Key Actions needed for 2020

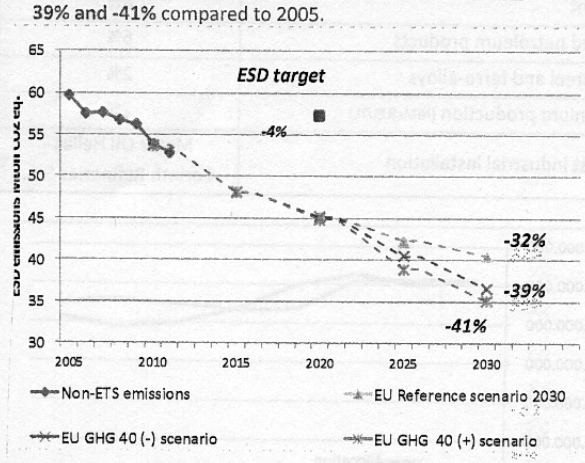
- **Support provided to RES led to overcompensation,** and could not be maintained over time. Ongoing reforms need to be pursued to ensure that RES support is provided in a budget-neutral manner as of 2014. At the same time, it must be provided in a cost-effective manner to avoid placing excessive burden on consumers.
- Greece is on track to meet its **energy savings target.** However, the recent final energy consumption reduction was mainly reached due to the recent economic downturn. Therefore, close monitoring of energy efficiency measures is required in order to ensure that the foreseen economic growth will not lead to a deviation from that target.
- Greece could improve the **efficiency of the incumbent electric power company (Public Power Corporation** – PPC S.A.) and foster **competition** in the gas and electricity markets.

Opportunities and challenges for the 2030 framework[1]

- Greece's non-ETS target for 2020 is -4% compared to 2005. It is projected that Greece will over-achieve its target by a large margin. For 2030, Greece's cost-effective reductions in non ETS sectors under the 2030 40% cost-efficient scenario would reach -39% in 2030 compared to 2005, and total GHG emissions would reach -55%; above the EU average.
- Greece's EU 2020 target is 18% and Greece is projected to reach the target. Greece's share of RES in 2030 is projected to increase to 27%, in the 2030 40% cost-efficient policy scenario, close to the EU average.
- For Greece, economic impacts are higher than EU average: additional system costs in cost-efficient 40% scenario in 2030 are 0.30% of GDP; average annual additional investment needs for 2011-2030 are 0.23% of GDP, slightly above EU average; there is a small impact on electricity prices compared to reference (+2% difference). Final consumers' combined electricity and fuel bill in 2030 decreases by 0.38% of GDP compared to reference.
- Greece is marked by high energy import dependency - 69% in 2010. It is projected to increase to 79.3% in 2030 under reference due to lower lignite production, while net imports are relatively constant. Energy import dependency is projected to reach 75% in the 2030 cost-efficient policy scenario with the net imports projected to be lower than in reference.
- Reduced fossil fuel consumption also improves health conditions through lower emissions of pollutants and lowers costs for air pollution control. The monetised health benefits and prevented air pollution prevention costs per year for Greece in 2030 range from 0.09 to 0.16% of GDP (based on a low and high valuation), which is slightly higher than the EU average.
- With current ETS distribution rules minimum annual auctioning revenues 2021-2030 in this scenario are estimated at €597 m.[2]

Non-ETS Emissions trends[3]

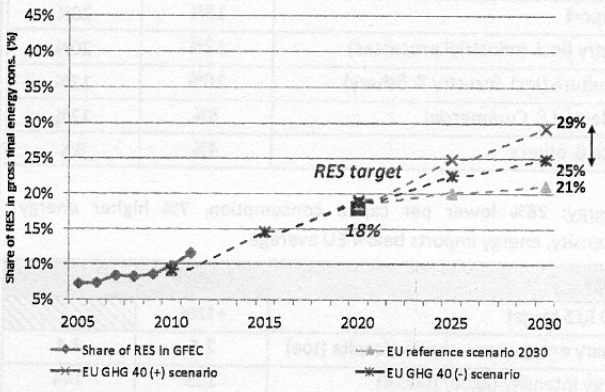
- ☺ Progress towards 2020 target: EU (and national) projections show Greece on track to meet -4% 2020 ESD target, in EU projection by a large margin mainly due to recession (20 pps).
- 2030 non-ETS emissions under EU reference scenario : **-32%** compared to 2005
- 2030 non-ETS emissions under EU GHG 40% scenarios: between **-39% and -41%** compared to 2005.



National projections as quality checked by the EEA see Greece to only narrowly achieve its non-ETS target by a 1 pps distance. These projections do not however fully take into consideration the impact of the economic crisis nor the recently adopted Energy Efficiency Directive.

Share of RES in Gross Final consumption[3]

- ☺ Progress towards 2020 RES target: Greece **is on track; 12%** RES share in 2011. Close to target →**18%** in 2020.
- Share of RES in 2030 reference scenario: **21%**
- Share of RES under EU GHG 40% scenarios: between **25%** and **29%** depending on RES 2030 target.



RES support mechanisms: RES electricity is promoted through a feed-in tariff, subsidies, a tax exemption and a net metering scheme. Heating RES profit from a tax exemption and a subsidy scheme. The main incentive for renewable energy use in transport is a quota system.

1The projection results for 2030 in this box are based on the policy scenario which achieves a 40% GHG target in a cost-efficient way across the EU.

2 Conservative estimate calculated based on auctioning in power sector only, based on ETS carbon price evolution between 2020 and 2030 (2030 level EUR 40, could be lower in case of very strong specific renewables and energy efficiency policies).

3 The EU 2030 framework for climate and energy policies is underpinned by a set of policy scenarios indicating lower range and higher range values from different projection scenarios characterised by 40% GHG reduction; 40% GHG reduction/ambitious EE measures and 40% GHG reduction/ambitious EE measures/30% RES share. These figures give guidance for future work but no decisions have been taken in the currently proposed framework.

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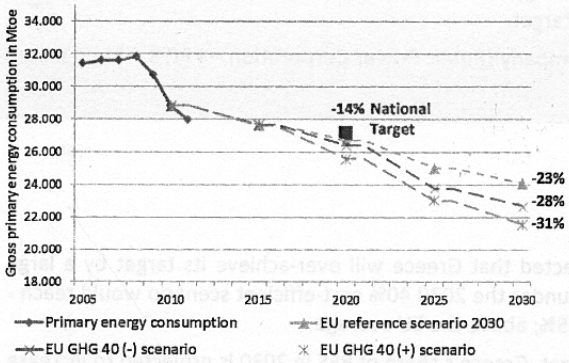
Energy consumption trends[3]

- EU reference scenario 2030: **23% decrease** of gross primary energy consumption compared to 2005.
- EU GHG 40% scenarios: Between **28% - 31% decrease** of gross primary energy consumption compared to 2005.



EE policies: Introduction of natural gas in the national energy system. Basic measures promoting EE in buildings sector are in place.
The economy still has high energy saving potential (mostly in residential, tertiary and public buildings sectors); energy efficiency investments could be a strong vector of economic recovery.

Electricity Mix[3]

Change in total generation – reference scenario forecasts an increase of 3 TWh (+5%) from 2010 to 2030.

- Reference scenario 2010 to 2030: Net decrease in conventional thermal fuels, with solids (lignite) showing a large reduction, whilst gas increases considerably.
- RES shows a considerable increase in its share, to 45% of total electricity mix.
- Policy scenario ranges to 2030: Large RES increase to up to 70% of total mix, displacing conventional thermals, primarily gas. CCS is not projected to play a role in the decarbonisation of Greece's energy supply to 2030.

Power generation	2010	2020 Reference Scenario	2030 Reference Scenario	2030 Policy Scenario
Solids	51.4%	39.0%	11.4%	2.5-19.1%
Oil	10.9%	6.1%	4.4%	0.7-4.4%
Gas	17.9%	17.3%	38.7%	17.0-34.6%
Nuclear	0.0%	0.0%	0.0%	0.0%
RES	19.9%	37.6%	45.4%	58.4-69.7%

Key climate and energy indicators 2011

- GHG emissions: **13% higher** per capita emissions than EU average

GHG Emissions	Greece	EU Average
ESD 2020 GHG target (comp. 2005)	-4%	
ESD GHG emissions 2012 proxy (comp.2005)	-16%	-10% (EU27)
Total GHG emissions 2012 proxy (comp.2005)	-15%	-12%
GHG emissions/capita (tCO_2equivalent)	10.2	9.0

- Largest GHG sectors: Energy/power industry sector

Largest Sectors of GHG Emissions	Greece	EU Average
Energy/power industry sector	48%	33%
Transport	18%	20%
Industry (incl. industrial processes)	12%	20%
Agriculture (incl. forestry & fishery)	10%	12%
Residential & Commercial	8%	12%
Waste & others	4%	3%

- Energy: **26% lower** per capita consumption, **7% higher** energy intensity, energy imports below EU average

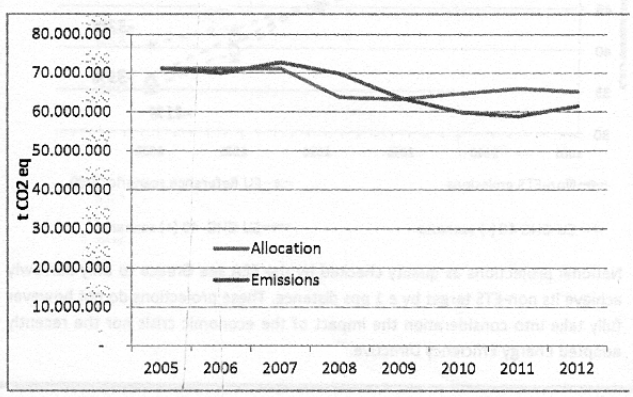
Energy	Greece	EU Average
2020 RES target	+18%	
Primary energy consumption/capita (toe)	2.5	3.4
Energy intensity (kgoe/1000 €)	155	144
Energy to trade balance (% of GDP)	-2.4%	-3.2%

- Taxes: **Higher** share of environmental taxes and **12% lower** implicit tax rate on energy than EU average

Taxes	Greece	EU Average
Share of environmental taxes (% of GDP)	2.7%	2.4%
Implicit tax rate on energy (€/toe)	161	184

EU-ETS: Key figures

Data for ETS Phase 3 (2013)	Greece	EU Average
Share of ETS in total GHG emissions (2011)	51%	41%
Auction redistribution beneficiary (Art.10(2)b)	X	
Importance of industry sectors	**Greece**	
Share of steel production (% EU production)	1%	
Share of aluminium production	7%	
ETS sectors (2012):	**Greece**	
Electricity production	82%	
Cement	8%	
Refined petroleum products	6%	
Iron, steel and ferro-alloys	2%	
Aluminium production (NIMs&EUTL)	2%	
Largest industrial installation	Motor Oil Hellas - Corinth Refineries S.A.	



CERs and ERUs used 2008-2012: 28 mio tCO_2 (9% of ETS emissions)