

Assessing progress towards deep decarbonisation in Europe

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**DEEP
DECARBONIZATION
PATHWAYS
PROJECT**

www.deepdecarbonization.org



- Objective to demonstrate that countries can achieve deeply decarbonized energy systems by 2050, commensurate with the transformation required under the internationally agreed 2 °C target
- Based on national level analyses by a consortium of the 16 largest emitting countries (>70% of global energy-related CO₂ emissions)



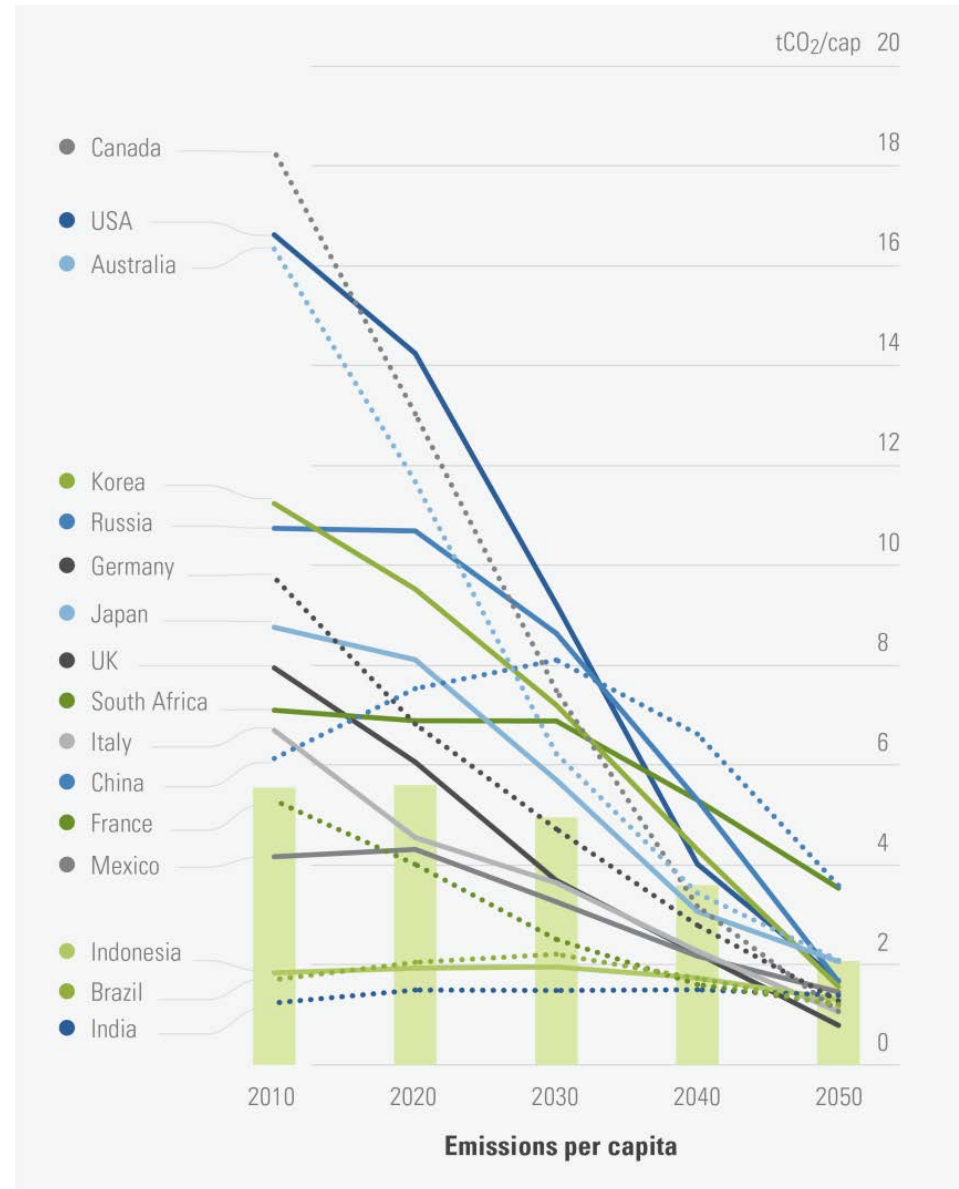
Principles of approach

- **National-scale approach:** account for domestic circumstances and promote synergies with socio-economic priorities
- **Long-term vision to 2050:** inform short term decisions and the sequence of actions (\neq risks of lock-ins)
- **Transparency, granularity & diversity:** enable engagement with decision makers and dialogue with different groups of stakeholders



Key outputs (Phase 1)

- **Quantitative insights:**
Transformative scenarios are feasible in all the countries we have studied, and compatible with development objectives
- **Policy impact:**
Important supporting activity to Paris Agreement, Art. 4.19, and national decision makers
- **Network established:**
Modelling expertise to support 2050 Platform & Mid Century Strategies, and NDC strengthening



Assessing progress on decarbonisation across Europe's energy systems

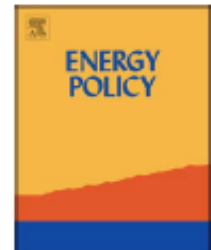
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Tracking sectoral progress in the deep decarbonisation of energy systems in Europe



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European climate policy objectives and progress to date

- EU NDC, representing all Member States, commits to a *binding target of an at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990*
- NDC also reiterated its objective to reduce its emissions by 80-95% by 2050 compared to 1990
- Current GHG reductions (in 2015) of 22% compared to 1990 levels (against 2020 target of 20%)
- New set of measures under Clean Energy for All package (2016)



Comparing historical progress to future benchmarks

- 13 scenarios from 5 Member States (FR, DE, PL, UK, IT) and EU-wide model (PRIMES) selected
- ‘Sectoral performance benchmarks’ derived for each decade (power, buildings, industry, transport)
- Based on two indicators from Kaya identity approach - energy and carbon intensity (annual rate of improvement)
- Historical performance data (ODYSSEE) (2000-2013/14) compared to benchmarks, to help identify sectoral challenges and provide a framework for assessing policy adequacy



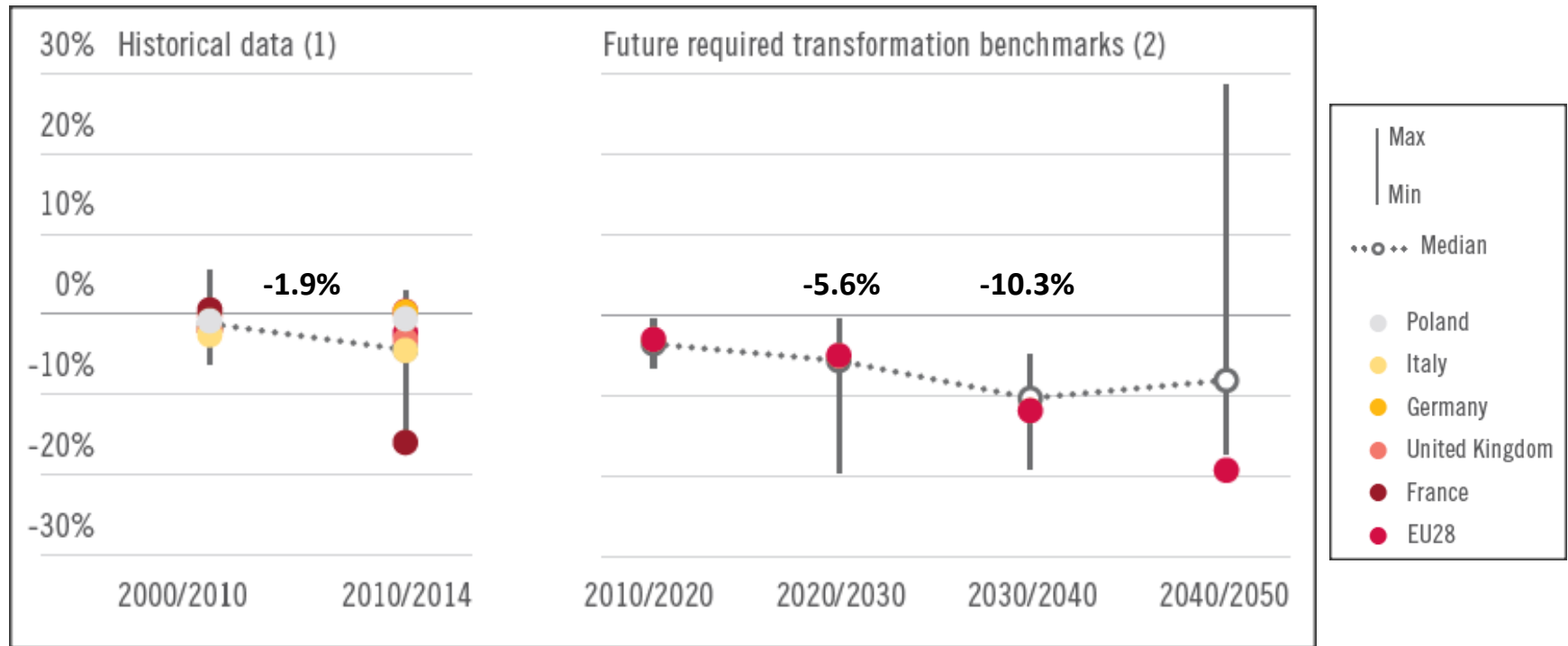
Indicators: Historical rate versus 2020-30 benchmark

- Across most indicators, stronger progress is needed in next 10 years
- Longer-term 2050 perspective increases ambition for mid-term policy to 2030

Sector	Indicator	Indicator unit	Historical y-o-y rate of change, %/yr	2020-30 y-o-y rate of change, %/yr (median)
Power generation	C.I. Elc Gen	gCO ₂ / kWh	-1.9	-5.6
Residential buildings	E.I. buildings	kWh / m ²	-1.8	-1.8
	C.I. FEC	gCO ₂ / kWh	-0.6	-2.9
Transport	E.I. pass.	kWh / pkm	-0.5	-2.4
	E.I. freight	kWh / tkm	-0.7	-1.2
	C.I. FEC	gCO ₂ / kWh	-0.3	-1.1
Industry	E.I. output	kWh / VA	-1.6	-1.4
	C.I. FEC	gCO ₂ / kWh	-0.6	-1.6

Power sector

- Step change needed in decarbonisation of power supply
- >20% gen. from coal but needs to be less than 10% in 2030, 0% by 2040
- EU ETS reform critical....but time to reduce allowance oversupply
- Continued support for RE (29% of gen.) but also need for LT tech development

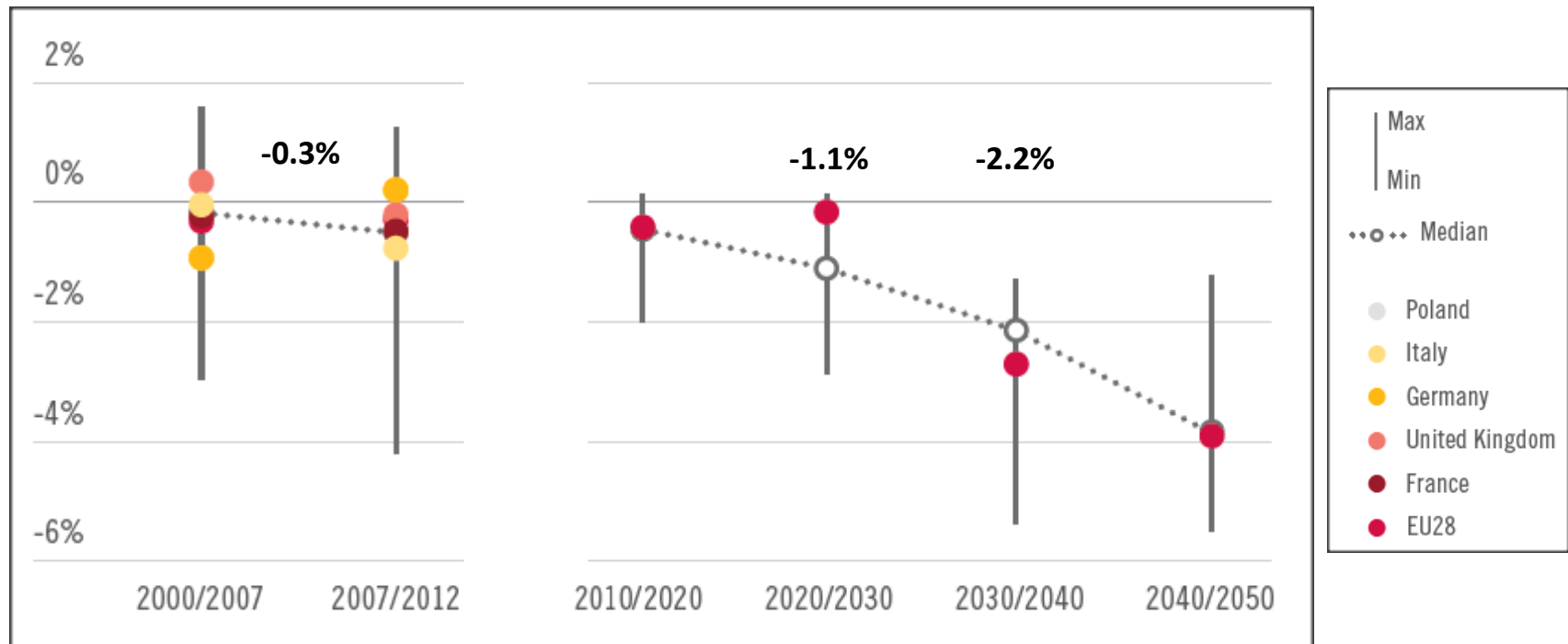


Improvement in carbon intensity of electricity supply (Source: IDDRI, 2016)



Transport sector

- Benchmarks see rapid electrification, increases in biofuels, and in LT, H2 (freight)
- Policy uncertainty - biofuels, passenger CO2 standards
- Need focus on vehicle incentives and infrastructure for electrification
- EU coordination via 2016 European Strategy for low-emission mobility



Improvement in carbon intensity of transport energy (Source: IDDRI 2016)

Other sectors

- Residential buildings
 - Historic versus benchmarks shows rates of improvement not very different
 - But step change in carbon intensity – from <1%, rising to 2.9% in 2020s
 - High levels of electrification by 2030, similar to those observed in France today
 - Policy needs to enhance renewable heat, strengthen prospects for electrification, improve retrofit and consider system transition away from gas
- Industry
 - Strong reductions in emission since 2000 (-23%); correlation with economic crisis and weak recovery
 - Inertia in sector; back loading in scenarios as technology development further down the road (CCS, electrification, improved materials)
 - Policy inadequate to drive structural change but needed due to long lead in time



Key conclusions

- Historical data (2000-2014) shows significant progress in decarbonisation
 - CI of power generation: 21% reduction
 - EI of buildings: 21% reduction
 - EI of passenger transport: 9% reduction
- However, EU is off-track to meet 2030 (NDC) and 2050 objectives
 - Insufficiency of rate of change now compared to what is needed
 - Much of observed reductions due to cyclical effects e.g. economic slow down post-2008 (not structural)
 - Longer term decarbonisation options are not being adequately prepared
- Some scenarios also highlight the insufficiency of NDC ambition



Policy recommendations to get on track

- Focus on drivers of emissions in each sector (as opposed to broad cross-sectoral targets) – with focus on structural not marginal change
- Proposal under the 2016 Clean Energy for All Europeans package must be introduced in the strongest manner possible
- Policy consideration needed of how to remove coal from power generation sector



Thanks for listening.

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Key references:

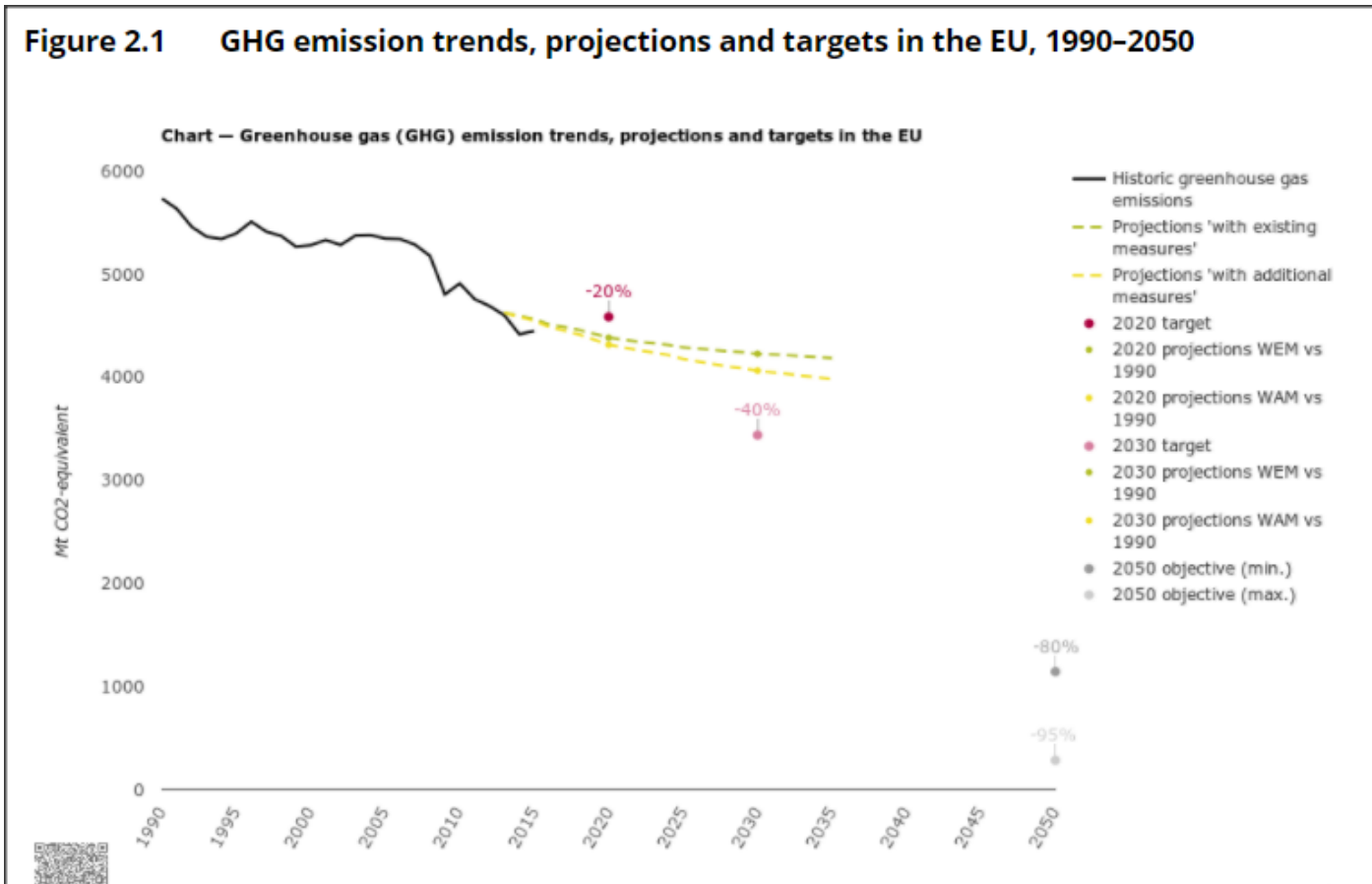
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EEA Progress Assessment

Figure 2.1 GHG emission trends, projections and targets in the EU, 1990-2050

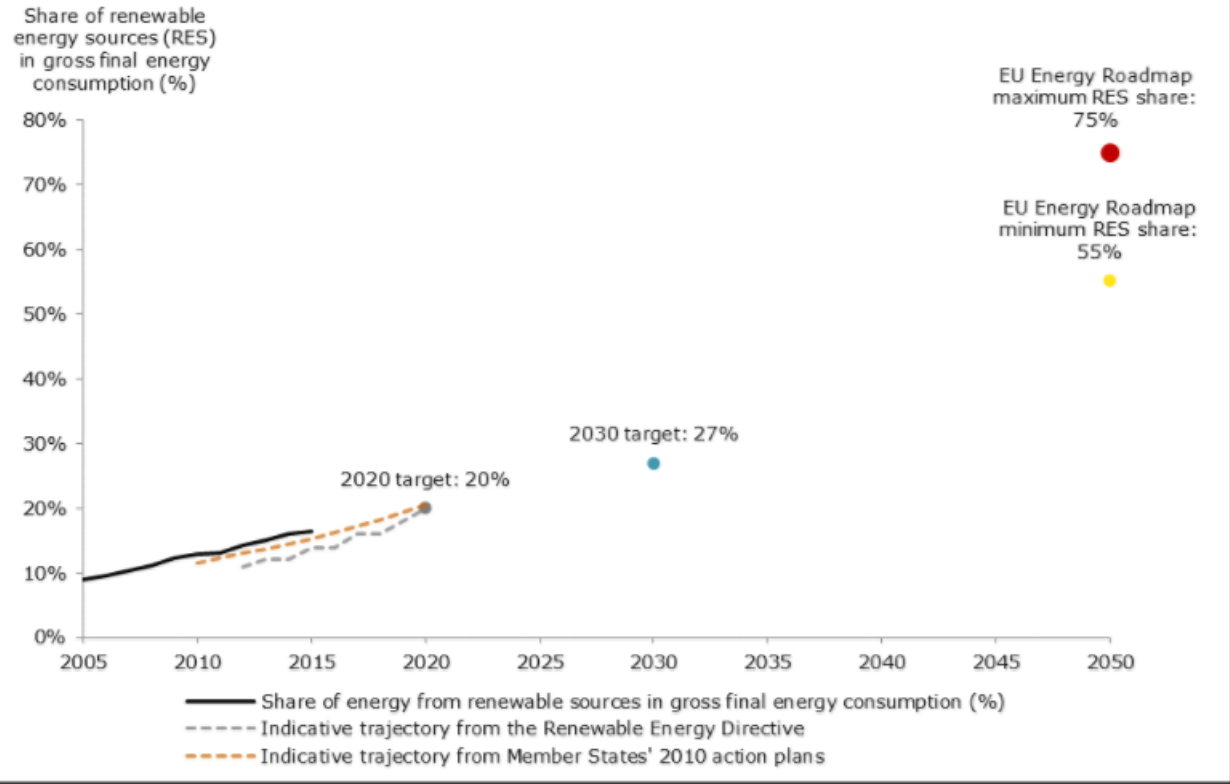


<https://www.eea.europa.eu/themes/climate/trends-and-projections-in-europe/progress-in-reducing-total-eu>



EEA Progress Assessment

Figure 4.2 Share of energy from renewable sources in EU's gross final energy consumption, 2005-2050

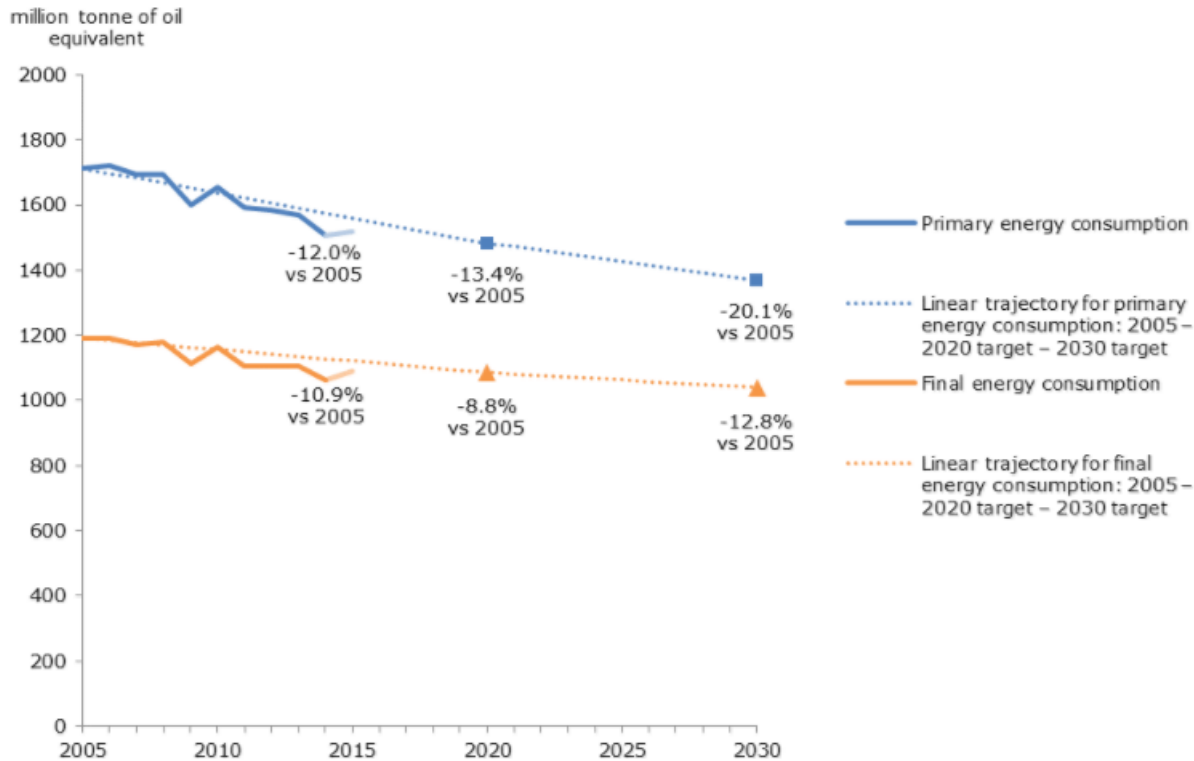


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EEA Progress Assessment

Figure 6.1 Primary and final energy consumption in the EU, 2005-2015, 2020 and 2030 targets



Note: The 2020 target represents energy savings of 20 % from levels projected for 2020 in the Commission’s Energy Baseline Scenario (EC, 2008). The indicative 2030 energy efficiency target represents an improved energy efficiency of at least 27 % compared with 2030 projections in the same Energy Baseline Scenario.

<https://www.eea.europa.eu/themes/climate/trends-and-projections-in-europe/6-progress-of-the-european>