



# **Sustainable Power Sector Development in the GMS**

**- Update and Additional Scope of RETA 9003 -**

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# Original Project 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**.
- **TA budget:** 1 million euro cofinanced by AfD
- **TA implementation period:** Mar 2016 – Dec 2018
- **TA implementing agencies**
  - Energy ministry responsible for power sector planning, renewable energy, energy efficiency, and power trade
  - National electric power utilities
  - Environmental and social safeguard regulation agencies

# Changing Context of Energy Sector in GMS

- Fast economic growth; increasing trade
- Population growth and urbanization; higher demand for better living standards and services
- Rapidly changing energy sector dynamics and economics with disruptive technologies

Sustainable Energy Sector Development



Renewable  
Energy

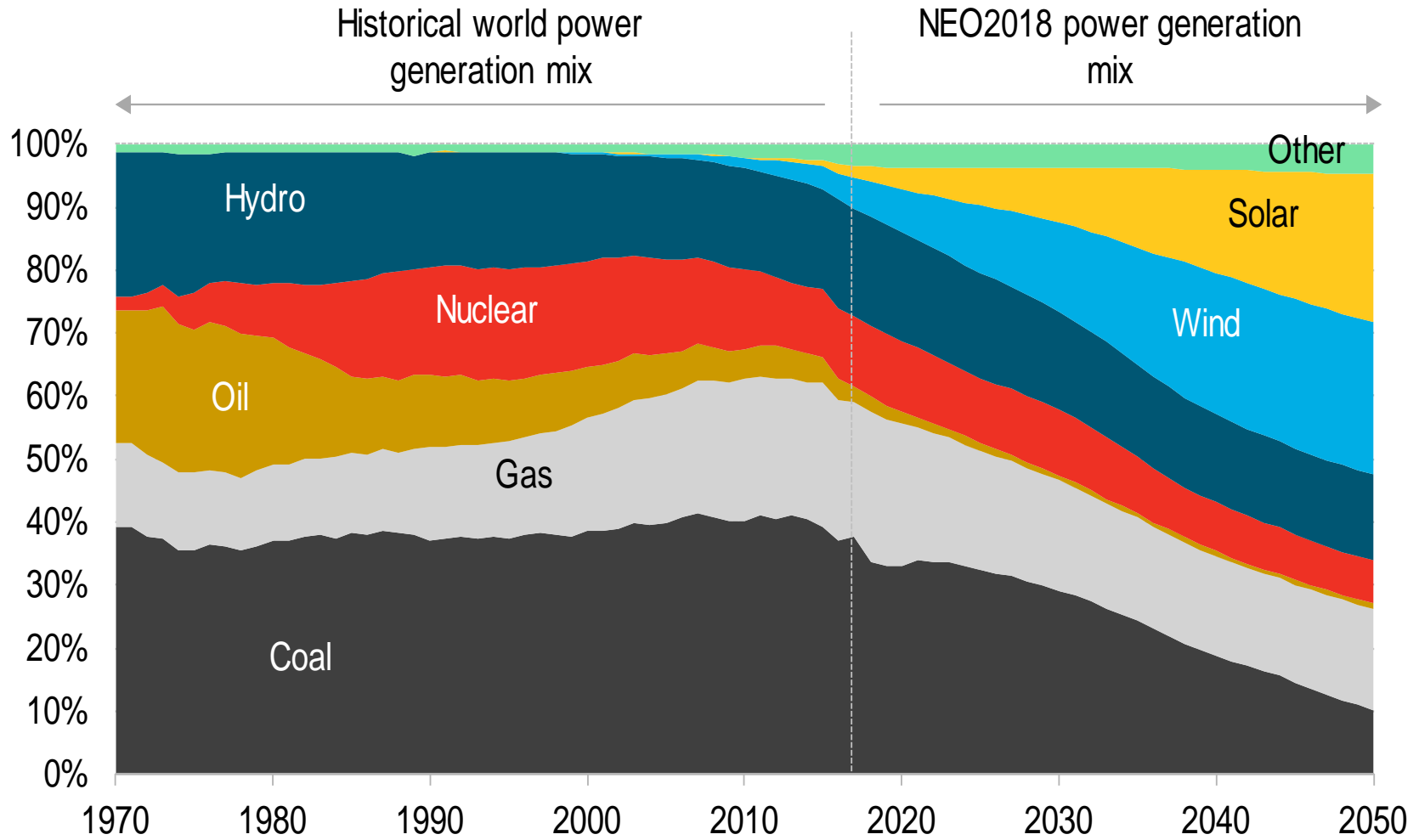


Energy  
Efficiency



High-level  
Technologies

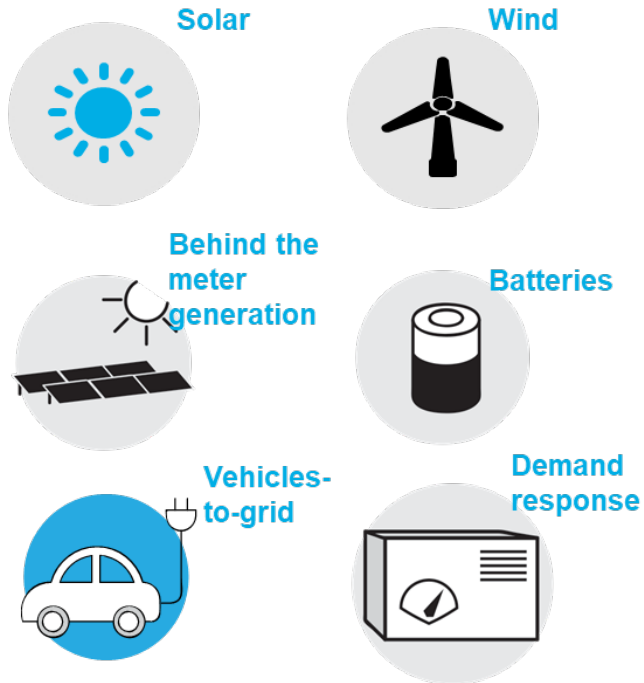
# 50% wind and solar generation by 2050



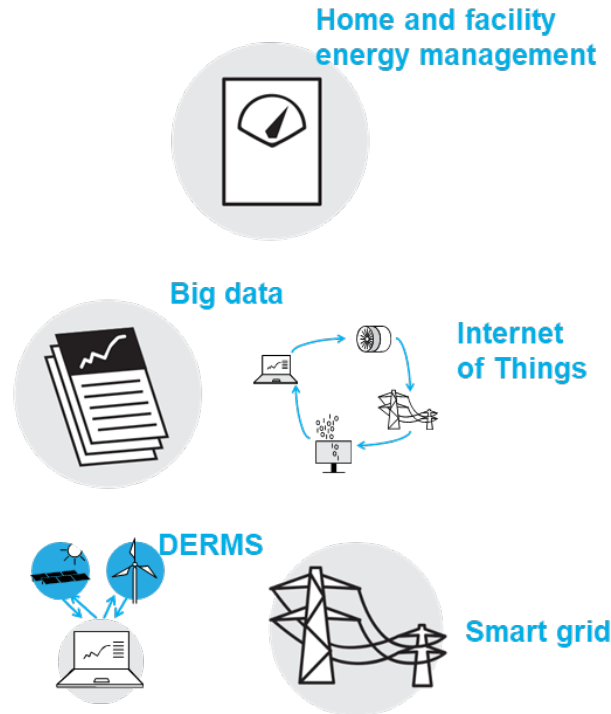
Source: Bloomberg NEF, IEA

# Sources of change in the power system

## New generation sources



## Resource management

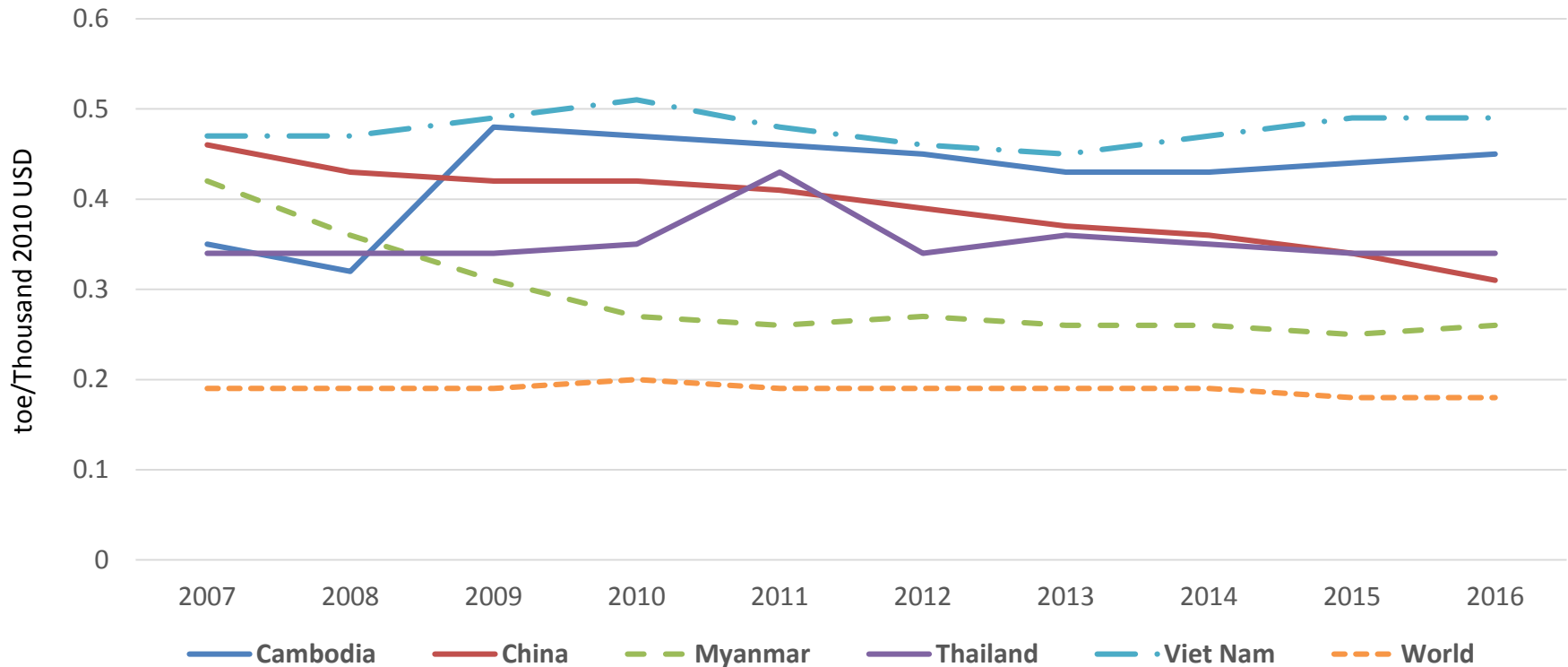


## Regulation and market design



Source: Bloomberg NEF

# Energy Intensity Level in GMS



Source: International Energy Agency Statistics Website. <https://www.iea.org//statistics>

- ✓ Energy intensity level (tons of oil equivalent/thousand 2010 USD) of GMS countries is about two times higher than the world average
- ✓ Viet Nam and Cambodia show relatively higher energy intensity than other GMS countries
- ✓ China and Myanmar show improved energy intensity in the past 10 years while other GMS countries maintain the same level of energy intensity

# Extended scope with additional financing for GMS clean energy transition

- **Background:** GMS countries envisage more RE and EE investments due to improved policies and regulatory environment and are considering to adopt more innovative technologies
- **Additional financing:** USD 1,050,000 (\$505,000 from AfD and \$500,000 from ADB's Regional Cooperation and Integration Fund) approved in Dec 2018
- **TA extension:** 24 months extended to 31 Dec 2020
- **Key Activities:**
  - (i) Develop individual RE and EE project pipelines and business models using various financing mechanisms including PPP, energy efficiency funds, and ESCO models
  - (ii) Deepen capacity building and knowledge support under the current scope of the TA
- **Candidate Technologies:** rooftop solar, waste-to-energy, solar water heating, efficient LED lighting (home and street lighting), building retrofitting, battery storage systems, renewable energy grid integration, distributed micro-grid renewable energy and batter hybrid systems, etc

# Project Component

## 1. Vietnam IRP and SEA

- 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 (under preparation)

## 2. Capacity Building in GMS countries \*

- Gap analysis and training needs assessment (completed)
- Regional and country workshops (4 completed, 2 to be completed)
- 2 twinning programs on RE integration (PRC) and SEA (Viet Nam) (completed)
- New twinning program on EE with Thailand to be conducted

## 3. Knowledge Products (KPs)

- KP1 - Vietnam's SEA in PDP (completed)
- KP2 – Integrated and Strategic Power Sector Planning Guideline – under preparation
- Country Guidelines and Briefing Notes – under preparation

## 4. (New) RE and EE pipeline and business models development \*

- 8 project concepts to be developed for RE and EE with business models and financing mechanism
- A regional investors' workshop and other country workshops as needed to be organized

**NEW**

\* Extended scope with additional financing of \$1,050,000



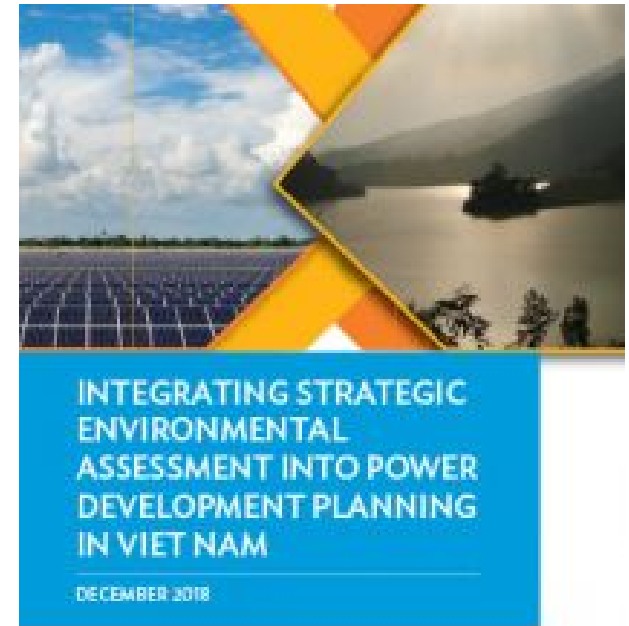
# Activities completed since last RPTCC-24 in Myanmar, June 2018

1. **Two National Workshops** in Myanmar (June 21-28, 2018) and Thailand (July 2-3, 2018)
  - introduced **key aspects of strategic and integrated power sector planning**
  - reviewed the current status of policies/planning **on RE, EE, cross border power trade, and SEA**
  - assessed large potential in RE and EE has not been fully considered in power sector planning in Myanmar while RE and EE are relatively well integrated into the planning process through specific plans and targets in Thailand
  - identified a few key areas to improve in each country
    - **Myanmar:** (i) maximize synergies and opportunities across RE technologies (solar and wind with battery- and hydro-storage) for national electrification and national PDP planning process; (ii) include impact of EE improvements from planned EE project in electricity demand forecast; introduce fiscal incentives for EE and promote public awareness about EE; and (iii) improve SEA capacity
    - **Thailand:** (i) specify requirements for RE connection to the grid in the grid code, (ii) conduct more strategic RE planning for systematic increase – coordination with network planning & real-time visibility and accurate generation forecasts; (iii) improve demand side management to reduce peak demand; (iv) improve availability of public information about RE to investors; (v) apply SEA in PDP

# Activities completed since last RPTCC-24 in Myanmar, June 2018

## 2. Knowledge Product published in Dec 2018 on Integrating SEA into Power Development Planning in Viet Nam

- It traces the process of incorporating an SEA into the PDP in Viet Nam from PDP VI stage (no SEA experiences) to Revised PDP VII (significant SEA capacity)
- In Viet Nam, the SEA has provided an understanding of the implications of the different development options in the PDP, leading to significant changes in the final contents of the plan and ensuring that it is better aligned to national development policies of Viet Nam.
- <https://www.adb.org/publications/environmental-assessment-power-development-planning-viet-nam>



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# Activities completed since last RPTCC-24 in Myanmar, June 2018

## 3. **Twinning Workshop in Kunming, PRC with China Southern Grid on Integrating RE in the Power System and Planning Interconnections (Nov. 26 – 30, 2018)**

- **Topics** covered (i) planning and operational aspects of integrating RE; (ii) battery storage system; (iii) interconnections – planning methodology and benefits; (iv) interconnections using (voltage source converter) VSC-HVDC technology; (v) connection code; (vi) GMS Power Grid Interconnections; and (vii) site visit of a 60MW 110 kV solar farm and a centralized wind power control centre, monitoring and controlling multiple wind farms in Yunnan province
- **Key takeaways:**
  - **Key challenges** related to integrating larger volumes of intermittent RE in the power system relate to (i) peak load regulation and frequency modulation; (ii) additional system tripping due to lack of frequency and voltage adaptability; (iii) complex efforts to ensure system stability; and (iv) reactive power and voltage fluctuations caused by integration of additional RE generation.
  - **Adapting the RE planning methodology to long-term planning** focused on key parameters to consider in the modelling of solar and wind power in the simulation of the overall power system operation – including wind speed distribution and spatial correlation as well as correlation of solar radiation, spatial correlation among multi-PV stations
  - **Interconnection benefits** in terms of reserve sharing and balancing energy exchanges and resulting reduced reserve requirements and improvements in system reliability
  - **Operational aspects of integrating RE** focused on (i) requirements for management of frequency modulation through a smart control and management system which monitors load and frequency at any time at sub-stations at 110kV and above and (ii) real time monitoring and forecasting of RE through key parameters such as wind speed and solar radiation, outside temperature and atmospheric pressure

# Activities completed since last RPTCC-24 in Myanmar, June 2018

## 4. **Twinning Workshop in Hanoi, Viet Nam with Institute of Energy** on Integrating SEAs in the Power Sector Planning Process (March 6 – 7, 2019)

- **Topics** covered (i) Vietnam's SEA system and legislation; (ii) experience of SEAs in PDPs in Vietnam: from PDP VI to RPDP VII; (iii) key stages in the implementation of an SEA (including a scoping exercise); and (iv) SEAs for Thermal Power; for Hydropower; and for renewable energy and the transmission line system
- **Key takeaways:**
  - **Limiting factors in SEA** are (i) lack of available information is a challenge; (ii) skilled people are needed both for preparing the SEA and reviewing the SEA report; (iii) financial resources are often inadequate for preparing the SEA report; (iv) insufficient awareness of the SEA process; (v) poor public consultation – and lack of participation in the SEA process; (vi) low quality of SEA preparation and report review – pressure to improve quality.
  - **Strengthening the SEA** through (i) amending SEA policy so that SEA is mandatory rather voluntary; (ii) clarifying the roles and responsibilities for preparing SEAs in the legislation. Ownership and responsibility must be clearly defined; (iii) developing procedures/ guidelines and capacity in the line ministries; (iv) implementing pilots/examples of good practice; and (v) integrating externalities within PDP optimization process as possible





country  
workshops and  
twinning  
workshops



# Next steps

- **Continuing and deepening existing scope**
  - **Knowledge Product/Reports**
    - Integrated and strategic power sector planning guideline for the GMS
    - Country guidelines for Myanmar, Lao PDR, Cambodia, presenting country-specific recommendations
    - Report on Strengthening the Policy Framework for Power Sector Planning in Vietnam
  - **Demand-based country workshops** on (i) IRP and SEA as well as (ii) RE and EE technologies, business models, and financing mechanisms
  - **Demand-based twinning programs** on RE (in PRC) and SEA (in Viet Nam)
  - **New twinning hub on EE** based in Thailand and focusing on the subject of energy efficiency and conservation. Discussions with Department of Alternative Energy Development and Efficiency (DEDE) under Ministry of Energy, Thailand ongoing

# Next steps

- **Initiation of new scope for RE/EE support**

- ADB's Country Consultation Mission for country need assessment and implementation arrangement

Date	Day	Option 1
21 April 2019	Sunday	Travel from Manila/Hanoi to Guangzhou, PRC
22 April 2019	Monday	Mission in Guangzhou, PRC
23 April 2019	Tuesday	Mission in Guangzhou, PRC Travel from Guangzhou to Bangkok TG 669 (15:45 – 17:45)
24 April 2019	Wednesday	Mission in Thailand
25 April 2019	Thursday	Mission in Thailand Travel from Bangkok to Vientiane TG 574 (18:35 – 19:45)
26 April 2019	Friday	Mission in Lao PDR
27 April 2019	Saturday	Travel from Vientiane to Bangkok TG 575 (20:30 – 21:35)
28 April 2019	Sunday	Travel from Bangkok to Nay Pyi Taw PG 721 (17:00 – 18:55)
29 April 2019	Monday	Mission in Myanmar
30 April 2019	Tuesday	Travel from Nay Pyi Taw to Bangkok PG 722 (30 April 19:35 – 22:30)
1 May 2019	Wednesday (Labor Day)	Travel from Bangkok to Phnom Penh TG 584 (18:45 – 19:55)
2 May 2019	Thursday	Mission in Cambodia
3 May 2019	Friday	Travel from Phnom Penh to Bangkok TG 585 (21:15 – 22:20)
4 May 2019	Saturday	Travel from Bangkok to Manila
Total Mission Days		14 days

- Finalizing New TORs and Publishing Request for Proposal (May 2019)
- Commencement of consulting work (July 2019)
- New knowledge partnerships with Singapore and Korea



# Thank you



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