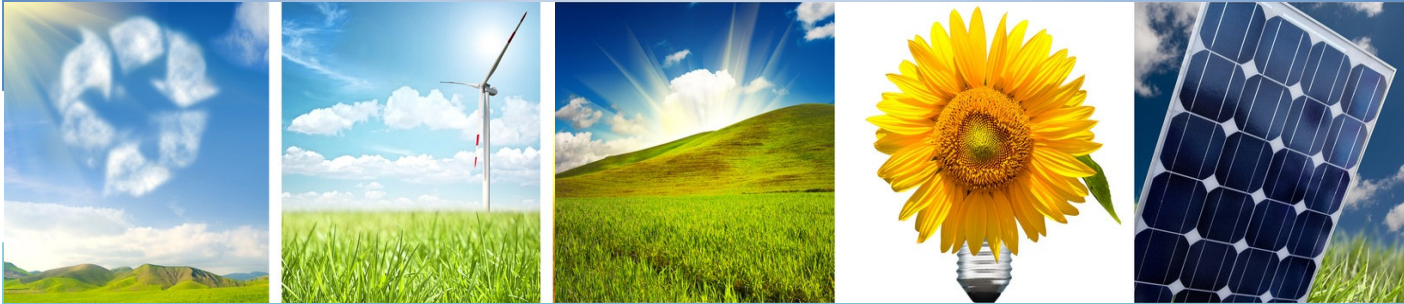




SOCIALIST REPUBLIC OF VIETNAM

UPDATE VIETNAM POWER SECTOR



Hanoi, November 2019

Contents

1. Status of National power system, Cross border cooperation
2. Overview of National Grid Codes
3. Update on new policy development in Vietnam
4. Recommendations for future cooperation






Status of National Power System and Cross border cooperation



TOTAL INSTALLED CAPACITY

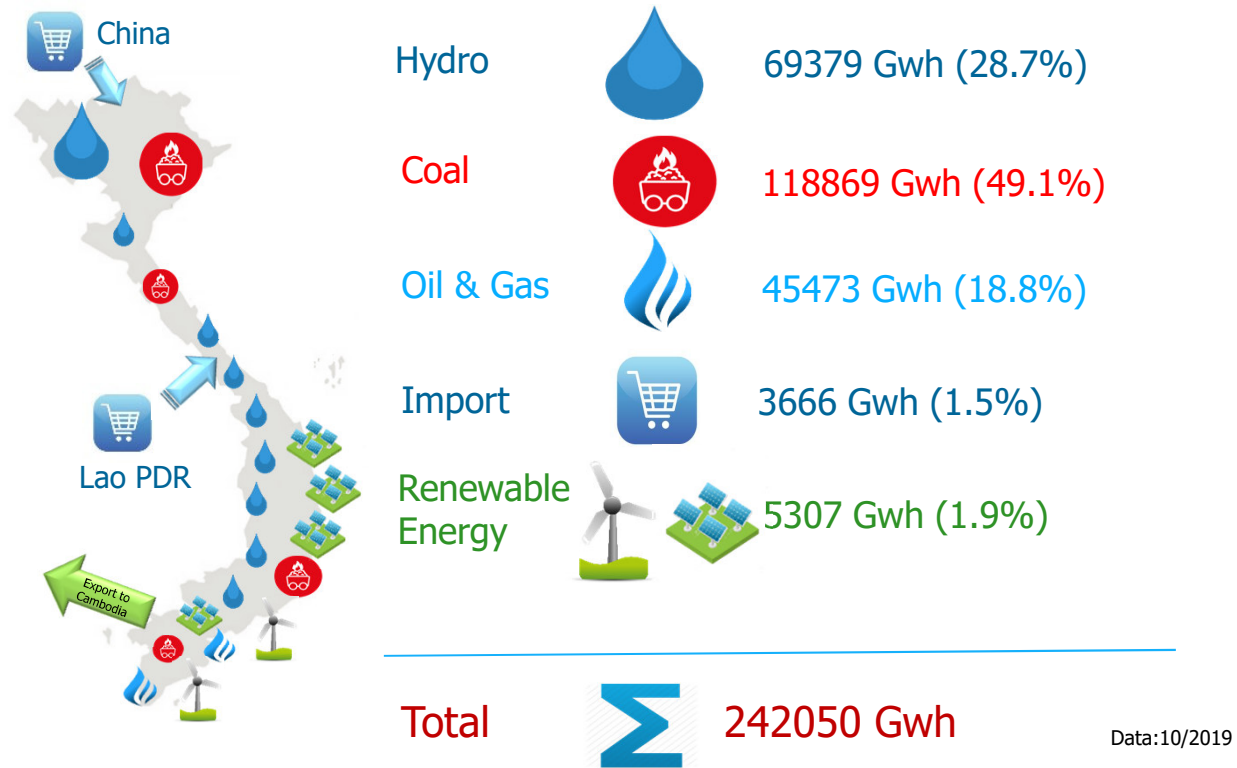


Hydro		20411 MW (37.2%)
Coal		19258 MW (35.1%)
Oil & Gas		8696 MW (15.9%)
Import		1400 MW (2.6%)
Renewable Energy		5080 MW (9.2%)

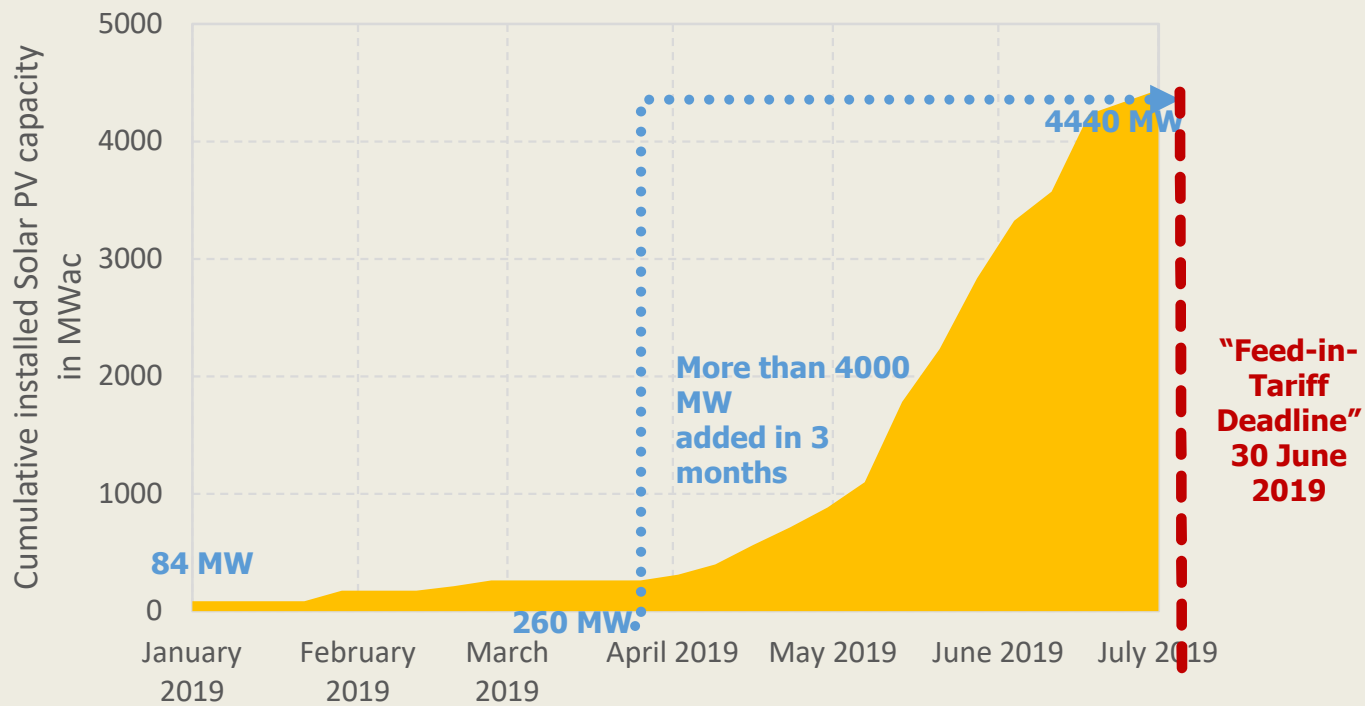
Total  **54845 MW**

Data:10/2019

ENERGY PRODUCTION 2019



Solar PV Development in Vietnam



TRANSMISSION SYSTEM



Vietnam Transmission System (10/2019)

□ 03 interconnected regions

	Quantity	No of Subs/Lines
500kV substation	35100 MVA	33
500kV line	8000 km	85
220kV substation	57441 MVA	128
220kV line	17861 km	413

Transmission capacity of 500kV System

Year	North - Central	Central - South
2019	2200-2400	4000
2021	4000	4000

Update on rural electrification

- ❑ Electrification:
 - ❑ 100% of the communes
 - ❑ 99.37% of the households
 - ❑ 99.05% of the rural households
- ❑ 20/63 (31.74%) cities have reached 100% of the households having access to electricity



02

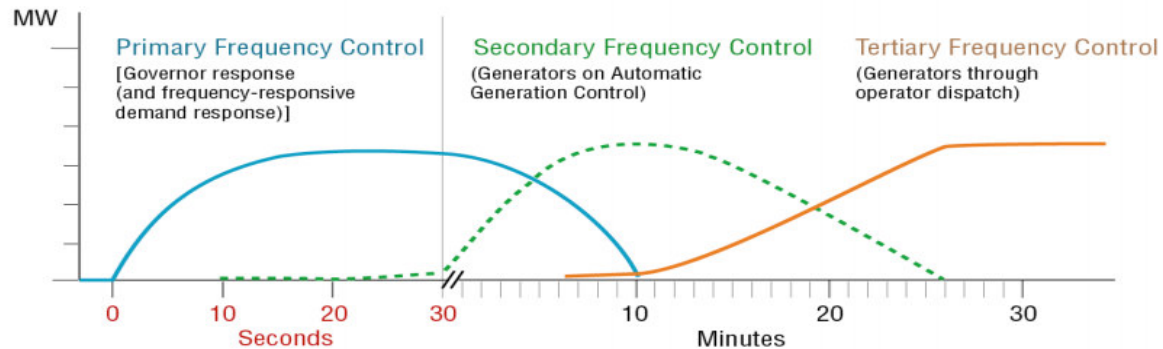
Overview of National Grid Codes



Reasons for Amendment

- The penetration of RE increase very fast
 - Technical requirements: connections, operation
 - Ancillary services
 - Frequency control/spinning reserves
- Smart grid technologies are applied
 - SCADA/EMS-DMS
 - Establishment of OCC and Unmanned substation
 - SAS/DAS,...
 - Remoted control
- Implementing Wholesale competitive power market; changed in structure of power sector

Changed the Frequency control approach



TIMING REQUIREMENT

PRIMARY FREQUENCY CONTROL

- From 0s – 30s. Peak at 10-15s

SECONDARY FREQUENCY CONTROL

- Signal sent to unit at 10s. Unit start to response at 30s, keep upto 25 mins. Peak at 8-10 mins
- Control automatically by AGC

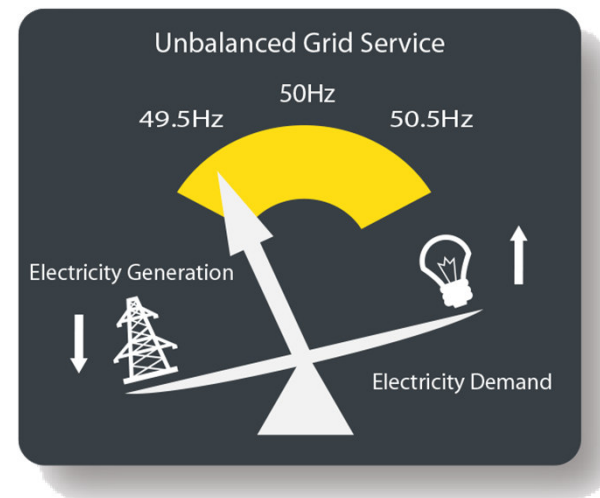
TERTIARY FREQUENCY CONTROL

- Response if the available power for primary and secondary response can not be recovered

Ancillary Services

5 Ancillary services in Grid Code

1. Frequency Control (including spinning Reserve)
2. Fast Start
3. Voltage Control
4. Reliability Must Run
5. Black Start



Connection Conditions for RE

- Frequency ranges of operation
- Active power limitations at low and high frequencies
- Voltage ranges of operation
- Reactive power capability
- Voltage/reactive power control concepts
- Frequency response (low-/high frequency response)
- Power quality aspects
- Protection and communication



03

Update of new policy development in Vietnam

3.1. Policy development on RE in Vietnam



Status of waste, **SOLAR**, wind energy industry

Solar farm:

- Total capacity registered 26,000 MW (22.100 MW) period 2019-2025.
- Total capacity included into master plan 8,100 MW.
- Around 122 solar farm projects were signed PPA with EVN with installed capacity of 6,543 MW.



Solar roof-top:

- Total installed capacity of more than 200 MW (update to October, 2019)



Status of **WASTE**, solar, wind energy industry

- 12 projects with installed capacity of 360 MW were put into operation which fired sugar cane (Co-generation).
- 02 fired waste projects with installed capacity of 10 MW which are in progress of construction.
- Some projects are proposed to add in Master plan
- Some off-grid projects



Status of waste, solar, **WIND** energy industry

1. Operated plants: 9 plants / 305MW
2. Under construction and got PPA: 13 plants / 650MW
3. 11 Provinces developed and are approved Wind power master planning:
 - ✓ Technical potential: 23.000MW
 - ✓ Approved in master plan: 94 plants/4000MW
4. After PM issues Decision 39 (new FIT)
 - ✓ Capacity: around 16700MW is proposing for approval in Master Plan
 - ✓ Location: **Quang Tri, Bac Lieu, Ben Tre**, Ca Mau, Soc Trang, Phu Yen, Tra Vinh, Gia Lai, Daklak,



Status of waste, solar, wind energy industry

General incentive mechanism for RE projects

- ✓ EVN has obligation to buy electricity from RE projects
- ✓ Duration of PPA is 20 years
- ✓ Electricity tariff is adjusted following the rate of USD/VND
- ✓ Incentive income tax: 0% in first 4 years, reduce 50% in next 9 years, reduce 10% from the year 10-15.
- ✓ Exemption of imported tax, reduce tax of environment, land usage etc.

Status of waste, solar, wind energy industry

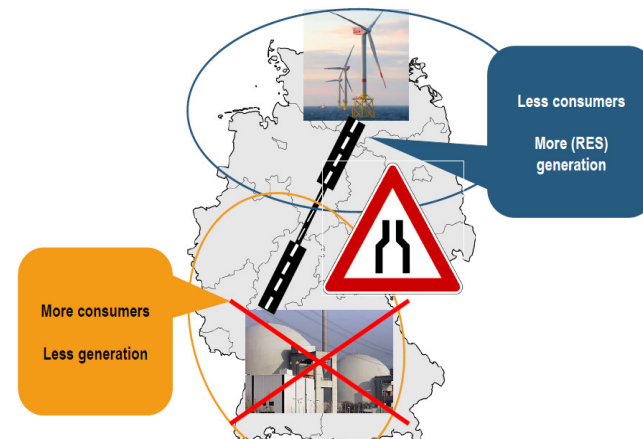
RE type	Status		FIT Level	Note
	Existing	Proposing		
Wind power	FIT		8,5 UScent/kWh for on-shore projects 9,8UScent/kWh for off-shore projects	COD before 31 Oct 2021
Biomass	FIT (CHP)	revised	- CHP: 5.8 UScent/kWh - Generation Cost from imported coal power plant (~ 7.6 UScent/kWh for 2016)	
Power plant from solid waste	FIT		- Land fill gas: 7.28 UScent/kWh - Incineration: 10.05 UScent/kWh	
Solar (PV)	FIT	Revising	- Solar Farm: FIT 9.35 UScent/kWh - Rooftop: net-metering, FIT 9.35 UScent/kWh	COD before 30 Jun 2019

Future Policy for RE Development

- ❑ **Revise and update the FIT for Solar energy**
 - ❑ Rooftop solar PV promotion program 2019-2025 is approved
 - ❑ Solar farm is revising and proposing.
- ❑ **Auction scheme ?**
 - ❑ Studying and developing proposals
 - ❑ 2 models are proposed by WB
 - ❑ Applying in some countries
- ❑ **Direct PPA – DPPA ?**
 - ❑ Pilot program is developed and reported
 - ❑ Completing and developing the model and detailed design
 - ❑ 2021-2023: Implement the pilot project
- ❑ **Power market ?**
- ❑ **Renewable Portfolio Standard, RE Certificates (RECs), ...**
- ❑ **Energy Storage System (ESS)**

Challenge for RE Development

- ✓ Limit the connection capacity/network
 - ✓ Transmission Grid expansion did not design for large amount of Solar and Wind farm.
 - ✓ Building time of new transmission lines and substations is much longer than building Solar and Wind farm.
 - ✓ Interrupt temporarily trading, risks in real time operation
- ✓ Stability, security, reliability.
- ✓ Forecasting, dispatching in real time
- ✓ Ancillary services: Frequency and Spinning Reserve



3.2. Policy development on DSM in Vietnam



Peak Clipping



Conservation



Load Building



Valley Filling



Flexible Load Shape



Load Shifting

Target *(Decision No. 279/QĐ-TTg dated 08/3/2018)*



➤ **General Target:**

- Contribute to improve power quality, power supply reliability; environmental protection and socio-economic development; sustainable development.
- Consistent with the trend of energy development; optimal, efficient chain of electricity production, supply and consumption.
- Curtail the peak load of power system, reduce pressure on investment and electricity price increase,...
- Raising awareness of customers as well as society in electricity consumption and management.

➤ **Specific Target (summary):**

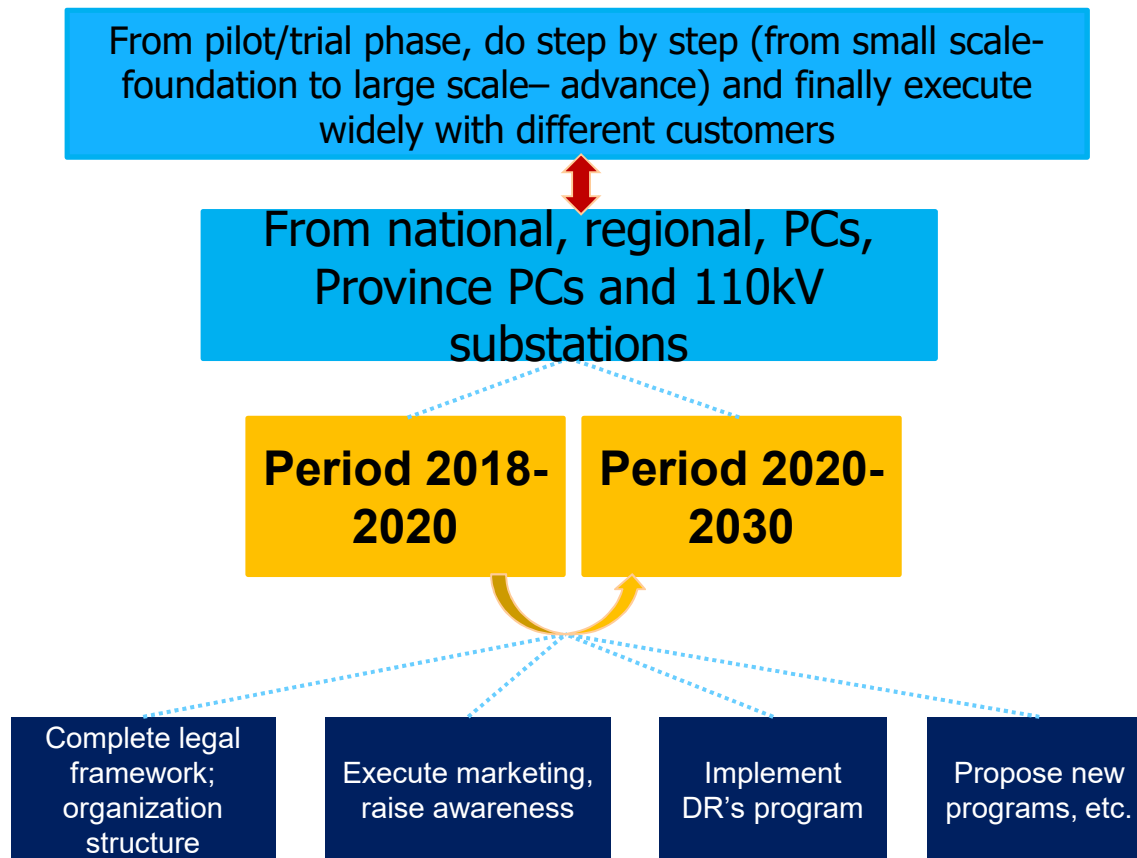
- Reduce the peak load of national power system by **300** MW in 2020, **1000** MW in 2025 and **2000** MW in 2030.
- The load factor of national power system will increase from **1% ÷ 2%** in 2018-2020 and **3% ÷ 4%** in the period of 2021-2030.
- Step by step attracting and expanding the number of customers to participate, especially resident customers.
- Coordinate and implement integrated with EE, Smart Grid and RE development to achieve the highest efficiency.

ROAD MAP AND IMPLEMENTATION PLAN OF DR PROGRAM

(Decision No. 175/QĐ-BCT dated 28/1/2019)

- National DR program is the central, strategic program of National DSM program:
 - Reduce ratio of peak load: at least 30% compare to target of DSM program.
 - Become one of solutions to provide ancillary service for power system operation.
 - Main contribution in improving load factor of national power system (K_{pt}), regional power system and PCs.
- Contribute to reducing transmission losses on the North – Central – South transmission grid
- After 2020, execute widely with voluntary and active participation of different type of customers
- An activity in production and business plan to optimize these activities
- Transform from traditional electricity consumption customers to smart customers

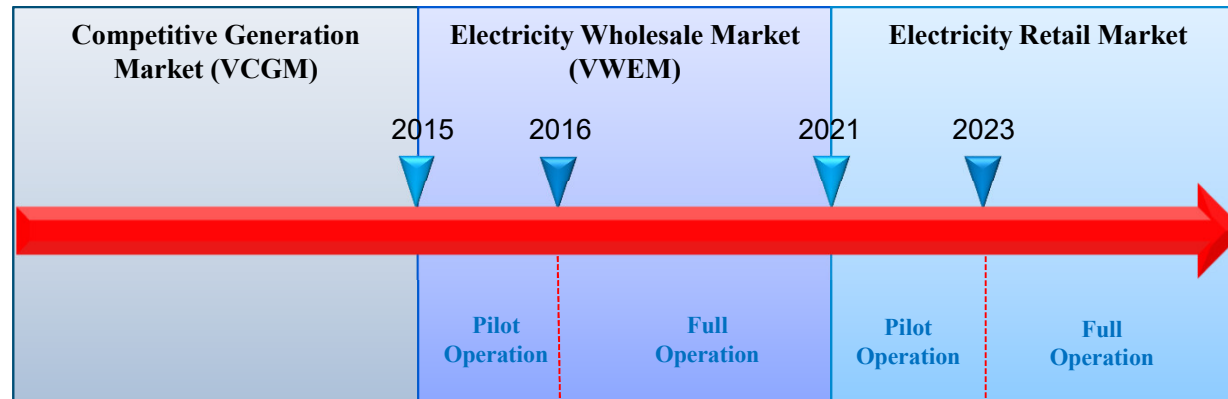
DR Road map and implementation plan



3.3. Update on Competitive Power Market Development and Electricity Tariff

Competitive Power Market Development

Roadmap (Decision 63/2013/QD-TTg):

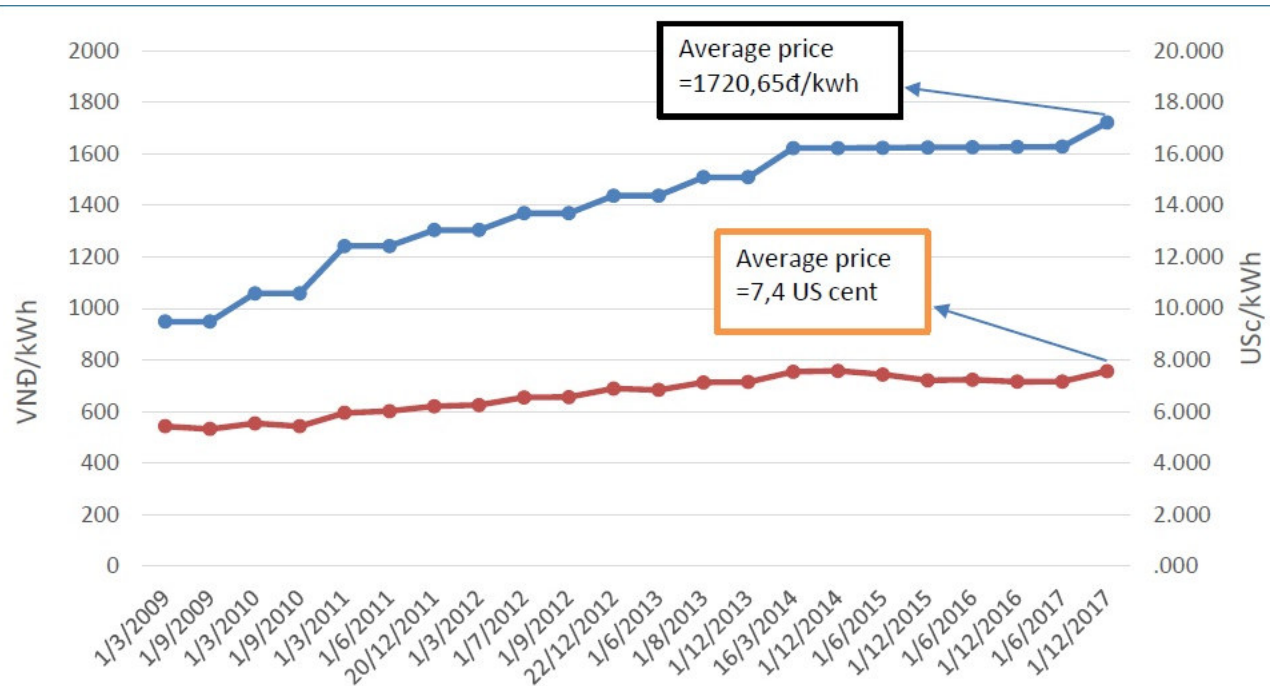


Stages of VWEM implementation:

- 2019: Full VWEM (MOIT Decision No. 8266)
- 2019 onwards: Long Term VWEM



Averaged Electricity retail tariff



- Increased 8,36% in March 2019, to 1.864 VNĐ/kWh (around 8 US cents/kWh)

04

Recommendations for future cooperation

Recommendations for future cooperation

- ❑ Promote the MOU for exchange power between countries (Vietnam-Laos, etc)
- ❑ Support bilateral interconnection in near – term and multilateral interconnection in longer – term
- ❑ Continuously the finalize the GMS GC as well the roadmap to adopt in each countries
- ❑ Greater focus on promotion of investment and grid interactivity of smaller-scale RE installations