Sustainable Energy Sector Development in the GMS

Update and Additional Scope of RETA 9003

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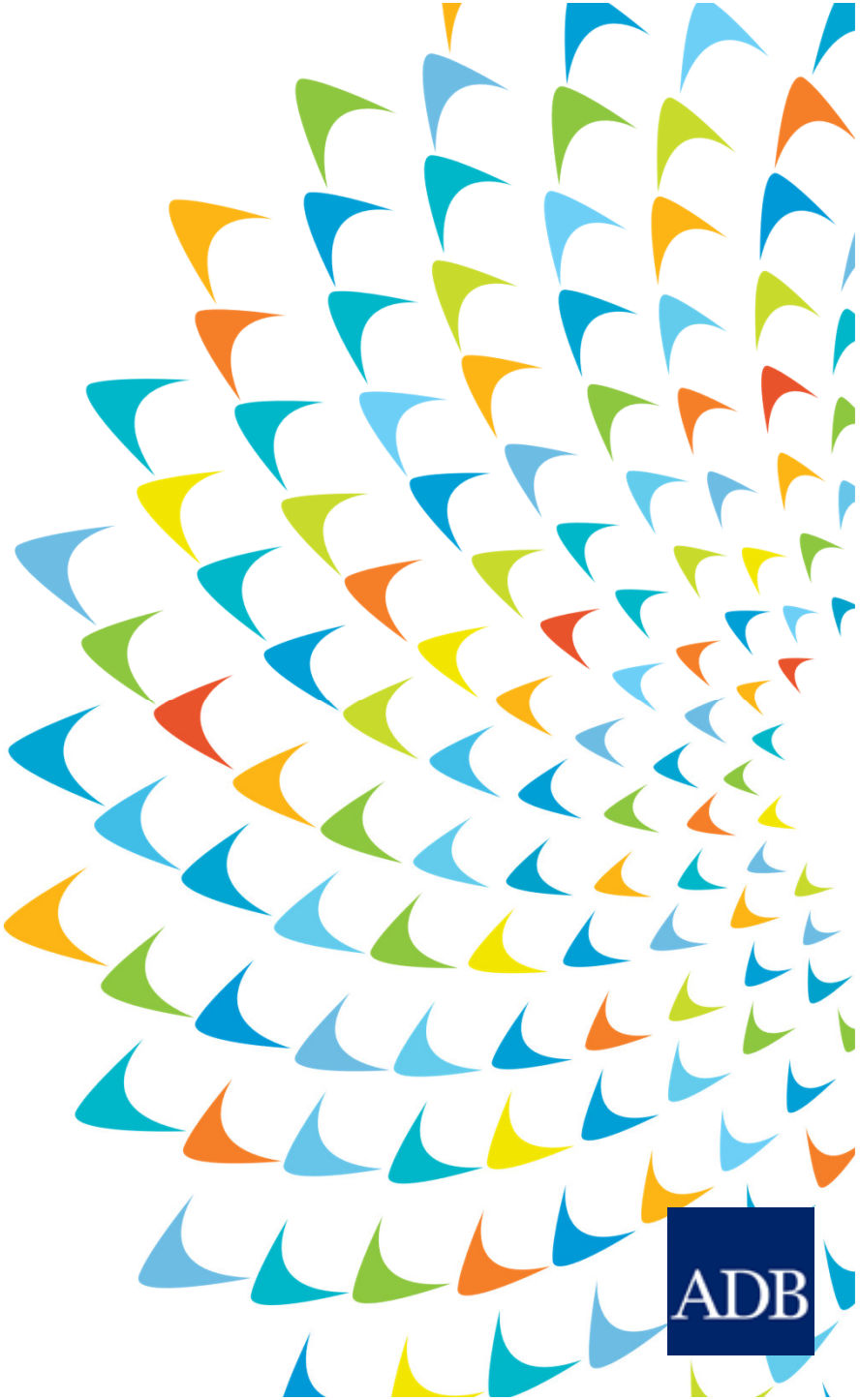
Hyunjung Lee, hjlee@adb.org
Senior Energy Economist
Asian Development Bank



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1. Background and Rationale

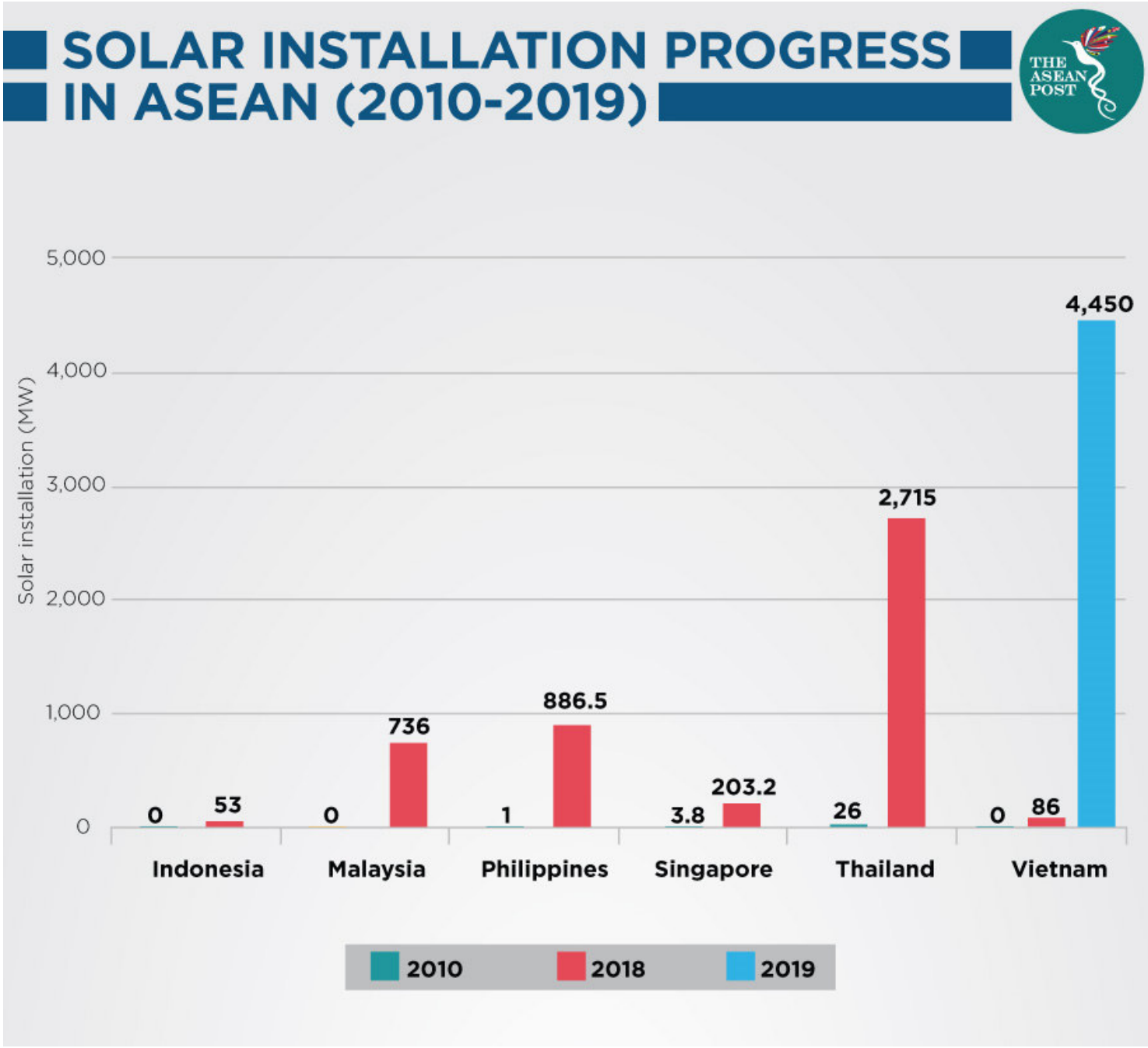
TA 9003 Overview

- **Background**
  - GMS economic growth has been strong; demand for electricity growing even faster; current PDPs expected installed capacity of 210 GW by 2025 are contributed by **large hydro and coal-fired generation**, presenting **high environmental and social pressures and climate risks in the GMS**
  - TA aims to support a more economically, environmentally, and socially sustainable power sector developed for greater mitigation of climate change impact in GMS through **improved power sector planning using IRP and SEA**
  - As a result of more strategic and integrated planning, GMS countries **envisage more RE and EE investments** due to improved policies and regulatory environment and rapid cost reduction of innovative technologies
  - **Additional scope** is designed to support GMS countries to **materialize RE and EE investments** in the ground with policy and regulatory measures and viable business models
- **TA budget**
  - **$2.5 million** (AfD: $1.65 million; ADB: $0.85 million)
- **TA implementation period**
  - **Mar 2016 – Dec 2021**

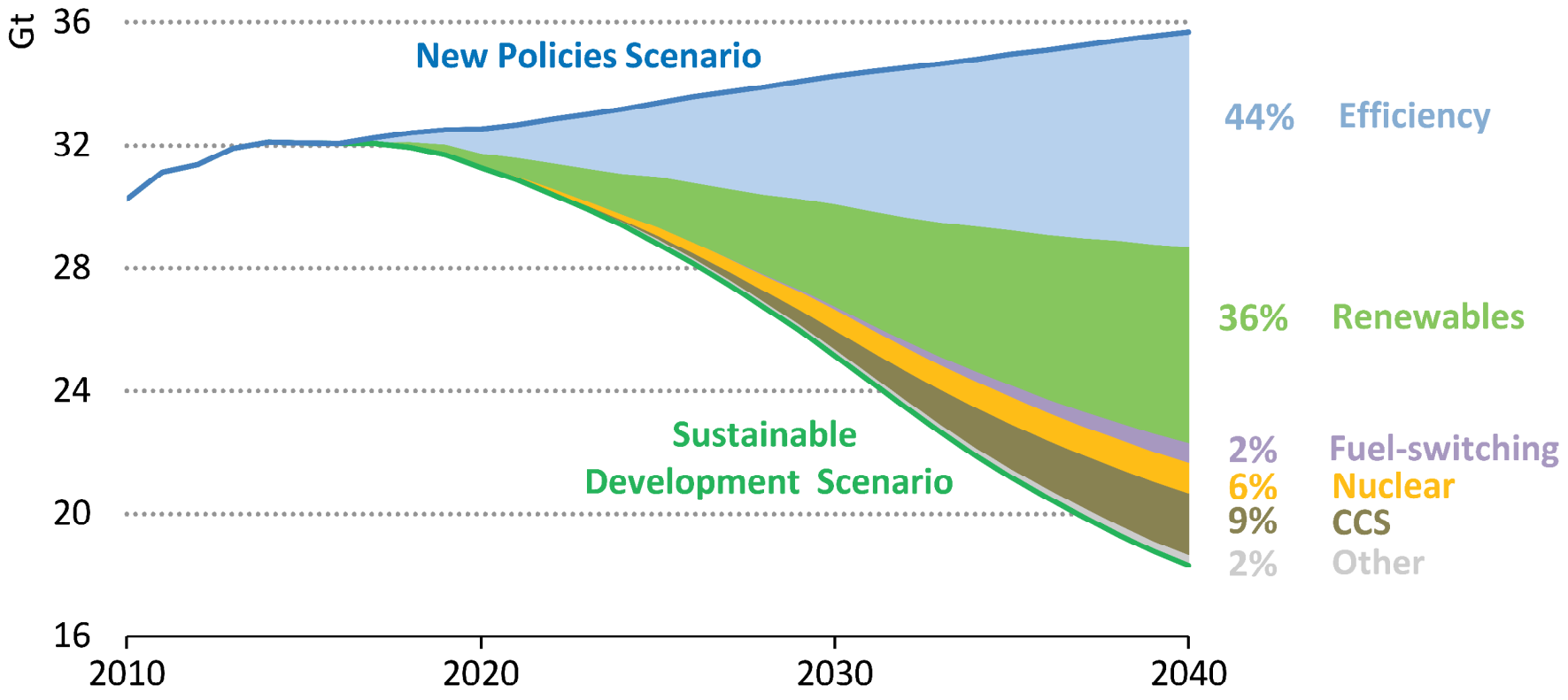
ADB TA 9003 (2016-2021)

1. Integrated Resource Planning and Strategic Environmental Assessment	• Review of integration of SEAs in PDP (completed) • Report on feasibility of including externalities in Vietnam's IRP modelling (completed) • Strengthening the Policy Framework for Power Sector Planning in Vietnam for PDP VIII (completed)
2. Capacity Building in GMS countries	• Gap analysis and training needs assessment (completed) • Regional and country workshops (5 workshops completed) • 2 twinning programs on RE integration (PRC) and SEA (Viet Nam) (completed) • Regional Workshop on EE with Thailand (completed)
3. Knowledge Products (KPs)	• KP1 - **Vietnam's SEA in PDP** (completed) • KP2 – **Integrated and Strategic Power Sector Planning Guideline** (draft completed; to be published in Nov 2020) • **Country Guidelines and Briefing Notes for IRP and SEA** (completed)
4. (New) RE and EE pipeline and business models development*	• **Cambodia, Myanmar, Laos – EE market assessment** • **Viet Nam and Thailand – utilities EE service and financing models** • **Myanmar wind power roadmap study** • A regional investors' workshop and other country workshops as needed to be organized

* Extended scope with additional $1,400,000 – approved in Dec 2018 and Dec 2019


SOLAR INSTALLATION PROGRESS IN ASEAN (2010-2019)
THE ASEAN POST
Solar installation (MW)
5,000
4,000
3,000
2,000
1,000
0
0
53
0
736
1
886.5
3.8
203.2
26
2,715
0
86
4,450
Indonesia
Malaysia
Philippines
Singapore
Thailand
Vietnam
2010
2018
2019

44% carbon emission reduction from energy efficiency



Source: IEA. Energy Efficiency 2018: Analysis and Outlooks to 2040

Regional Comparison of EE policy measures

Regional experience shows that a strong policy framework is a precursor to catalyze implementation; Countries such as Thailand, which have created conducive policies have reaped rich dividends by acting early

Sl. No.	Country	Laws and regulation	Designated factories & Buildings	Energy manager	Appliance S&L	Building EE Code	Financial support
1	**Cambodia**	**In-process**			**In-process**		**In-process**
2	**Lao PDR**				In-process		
3	**Myanmar**	**In-process**	**In-process**	**In-process**	**In-process**	**In-process**	**In-process**
4	Brunei Darussalam						
5	Indonesia						
6	Malaysia						
7	Philippines						
8	Singapore						
9	Thailand						
10	Viet Nam						

Legend	Present	Absent/ In process

Source: PwC analysis, ERIA

ADB Assistance under TA 9003

- Cambodia, Laos, and Myanmar: Demand Side Energy Efficiency Market Assessment with policy interventions & their financial viability
- Thailand and Viet Nam: Utility Energy Efficiency and Demand Response Business Model Development

2. Demand Side Energy Efficiency Market Assessment for Cambodia, Laos, and Myanmar

Nodal Ministries involved

Lao PDR

- Ministry of Energy & Mines (MEM)

Cambodia

- Ministry of Mines & Energy (MME)

ADB

- Ministry of Planning, Finance & Industry (MoPFI)

Myanmar

PwC India Consulting Firm

Over 20 years of exp in Standards & labelling of electronic products in industrial, domestic & commercial sector, EE policy development, market assessment, Stakeholder engagement & capacity building

Rajeev Ralhan

Project Director & EE Technology Expert

Manoj Bansal

Team Leader & Energy Specialist

Over 20 years of exp in EE policy development, DSEE market assessment, Strategy, Financial & business analysis for EE, Energy audits, management & capacity building

Pradeep Singhvi

EE Financing Expert

Over 11 years of exp in DSEE project development & implementation, Economic & financial assessment of large scale EE projects, Financial assessment of industrial, commercial & domestic market EE interventions

Sophanna Nun

EE Analyst (Cambodia)

Over 9 years of exp in DSSEE project development & implementation, DSEE policies & strategies, Understanding of Energy sector in Cambodia

Sengratry Kythavone

EE Analyst (Lao PDR)

Over 20 years of exp in D SSEE project development & implementation, DSEE policies & strategies, Understanding of Energy sector in Lao PDR

Thoung Win

EE Analyst (Myanmar)

Over 12 years of exp in DSSEE project development & implementation, DSEE policies & strategies, Understanding of Energy sector in Myanmar

Timelines

Current Phase of DSEE Market Assessment in Cambodia

Assessment Phase

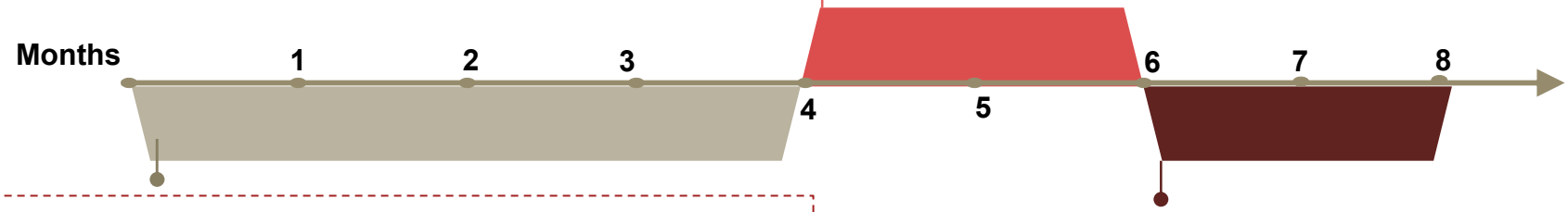
Review of Case Studies to Prepare Project Proposals

'As-Is' assessment and 'To-be' recommendations on Training programmes

Assess Business Case of Identified Projects

Development of Proposals for Key Stakeholders

Sharing assignment draft outputs with MEM and other key stakeholders



Inception Phase

Secondary Research and Review of Existing Information-

Consultation over video calls with government & private sector

Post consultation review.

Sector Wise Data Collection

DSEE Market Assessment (Preliminary)

Sharing preliminary assignment outputs and gathering feedback on same

Reporting & Conclusion Phase

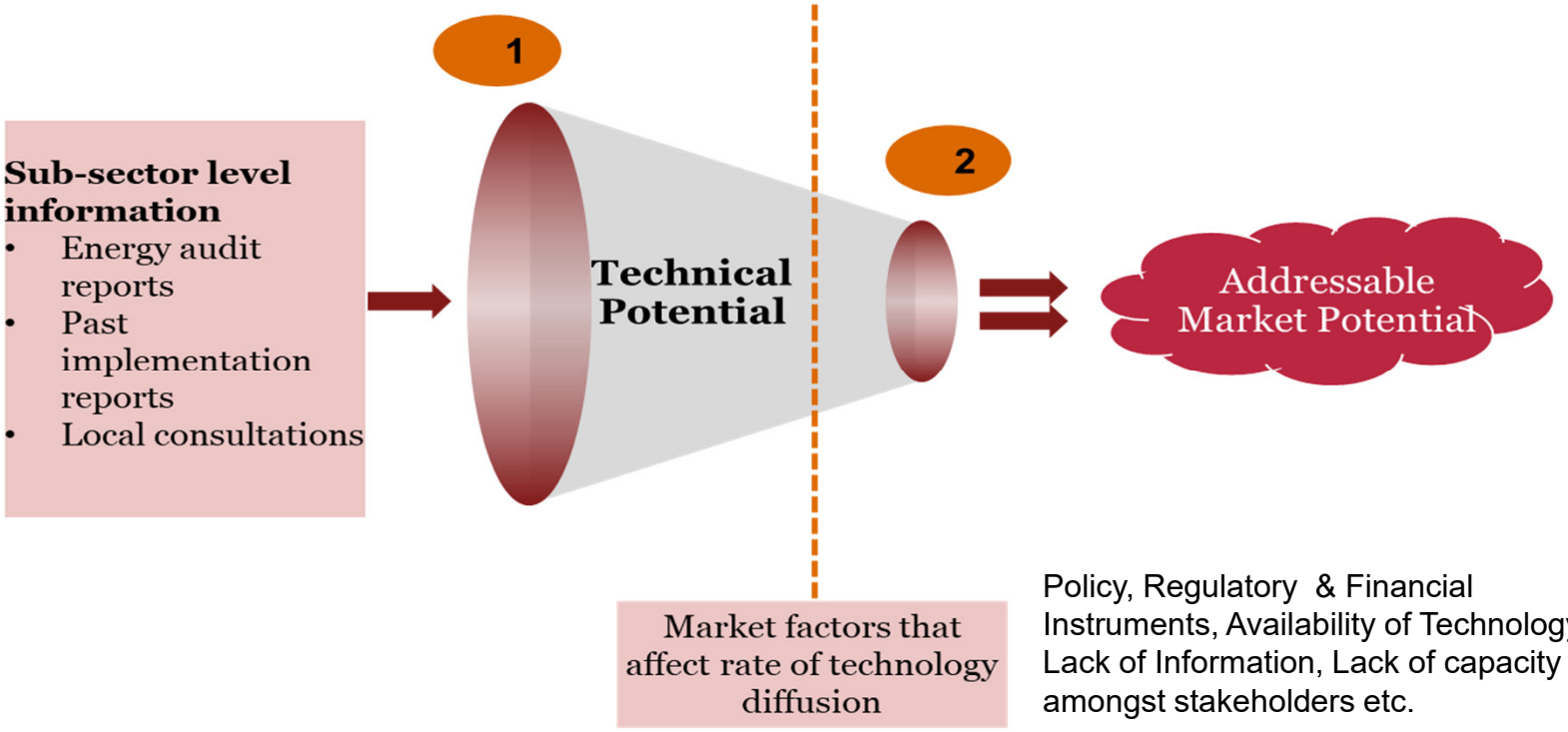
Feedback from key stakeholders

Finalizing the assignment outputs

Current Phase of DSEE Market Assessment in Lao PDR & Myanmar

Methodology for Market sizing

A combination of secondary research and consultations will be used to estimate the technical potential, on which the effect of market factors will be evaluated to calculate the Addressable Market Potential



Policy, Regulatory & Financial Instruments, Availability of Technology, Lack of Information, Lack of capacity amongst stakeholders etc.

Cambodia: Progress Till Date & Next Actions

Progress

Inception mission was organised with MME **on 28 Jan-7 Feb 2020 in Phnom Penh**

Inputs on market assessment in Cambodia received from 16 government agencies

Presentation on findings of Inception phase and agreement on additional scope with Nodal Agency

Inception report finalized and approved subsequent to written feedback from ~ 7 stakeholders

Plan for Surveys finalized and relevant approvals taken (streetlighting, household, commercial buildings)

TOC of National Energy Efficiency Policy Finalized and work commenced (Part 1 completed)

Further Analysis for Draft Final Report

- Finalization of DSEE interventions / Project Opportunities
- Investment potential for DSEE interventions (to be informed by surveyed data)
- Development of Business Models and financing structure
- Finalization of National EE Policy
- Finalization of S&L for Air Conditioners and Refrigerators

Next Actions

- Surveys and consultations for DSEE MA to be conducted from 20th October to 20th January 2021.
- S&L development & consultations to be completed by January 2021
- Joint consultations for EE policy finalization with intergovernmental committee on EE Policy

Lao PDR: Progress Till Date & Next Actions

Progress

- Inception report was developed with preliminary assessment using available information from public domain and National EE Analyst
- Inception report covered current energy supply & demand situation, stakeholder mapping, policy review, past & possible DSEE interventions
- Inception meeting was organised with MEM **on 22nd Sept 2020 via online platform**
- Finalized Project Execution Mechanism with Nodal Ministries; IREP as focal point of contact
- Drafting and sending meeting invitation as well as questionnaires to partner ministries for data collection

Further Analysis for Finalization of Inception Report

- Finalization of scope for the assignment
- Nodal ministry to provide comments on the inception report
- Nodal Ministry to provide latest available data/ information to update and strengthen the inception report
- Finalization of DSEE interventions / Project Opportunities

Next Actions

- Connect with partner ministries and relevant departments to identify priority DSEE areas
- Connect with private sectors for data collection for market assessment
- Gauge Data Availability for market assessment – (Survey Requirement)
- Investment potential for DSEE interventions (Depending on data availability)

Myanmar: Progress Till Date & Next Actions

Progress

- Inception report was developed with preliminary assessment using available information from public domain and National EE Analyst
- Inception report covered current energy supply & demand situation, stakeholder mapping, policy review, past & possible DSEE interventions
- Inception meeting was organised with MOPFI on **8th Sept 2020 via online platform**
- Finalized Project Execution Mechanism with Nodal Ministries; EECD appointed as focal point of contact
- Drafting and sending meeting invitation as well as questionnaires to partner ministries for data collection

Further Analysis for Finalization of Inception Report

- Finalization of scope for the assignment
- Nodal ministry to provide comments on the inception report
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- Finalization of DSEE interventions / Project Opportunities

Next Actions

- Connect with partner ministries and relevant departments to identify priority DSEE areas
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Envisaged Results

Outputs (On completion)

- Identified DSEE Technologies
- Assessed Investment potential
- Developed project pipeline
- Prepared roadmap for implementation and Capacity building
- Identified opportunities for cross-country collaboration

Outcomes (Medium term)

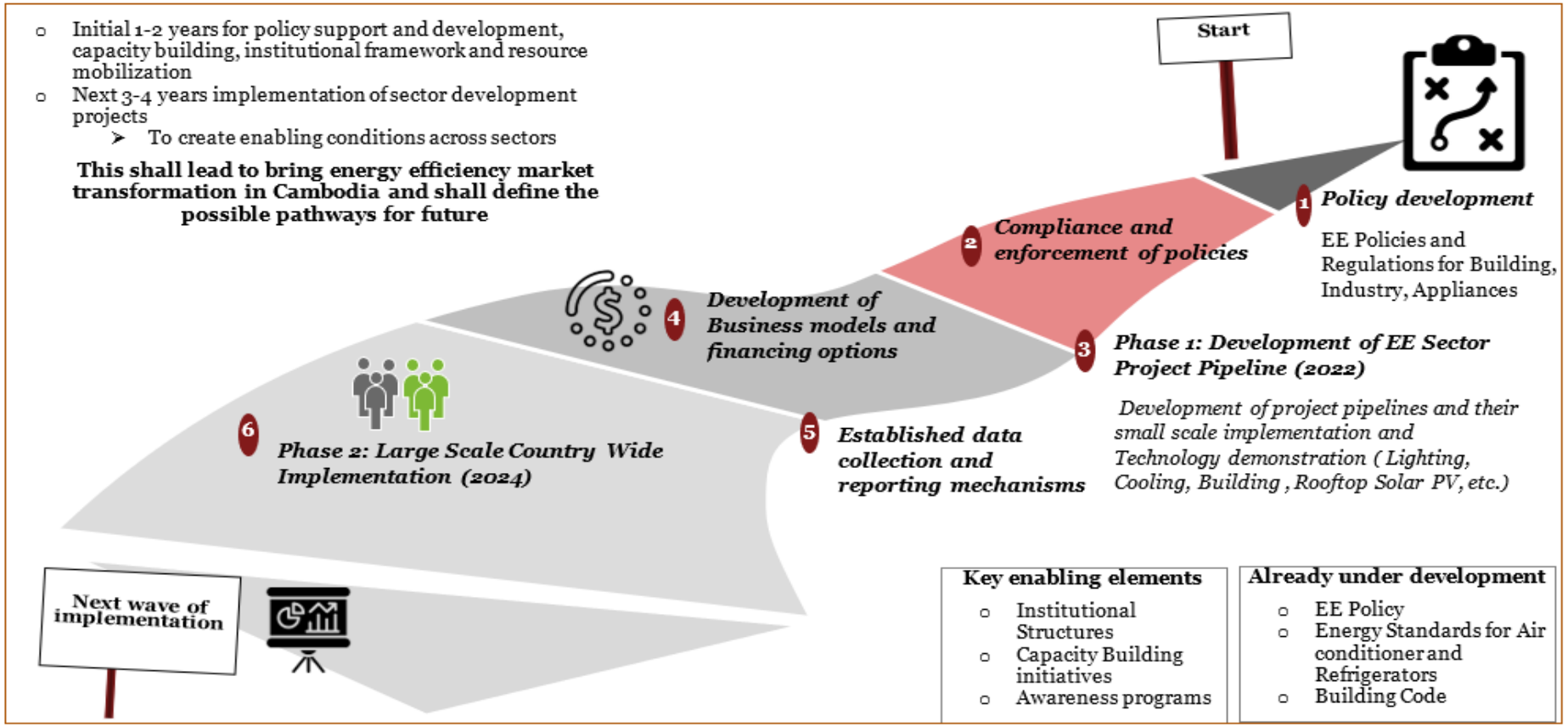
- Focused policies and regulations
- Improved penetration of clean energy technologies
- Evidence creation for successful financing of DSEE projects
- Increased appetite for DSEE implementation

Impact (Long term)

- Market transformation
- Enhanced skillset and capabilities
- Cost competitiveness
- Enhanced energy security and generation capacity avoided
- Reduction of emissions in line with the national commitments

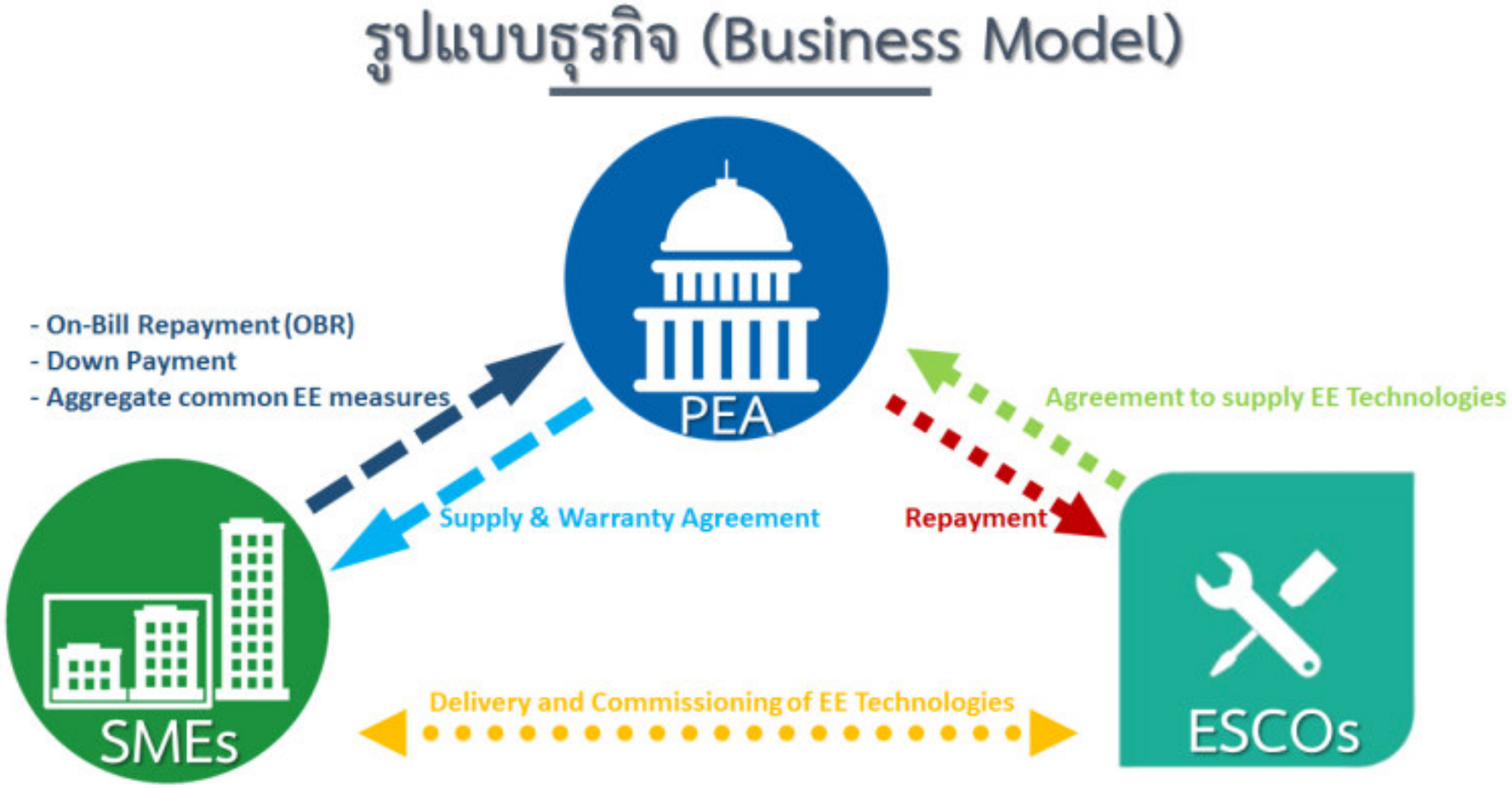
EE Market Transformation Roadmap

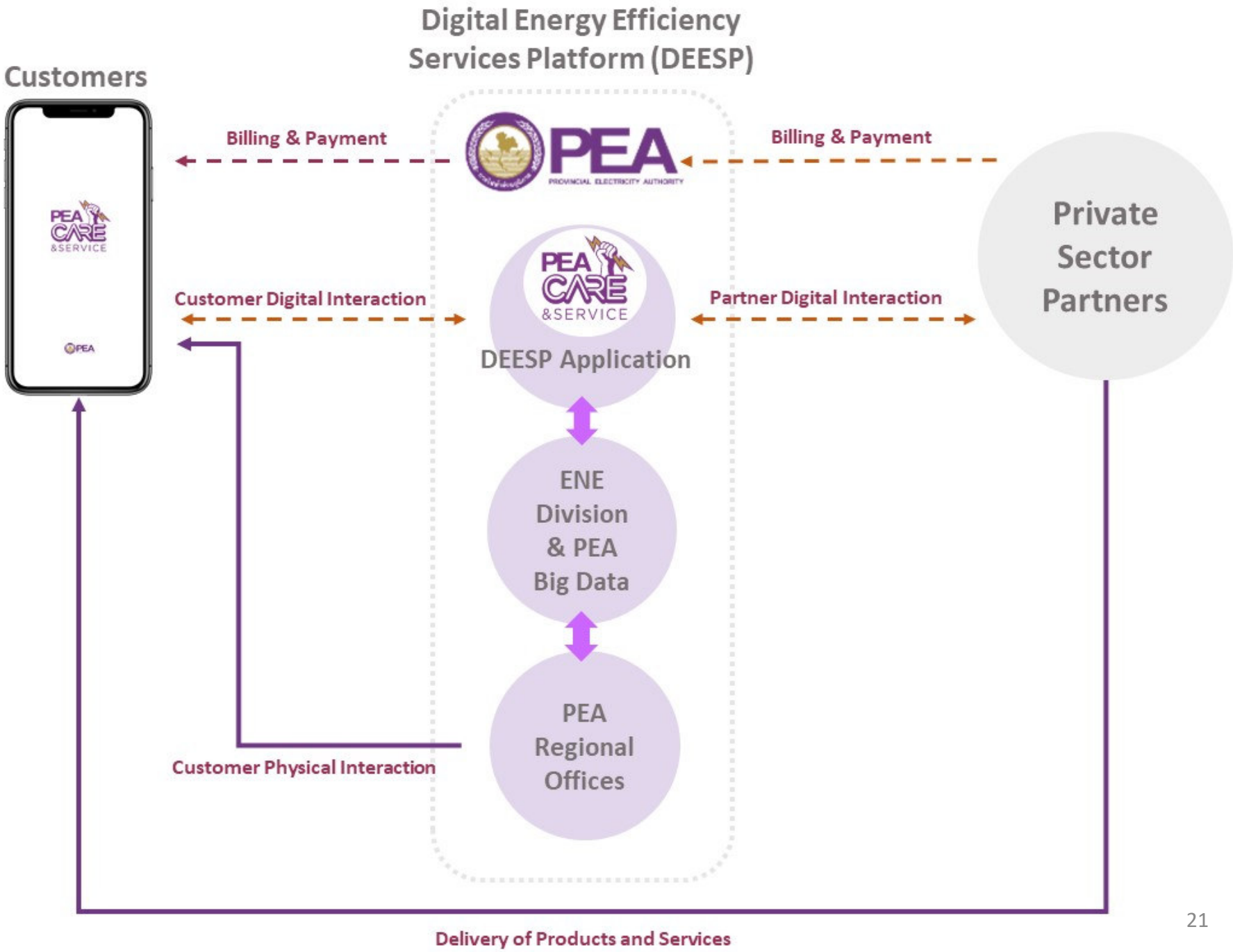
ADB is taking a programmatic approach focusing on policy interventions, followed by demonstrations, implementation support and capacity building have the potential to bring EE market transformation. The elements of this approach are prerequisites for designing EE investment projects.



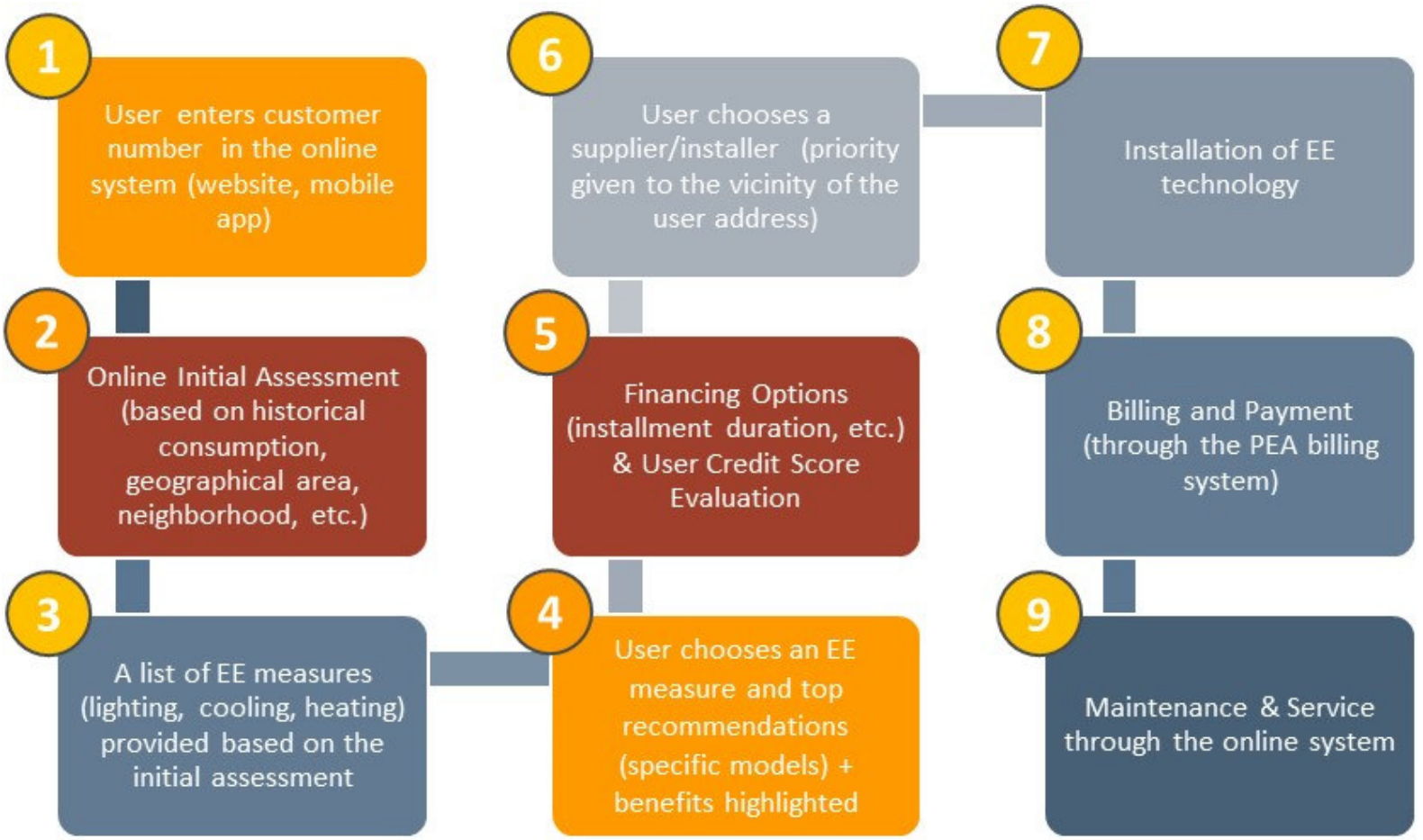
3. Thailand PEA Digital Utility Energy Efficiency Service Model

Thailand PEA EE Service Model



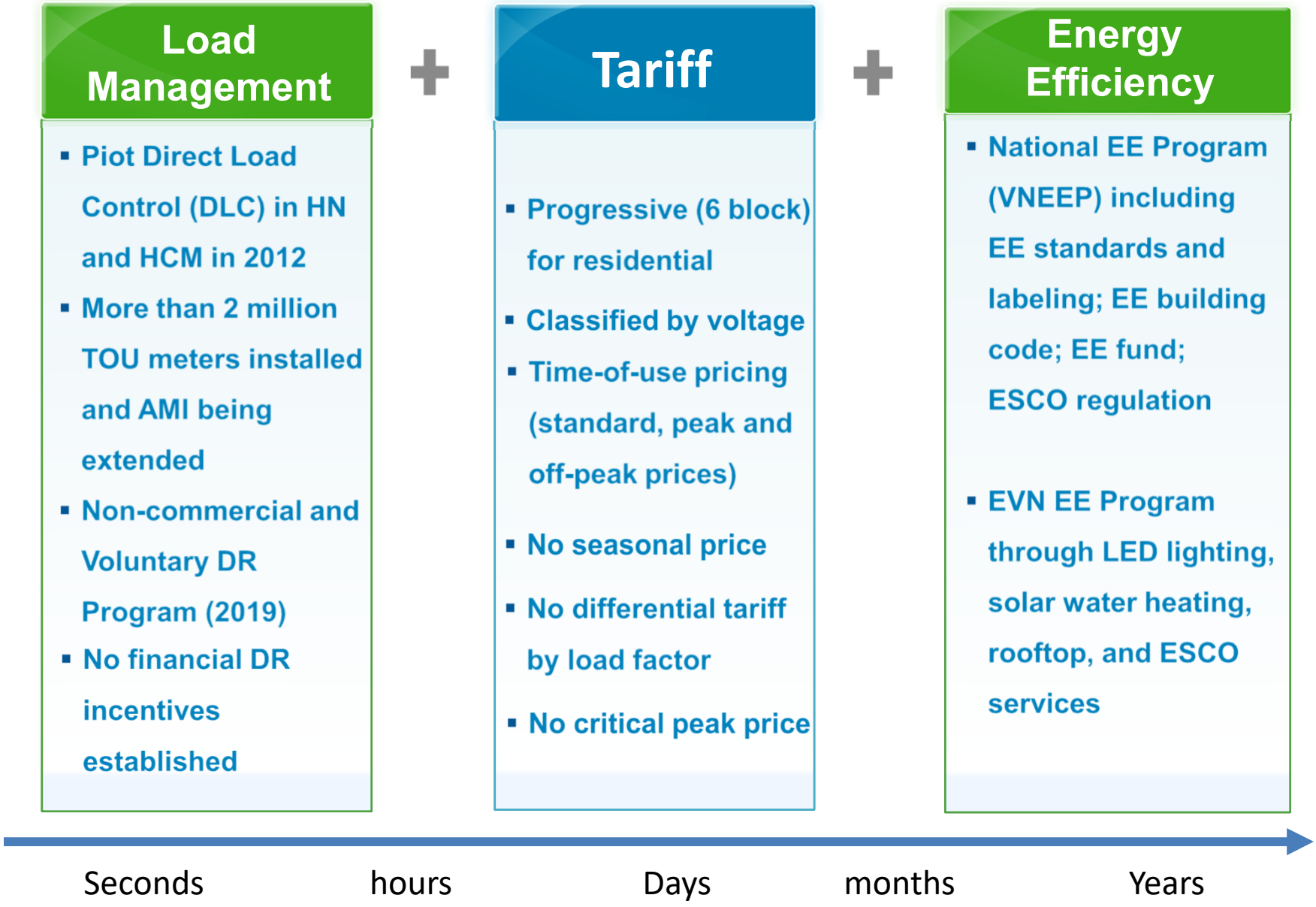

Digital Energy Efficiency
Services Platform (DEESP)
Customers
Billing & Payment
Billing & Payment
PEA
PROVINCIAL ELECTRICITY AUTHORITY
Private
Sector
Partners
Customer Digital Interaction
Partner Digital Interaction
PEA CARE &SERVICE
DEESP Application
ENE
Division
& PEA
Big Data
PEA
Regional
Offices
Customer Physical Interaction
Delivery of Products and Services

PEA DEESP Process



4. Viet Nam Demand Side Management and Demand Response Potential Assessment and Business Model

Viet Nam DSM and DR Financing Mechanism



Viet Nam DSM/DR Key Deliverables

Deliverables	Estimated Submission Date
Inception Report: - Methodology and working arrangements and timetable for the project implementation; and - General methodology for DR potential assessment: international experience, recommendation.	- Draft report: Within 04 weeks from commencement of the assignment; - Final report: Within 02 weeks from receipt of comments from ADB, ERAV and EVN.
Mid-term Report: - Detailed methodology (tools, approach, required data, procedures, etc.) and plan for DR potential assessment; and - Data/information collection, potential DR assessment. - Assessment of existing legal and regulatory framework of Viet Nam on DR;	- Draft report: Within 12 weeks from commencement of the assignment; - Final report: Within 02 weeks from receipt of comments from ADB, ERAV and EVN.
Draft Final Report: - National DR potential assessment and proposed target in 2020, 2025 and 2030 in different scenarios; - Propose policies, mechanisms and potential DR program/project should be applied in Viet Nam; and - Consultant and final workshop materials.	Within 20 weeks from commencement of the assignment
Final Report	Within 4 weeks from receipt of comments from ADB, ERAV and EVN.

M1: Using Appliance level data

- This methodology uses a bottom up approach, the step by step procedure for which is illustrated below:

Step-1
- **Number of eligible customers**: The number of customers under the utility, eligible to undertake any planned DR programs by the power company

Step-2
- **Equipment saturation rate**: The appliance density and appliance ownership for consumers under the power company. Equipments like Central Air Conditioning Unit, Space heating appliances, Commercial water heating equipments, etc.

Step-3
- **Expected peak co-incidence for appliances targeted during DR events**: Peak coincidence factor is defined as the ratio showing how much of an end-use appliance is coincident with utility's system peak

Step-4
- **Program and event participation rate**: These values are derived from benchmarked against experiences or plans of national utilities in carrying out DR pilots in the past

Achievable DR potential = (***Number of eligible customers*** ✖ ***Equipment saturation rate*** ✖ ***Expected peak co-incidence factor***) ✖ ***Program and event participation rate***

Technical DR potential

M2: Using per customer load profile

- This methodology uses a top down approachas it first determines the average per customer load profile (in MW) followed by using the benchmarked participation rate to find the DR potential.

Step-1

- **Segmentation of customers**: The customer segmentation refers to the various categories of consumers within a utility e.g. agricultural, industrial, commercial, residential, etc.

Step-2

- **Develop average per-customer load profile:** Dividing the aggregate load coincident with system peak period for each customer segment by the number of customers in each segment

Step-3

- **Estimation of participation rates**: The analysis would use international benchmarking as the main technique in making assumptions for the customer participation rate for different DR programmes

Step-4

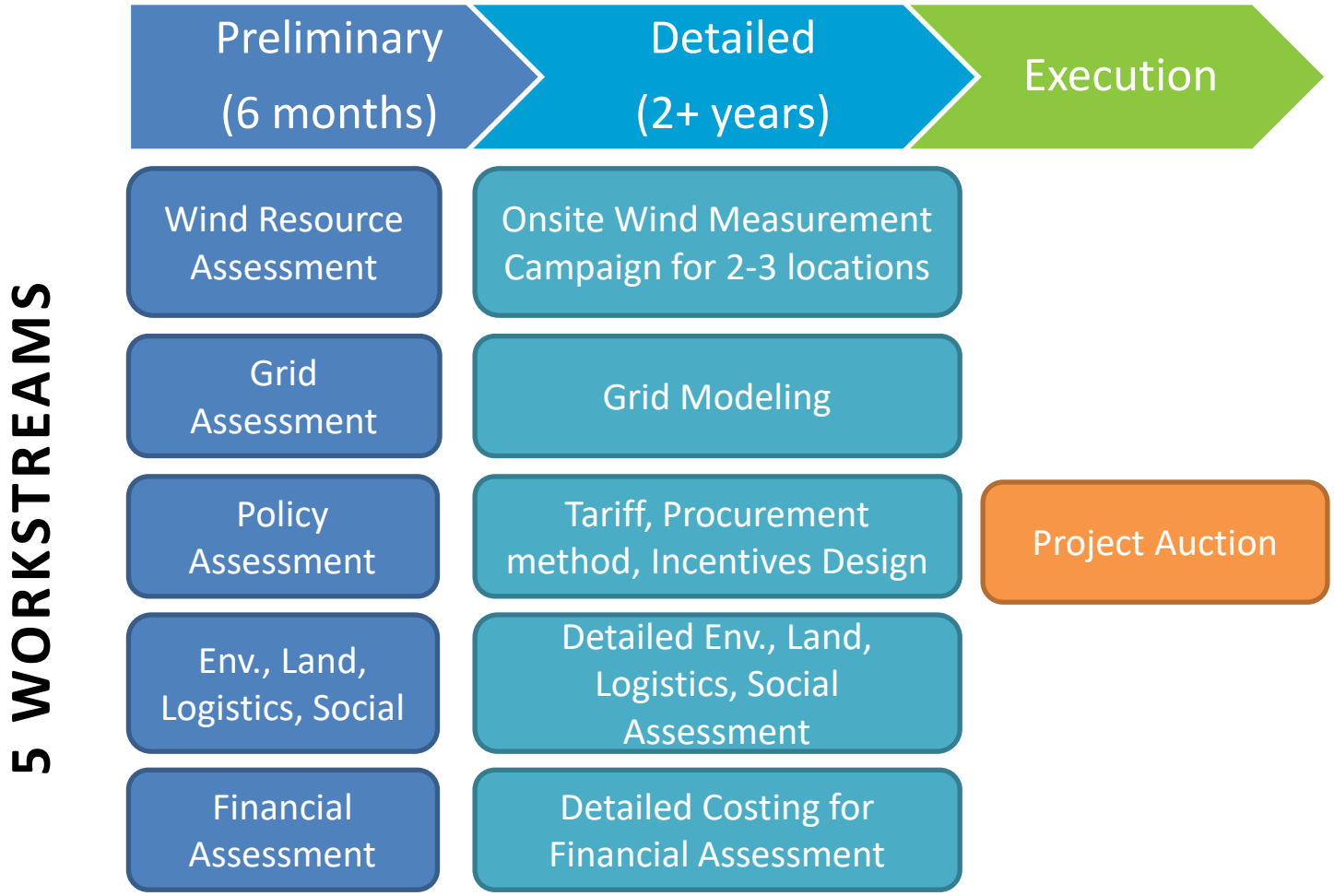
- **Estimating the load impact per customer segment:** Applying average load impact as estimated from expert judgment or benchmarking to the data of electricity demand for specific end-use loads or equipment stock (e.g. AC).

5. Myanmar Wind Power Roadmap Study

Myanmar Wind Power Roadmap

1	Conduct consultations with Myanmar authorities and stakeholders	ongoing
2	Develop the roadmap that would evaluate different scenarios for on-grid solar and/or wind energy development at progressively large scales in consultation with Myanmar authorities and stakeholders	Oct 2020 - Jan 2021
3	Undertake the study of the impact of increased solar and/or wind-based generation on grid-level stability and power flow	Dec - Mar 2021
4	In consultation with Myanmar authorities, shortlist 3-4 locations for candidate projects that could be further assessed through onsite wind measurement campaigns for possible tendering in the future	Mar - May 2021

Wind Power Roadmap Outline for Myanmar



Other alternatives are to develop a renewable energy (RE) zone that can accommodate multiple wind projects

Conclusion

- Four studies for EE and RE underway at different stages and expected to be completed by the end of 2021
- Despite COVID-19 restriction, all consultants engaged and supervised in cooperation with ADB's country team and communicated with countries virtually
- Regional workshops will be organized to share the results throughout 2021
- ADB country programming will consider the inclusion of EE and RE pipeline projects for ADB's potential investment with other development partners including Green Climate Fund (GCF) (e.g. Cambodia EE Sector Development Program (SDP) for 2022 loan by ADB and GCF ($80 million indicatively)

Thank you

Contact: hjlee@adb.org