

# Understanding the Energy Supply Chain

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# Presentation Outline

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- I. Power Demand and Supply Chain
  - Power Myth
  - Power Supply and Demand Chain
  
- II. What is WESM
  - WESM Basic Features
  - How WESM bidding works
  - RTD Scenarios



# Reality Check



Bakit sobrang **mataas** ang presyo ng ating kuryente?

Bakit parang **mas mababa** ang presyo ng kuryente nung panahon ng **NPC**?

Bakit mas **mataas** ang presyo ng kuryente natin compared sa ibang ASEAN countries?

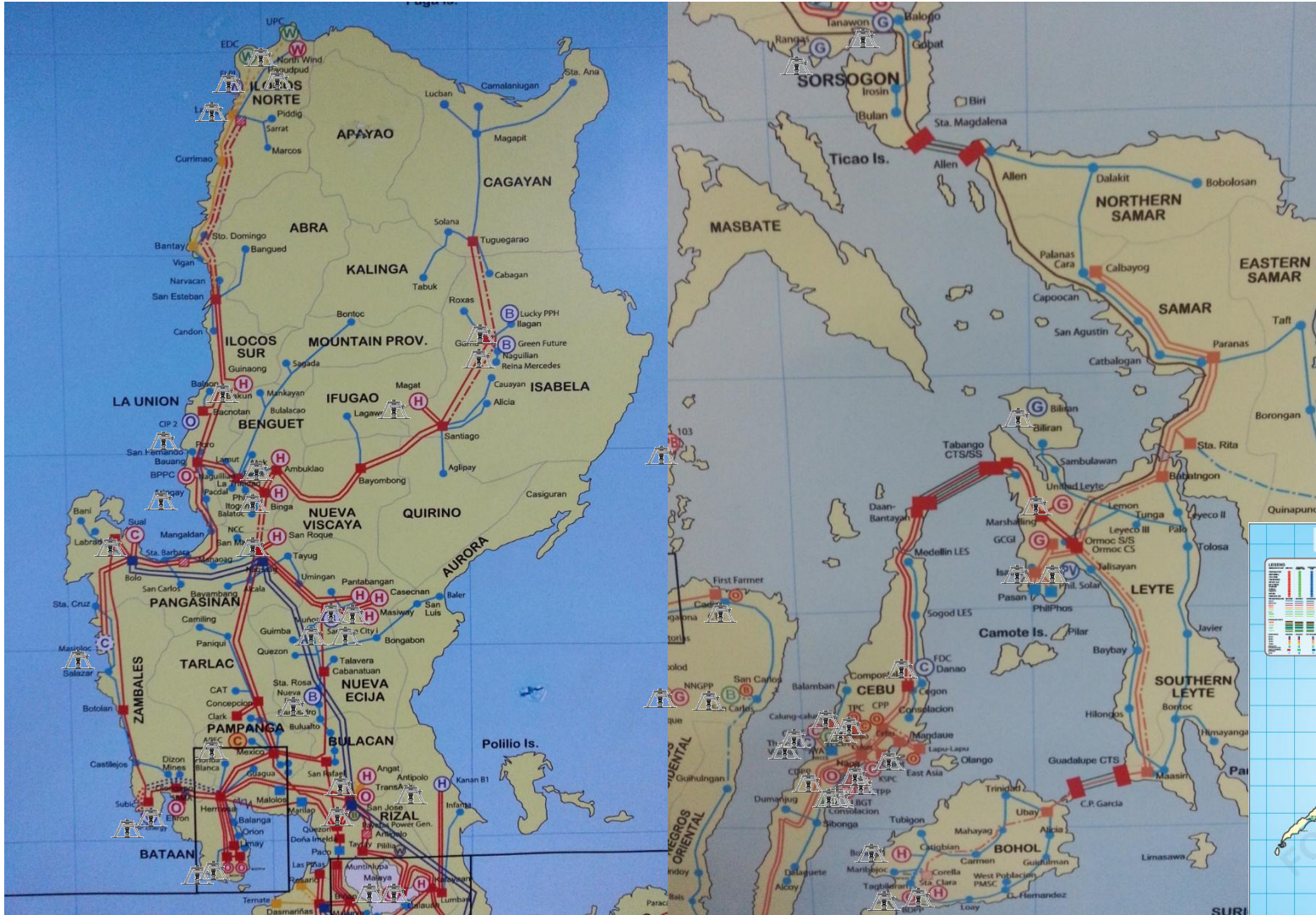
Kaya ba mataas ang ating power rate gawa ba ng **WESM**?

**Mali** ba ang composition ng power generation mix ng ating bansa?

Tama nga ba na **privatized** ang planta ng NPC?



# NPC Assets

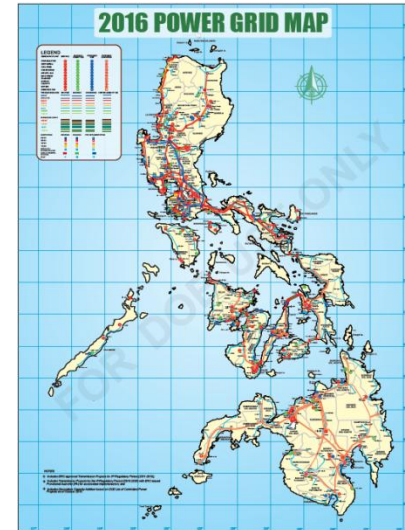


- NPC Power Plants 121 (11,361 MW)
- Transmission lines (10,494 ckt. km.)
- Substation Capacity (20,041 MVA)

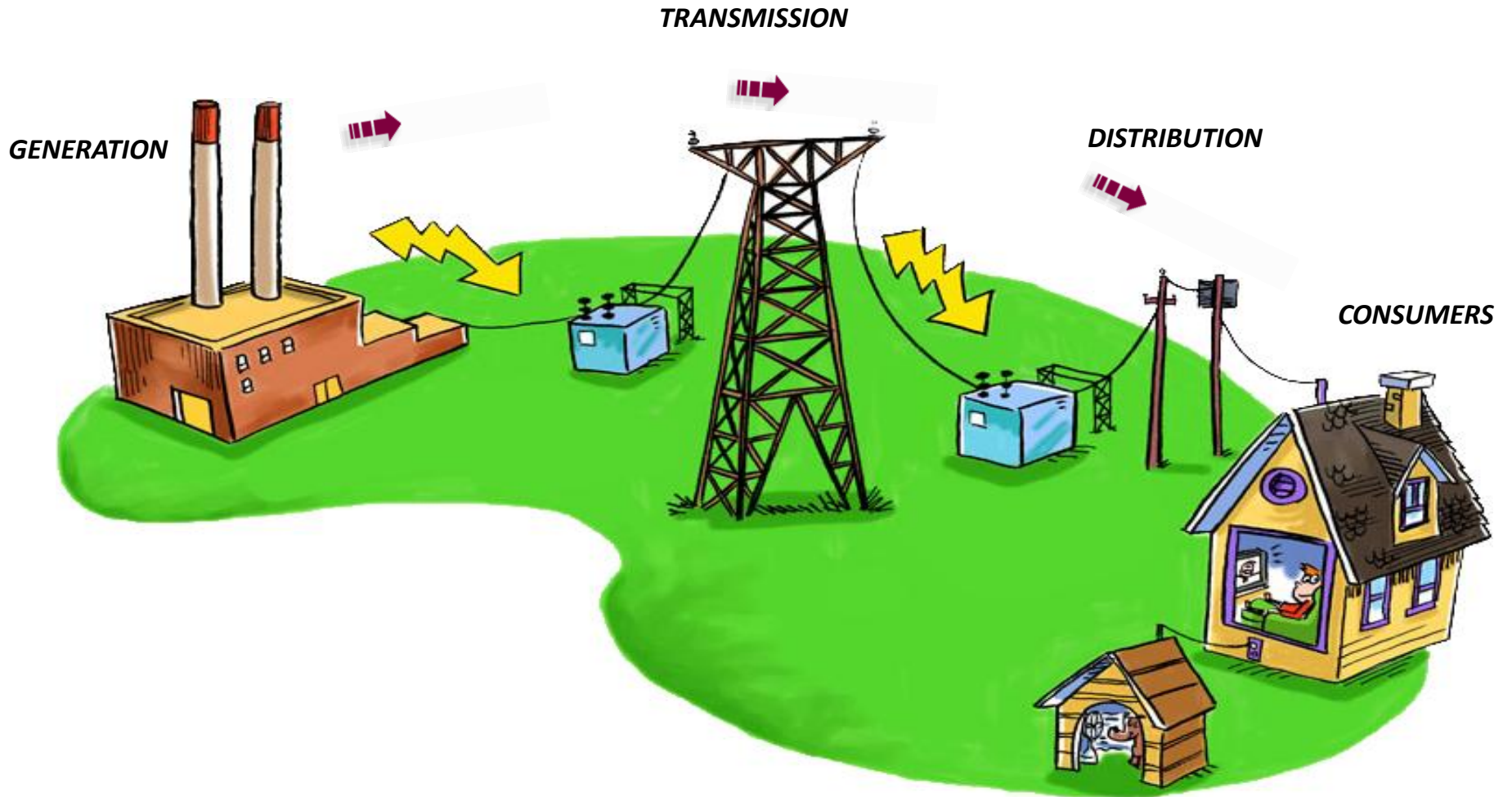




# NPC Assets



# Power Demand and Supply Chain



# Power Demand and Supply Chain



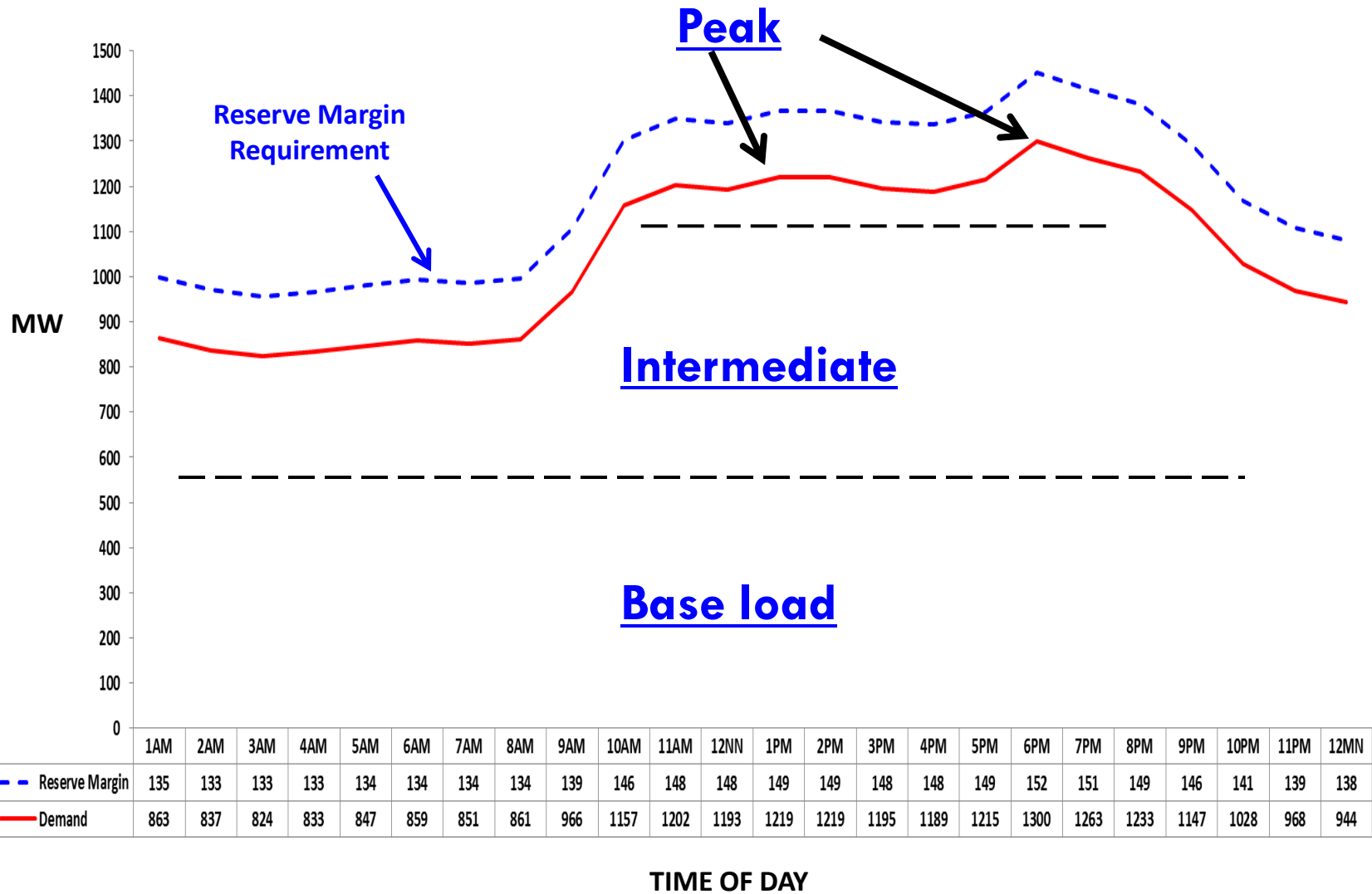


# Power Demand and Supply Chain

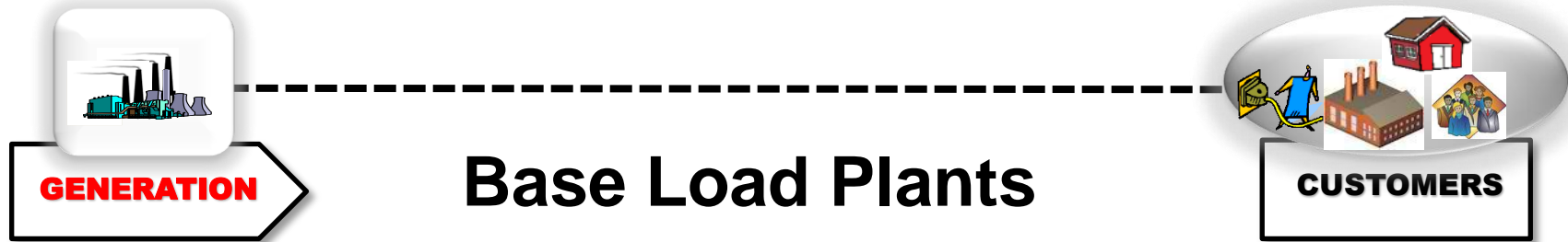




# Typical Load Curve



# Types of Power Plant



- Plants which can generate dependable power to consistently meet demand
- Produce continuous, reliable and efficient power at low cost
- Run 24/7 throughout the year except in cases of repairs or scheduled maintenance

**1294 MW**  
**Sual Coal-fired Power Plant**



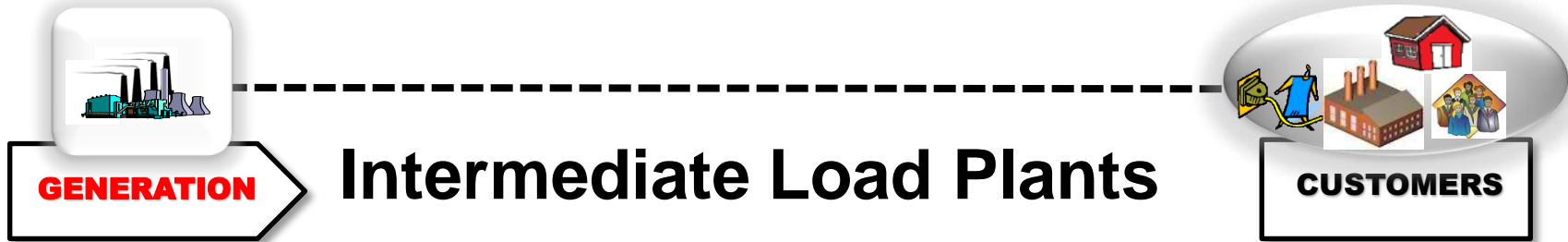
**600 MW**  
**Pagbilao Coal-fired Power Plant**



**610 MW**  
**Leyte Geothermal Power Plant**



# Types of Power Plant



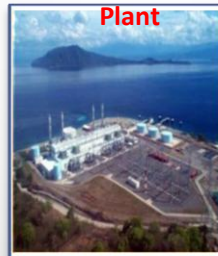
Fill the gap between base load and peaking plants

- Larger than peaking plants so the construction cost are higher
- They also run more efficiently

**1060 MW**  
**Sta Rita Natural Gas-fired Plant**



**1200 MW**  
**Ilijan Natural Gas-fired Plant**



**500 MW**  
**San Lorenzo Natural Gas-fired Plant**



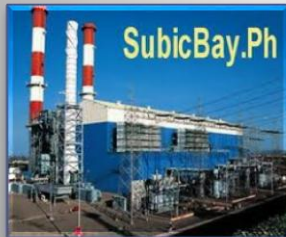


# Types of Power Plant



- Provide power during peak system demand period
- Higher responsive to changes in electrical demand and can be started up relatively quickly (Hydroelectric Power Plant)
- Very expensive to operate, relative to the amount of power they produce and the cost of fuel to power them (Oil-based power plant)

116 MW  
Subic Diesel Power Plant



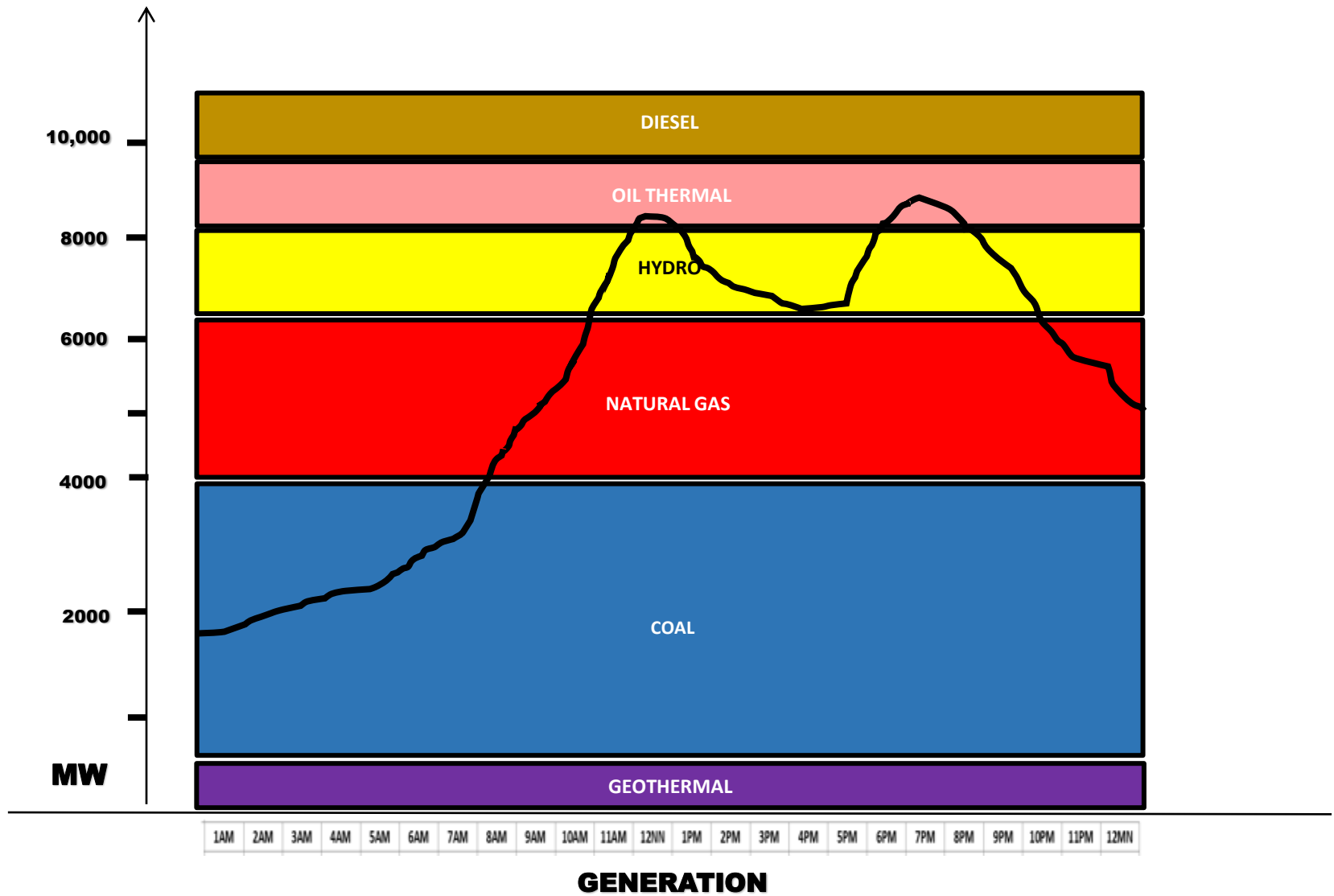
360 MW  
Magat Hydroelectric Power Plant



755MW  
CBK Hydroelectric Power Plant



# Stacking of Power Plants



# WESM Stakeholders



PHILIPPINE ELECTRICITY  
MARKET CORPORATION  
(PEMC)



NATIONAL GRID  
CORPORATION  
(NGCP)



DEPARTMENT OF  
ENERGY  
(DOE)



ENERGY REGULATORY  
COMMISSION  
(ERC)



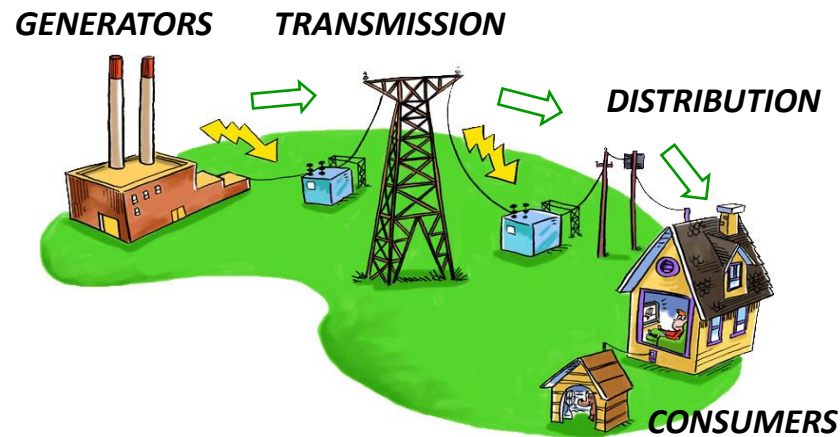
POWER GENERATION COMPANIES  
(GENCOs)



DISTRIBUTION UTILITIES  
(DUs)



DIRECTLY CONNECTED  
CONSUMERS

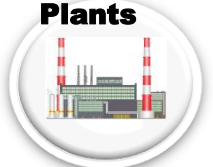




# How WESM Bidding Works



**NPC  
Plants**



**NPC IPPs**



**IPPs**



**IPPAs**



**DUs/ECs**



**NGCP**

- Energy offers/bids **1**
- Reserve offers

**7**  
Billing & Settlement  
Charges & Payments

Market Clearing  
Results: **4**  
MCPs and MOT



- Energy demand **2**
- Reserve requirements

System Condition:  
• Outages **3**  
• Contingencies  
• Transmission limits

Dispatch  
Instructions:  
Dispatch  
targets **5**

Revenue Meters:  
Metered values **6**



# WESM Basic Features



**GROSS POOL** - All energy transactions are scheduled in the market



**GROSS DISPATCH** - Generators submit energy offers (price and Quantity) for central scheduling and dispatch



**TRADING HOURS** - 24 hours/day, 7 days per week



**LOCATIONAL MARGINAL PRICE** - Marginal price computed at each node or location to reflect transmission loss and/or congestion



# WESM Basic Features



**GOVERNANCE** - Governed by stakeholders (PEMC)



**TRADING GUARANTEES** - Prudential guarantees to assure payment



**NET SETTLEMENT** - Bilateral Contract quantities transacted in the pool, but, can be settled outside of the market. Ex-ante price and quantity aligned with ex-post price and quantity



**BILLING & SETTLEMENT** - 60 days period for B&S





# How WESM Bidding Works



**GENERATION**



**CUSTOMERS  
DUs/ECs**



**Hydro C**  
P 0,000/MWh  
25 MW



**Hydro B**  
50 MW  
P 1,000/MWh



**Wind/Solar**  
5 MW  
Priority  
Dispatch



**Run-of-River**  
50 MW  
Non-  
Scheduled



**Geogas F**  
P  
3,000/MWh  
150MW



**Natgas E**  
- P  
1,000/MWh  
100MW



**Coal D**  
P 2,500/MWh  
115 MW

**Diesel H**  
P 4,000/MWh  
200 MW



**Bunker G**  
P 3,500/MWh  
300 MW



**Biomass**  
5MW  
Priority  
Dispatch

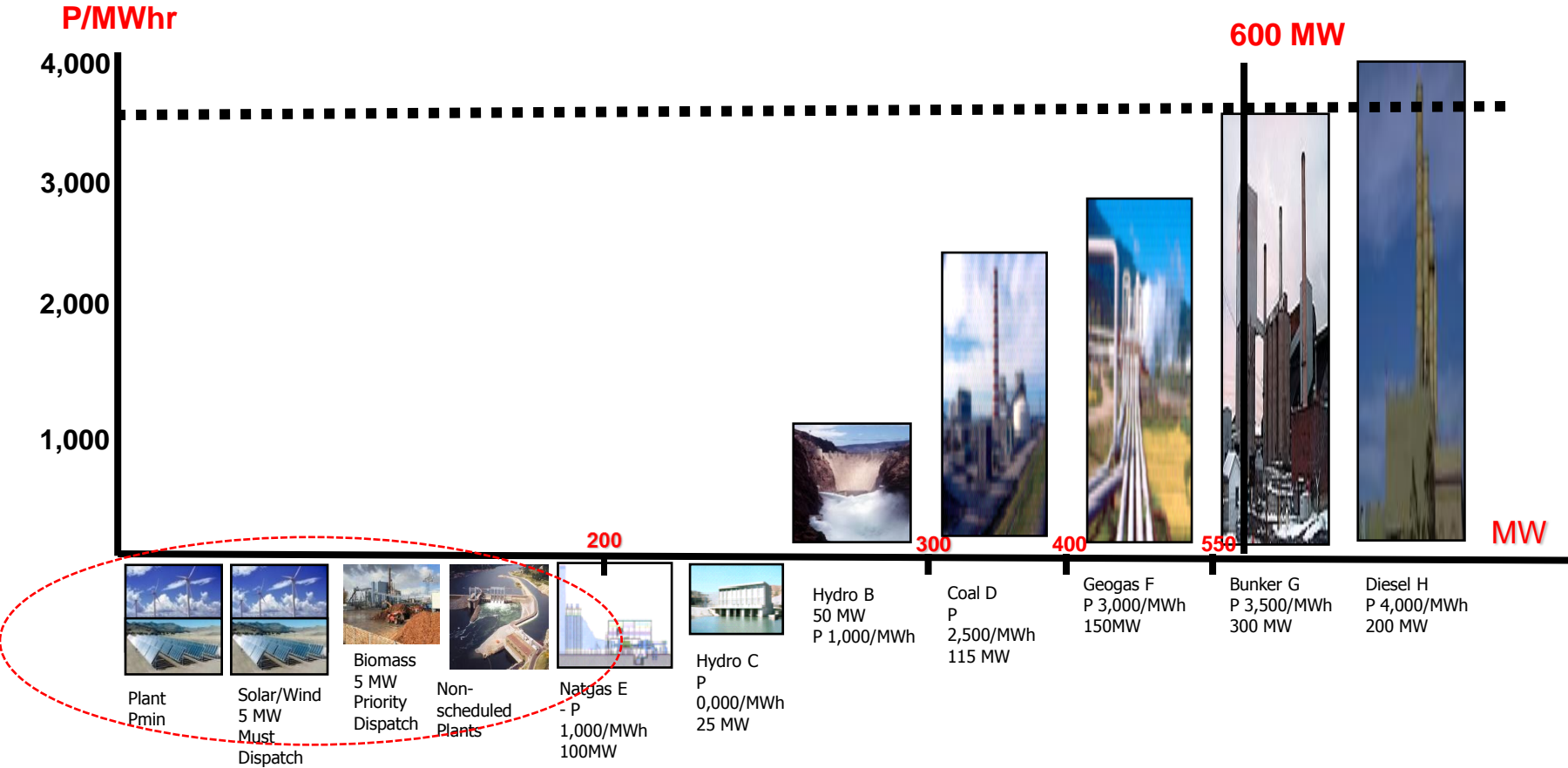


**Roxas Boulevard Demand  
Requirements: 600 MW**

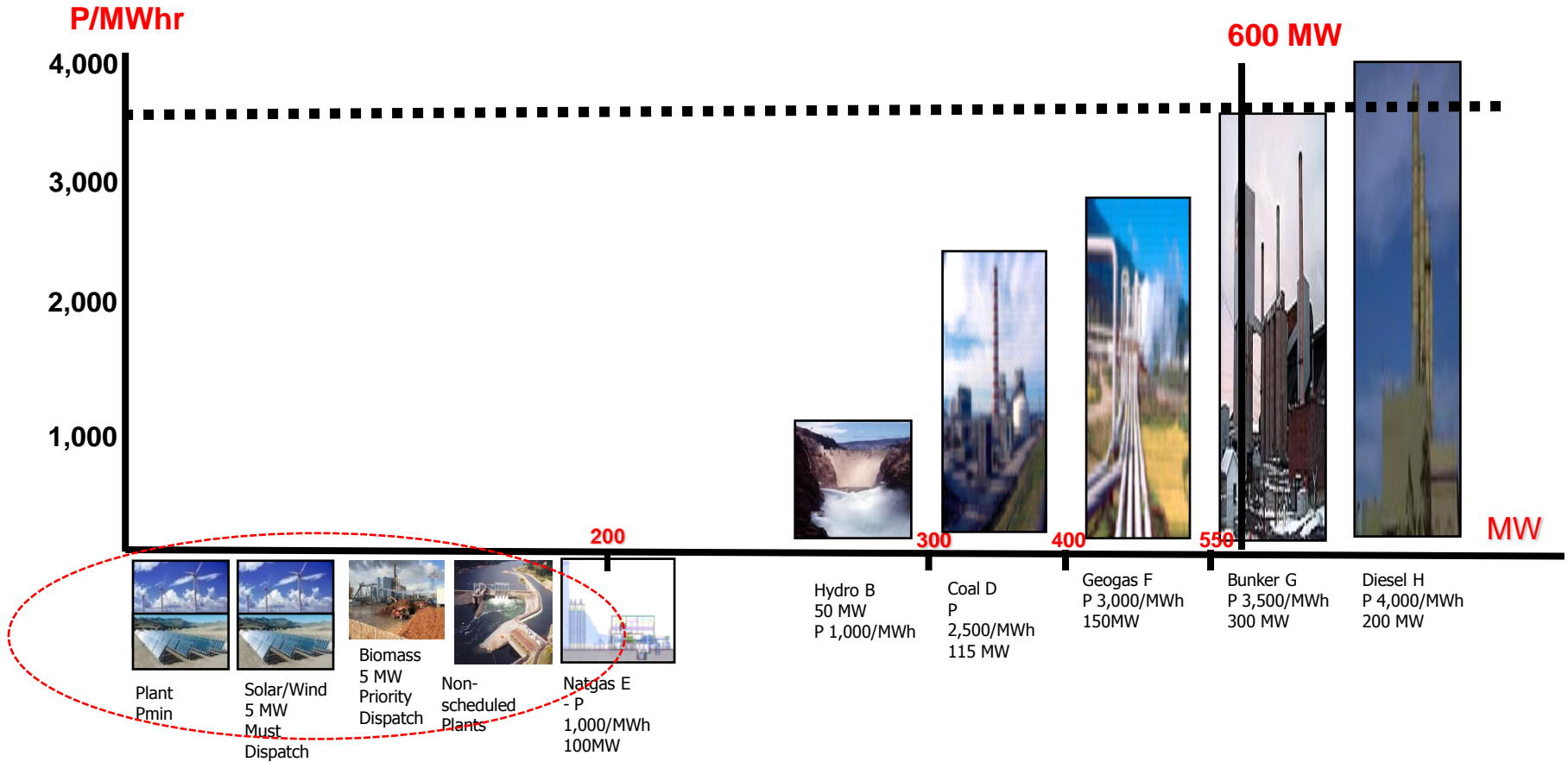


# Merit Order Table

**Market Clearing Price - Php 3,500/MWh (marginal cost of meeting demand)**  
**Marginal Plant – Bunker G**  
**Price Taker**



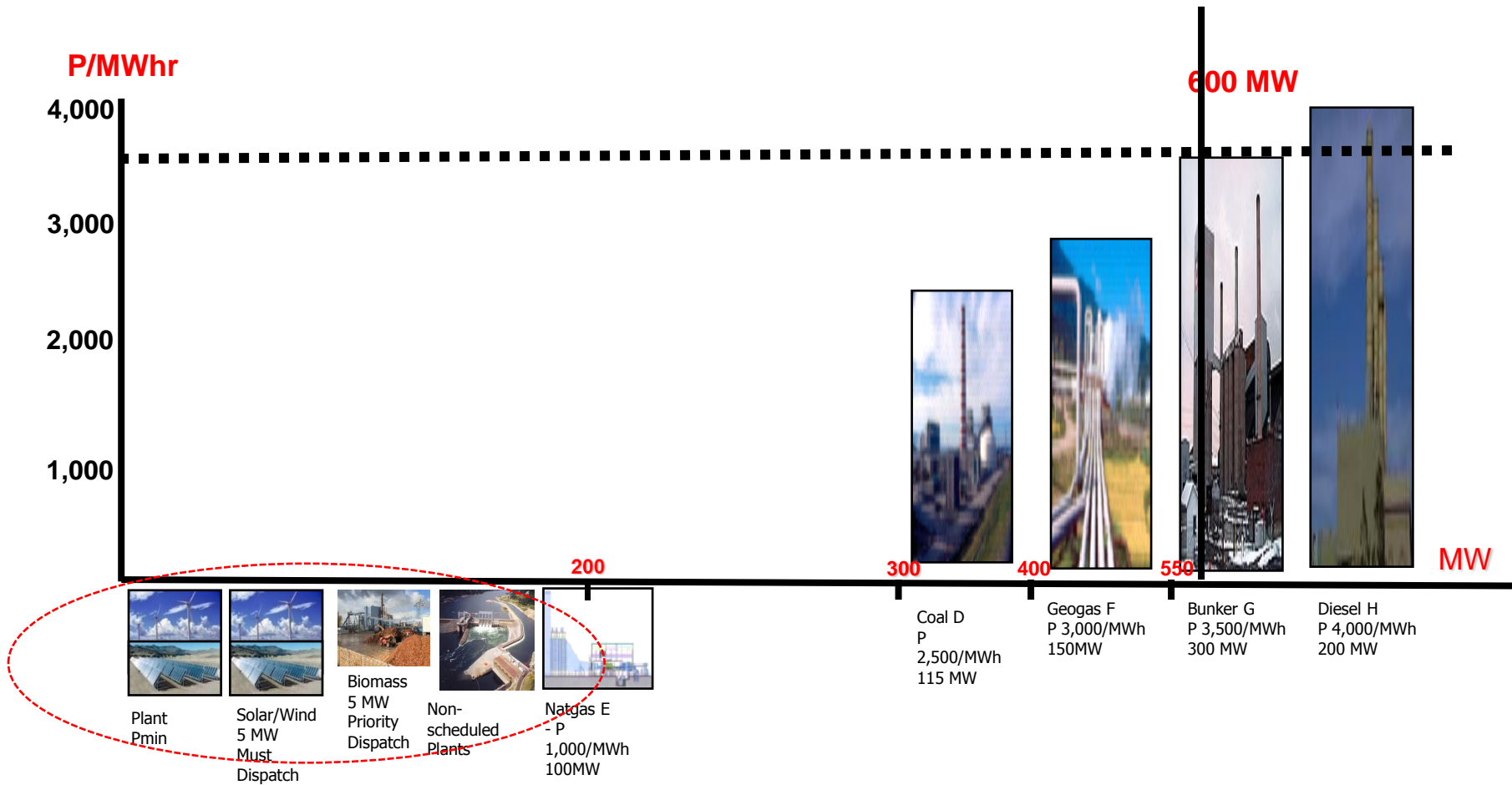
# Merit Order Table



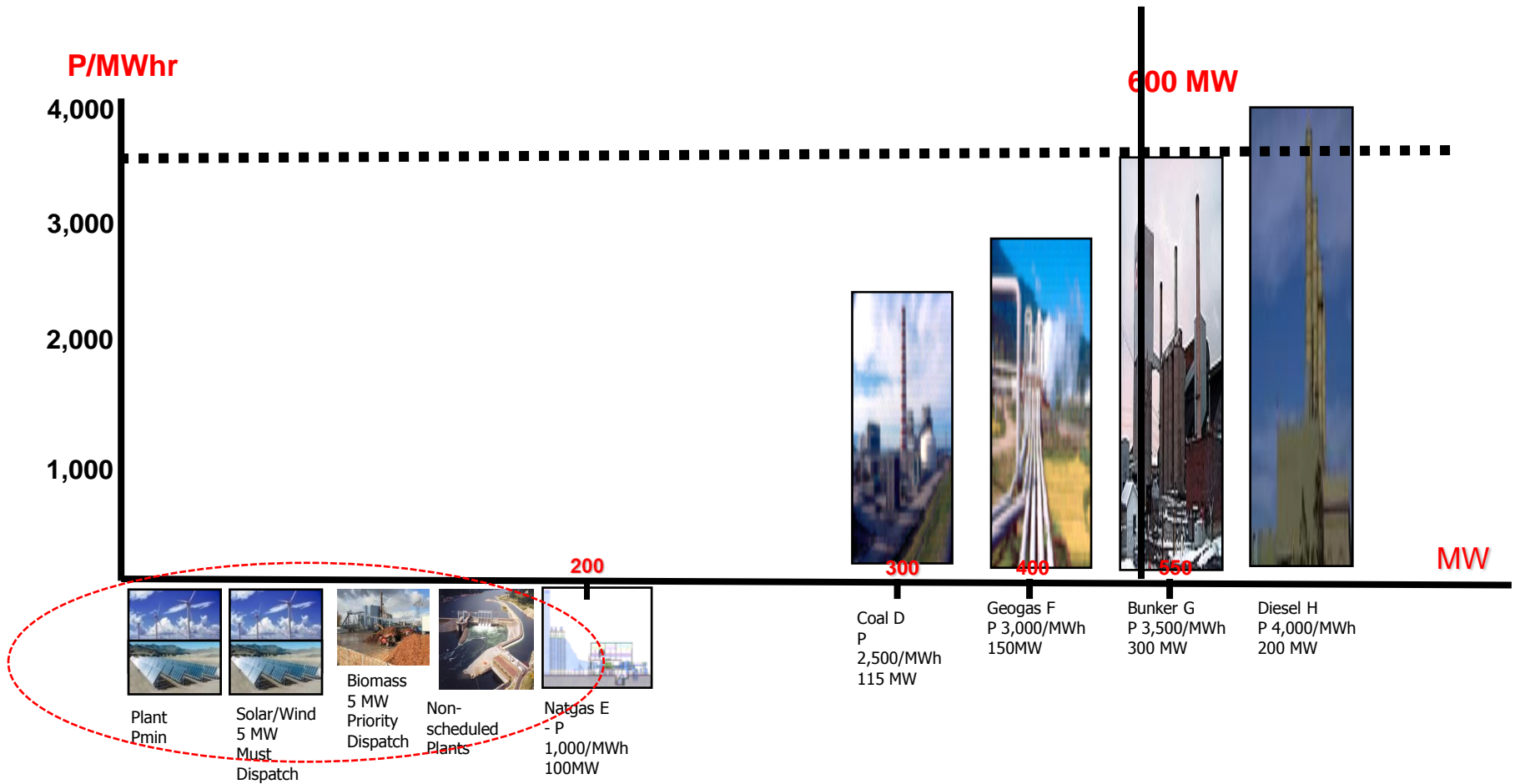


# Merit Order Table

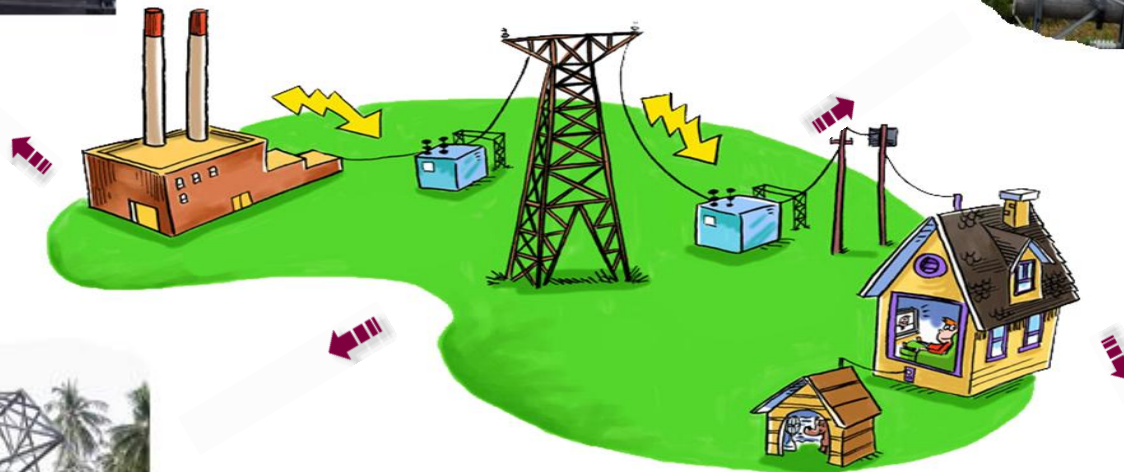
Market Clearing Price - Php 4,000/MWh (marginal cost of meeting demand)  
 Marginal Plant – Diesel H  
 Price Taker



# Merit Order Table



# Real Time Facility Status



# Thank You!



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