# Supporting the Energy Transition Through a Sector Development Programmatic Approach: the Case of Cambodia

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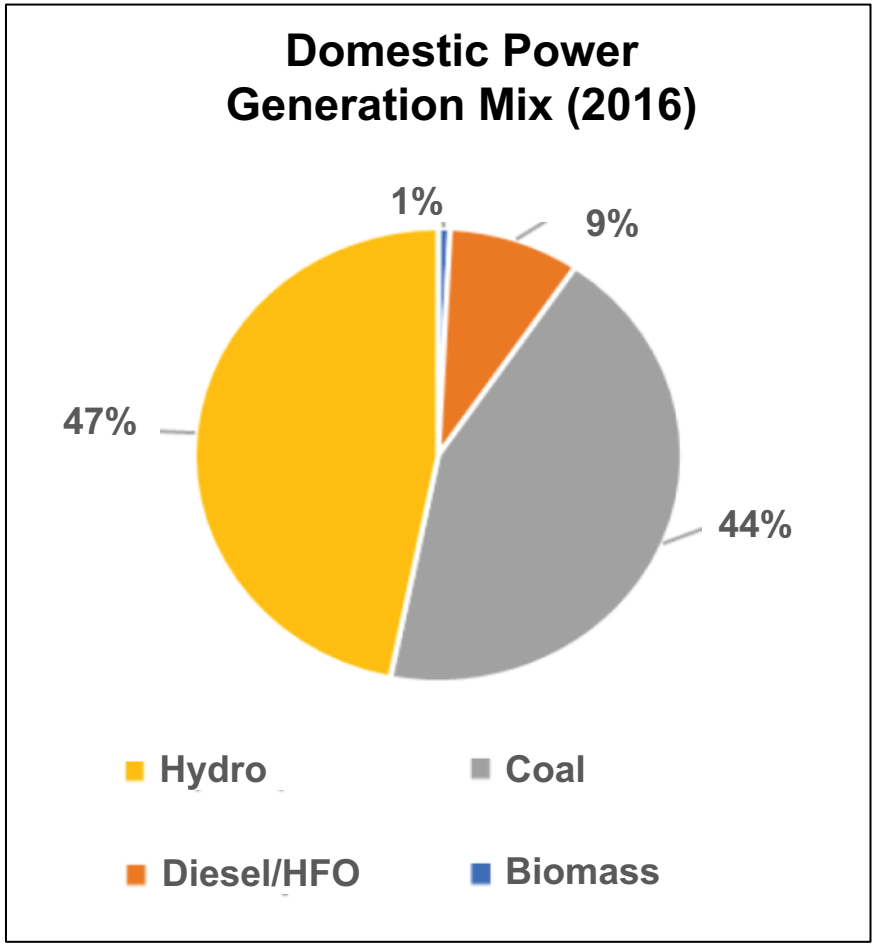
# Cambodia – Overview of the Power Sector in 2016

- Electricity demand increasing almost 3-fold over the previous 6 years, from 2,515 GWh in 2010 to 7,175 GWh in 2016
- Major drivers of power demand: economic development, urbanization and the expansion of electrification
- Increasing electrification and quality of service as major priorities of the government: in 2016, only 58% of households were connected to the grid
- Power supply dominated by hydropower, coal and imports. Except for biomass, no other renewable energy sources had been deployed
- Electricity prices amongst the highest in the region
- Energy efficiency largely untapped




Source: EAC (2017)

# Cambodia's Solar Opportunity

- Solar PV is an important option for power generation in Cambodia:
  - Abundant solar resources well-matched with demand centers
  - Introduces flexibility in the energy mix by reducing dependency on other sources of power such as fossil fuels and reduces greenhouse gas emissions
  - Helps cover peak demand at day-time as well as hybrid operation with other renewable sources, especially hydro
  - Quick and modular implementation

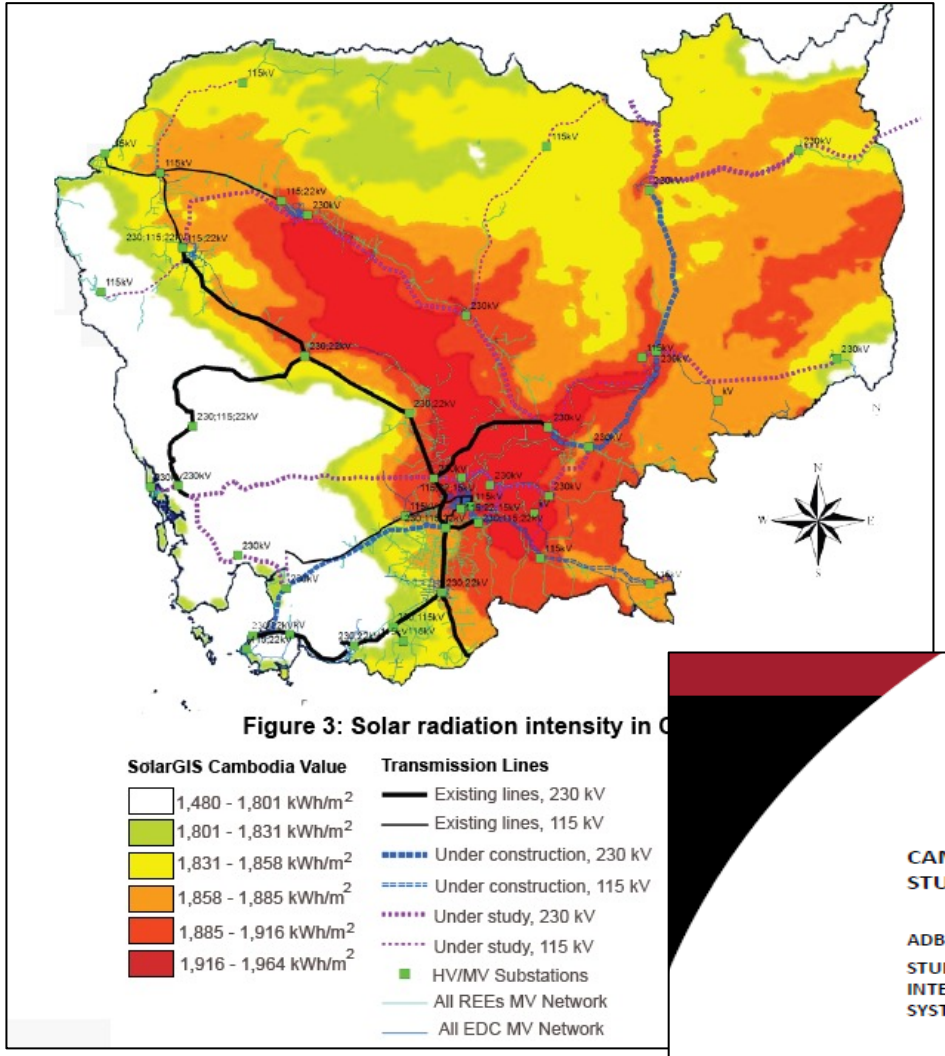
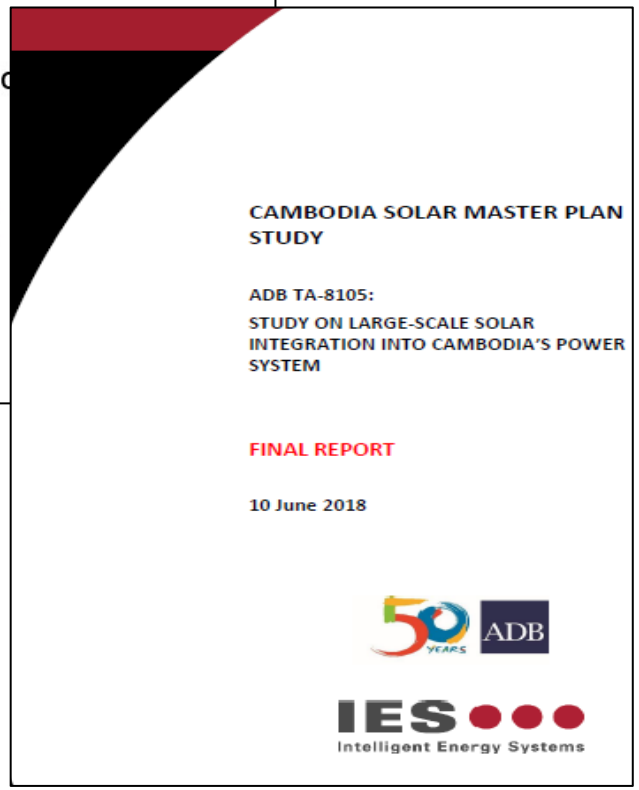


Figure 3: Solar radiation intensity in C

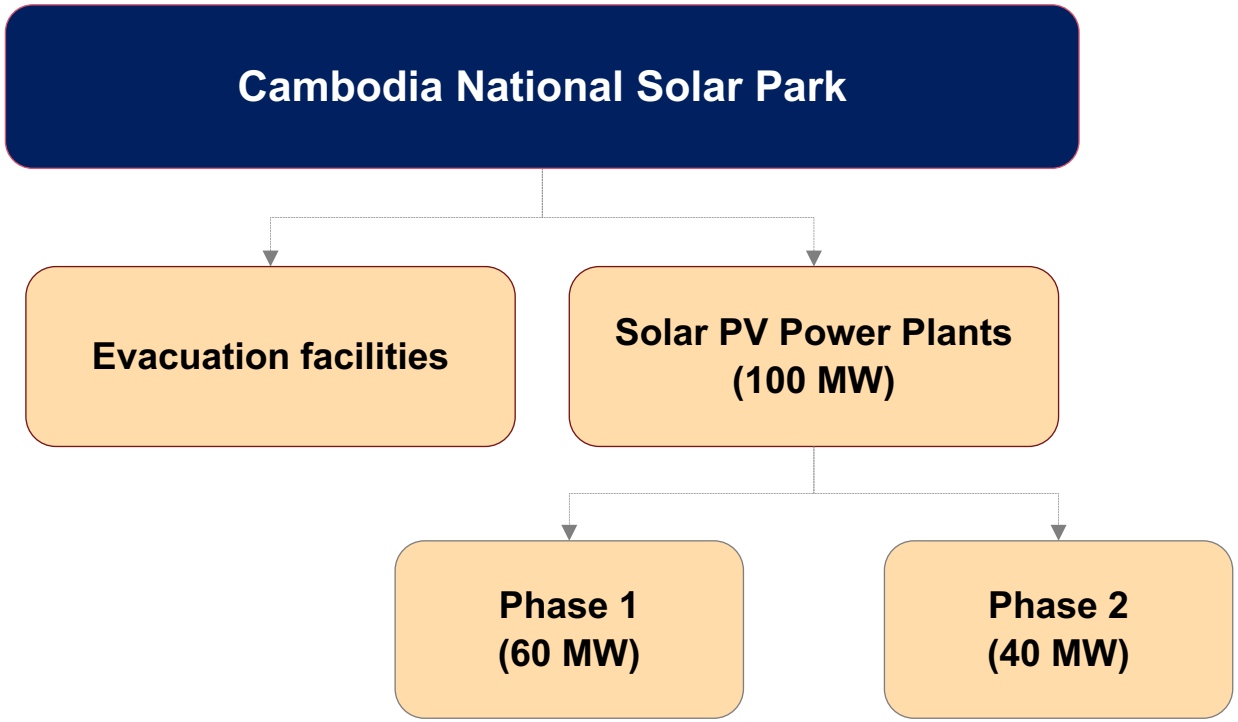



- Yet, as of 2016 no solar PV capacity, grid connected, had been developed

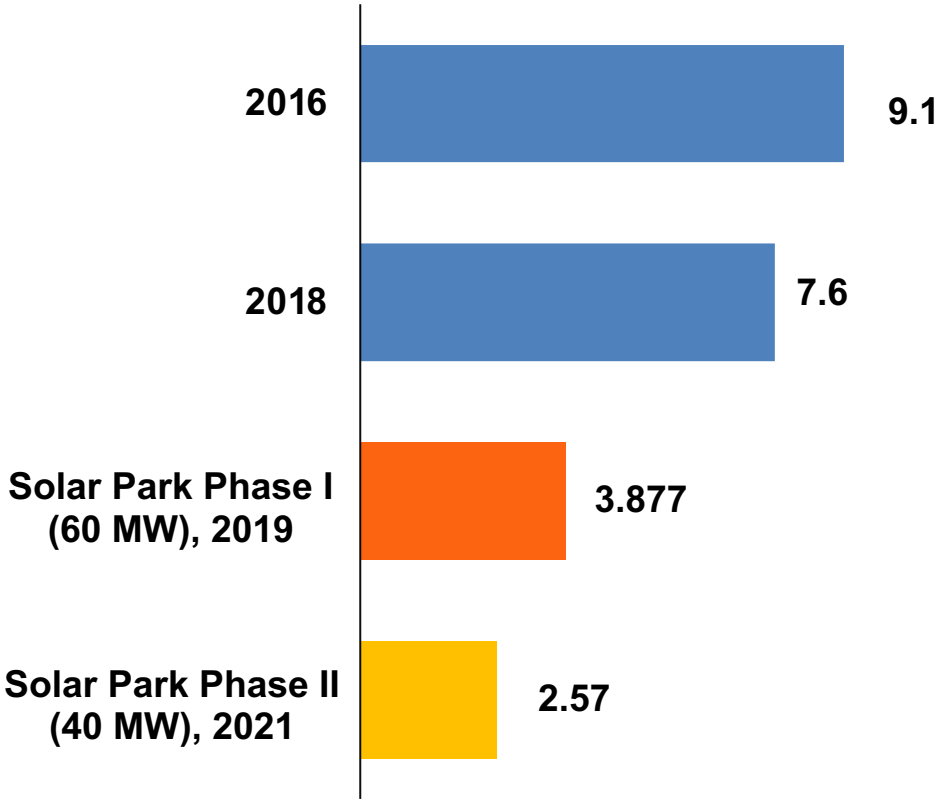
# Cambodia's National Solar Park Project (2019)

Cambodia's first national solar park was developed with the technical and financial assistance of ADB and has the capacity to accommodate 100 MW of solar PV generation

**Project Components**



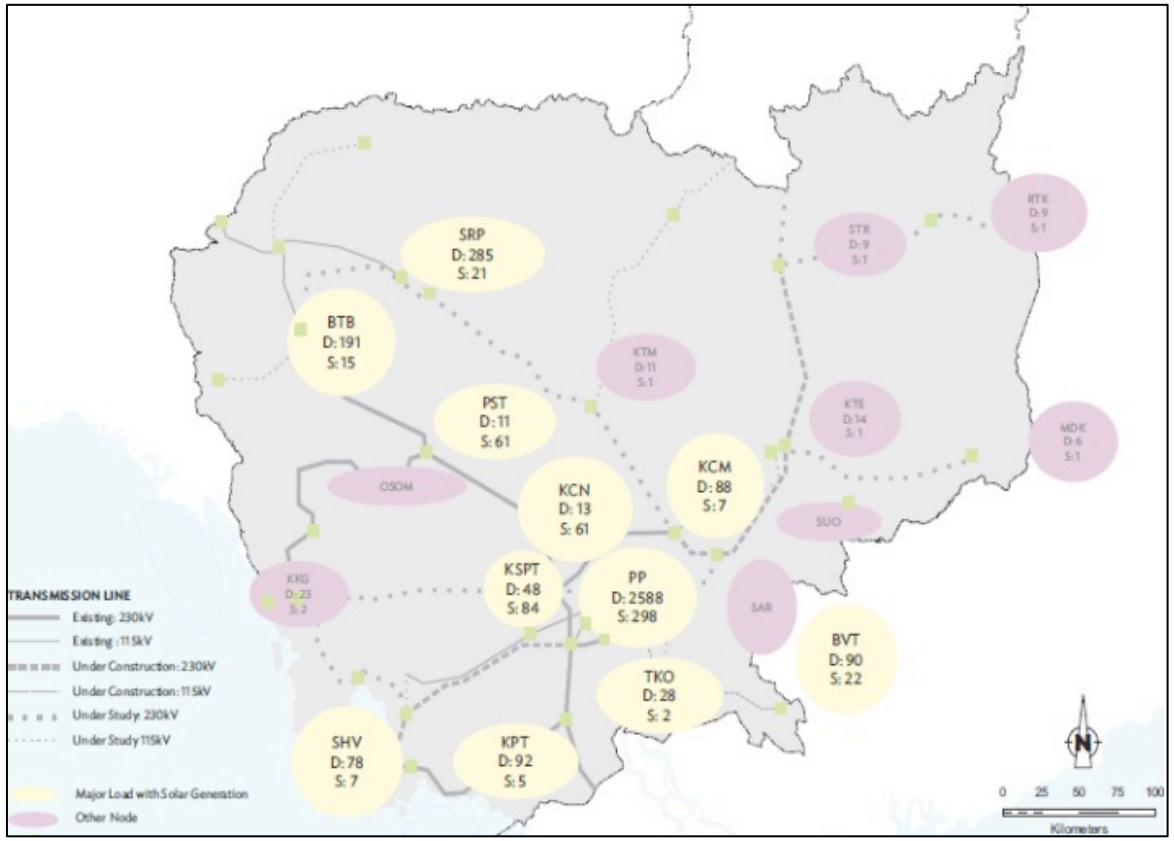

**Evolution of Electricity Price for Solar Projects** (US cents/kWh)



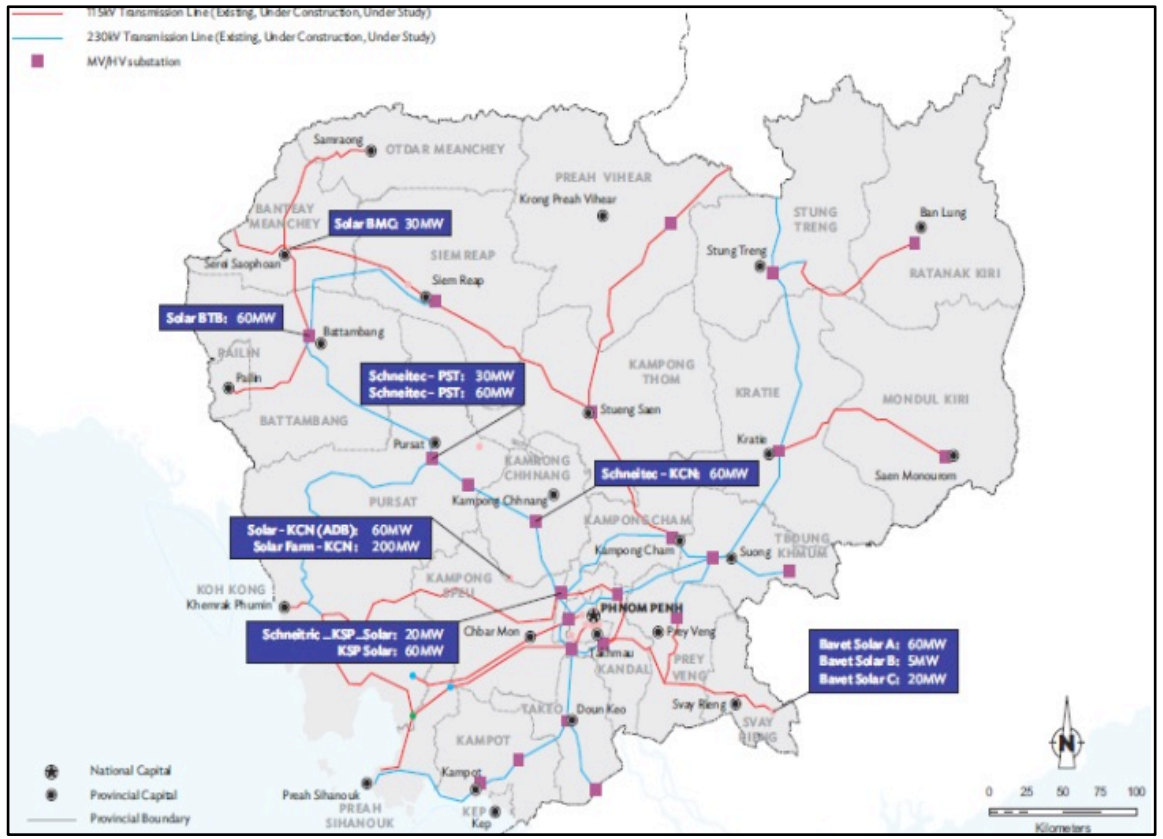
# The Catalytic Effect of the National Solar Park Project

The Solar PV Roadmap and the national solar park tender catalyzed the rollout of additional solar PV projects. At the end of 2022, solar PV accounted for 13% of the domestic generation capacity (437 MW)

## Solar PV Roadmap (2018)




## Planned and Realized Solar Developments



# Realizing the Potential for Energy Efficiency in Cambodia

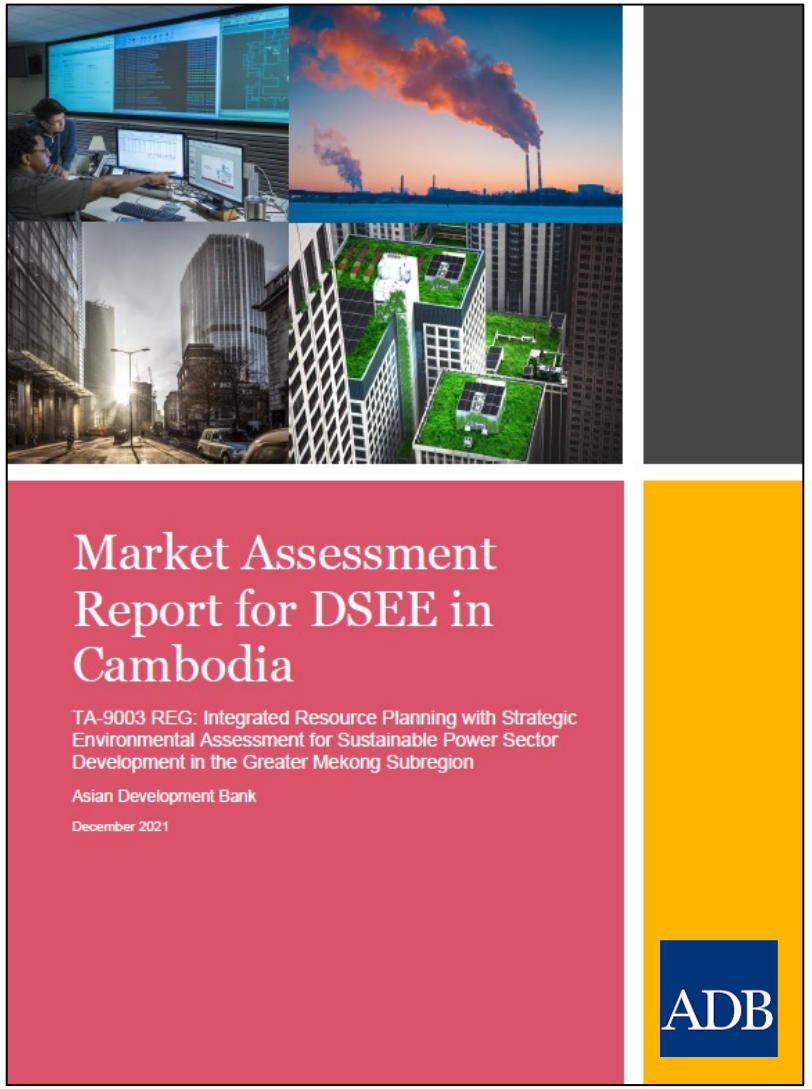
Summary of Findings from ADB Pre-Feasibility Study (2020-2021)

**Energy Efficiency Potential (2021-2030)**

- **12.50 TWh (1.07 Mtoe)**
- **3.0 Bn USD of Investments**
- **6.67 $MtCO_2$ in GHG Emission Reduction**

- The study assessed the potential in Cambodia for demand-side energy efficiency
- Assessment based on primary and secondary sources, including data from field surveys
- Industry and building identified as the sectors with the largest potential for investments on energy efficiency

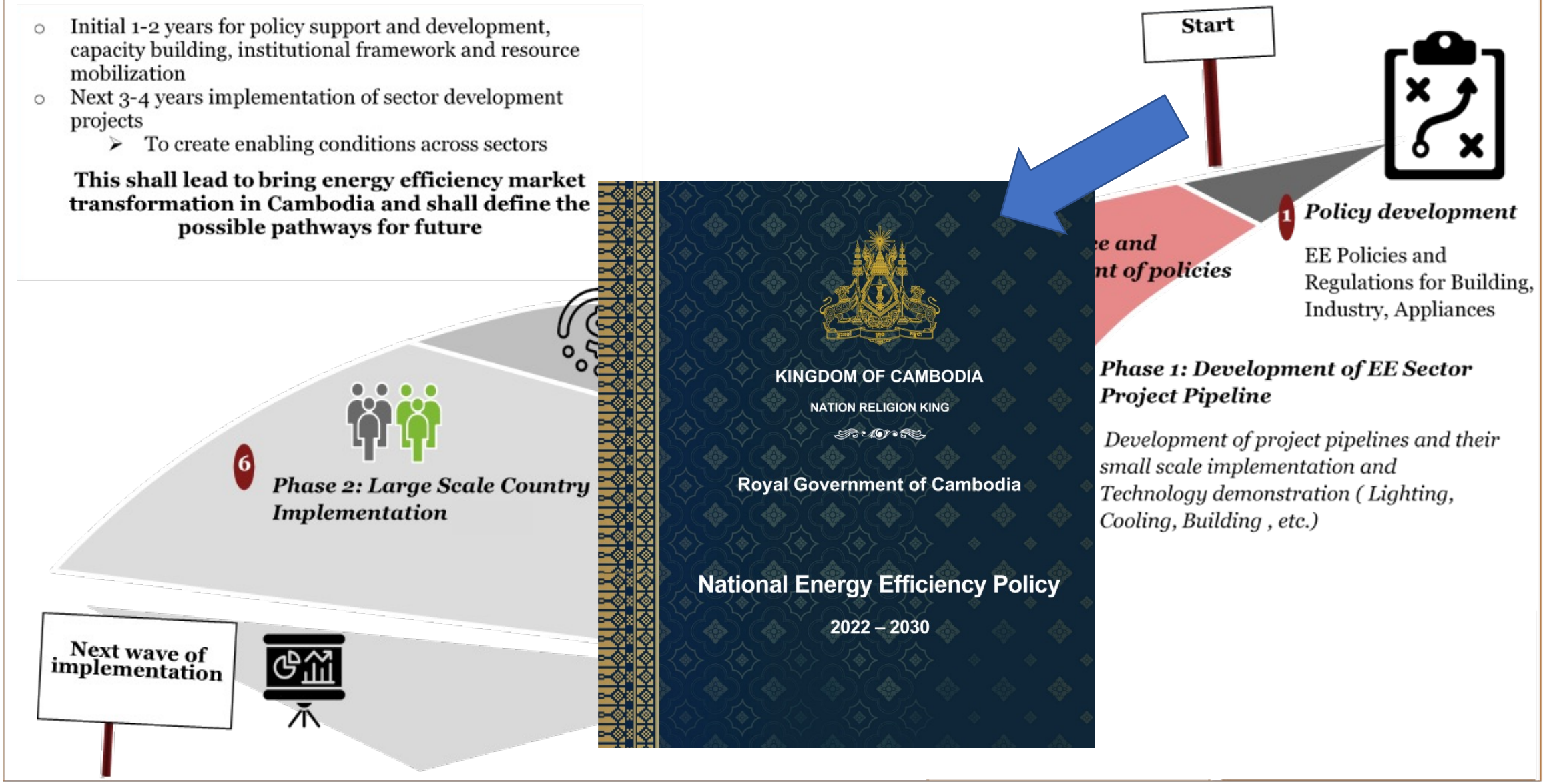
**How to realize this energy efficiency potential?**



# A Programmatic Approach for Energy Efficiency in Cambodia

- Initial 1-2 years for policy support and development, capacity building, institutional framework and resource mobilization
- Next 3-4 years implementation of sector development projects
  - ➢ To create enabling conditions across sectors

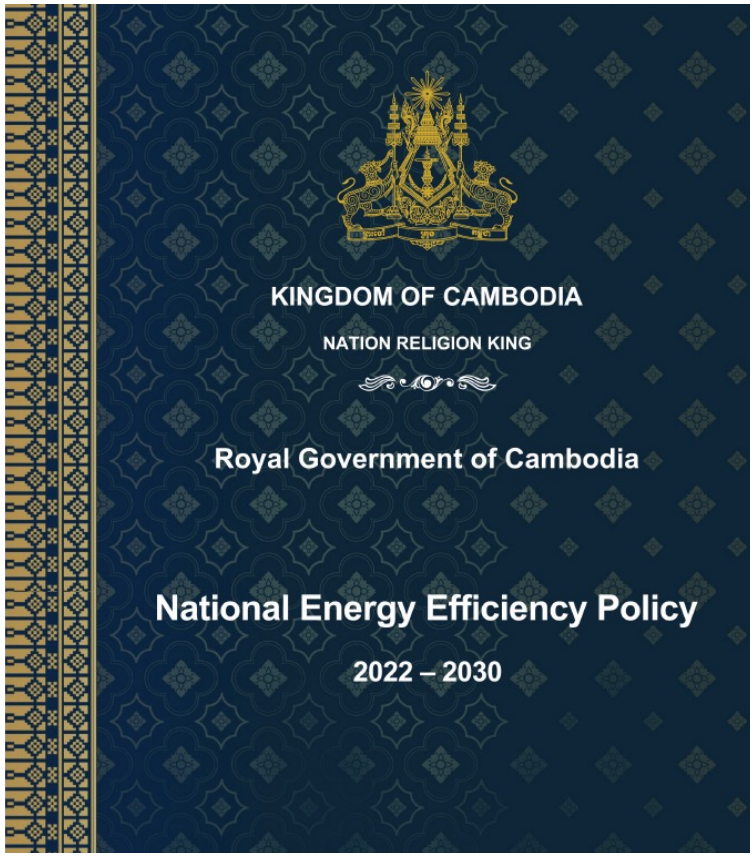
**This shall lead to bring energy efficiency market transformation in Cambodia and shall define the possible pathways for future**



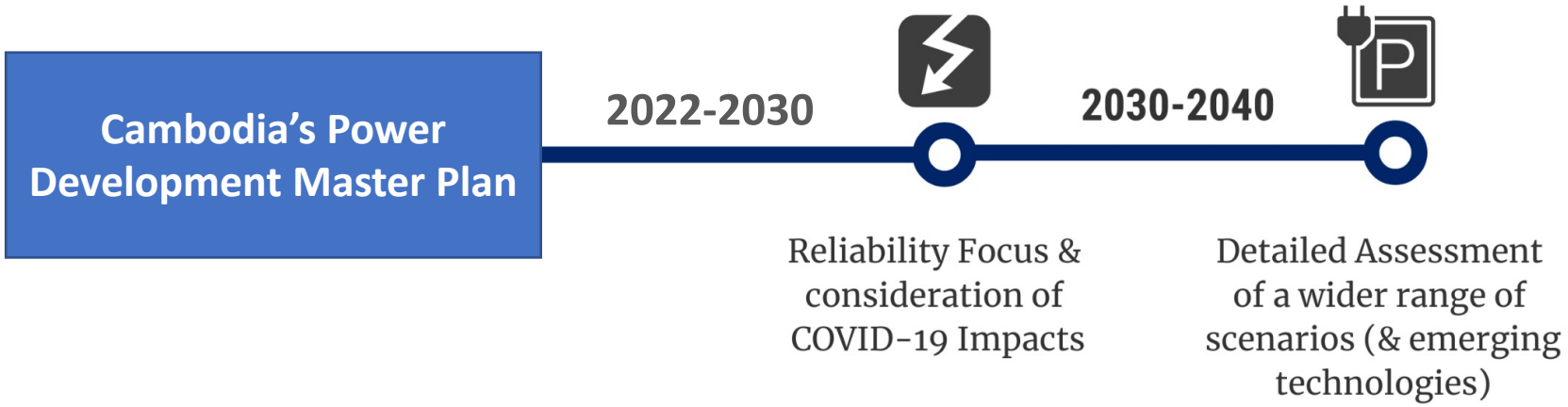
# National Energy Efficiency Policy (2022)

An enabling policy framework is required to support the transition towards a more energy efficient economy – the National Energy Efficiency Policy (2022) is the first step in that direction

- The Policy sets a national target for the reduction of total energy consumption of at least 19% by 2030 in relation to a business-as-usual scenario
- The target of the Policy is broken down for different sectors: industry, residential, commercial buildings, the public sector and transport
- The Policy identifies measures and instruments to be prioritized in Cambodia to support a wider adoption of energy efficiency and a roadmap for implementation
- The Policy establishes a governance framework that assigns specific roles and responsibilities to different government institutions, including a mechanism to facilitate coordination
- The Policy was prepared based on an extensive consultation process, which involved different government institutions, the private sector, and development agencies. Government approved the Policy in November 2022



# Power Development Masterplan (2022-2040)

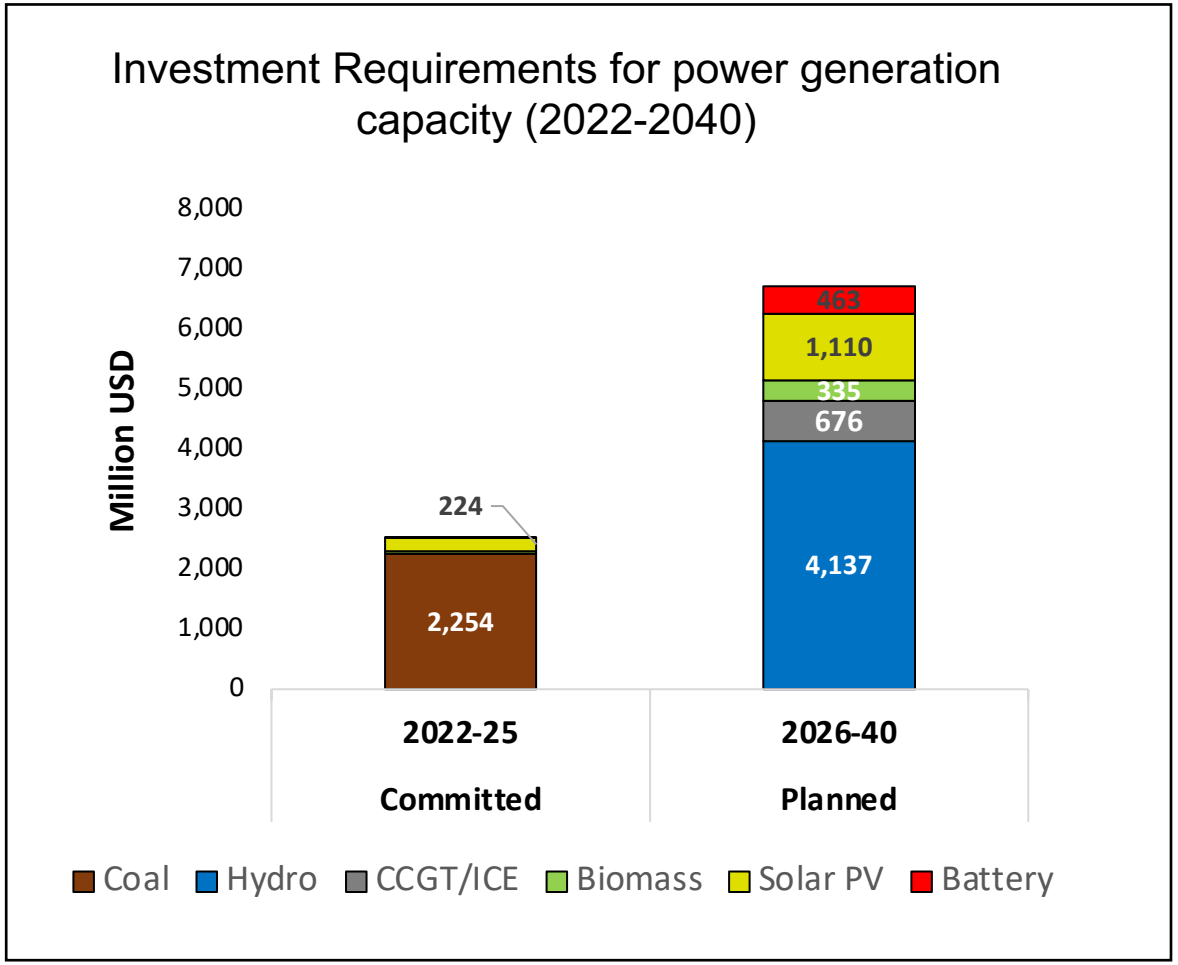



**Objectives:**

- **Satisfy** future load growth with reliable & affordable electricity
- **Strengthen** energy security through greater use of domestic energy resources
- **Maintain** government projects that had already been contracted
- **Increase** the share of clean energy including renewables, variable renewable energy and energy efficiency without compromising reliability and affordability to address national environmental goals & global commitments to the Paris Agreement

# Power Development Master Plan Results

The government adopted a scenario that maximizes the expansion of renewable energy and energy efficiency, with investments in power generation expected to total $9.2 billion over 2022-2040



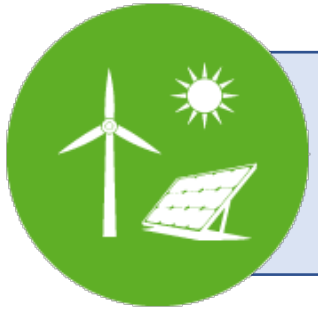

| | Year | Reference Scenario |
|---|---|---|
| **Renewable Energy Generation (%)** | 2030 | 35.0% |
| | 2040 | 43.1% |
| **Renewable Energy Installed Capacity (%)** | 2030 | 48.9% |
| | 2040 | 60.8% |

Targets for renewables above those announced in the Updated NDC (2020) and Long-Term Strategy for Carbon Neutrality (2021)

# Energy Transition in Cambodia

Cambodia has been taking first steps in the direction of a **clean energy transition**, having committed to:

- **Not to develop any new coal-fired power plants** beyond those that have been signed up to (2021)
- **No large hydropower** developments in the mainstream Mekong River (2021)
- Maximize the deployment of **renewable energy** generation (2022)
- Increase the adoption of **energy efficiency** (2022)



***Energy Transition Sector Development Program***

# Energy Transition Sector Development Program (SDP)

## Concept at a Glance – Subprogram 1 (approved 2022)

### Policy Component

**Reform Area 1** – Energy planning and governance strengthened

**Reform Area 2** – Low carbon and circular economy transition accelerated

**Reform Area 3** – Transparent and competitive investment in new solutions enabled

**$50 million**

### Project Component

**Project Investment 1 – Demonstration-Scale Battery Energy Storage System (BESS)**

**~$24 million**

**Project Investment 2 – Energy Efficiency in Streetlighting**

**~$3 million**

**Loan / Grant / Technical Assistance**

- ADB OCR
- ASEAN Infra-structure Fund
- Climate Invest-ment Funds
- ACGF Green Climate Fund

# Energy Transition SDP – Policy Reforms

| Policies |
| --- |
| **Reform Area 1: Energy planning and governance strengthened** |
| 1.1 Power Development Master Plan (2022– 2040) |
| 1.2 Gender Mainstreaming Strategic Plan in Mines, Energy and Petroleum Year 2021–2025 |
| 1.3 Long-Term Strategy for Carbon Neutrality (2021) |
| **Reform Area 2: Low carbon and circular economy transition accelerated** |
| 1.4 National Energy Efficiency Policy (2022) |
| 1.5 Launched the GMS Energy Transition Task Force (2022) |
| 1.6 The Climate Change Action Plan for Energy Sector 2021–2023 |
| 1.7 Roadmap for Sustainable Consumption and Production (2022) |
| 1.8 Circular Economy Strategy and Action Plan (2022) |
| **Reform Area 3: Transparent and competitive investment in new solutions enabled** |
| 1.9 Investment Law outlining incentives for green energy and technologies (2022) |
| 1.10 Strategic Framework and Programs for Economic Recovery in the Context of Living with COVID-19 in a New Normal (energy transition as a core priority) (2022) |
| 1.11 Sub-decree to reduce special tax on Electric Vehicles from 30% to 10% (2022) |

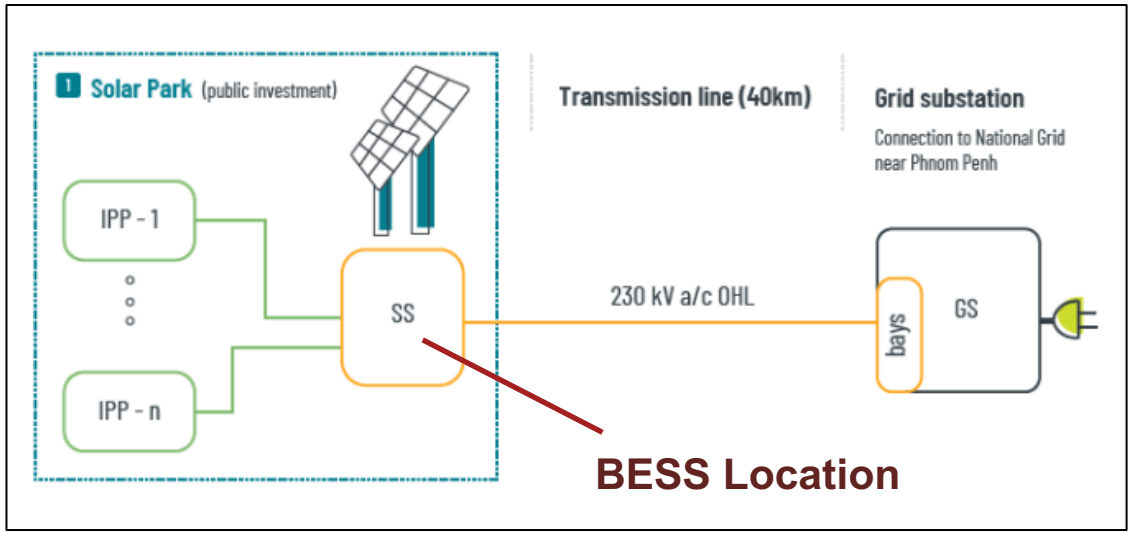
# Energy Transition SDP – Project Investment 1 (BESS)

- Increase in fossil fuel prices and the expansion of domestic solar power generation have led EDC to prioritize the uptake of BESS

- Utility-scale BESS expansion has been considered in the reference scenario of the Power Development Masterplan (2022-2040), with the first installations to achieve COD in 2025

- Estimated size of the system: **~50 MW / 50 MWh**

- The BESS will fulfil several functions, including:
  - ✓ Energy storage during periods of excess capacity
  - ✓ Frequency regulation
  - ✓ Deferral of investments in power system expansion



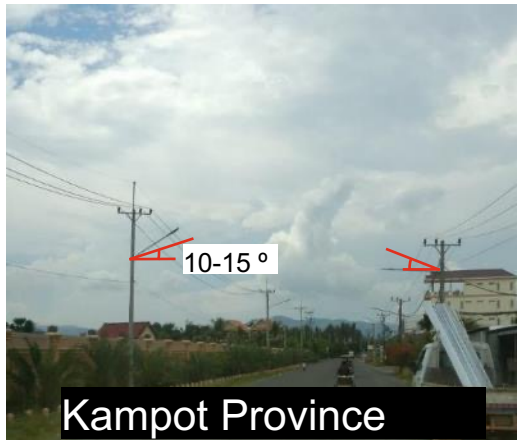

- The BESS will be installed at the national solar park project in Kampong Chhnang Province

# Energy Transition SDP – Project Investment 2 (Energy Efficiency)

## Replacement

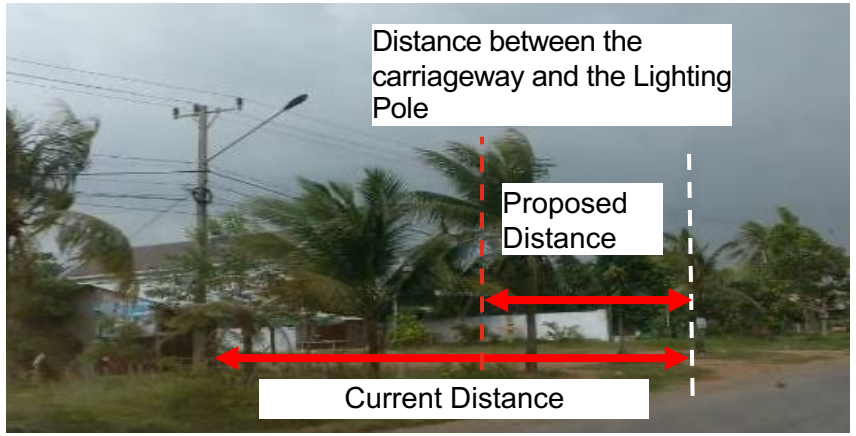


**Case 1: Replacement** of HPSV luminaires with LEDs to be carried out, as LEDs have a better energy performance


**Case 2: Incorrect Boom angles** in street lighting design and improperly sized LED lamps were observed to lead to improper light distribution on roads. For such cases as well, replacement and infrastructure upgrades shall be undertaken.

## Greenfield Installations




**Case 1:** Roads with **no coverage of streetlights**, which have settlements or commercial areas in their vicinity – they were prioritized for greenfield installations of streetlights.

**Case 2:** Due to **high distance of poles from the road**, the illumination is not sufficient. Greenfield installations were also recommended for such cases.

# Energy Transition Sector Development Program

## Concept at a Glance – Subprogram 2 (for 2024/2025)

**Policy Component**

**Reform Area 1** – Energy planning and governance strengthened

**Reform Area 2** – Low carbo… …ular economy transition accel…

**Reform Area …** …sparent and competitive investmen… …solutions enabled

Additional policies

**Project Component**

**Project Investment 1 – Energy Effici… Revolving Fund**

**Project Investment 2 … Healthcare Facilities for … …ed Services**

**Proje… …tment 3 – Other investments …ed with the energy transition**

Under preparation / discussion

**Loan / Grant / Technical Assistance**

**ADB OCR**

**Climate Finance**

**Other Funders**

Not Exhaustive

# Policy Component – Development of MEPs and Labelling Program

**Regulations specifying appliance specific requirements:**

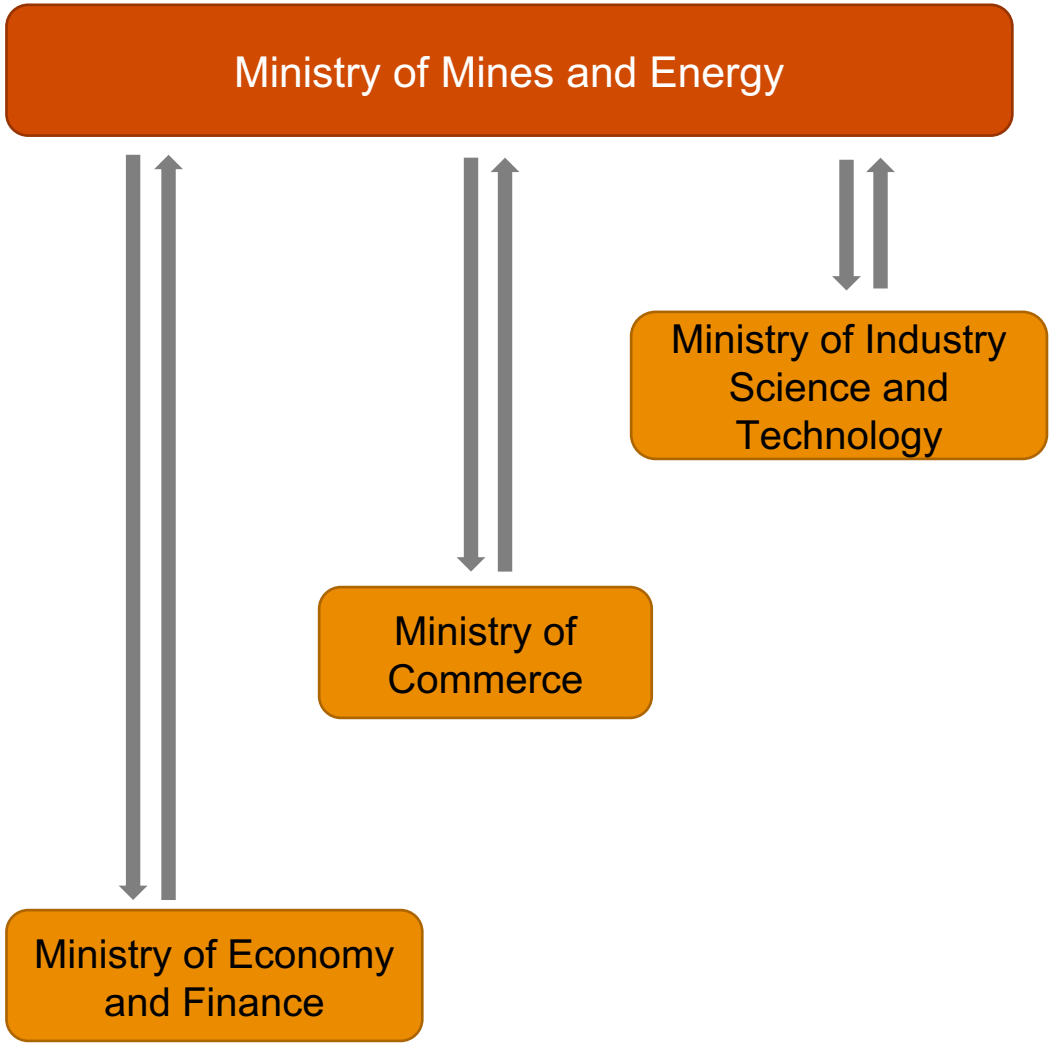
1. For each appliance requirements include: Scope, standards, testing method, MEPS, Energy Efficiency levels, label design, and check testing procedure

**Regulations specific to compliance and enforcement**

1. To forbid the sale, import and manufacture of appliances not compliant with the S&L regulations
2. To decide on the financial and/or non-financial measures to be imposed in the case of non-compliance

**Guidelines to specify:**

1. Application process for importers and manufacturers of equipment
2. Procedures for test checking
3. Procedures for inspection and verification
4. Procedures for testing laboratory accreditation requirements
5. Others




**Complementary Measures**

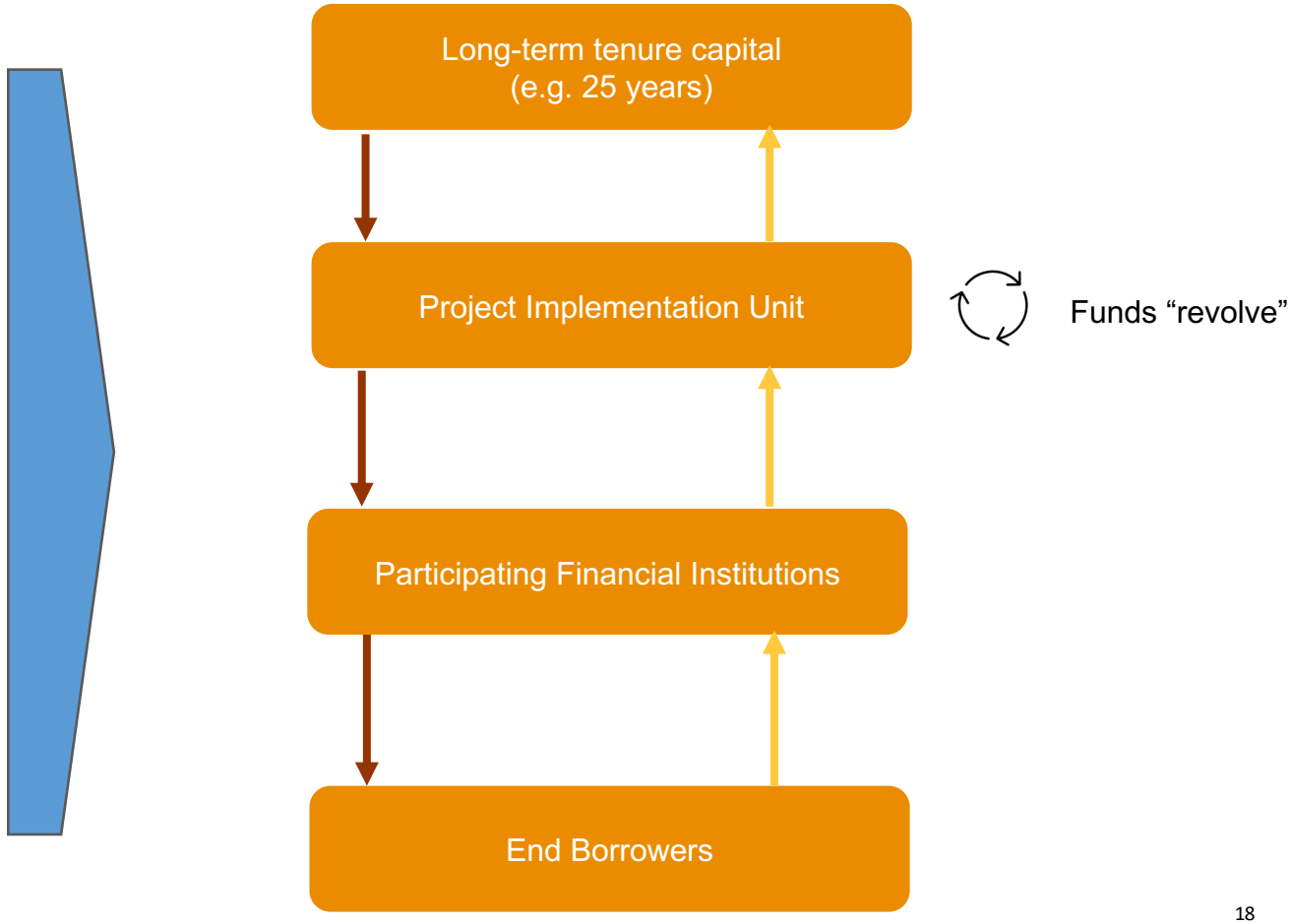
- Detailed Roll-Out Plan
- Standard and Operating Procedures
- Stakeholder Consultations
- Private Sector Engagement
- Market Assessment

# Energy Efficiency Revolving Fund (Concept)

An Energy Efficiency Revolving Fund would provide access to financing to SMEs to facilitate their investments in energy efficiency

- Markets with low to medium maturity
- Help demonstrate the commercial viability of energy efficiency investments
- Provide a credit history for borrowers
- Scope of eligible investments to consider other measures aligned with the energy transition

## Revolving Fund Basic Design



# Concluding Remarks

- The energy transition can be embraced by low and middle-income countries, which can result in opportunities for economic growth and job creation

- Governments play a key role in creating the enabling conditions to support this transition thereby reducing risks to investors:

  - Through the enactment of supportive policies and regulations

  - By setting ambitious but realistic targets

  - Supporting keystone projects and increasing access to financing

# Thank you

15 June 2023