction in Viet Nam with the South East Asia Energy Transition Partnership (ETP) that has been indicated in the Memorandum of Understanding between the Department of Climate Change (DCC), Ministry of Natural Resources and Environment of Viet Nam (MONRE) and the United Nations Office for Project Services (UNOPS) on 21 June 2022.

- Consulting Consortium: **VNEEC, Perspectives Climate Group and EPRO**
- Implementation time: 16/02/2023 to 31/03/2024
- **Objective:**
 - Conduct an in-depth study and survey to assess the current state including the technology available, market status, and international/national policies of the cooling sector in Viet Nam;
 - Based on the current state of the cooling sector, propose input to develop the NGCP to promote conversion to high energy efficiency (EE) and low carbon technologies and increase energy savings in the cooling sector.

Technical Assistant overview (2)



Milestone 1

Task 1:

Inception report and project work plan

Milestone 2

Task 2:

Organize an Initial Stakeholder Workshop

Task 3:

Assessment and projections of growth in cooling sectors /sub-sectors

Task 4:

Conduct the assessment and projections of growth in cooling sectors/sub-sectors

Milestone 3

Task 5:

Conduct sector/subsector review (refrigerants, technologies, regulatory, policy) and gap analysis

Task 6:

Develop the NGCP and its roadmap

Task 7:

Conduct a review and analysis of financing, implementation approaches & business models

Task 8:

Consultation workshops on the draft NGCP and its roadmap

Milestone 4

Task 9:

Final report and final workshop

Database development

Phase 1 Data collection

Phase 2 Data processing

Phase 3 Modelling and results

Desk review

Data compilation

Stakeholder consultations

Data processing

Modelling

Draft results

Final results

- Research papers
- Reports by organisations

- Surveys: Retail stores websites, Questionnaires
- Inherited data from previous projects
- Published data: WB, UN, IEA, Viet Nam Register, GSO, VAMA, EVN, etc.
- Paid data: Euromonitor, GFK report, etc.
- Data from third parties: National data and reports related to the cooling sector from Viet Nam Industry and Trade Information Centre (MOIT)

- Line Ministries
- Associations,
- Enterprises,
- Universities,
- Cooling experts
- etc.

- Use PAMS methodology, IPCC methodology regression, analysis, excel, modelling
- Develop BAU and other scenarios

- Receive feedback from stakeholder workshop & bilateral meetings

- Integrate feedbacks and publish the final results

=> This is the most updated database (2018-2022) on the current status of equipment and refrigerants in the cooling sector (including 7 sub-sectors) in Viet Nam 5

Key results summary – BAU scenario (1)

Emissions Trends

- Total cooling sector emissions in 2022: **64.68 MtCO₂e**
- Direct emissions contribute **15.7%**, while indirect emissions contribute **84.3%** in 2022
- Doubling of emissions expected by 2050, **peaking in 2045**
- Residential and Commercial AC sub-sector is the major contributor

Emission Composition

- 84.3% of 2022 emissions were indirect due to higher emission factors
- Emissions to double by 2050, with direct emissions reaching 93.24 MtCO₂e and indirect 19.06 MtCO₂e

Energy Consumption

- 2022, cooling sector consumed 65.95 TWh of electricity
- Expected threefold increase in energy consumption by 2050 due to rising demand
- Contributed 25.2% EVN's total electricity generation in 2022

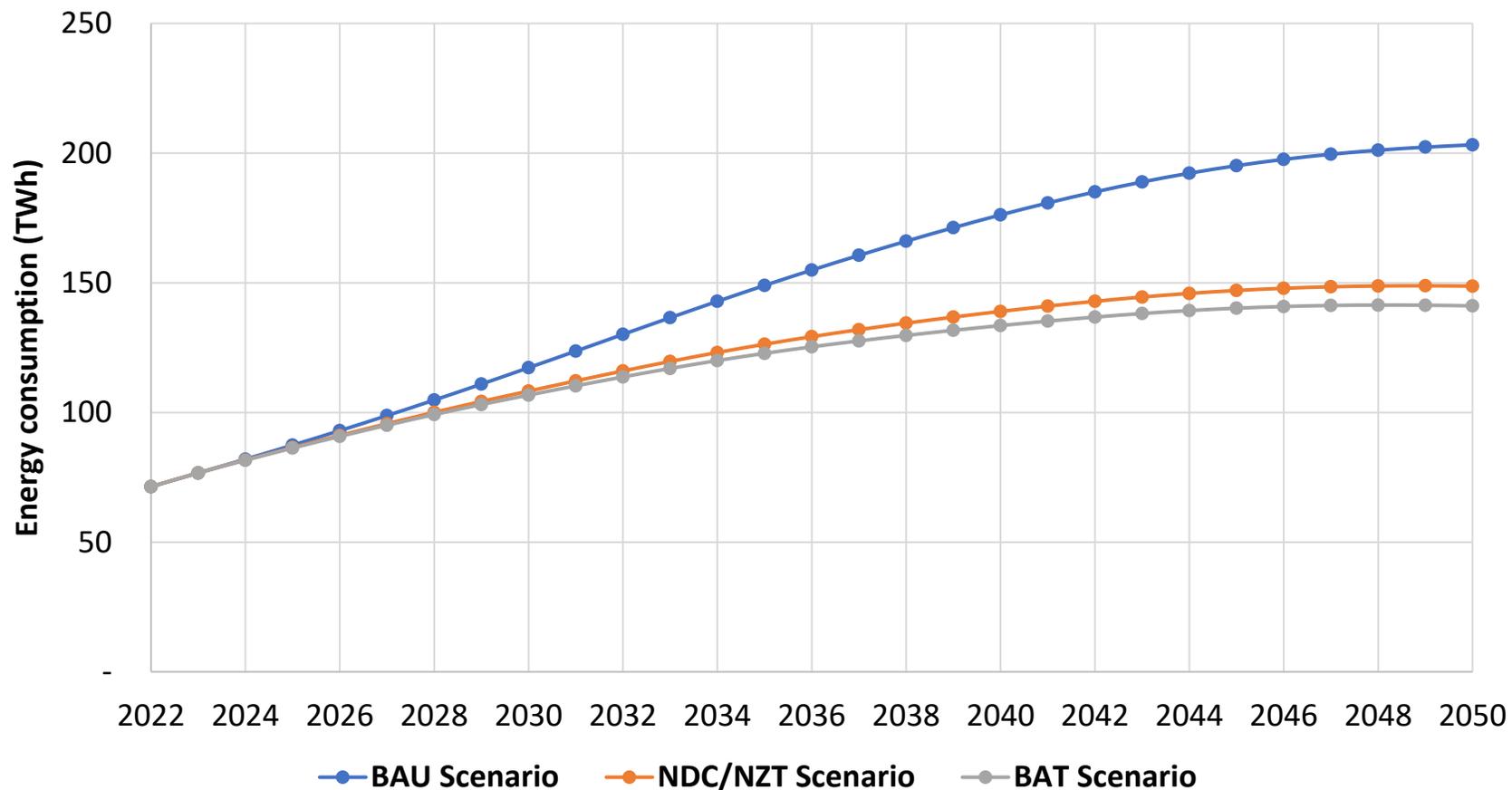
Refrigerant Trends

- HFCs dominate the sector, especially in Air Conditioning sector.
- HCFCs like R-22 and R-123 in Industrial Refrigeration and servicing are to phase out by 2040.
- Natural alternatives (R-600a, R-290) are dominant in Domestic and Commercial Refrigeration.
- R-717 (NH₃) utilised in large Industrial Refrigeration systems
- HFO of R-1234yf slowly penetrating the MAC sub-sector

Key results summary – Growth scenario (1)

Energy Saving of the cooling sector (compared to BAU scenario):

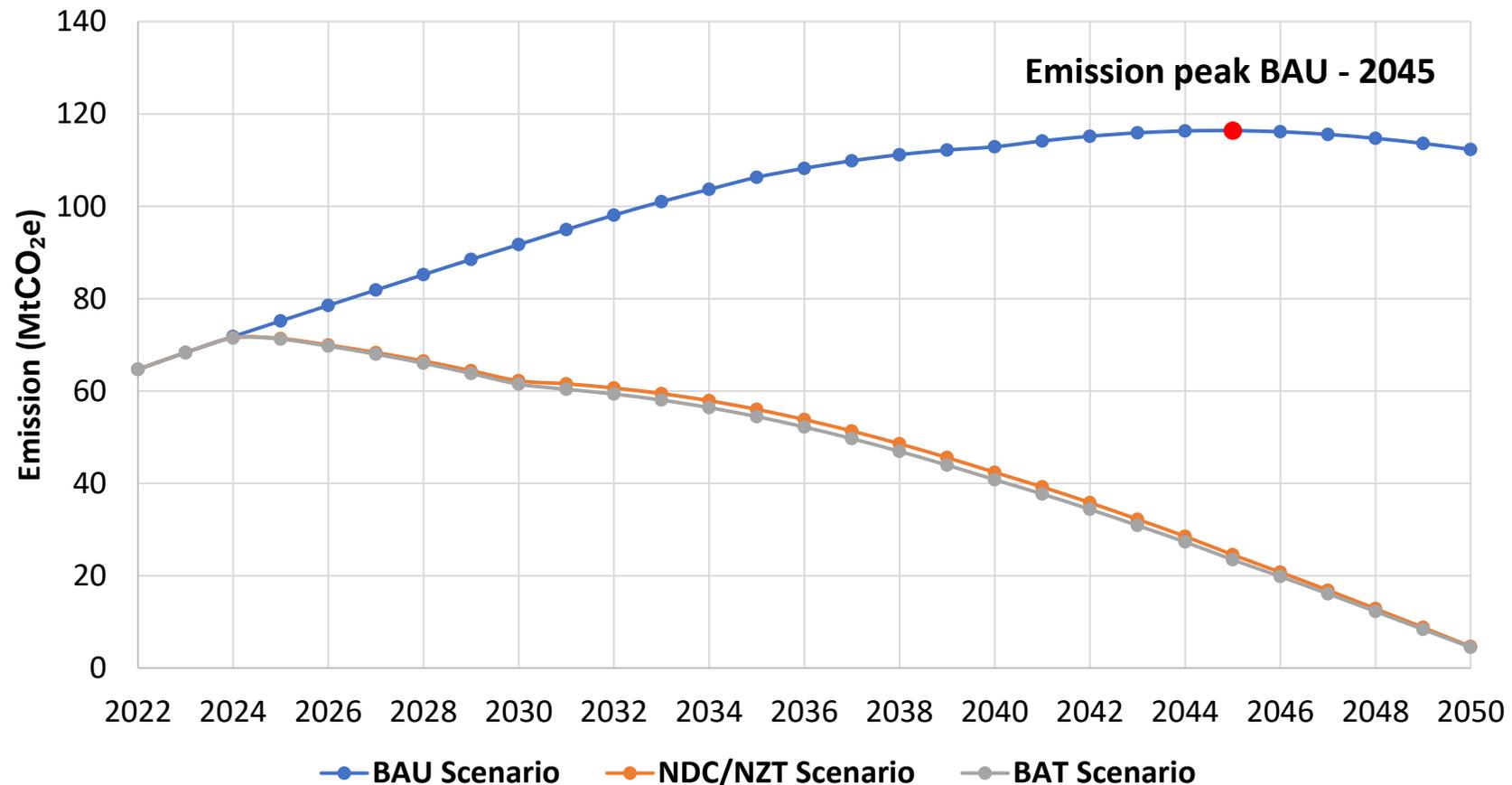
- **BAT scenario** total energy saving is **10.57 TWh** in **2030** and **62.09 TWh** in **2050**.
- **NDC/NZT scenario** total energy saving is **9.03 TWh** in **2030** and **54.48 TWh** in **2050**.
- Residential and Commercial AC is the most potential sub-sector.



Key results summary – Growth scenario (2)

Total emission of the cooling sector (compared to BAU scenario):

- NDC/NZT scenario: reduce to about **4.71 million tons CO₂e in 2050** and a 92% reduction compared to BAU 2022 (64.68 million tons CO₂e);
- BAT scenario: reduce to about **4.50 million tons of CO₂e by 2050** and a 93% reduction compared to BAU.





NGCP roadmap (1)

- Based on the results and key findings of the establishment and analysis of different growth scenarios, the NGCP was developed to set the framework for Viet Nam's cooling related mitigation measures.
- With the identification of the barriers and the actions needed, the NGCP action plan was built with the aim to establish a step-by-step process including specific milestones and activities to reach the ultimate mitigation goals for the sector and to contribute to the NZT by 2050.
- A comprehensive NGCP roadmap was developed to set clear targets and corresponding actions for Viet Nam to reach its commitments by 2050.

NGCP roadmap (2)

Viet Nam has committed to significantly reduce the overall GHG emissions of the air conditioning and refrigeration sector by ratifying the Kigali Amendment to the Montreal Protocol and signing the Global Cooling Pledge at COP28.

These commitments are translated into specific energy efficiency and refrigerant-related targets as follows:

Increase the **average efficiency of new AC equipment** by 50% by 2030, and 80% by 2050, with reference to 2022



Increase the **efficiency rating of new cooling equipment** (except AC equipment) sold by 7% - 30% by 2030, and 10% - 35% by 2050, with reference to 2022



Phase down HFC consumption according to the Kigali Amendment schedule compared to baseline (HCFC average consumption in 2009 - 2010 and HFC average consumption in 2020, 2021 and 2022)



Achieve **20% recovery of refrigerants** at the end of life of cooling appliances by 2030 and 100% by 2050

NGCP Roadmap - Component 1

Reviewing current, developing new policies and enforcing them to ensure penetration and use of climate-friendly cooling equipment in line with NDC, JETP and NZT.

Update MEPS	Revision, supplementation, and enforcement of other policies
<ul style="list-style-type: none"> • By 2050, ratchet up the MEPS for single-split AC by at least 80% from the current level • By 2050, ratchet up the MEPS for domestic refrigeration by at least 30% from the current level • Ratchet up the Star Rating Labelling Program for domestic refrigeration in line with the updates of the MEPS • Expand the MEPS to other cooling equipment such as VRV/VRF, chiller, industrial refrigeration compressors, and others 	<ul style="list-style-type: none"> • Revise and enforce regulation on HFCs/equipment using HFCs in line with the Kigali Amendment • Technical standards on recovery of refrigerants -> achieve 100% recovery of refrigerants at the end of life of cooling appliances by 2050 • By 2025, revise, amend, supplement and enforce criteria for climate friendly cooling equipment products in public procurement • Regulations for monitoring and verification of the refrigerant usage and deployment in the cooling equipment, starting with a comprehensive inventory of HCFCs and HFCs in the air conditioning and refrigeration sector • By 2025, develop a manual and guidelines on the inspection, supervision, and evaluation of the implementation of legal regulations on MEPS, energy efficiency labelling and HCFC as well as HFC phase-down.

NGCP Roadmap - Component 2

Harnessing technical and financial resources from multiple channels, including direct state budget, international support or private resources to promote efficient and low-GHG cooling equipment production and mainstream successful business models and financing schemes for their upscaling.

Undertake **regular needs assessments** of local cooling equipment manufacturers/ cooling servicing providers to enable compliance with the new MEPS and energy efficiency labelling systems;

Mobilize domestic and international technical and financial resources to comply with the new MEPS and energy efficiency labelling systems and more generally to enable the production and use of climate-friendly cooling equipment and appliances;

Enhance capacity of research and development institutes, training institutions, and subject matter experts, trainers on best practices regarding implementation of energy saving cooling equipment, financing and business models, and ESCO models, among others;

By 2025, **revise, amend and supplement legal regulations** in order to scale up of energy service companies (ESCOs).

NGCP Roadmap - Component 3

Capacity building on the handling, usage, operation and maintenance of high efficiency and low GHG refrigerant cooling equipment and design of projects upscaling use of such equipment as well as life cycle management of controlled substances.

Training cooling technicians

- Conduct training of technicians to cover 100% of servicing technicians by 2030
- By 2025, integrate climate-friendly cooling equipment and refrigerants in vocational training of cooling sector professionals

Capacity enhancement for government agencies

- Regular updating and compiling of training materials, technical documents, and instructional materials

Creating networks

- Consolidate and strengthen the network of technical experts and service organisations
- Establish a task force to coordinate partnerships between government, industry associations, and private sector entities to invest in training initiatives

General education

- Incorporate energy efficiency/conservation/replacement of HCFCs and HFCs in the education curriculum
- For energy users, social, and political organizations, develop plans/seminars for training on efficient use of cooling equipment
- For financial institutions: Organise training programs for financial institutions to improve the capacity of appraising projects granting loans in the field of production and use of climate-friendly cooling equipment

NGCP Roadmap - Component 4

Awareness raising regarding climate-friendly cooling equipment

Integrate climate-friendly cooling equipment and appliances in the awareness raising campaigns and mass communication plans to raise the awareness and responsibility of community, businesses, and society for energy saving under VNEEP and other energy efficiency programs;

Integrate contents on climate-friendly cooling equipment in communication programs under VNEEP and other energy efficiency programs on energy-saving products;

Highlight **financial savings and short pay back periods** of energy efficient cooling equipment.

***Example:** educational programs; providing information for businesses and communities; holding contests and prizes regularly; running movements/campaigns to promote energy saving and environmental protection; arranging fairs and exhibitions promoting energy-saving products and technologies*

Proposed GHG emission reduction pilot model for the cooling sector in Vietnam (1/3)

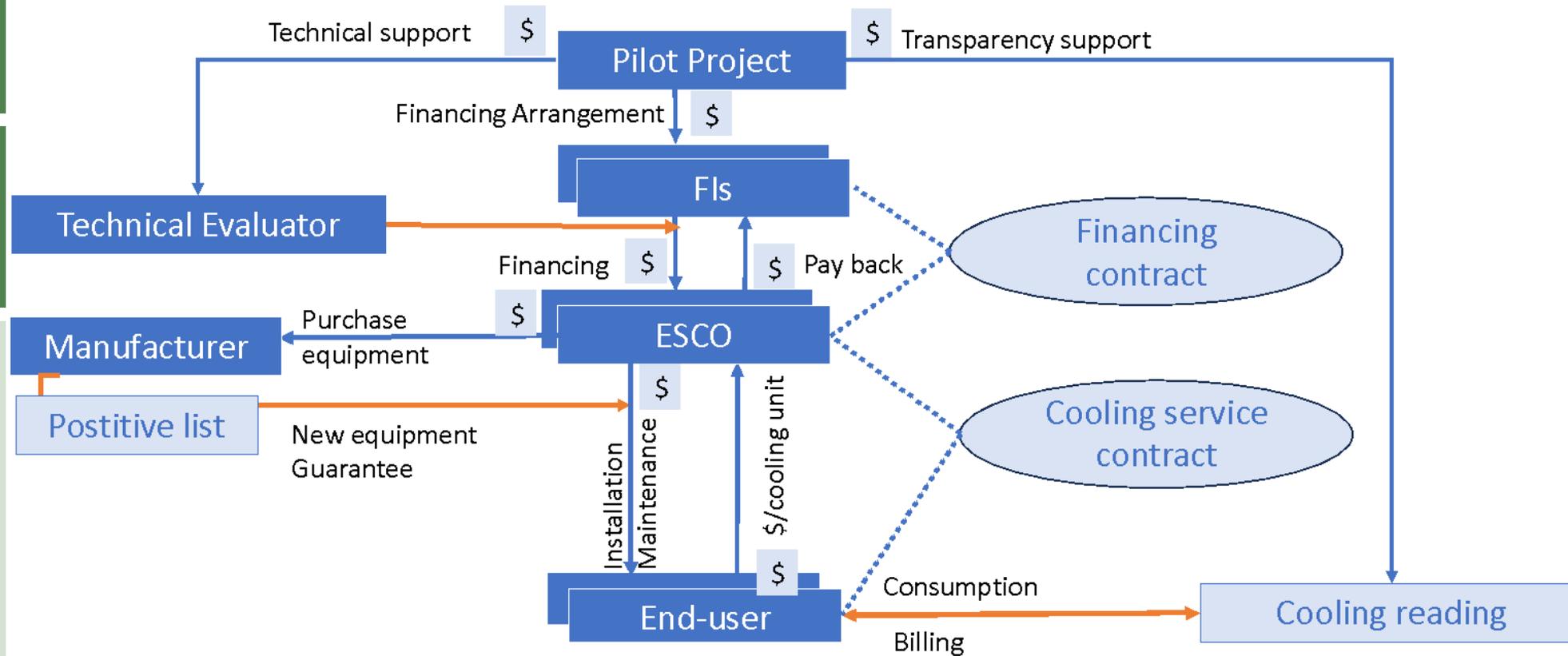
Cooling as a Service

- Refinance production
- Reduce initial investment costs for users

Pilot funding for:

Installation, use and maintenance

- Energy service Companies (ESCO)
- Commercial ACs



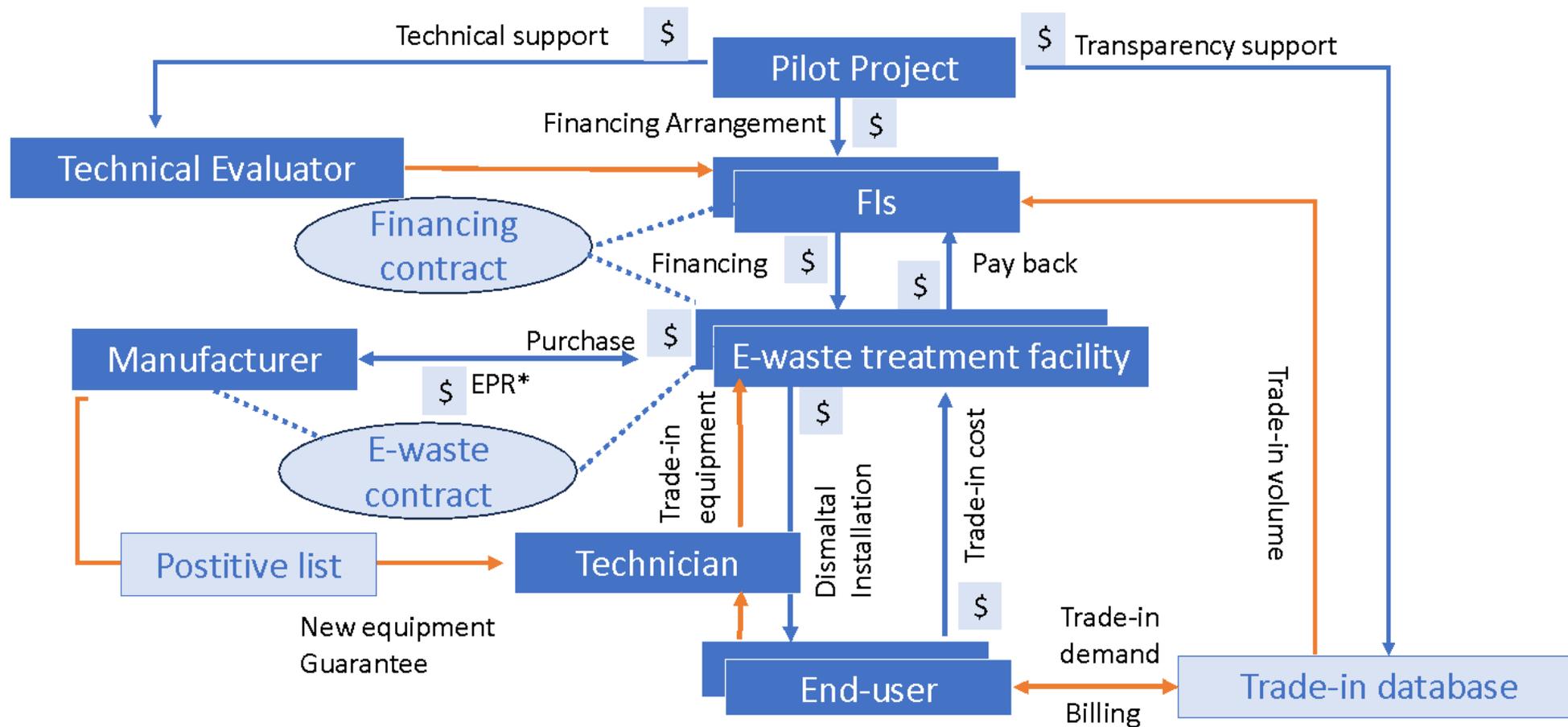
Proposed GHG emission reduction pilot model for the cooling sector in Vietnam (2/3)

Trade in

- Refinance production
- Reduce initial investment costs for users

Pilot funding for: End of product life cycle when disposed

- E-waste treatment facilities
- Residential ACs



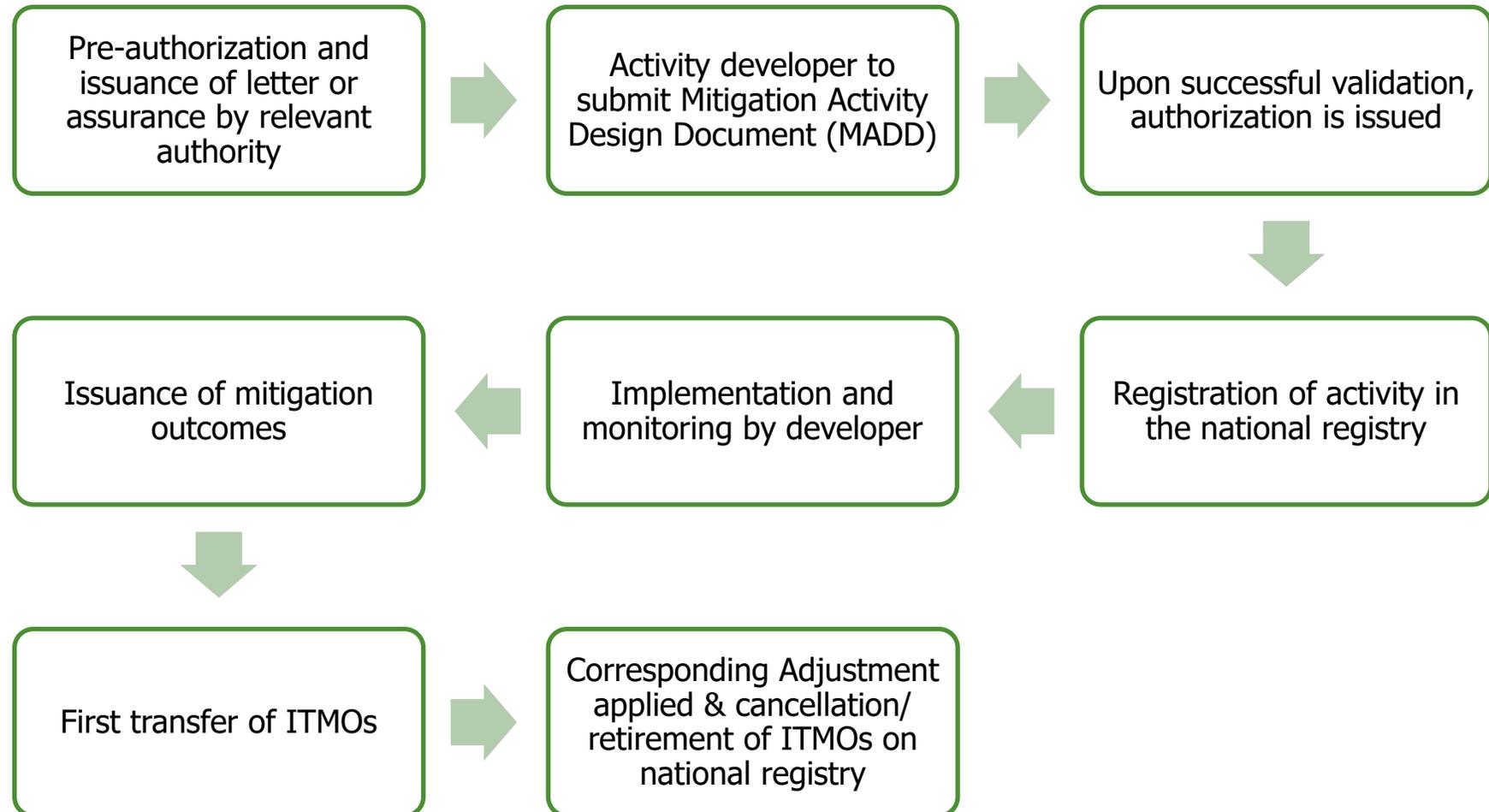
Proposed GHG emission reduction pilot model for the cooling sector in Vietnam (3/3)

ITMOs

- Generate capital sources to implement domestic projects
- Secure national commitment

Pilot generate and transfers mitigation results:

- Government-level agreement on cooperation according to Article 6.2
- Project development



Contribution to the Prime Minister's Draft Decisions

Within the framework of Technical Assistance for the **National Green Cooling Program (NGCP)**, the Consulting consortium had the opportunity to **contribute to two Prime Minister's Draft Decisions.**

Draft Decision of the Prime Minister on promulgation of the National Plan on the management and elimination of ozone depleting substances and controlled greenhouse gases

Draft Decision of the Prime Minister on promulgation of regulations on environmental criteria and confirmation for projects granted green credit and issuance of green bonds

Recommendations for further Technical Assistance activities

In order to maintain the spirit and further develop the outcomes of this TA, it is recommended that the following activities can be considered to implement in the next steps:

- Implementation of the Prime Minister's Decision on the Management Plan for phasing out Ozone Depleting Substances and controlled GHGs: The finalization of the draft Decision is currently underway by the DCC, MONRE to be submitted for approval and promulgation by the Prime Minister. Following this, DCC will be responsible for developing guidelines to implement the Decision. Continuous technical support will be essential to aid DCC in the formulation of the guidelines, facilitating events and training sessions for relevant stakeholders. This ongoing support is crucial for ensuring the successful short and long-term implementation of the Decision.
- Mobilization of technical assistance/support to implement the Viet Nam's commitments under the Global Cooling Pledge.
- Support for implementation of the pilots of investment projects in the green cooling.



National Green Cooling Program



Thank you!

