

The EU Energy System towards 2030 – the EU Reference Scenario 2016

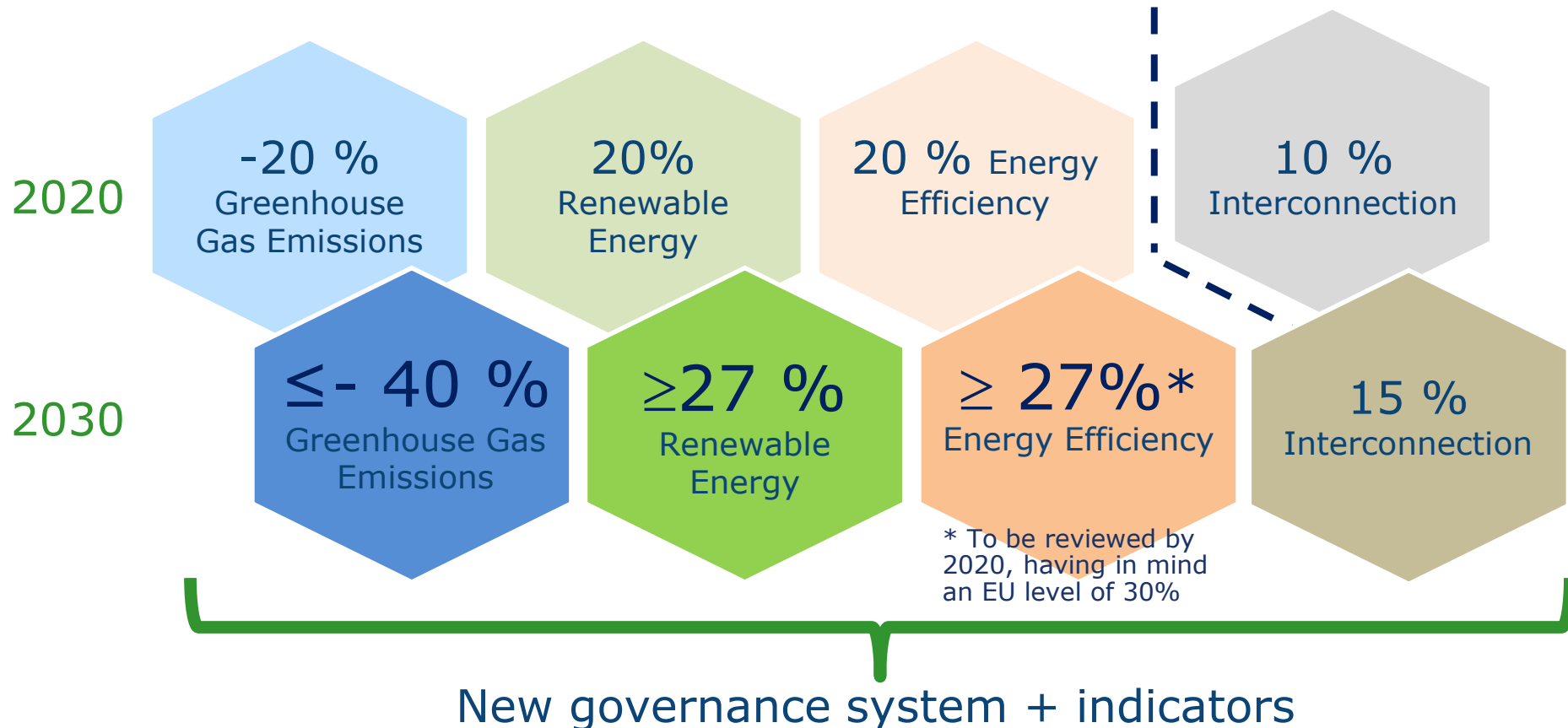
**PCI Regional Groups workshop on scenarios for
the TYNDPs 2018**

DG Energy
Unit A4 – Economic analysis and financial instruments

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The 2030 Climate and Energy Framework

Agreed headline targets - 2014 EU Council 2030 Framework for Climate and Energy



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How will the energy & transport system and GHG emissions evolve under current trends and policies?

**The EU Reference
Scenario 2016**

The EU Reference Scenario – What is it?

- Projection of energy, transport and GHG emission trends up to 2050 for the EU and individual Member States (**not a forecast**)
- Energy system projection for demand and supply side sectors including full energy balance, investment costs, prices and related CO₂ emissions per country
- Calibrated on EUROSTAT, full review of key input parameters (economic, fossil fuel prices, technological parameters)
- Consistent among policy areas (economic, energy, climate, transport and others, such as agriculture and environment)
- An integrated development process (in the Commission and with consultation of Member States)
- Meant to inform decision makers and stakeholders on the effects of current policy framework,
- A starting point for further assessments

Modelling policies: principles

- The Reference scenario includes adopted policies and assumes implemented all legally binding 2020 targets set by the EU (GHG, RES, RES-T)
- It does not assume 2030 climate and energy targets to be met, nor additional policies after 2020
- National policies (adopted until 31/12/2014) are also included
 - Information on national policies is based on information reported by MS to the EC (e.g. Monitoring Mechanisms, MS questionnaires)
- Planned investments by MS are also taken into account, based on MS' replies to questionnaires

Electric grid – cross-border interconnections

- All interconnections between MS are represented
- Non-EU countries, such as CH, NO, and the South East European area also represented.
- ENTSO-E Ten Year Development Plan (TYNDP) fully used to project into the future investment in interconnectors and to adjust (increase) Net Transfer Capacity values.
- After the end of the TYNDP, expansions based on interconnections as needed to support developments of RES (e.g. offshore wind).

Electric grid – within Member States

- Interconnections within Member States not explicitly modelled. Still:
- The Reference scenario assumes that beyond 2020 **grid expansion** will remove most congestions within countries, which is partly the aim of the ENTSOE development plan and national grid expansion plans currently under implementation
- Within countries, grid expansions are assumed to be a **function of capacity expansion particularly for RES. Cost of distribution grids takes into account decentralised generation** (and eventually mobility electrification)

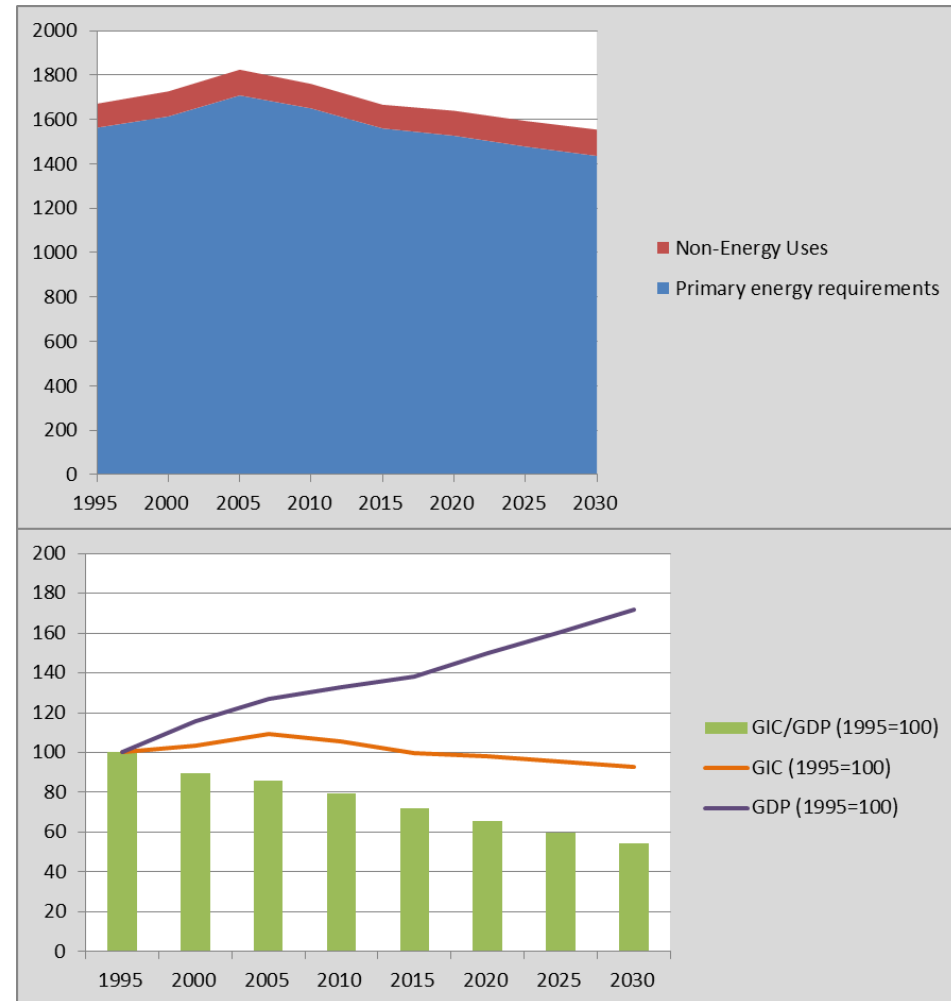
→ **Better functioning of internal market therefore assumed,** with in particular flow based allocation of interconnection capacities post 2020.

Gross inland energy consumption

Primary energy demand and GDP decouple, continuing trends observed since 2005

Energy efficiency improvements mainly driven by policy up to 2020 and by market/technology trends after 2020 drive reduction of demand

Deceleration of energy efficiency progress occurs post-2020



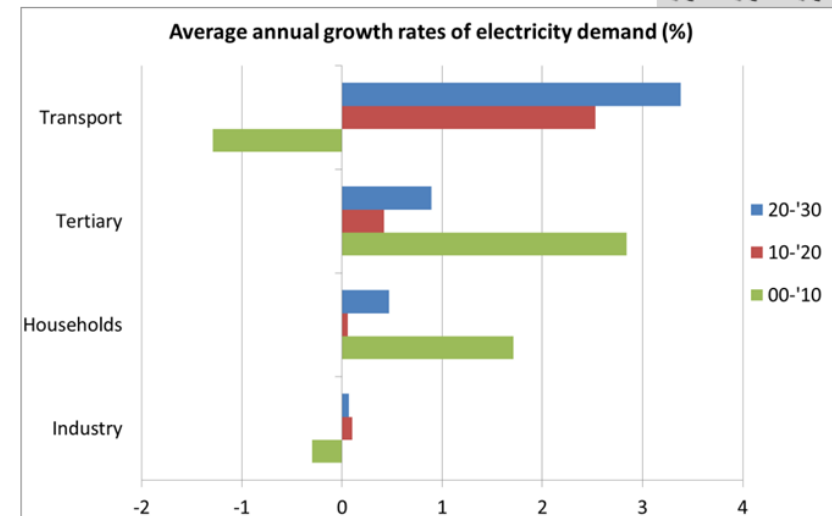
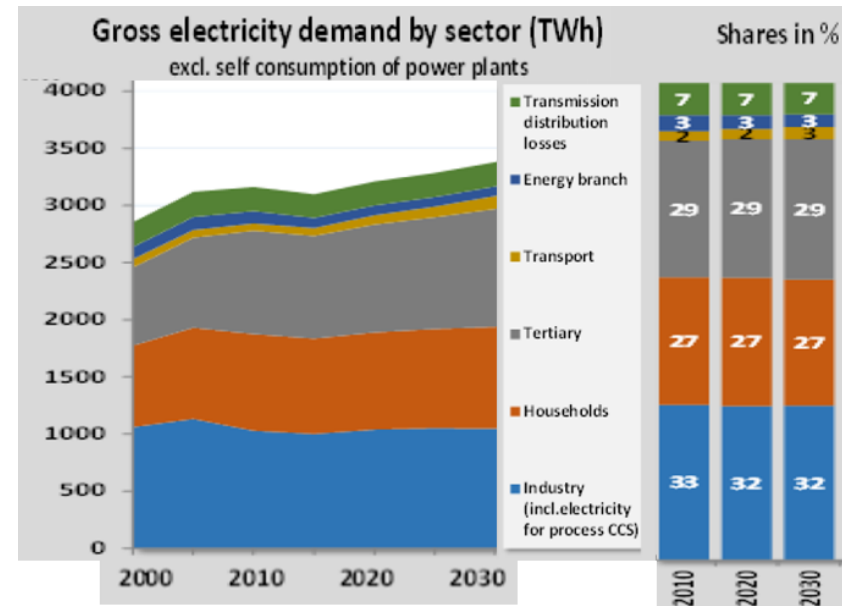
Demand for Electricity

Demand for electricity is projected to recover after stagnation in recent years

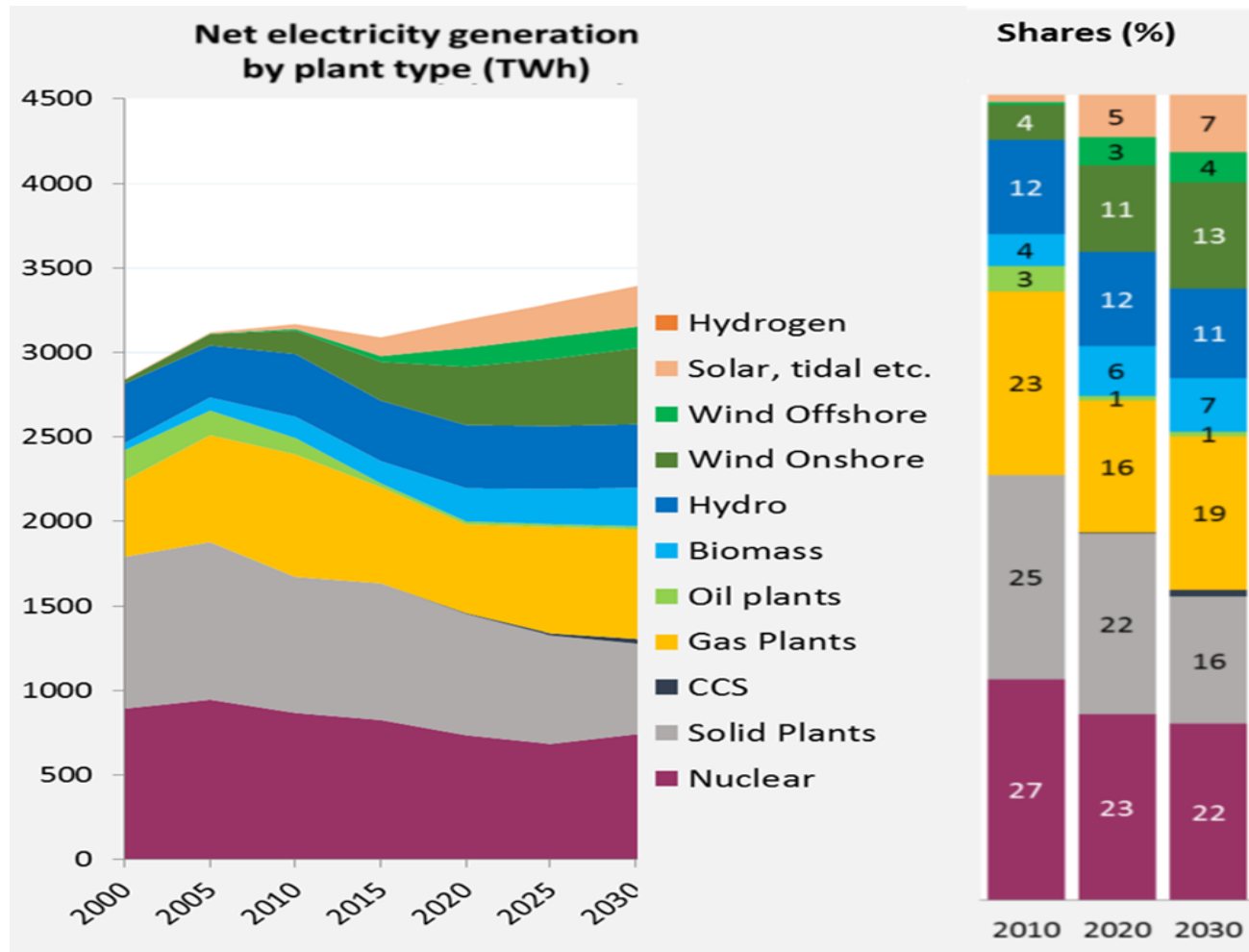
Electricity is increasingly used for heating of buildings (heat pumps) and in thermal processes in industry

Specific electricity uses also increase significantly in all sectors

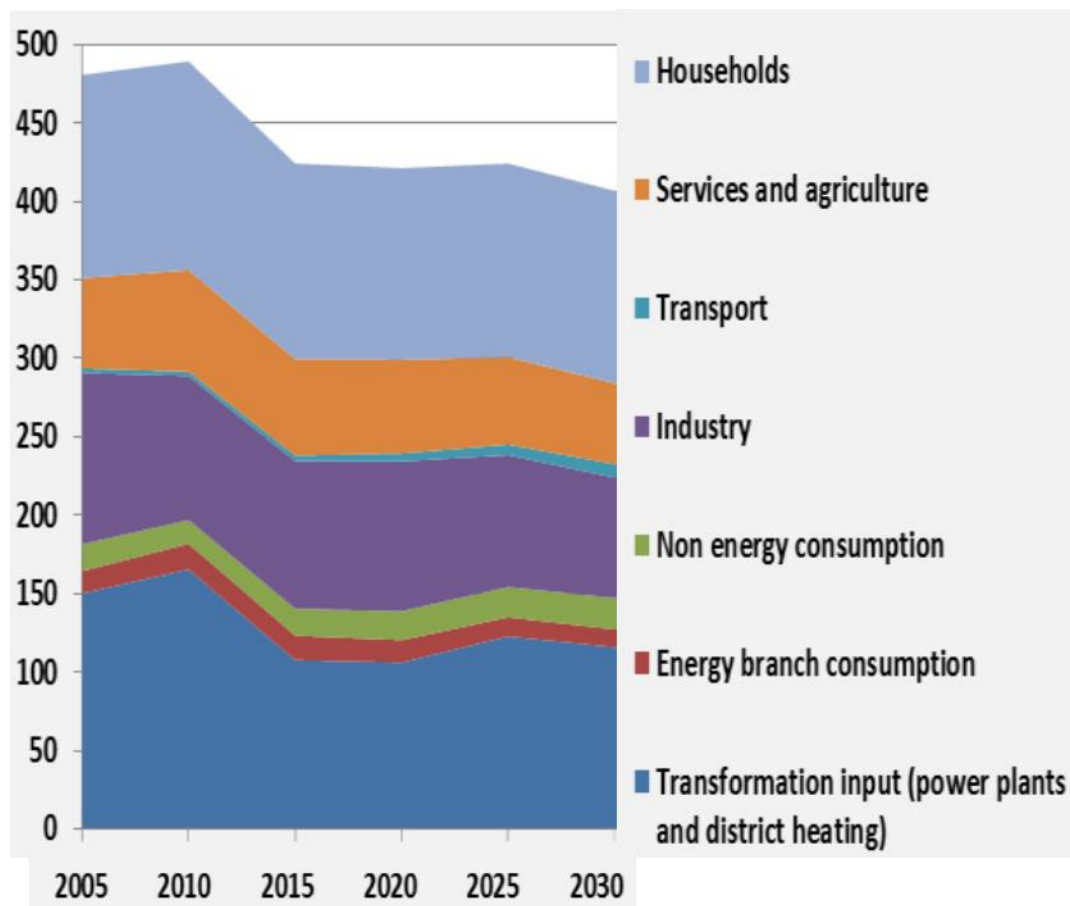
Energy efficiency improvements in end-uses, notably in the domestic sector, mitigate electricity demand growth



Power generation mix



Demand for gas (bcm)



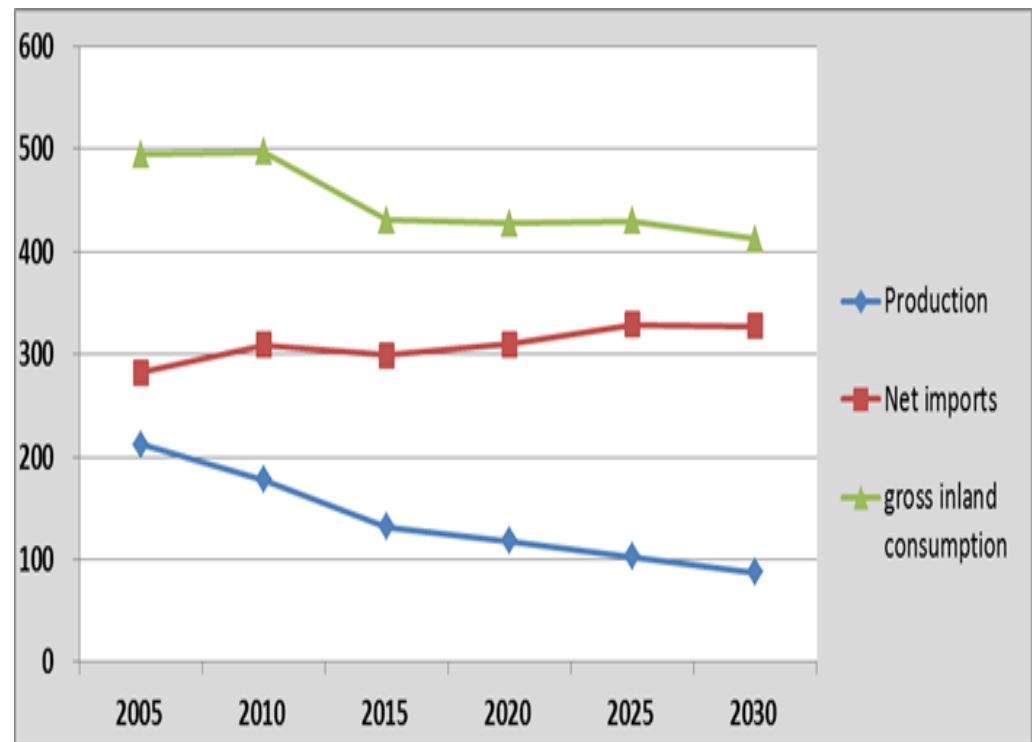
Source: PRIMES

Gas production, demand and imports (bcm)

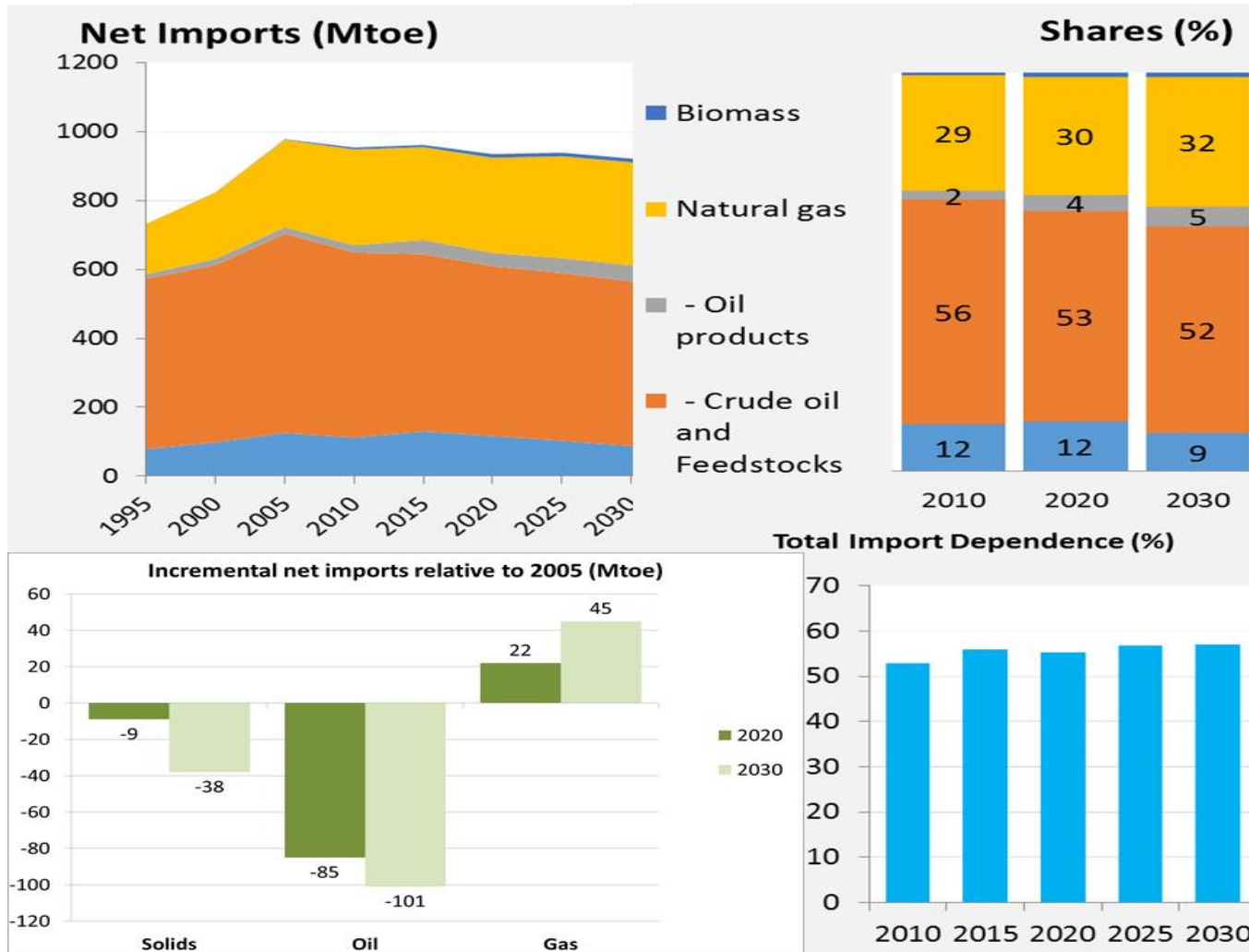
Up to 2020, consumption remaining stable

Net import dependency of natural gas increases as domestic gas production continues its downward trend.

Post 2020, slight decrease in consumption of gas, as well as further reductions in indigenous production of gas.



Energy imports



Source: PRIMES

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Concluding remarks

- Reference scenario based on current policies as starting point for further analysis
- Variants and sensitivities can further give indications on how key parameters influence results
- Notably projections consistent with 2030 targets and long term decarbonisation will give further insights
- Development of modelling tools to better take into account specific grid aspects and short term functioning of electricity markets, eg generation adequacy with increasing shares of intermittent RES, analyse costs and benefits of specific infrastructure projects

Thank you for your attention

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Where do we stand now?

Progress towards Energy union objectives

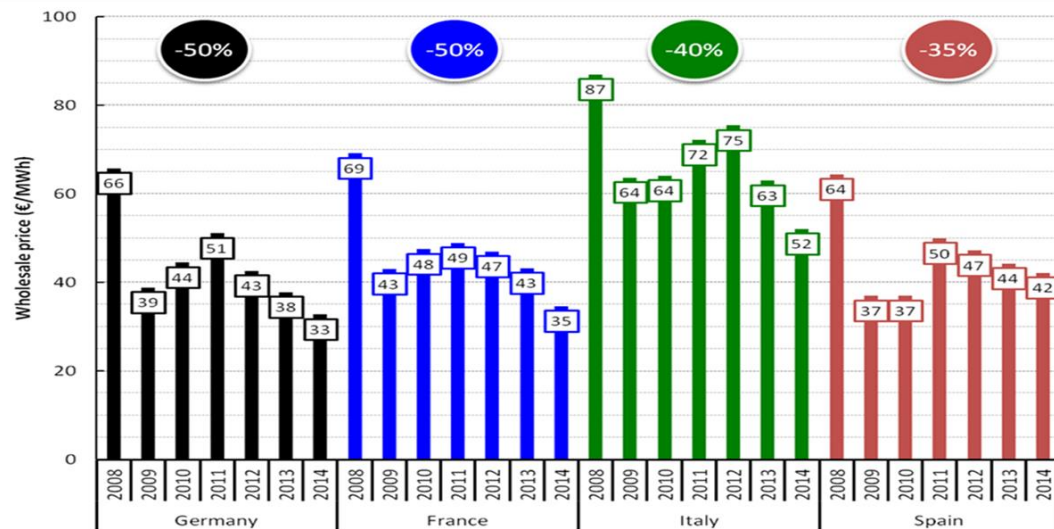
State of play: Internal market for electricity and gas

Achievements

- Market coupling
- Increased competition
- Convergence in wholesale prices

Challenges ahead

- Need for flexibility (generation, demand response, storage) in a world with more RES
- Markets to deliver the right signals for necessary investments
- Fragmentation, uncoordinated policies



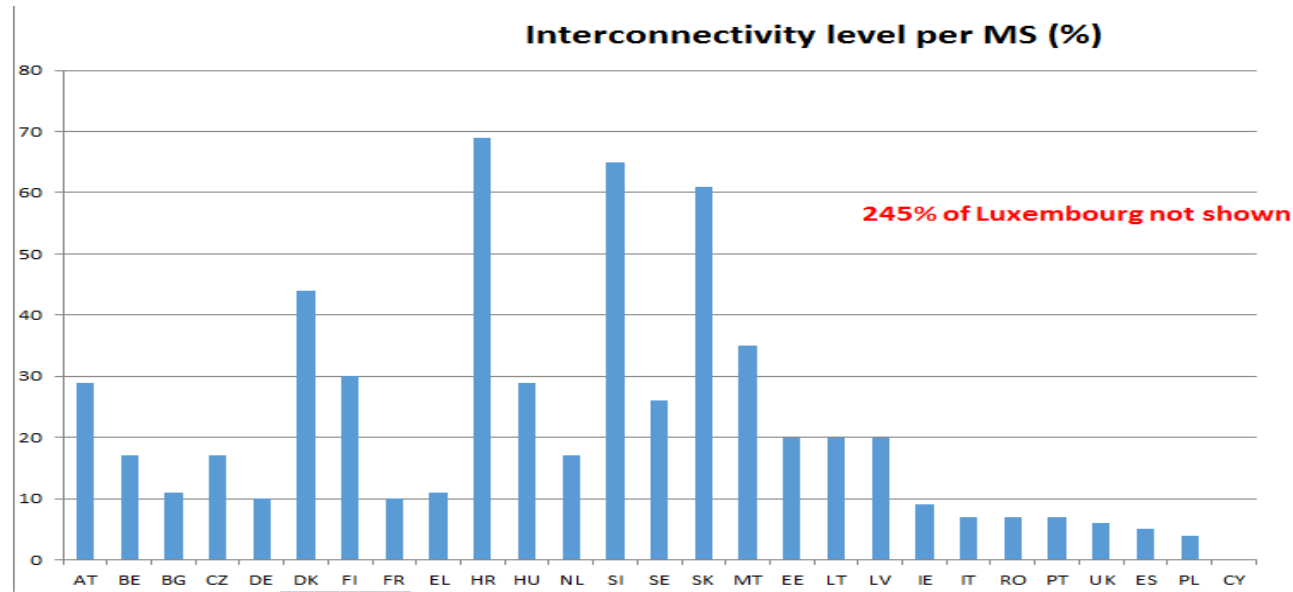
State of play: Trans-European networks

Achievements

- TEN-E: one-stop shop, permitting procedure, identification of PCI's and regulatory solutions
- CEF (+ EFSI): financing instrument

Challenges ahead

- Implementing the 15% target, while taking into account the cost aspects and the potential of commercial exchanges in the relevant regions
- Regional cooperation



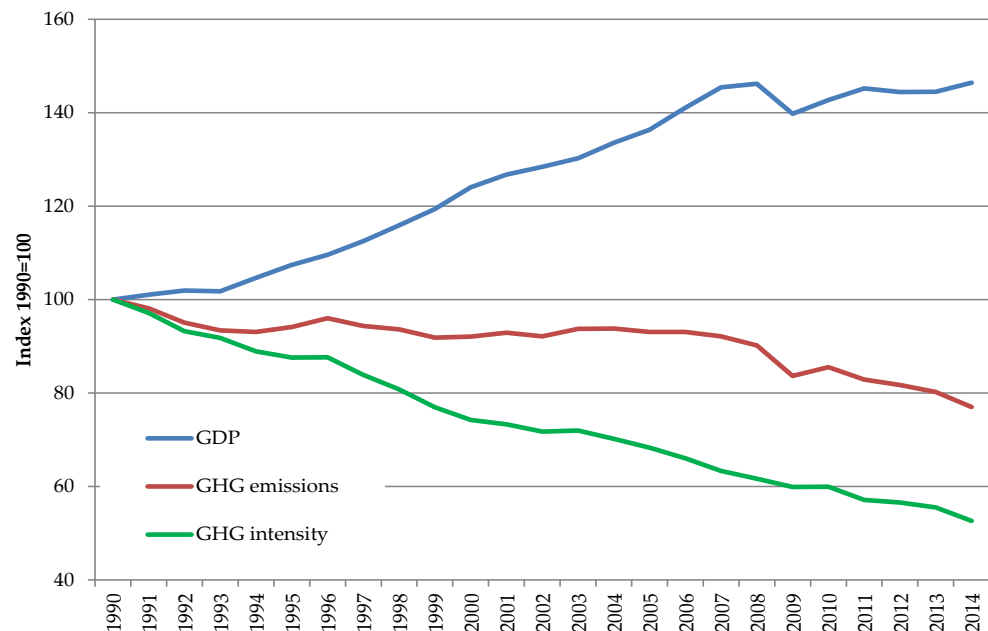
State of play: GHG emissions

Achievements

- Long term decoupling of GHG emissions from GDP growth
- Target for 2020 already achieved (-23% in 2014)
- EU-wide ETS market

Challenges ahead

- Fair and equitable effort sharing, while preserving cost-effective approach
- Restoring ETS as central instrument



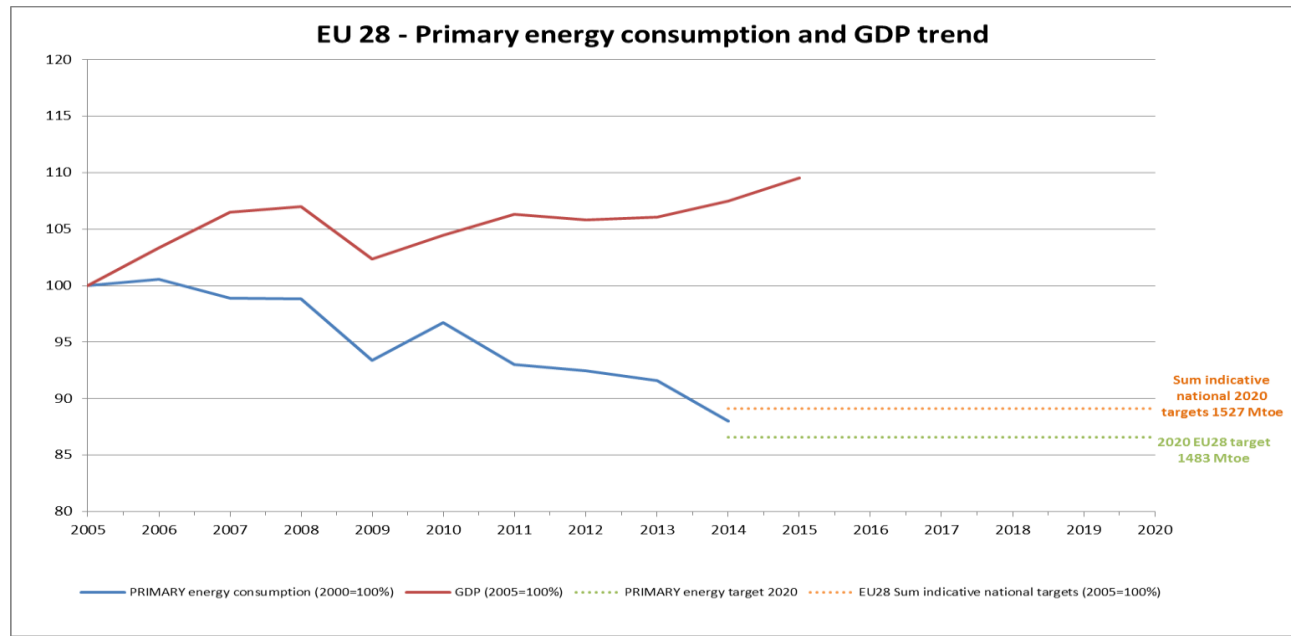
State of play: Energy Efficiency

Achievements

- Comprehensive policy framework (EED, EPBD, Eco-design,...)
- Significant progress towards 2020 target
- CO₂&cars (130g/km in 2015, 95g/km in 2021)
- energy efficiency standards (light bulbs, appliances, electric motors...) & energy labelling (domestic appliances)

Challenges ahead

- large untapped potential, eg existing buildings
- finance
- electrification (long term)



State of play: Renewables Policy

Achievements

- *drove down costs key technologies (PV, wind)*
- *accelerated deployment – strong impact on investments patterns*
- *important effects in terms of emission reductions*

Challenges ahead

- *EU as technology provider ("renewable nr. 1")*
- *Network development as enabler for RES penetration*
- *Market integration*

