

# Smart Grid Transformation in the Distribution Sector in the Philippines

## Pre-Assessment Study Results

ACEF 2025

Thematic Session 3.1: Smart Utilities – Demand Flexibility and Demand Optimisation

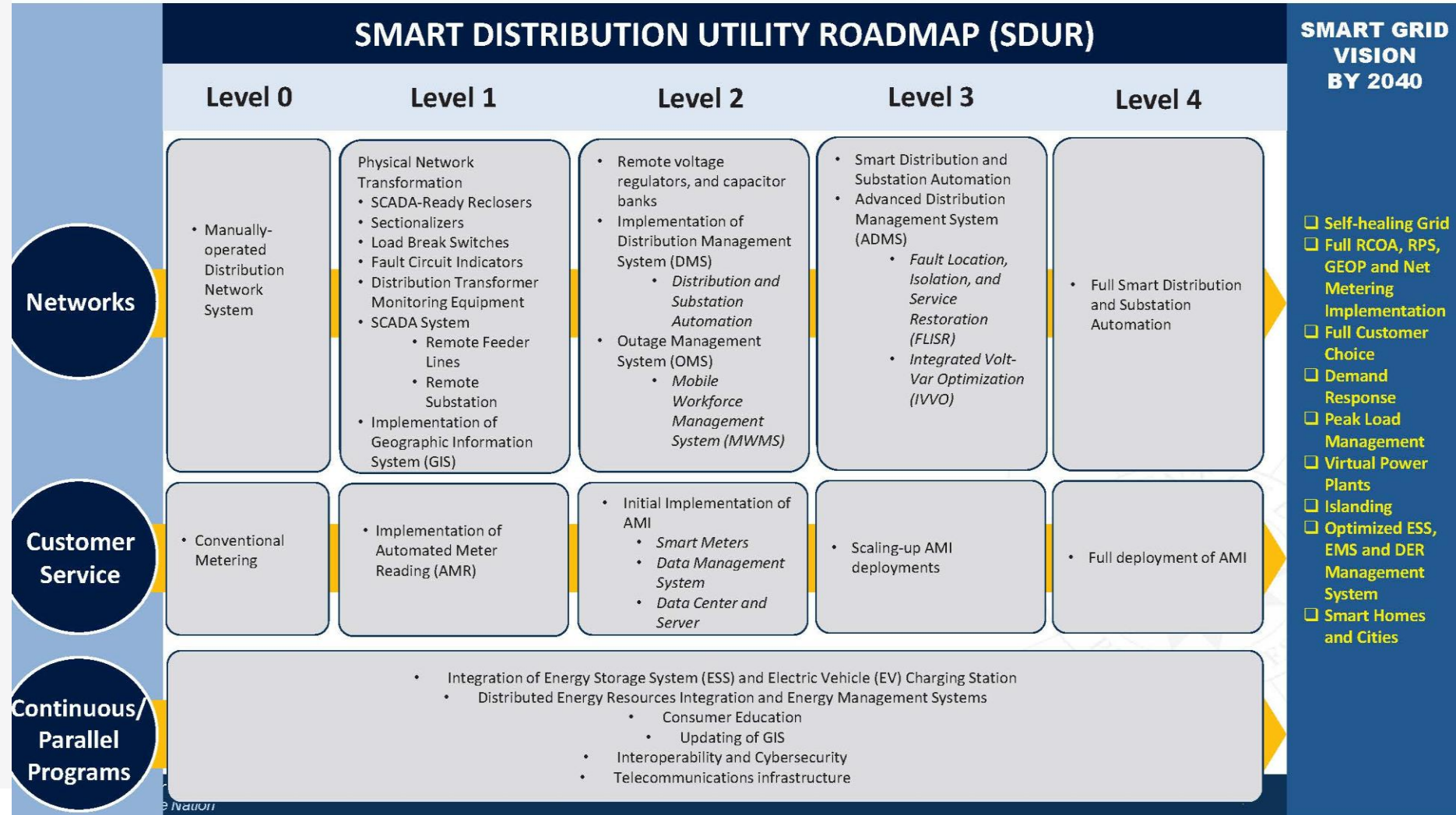
3 June 2025, 14:00-15:30 Asian Development Bank

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# 1. Smart Distribution Utility RoadMap

## DC2020-02-0003: Providing a National Smart Grid Policy Framework for the Philippine Electric Power Industry and RoadMap for Distribution Utilities



## 2. Project Objectives, Outcomes and Outputs

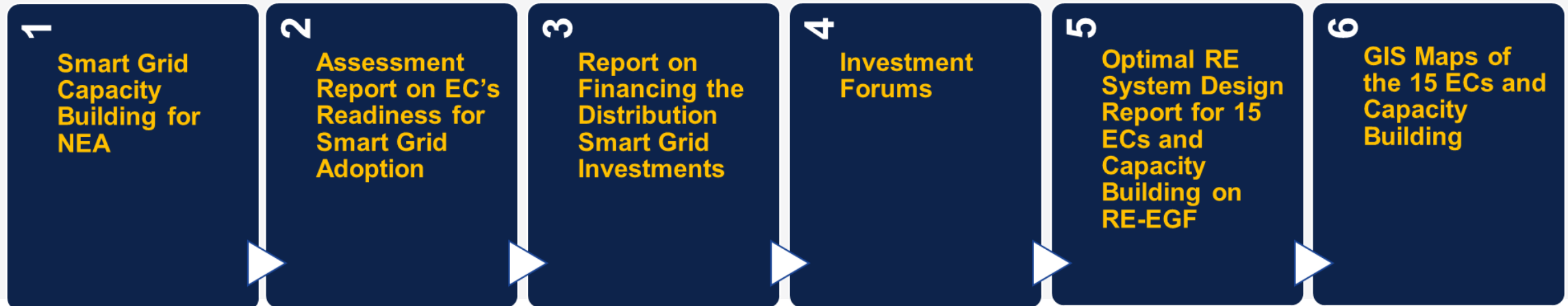
- **Objectives**

- To facilitate the transformation to a smart distribution utility and contribute to the Philippines' clean energy goals as well as improve the capacity and build the capability of NEA and the ECs for smart grid implementation
  - **Address barriers to smart grid adoption**
  - **Enhance technical capacity in GIS-based mapping and renewable energy optimisation**

- **Outcomes**

- Smart distribution utilities become Level 1 smart grid
- Enable investments for smart grid implementation
- Enhance the capacity of distribution energy administrators and electric cooperatives for smart grid implementation

- **Outputs**



### 3. Participating Electric Cooperatives

- 1 QUEZELCO I R39X+RHG, Barangay Poctol, Pitogo, Quezon, Pitogo
- 2 AURELCO Baler, Aurora
- 3 ORMECO 9596+M4J, Western Nautical Hwy, Calapan, 5200 Oriental Mindoro
- 4 PALECO North National Highway, Bgy. Tiniguiban, Puerto Princesa, Palawan
- 5 PANELCO I Bani, Pangasinan
- 6 PELCO III XQ65+JGV, Apalit, 2016 Pampanga
- 7 ILECO II XJ2W+59V, Barangay, Pototan, 5008 Iloilo
- 8 SAMELCO I 3J2Q+F53, Brgy. Carayman, Calbayog City, 6710 Samar
- 9 SAMELCO II 54 AH26, Catbalogan City Proper AH26, Catbalogan City Proper, Catbalogan City, Samar
- 10 NORECO I Q4HV+JP8, National Road, Bayan ng Bindoy, Lalawigan ng Negros Oriental
- 11 BILECO Naval, Biliran
- 12 AKELCO M9VG+H7X, Quezon Avenue, Kalibo, Aklan
- 13 LEYECO V 2JR3+89X, Ormoc, Leyte
- 14 DORECO X629+M35, National Highway, Madang, Mati, Davao Oriental, Lupon
- 15 SIARELCO Q27R+V69, National Highway, Dapa, Siargao Island, Surigao Del Norte, Dapa

Pre-assessment Sites:

- L1
- L2
- L3
- L6

L1	PANELCO I	Bani, Pangasinan
L2	PELCO III	XQ65+JGV, Apalit, 2016 Pampanga
L3	AURELCO	Baler, Aurora
L4	QUEZELCO I	R39X+RHG, Barangay Poctol, Pitogo, Quezon, Pitogo
L5	ORMECO	9596+M4J, Western Nautical Hwy, Calapan, 5200 Oriental Mindoro
L6	PALECO	North National Highway, Bgy. Tiniguiban, Puerto Princesa, Palawan
V1	AKELCO	M9VG+H7X, Quezon Avenue, Kalibo, Aklan
V2	ILECO II	XJ2W+59V, Barangay, Pototan, 5008 Iloilo
V3	NORECO I	Q4HV+JP8, National Road, Bayan ng Bindoy, Lalawigan ng Negros Oriental
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V6	BILECO	Naval, Biliran
V7	LEYECO V	2JR3+89X, Ormoc, Leyte
M1	SIARELCO	Q27R+V69, National Highway, Dapa, Siargao Island, Surigao Del Norte, Dapa
M2	DORECO	X629+M35, National Highway, Madang, Mati, Davao Oriental, Lupon



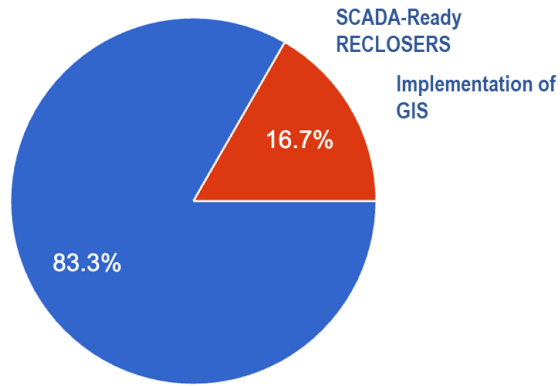


## 6. Baseline SDUR

### 4 Electric Cooperatives (PALECO, PELCO III, PANELCO I, AURELCO)

#### Distribution Network

Level 1 -refers to DUs that have initiated the installation and integration of reclosers, sectionalisers, load break switches, fault circuit indicators, SCADA system/s, and/or GIS.

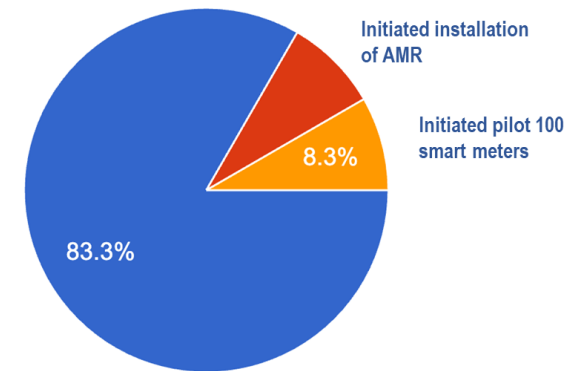


- Level 0 -refers to DUs that have yet to initiate any Smart Grid plans and prog...
- Level 1 -refers to DUs that have initiated the installation and integration of reclo...
- Level 2 -refers to DUs that have initiated the installation of remote voltage regul...
- Level 3 -refers to DUs that have initiated the implementation of FLISR and/or A...
- Level 4 -refers to DUs that have fully implemented SDA and SSA.

#### Customer Service

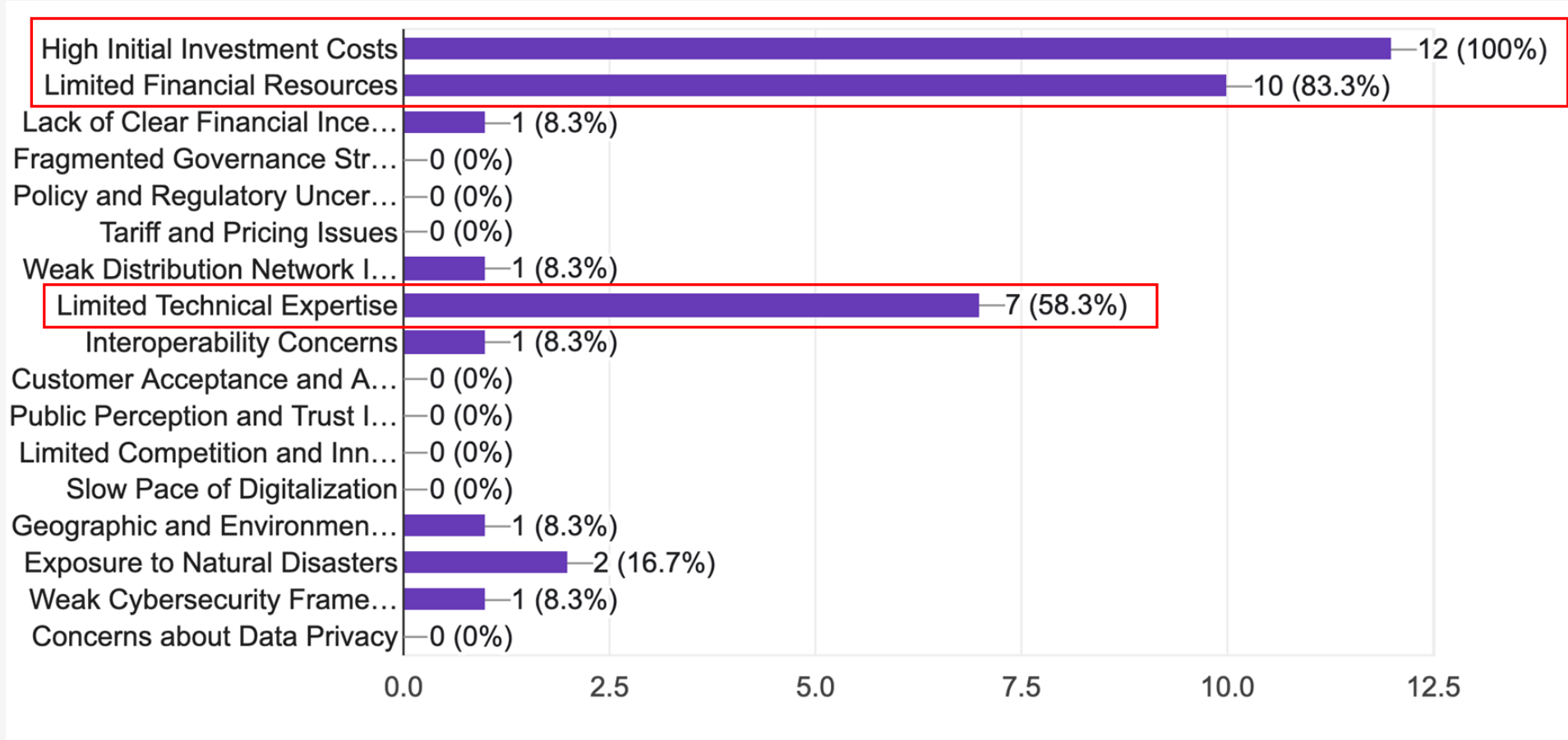
Level 1 -refers to DUs that have initiated the installation and integration of AMR.

Level 2 -refers to DUs that have initiated the implementation of AMI by installing Smart Meters, Data Management System, and Data Center and Server.



- Level 0 -refers to DUs using conventional metering and have yet to...
- Level 1 -refers to DUs that have initiated the installation and integration of AMR.
- Level 2 -refers to DUs that have initiated the implementation of AMI by installin...
- Level 3 -refers to DUs that have installed additional Smart Meters.
- Level 4 -refers to DUs that have fully implemented AMI technologies.

## 7. Barriers to Investments



# 7. Highlights

## 1. Smart Grid Benefits

- **Utilities:** Improved operations, demand management, renewable integration
- **Consumers:** Better energy control, smart services, improved reliability

## 2. Assessment Findings

- All 4 ECDUs operate manually
- Partial investments in SCADA-ready devices
- PALECO has pilot smart meters; others have none

## 3. Baseline Status

- Distribution Network: Level 0
- Customer Service: Early-stage AMR/AMI implementation

## 4. Regulatory Framework

- DOE Department Circular 2020-02-0003 (Smart Grid Framework)
- Aligned with RPS and national energy mandates

## 5. Key Barriers

- Limited tech know-how
- Infrastructure and funding challenges

## 8. Key Insights

### 1. Electric Cooperatives: on-grid vs small island off-grid

- Some off-grid regions are comparable to large on-grid areas in terms of size, development and infrastructure
  - Smart Grid deployment strategies can mirror those used in grid-connected areas
    - includes advanced metering, distribution automation, and centralised control systems
    - may support sophisticated energy management and customer engagement platforms
  - Consolidation may be possible for adjacent off-grid networks
- For small-scale off-grid networks, investment should focus on cost-effective, high-impact areas
  - Could focus on upstream automation
  - Customer-level investments should be minimal and highly targeted (use case)

### 2. Financial Barriers

- Investments could be strategically justified through key benefits:
  - improved grid reliability, enhanced power quality, increased operational efficiency, reduced system interruption and unserved energy, and improved customer service
- Key challenge lies in developing a capital expenditure (CAPEX) plan that effectively captures and delivers the full range of benefits

### 3. Level 0 to Level 1: benefits

- Smart grid investments at the network level —such as grid automation, advanced monitoring, and distribution management systems— are expected to deliver the greatest overall benefits.
- Customer-level smart grid investments are likely to yield relatively modest returns, especially in areas where average electricity consumption per customer is low.