

**WORKSHOP ON “POWERING ASEAN:  
CAN THE NORDIC MODEL WORK?”**

**ASEAN POWER GRID:  
ROUTE to MULTILATERAL ELECTRICITY TRADE**

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## Overview of ASEAN Electricity Outlook



## ASEAN POWER GRID



## Legal Basis, Objectives and Benefits



## Current Status of APG and Challenges



## Road to Multilateral: Barriers & Strategies,



## Lesson Learnt from Nordic Model



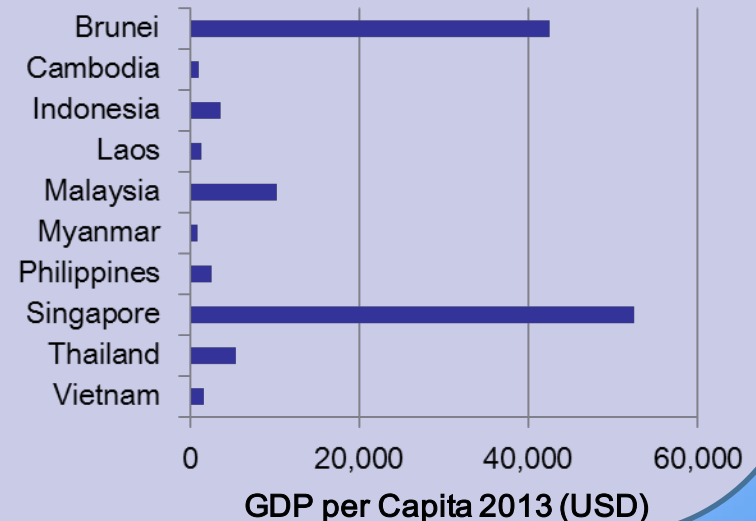
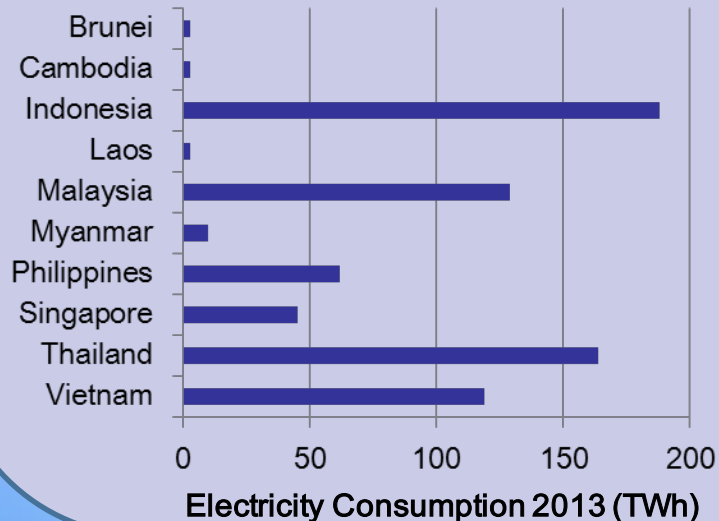
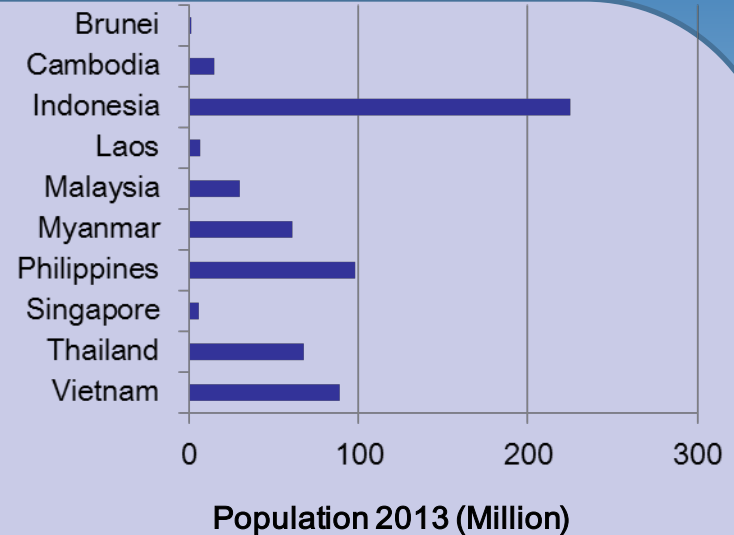
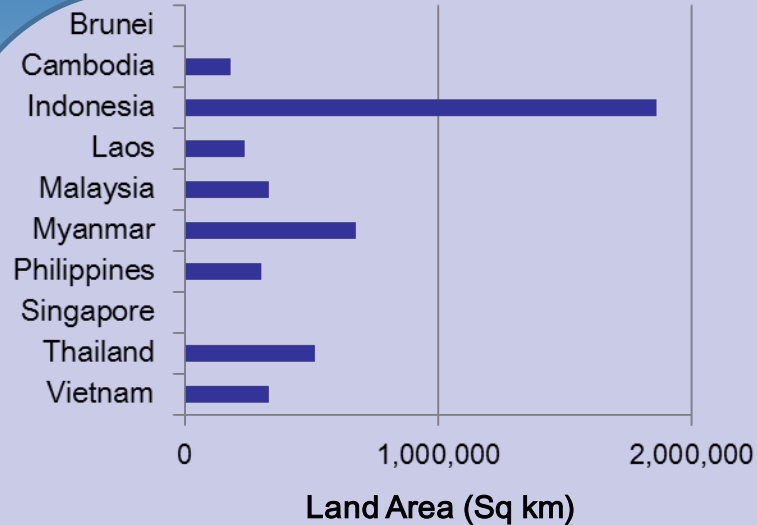
## Conclusion



# ***ELECTRICITY in ASEAN***

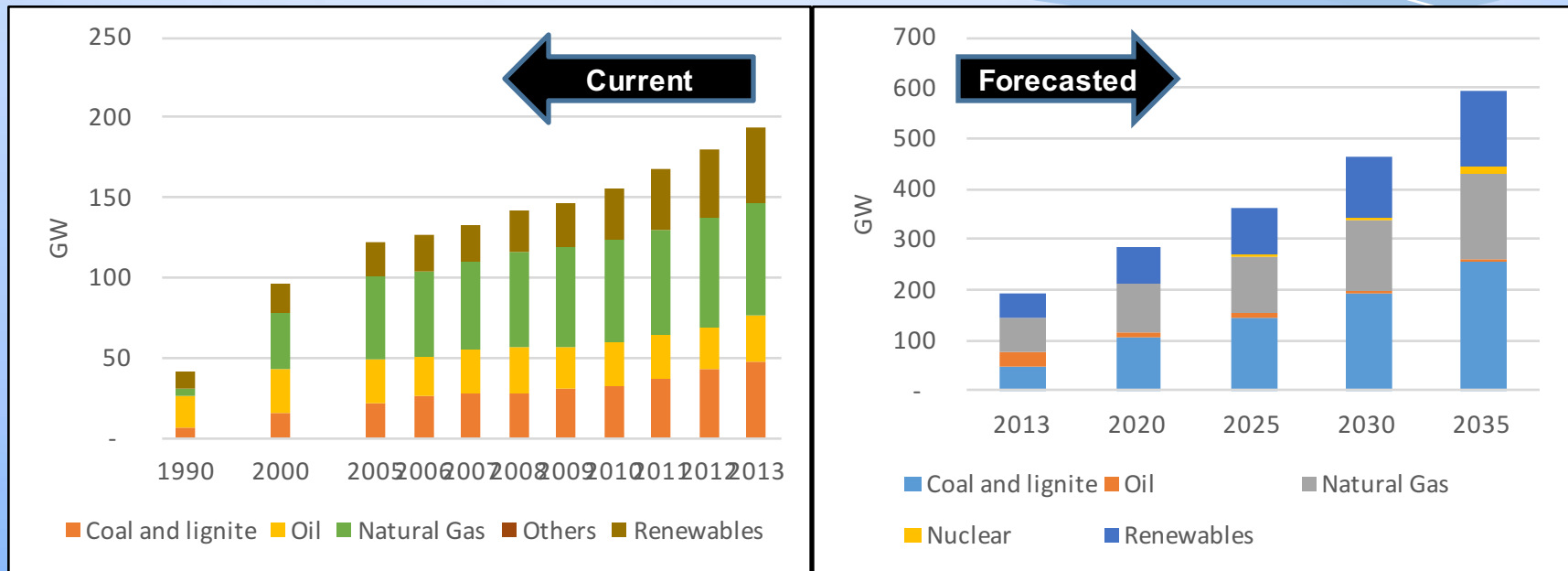


# ASEAN – REGION OF DIFFERENCES

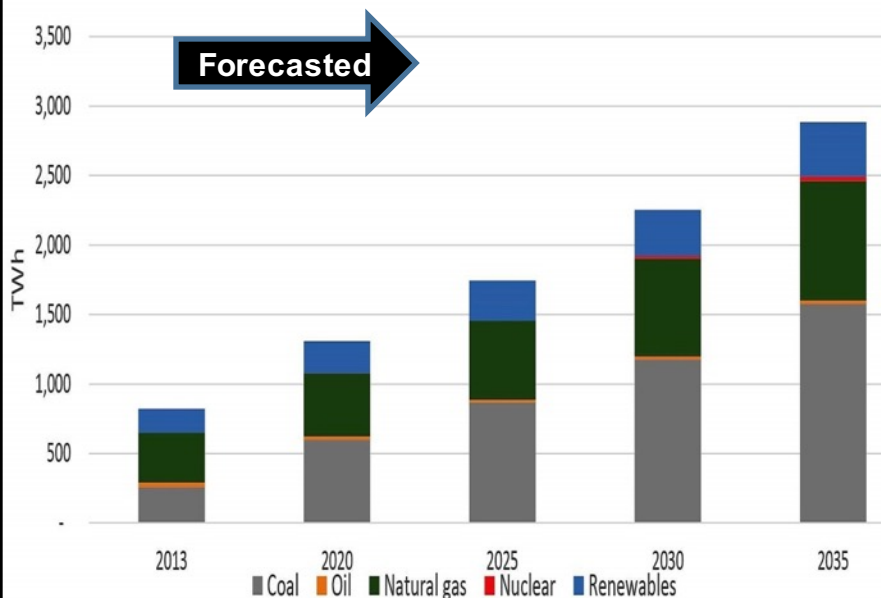
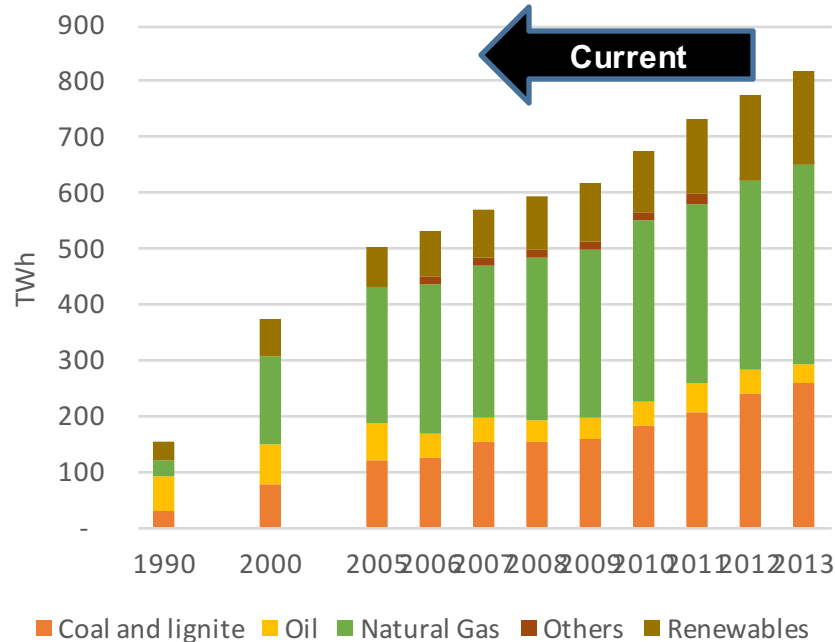


# ASEAN – Energy Situation

## ASEAN Generation Installed Capacity



# ASEAN – Electricity Production (ACE, 2015)



# Why we need ASEAN Connectivity

**ASEAN has a huge of natural resources, high energy demand, high economic growth**

**“Connectivity creates Stronger, Safer, Better Economics”**

**“Stronger Economics, stronger ASEAN, stronger Member States”**

Source: ASEAN Secretariat

# ASEAN's POTENTIAL ENERGY RESOURCES

## Fossil Energy Resources:

- ❖ **Oil** ⇒ Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam
- ❖ **Gas** ⇒ Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam
- ❖ **Coal** ⇒ Indonesia, Malaysia, Philippines, Thailand, Vietnam

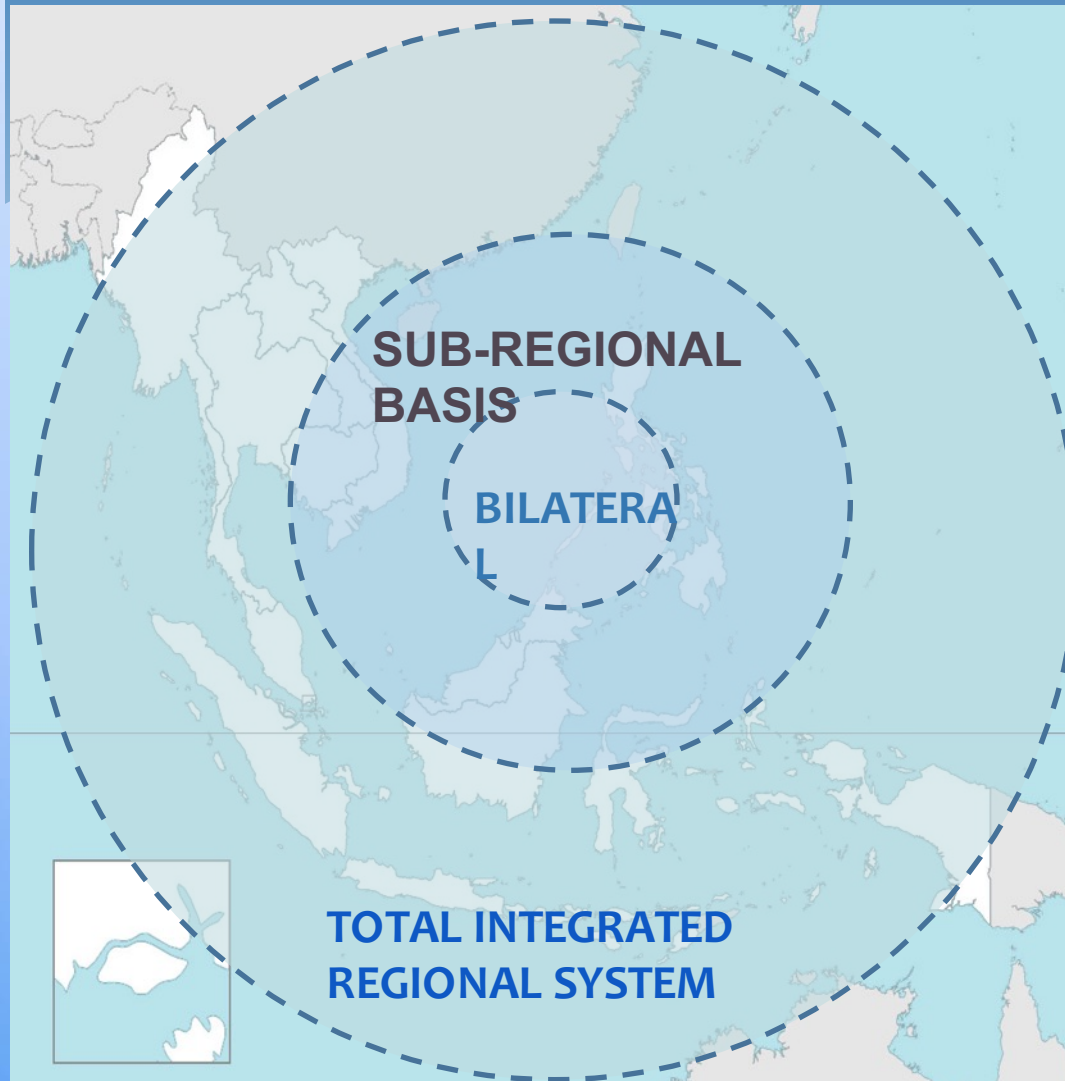


## Renewable Energy Resources:

- ❖ **Hydro** ⇒ Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Vietnam
- ❖ **Geothermal** ⇒ Indonesia, Philippines
- ❖ **Solar** ⇒ All Countries has various amount
- ❖ **Wind** ⇒ Limited potential
- ❖ **Biomass** ⇒ All Countries has various types and amount



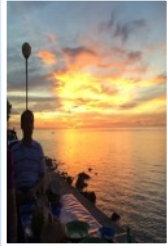
# ASEAN – Energy Cooperation



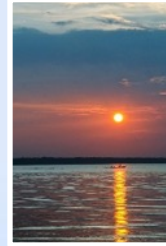
## BACKGROUND

- **Efficient, reliable and resilient electricity infrastructure** in stimulating regional economic growth and development.
- **Establishment of integrated systems.**
- **Promoting the efficient utilisation and sharing of resources.**
- Enhance electricity trade across borders which would provide benefits to meet the rising electricity demand and improve access to energy services in the region”.

# ASEAN Energy Cooperation: APAEC 2016 – 2025 (Phase One)



*The key initiatives include embarking on multilateral trading to the ASEAN Power Grid (APG), enhancing gas connectivity by expanding the focus of the TAGP to include LNG regasification & promoting clean coal tech.*



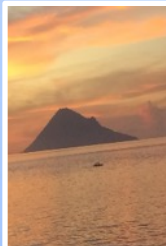
*The realisation of the APG is to first encourage on a cross-border bilateral basis, then gradually expand to sub-regional basis, and finally to a fully integrated ASEAN power grid system*



*Seriously consider to harmonise regulatory frameworks and standards to facilitate regional energy connectivity*



*Action Plan for the next five (5) years is to embark on multi-lateral interconnections.*

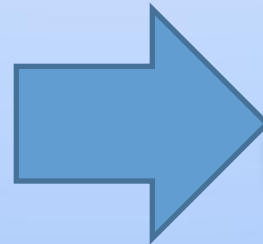


*Initiative to undertake a pilot project to explore cross-border power trade from Lao PDR to Singapore and serve as a pathfinder to enhance multilateral electricity trading beyond neighbouring borders towards realising the APG.*

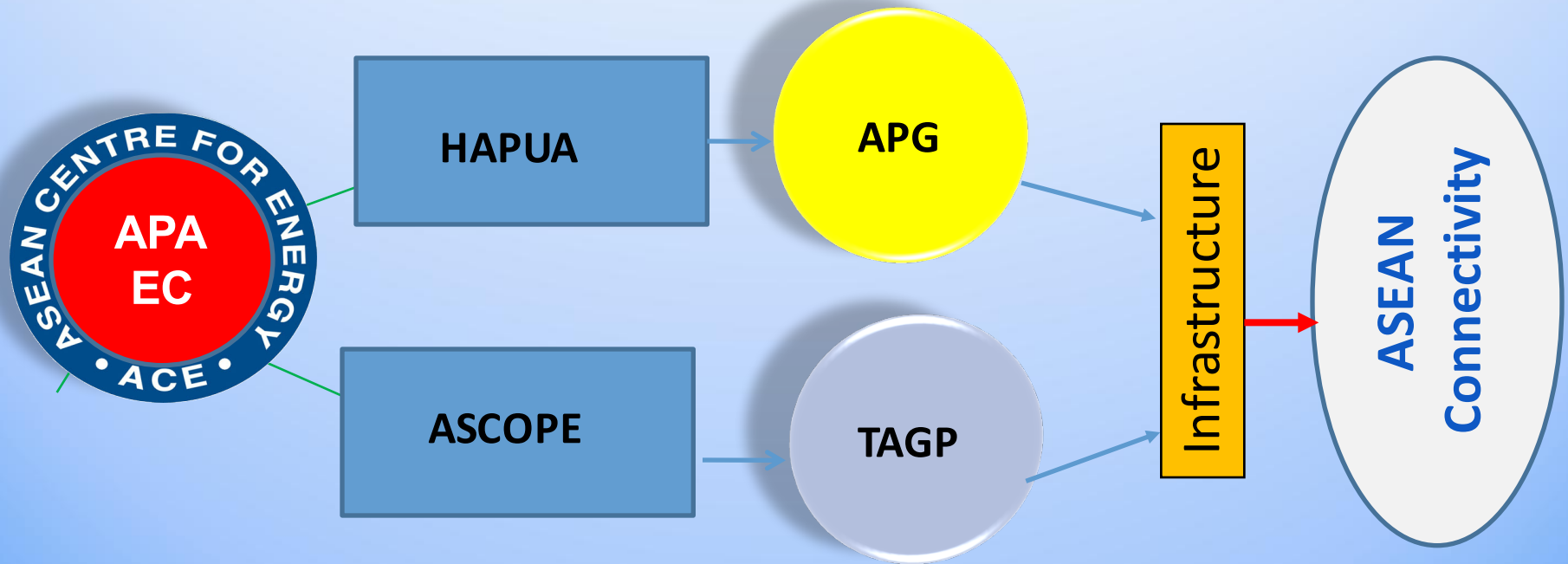
# ASEAN ENERGY COOPERATION IN ASEAN CONNECTIVITY

*“Enhancing Energy Connectivity and Market Integration in ASEAN to Achieve Energy Security, Accessibility, Affordability and Sustainability for All”*

- Development of the APAEC
- Global Energy Landscape
- ASEAN Energy Development



# ASEAN – Energy Cooperation





**ASEAN POWER GRID**  
POWERING THE REGION

# LEGAL BASIS: The MOU of ASEAN Power Grid (APG)



The ASEAN Power Grid (APG) is a flagship program mandated in 1997 by the ASEAN Heads of States/Governments under the ASEAN Vision 2020.

The 17th AMEM in Bangkok July 1999 has adopted The APAEC 1999- 2004 tasked to implement the ASEAN Power Grid (APG) program

**Objective: to strengthen and promote power interconnection and trade to help ensure greater regional energy security and sustainability on the basis of mutual benefit**

*\*) The MOU of APG signed by ASEAN Energy Minister in July 2007*



**ASEAN POWER GRID**  
POWERING THE REGION

# Objectives of APG

**Facilitate cross-border power purchases/exchanges within the region**

*Allows effective development and utilization of resources*

**Optimize usage of diverse energy resources in the region**

*Enable power transfer from efficient generation in the region to load centers*

**Reduce capital investment required for generation capacity expansion**

*Capitalizing difference of demand peaking time*

**ENHANCING  
REGIONAL ENERGY  
SUSTAINABILITY,  
SECURITY,  
RELIABILITY,  
TOWARD MORE  
EFFICIENT,  
ECONOMIC AND  
SECURE OPERATION  
OF POWER SYSTEM**

# BENEFITS OF ASEAN POWER GRID



**Greater economic generation and transmission of electricity**



**Greater reliability and security of electricity supply in member countries**



**Provision of a platform for future ASEAN electricity trade**



# TANGIBLE BENEFIT FROM APG

Note: \* 2009 Present value.

Items	Total Expenses (MUSD) *		Savings (MUSD) *
	Without Interconnection	With Interconnection	
Capital Costs	83,699	81,980	1,719
Fuel Costs	253,025	252,871	154
<b>Total</b>	<b>336,724</b>	<b>334,851</b>	<b>1,873</b>

Source: ASEAN Interconnection Master Plan Study (II), June 2010

# UPDATED STATUS OF ASEAN POWER GRID PROJECTS



## EXISTING

- 9 cross borders
- Total power: 5,200 MW



## ON-GOING (COD 2018/2021)

- 6 cross borders
- Total Power: 3,300 MW



## FUTURE (BEYOND 2020)

- 16 cross border
- Total Power: 23,200 MW

# APG's CHALLENGES

National  
impediments to  
promotion of  
power trade

- Differing national policies of AMS
- Countries desire for self-sufficiency before interconnection is allowed
- Countries concerns over restructuring of ESI under Multilateral Electricity Trading

Electricity  
industry  
restructuring and  
evolution into a  
multilateral  
power trading

- No harmonized operational & regulatory framework or tariff structure
- No mechanisms for power wheeling, pool rules, power bidding, regulatory framework and ensuring system reliability & security
- Financing Modalities for funding sources

Enviroment  
Awareness

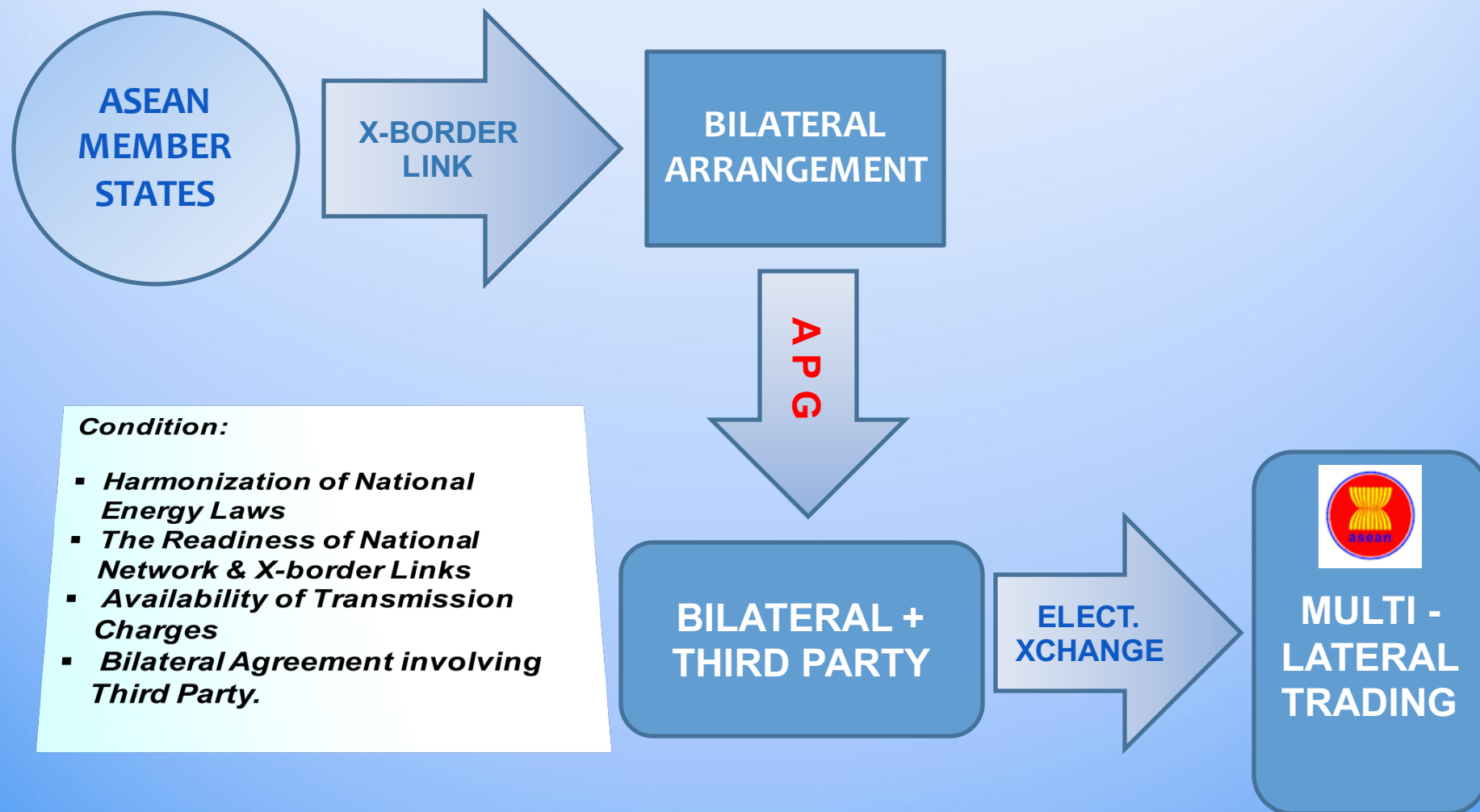
- High penetration of intermittent renewable energy sources
- Aware and concern on environment impact



# *ROAD TO MULTILATERAL ELECTRICITY TRADING*



# ROAD TO MULTILATERAL ELECTRICITY TRADING



# BARRIERS FOR THE REALIZATION

“the implementation of the energy interconnection projects under the APG encounter barriers due to resource constraints, technical, financial issues and regulatory issues”

- National Energy Policy
- National PDP & Priority
- Regulation

Harmonization

- Coordination & Commitment
- Private Participation
- Financial issues to develop infrastructures & institutions

Solution under ASEAN Spirit

## **OVERCOMING the BARRIERS**

**(The implementation Strategies)**

- ☐ **Prioritize, focus and agree on targets.**
- ☐ **Governance and strong stakeholders commitments & involvement**
- ☐ **Build human capacity, strong regulations, finance**
- ☐ **Performance feedbacks, monitoring, evaluation**

# STRATEGIES FOR ASEAN MULTILATERAL TRADING

Synchronize Power Development Plan

Accelerate the development of the Cross-border Interconnection projects

Encourage Third Party Participation

Developing the Transmission Charges Formula

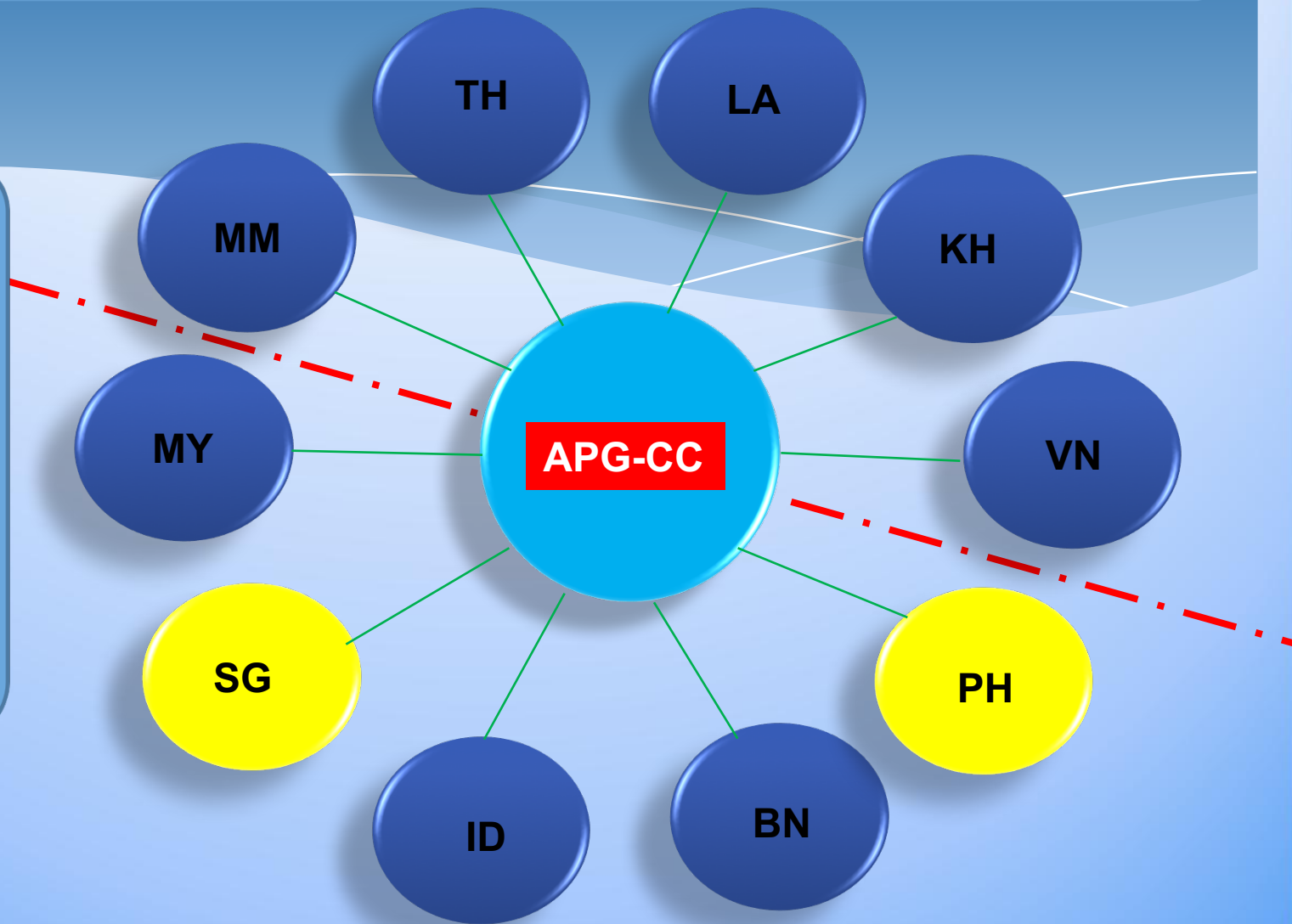
Encourage and optimize the utilization of ASEAN resources

**ASEAN**  
**Electricity**  
**Multilateral**  
**Trading**



# LESSON LEARNT FROM NORDIC POOL MODEL

# EXISTING ASEAN ESI



*Integrating  
the ASEAN  
ESI:*

- SG & PH de-regulated
- The rest regulated

*Will it be a  
problem?*



**ASEAN POWER GRID**  
POWERING THE REGION

# LESSON LEARNT FROM NORDIC MODEL

## ASEAN Multilateral Trading

### Objectives:

- a) achieve long-term security, availability and reliability of energy supply;
- b) enhances efficiency by optimizing the region's energy resources; and
- c) Allow access to affordable energy to populations across the region

**Can Nordic model works?**

## The Nordic Pool Model

### The key benefits:

- a) the system enhances efficiency,
- b) delivers electricity at the most cost-effective price,
- c) maximizing the benefits of both producers and consumers.

**Conduct FS**

1. No interference with the national market,
2. No need to : - modify national pricing systems (including subsidies),  
- change the ownership structure of utilities (privatization),
3. No need to create regional bodies to supersede national regulatory authorities.
4. No need to unbundled and privatized the utilities
5. regulatory agency in each participant country can be retained.
6. each country has its own market transmission system operator, working closely with the regional operator.


**Approach**

**A step wise approach is necessary, rather than a big bang where everything is attempted at the same time**


# CONCLUSION



ASEAN countries collectively need to benefit from the abundance of indigenous resources within the region



APG is a step towards the optimization and conservation of energy in the ASEAN region



APG creates bilateral arrangement through cross border electricity trading toward multilateral trading arrangement



Need to further explore the Nordic Pool Model to be implemented in APG



Support and commitment are required from ASEAN Member States to realize the multilateral electricity arrangement



**ASEAN POWER GRID**  
POWERING THE REGION



**THANK YOU**



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