



**HAL**  
open science

## Clean energy and environnement in Southeast Asia

Minh Ha-Duong, Fabby Tumiwa

► **To cite this version:**

Minh Ha-Duong, Fabby Tumiwa. Clean energy and environnement in Southeast Asia. 3rd cycle. YSEALI ACADEMY'S FLAGSHIP SEMINARS 2021 - PUBLIC POLICY SEMINAR CURRICULUM - Energy Economics and Policy, Ho Chi Minh City, Vietnam. 2021. hal-04486316

**HAL Id: hal-04486316**

**<https://hal.science/hal-04486316>**

Submitted on 1 Mar 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Clean energy and environment in Southeast Asia

**[minh.haduong@vietse.vn](mailto:minh.haduong@vietse.vn)**

**[fabby@iesr.or.id](mailto:fabby@iesr.or.id)**

# Agenda

- Introduction
- Renewable energy in ASEAN: potential and current status (Minh)
- Environmental pressure, climate change mitigation (Fabby)
- Case 3: Offshore wind in Vietnam (Group 7)
- Case 1: Biofuels in Indonesia (Group 2)
- Cultural intermission: Which kind of Indonesian are you
- Case 2: Solar for Singapore (Group 6)
- Concluding summary

# Renewable energy in ASEAN: potential and current status

- 1) The ASEAN 2025 goal is **23% RE / TPES**
- 2) The resource diversity

References:



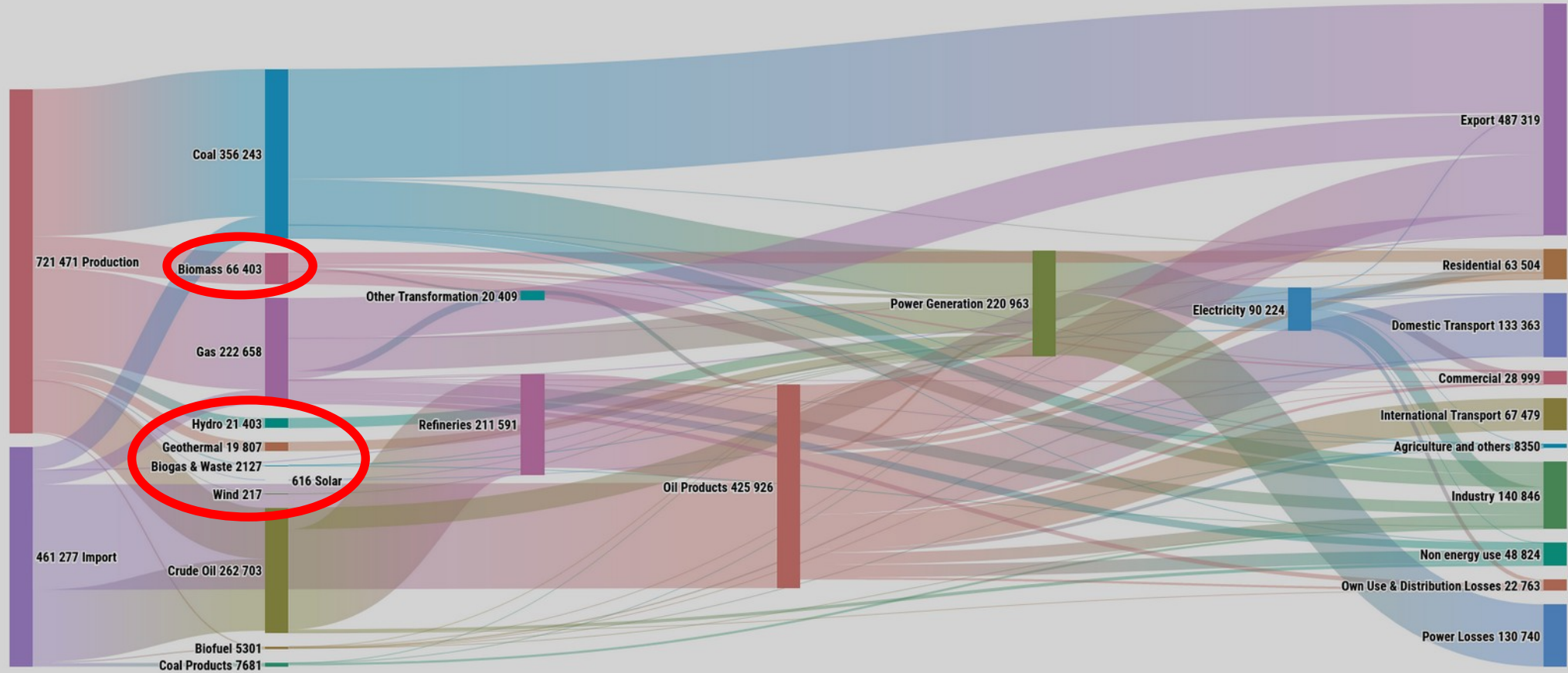
**ASEAN Centre for Energy**  
One Community for Sustainable Energy



**IRENA**  
International Renewable Energy Agency

# The Latest ASEAN Energy Balance (2017)

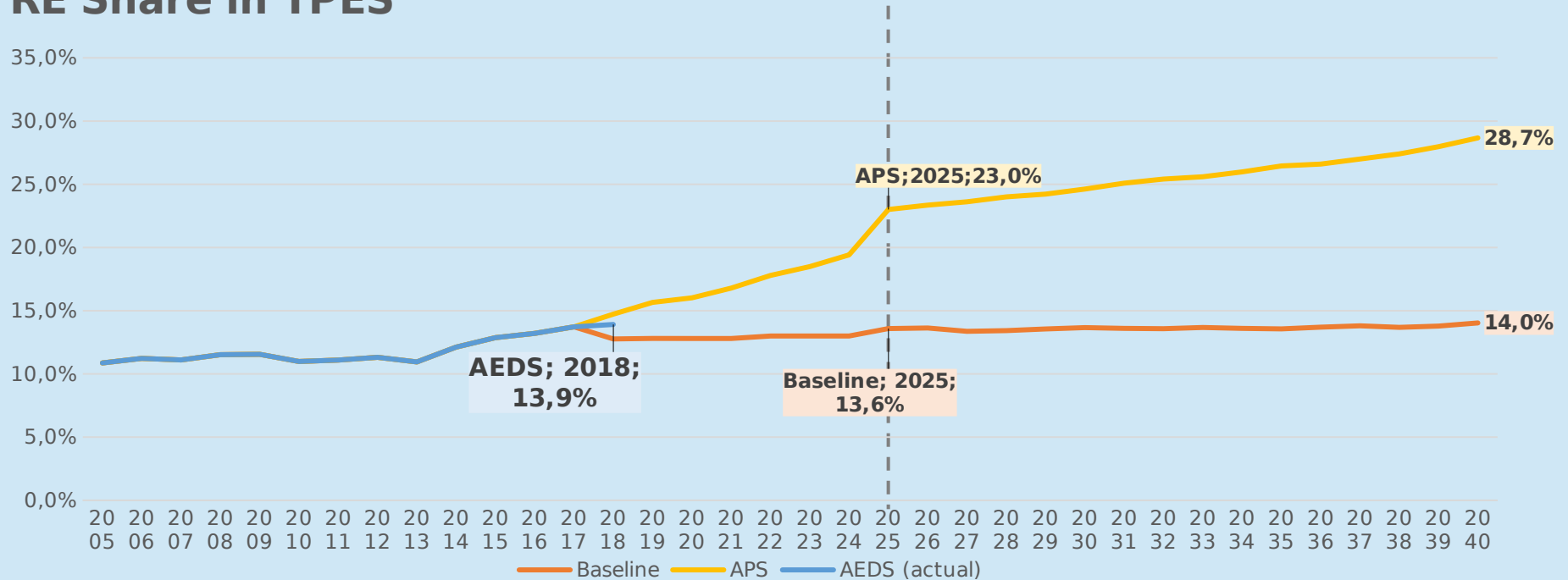
(in ktoe)



Source: <https://aeds.aseanenergy.org>

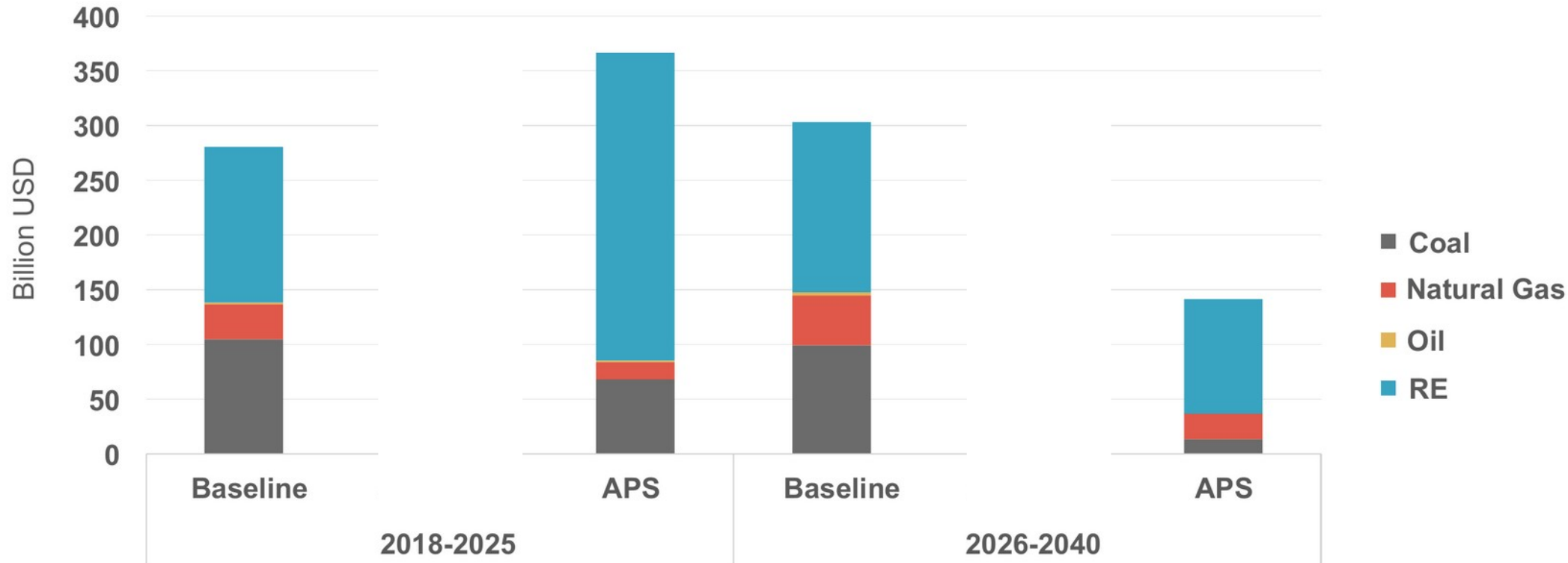
# Regional target: 23% RE by 2025

## RE Share in TPES



Target endorsed at 2020/11 ASEAN ministers meeting  
Source: 6<sup>th</sup> ASEAN energy outlook, figure 44

# Investment shift to meet the target



Note: Cumulative investment is discounted at 3% to present value (year 2020).

# Renewable energy in ASEAN: a diverse potential

- 1) The ASEAN 2025 goal is 23% RE / TPES
- 2) The **resource diversity**

References:



**ASEAN Centre for Energy**  
One Community for Sustainable Energy

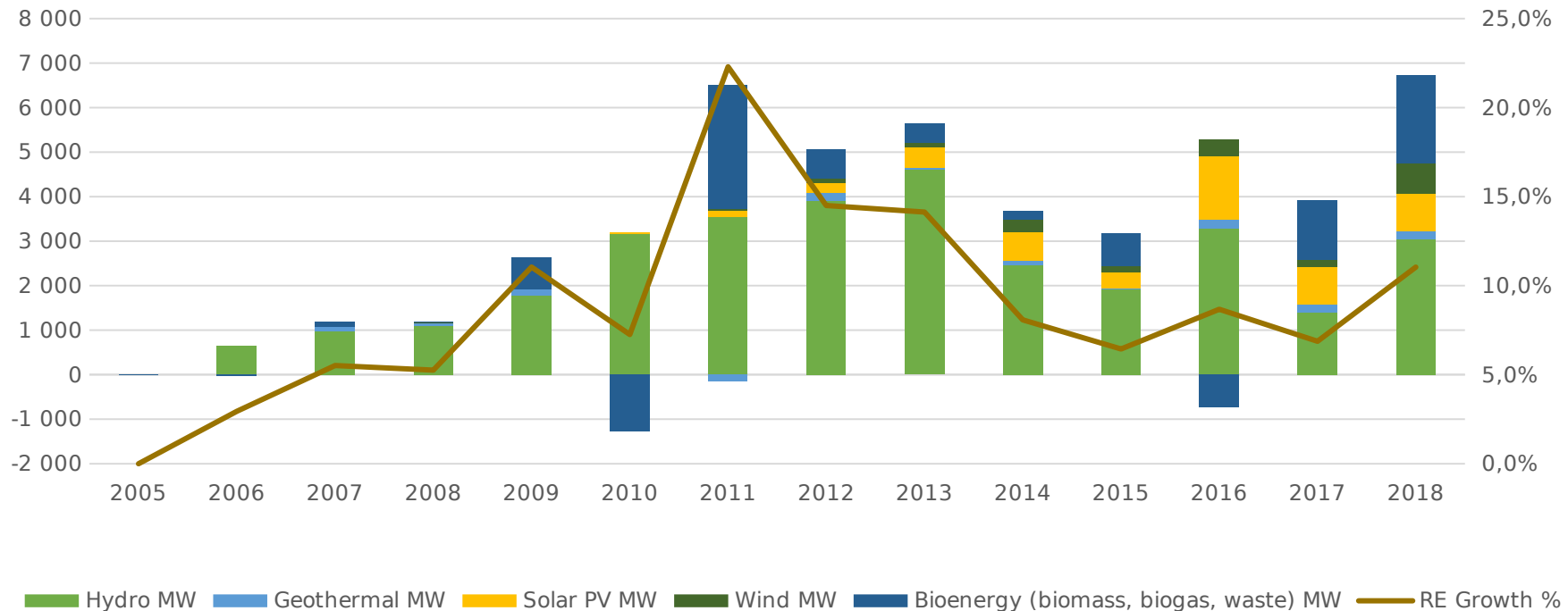


**IRENA**  
International Renewable Energy Agency



New power capacity additions in 2018 was 18.8 GW, where 6.7 GW (36%) coming from RE

**RE Annual Capacity Additions (MW) & Growth (%)**

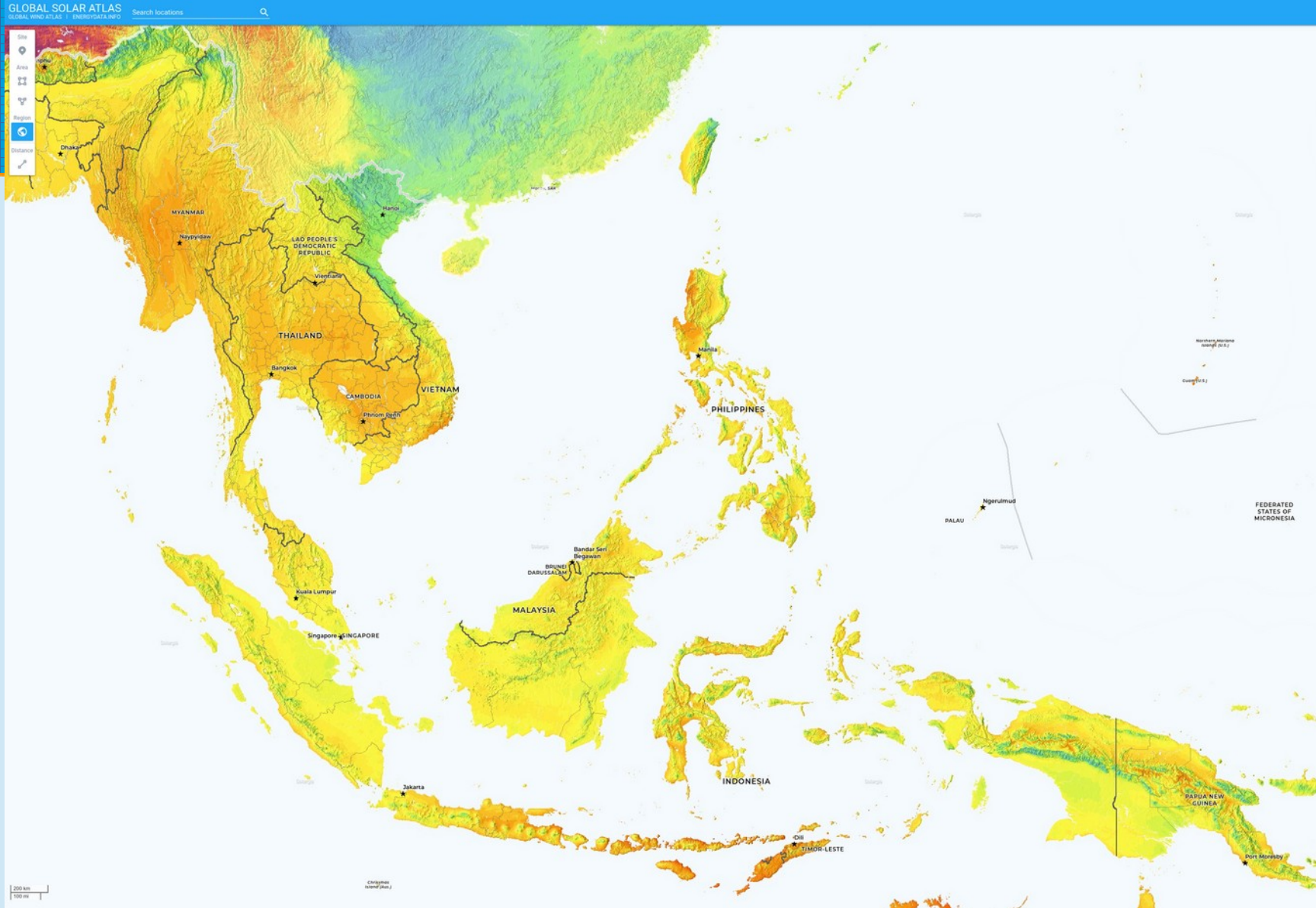


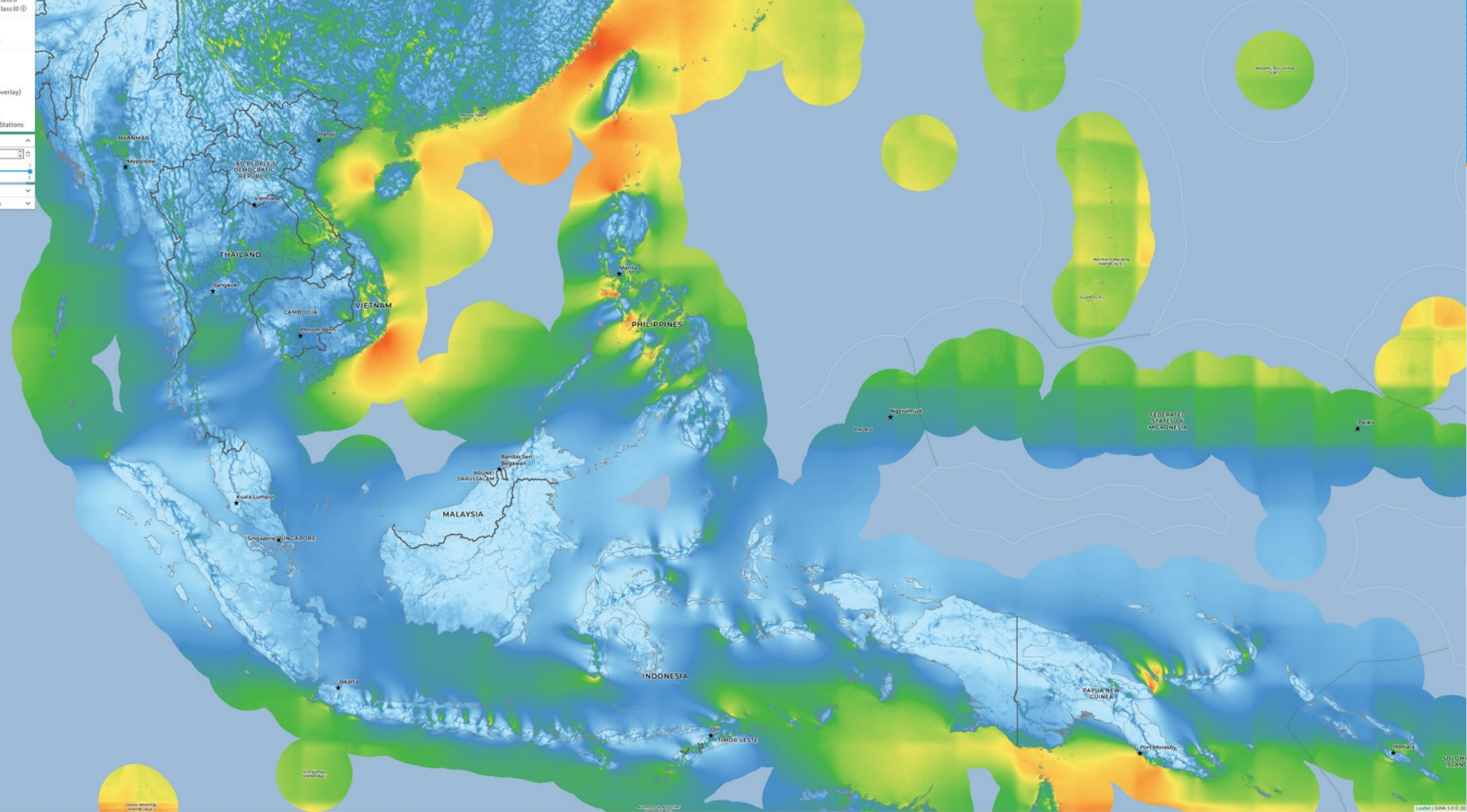
# Hydropower Potential per Capita (kWh/year)

Hydro

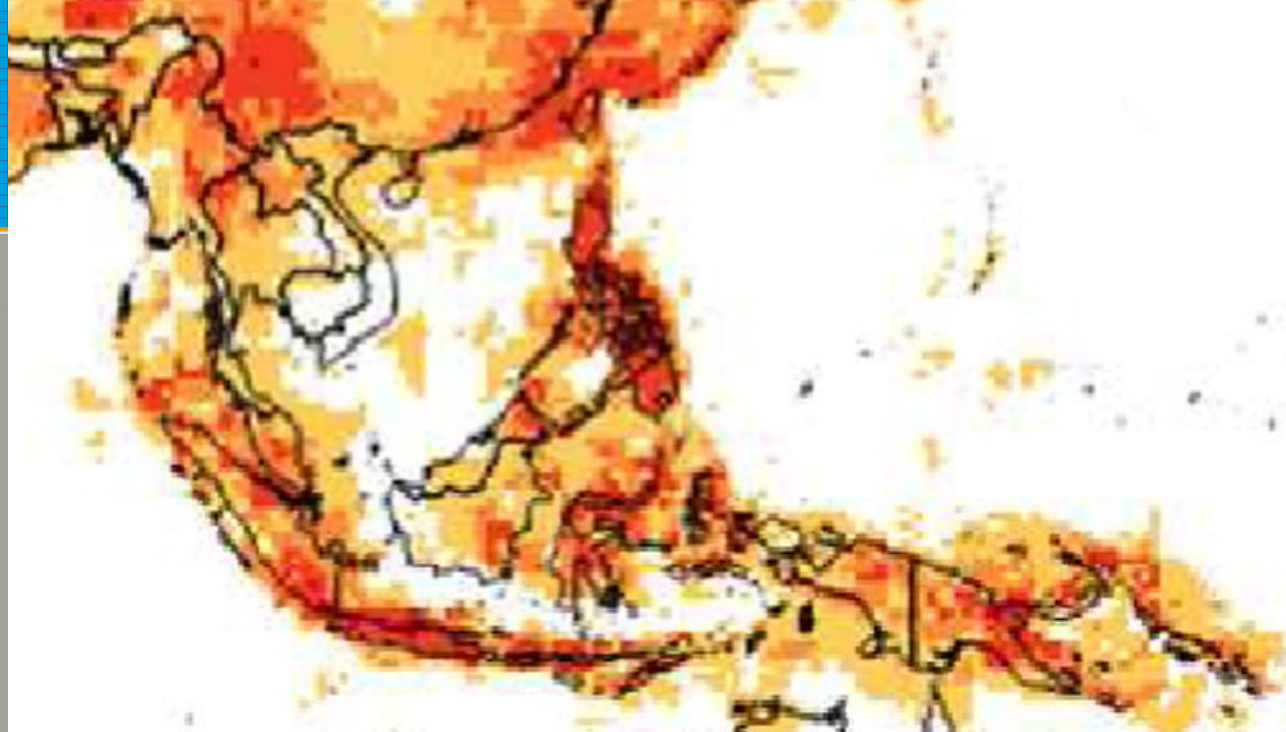
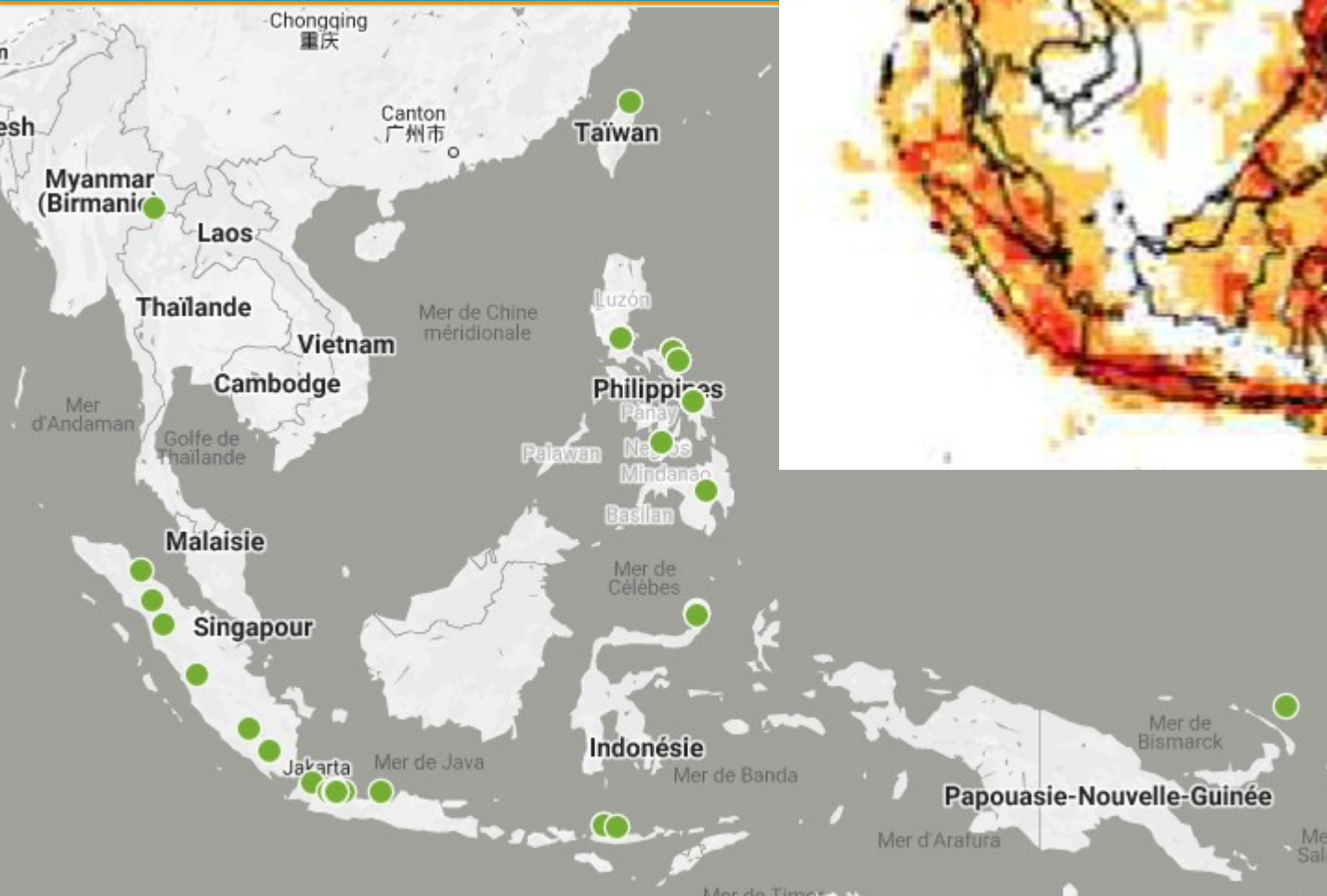


# Solar





# Geothermal



Sources:

Coro et Trumpy (2020)

<https://www.thinkgeoenergy.com/map/>

# Conclusion

- Renewables: small fraction of capacity, large fraction of investment
- Solar good/very good everywhere.
- Hydro/geothermal/wind very good in many countries.

# Topic presentations

- 10 mn presentation
- 2mn reply and comments
- 2mn reply and comments

# Summary remarks

- Renewables key to reduce GHG emissions → 23% RE/TPES by 2025
- Renewables small share of capacity but big share of investment
- Vietnam renewables market boomed, others can follow easily



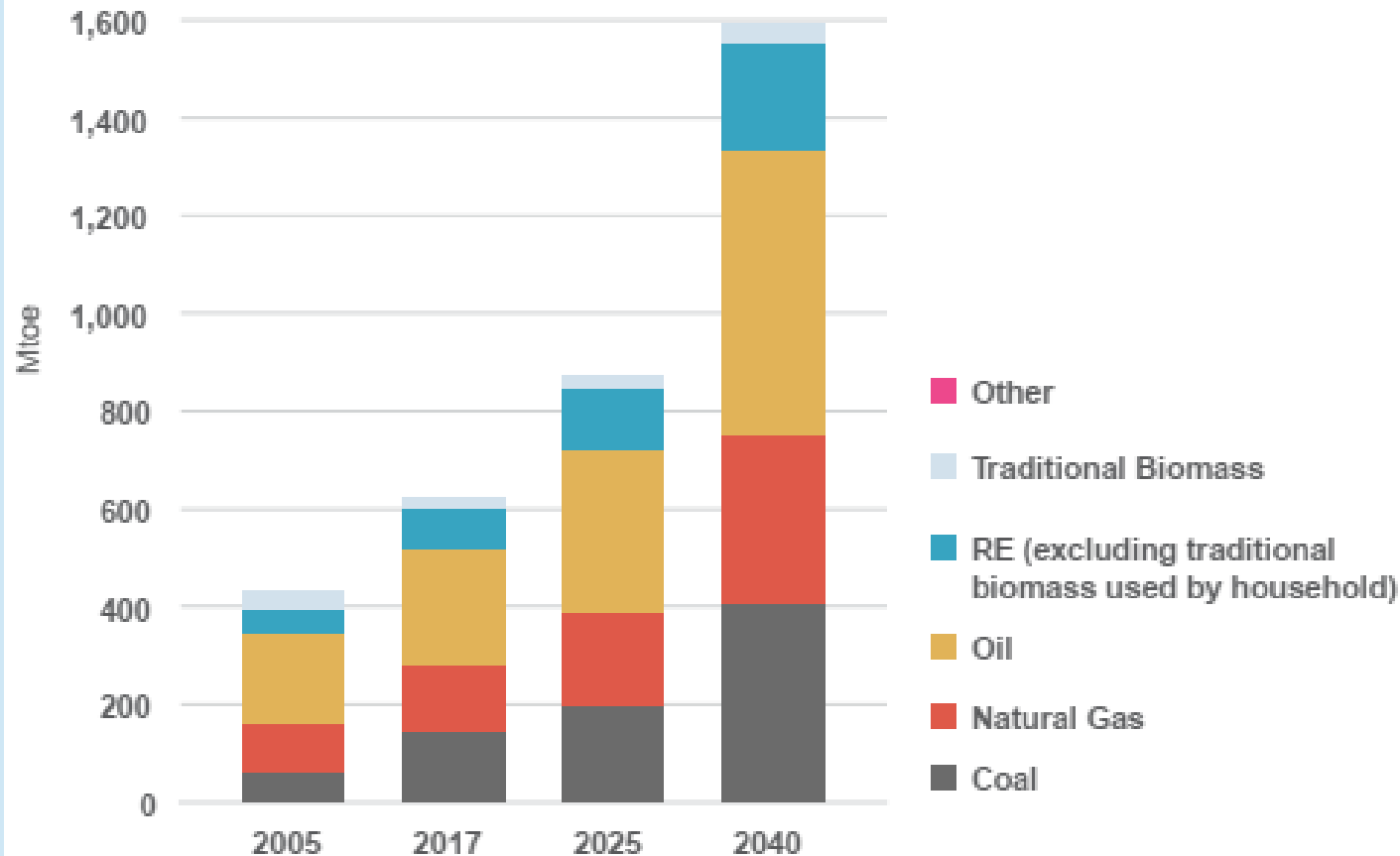
# Technologies status

- Hydro first in Myanmar and Lao
- Geothermal hot in Philippines and Indonesia
- PV is good everywhere, but storage is not cheap yet.
  - SG: International trade, competition by innovation.
- Wind is the frontier
  - VN case: Need marine protection laws, going (too?) fast.
- Biofuel and Biomass: Sustainability is still in the future
  - ID case: It's the economy. Answer to high oil prices.

# Extra slides

- ASEAN Primary Energy Supply Baseline
- Biomass policies in ASEAN
- ASEAN and ocean renewable energy

# ASEAN Total Primary Energy Supply, Baseline Scenario



# Biofuel and biomass

- Mandated biofuel policies in Indonesia, Philippines, Thailand, Malaysia
- Plans to mandate one in Cambodia, Lao PDR, Myanmar, Vietnam
- No plans in Brunei, Singapore

# Ocean Renewable Energy

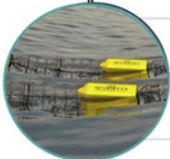
Quirapas et Taihagh 2021, RSER



**TIDAL BARRAGE:** Utilise energy from the difference in height between high and low tides.  
Largest installation is 250 MW in South Korea.



**TIDAL IN-STREAM:** Leverages fast flowing currents to turn hydrokinetic turbines located underwater.  
A 1.5 megawatt of tidal in stream facility was installed in Scotland in 2016.



**WAVE:** Produced from surface motion of ocean waves or from pressure fluctuations below the surface.  
Ireland is the leading country in wave power development with 5 MW of installed capacity.



**OCEAN THERMAL:** Ireland is the leading country in wave power development with 5 MW of installed capacity.  
Monaco has a 70 MW of ocean thermal power generation.



**SALINITY GRADIENT:** Available energy from the differences in salt concentration between fresh and seawater.  
Salinity gradient is still in the emerging development stage with 50 kW facility in Netherlands.

# Status of OTEC and Resource Assessment (Ikegami, 2017, OES)

