

European Framework for Fuel Cells & Hydrogen



Katarzyna Drabicka, European Commission, DG Research & Innovation

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The challenges

53%

of EU energy imported in 2014

€400 billion

spent on energy imports in 2014

6

Member States depend on a single external supplier for their entire gas imports

75%

of EU housing stock is energy inefficient

94%

of EU transport relies on oil products (of which 90% imported)

30%

EU wholesale electricity prices higher than US

4.4%

rise in EU household electricity prices 2012-2013

€1 trillion

investments into the EU energy sector needed by 2020

€120 billion

per year spent on energy subsidies (directly or indirectly)

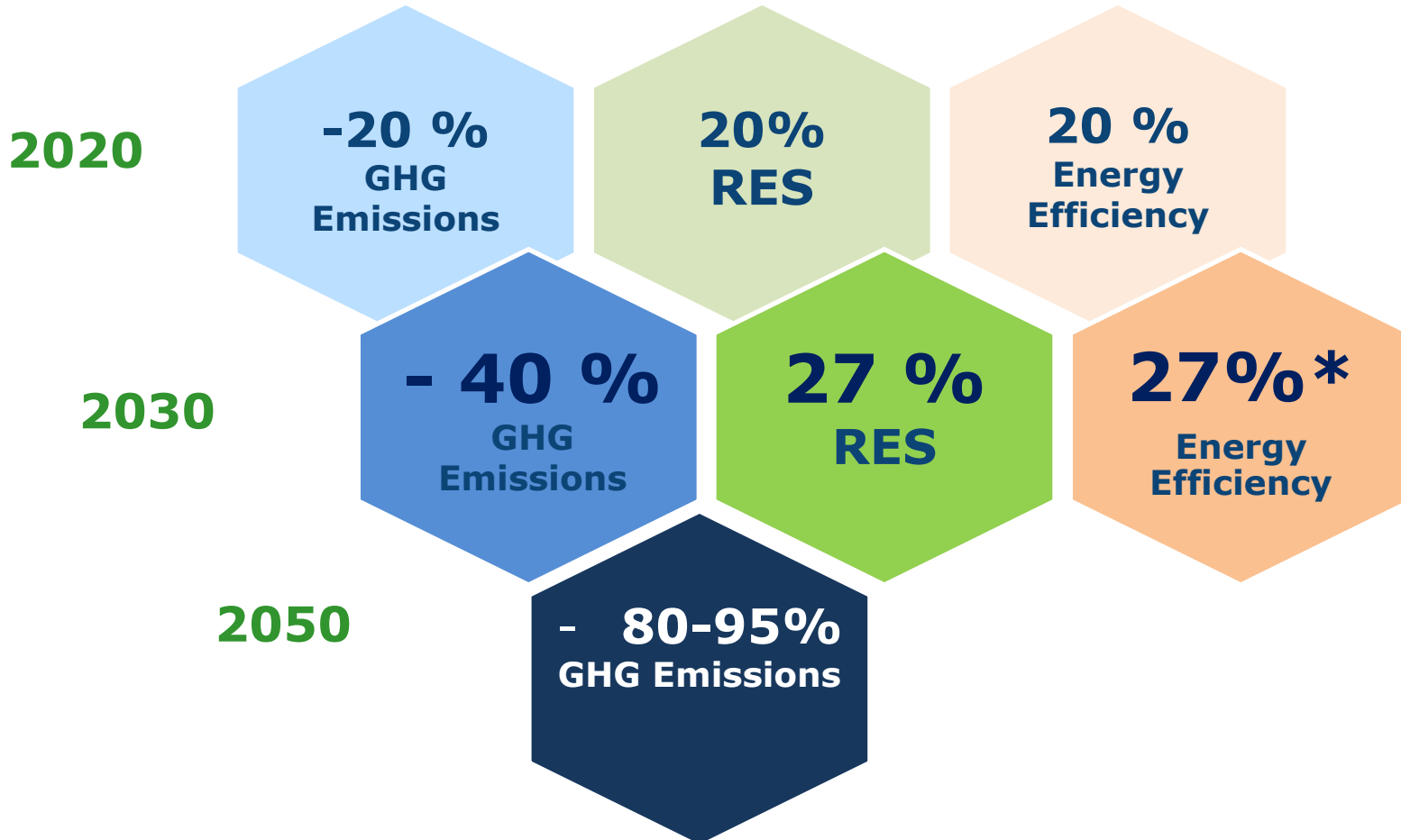
€129 billion

annual turnover of EU renewable energy businesses

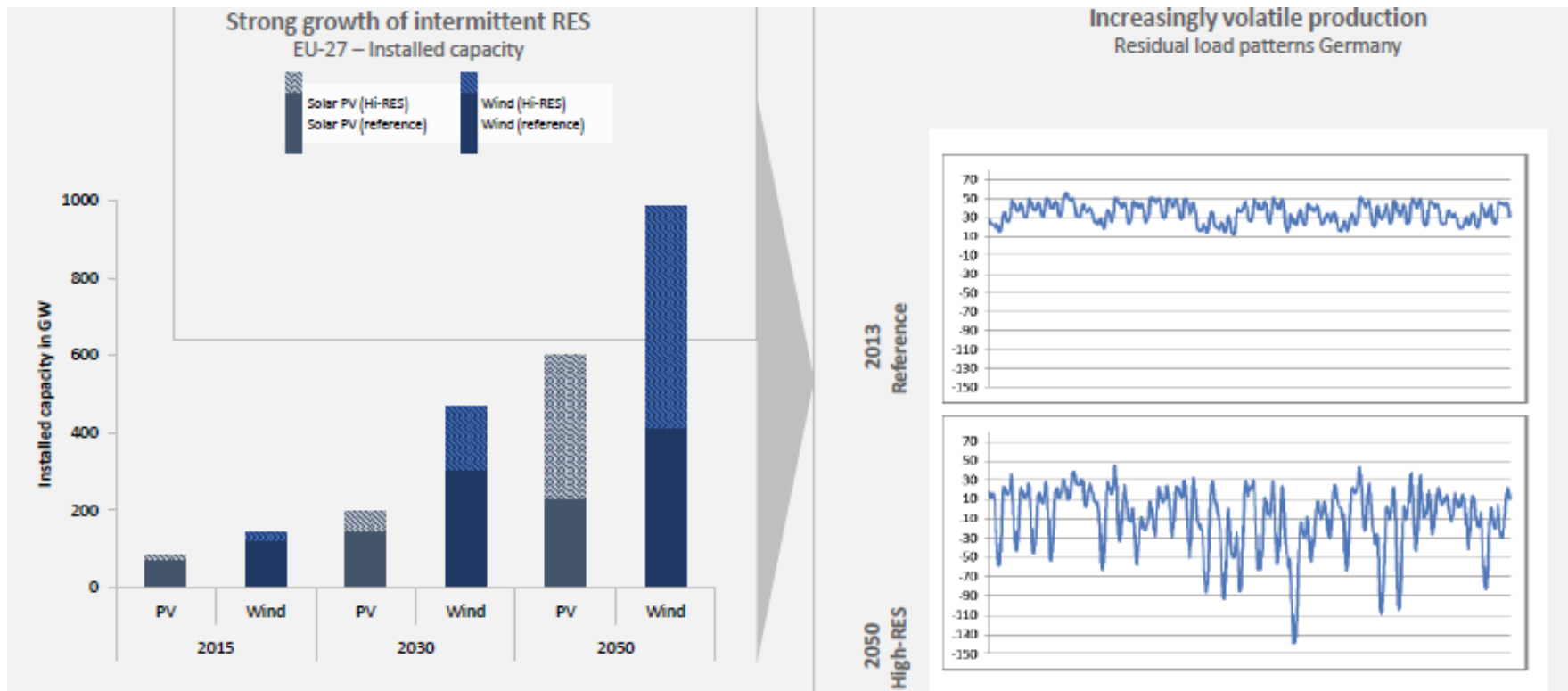
Source: EU Commission Communication on "A framework Strategy for a Resilient Energy Union with Forward-Looking Climate Change Policy", 25 February 2015.



EU Climate & Energy Targets



What does more RES mean in practice?



➔ **More demand for flexibility & system innovation**



European
Commission

How do we get there?

Towards an
Energy Union

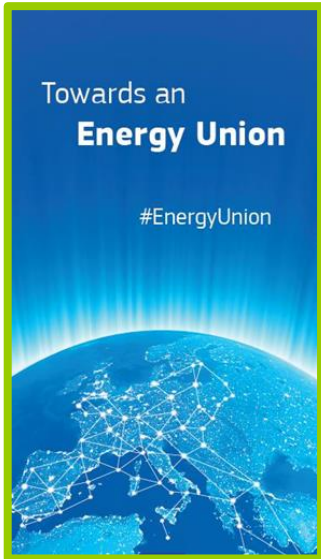
#EnergyUnion





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What about H2 & Fuel Cells?



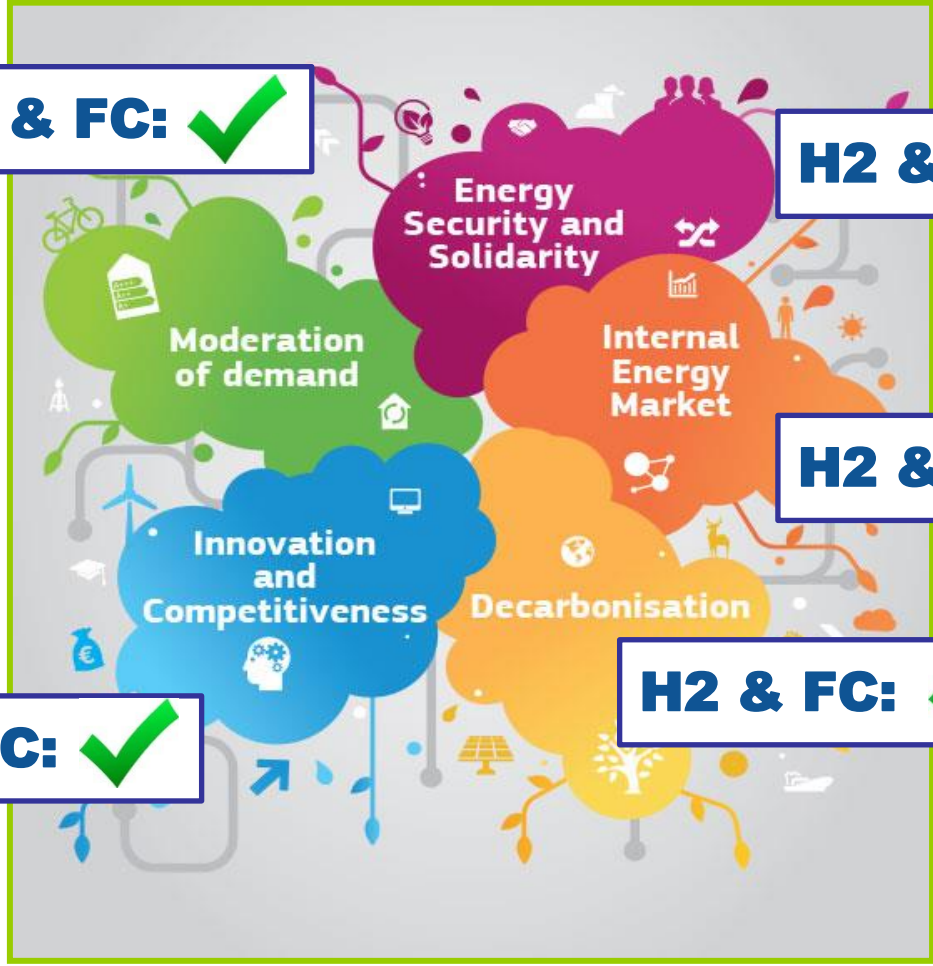
H2 & FC: ✓

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Initiatives relevant for H2 & Fuel Cells:

1. Energy:

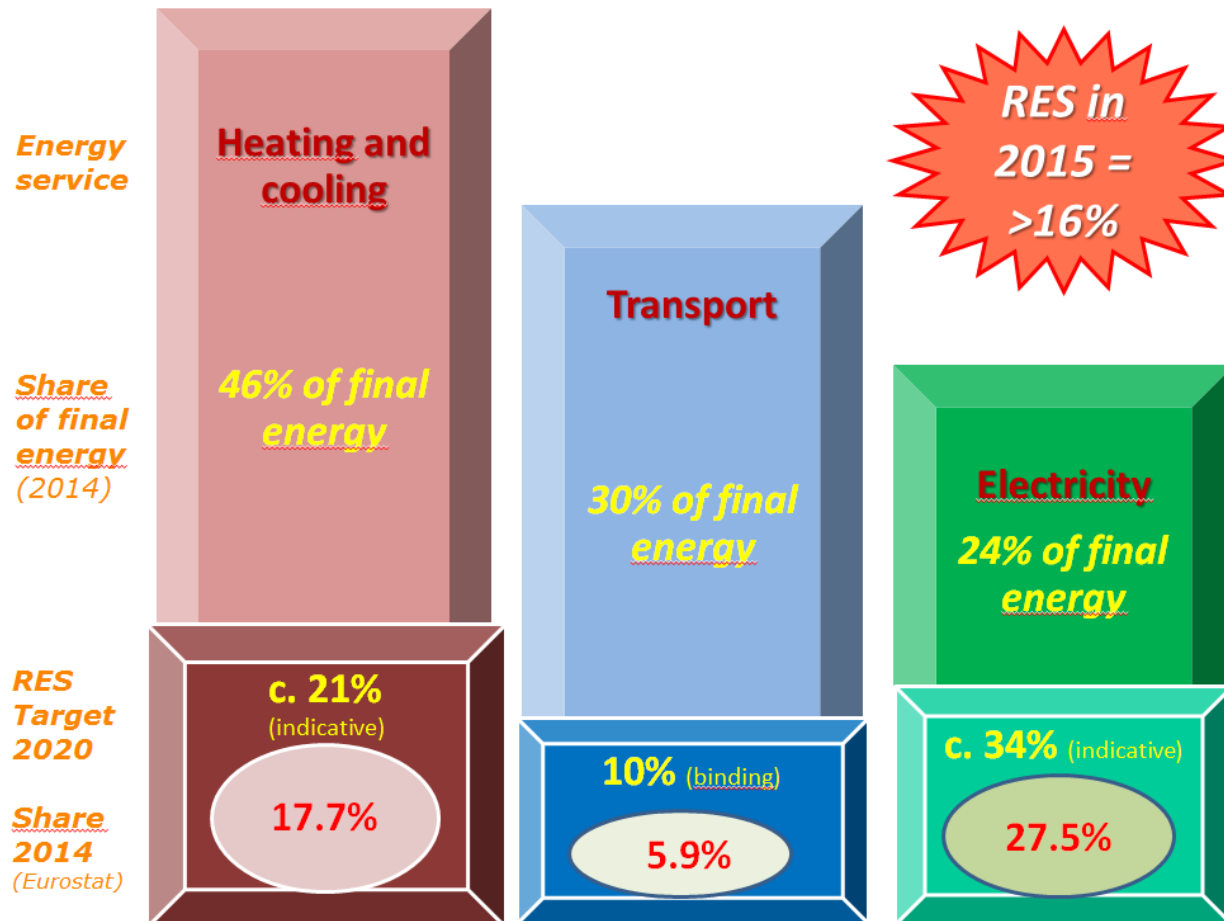
- **New Electricity Market Design** (December 2016)
 - ✓ To make the market fit for renewables & empower consumers
- **New Renewable Energy Directive** (December 2016)
 - ✓ To ensure cost-efficient achievement of the 27% share of RES
- **New Energy Efficiency Package** (December 2016)
 - ✓ To stimulate energy efficiency improvements across sectors
- **Emission Trading Scheme** reform (on-going)
 - ✓ To provide better investment signals for low-carbon technologies

Initiatives relevant for H2 & Fuel Cells:

2. Transport

- **European Strategy for Low-Emission Mobility** (July 2016)
 - ✓ Post-2020 CO₂ standards for cars & vans (2017)
 - ✓ Post-2020 strategy for lorries, buses & coaches (2017)
 - ✓ Revision of Clean Vehicles Directive (2017)
- **Directive on alternative fuels infrastructure** (2014/94/EU)
 - ✓ To enable roll-out of low-carbon mobility Europe wide
- **Effort Sharing Decision** (July 2016)
 - ✓ To define the CO₂ reduction targets in transport, buildings & agriculture

Renewables in the EU – progress per sector



Initiatives relevant for H2 & Fuel Cells:

3. R&I

- **FCH 2 JU** (665 M€ ring-fenced budget for 2014-2020)
- **Strategic Energy Technology (SET) Plan:**
 - ✓ Action 6: Energy efficiency for Industry
 - ✓ Action 8: Renewable Fuels for Transport
 - ✓ Action 9: CCS/CCU
- **Energy Union Research, Innovation & Competitiveness Strategy** (December 2016)
- **Mission Innovation**

Summary:

- Long-term ambitious vision is in place
- The implementation has started (→ Energy Union)
- The regulatory changes will drive low-carbon innovation
- FCH technologies are well placed to play an important role but green H₂ as a concept not well known

→ Industry & EU Member States need to act



European Commission

BUT pieces start to fall in place:

Leeds City Gate

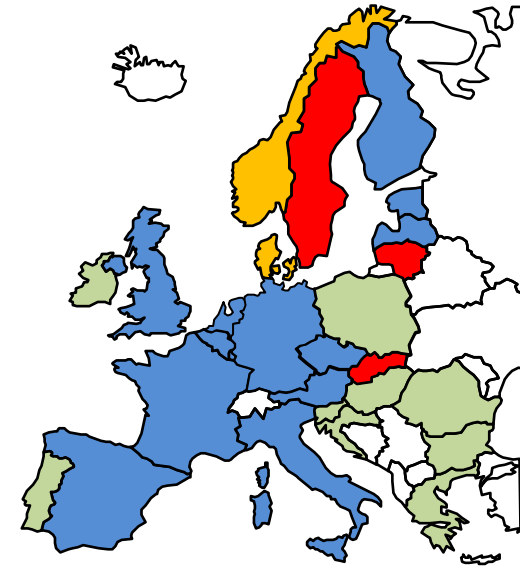
H21

- Technically possible ✓
- Economically viable ✓
- Meet decarbonisation targets ✓
- New job opportunities ✓
- Establish UK as world leader ✓

Northern Gas Networks
 WALES & WEST UTILITIES
 kiwa
 amec foster wheeler
 Partner for progress



20/09/2016: Alstom unveils its hydrogen train



AFI – current status

- H2 included in AFI Plan
- H2 not included in AFI Plan
- Likely to be included
- Unknown
- Not applicable

H21 project studies conversion of gas networks to 100% H2

More information:

- EU Energy Policy:
<https://ec.europa.eu/energy/>
- EU Transport Policy:
<https://ec.europa.eu/transport/>
- EU Research & Innovation Policy:
<http://ec.europa.eu/research/index.cfm>

katarzyna.drabicka@ec.europa.eu