European Energy policy and Sustainable Development

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Energy

Climate and energy: where do we stand?

- **Developments since the 2009 Energy and Climate change package**

Renewable energy saw rapid cost decreases
Technologies are gradually becoming competitive
But large scale integration is a challenge

Impact of the financial crisis
Fall in private investment, tight financing conditions

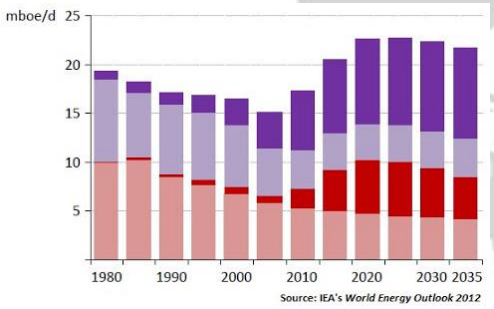
Fukushima

Some countries phase out nuclear power production

Ukraine

COP21 -Paris

Shale gas
US oil and gas production



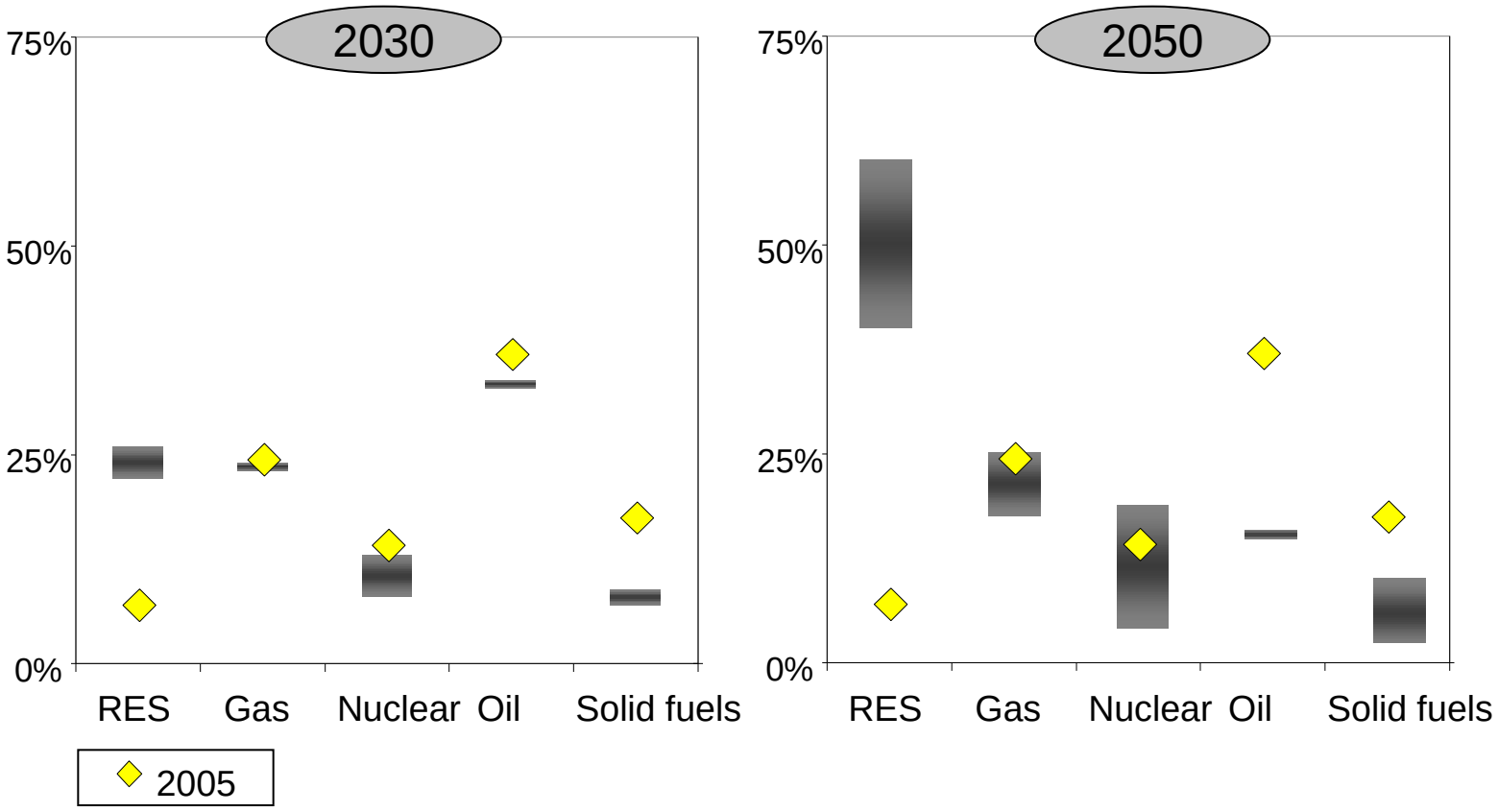
Unconventional gas
Unconventional oil
Conventional gas
Conventional oil

Rising demand -> rising prices
By 2030, world economy set to double and energy demand to rise by 1/3

Looking to the future – Energy Roadmap 2050

- Basis: 20/20/20 objectives of the EU energy policy
- Roadmap 2050: Cutting GHG emissions until 2050 down to 80 – 95 % below the level of 1990
- The Energy Roadmap 2050: the basis for the elaboration of a low carbon 2050 strategy
  - *Supported by multiple **scenario** analyses, to show how to reach the 80 % / 95 % goal while at the same meeting other policy objectives (Competitiveness and Security of Supply)*
  - *Containing robust assumptions for all possible scenarios*

Fuel Ranges (primary energy consumption)



Major energy challenges in Europe

- Import Dependency
- Energy Prices
- Decarbonisation
- Technology mix

EE and RE at the core of the solutions for 2020 -2050

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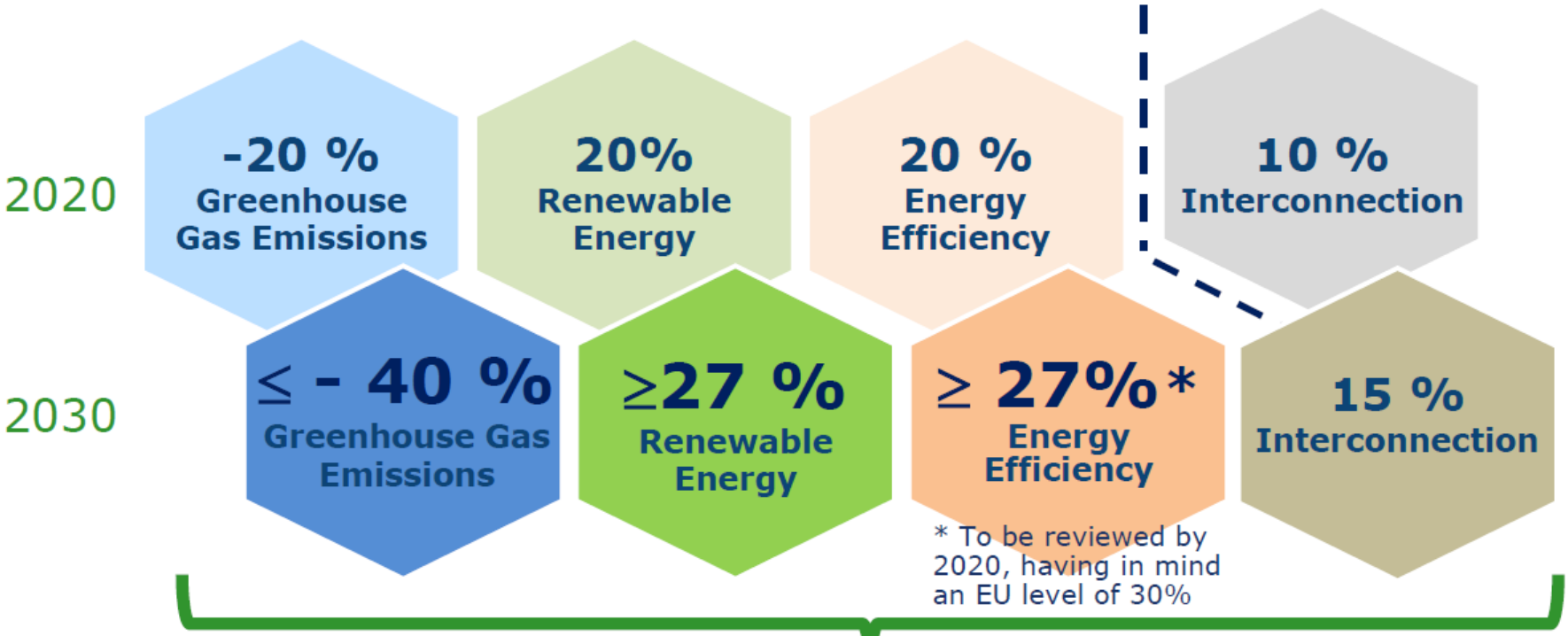
2030 framework for climate and energy policies



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The Energy Union

The Energy Union aims to address the three objectives of **competitiveness**, **security of supply** and **sustainability**.

•*through a strong commitment by the EU institutions and the Member States to deepen integration, cooperation and coordination of both the external and internal aspects of energy policy.*

The Energy Union should be based on five mutually reinforcing dimensions:

1. Supply security, based on solidarity and trust
2. A competitive and completed internal energy market
3. Moderation of energy demand
4. Decarbonisation of the EU energy mix
5. Research and innovation

Relevant Key Activities

- **Strenghen European regulatory framework**
- **Sustainable energy security package, 2016**
  - **LNG and Storage**
  - **A decision on Intergovernmental Agreements in energy**
  - **Security of Gas Supply Regulation**
  - **Heating and Cooling strategy**
- **A new market design, 2016**
- **Renewables package 2016-2017**
  - **Self-consumption**
  - **Bioenergy sustainability**
  - **post 2020 RES legal framework**
- **Alternative fuels & integration of energy and transport sectors**
- **Initiative on global technology and innovation leadership on energy and climate**

Source: Directorate-General for Energy

legislation review & revision in 2016

Rational : meet COP21 commitments and pave the way towards 2050

Review
Energy Efficiency Directive

Review
Energy Performance of Buildings Directives

Review
Renewable Energy Directive

Market Design Initiative

Energy Labelling & Ecodesign Directives

EU Strategy for Heating and Cooling

Smart Finance for Smart Buildings and Businesses

Electricity Market Design

The electricity market framework will be revised to better integrate renewables into the electricity system. This will include market arrangements:

- suitable for an interconnected EU-wide electricity market providing clear **price signals** for new investments and facilitating the further development of renewables;
- to promote **regional cooperation** and coordination on energy policies;
- to enable cooperation on **development of renewables**, including on support schemes;
- to provide a truly European dimension to **security of electricity supply**.

Electricity Market Design

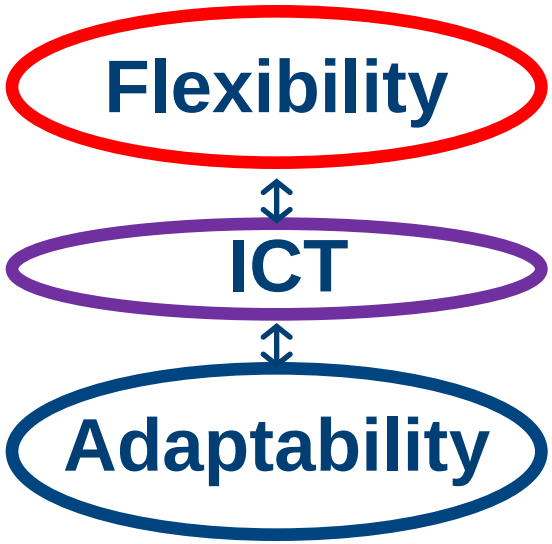
The revision will develop further the markets with respect to :

- Efficient cross-border short-term markets.
- long-term price signals to ensure sustainable investments.
- Infrastructure to ensure integrated internal market.
- Markets to integrate renewables efficiently and purposefully.
- Regional coordination of national policymaking.
- Improved cooperation between System Operators.
- Ensuring system adequacy and reliability
- Capacity markets – including cross-border CM.

A flexible and adaptive energy system

Smart Energy System

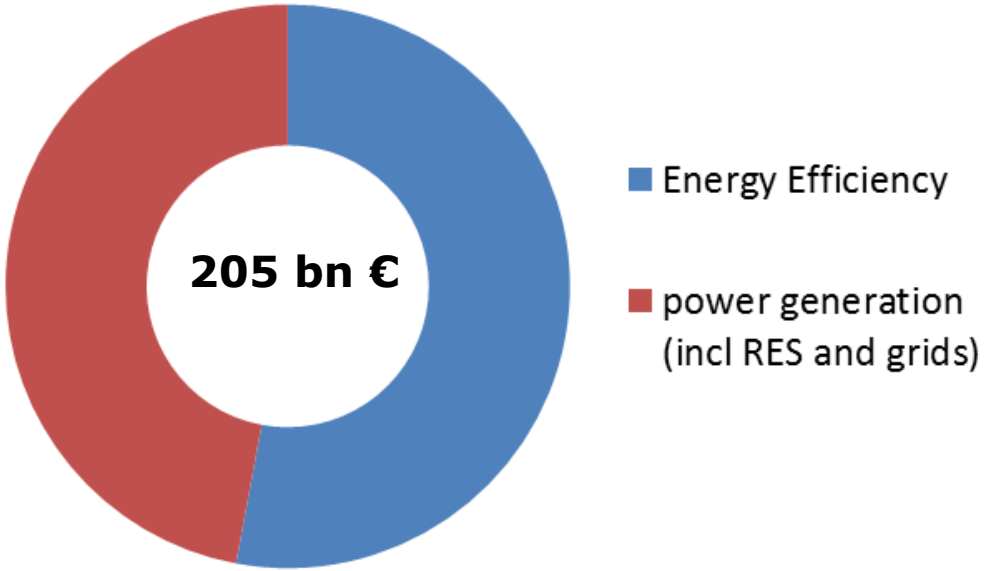
- Generation
- Demand
- Electricity, gas and heat networks
- Storage



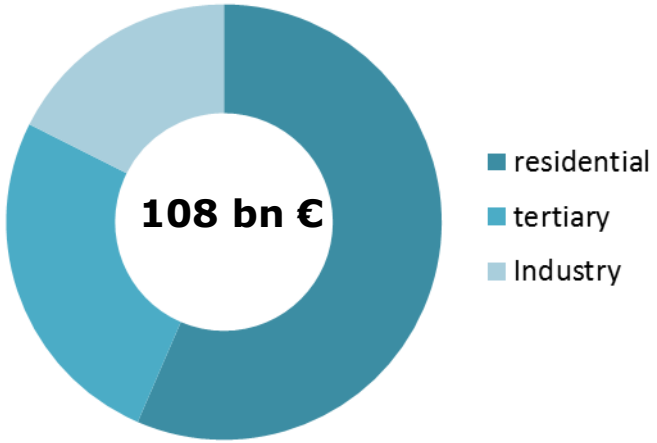
Power generation
Grid
Storage
Demand management
Transport; BEV, etc.
Prosumers
Markets
Fuel switching
Avoid lock-in
Adaptation of the gas grid

Investment needs in the energy system

Annual investments until 2030



Annual EE investments until 2030



Source: SPECIAL TASK FORCE (MEMBER STATES, COMMISSION, EIB) ON INVESTMENT IN THE EU

Natural gas is not antagonistic with the development of renewables

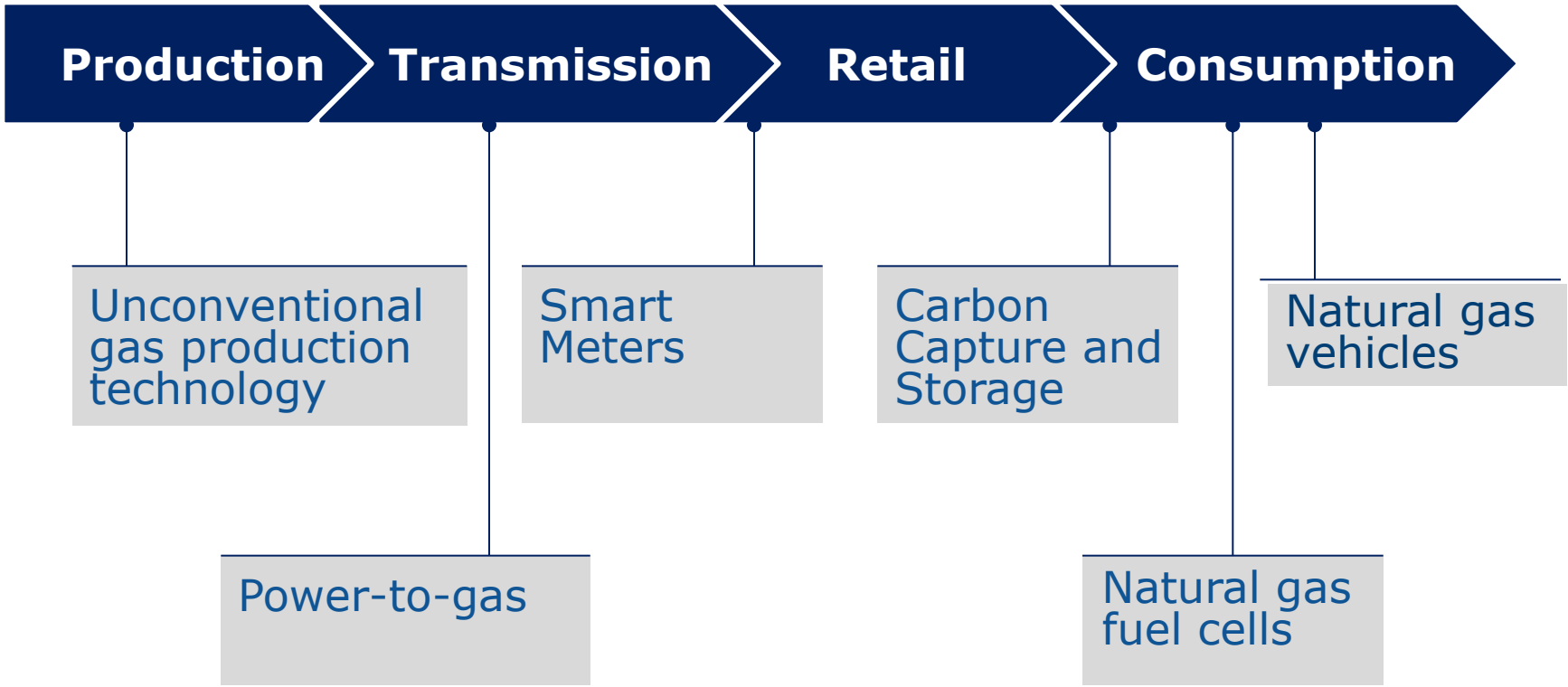
Gas-fired power stations support the integration of significant RES on the grid

- Flexible CCGTs and gas peaking units
- Fast start-up and ramp-up times,
- Large load range
- Privileged technology for load variability

The gas transport infrastructure can be used as an energy buffer for RES producers

- Unused wind/solar energy stored in the gas grid
- Power-to-gas conversion units
- Direct use of gas or reconversion in gas-fired units
- Several pilot plants currently developed in the EU

Key role of innovation to support the position of gas in the decarbonisation of the EU energy system



Low-carbon gas
Regulatory and policy considerations

- **Gas markets**
  - Gas quality standards (including the blending and bio-methane)
  - Certification system (=market) for low-carbon gas (industry, NG grid, mobility, etc.)
  - Compatibility of gas based solutions with the (electricity) market models
  - Potential impact of storage on the generation capacity market and integrated development of that market (including the various P2G/P2H2 applications)
- **Electricity markets**
  - long term investment models for all technologies
  - investigate capacity market schemes
  - creation of an improved model for balancing and for demand side flexibility.
  - discussion on pricing models and reforming the network tariff structures to take into account the increasing variability of generation.
  - reinforce the governance framework, (incl. distributed generation (RE), storage, smart technologies, etc.).

Key considerations related to gas turbines

Gas turbines faces several opportunities and challenges in the transition towards a low-carbon energy system:

1. Integration of vRE
    - Turbines can provide for backup capacity
    - Allowing integration of vRES
2. More products and bigger quantity of products on the electricity market
    - Adapt technical and market performance of turbines to provide high-value services
3. Compete with other conventional generation
    - Better suitability and lower emissions
4. integrate seamlessly low-carbon gas

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Thank You for Your Attention!

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http://ec.europa.eu/energy