

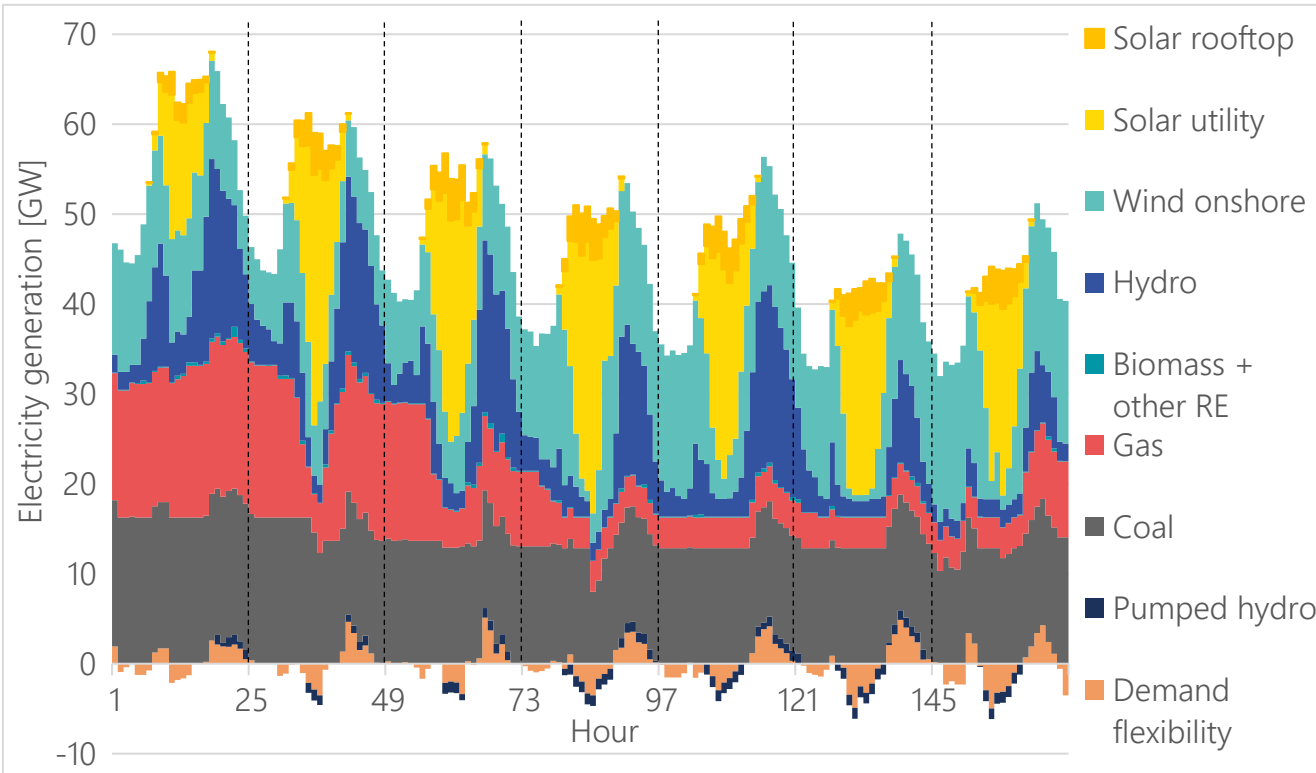


# VIETNAM ENERGY OUTLOOK 2021

Cost-effective balancing

# Balancing the power system

Hourly generation during one week in BSL in 2035



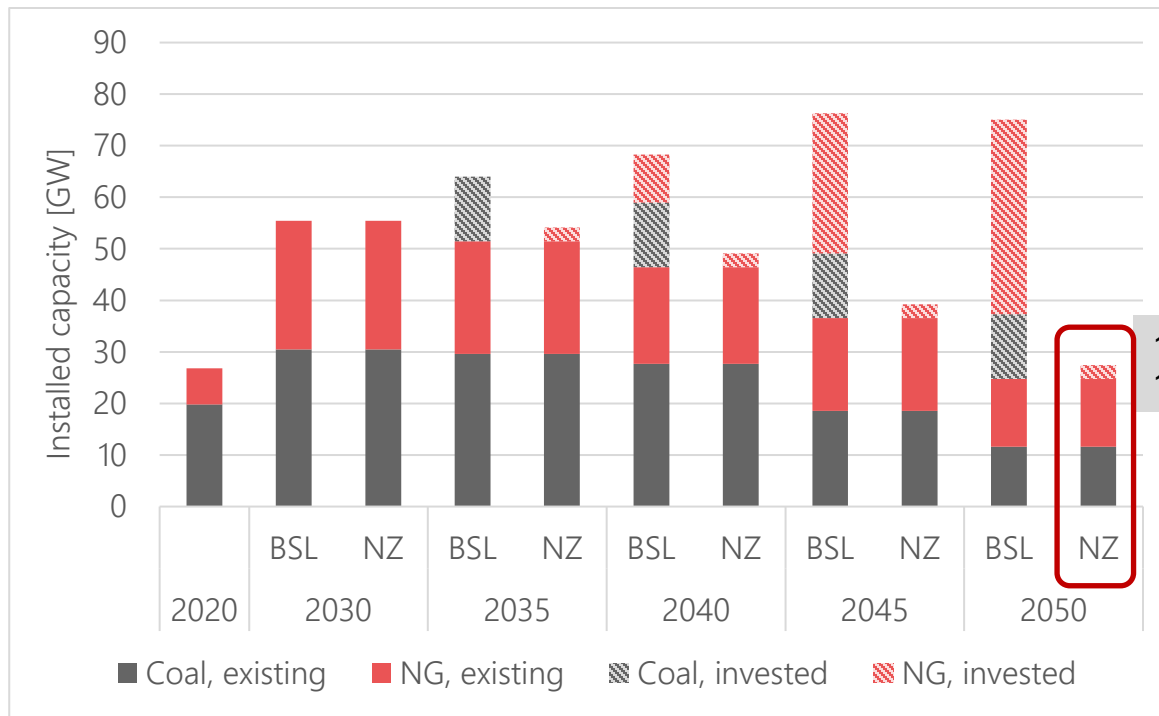
Balancing is a challenge already in 2035 in BSL. Optimal dispatch important to reaching net zero



**Recommendations**

1. Ensure optimal dispatch e.g. through markets
2. Activate demand flexibility

# The need for thermal capacity



16 GW NG  
12 GW coal

## In NZ:

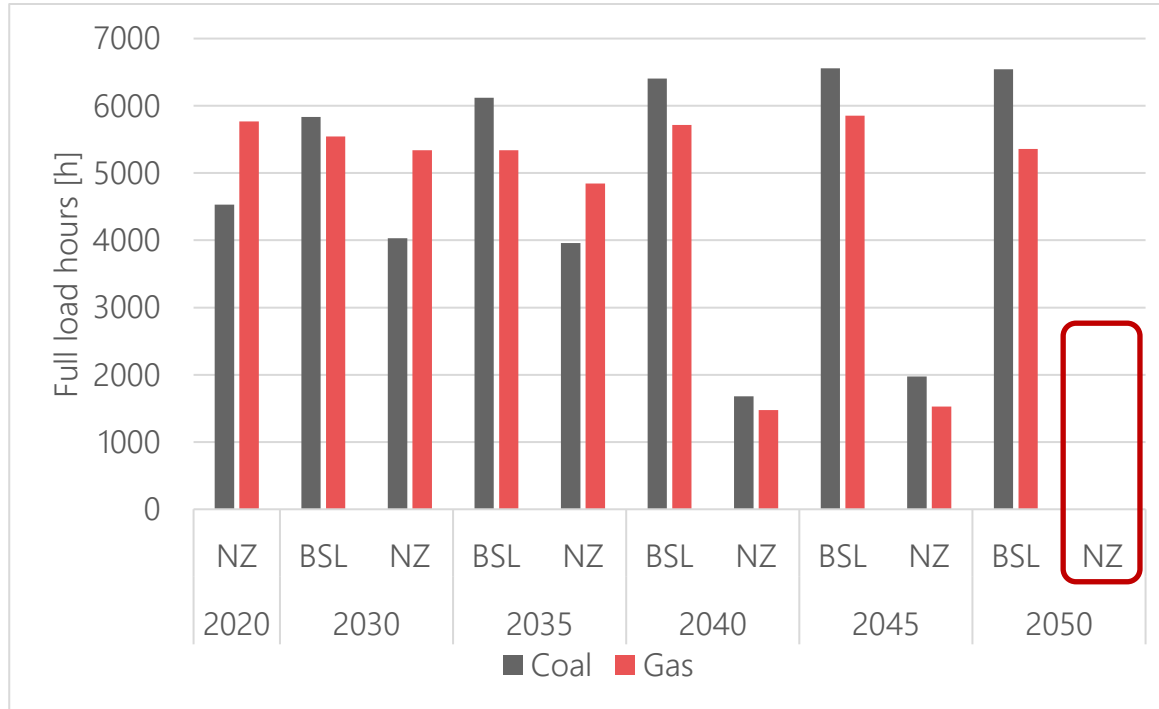
- No new coal
- Max gas capacity = 25 GW
- By 2050, coal and gas plants still exist



## Recommendations

Plan no more coal and carefully consider new gas-fired power plants to avoid lock-in effect / stranded assets

# The role of thermal power plants could change



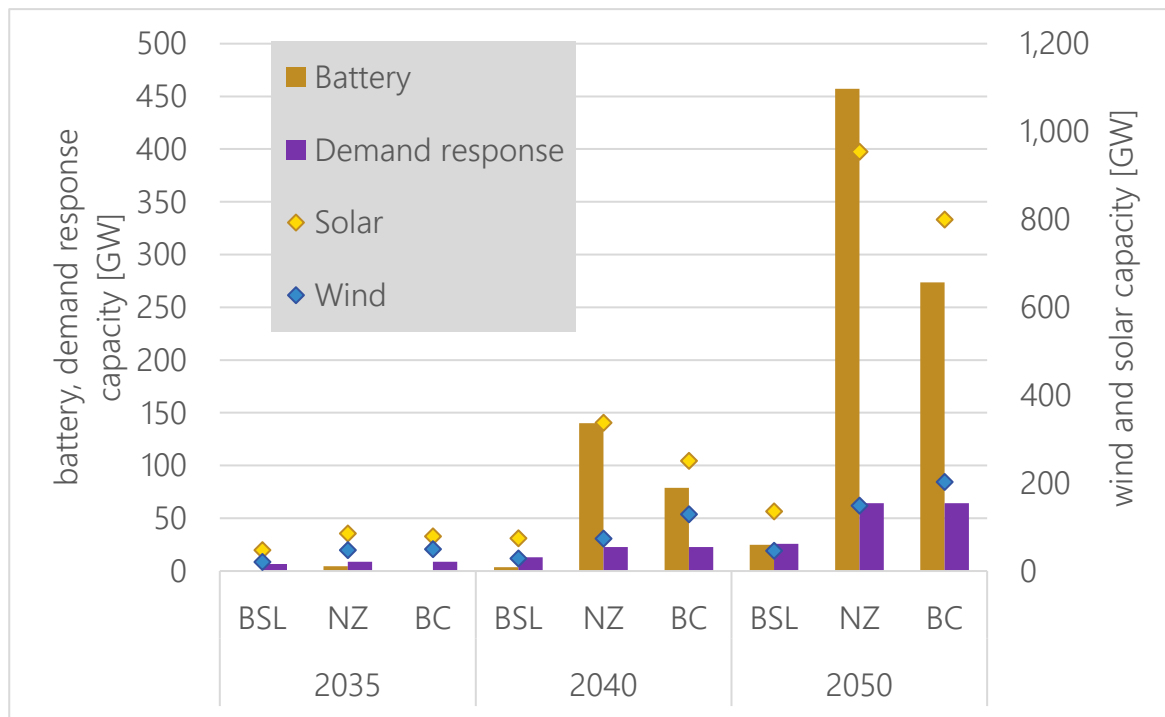
Coal/gas plants should reduce operation especially from 2040 and completely stop in 2050 to reach NZ



## Recommendations

1. Avoid contracts with minimum generation for coal and gas plants
2. Ensure flexible operation of existing and new thermal power plants

# Need for storage



PV and BESS is a good match

Large amounts of storage is needed, but not until 2035.

NZ in 2050:

→ 77M EVs = 550 GW

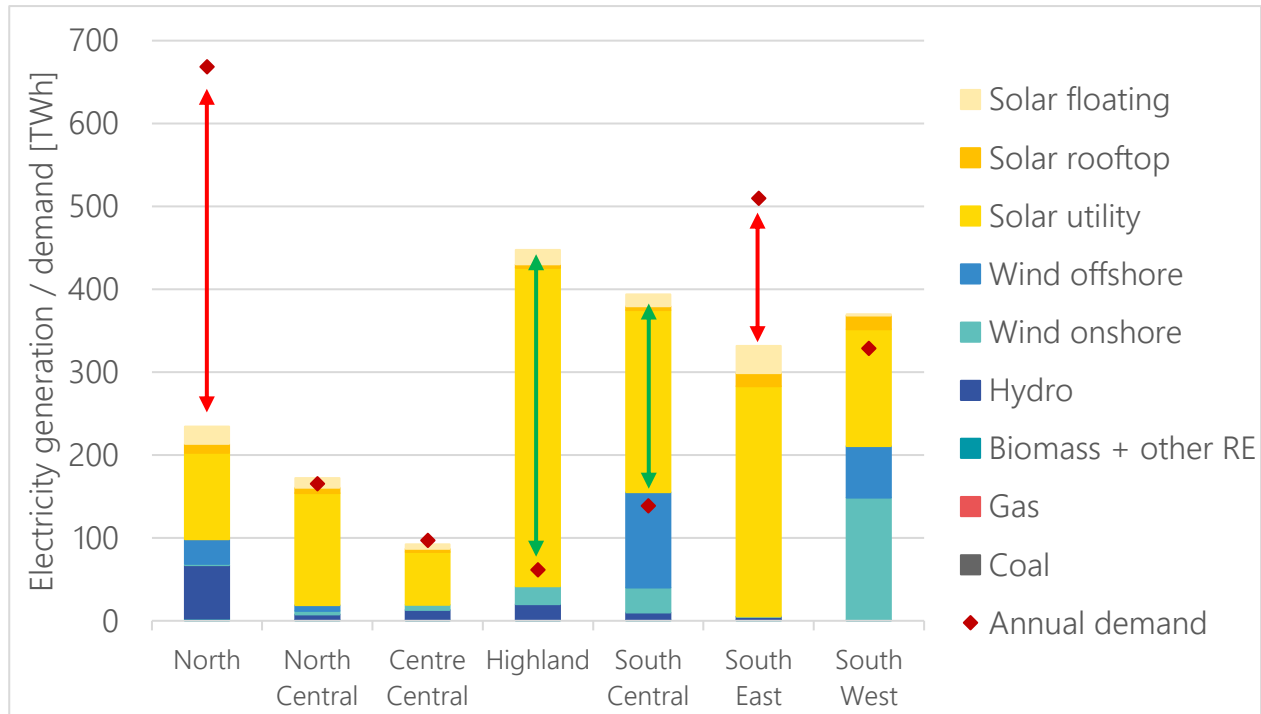


## Recommendations

1. Ensure regulatory framework for demand response
2. Prepare to implement BESS in large scale after 2030

# Regional imbalance of demand/supply

NZ scenario in 2050

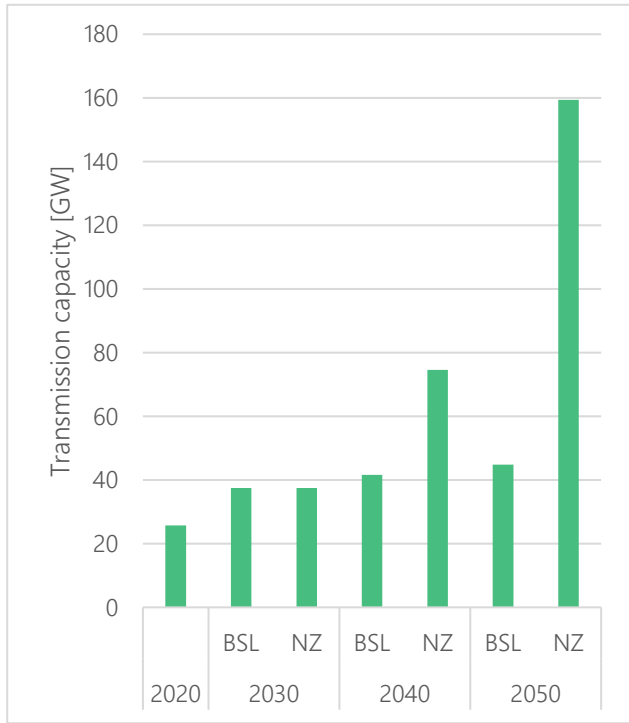


Large regional imbalances  
-> need for transmission

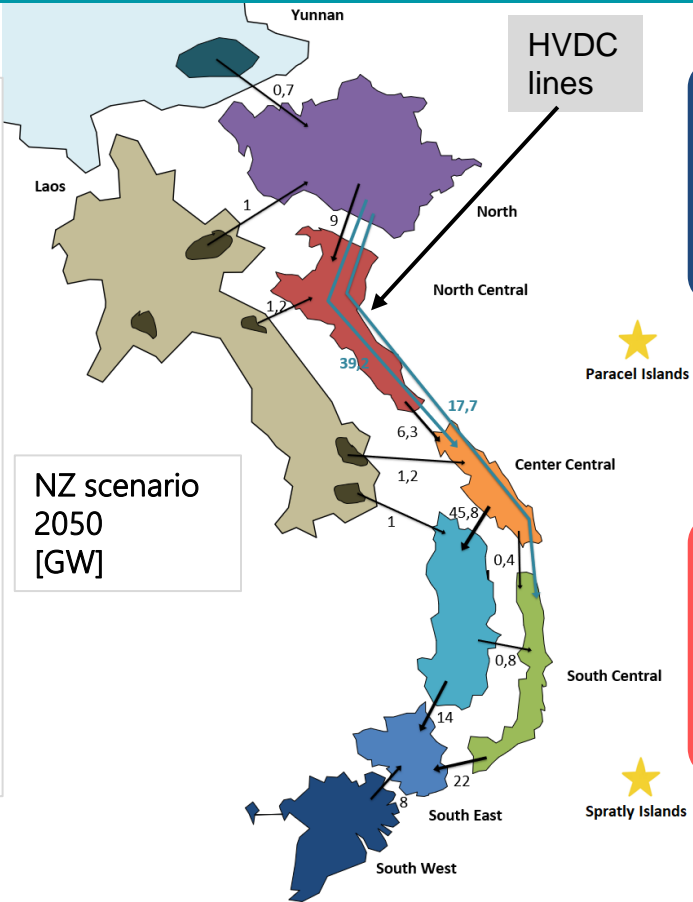


**Recommendations**  
Plan for large grid reinforcement in long term

# Need for transmission



BSL: Baseline scenario  
 NZ: Net zero scenario



12 GW additional capacity needed already in 2030  
 Large HVDC lines needed in long term

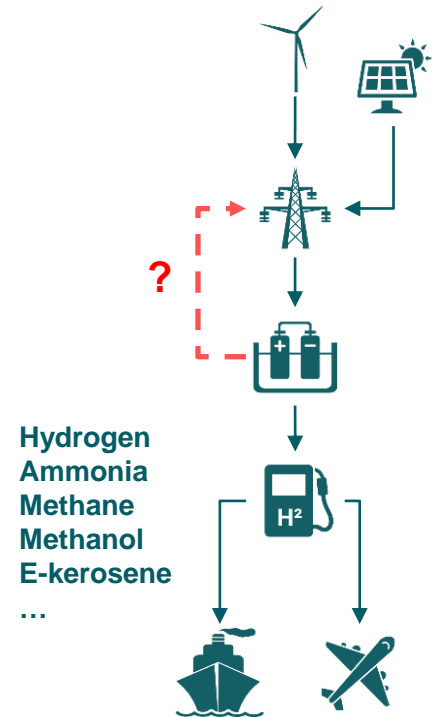


**Recommendations**

1. Reinforce AC grid as soon as possible
2. Plan for large HVDC lines after 2030

# Hydrogen and Ammonia?

- Green e-fuels such as hydrogen and ammonia will be needed to transition the transport sector
- The production of hydrogen can be flexible and thus contribute to balancing
- But will it be cost-efficient to produce electricity from hydrogen and ammonia?





## Cost-effective balancing: Early actions

- Utilise existing assets first (thermal, hydro)
- Create regulatory framework for Demand-Response
- Reinforce the transmission system in HVDC

## Cost-effective balancing after 2030

- Develop storage in large scale
- Develop hydrogen production and e-fuels



Thank you!

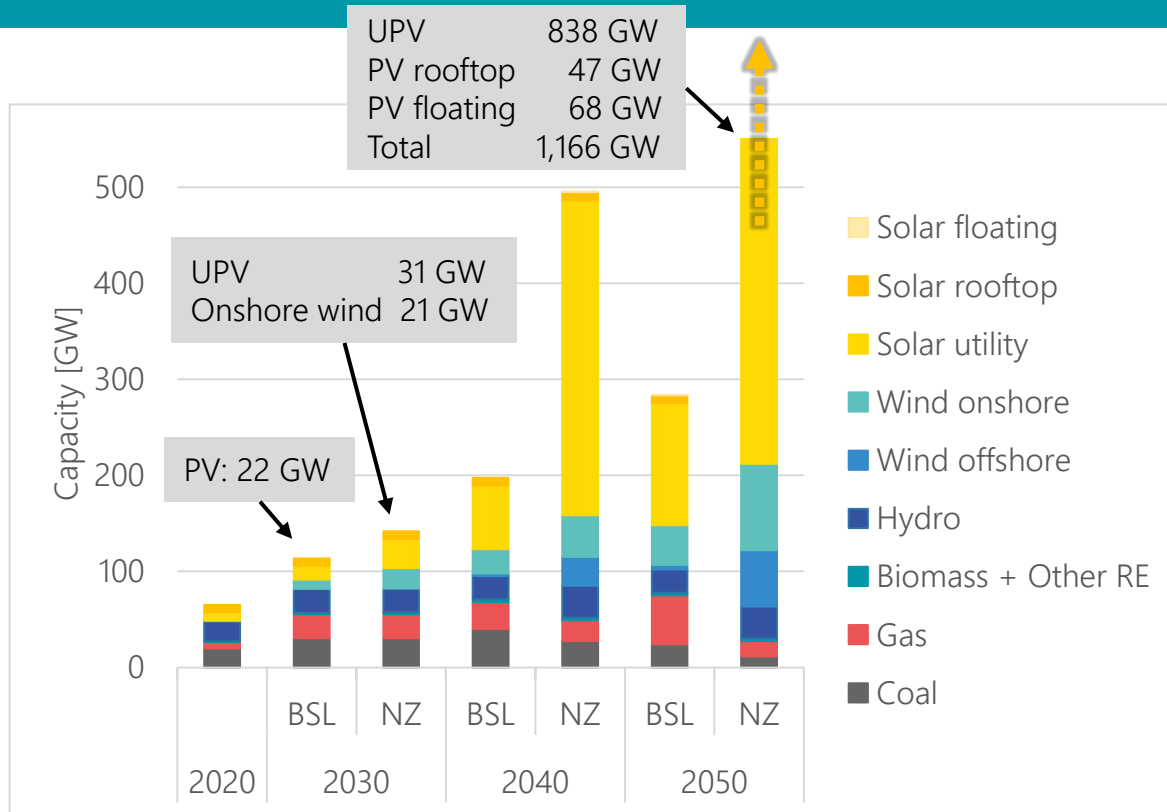
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# Power Generation – Installed Capacity



UPV is expected to be the cheapest resource and a very large amount could be integrated in long term.



**Recommendations**

1. Consider more UPV and onshore wind before 2030
2. Integrate as much UPV as possible in the long term