The Role of Oil & Gas in the "Energy Transition" Era

DESFA
Hellenic Gas Transmission System Operator S.A.

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The Era of Energy Transition

Energy Transition has been triggered by the need to stop the increase in global temperature caused by the CO2 emissions

Targets:

- Development of RES
- Replacement of fossil fuels in uses
- Energy saving

Administrative tools:

- Emission Trading System
- Administrative prohibitions (fuel bans/ emission restrictions)
- Tax policies

Financial tools:

- Incentives for development of RES
- Incentives for energy saving
- Financial assistance for construction of electricity infrastructure
- Financial assistance for research/pilot projects on green energy

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The Era of Energy Transition

EU Policies:

October 2014 - 2030 Framework for climate and energy

November 2016 - Clean energy for all Europeans

a package of measures with the goal of providing the stable legislative framework needed to facilitate the clean energy transition

November 2018 - Clean Planet for all

a strategic long-term vision for a prosperous, competitive and climate neutral economy by 2050

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The Era of Energy Transition : Targets and Progress

	GHG emissions reduction		share of renewable energy in final energy consumption	reduction of primary energy consumption (in Mtoe)
EU 2020 target[1]	**20%[2]**		**20%**	**20% reduction[4] = 1.483 Mtoe**
EU 2016 actual	22,4%		17%	1.543
GR 2020 target	**4%[2]**		**18%**	**24,7%**
GR 2016 actual	10,3%		15,2%	23,50%
	ETS [3]	**Non- ETS [3]**		
EU 2030 target	**43%**	**30%**	**27 → 32%**	**27% → 30% → 32,5%**
GR NECP 2030 target	43%	16%	31%	18,10%
EU 2050 target	**80-95%**			

(1) https://ec.europa.eu/eurostat/documents/4411192/4411431/Europe_2020_Targets.pdf

(2) compared to 1990 levels

(3) compared to 2005 levels

(4) compared to projections made in 2007 for 2020

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Towards Energy Transition: How long and to what extent?

Energy Transition has started

Huge costs associated

Targets set, remain to be confirmed

Duration of Transition: certainly long, not known with accuracy depending on:

- Research results
- Global cooperation
- Limits of economies and societies that bear the cost of transition

Degree of decarbonization: not known with accuracy depending on:

- Research results
- Availability of resources needed (e.g. rare earths)
- Transportation: the most difficult sector to be de- carbonized (esp. aviation & shipping)

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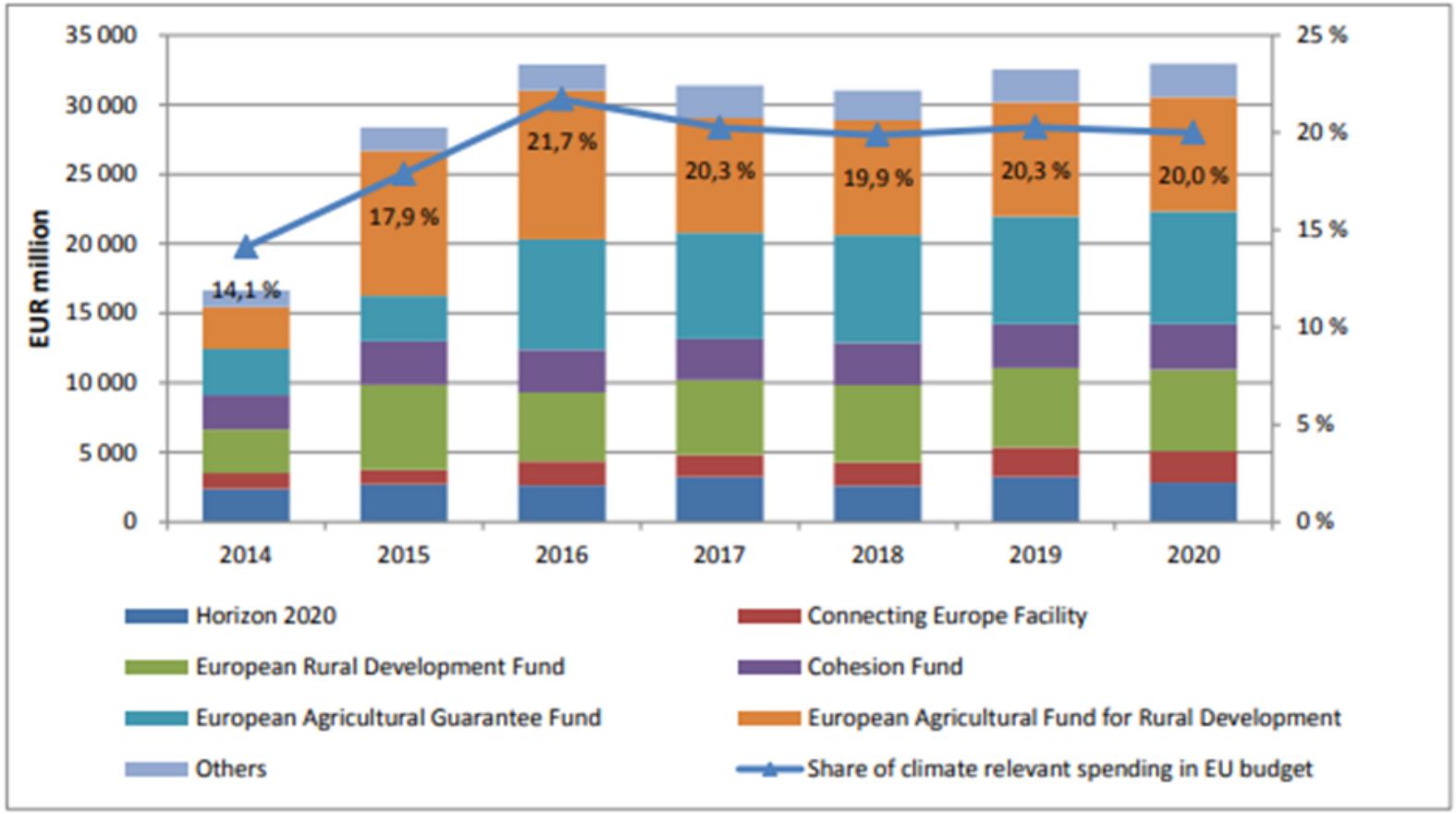
Towards Energy Transition: EU is leading

Climate-relevant spending in the EU budget, 2014-2020 (EUR million)



EU and the Paris Climate Agreement: Taking stock of progress at Katowice COP, European Commission, October 2018

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Towards Energy Transition: Role of gas

Role of gas critical for the energy transition

- Least polluting fossil fuel
- Mostly existing transmission and distribution network
- Can cover the variability & intermittency problem of RES due to fast start-up
- Economic energy storage means
- According to BP outlook up to 2040, gas will be the 2nd fastest growing energy after RES and is projected to double globally by 2040 with 40% of that expansion occurring over the next 5 years, while demand in Europe is projected at about current levels
- Potential for Renewable gas too (esp. biomethane)

CONCLUSION: Gas will inevitably be present in the energy mix in the foreseeable future (at least the next 30 years) although in a different scheme: variable capacity and storage more important, quantities will tend to decrease

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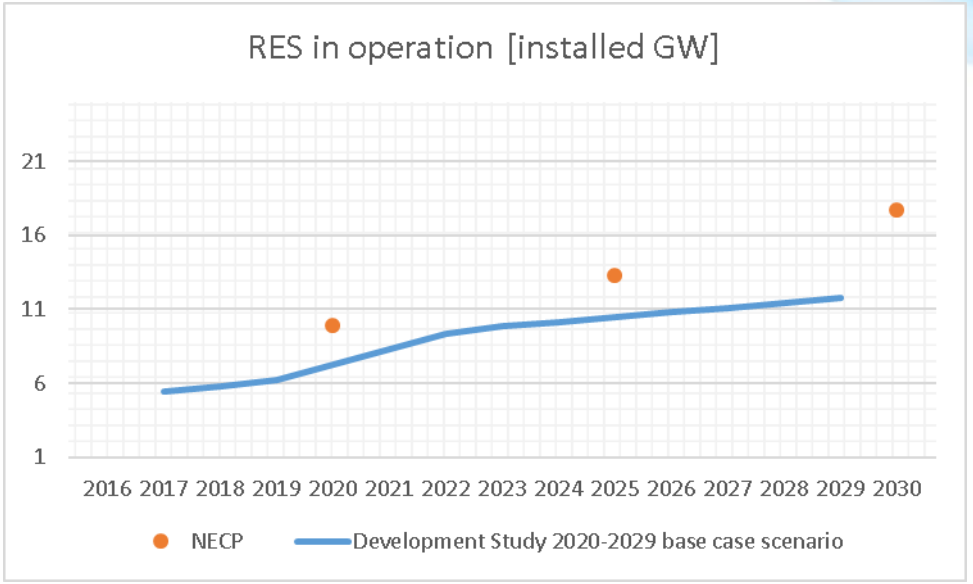
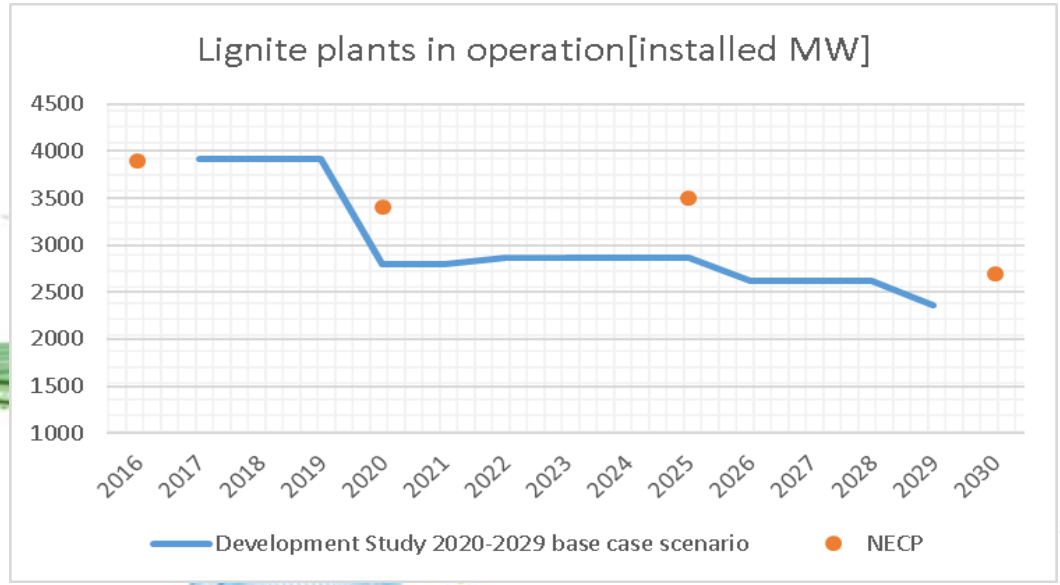
THE CASE OF GREECE
DESFA vs Greek National Energy & Climate Plan (NECP) projections

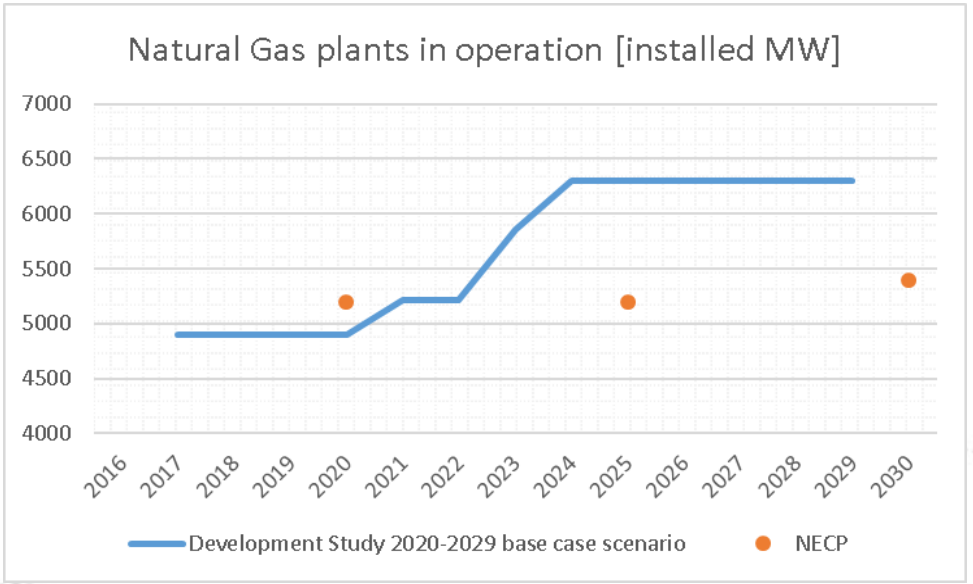
Key developments expected:

- Increase of RES
- Island interconnections with electrical cables
- Gradual phase-out of lignite (price of CO2 emissions will foster such objective)
- Substitution of oil with gas in urban heating sector

PROJECTIONS OF NECP IN RIGHT DIRECTION BUT TOO AMBITIOUS







Thank you for your attention!

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