



Contribution of FCH JU to EU Energy and Electricity Market Directives

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In Summary: EU Climate and Energy Framework



"I want to reform and reorganise Europe's energy policy in a new European Energy Union."

DECARBONISATION
OF EU ECONOMY

BOOST EU
COMPETITIVENESS

ENERGY SECURITY

20% REDUCTION GHG
20% RES
20% ENERGY EFFICIENCY

40% REDUCTION GHG
27% RES
27% ENERGY EFFICIENCY

80-95% CO2 REDUCTION

2020

2030

2050



1. The energy Union



1. ENERGY SECURITY

2. INTEGRATED INTERNAL ENERGY MARKET

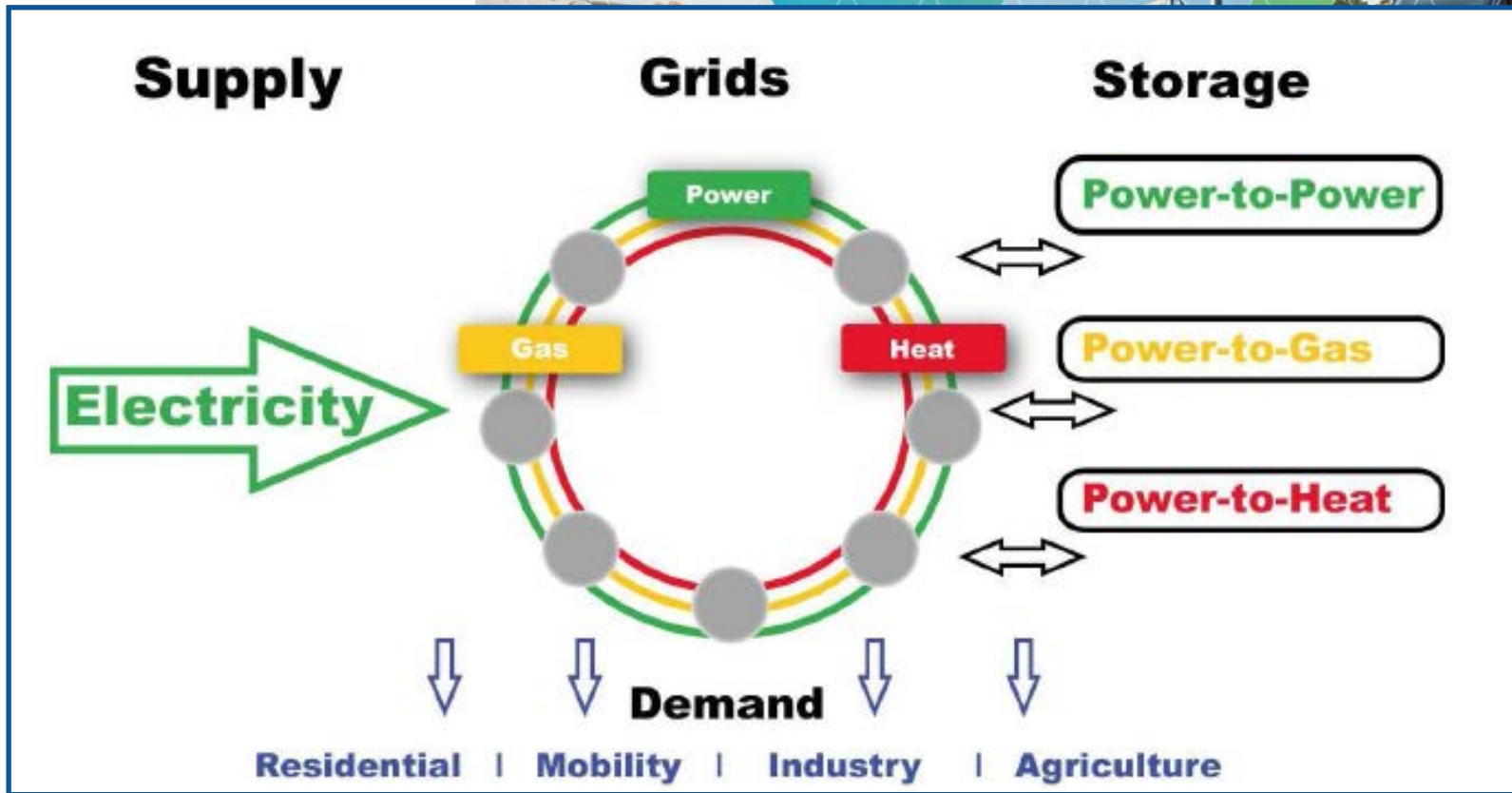
3. ENERGY EFFICIENCY

4. DECARBONISATION – LEADERSHIP IN RENEWABLES

5. RESEARCH & INNOVATION

1. Clean Energy for all Europeans Package

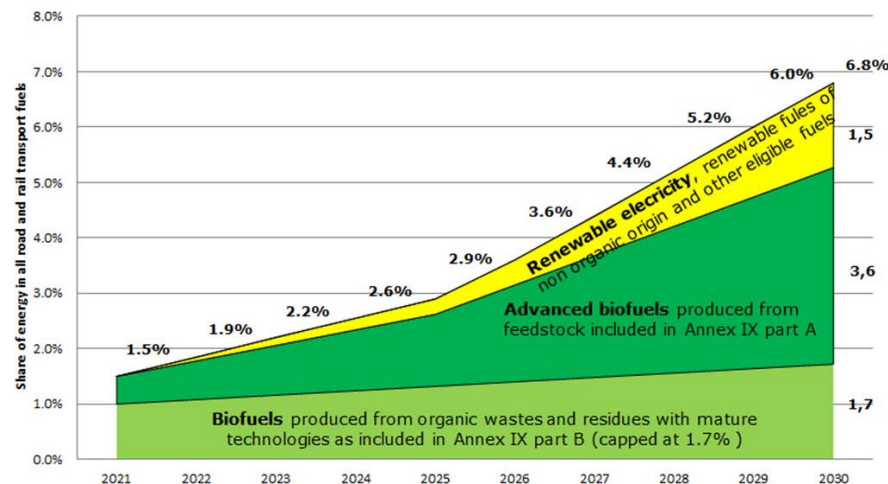
Clean energy for all Europeans



2. New Renewable Energy Directive

European
Commission

- 27% EU binding target for 2030
- Empowering consumers:
 - Right to self-consume & store energy
 - Non-discriminatory grid fees & charges
- More targeted, non-distortive market support
- More coherence in support schemes across EU
- Revised renewable targets in transport
 - Emphasis on advanced biofuels & fuels from non-biological origin



Research and
Innovation

3. Clean Energy for all Europeans Package

European
Commission

2013

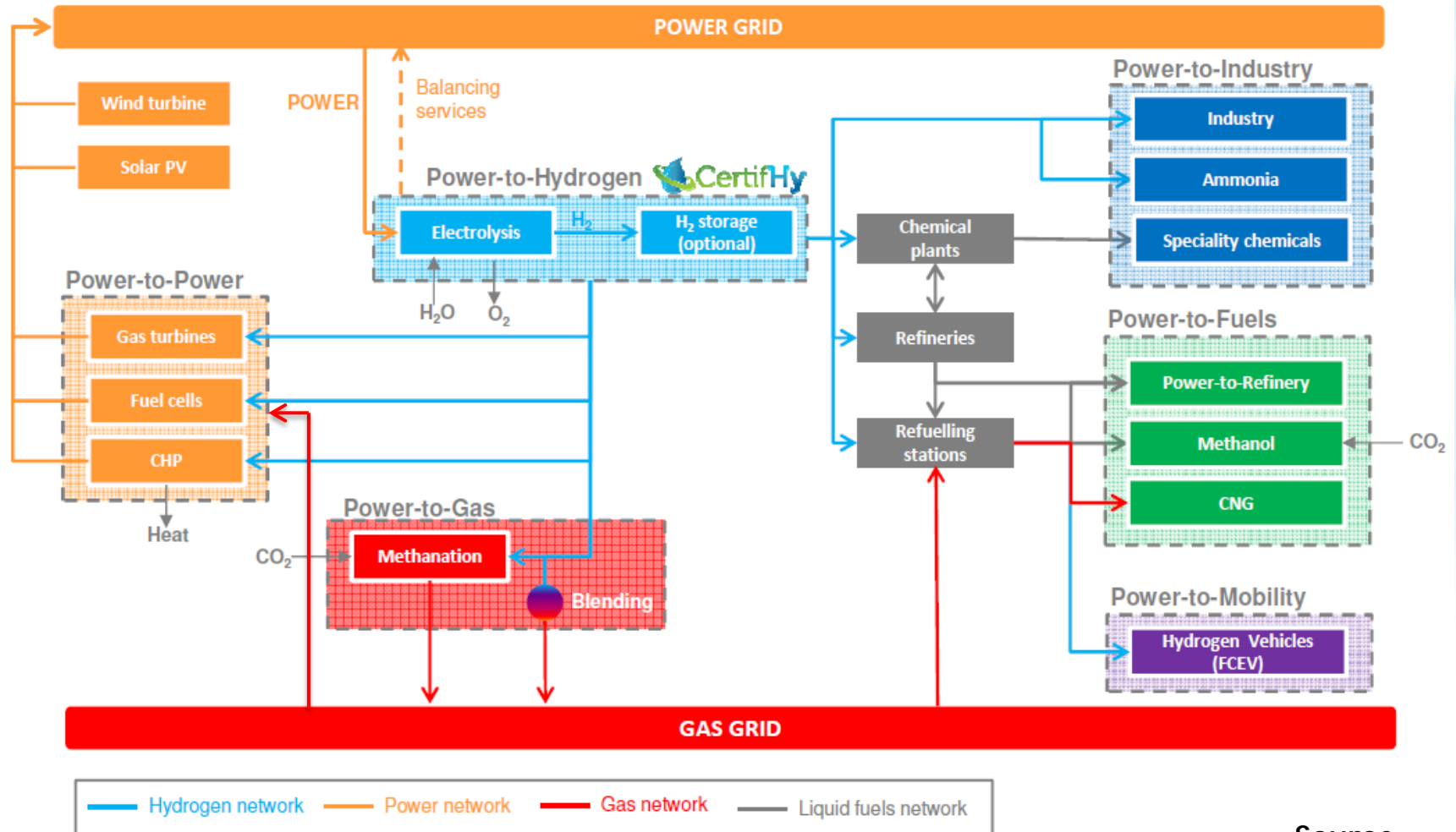


2030



Reduce emissions of air pollutants by 2030 through social, legislation and control measures

P2H & H2X: Connecting Power, Gas and Transport



Source:
Hydrogenics

FCH 2 JU: Strong Public-Private Partnership with a focused objective

Industry-led Public-Private Partnership (PPP)

Fuel Cells & Hydrogen Joint Undertaking (FCH2 JU)



Industry Grouping
About 105 members
~ 50% SME



Research Grouping
About 65 members



To implement an optimal research and innovation programme to bring FCH technologies to the point of market readiness by 2020

The Joint Undertaking is managed by a Governing Board composed of representatives of all three partners and lead by Industry.

Legal basis:
Council Regulation: 559/2014 of 6 May 2014 (H2020)



H₂ STORAGE FOR GRID BALANCING

Demonstrate on a large-scale hydrogen's capacity to harness power from renewables and support its integration into the energy system



HEAT & ELECTRICITY PRODUCTION

Increase fuel cell efficiency and lifetime



GREEN HYDROGEN PRODUCTION

Increase efficiency and reduce costs of hydrogen production, mainly from water electrolysis and renewables



MINIMAL USE OF CRITICAL RAW MATERIALS

Reduce platinum loading

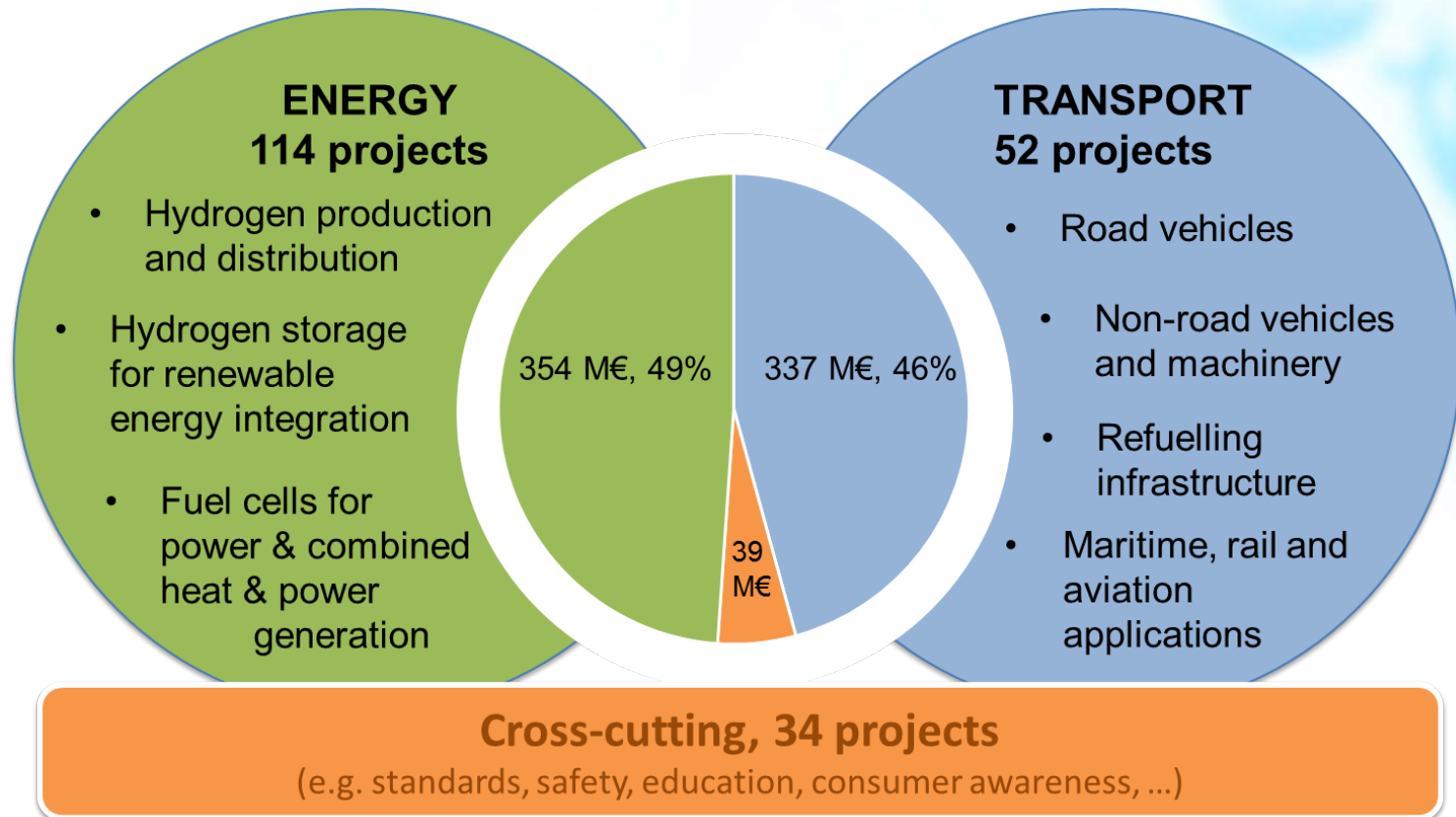


CLEAN TRANSPORT

Reduce fuel cell system costs for transport applications

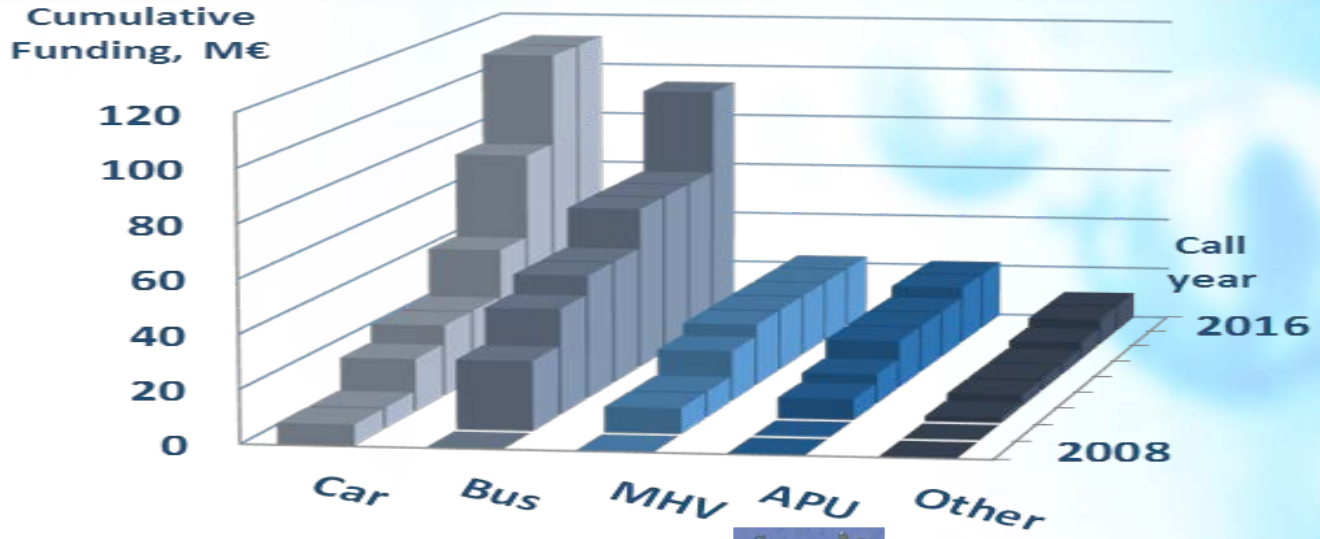
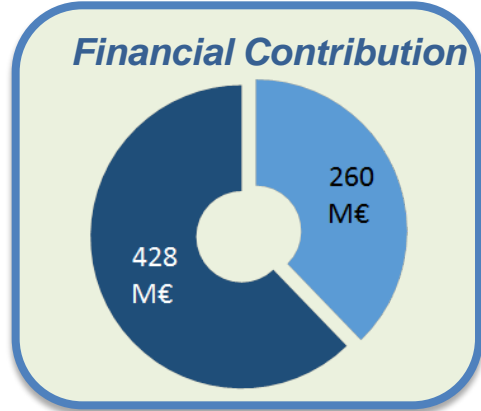
203 projects supported for 730 M€

Similar leverage of private funding: 782 M€



Transport demonstration portfolio

27 projects
260 M€




From national plans to a EU strategy

From demo to a nascent 1.5 bn € market to 2020

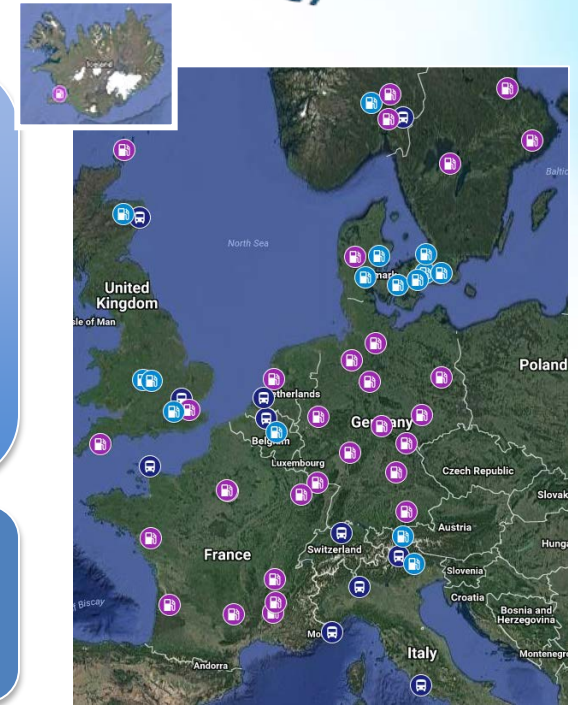


- ✓ >45 HRS
- ✓ >1,500 cars
- ✓ 206 buses in 19 cities

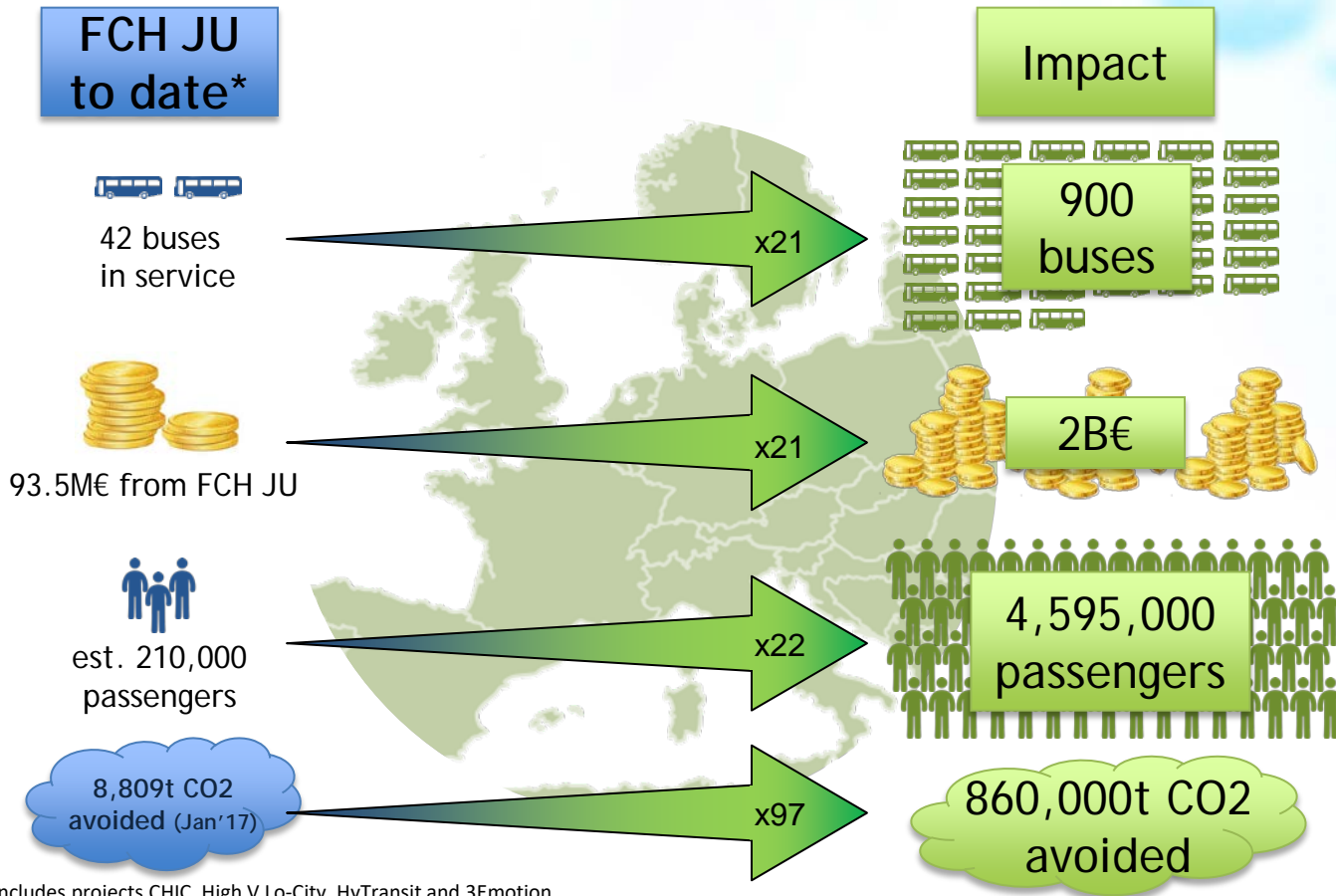


First steps to EU business case

- ✓ >250 MHV
- ✓ 10 sites



Faster innovation from the FCH JU: from bus demos to a 2B€ market appetite



TRANSPORT: Emerging markets...

Other applications are crucial to the decarbonisation challenge

MATERIAL
HANDLING
VEHICLES



The FCH2 JU
supports
transport
emerging
markets for a
cleaner future

MARITIME
APPLICATIONS



...

DRONES



AIRPLANES



TRAINS



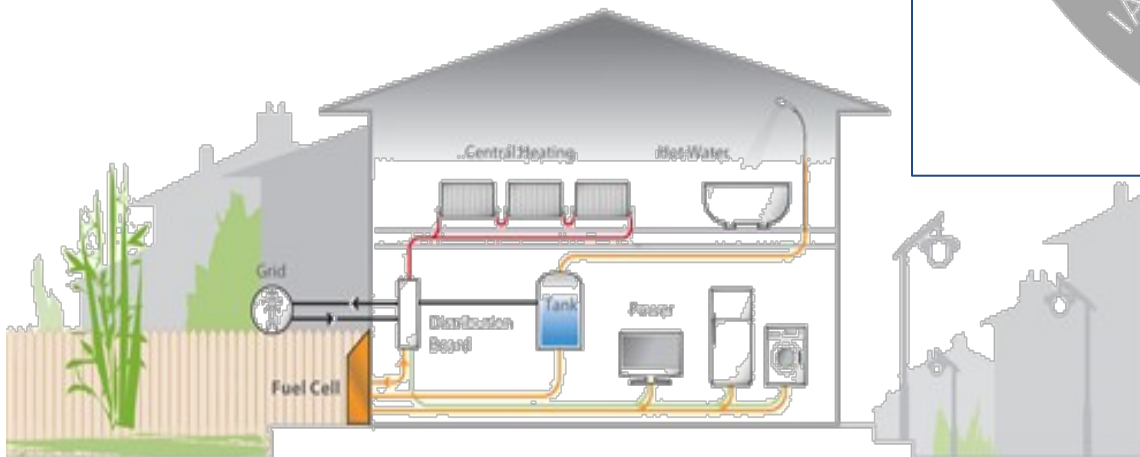
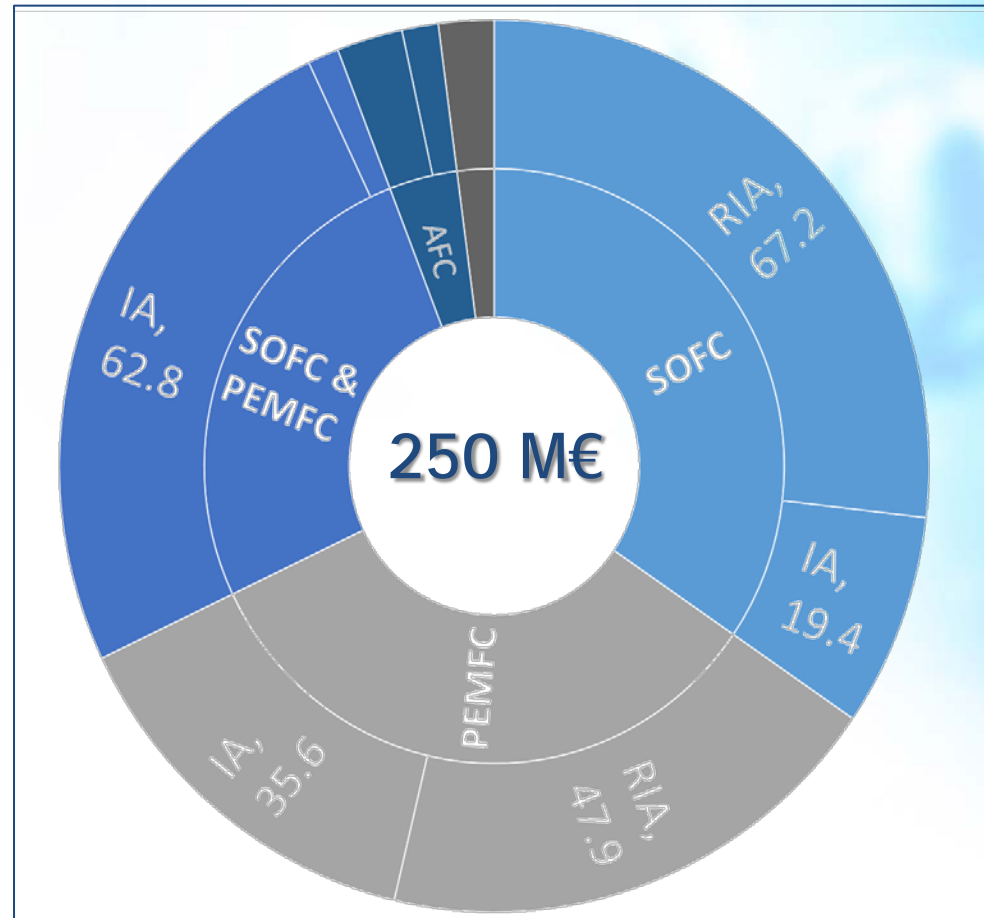
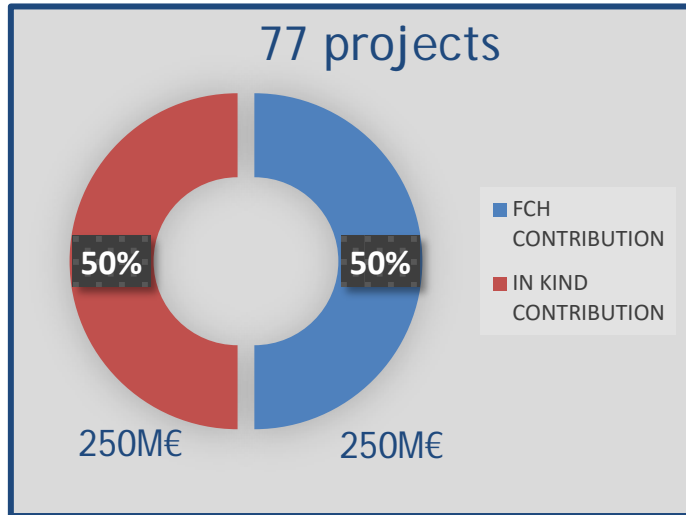
TRUCKS



BICYCLES

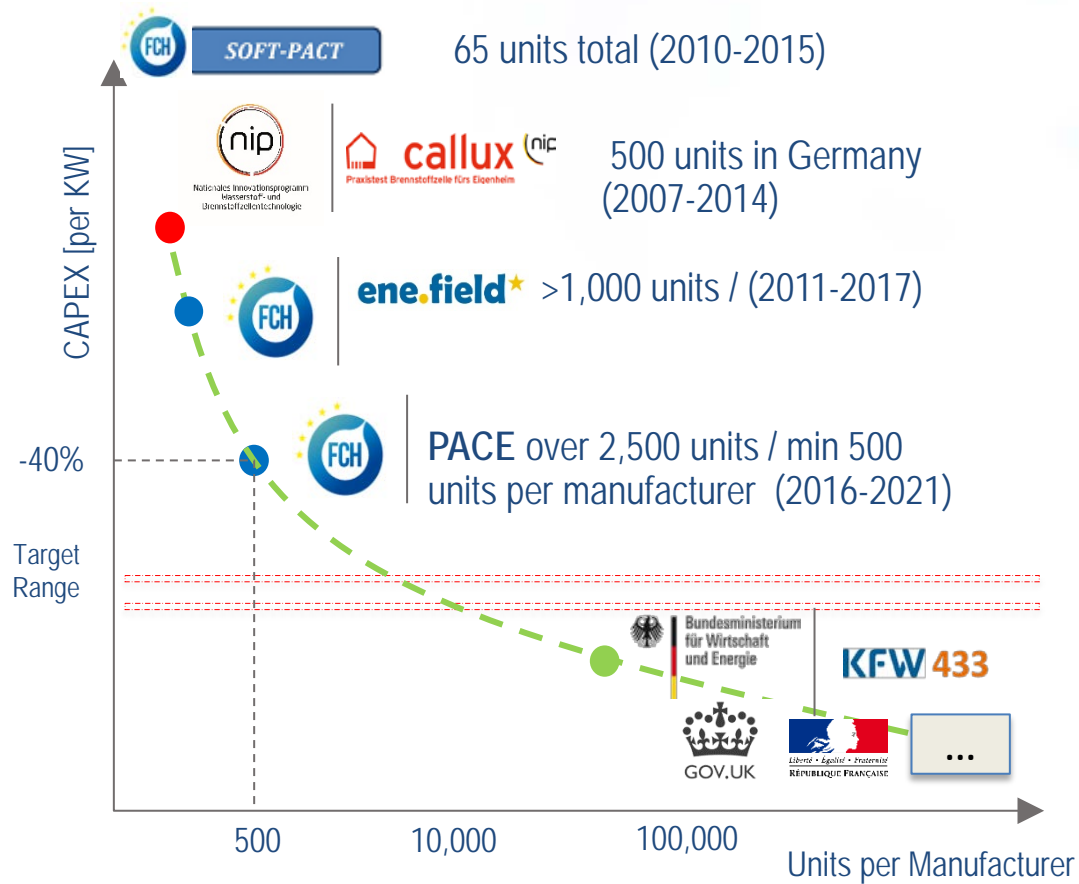


Cumulative FCH JU financial support for Stationary FCs



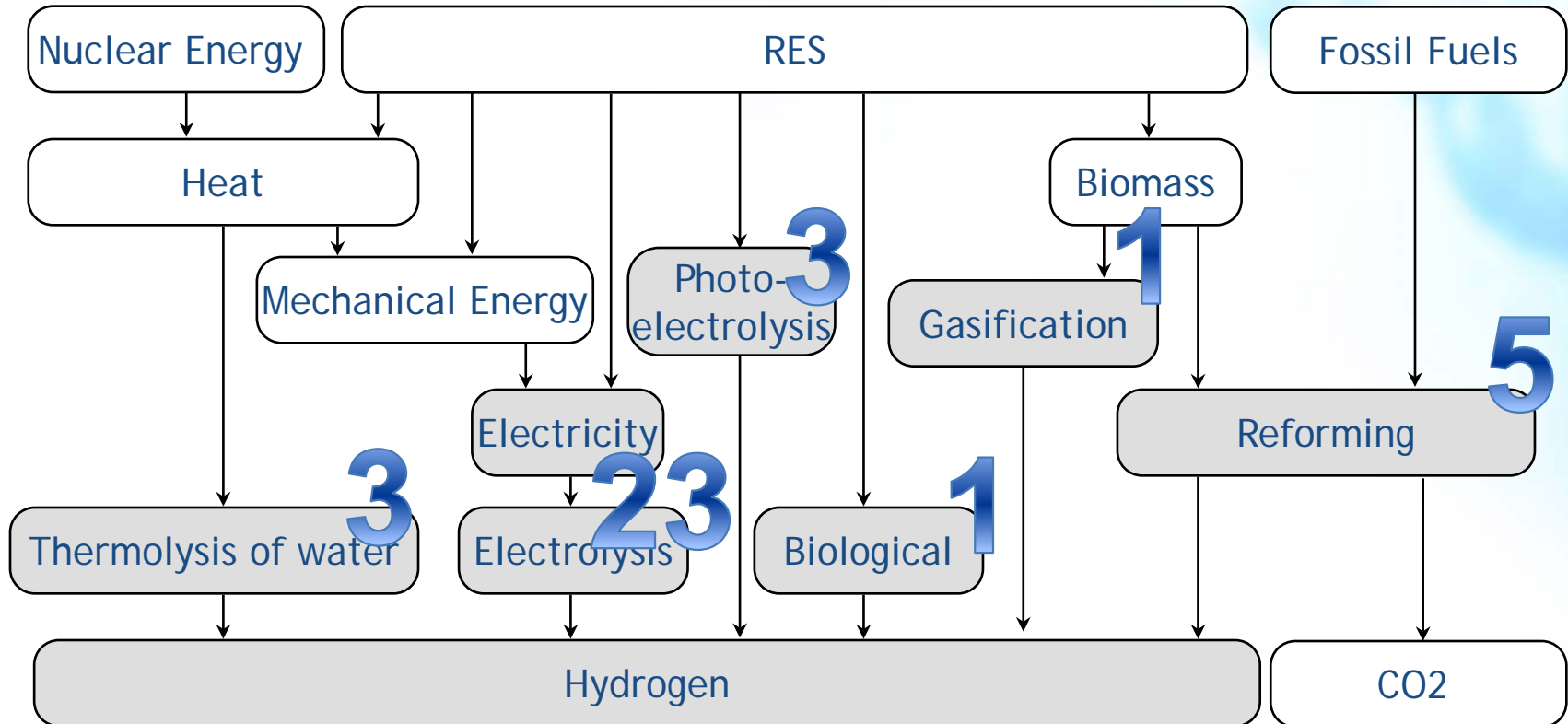
Stationary FCs Demonstration portfolio

Industry scaling up: from hundreds to thousands



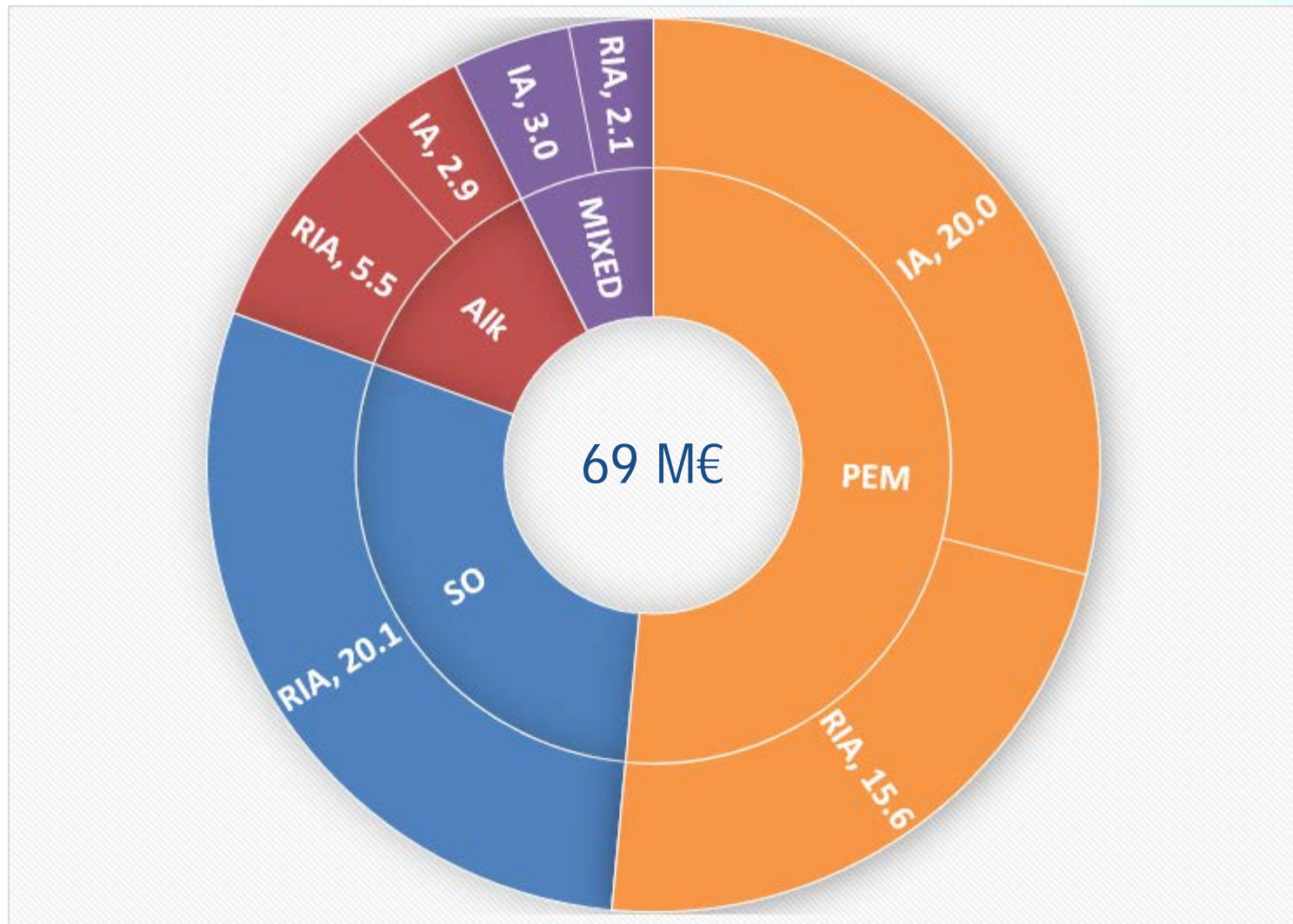
1) Cumulative production volume per company

FCH 1&2 Hydrogen Production Technical Coverage



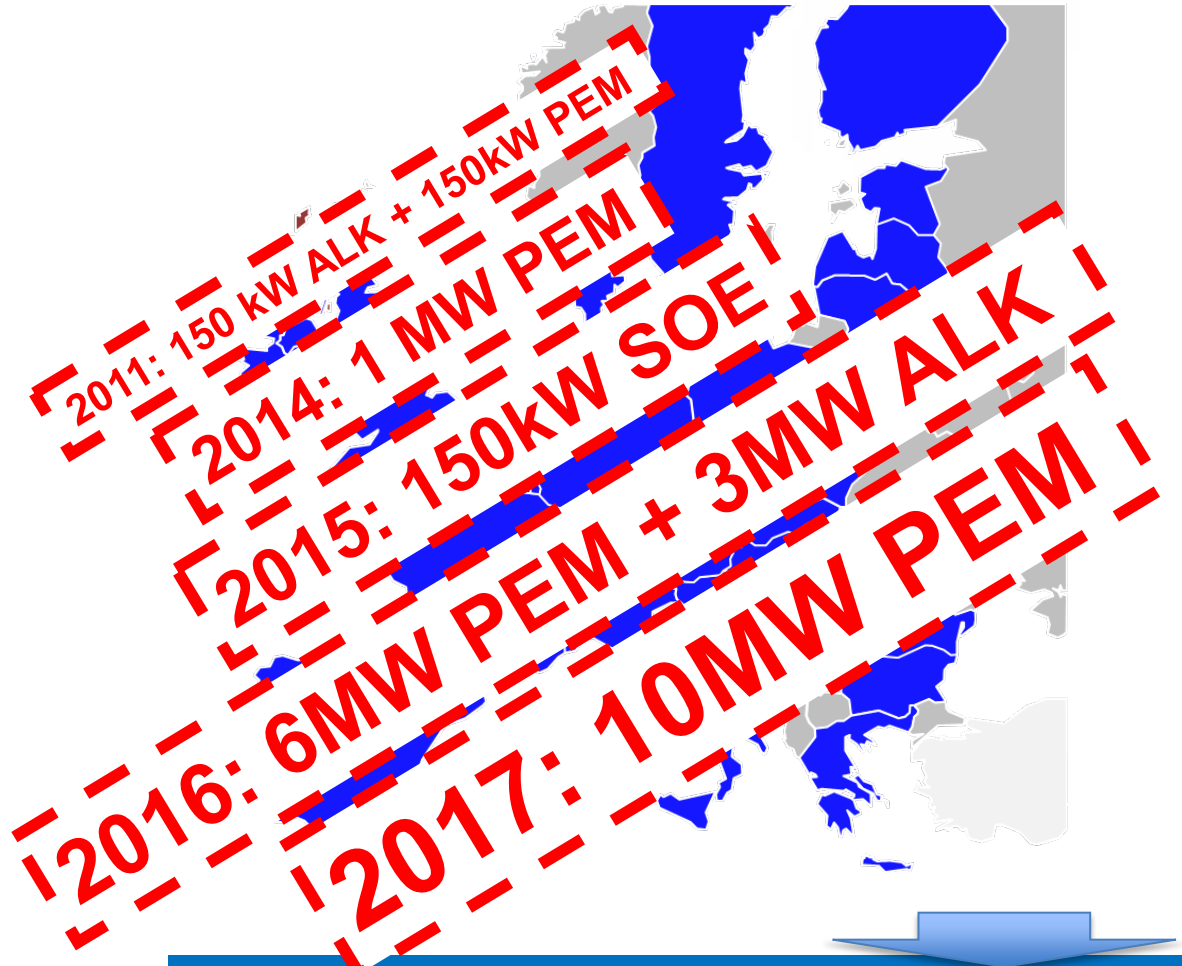
- 36 projects
- 93 M€ FCH JU support

FCH 1&2 JU Support to electrolyser projects (M€)



FCH JU support to electrolyser demos

Industry acknowledges the potential of Hydrogen to the greening of industrial products through increased penetration of renewables



Transport, Steel industry, Refineries, Chemical industry

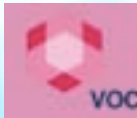
FCH supporting energy and environment EU Targets

- **Transport**
 - Catalyst in technology development and demonstration
 - 860,000 tn CO₂ saved
- **Stationary Fuel Cells**
 - efficiencies: 60% η_e / 80-90 η_{total}
 - Lifetime: >40,000 hours
 - No NO_x, SO_x, PMs, CO₂ (on green H₂)
- **P2H for greening of Industry, Transport**
 - Electrolysers @ 10s MW capacities
 - Reduced cost, improved dynamic performance facilitating the penetration of RES

TARGET

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FCH JU STAKEHOLDER FORUM 2017

Join the FCH for the 10th year edition of the
STAKEHOLDER FORUM



Stakeholder Forum:
22 November 2017
Steinberger Hotel, Brussels

Program Review Days:
23 and 24 November 2017
Steinberger Hotel, Brussels

FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING
STAKEHOLDER FORUM 2017
CELEBRATING

