



VEAM 2019

A critical review of energy scenarios in Vietnam

**A work by TRAN Hoang Anh
(VIET/USTH) et al.**

**Presenter: NGUYEN Trinh Hoang Anh
(VIET/USTH)**

**Vietnam Initiative for Energy Transition (VIET)
University of Science & Technology of Hanoi (USTH)**

Current situation of Vietnam

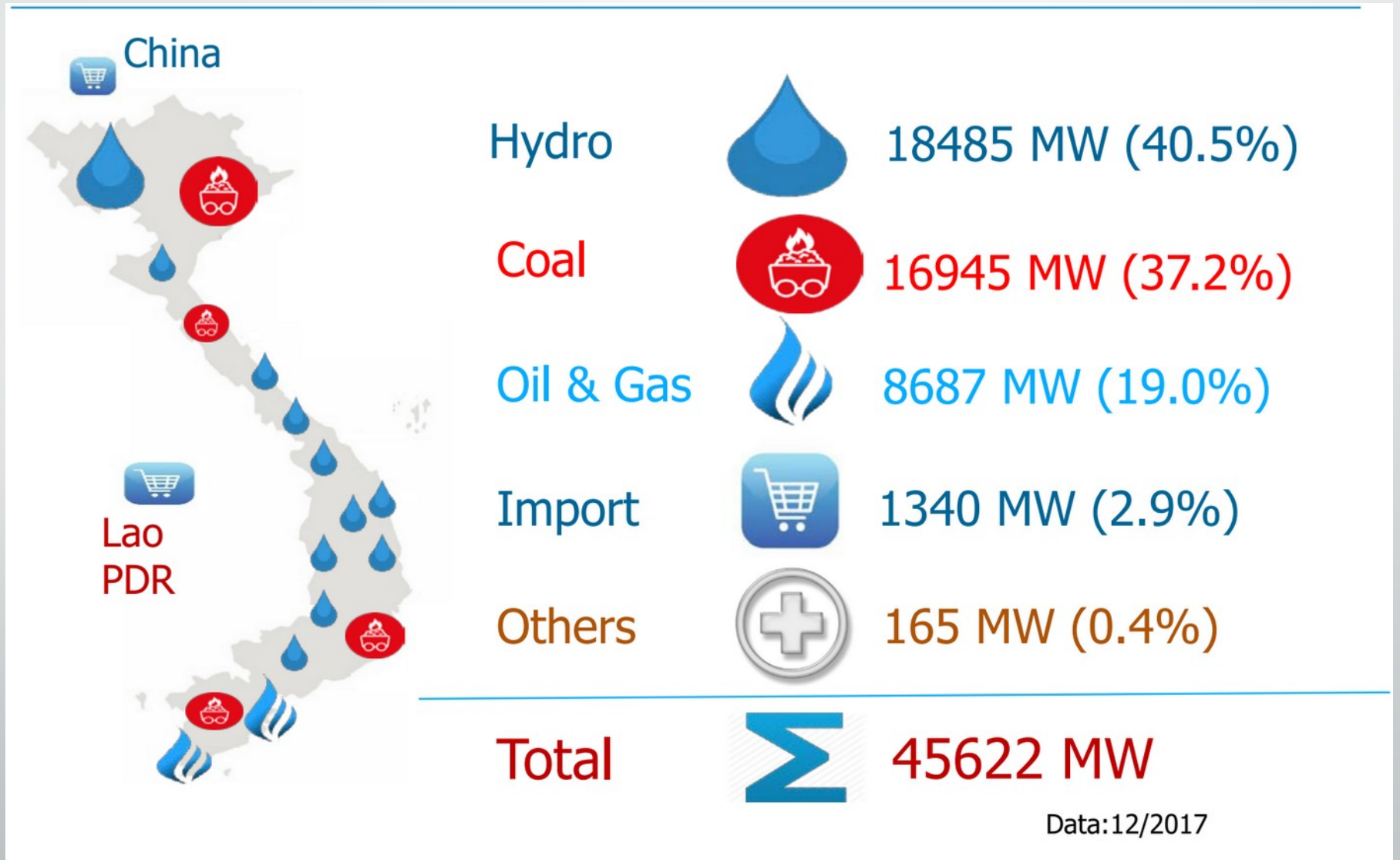
Electricity generation



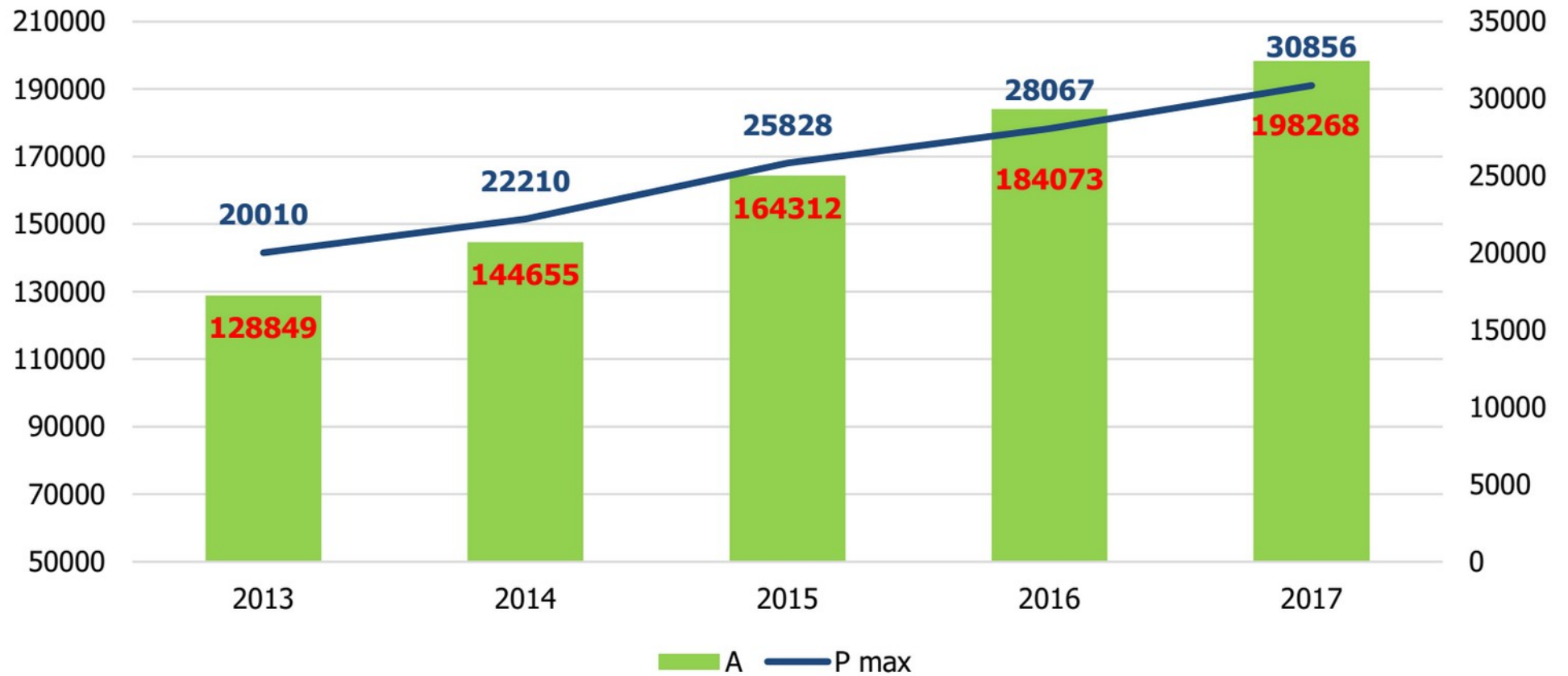
Important share of coal

Source: Vietnam Electricity Annual Report 2017 - EVN

Installed capacity in 2017



Energy production (MWH) and Peak load from 2013 to 2017

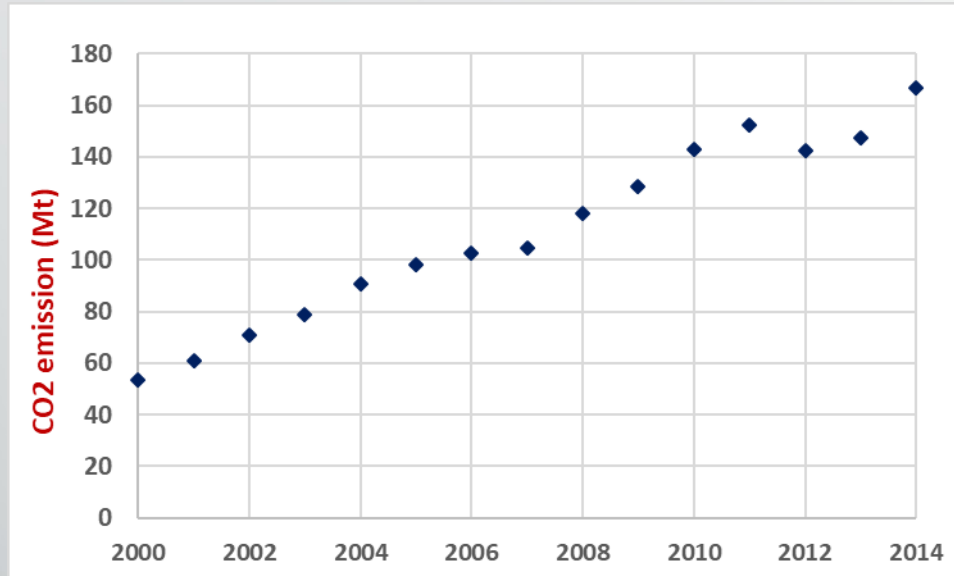


Average growth rate (%)

	2013-2017
Peak Load	11.47
E. Production	11.40

Current situation of Vietnam vs France

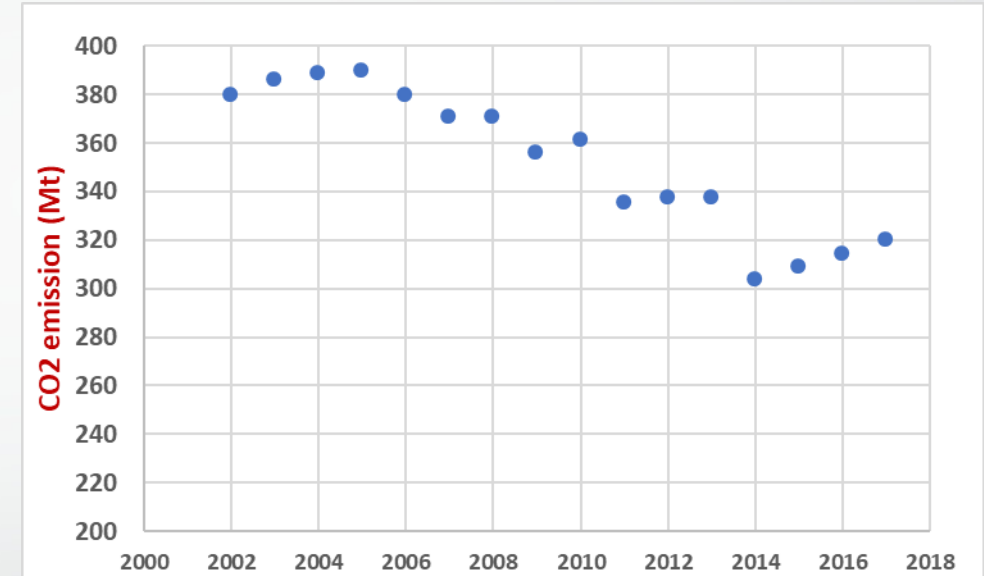
CO2 emission in Vietnam



Increase 4 times from 2000 to 2014

Source: World Bank

CO2 emission in France



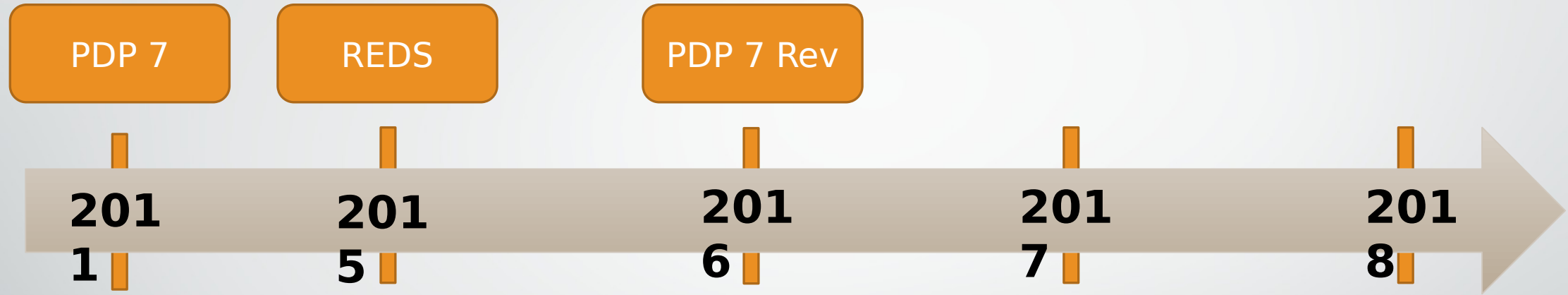
Decreasing tendency from 2000 to 2017

Major commitment to nuclear energy

Source:
<https://www.statista.com/statistics/449698/co2-emissions-france/>

Reviewed and comparison of energy studies

10 studies - 24 scenarios

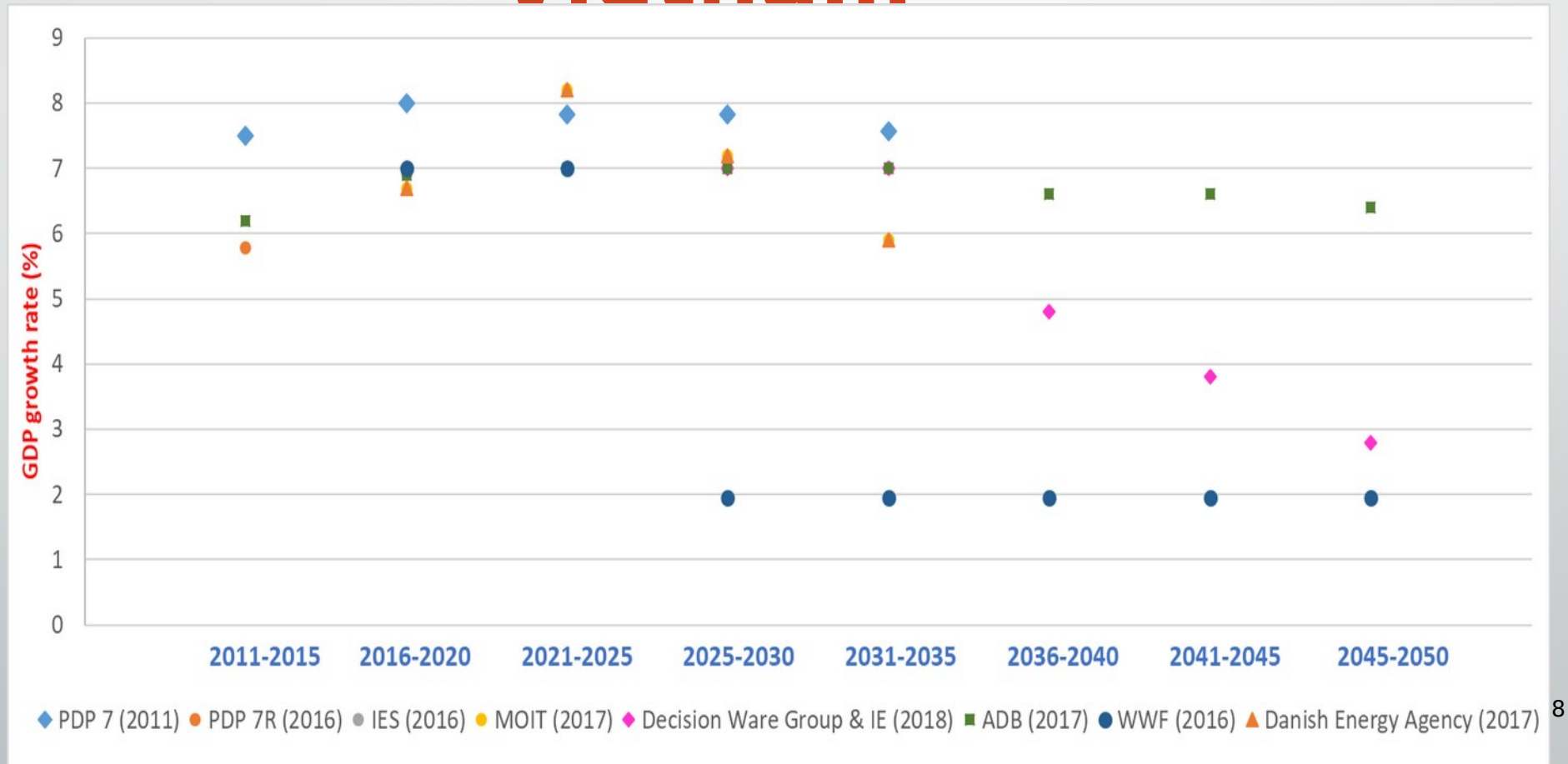


PDP = *Power Development Plan*

REDS = *Renewable Energy Development Strategy*

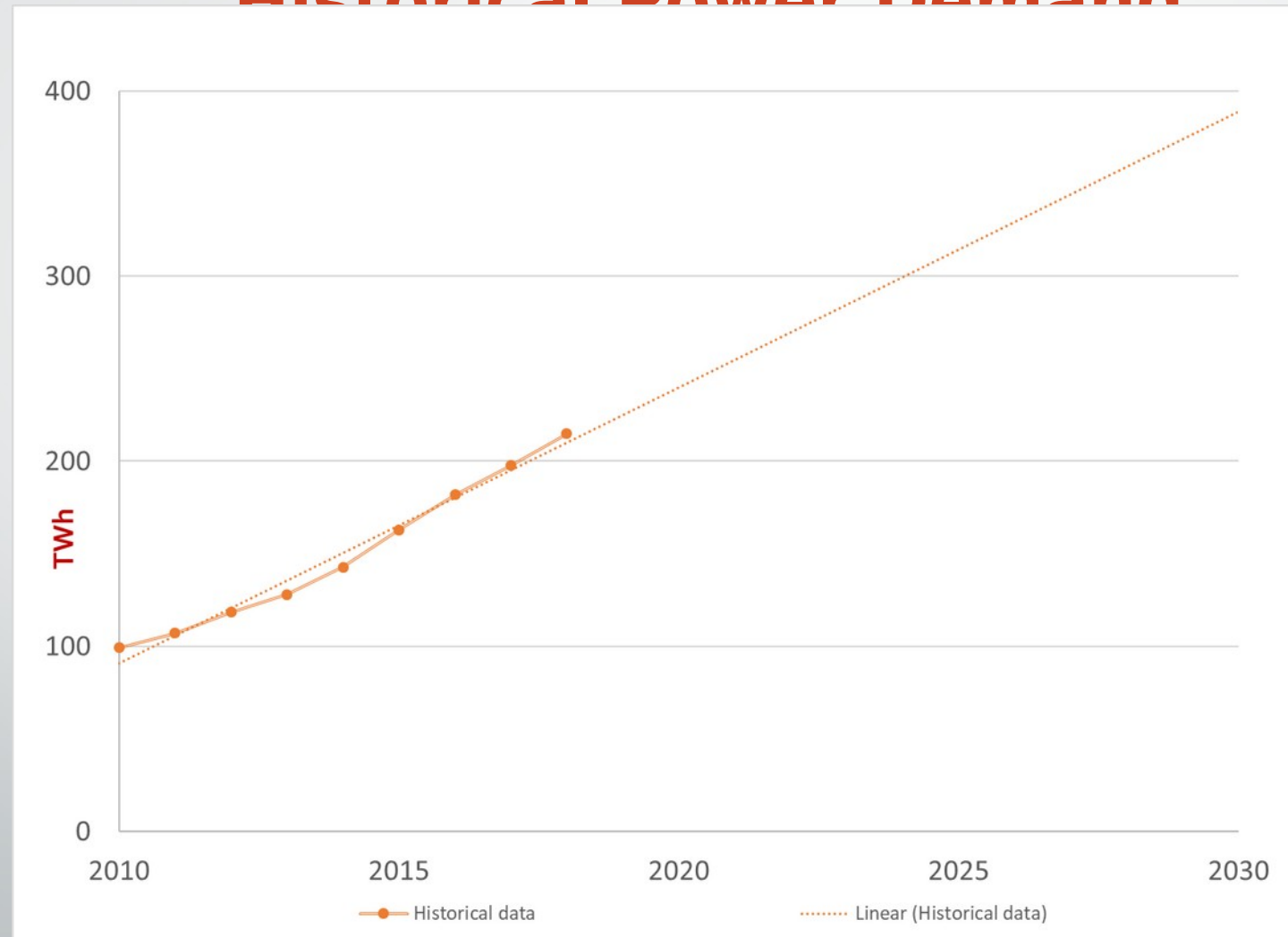


Population growth rate of Vietnam



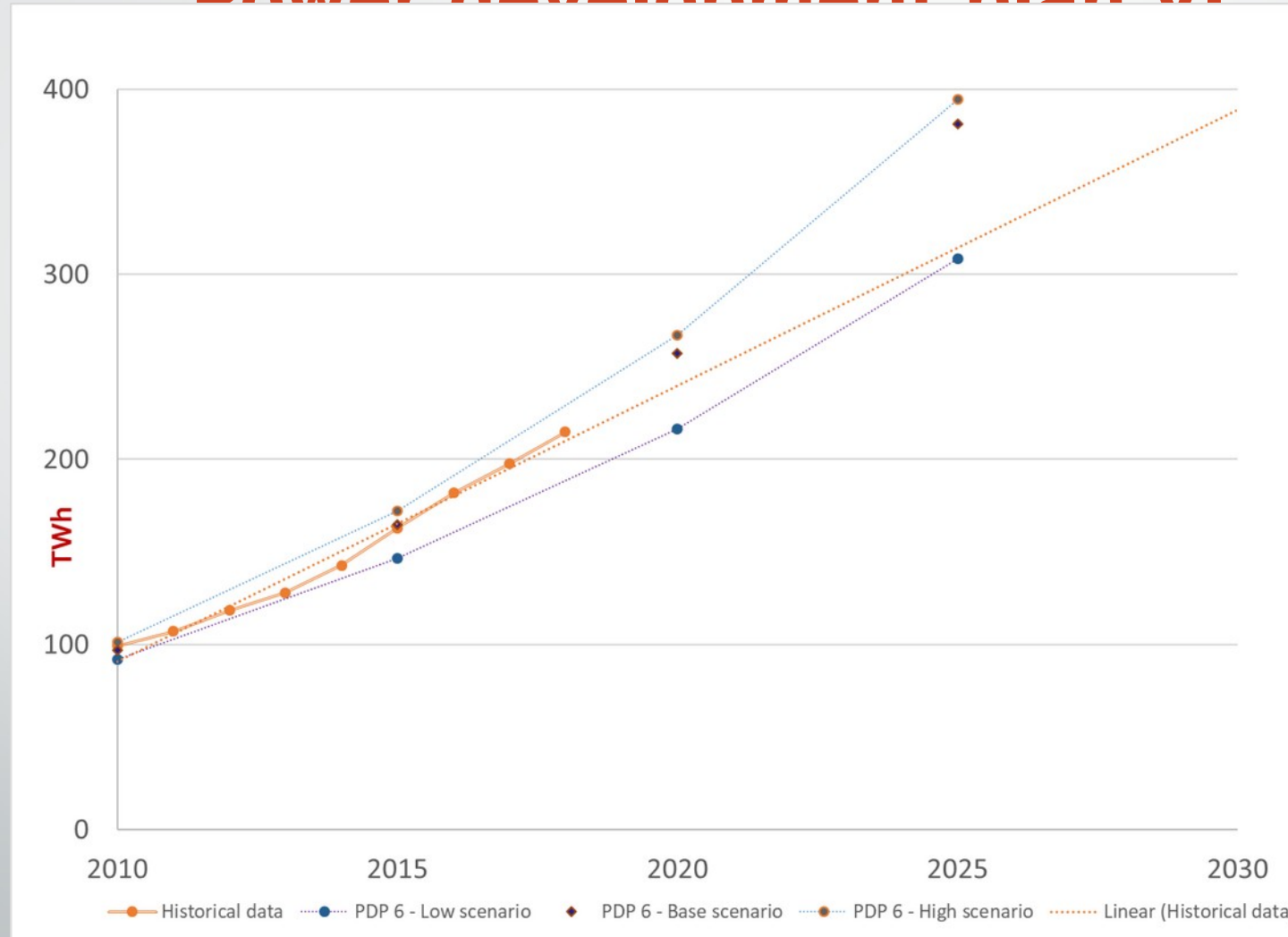
Back - casting of Power demand of Vietnam

Historical Power Demand



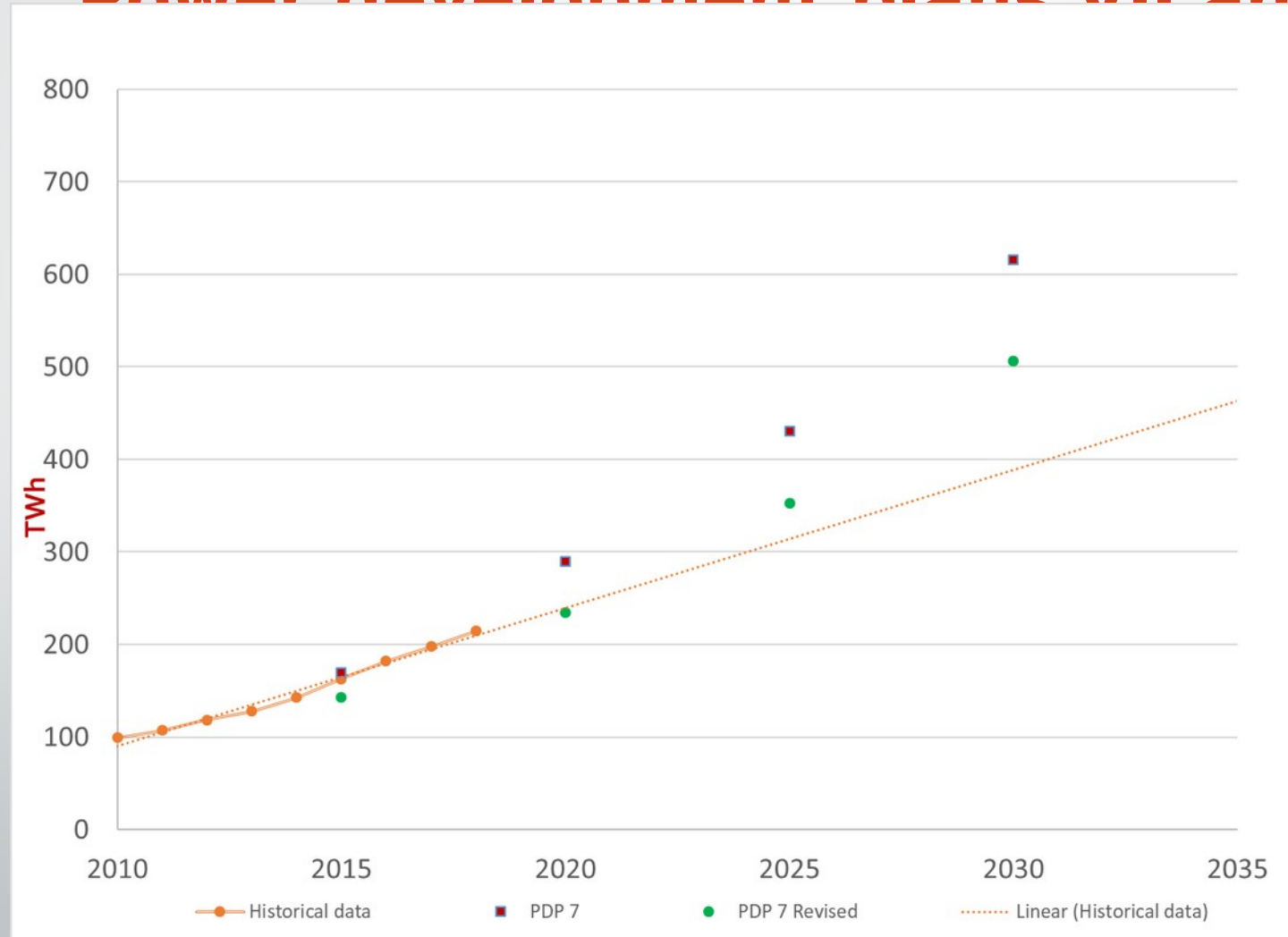
Back - casting of Power demand of Vietnam

Power development plan VI



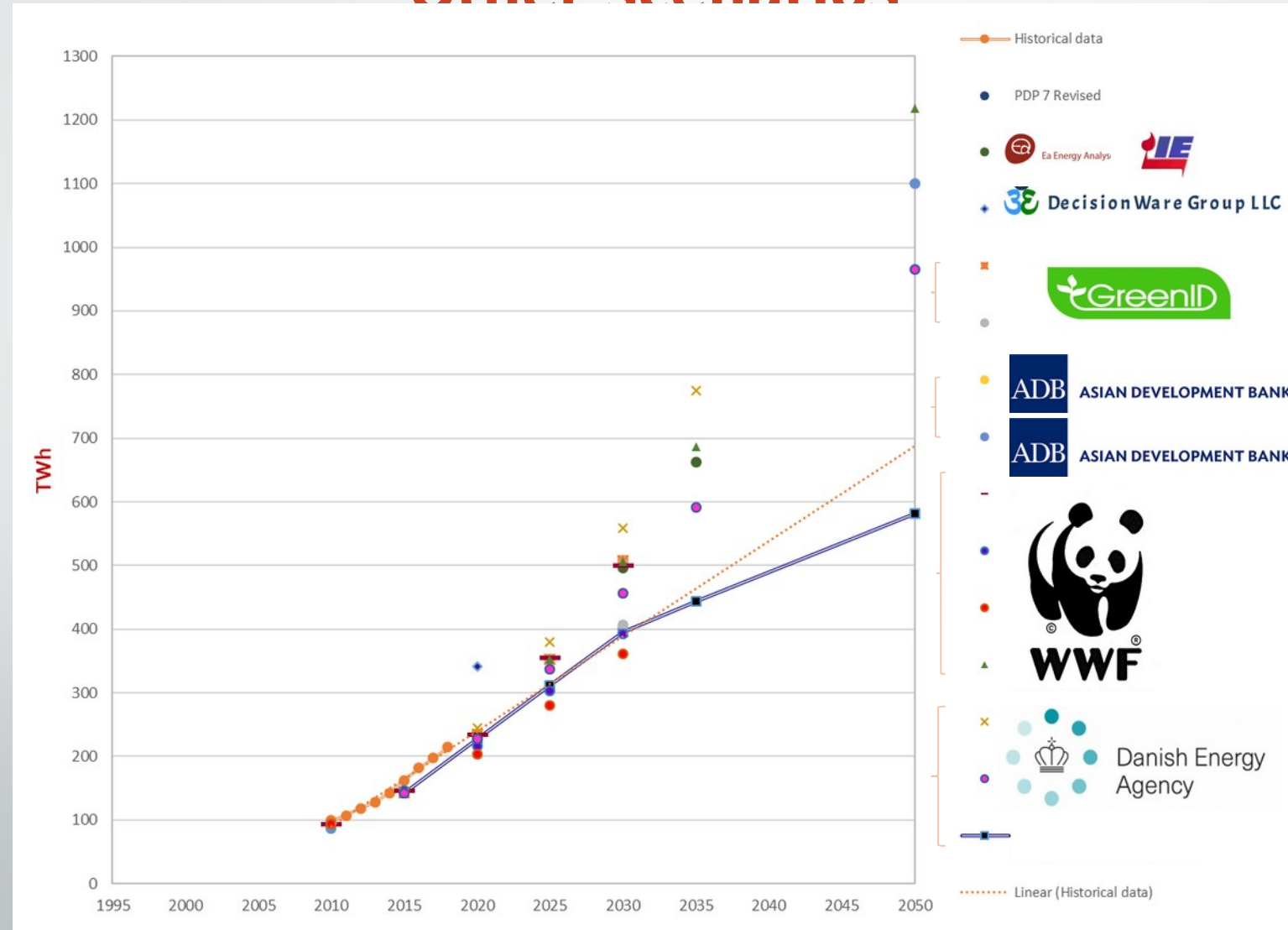
Back - casting of Power demand of Vietnam

Power development plans VII and

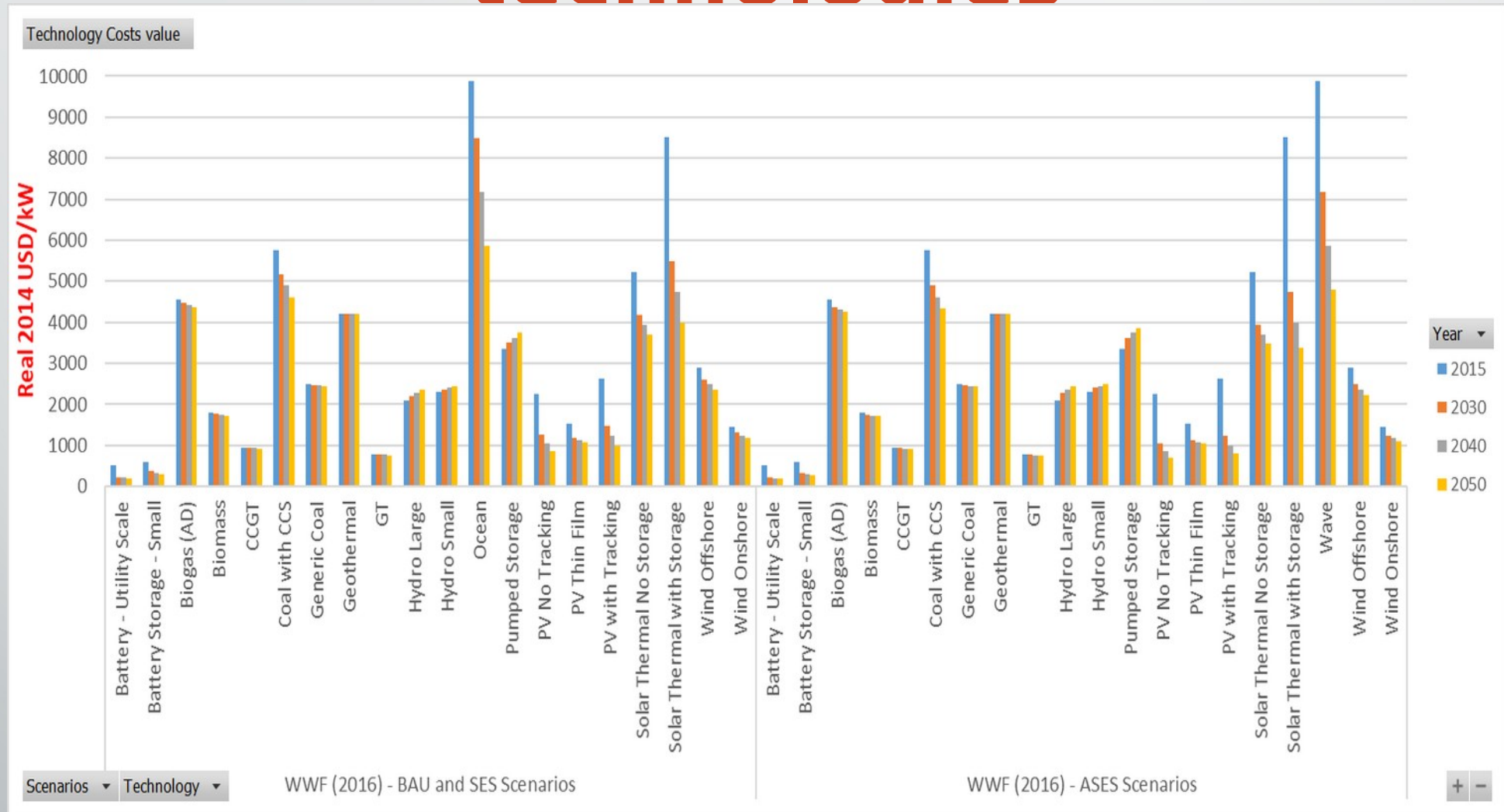


Comparison of Power demand projection

Other scenarios



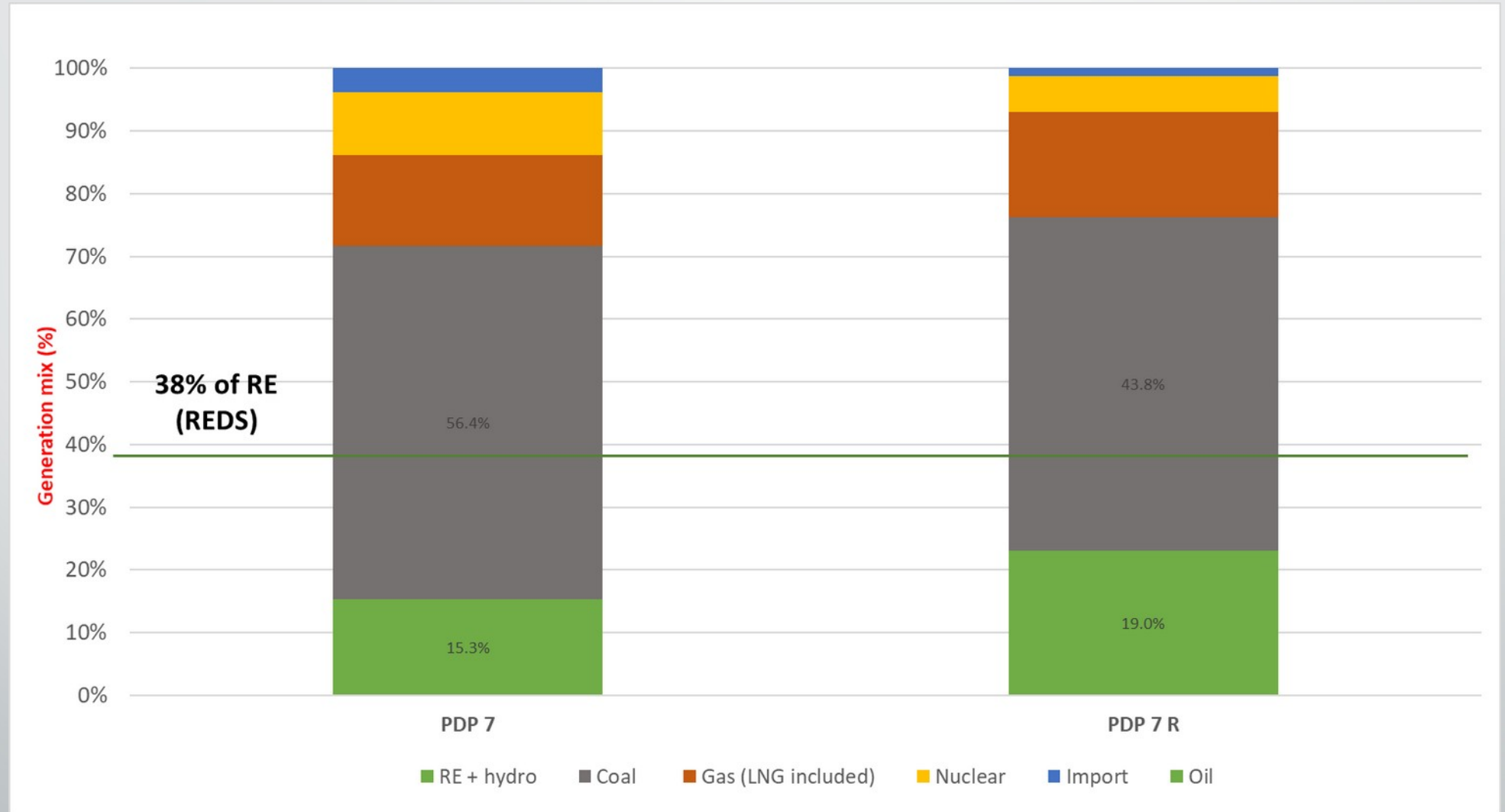
Costs of electricity generation technologies



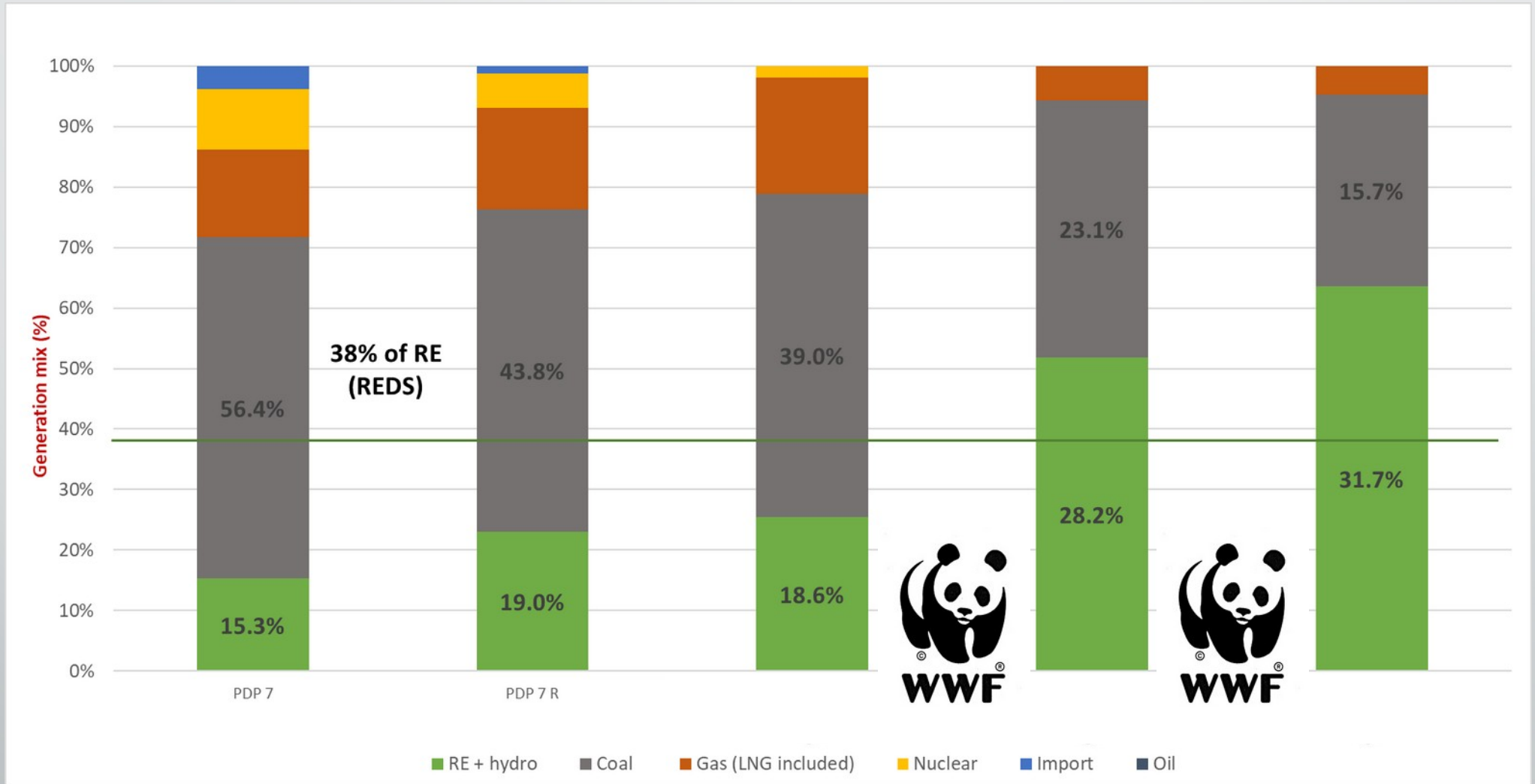
Energy Models used in the scenarios reviewed

N.	Report/ Scenarios	PDP 7 (2011) [2]	REDS (2015) [11]	PDP 7R (2016) [4]	IES (2016) [5]	WWF (2016) [12]	MOIT (2017) [13]	<u>GreenID</u> (2017) [7]	ADB (2017) [8]	Danish Energy Agency (2017) [9]	Decision Ware Group & IE (2018) [10]
	Modelling tools			Simple-E STRATEGIST – PDPAT II PSS/ADAPT PSSE	Simple-E Corrective – Module 1	PROPHET electricity planning	BALMOREL	MARKAL	EFFECT The computable general equilibrium (CGE)	BALMOREL	TIMES
	Approach				Linear programming	Mixed integer programming Least cost investment	Top – down (Partial equilibrium) Least cost optimization	Bottom – up Least cost optimization	Bottom – up GHG emissions forecast model	Top – down (Partial equilibrium) Least cost optimization	Bottom – up Least cost optimization

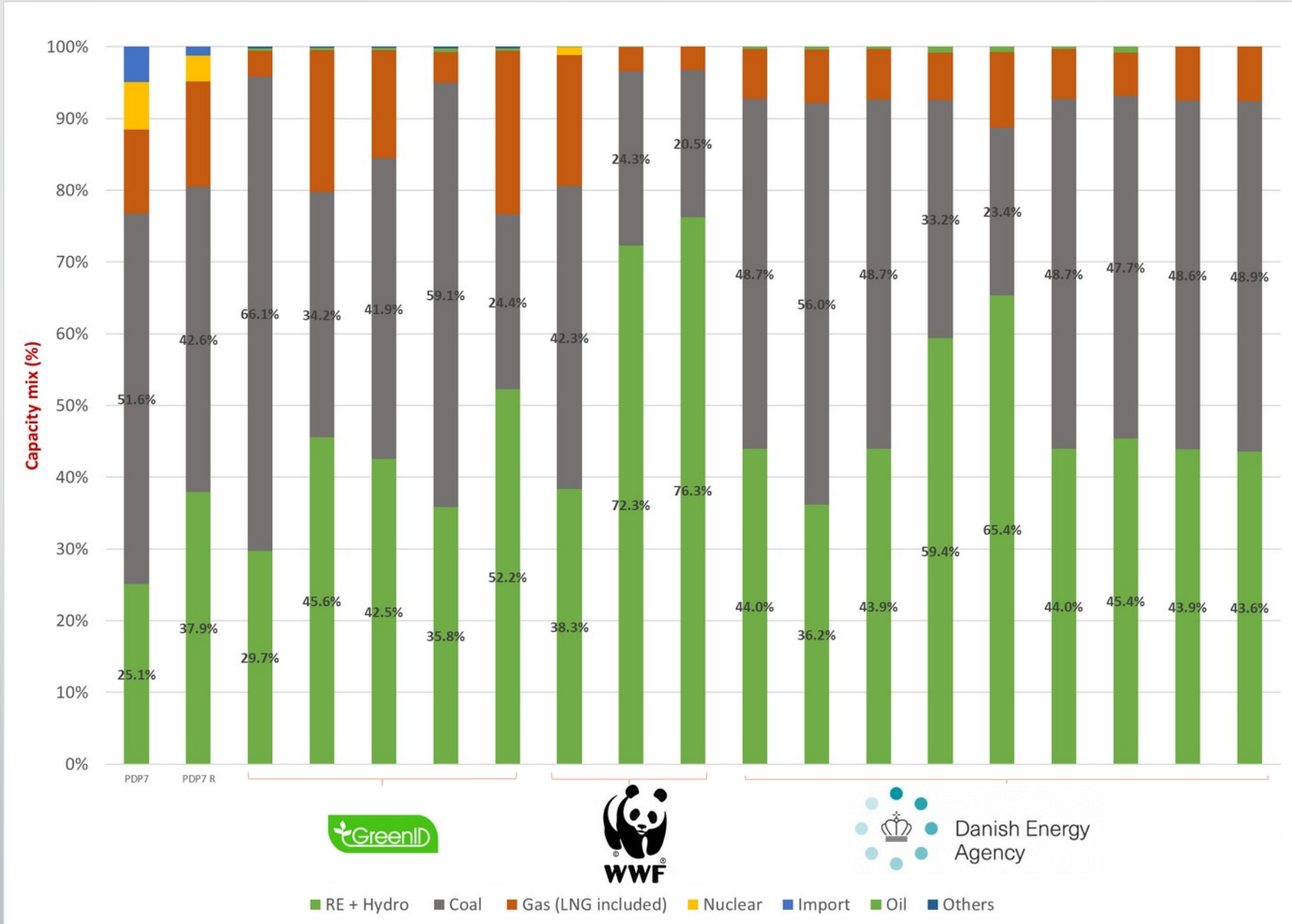
Comparison of Generation mix in 2030



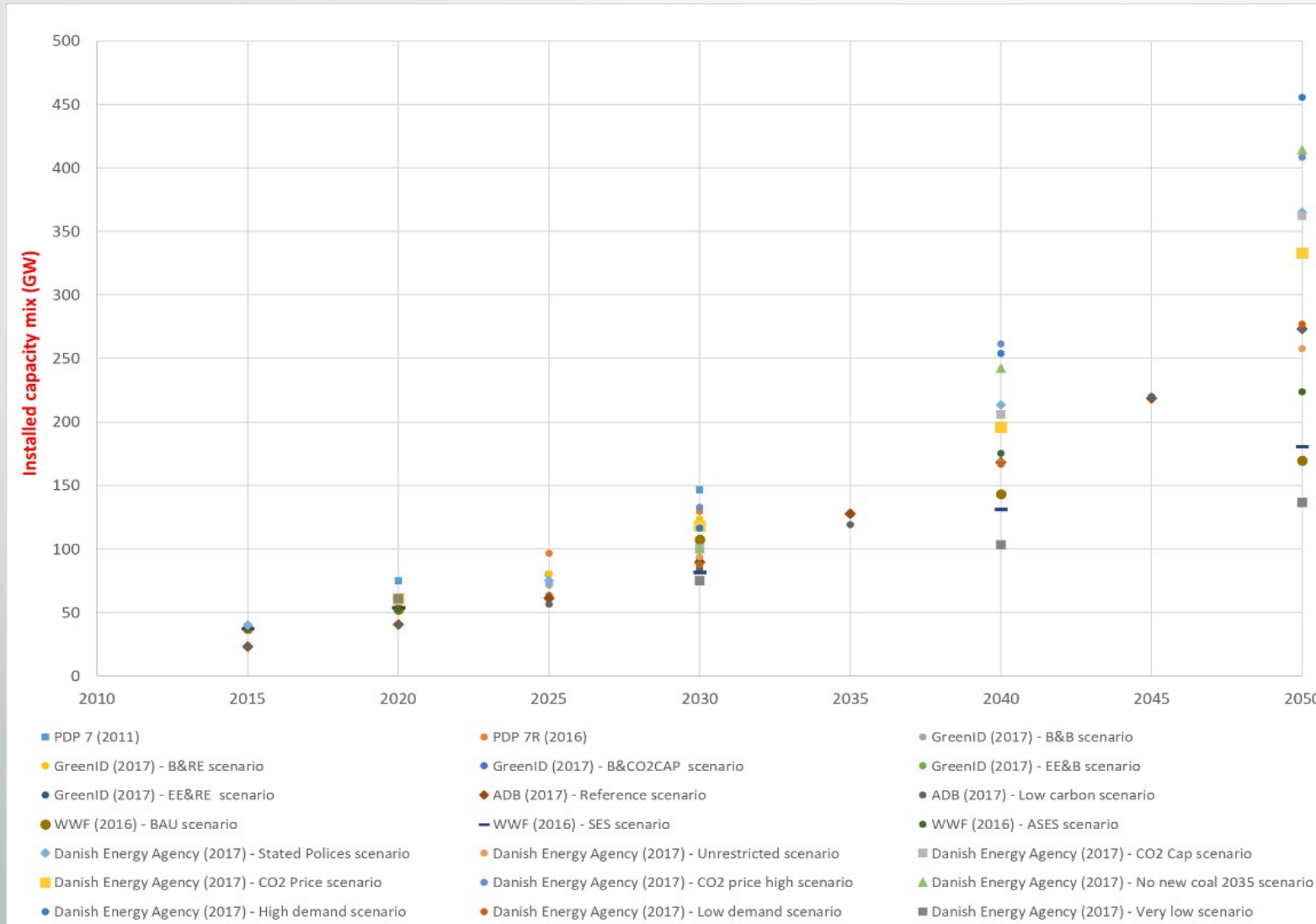
Comparison of Generation mix in 2030



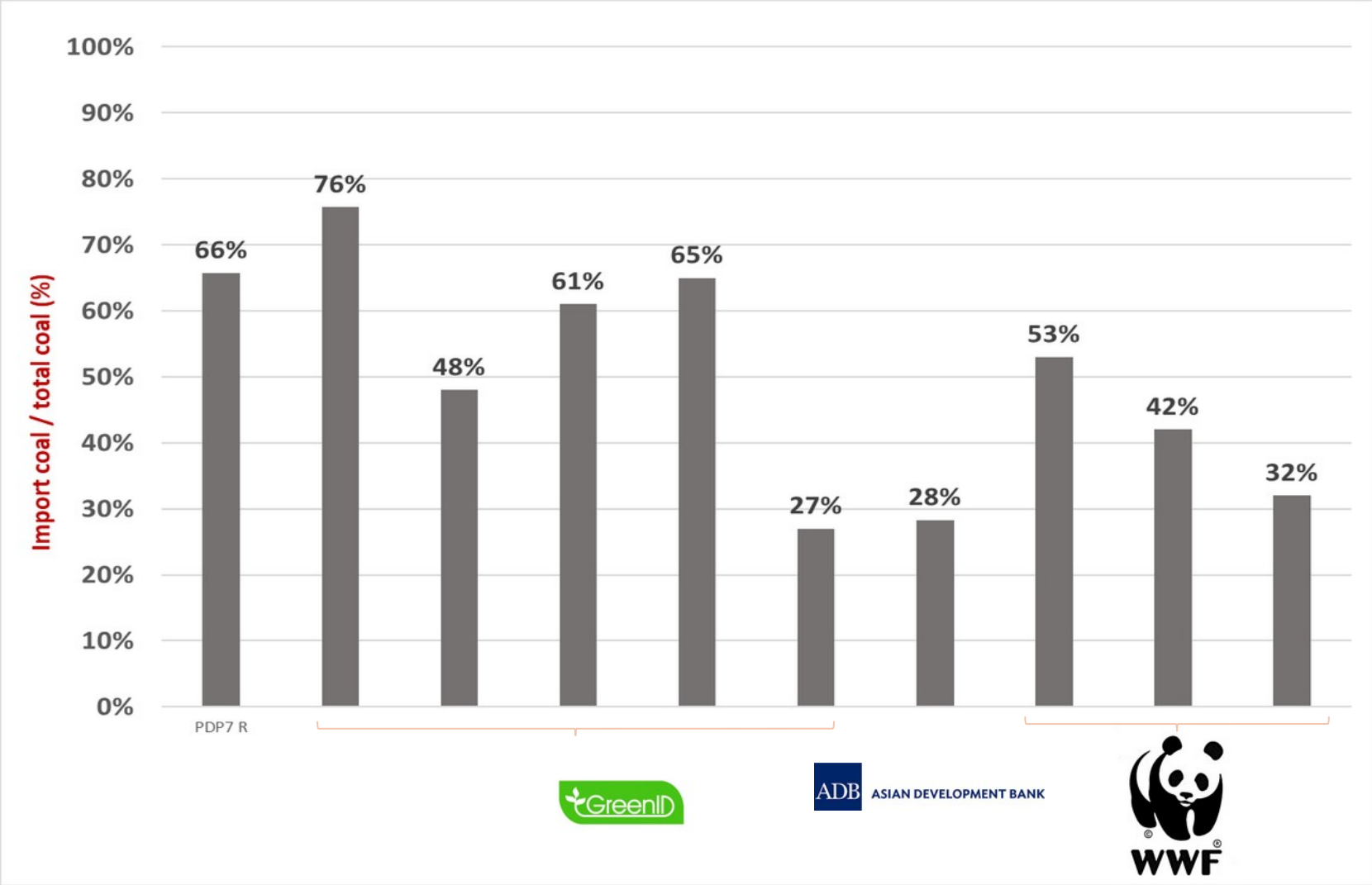
Comparison of Capacity mix in



Installed power capacity



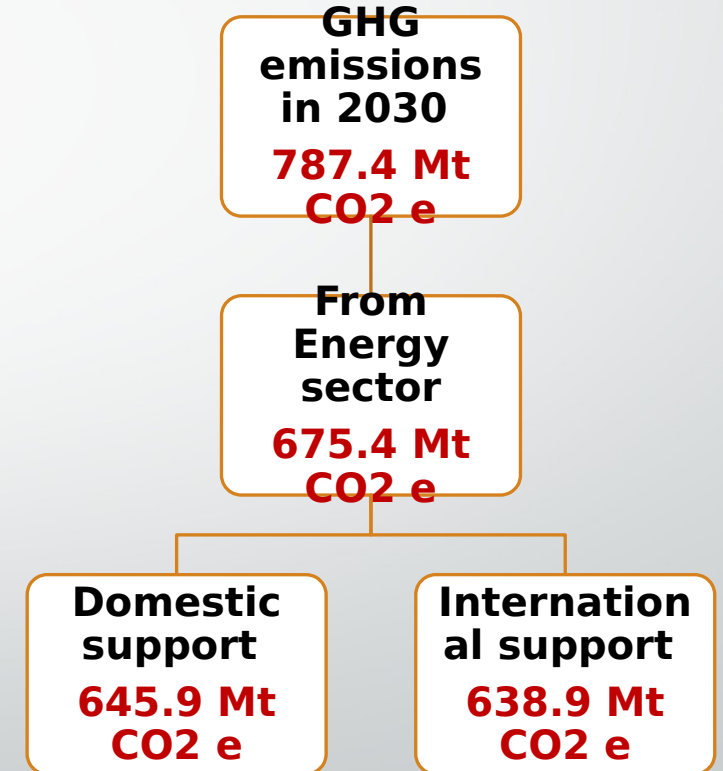
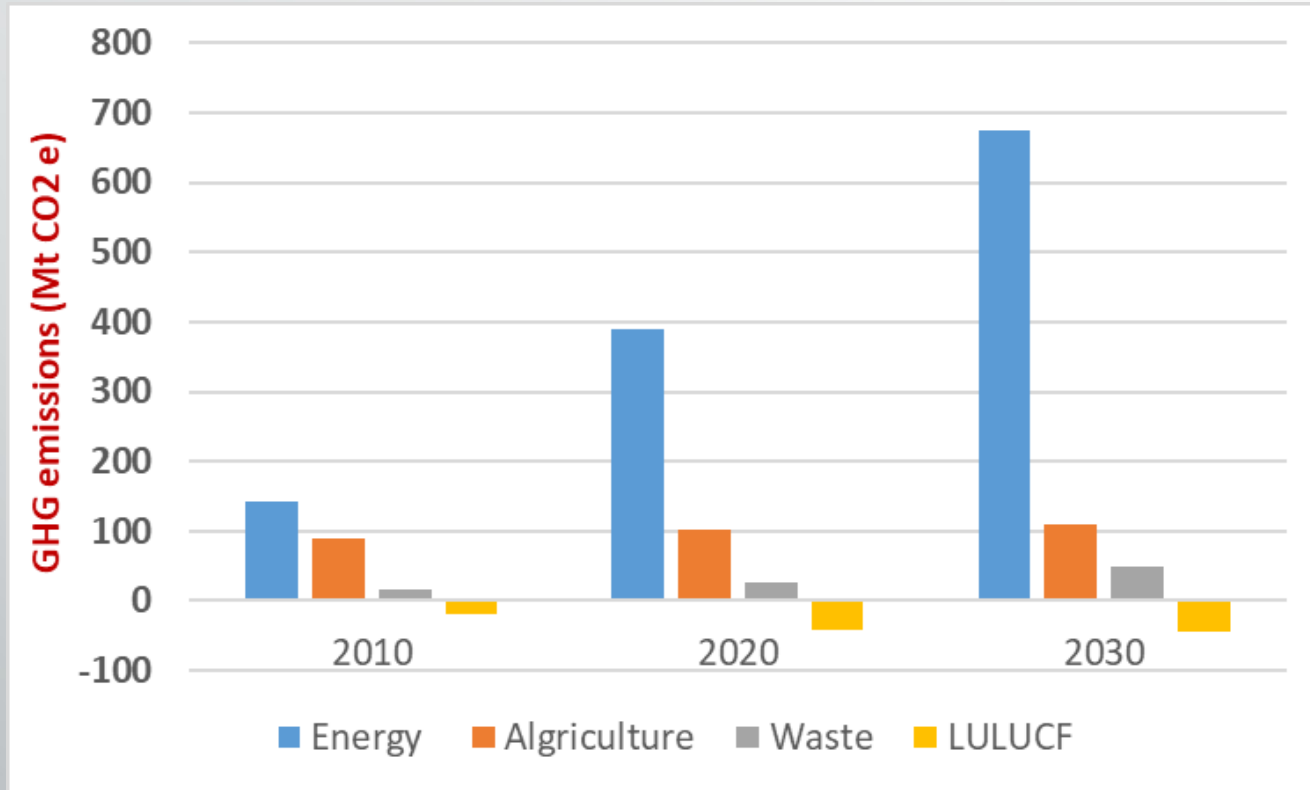
Comparison of the share of coal



More renewable energies and energy efficiency strategy provide solution to import less coal

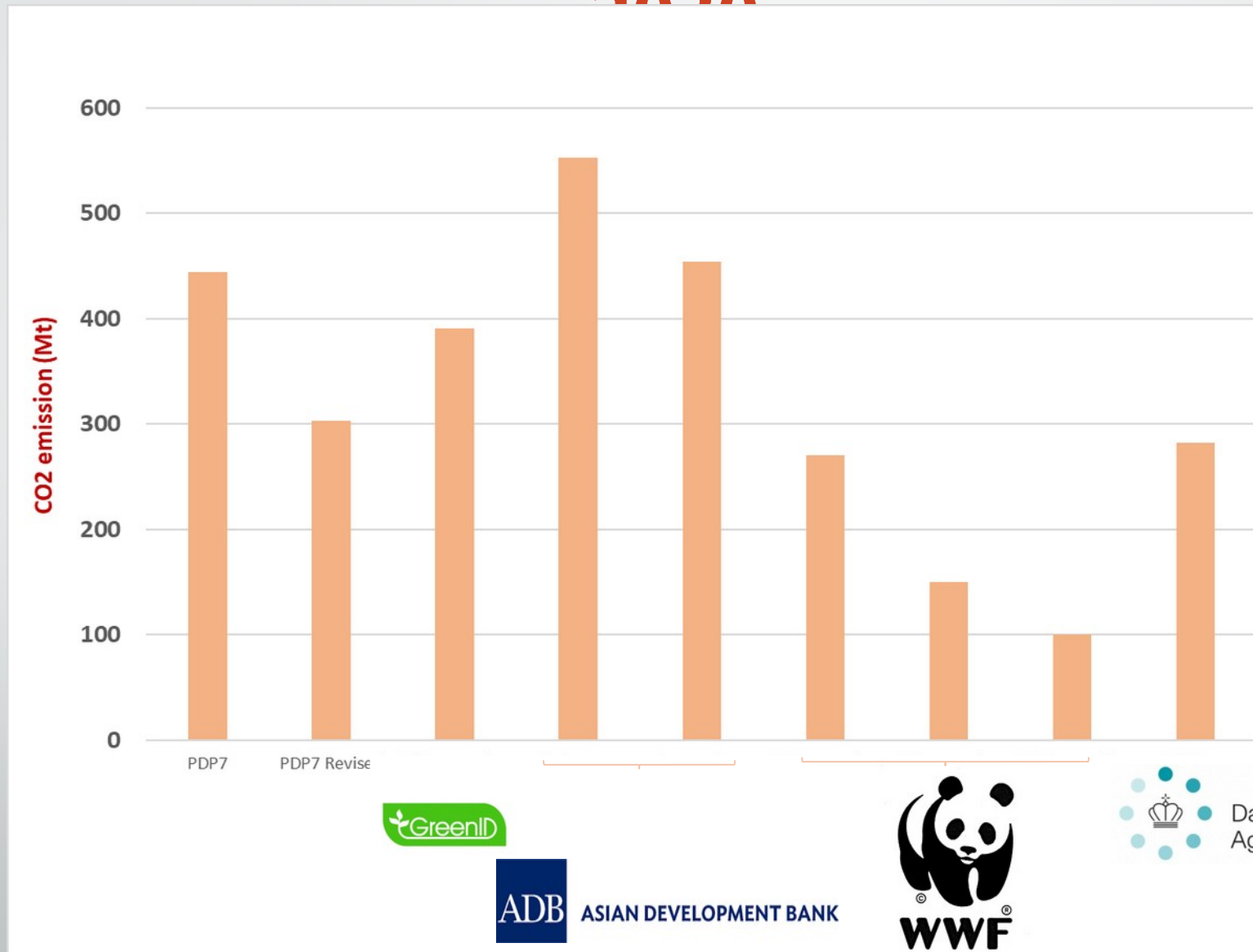
Comparison of CO2 emissions

Vietnam NDC 1



Source: Viet Nam's Intended Nationally Determined Contribution

Comparison of CO2 emissions in 2020



Carbon's price

For carbon's price, most of scenarios based on the price proposed the estimated CO₂ externality value in Vietnam: 7 USD/ton for near term projection and 20 USD/ton thereafter for long term projection S

Some exceptional cases are: (i) 20 USD/ton was set for the whole modelled period by WWF (2016) scenarios [6], or (ii) 35 US\$D/ton (taken from IMF 2014 source) in the GreenID (2017) study [7], or

(iii) Danish Energy Agency (2017) – CO₂ price high scenarios investigated to an ambitious environmental policies by imposing the most highest CO₂ price: the starting price at 20 USD/ton in 2020, achieving 45 USD/ton in 2035 and being constant until 2050.

Conclusion

- High dependency on non-renewable fuel such as crude oil, natural gas and coal as sources of energy (53 GW from coal power plants in 2030 – PDP7 rev) from official power development plans. Other alternatives provide brighter perspectives
- It is possible for Vietnam to achieve the commitment of the government to reduce 8% and 25% of GHG emissions without and with international supports, if Vietnam goes for green scenarios
- Renewable energies are not yet utilized to their maximum potential in Vietnam due to high costs and insufficient market conditions
- Challenges for energy transitions: RE grid integration, investment for

**Thank you for your
attention**

