



POWER DEMAND AND SUPPLY OUTLOOK 2018-2040

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Grand Xing Imperial Hotel, Iloilo City
9 October 2018



Presentation Outline



**2017
Power Demand
and Supply
Snapshot**



**Power
Development Plan,
2016-2040**



**Power Demand
and Supply
Outlook, 2018-2040**

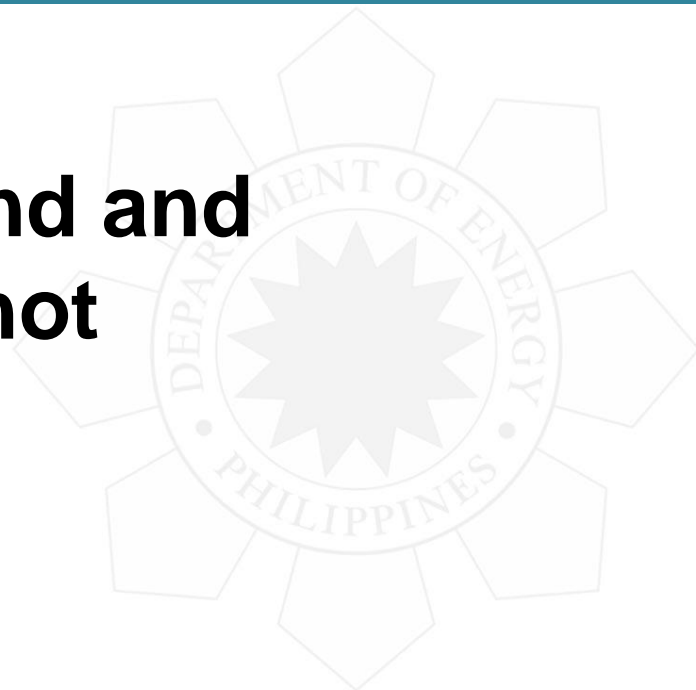


**Way
Forward**

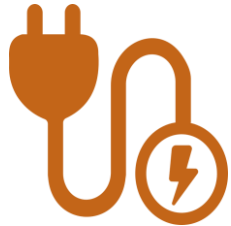




2017 Power Demand and Supply Snapshot



2017 Power Demand and Supply Snapshot



Peak Demand
13,789 MW



Capacity

Installed - 22,728 MW
Dependable - 20,515 MW
Available - 14,458 MW

Electricity Sales and Consumption

94,370 GWh



Newly Operational Installed Capacity

835 MW



Gross Generation

94,360 GWh

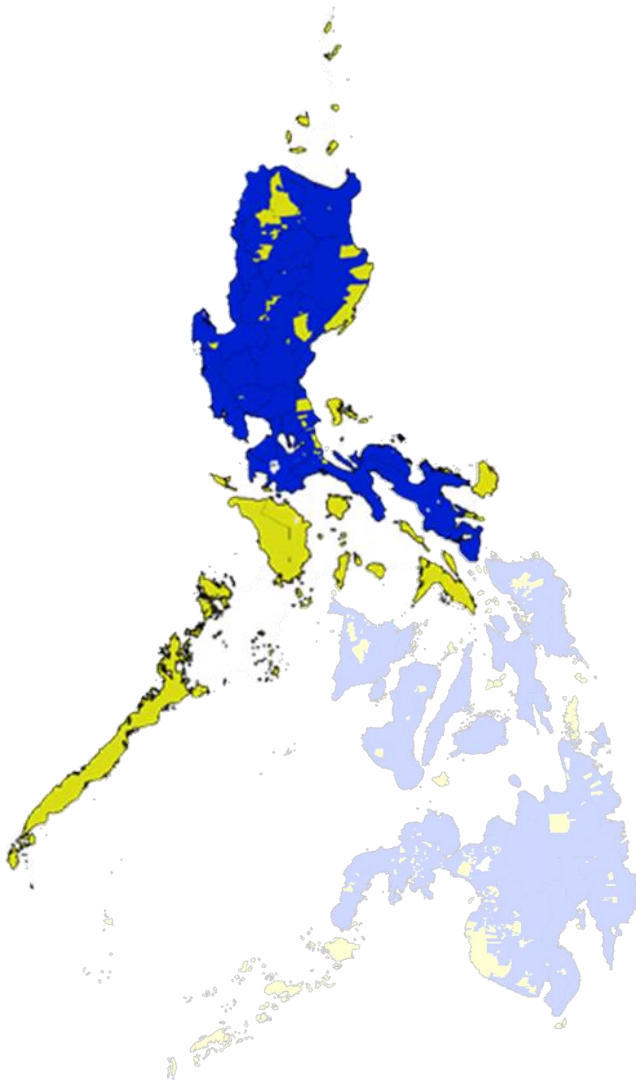


Power Project Capacity

Committed - 6,511 MW
Indicative - 17,444 MW



2017 Luzon Demand and Supply Snapshot



Blue and yellow fill colors correspond to grid and off-grid areas, respectively

10,054 MW

Peak Demand
(9 May 2017)

15,743 MW

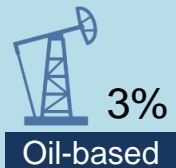
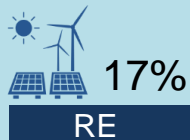
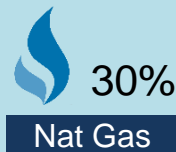
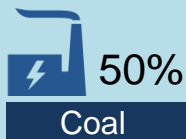
Installed Capacity

14,430 MW

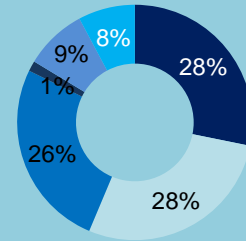
Dependable Capacity

68,512 GWh

Gross Generation



Electricity Sales and Consumption
69,625 GWh



■ Residential
■ Commercial
■ Industrial
■ Own-Use
■ Systems Loss
■ Others

392 MW

Newly Installed Capacity

Power Projects

6,511 MW – Committed
17,444 MW - Indicative



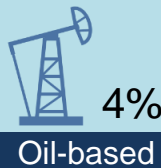
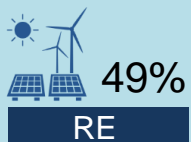
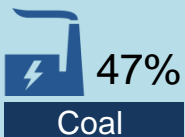
2017 Visayas Demand and Supply Snapshot

1,975 MW
Peak Demand
(14 November 2017)

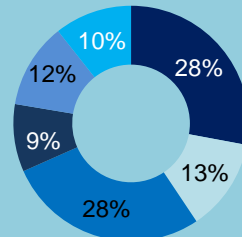
3,426 MW
Installed Capacity

3,002 MW
Dependable Capacity

14,054 GWh
Gross Generation



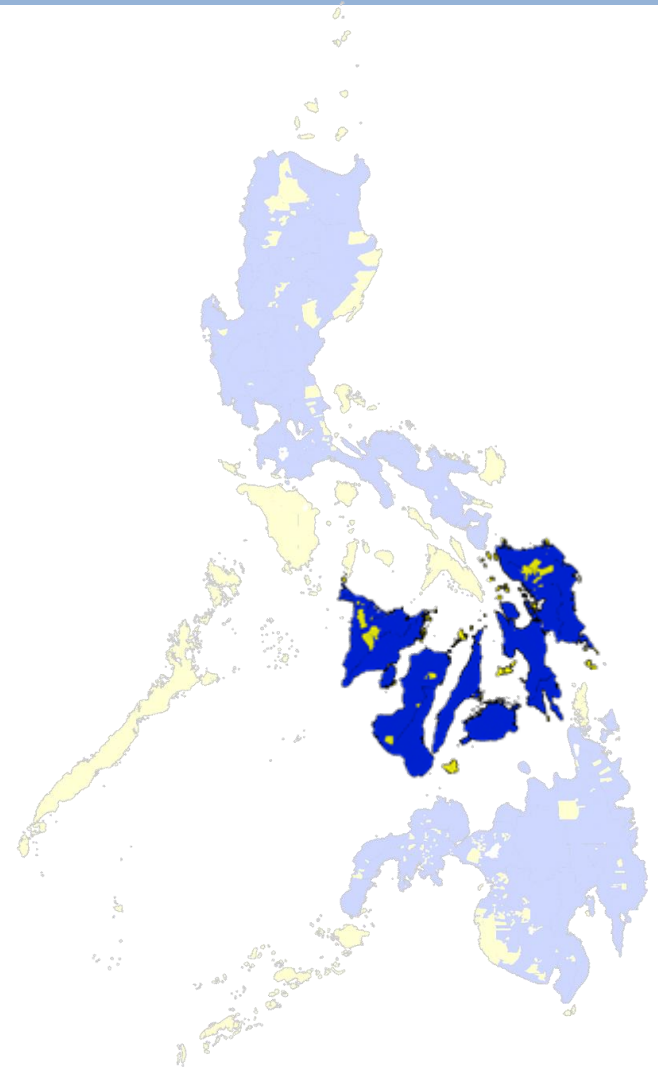
Electricity Sales and
Consumption
12,942 GWh



■ Residential ■ Commercial
■ Industrial ■ Others
■ Own-Use ■ Systems Loss

106 MW
Newly Installed Capacity

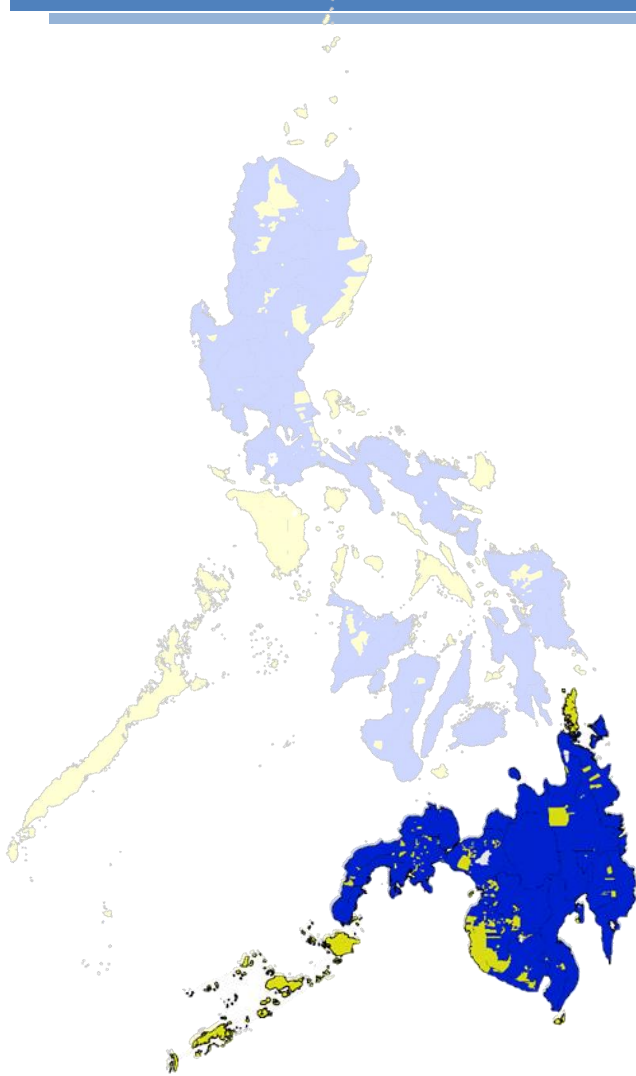
Power Projects
775 MW – Committed
3,399 MW - Indicative



Blue and yellow fill colors correspond to grid and off-grid areas, respectively



2017 Mindanao Demand and Supply Snapshot



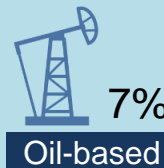
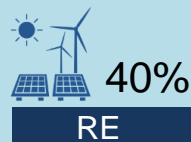
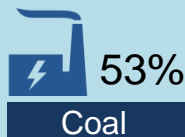
Blue and yellow fill colors correspond to grid and off-grid areas, respectively

1,760 MW
Peak Demand
(6 December 2017)

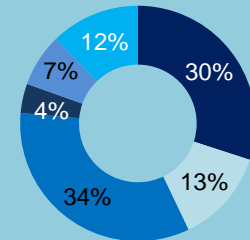
3,559 MW
Installed Capacity

3,083 MW
Dependable Capacity

11,804 GWh
Gross Generation



Electricity Sales and
Consumption
11,804 GWh



■ Residential ■ Commercial
■ Industrial ■ Others
■ Own-Use ■ Systems Loss

337 MW
Newly Installed Capacity

Power Projects
1,332 MW – Committed
1,981 MW - Indicative

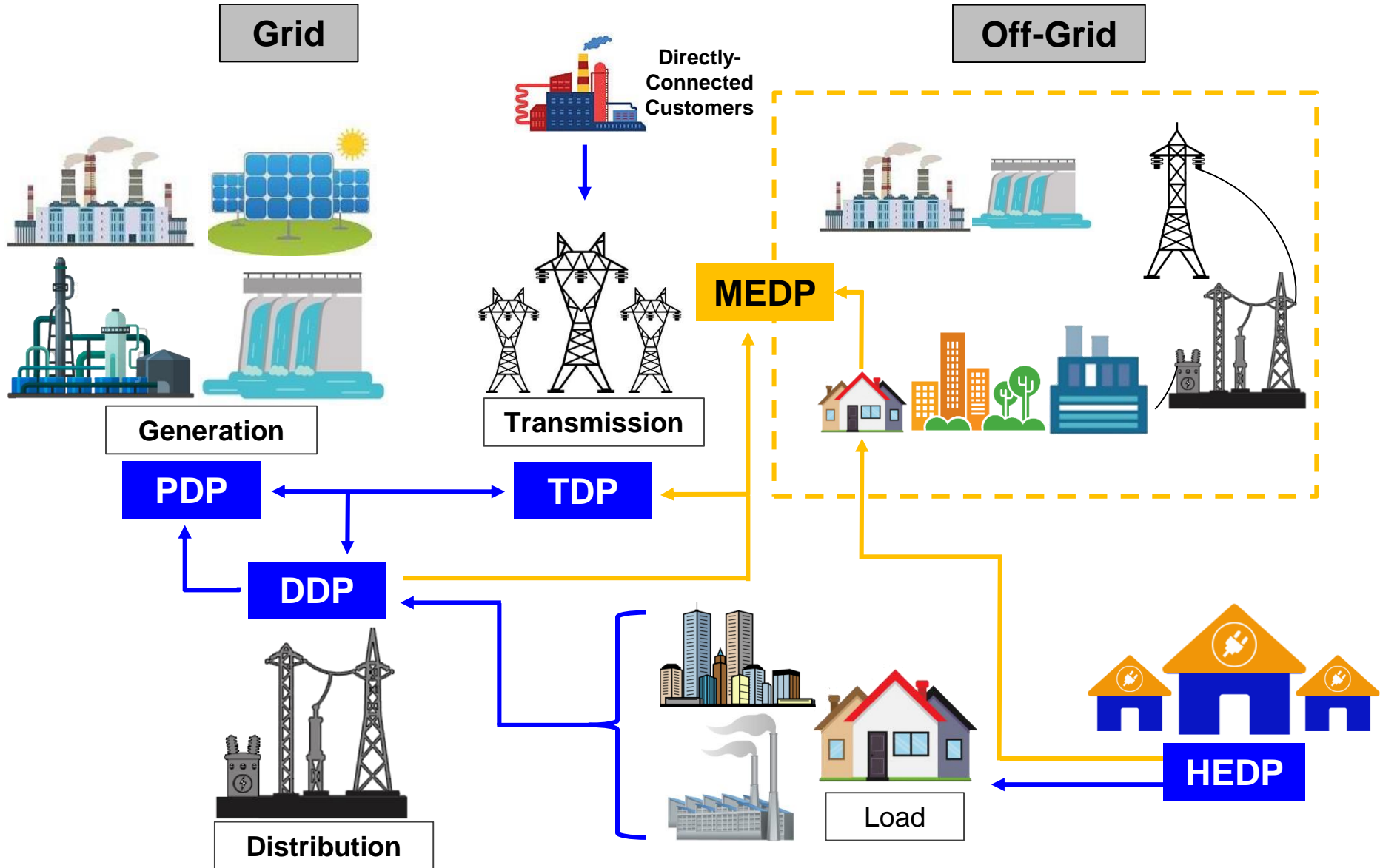




Power Development Plan, 2016-2040

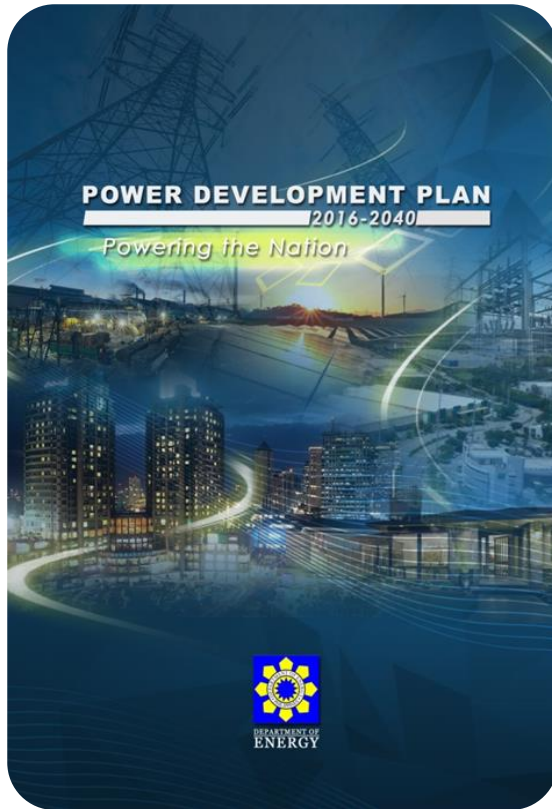


Power Development Plan Framework



Power Development Plan, 2016-2040

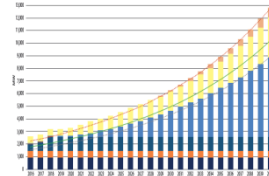
Major Contents



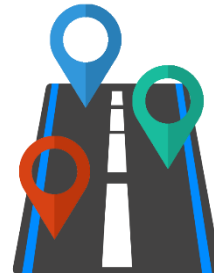
Philippine Electricity Profile



Five-Year Performance Assessment, 2011-2015



Power Demand and Supply Outlook, 2016-2040



Power Sector Roadmap





Power Demand and Supply Outlook, 2018-2040



2018-2040 Power Demand-Supply Outlook

Process Flow



Base Year Power Statistics, 2017

- Electricity Sales
- Peak Demand
- Dependable Capacity
- Gross Generation
- Power Plant Operational Data

Electricity Sales and Peak Demand Forecast

- Base Year Electricity Sales and Peak Demand
- Electricity Sales Forecast
- Economic Growth
- Load Factor

Supply Expansion Plan

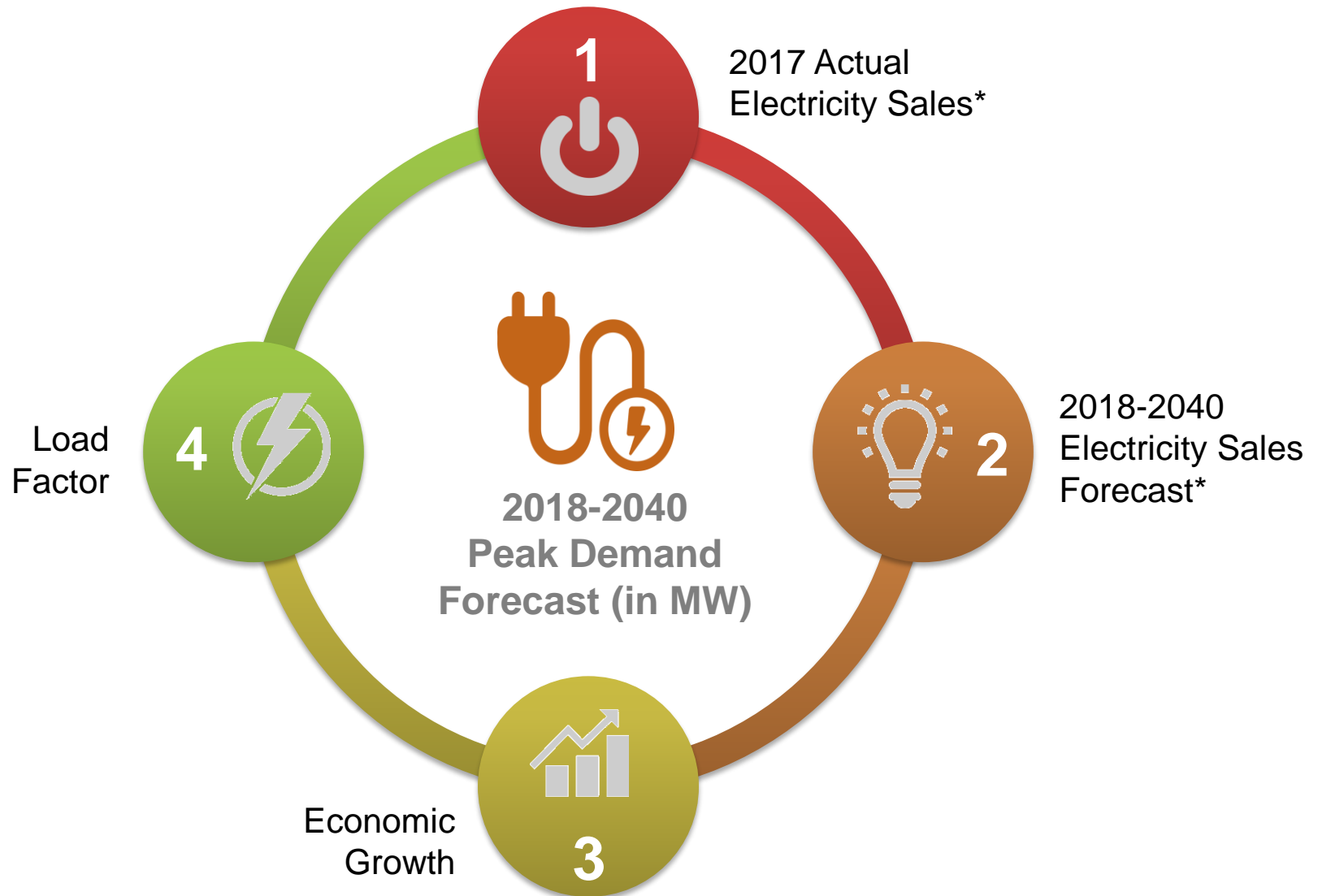
- Capacity Addition (MW) for Luzon, Visayas, and Mindanao Grids
- Gross Generation (MWh) Projection

Long-Term Power Demand-Supply Outlook

- Peak Demand Forecast
- Installed Capacity Requirement Per Plant Type (in MW),
- Power Generation Requirement Per Plant Type (in MWh)



Electricity Sales and Peak Demand Forecast



* Excluding Off-Grid



Supply Expansion Plan Methodology Diagram



Input Parameters

- Existing Power Plants
- Economic Indicators
- Committed and Indicative Power Projects
- Demand Forecast
- Technical Parameters

Assumptions/ Building Scenarios

- Shifting from Domestic Natural Gas to LNG by 2025
- At least 35% share of Renewable Energy to the Generation Mix by 2030
- Entry of Flexible Generation

Simulations

- Utilization of a cost-based optimization model for power generation expansion planning that allows flexibility of operation

Long-Term Power Demand-Supply Outlook

- Power Generation Expansion Plan for Luzon, Visayas and Mindanao Grids
- Gross Generation Projection

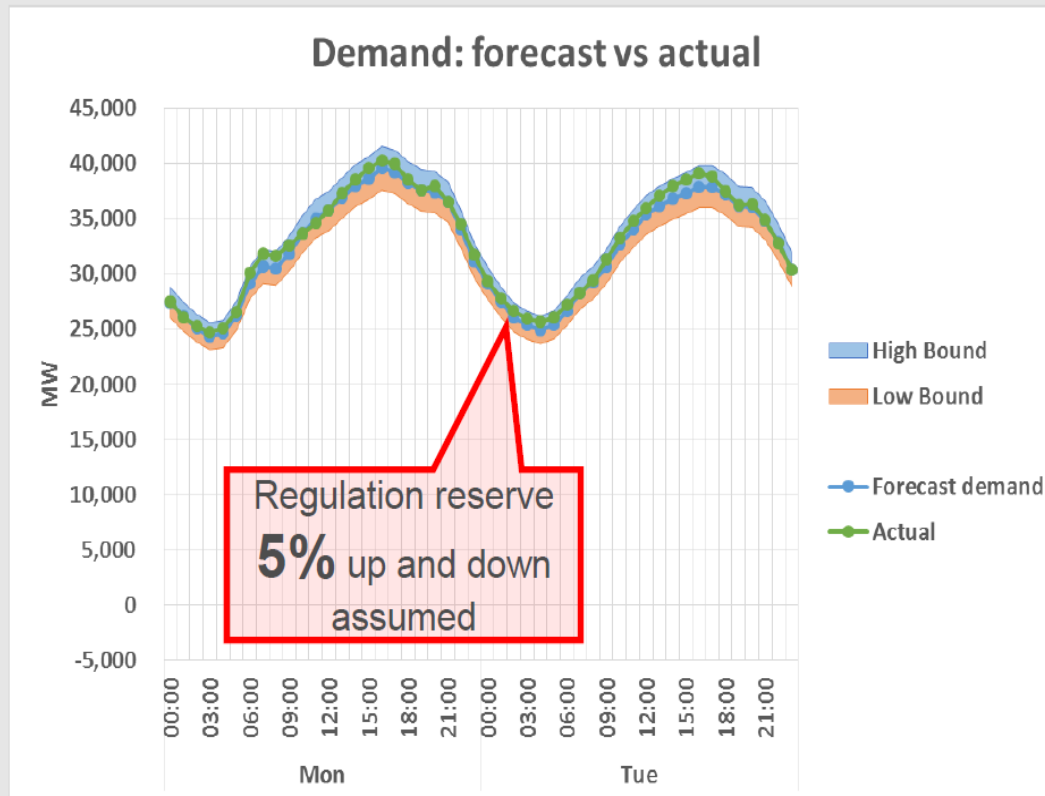


VREs and Flexible Generation

How to balance demand forecast errors?

System needs to be ready for the forecast errors

→ Operational reserves

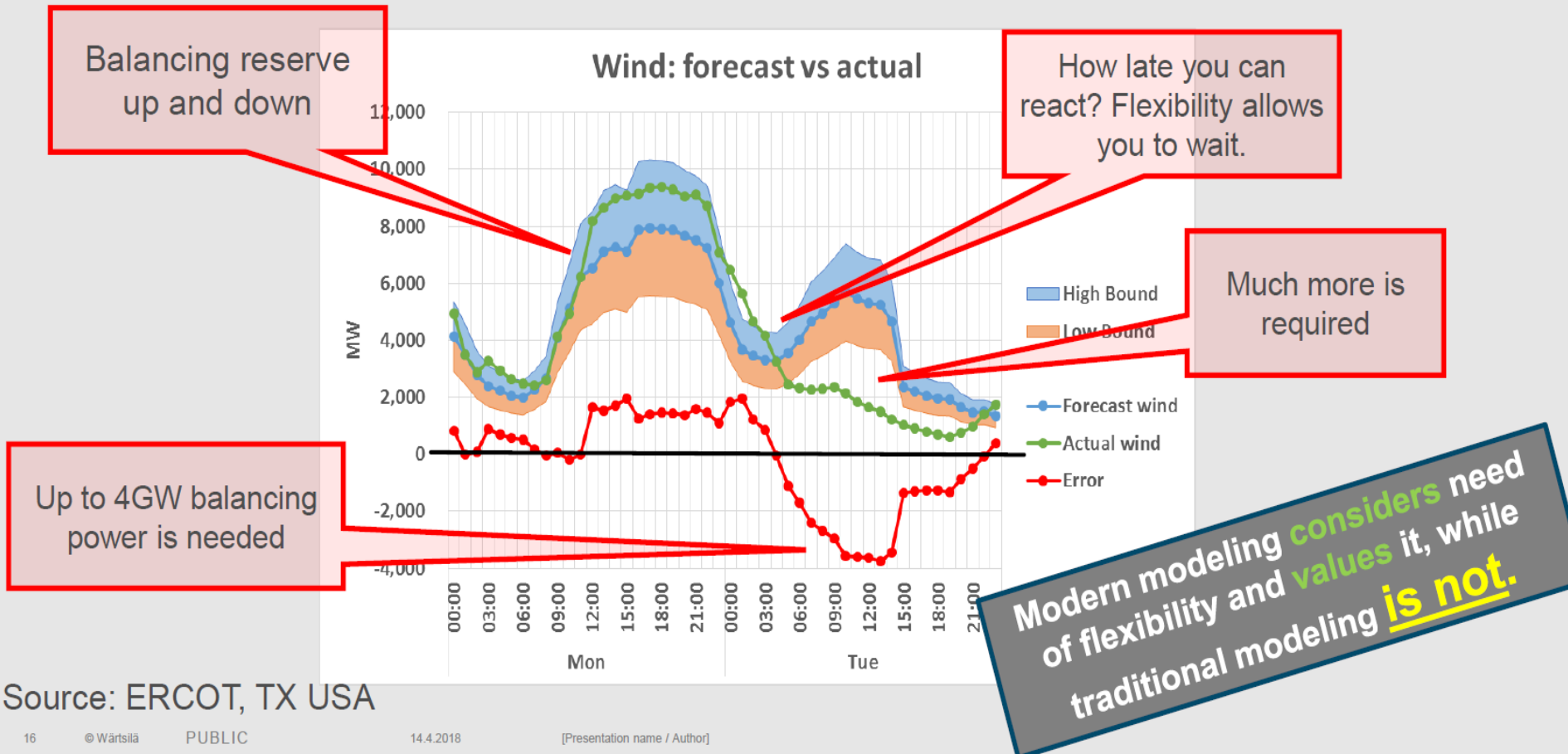


Demand behaviour is typically quite predictable and 5% reserve is covering forecast errors

Source: ERCOT, TX USA

VREs and Flexible Generation

How much power is needed for balancing renewable forecast errors?



Source: ERCOT, TX USA



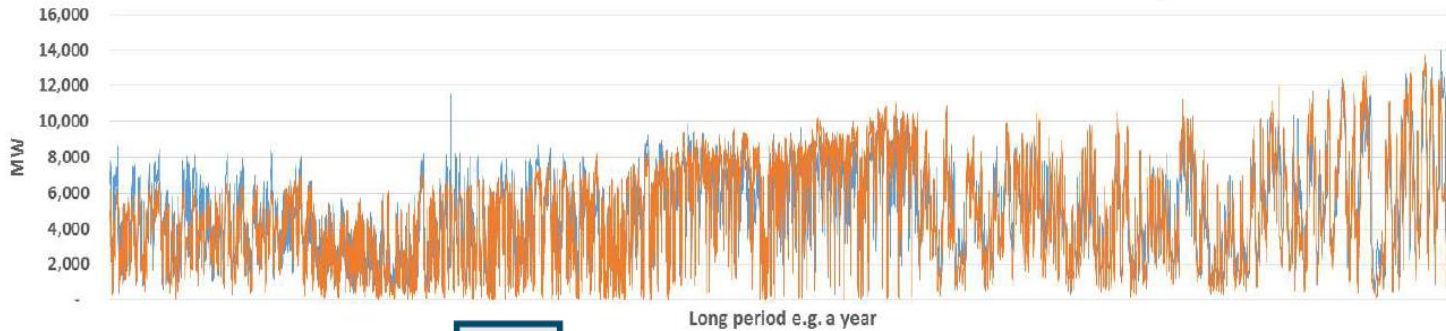
VREs and Flexible Generation

REQUIRED BALANCING RESERVES FOR RENEWABLES FORECAST ERRORS



Historical profiles

Wind: Forecast vs actual

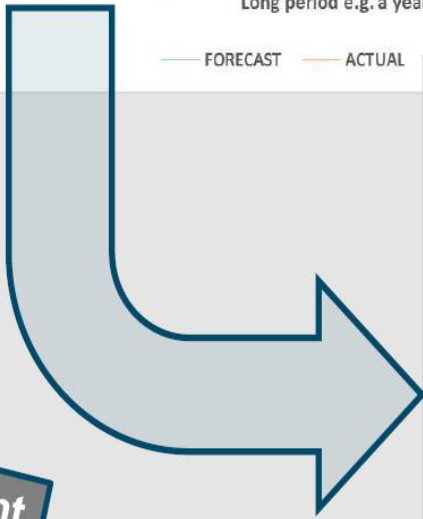


Long period e.g. a year

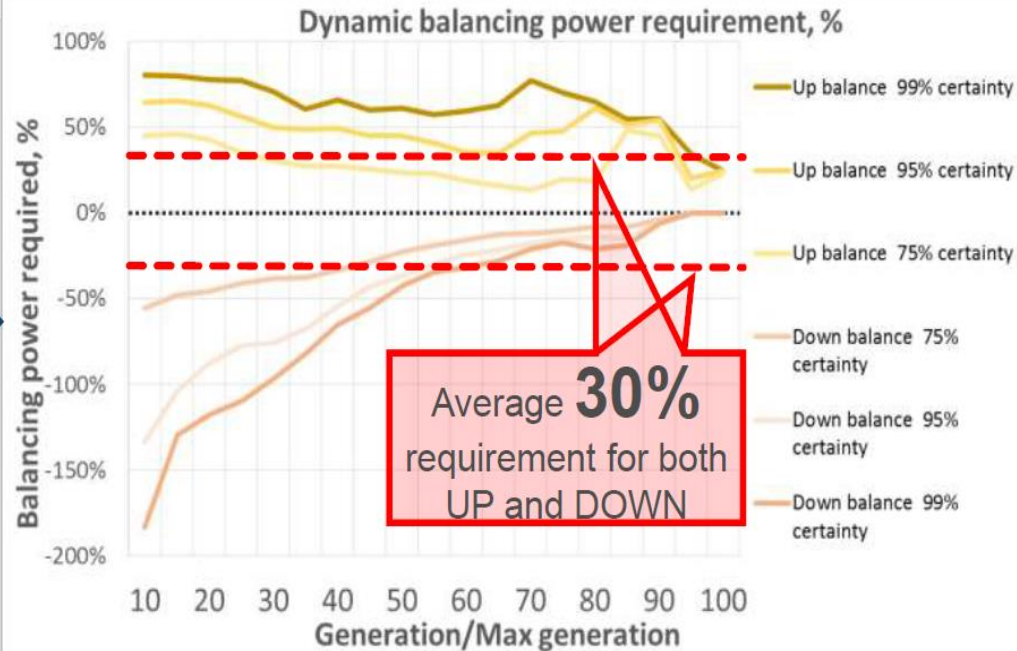
Source: ERCOT, TX USA

— FORECAST — ACTUAL

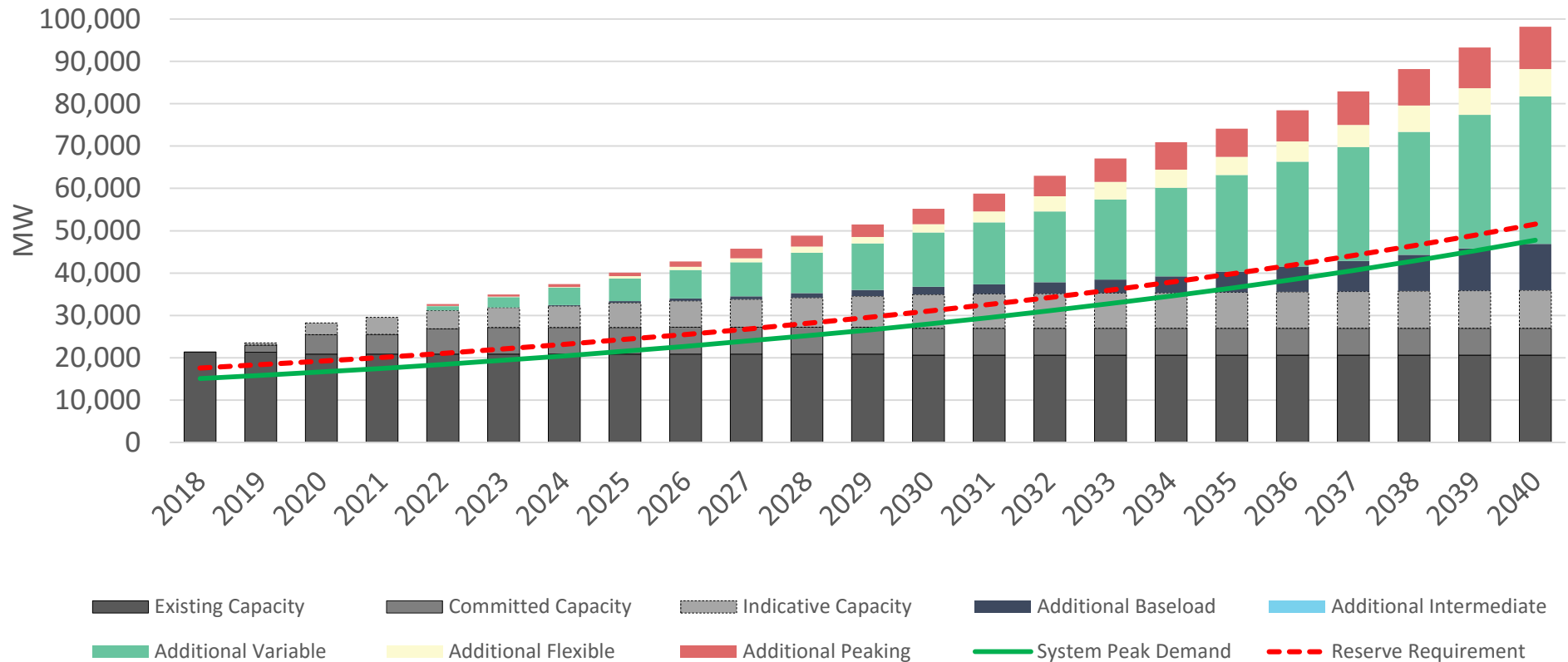
Statistical analysis



Balancing requirement needs to be considered carefully



Philippines Capacity Expansion 2018-2040



Total Installed Capacity

• 22,262 MW

Total Indicative Capacity

• 8,997 MW

Total Committed Capacity

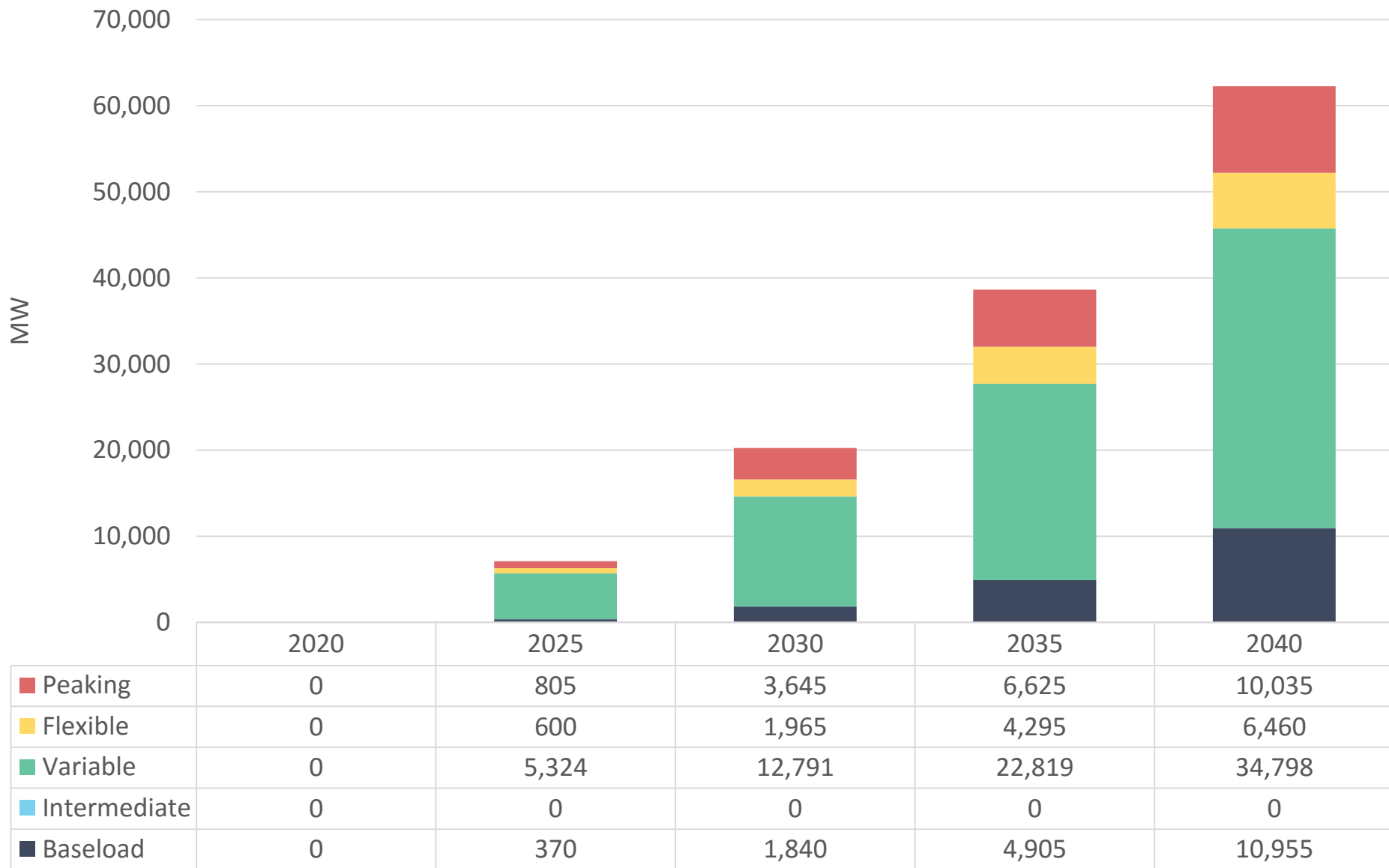
• 6,323 MW

Total Capacity Addition

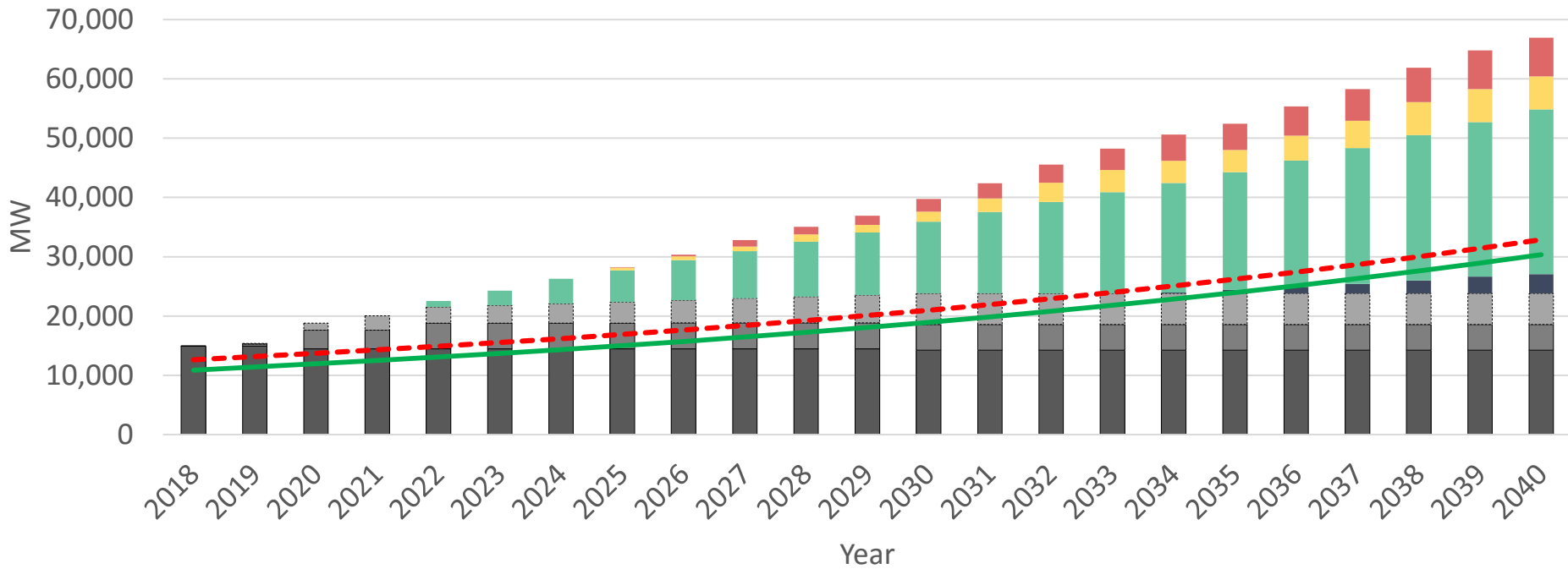
• 62,248 MW



Philippines Capacity Expansion 2018-2040



Luzon Capacity Expansion 2018-2040



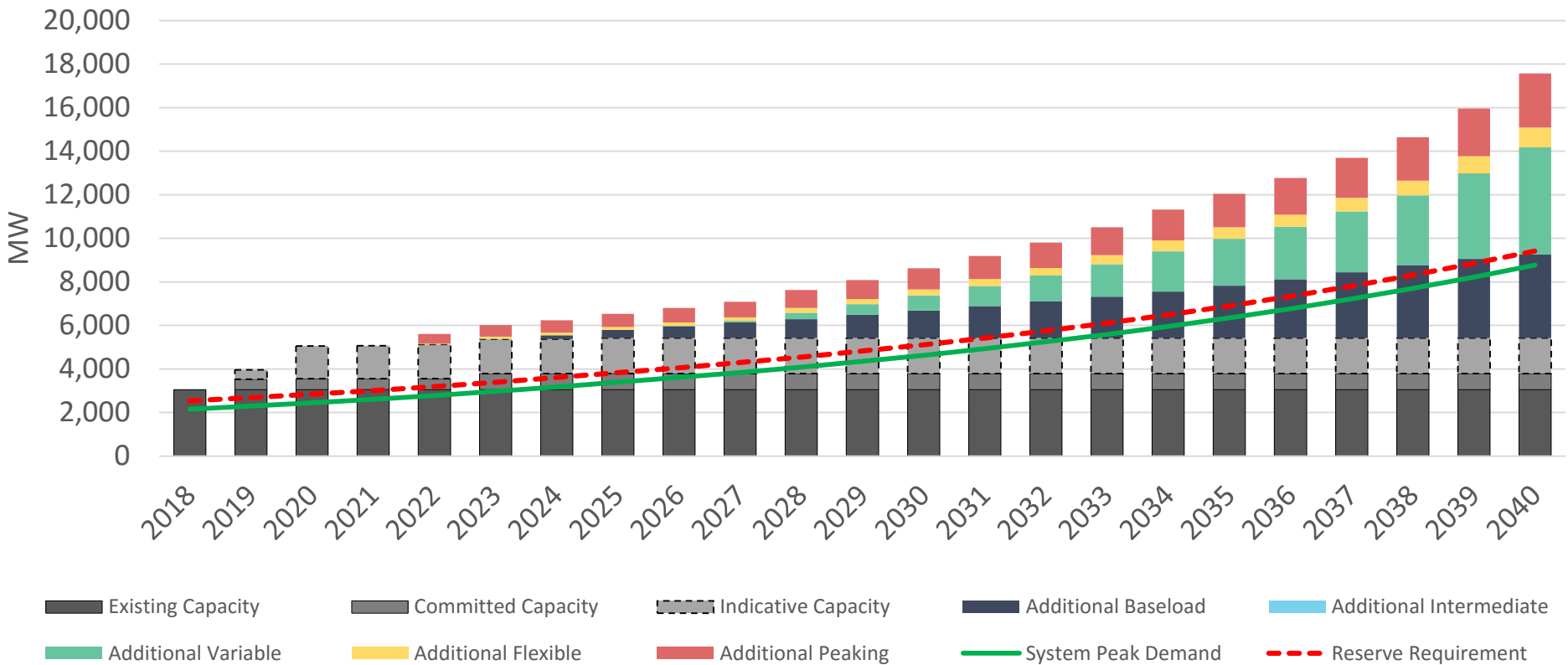
- Existing Capacity
- Committed Capacity
- Indicative Capacity
- Additional Intermediate
- Additional Variable
- Additional Flexible
- Additional Peaking
- System Peak Demand
- Reserve Requirement
- Additional Baseload

Total Installed Capacity	• 15,392 MW	Total Indicative Capacity	• 5,229 MW
Total Committed Capacity	• 4,371 MW	Total Capacity Addition	• 43,123 MW

Luzon Capacity Addition 2018-2040



Visayas Capacity Addition 2018-2040



Total Installed Capacity

• 3,390 MW

Total Indicative Capacity

• 1,630 MW

Total Committed Capacity

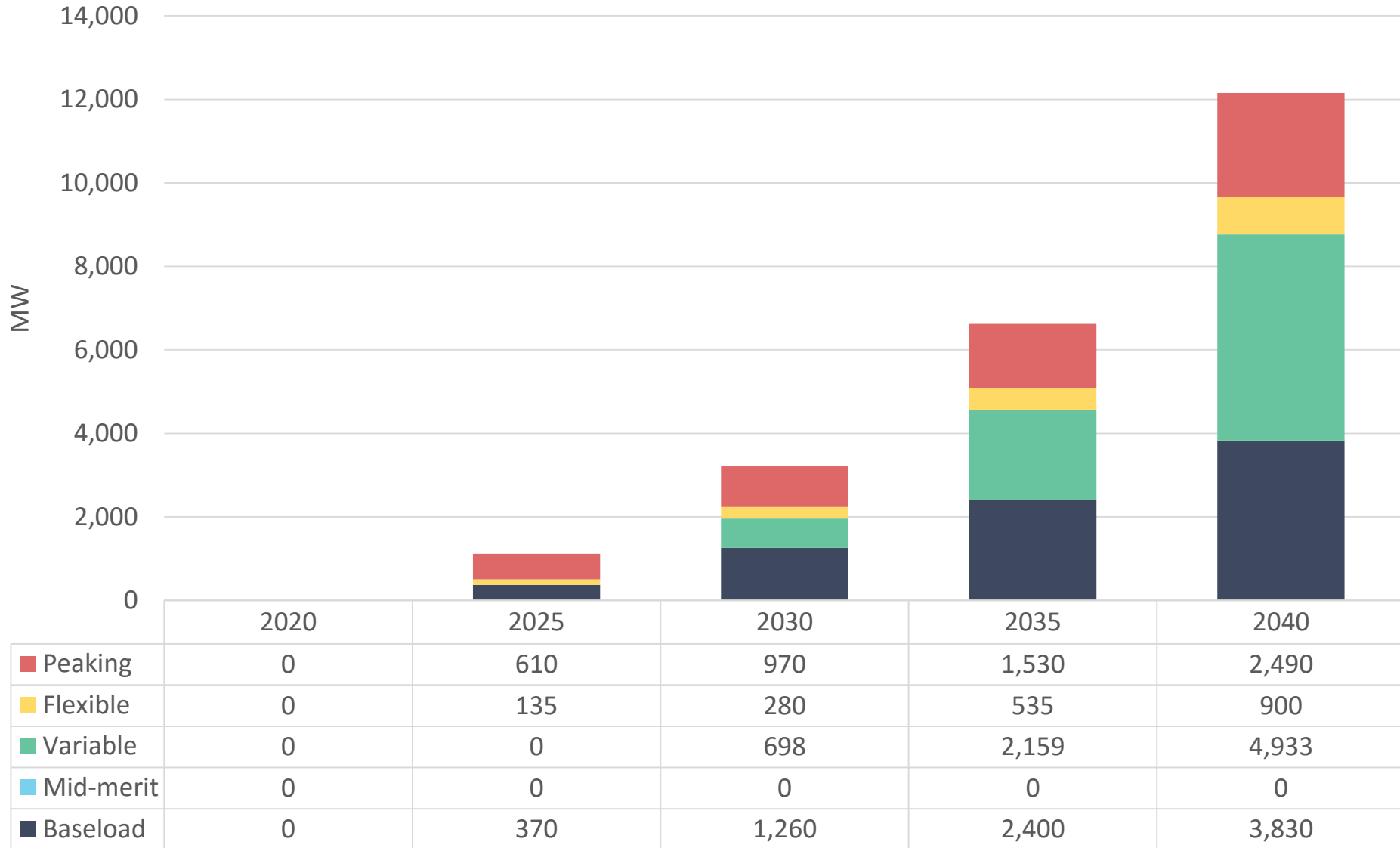
• 736 MW

Total Capacity Addition

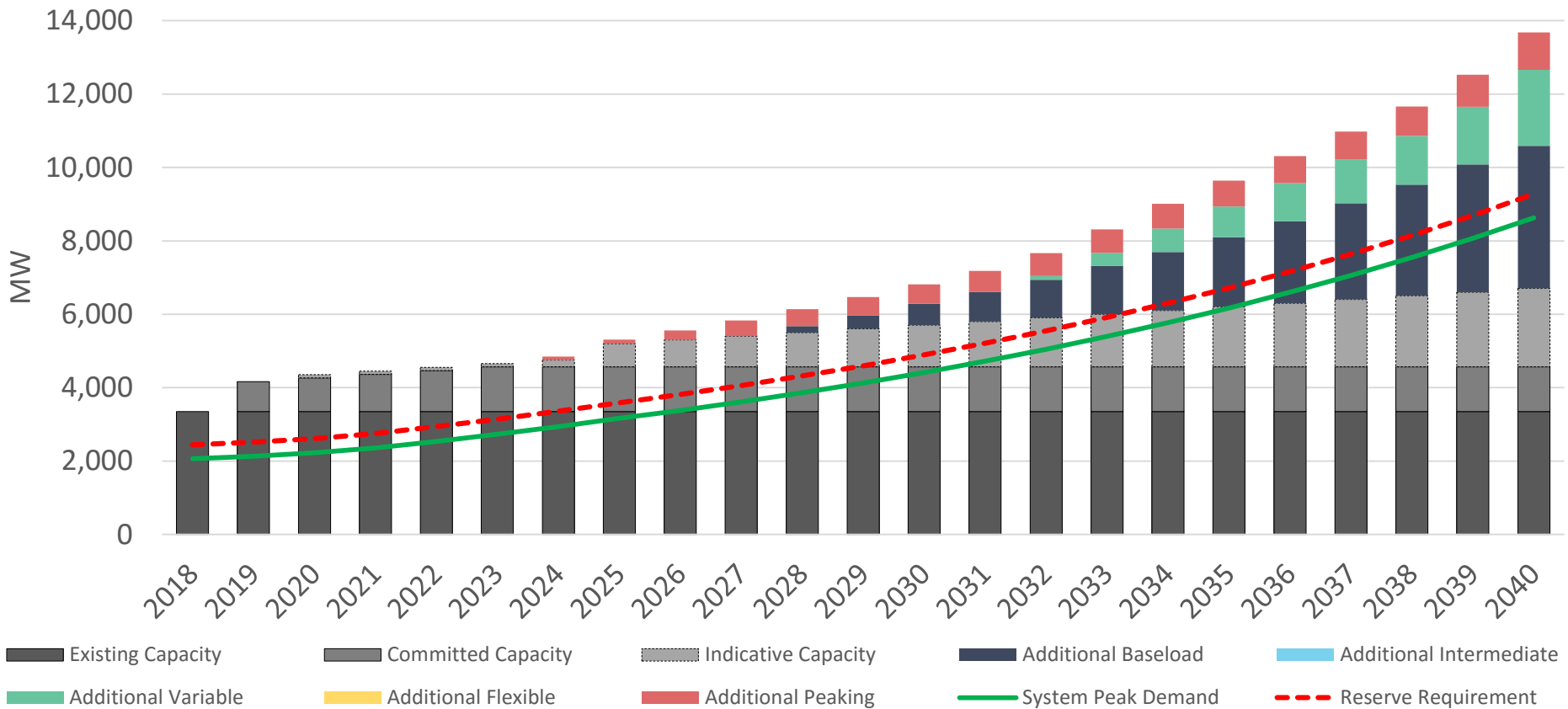
• 12,153 MW



Visayas Capacity Addition 2018-2040



Mindanao Capacity Expansion 2018-2040



Total Installed Capacity

• 3,481 MW

Total Indicative Capacity

• 2,138 MW

Total Committed Capacity

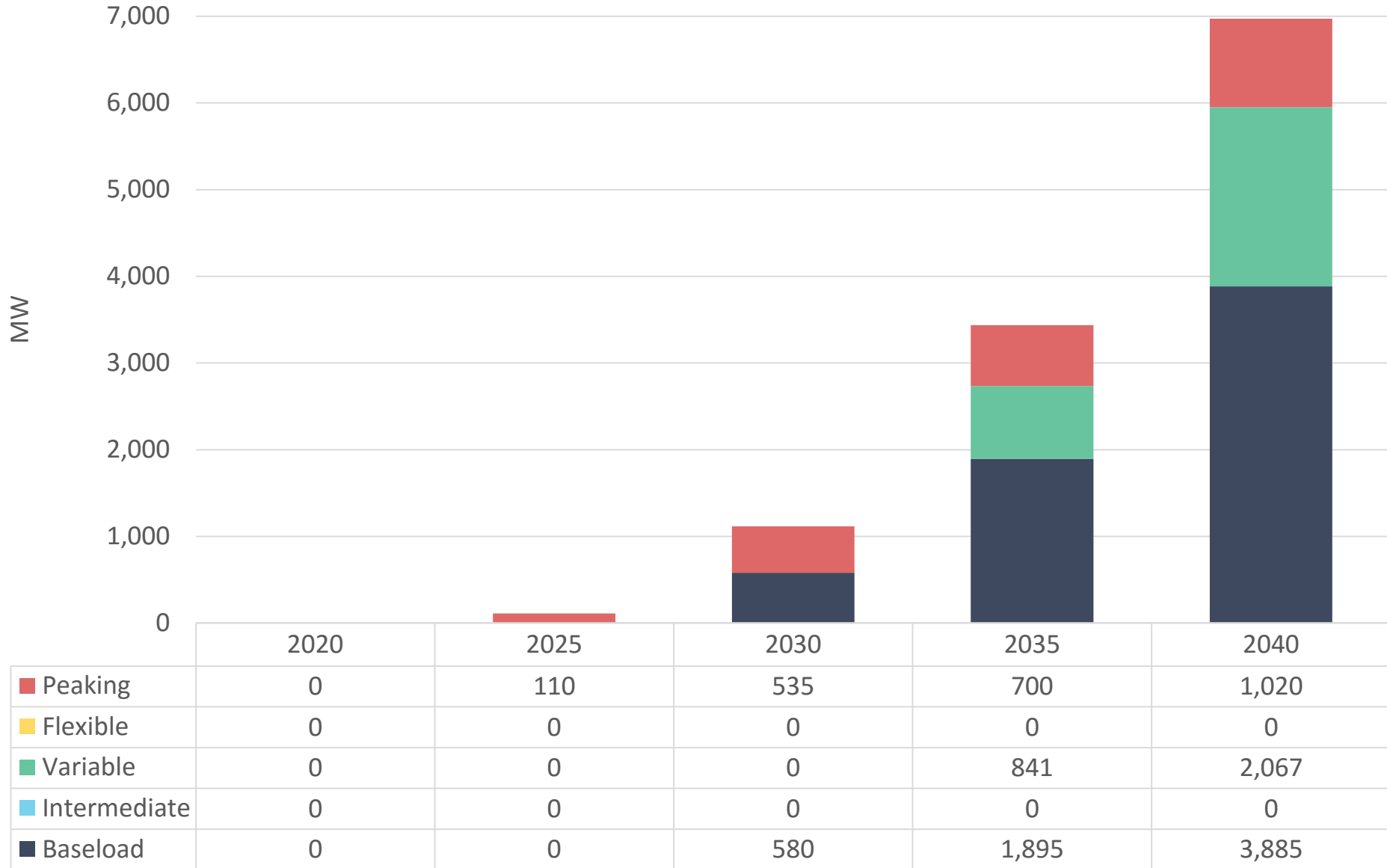
• 1,217 MW

Total Capacity Addition

• 6,972 MW



Mindanao Capacity Addition 2018-2040





Way Forward



<https://medium.com/solardao/%D1%81ompetition-of-renewable-energy-sources-10ad0916f8c6>



Way Forward

Activity	Timeline
Finalized scenarios and sensitivity analysis of the Supply Expansion Plan	September 2018
Draft Write-Up for Demand Forecasting and Supply Expansion Plan	October 2018
Consultations with attached agencies	November 2018
Finalization of PDP 2018-2040	December 2018
Publication, Posting, and Dissemination	January 2019





POWER DEMAND AND SUPPLY OUTLOOK 2018-2040

END OF PRESENTATION

Thank You

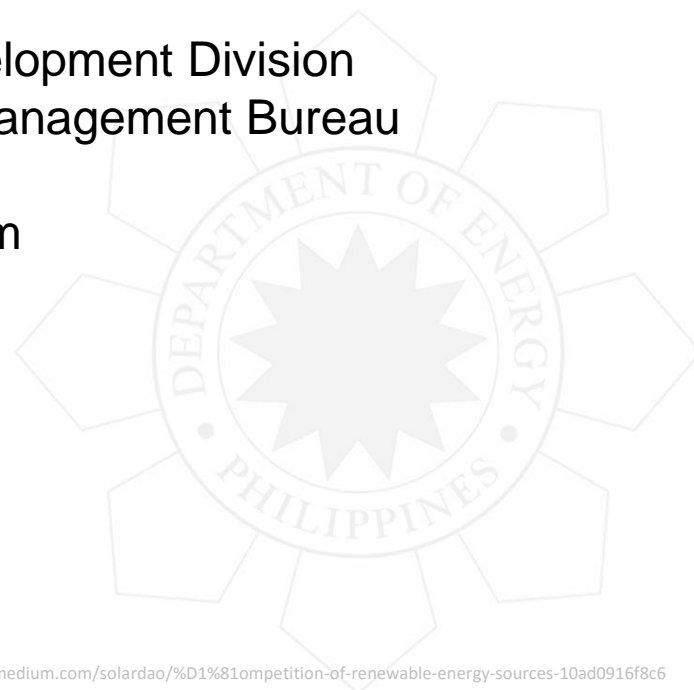




Please send your comments and inquiries to:

Power Generation and Supply Development and
Monitoring Section
Power Planning and Development Division
Electric Power Industry Management Bureau

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<https://medium.com/solardao/%D1%81ompetition-of-renewable-energy-sources-10ad0916f8c6>

