



# COUNTRY UPDATES

## VIETNAMESE POWER SYSTEM



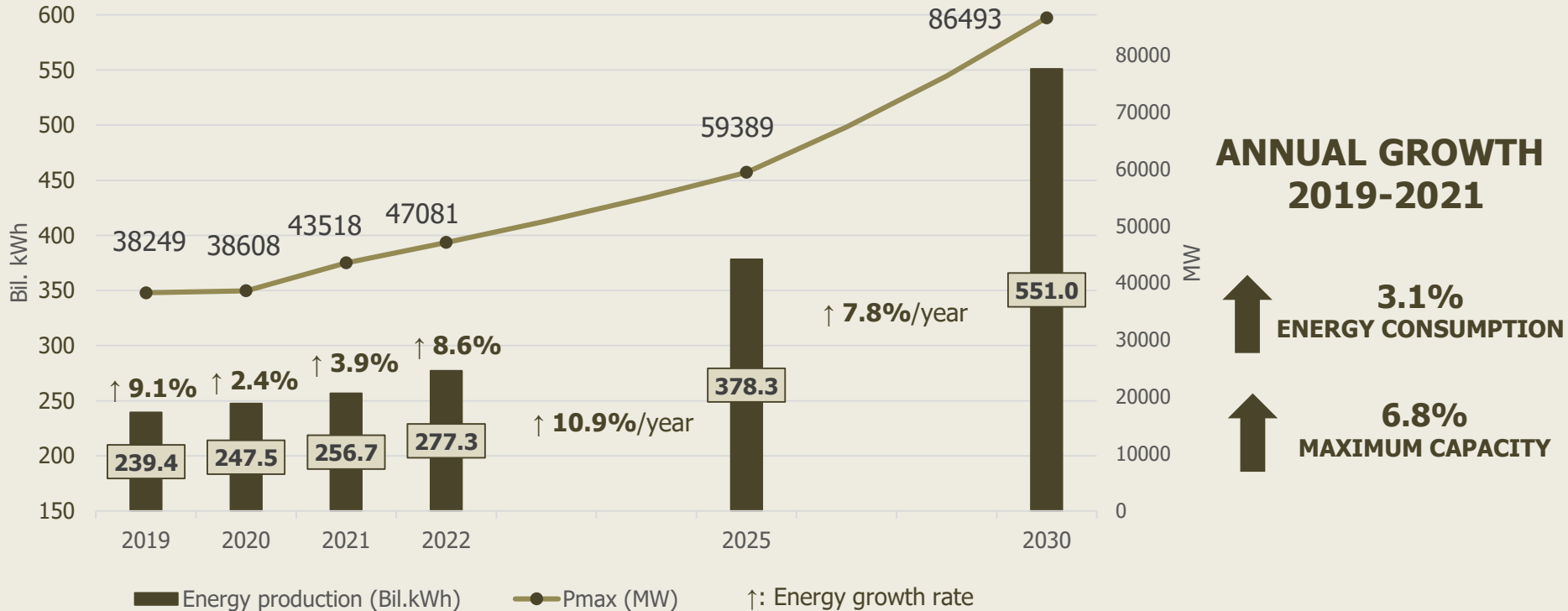
# 01

## CURRENT STATUS OF VIETNAMESE POWER SYSTEM



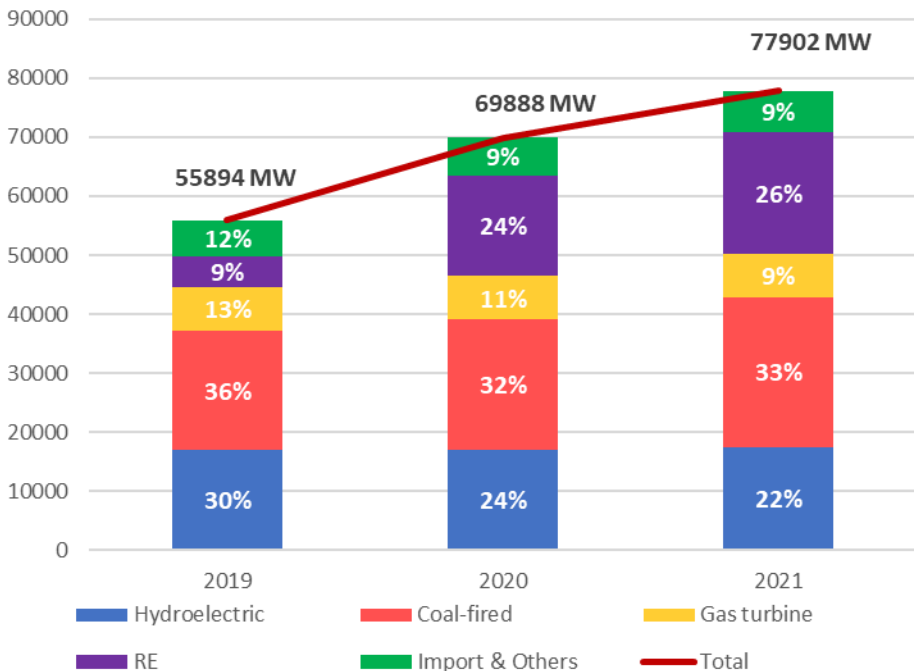
# LOAD

## NATIONAL POWER LOAD



# GENERATION

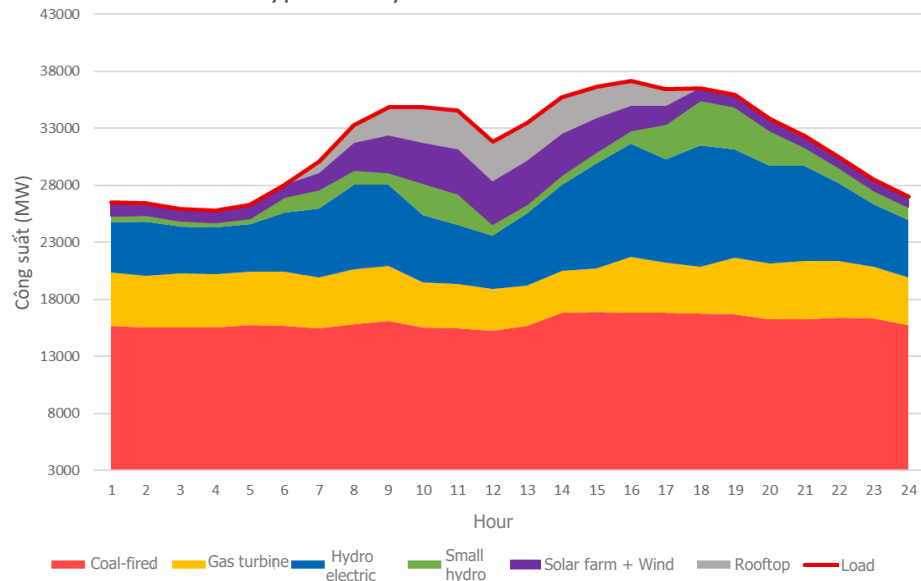
Installed capacity 2019-2021



Growth rate of installed capacity

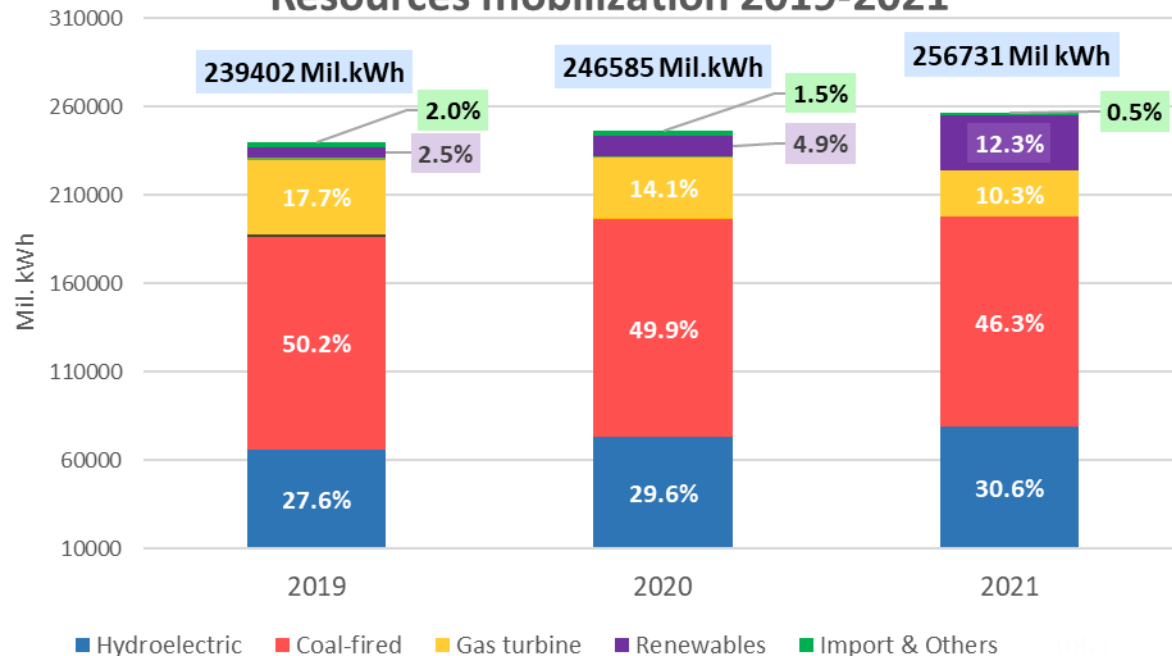
↑ **11 GW/year**  
~**18%/year**

Typical daily resources mobilization in 2021



# GENERATION

## Resources mobilization 2019-2021



Changes in energy production:



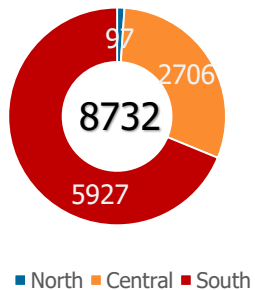
**Renewables**

Increase ~**12.7 GWh/year**  
Production shares increased from  
**2.5% to 12.3%**

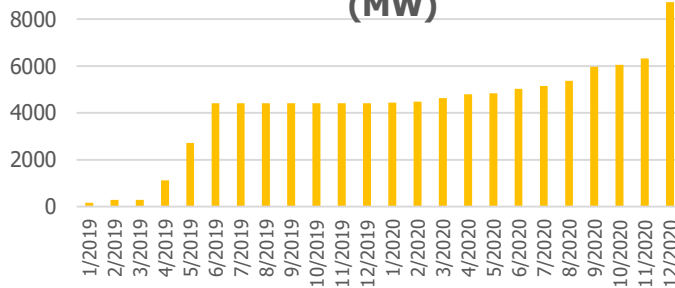


**Thermal (Coal, Gas, Oil)**  
Production shares decreased from  
**68.8% to 56.6%**

# DEVELOPMENT OF RENEWABLES



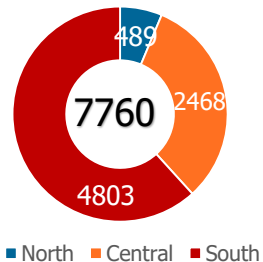
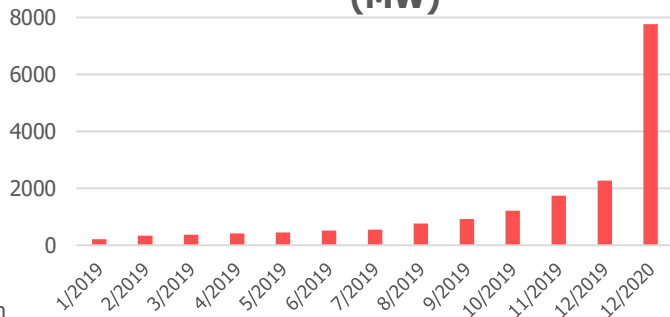
Installed capacity of Solar farm (MW)



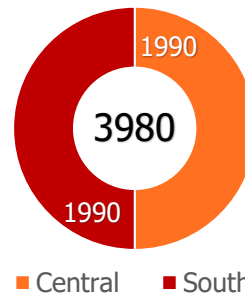
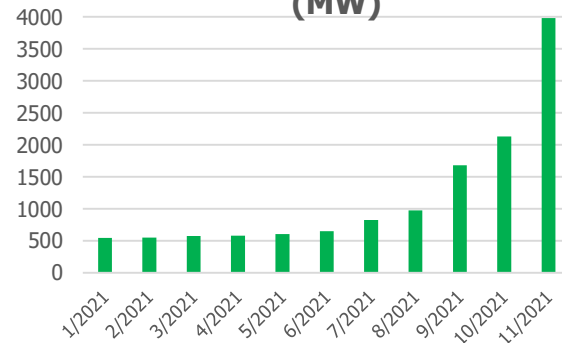
## FITs incentives for renewables:

- Solar farm: 9.35 UScents/kWh COD before 30/06/2019
- Rooftop: 8.38 UScents/kWh COD before 31/12/2020
- Wind: 8.5 UScents/kWh for onshore and 9.8 UScents/kWh for offshore COD before 1/11/2021

Installed capacity of Rooftop (MW)



Installed capacity of Wind (MW)









# 02

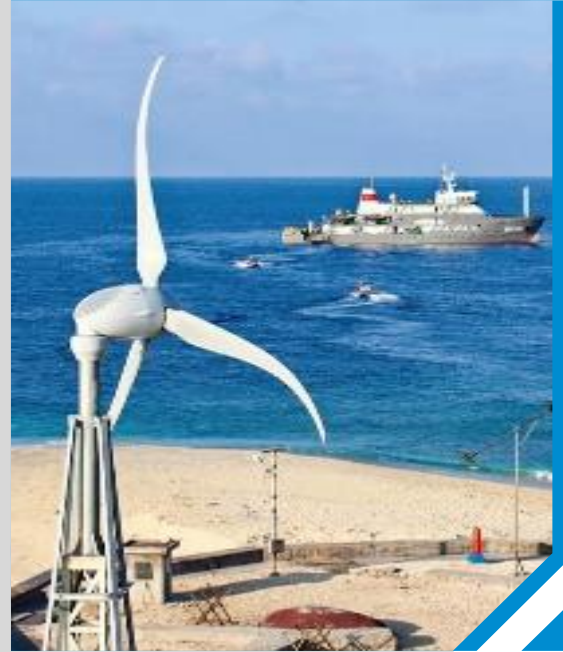
## OPPORTUNITIES AND CHALLENGES IN OPERATING POWER SYSTEM WITH HIGH RE PENETRATION



# OPERATION CHALLENGES WITH RENEWABLES

 GRID CONGESTION	→	<ul style="list-style-type: none"><li>• Currently, 18 overload 220/110kV lines/transformers</li><li>• 500kV regional transmission</li><li>• 220 RE power plants haven't been fully mobilized due to local congestion</li></ul>
 RENEWABLE SURPLUS	→	During low-peak hours, especially weekends and Tet Holiday, over-generation occurs due to high renewable penetration
 LOW SYSTEM INERTIA	→	<ul style="list-style-type: none"><li>• Low system inertia =&gt; Risk of system instability</li></ul>
 RE FORECAST ERRORS	→	High RE forecast errors increase the absolute value of imbalance and bring difficulties in system planning
 SUPPORTING MECHANISM	→	<ul style="list-style-type: none"><li>• The incentive mechanism for ancillary services is not attractive =&gt; lack of reserve to meet the uncertainty of renewables</li><li>• Currently, there is no mechanism for BESS</li></ul>
 FAULT RIDE THROUGH / LOW SCR	→	<ul style="list-style-type: none"><li>• There is no specific regulation on the fault ride through of renewable energy sources =&gt; The adjustment parameters of the solar inverters and wind turbines are always kept at the rated parameters set by the issuer =&gt; The serious incident occurs because the fault ride through parameters are not properly set (accidents May 13, 2021, June 2, 2021)</li><li>• Low Short-Circuit Ratio → power swing</li></ul>





THANK YOU FOR  
YOUR LISTENING