



**EVN**


**TẬP ĐOÀN ĐIỆN LỰC VIỆT NAM**

# RENEWABLE ENERGY IN VIETNAM POWER SYSTEM

Ha Noi, 10/12/2019

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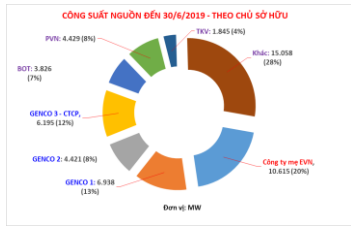
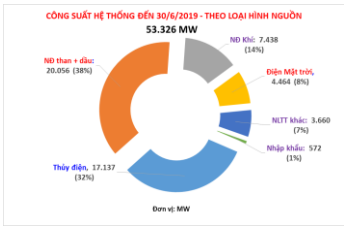
# OVERVIEW OF VIETNAM POWER SYSTEM

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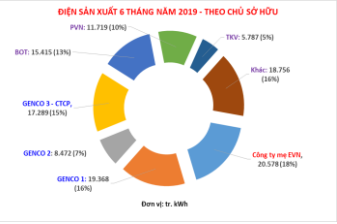
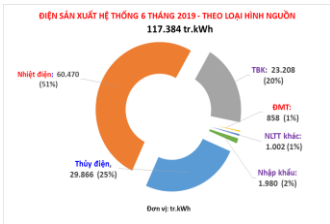
## I. OVERVIEW OF VIETNAM POWER SYSTEM



### Installed capacity until June 2019



### Generation capacity until June 2019



## I. OVERVIEW OF VIETNAM POWER SYSTEM



□ System production power during 10 first months of 2019:

No.	Sources	Plan 2019	Actual 10 months		Compare (%)	
		Decision no. 4677	Output	Percentage	Same period of 2018	Year plan
1	Hydropower	73,431	58215	28.97%	80.92	79.28
2	Coal-fired thermal power	116,534	97549	48.54%	134.12	83.71
3	Air turbine	42,427	36193	18.01%	107.64	85.31
4	Oil thermal power	2,435	1180	0.59%	404.12	48.44
5	Imported	2,581	2778	1.38%	109.44	107.64
6	Renewable Energy	3,198	4625	2.12%	662.8	133.39
	<i>In which: Solar power</i>	2,109	3484	1.73%		16.20
	<i>Wind power</i>	590	516	0.26%		87.45
7	Others	1,352	797	0.40%	96.39	58.97
	<b>TOTAL</b>	<b>241,958</b>	<b>200,977</b>	<b>100%</b>	<b>110.06</b>	<b>83.06</b>



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CURRENT SITUATION OF CENTRALIZED RENEWABLE ENERGY SOURCE OPERATION

## II. CURRENT SITUATION OF CENTRALIZED RENEWABLE ENERGY SOURCE OPERATION

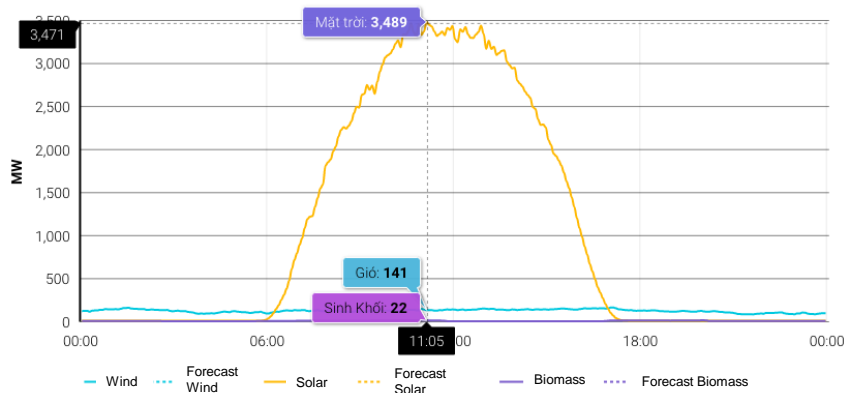
### ❑ Current situation of the mobilization of RE source

- ✓ There have been 98 projects with a capacity of 4,880MW in operation (89 solar power plants with a total capacity of ~ 4,440MW and 09 wind power plants with a total capacity of ~ 440MW).
- ✓ Mobilizing the full generation capacity of 79/98 wind and solar power plants with a total of ~ 4,200MW (86% of capacity).
- ✓ 19 plants in the two provinces of Ninh Thuan and Binh Thuan with a total capacity of ~ 670MW (accounting for 14% of the total capacity put into operation) must have their generation capacity restricted due to grid overload
- ✓ Pmax ~ 3,554 MW (30/9/2019)
- ✓ Maximum daily output is about 25-26 million kWh (equivalent to the power output generated by a coal-fired power plant with a capacity of ~ 1200MW like Vinh Tan 1, 2, Duyen Hai 1).

## II. CURRENT SITUATION OF CENTRALIZED RENEWABLE ENERGY SOURCE OPERATION

### ❑ Obstacles:

- ✓ Unstable power generation capacity.
- ✓ Solar Power can only generate between 6am and 6pm (as can be seen from the chart dated 20/11/2019).



## II. CURRENT SITUATION OF CENTRALIZED RENEWABLE ENERGY SOURCE OPERATION



### □ Other obstacles:

- ✓ Restricting grid load capacity.
- ✓ Adjusting power system frequency:
  - Currently, frequency modulation is mainly performed by hydropower.
  - Difficult future due to less hydropower.
- ✓ Requirement of higher reserve capacity.
- ✓ Power quality:
  - Voltage.
  - Harmonic



### III. DEVELOPING DISTRIBUTED RENEWABLE ENERGY SOURCE



#### □ Coordination of EVN and its members:

- ✓ Delegate Power Corporation/member units to sign and execute Power Purchase Agreement (PPA) from rooftop solar power projects (installation capacity is equal to or less than 01 MWp) of the Owner (the Owners may be households or individuals, organizations owning roofs or renting roofs to develop solar power).
- ✓ Organizing receiving registration of the Owners' request to install Rooftop Solar Power via Customer Care Centers by: telephone, email, Zalo, Chat box, ....
- ✓ Advising the Owner to choose installing photovoltaic cells, Direct Circuit to Alternative Circuit switch (inverter) of the Rooftop Solar Power project with clear origin, factory certificate/manufacturer's equipment quality certificate, equipment with high performance, longevity and long warranty period to ensure investment effectiveness.



### III. DEVELOPING DISTRIBUTED RENEWABLE ENERGY SOURCE



#### □ Coordination of EVN and its members:

- ✓ Within 03 days from the date of receiving the proposal to sell power from the owner's project, based on the manufacturer's technical documents, the Power corporation/its member units shall coordinate with the Owner to check the feature of anti-Islanding protection of the project equipment, make a record of the project's technical specifications, install two-way meters and sign a power purchase agreement with the owner.
- ✓ Make monthly payment to the Owner (by bank transfer).



### III. DEVELOPING DISTRIBUTED RENEWABLE ENERGY SOURCE



- ❑ EVN assigns the target of developing **Clients'** rooftop solar power among Power Corporations. Following are the goals for 2019:
  - ✓ Southern Power Corporation (EVNSPC): 95 MWp;
  - ✓ Hochiminh City Power Corporation (EVNHCMC): 50 MWp;
  - ✓ Central Power Corporation (EVNCPC): 48 MWp;
  - ✓ Northern Power Corporation (EVNNPC): 5 MWp and
  - ✓ Hanoi Power Corporation (EVNHANOI): 2 MWp.
- ❑ EVN encourages to install rooftop solar power at office space and 110kV substation of the units.
  - ✓ At EVN office, there is a 19.8kWp rooftop solar power system, which has been producing 22,545kWh since the start of operation (August 2017).

### III. DEVELOPING DISTRIBUTED RENEWABLE ENERGY SOURCE



- ❑ Status of implementation among clients in the region of Power Corporations (as of 11/2019 - total power generation: 58,329 million kWh)
  - ✓ Southern Power Corporation (EVNSPC): **158.15/95** MWp,
    - ❑ Provinces with high installation capacity are Ninh Thuan (40.657MWp), Dong Nai (20.039MWp), Binh Duong (14.624MWp), Tay Ninh (13.233MWp);
    - ❑ Provinces with low installation capacity are Bac Lieu (1.113MWp), Ca Mau (1.247MWp), Hau Giang (1.654MWp);
    - ❑ On average, each province in the region of EVNSPC has about 7.5MWp.
  - ✓ Hochiminh City Power Corporation (EVNHCMC): **52.76/50** MWp;
  - ✓ Central Power Corporation (EVNCPC): **76.121/48** MWp, in which Khanh Hoa (23.961MWp), Dak Lak (23.060MWp) are at most; on average in the region of approximately 5.855MWp/province;
  - ✓ Northern Power Corporation (EVNNPC): **13.9/5** MWp, in which Ha Tinh (2.558MWp), Hung Yen (2.252MWp), Bac Giang (2.106MWp);
  - ✓ Hanoi Power Corporation (EVNHANOI): **2.756/2** MWp.

### III. STATUS OF DISTRIBUTED RENEWABLE ENERGY SOURCES



#### □ Status of rooftop solar installation by customer groups (by loads)

Địa bàn đơn vị	Customers by load					Total	Percent
	Agriculture-Aquaculture	Industry-Construction	Commercial-Service	Individual-Households	Others		
EVN-NPC	6	53	89	1028	17	1193	6.3%
EVN Hanoi	0	8	13	355	5	381	2.0%
EVN-CPC	62	133	280	3037	73	3585	18.9%
EVN-SPC	235	359	660	7607	167	9028	47.5%
EVN-HCMC	14	129	313	4318	57	4831	25.4%
<b>Total</b>	<b>317</b>	<b>682</b>	<b>1355</b>	<b>16345</b>	<b>319</b>	<b>19018</b>	<b>100.0%</b>
<b>Percent</b>	<b>1.7%</b>	<b>3.6%</b>	<b>7.1%</b>	<b>85.9%</b>	<b>1.7%</b>	<b>100.0%</b>	

### III. DEVELOPING DECENTRALIZED RENEWABLE ENERGY SOURCE



#### □ Evaluation:

- ✓ The RTS systems are distributed in power consumer households, therefore, have little impact or pressure is put on the transmission and distribution grids as centralized solar plants with large capacity.
- ✓ RTS is highly popular in the Middle and the Southern Regions, in accordance with the potential of solar irradiance in the region. The largest consumer group is households.
- ✓ RTS in the Northern region develops slowly and with smaller scale due to low solar irradiance and less cost-effective than in the Southern region.

#### □ Recommendation:

- ✓ In order to promote the development of Rooftop Solar in the regions where there are institutional retailers (outside of EVN's power grid), EVN is recommending the Ministry of Industry and Trade to allow EVN to coordinate with institutional retailers to directly purchase power from solar power projects in this area.
- ✓ The Government/Ministry of Industry and Trade should continue policies to encourage and develop Rooftop Solar





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