2015 Programme Review Days

Introduction

Jean-Luc Delplancke

European Climate and Energy Policy Framework

From
The 20-20-20 goals by 2020:

- 20% increase in renewables
- 20% increase in efficiency
- 20% decrease in GHG emissions

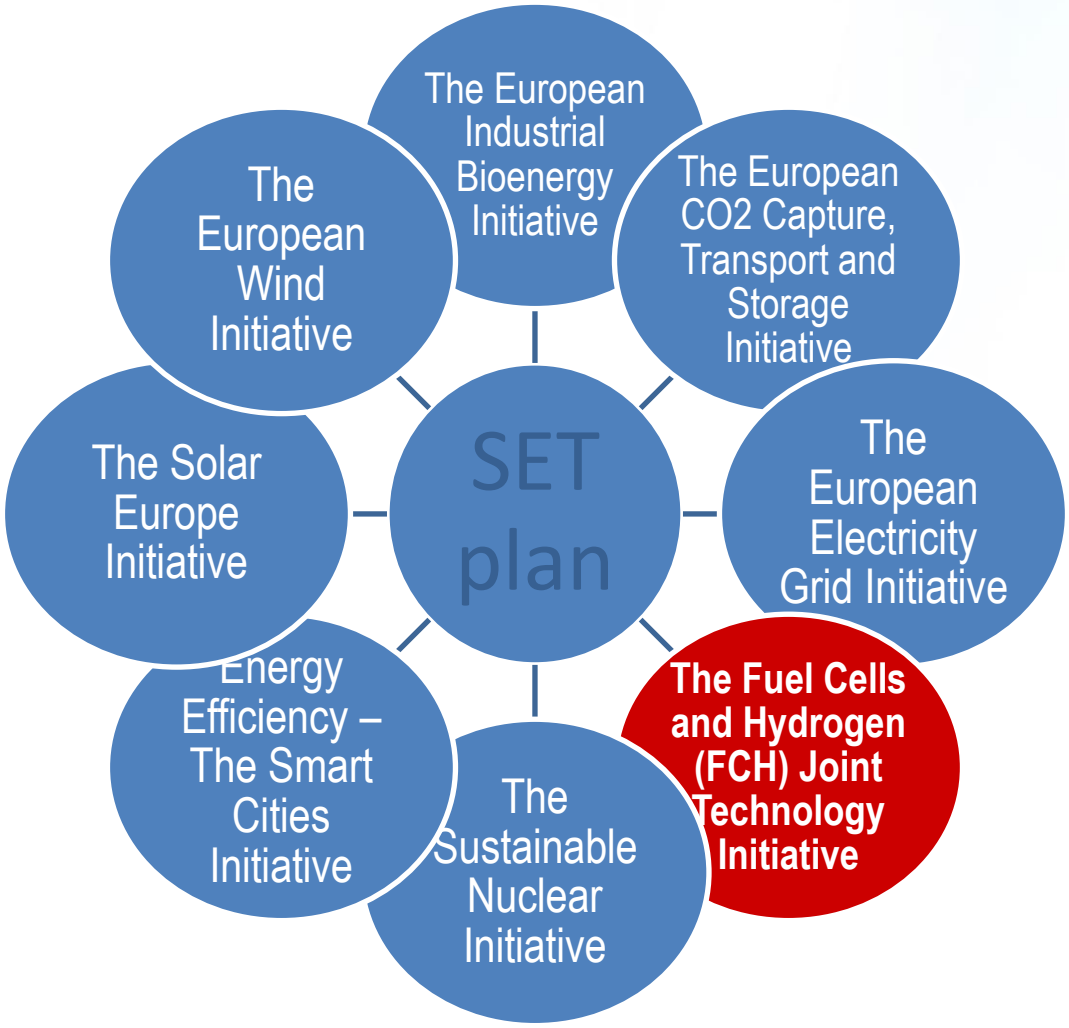
To
The EU targets by 2030*

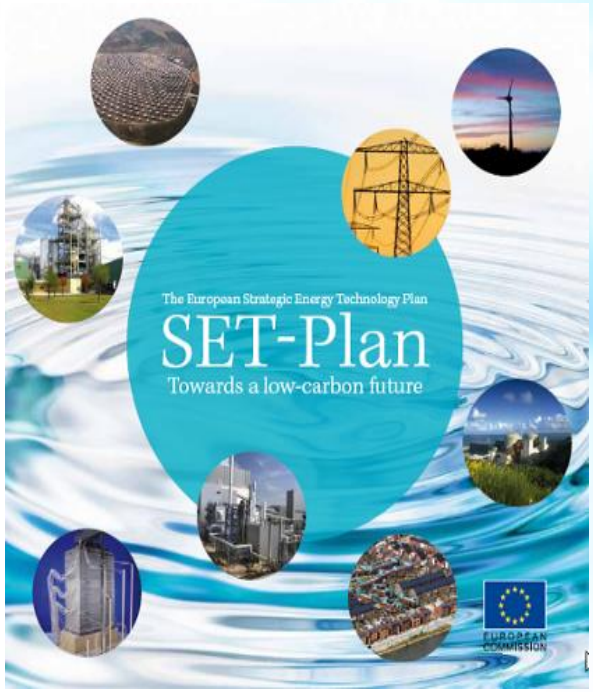
- 27% renewable energy
- 27% improvement of energy efficiency
- 40% reduction in GHG emissions

*European Council conclusions of 23/10/2014

- The EU imports 53% of all energy it consumes
- Its import dependency is particularly high for crude oil (more than 90%) and natural gas (66%)
- The total import bill is more than **1,000,000,000 € PER DAY! (1 € billion €/day)**

The European Strategic Energy Technology-Plan (SET-Plan)





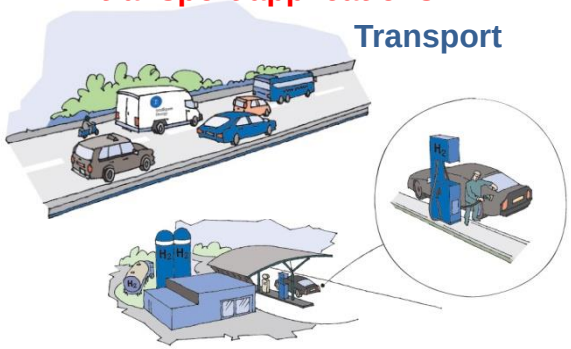
Joint Technology Initiative →
Joint Undertaking
Council Regulations:
521/2008 of 30 May 2008 **(FP7)**
1183/2011 of 14 November 2011
559/2014 of 6 May 2014 **(H2020)**

FCH 2 JU objectives

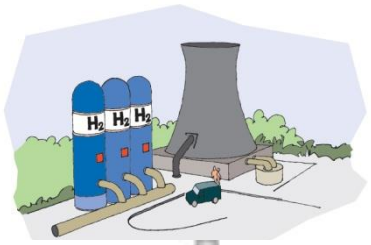
Reduction of production costs of long lifetime FC systems to be used in transport applications

Increase of the electrical efficiency and durability of low cost FCs used for power production

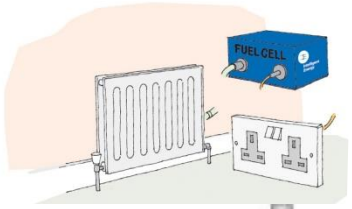
Transport



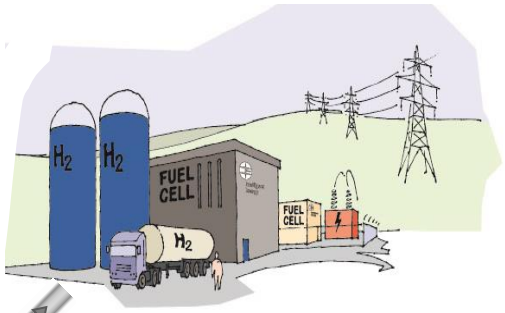
Industrial applications



Residential CHP



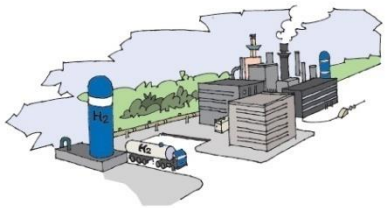
Feed to electricity grid



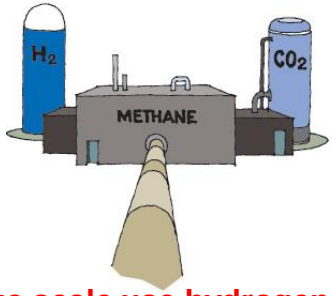
Reduce the use of critical raw materials

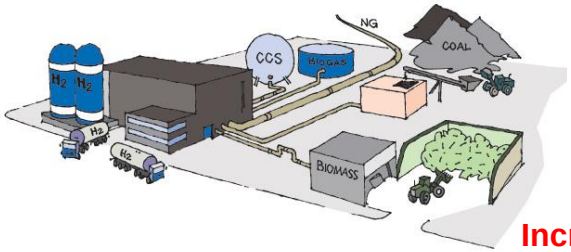
Existing natural gas, electricity and transport infrastructures

By-product from Chemical Industry



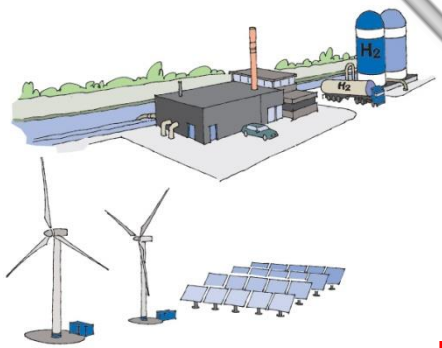
Methanisation feed to natural gas grid





Natural gas, biogas, coal, biomass

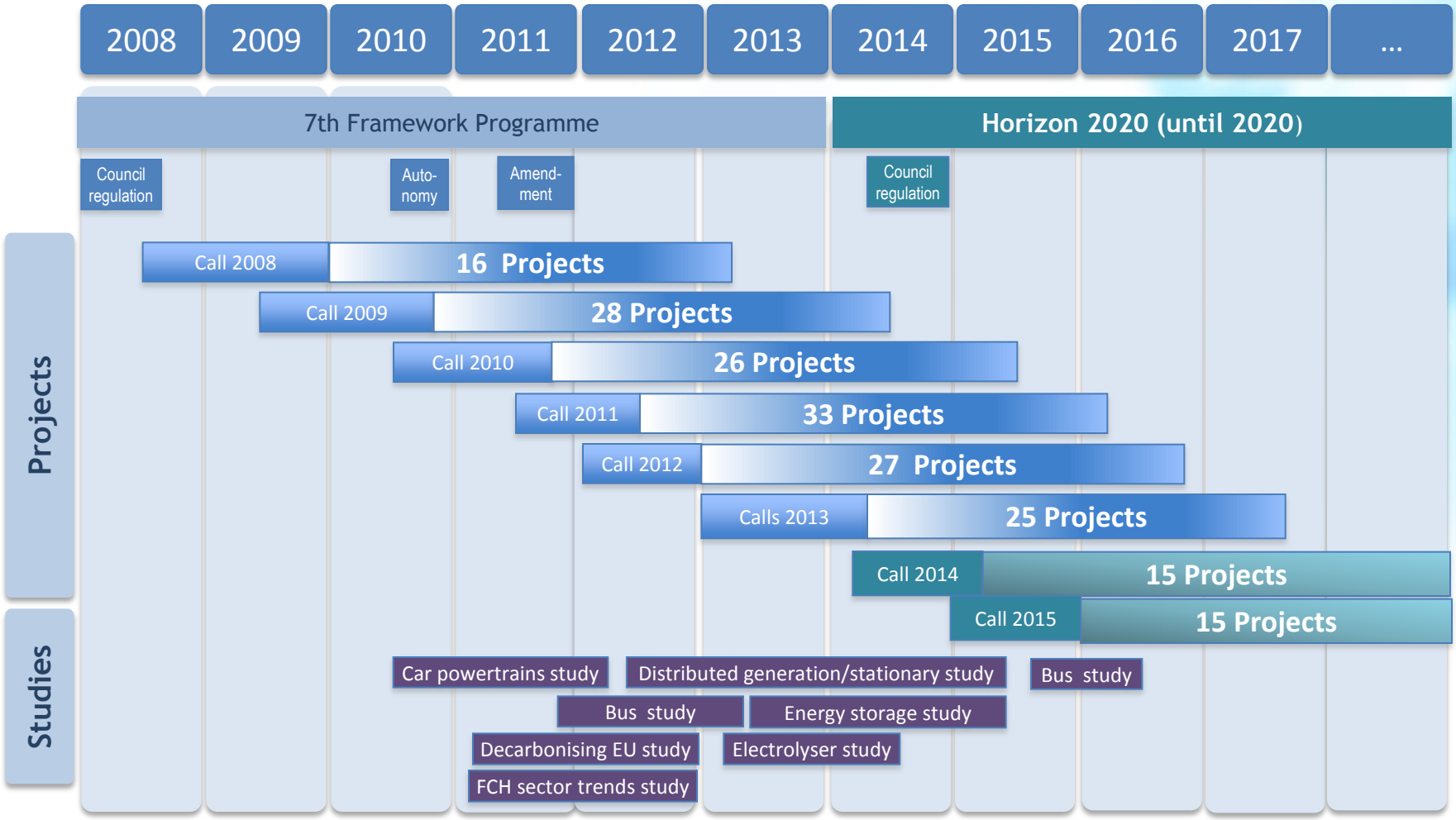
Increase the energy efficiency of low cost production of hydrogen from water electrolysis and renewable sources



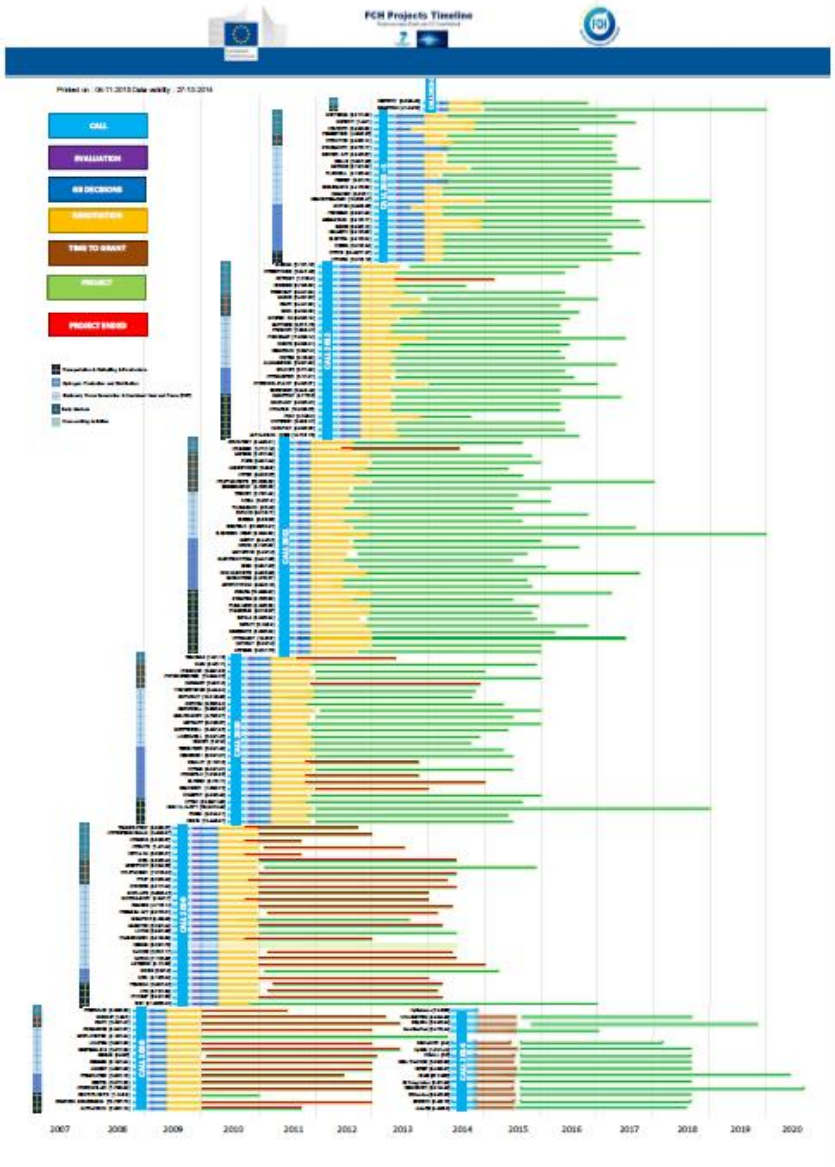
Renewable generation, storage and 'buffering'

Large scale use hydrogen to support integration of renewable energy sources into the energy systems

Supported R&D activities since 2008

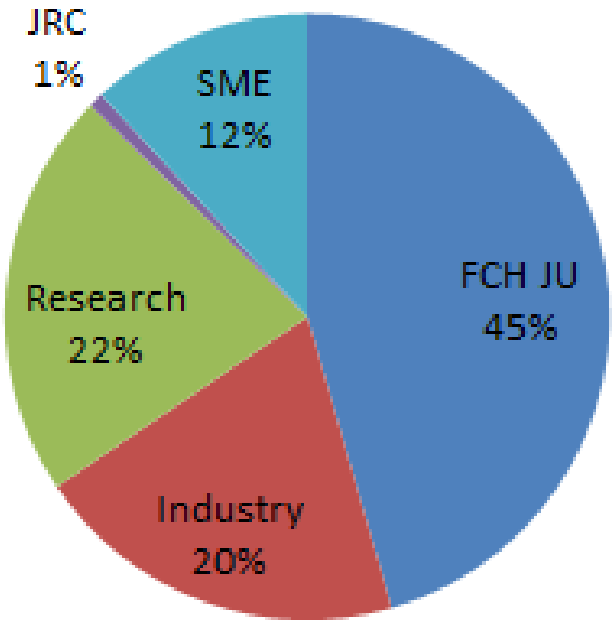


FCH 2 JU Projects



- FP7 projects:
  - 155 projects
  - 46 projects with final payment (30%) (at the date of 01/11/2015)
- H2020 projects:
  - Call 2014: 15 projects (14 signed)
  - Call 2015: 15 projects under preparation

Total costs of the finished FP7 projects



Total costs of the 46 FP7 projects with final payment = 140,054,047€

For each € invested by the EU, the Industry (0.7) and Research (0.5) invest 1.2 €

Energy Union

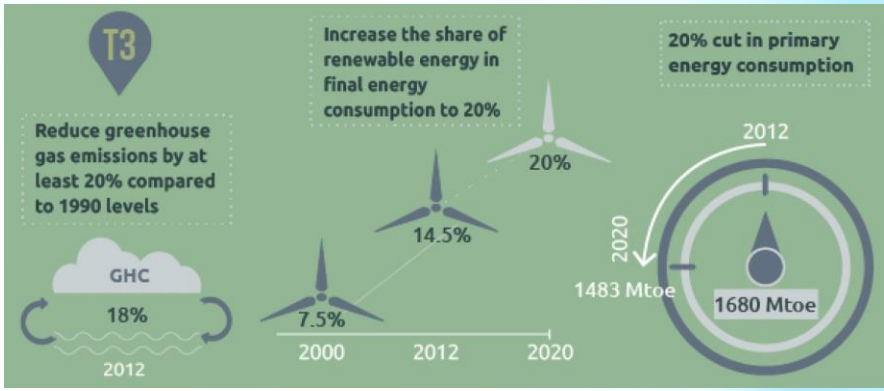
- The EU's Energy Union Strategy intends to increase the share of renewable energy in the energy mix.

- These Renewable Energy Sources (RES) produce electricity that is difficult to store

- Electricity production from RES is highly variable (Variable Renewable Energy sources (VRE))

- All sectors of human activities will be affected by the need to reduce the Green House Gas (GHG) Emissions

- Hydrogen as a clean energy vector can be used in all these sectors but to contribute to the reduction of GHG emissions Hydrogen needs to be **GREEN HYDROGEN**



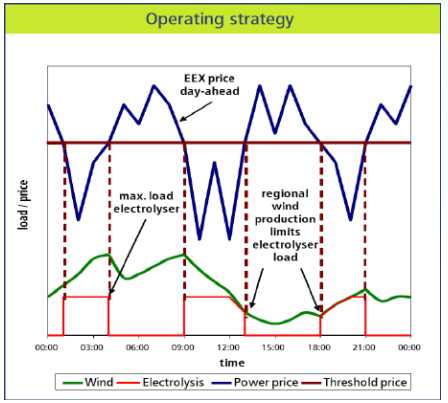
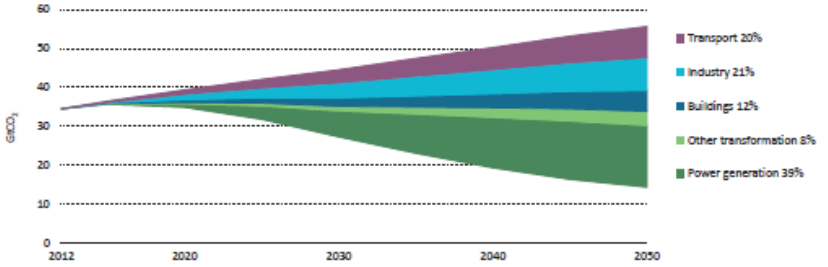
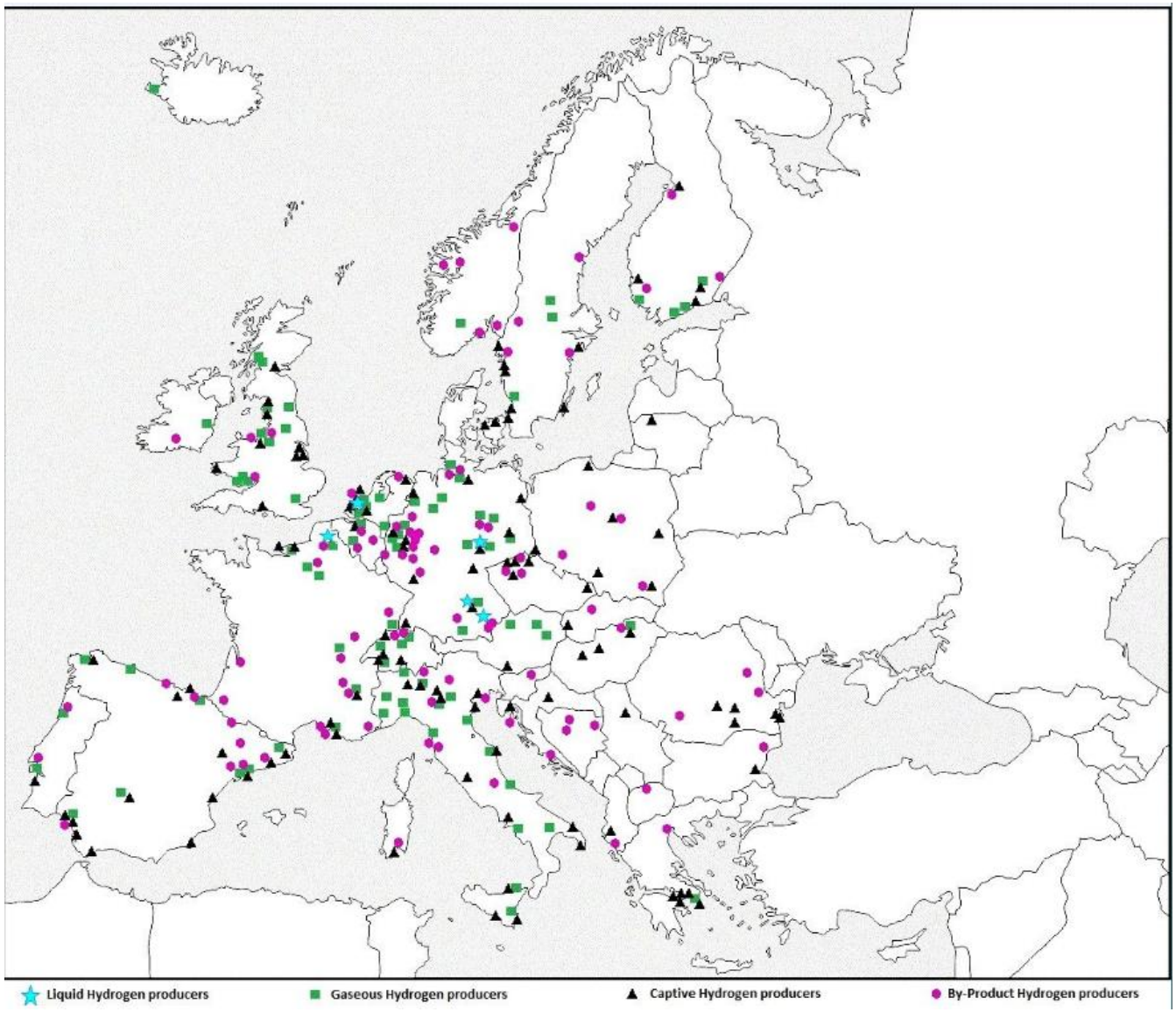


Figure 12: Energy-related carbon emission reductions by sector in the *ETP* 2DS



Note: $GtCO_2$ = gigatonnes of carbon dioxide.

Hydrogen Production Sites in Europe



Map Reference: HyER

(Hydrogen, fuel cells and Electro-mobility in European Regions)

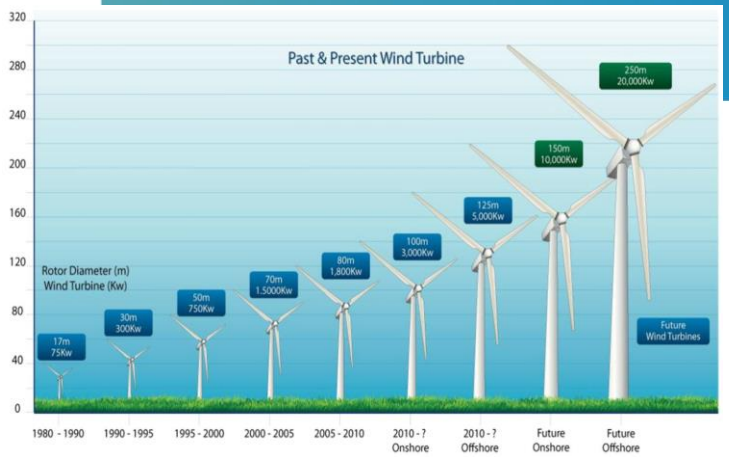
World Hydrogen Production:

48% SMR of Natural Gas
30% Petroleum Refining
18% Coal Gasification
4% Electrolytic Hydrogen

Hydrogen production generates annually 500 Mtons of CO_2

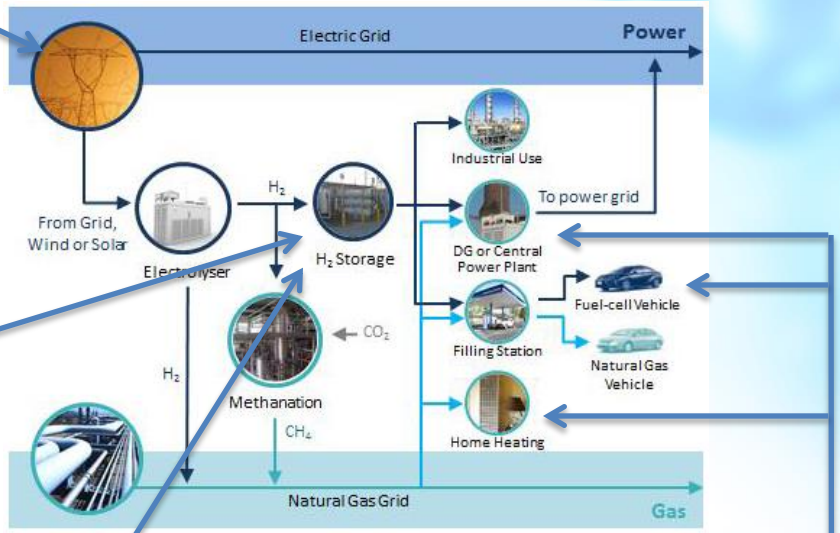
(Reference IEA 2015)

Green Hydrogen Production

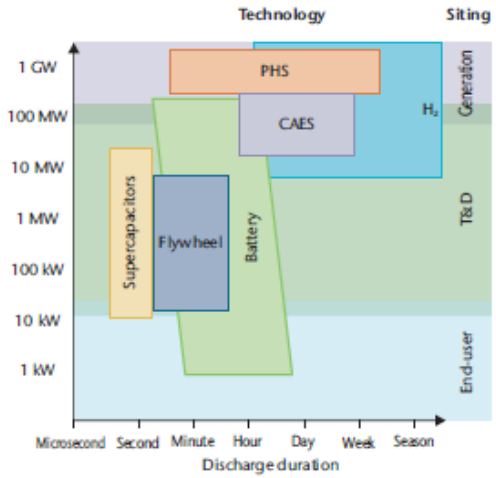


SOURCE: IPCC (2011), "SPECIAL REPORT ON RENEWABLE ENERGY"

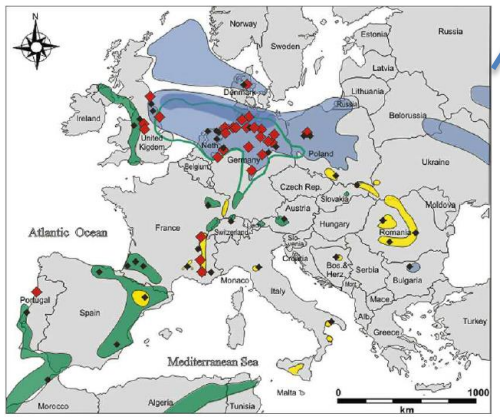
Bigger renewable energy sources will imply development of bigger water electrolysis devices. According to EC High RES scenario, in Germany by 2050 there could be a 170 GW market for electrolysers for P2G applications



Bigger amounts of produced hydrogen will imply deployment of bigger hydrogen storage facilities



CAES = Compressed Air Energy Storage
PHS = Pumped Hydro energy Storage



Bigger amounts of green hydrogen will imply the deployment of Fuel Cell devices for buildings, transport and energy production

Fuel Cells and Hydrogen Joint Undertaking Achievements

Hydrogen Packard car (1927) - Woikoski

Hybrid FC Buses

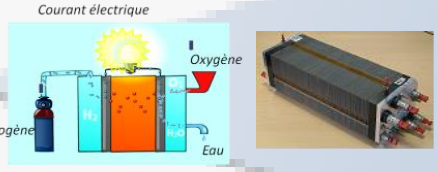
FCEV

FC in commercial planes

Marine & aerospace

Forklifts

FCEV RE



1995 2000 2005 2010 2015 2020

Backup power

Large scale stationary applications

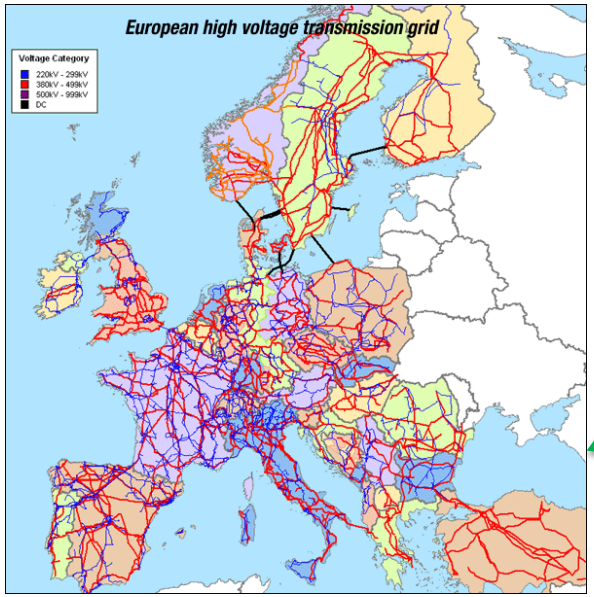
Energy storage

CHP Systems

Portable applications

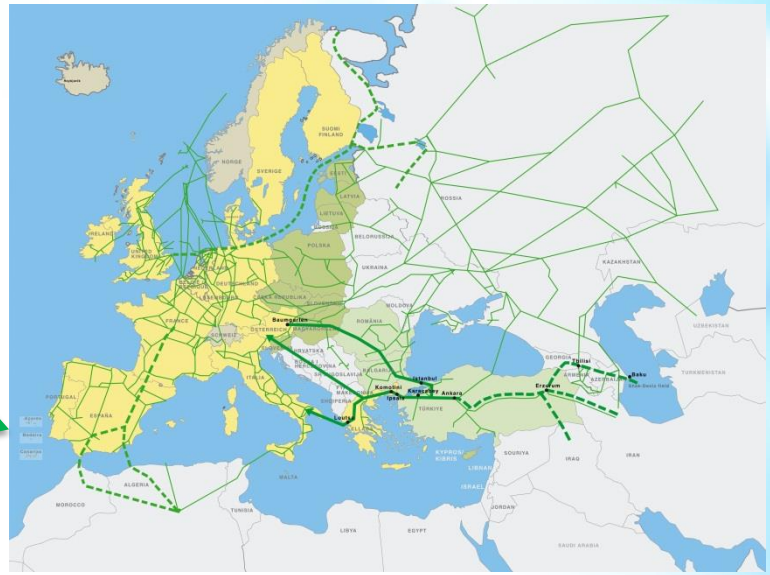
The scope of applications is widening with time

Connecting the European grids

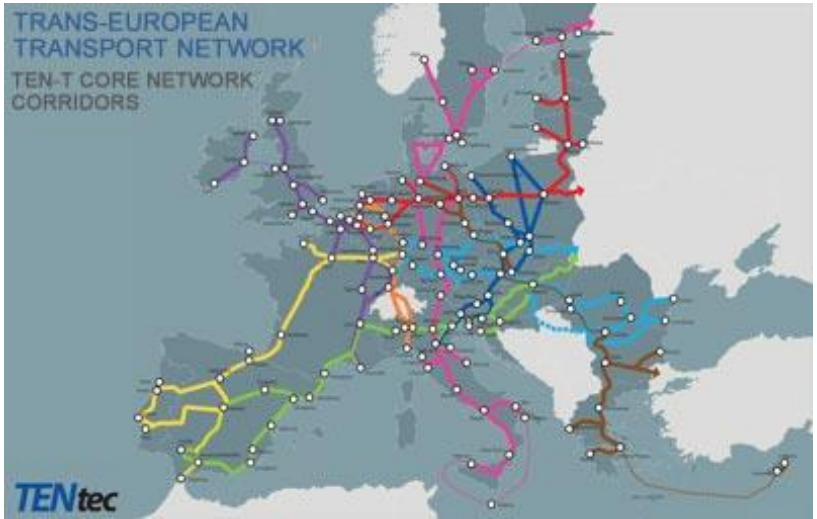


Electricity grid

The H_2 energy vector



Natural gas grid



Trans-European Transport Network

Programme Review Day 1(1): 17/11/2014

FCH 2 JU Programme Review Days 2015

Tuesday 17 November

13:30 – 14:30	Registration	
14:30 – 14:45	Opening and Welcome Address (Alcide de Gasperi Room, 2nd floor)	
	Jean-Luc Delplancke, Head of FCH 2 JU Programme Unit	
	PARALLEL SESSIONS ON TECHNOLOGY DEMONSTRATION PROJECTS	
14:45 - 15:00	**Introduction to Transport portfolio:** **Enrique Girón** **(Lord Jenkins Room, ground floor)**	**Introduction to Energy portfolio:** **Mirela Atanasiu** **(Alcide de Gasperi Room, 2nd floor)**
15:00 - 15:05	Q&A	Q&A
	PANEL 1 - Transport demonstration and proof of concept: light-duty vehicles, buses, forklifts, APU.	**PANEL 3 - Energy demonstration and proof of concept:** µ and industrial CHP, back-up power and components.
	Panel - Cars	
	Moderators: Carlos Navas and Eden Mamut	**Moderators: Mirela Atanasiu and Deborah Jones**
15:05 – 15:20	HYTEC	ENE.FIELD
15:20 – 15:35	HYFIVE	SOFT-PACT
15:35 – 15:50	H2ME	FLUMABACK
15:50 – 16:00	Q&A	Q&A
16:00 – 16:30	Coffee Break and Networking	

Programme Review Day 1(2): 17/11/2014

16:00 – 16:30	Coffee Break and Networking	
	Panel - Buses	
	Moderators: Enrique Girón and Eden Mamut	Moderators: Mirela Atanasiu and Deborah Jones
16:30 – 16:45	CHIC	SOFCOM
16:45 – 17:00	HIGH VLO CITY/HYTRANSIT	POWER-UP
17:00 – 17:20	Bus Study	REFORCELL/FLUIDCELL/FERRET
17:20 – 17:30	Q&A	Q&A
	Panel - Forklifts and APUs	
	Moderators: Enrique Girón and Eden Mamut	Moderators: Mirela Atanasiu and Deborah Jones
17:30 – 17:45	HAWL	FCPOWEREDRBS
17:45 – 18:00	DESTA	DIAMOND
18:00 – 18:15	FCGEN	SAPPHIRE
18:15 – 18:25	Q&A	Q&A
18:25 – 19:10	Poster Session - Panels 1 and 3 Manned (2nd floor)	
19:10 – 21:00	Networking Dinner	

Programme Review Day 2(1): 18/11/2014

Wednesday 18 November

08:00 – 08:30	Registration	
	PARALLEL SESSIONS ON SYSTEMS, COMPONENTS AND MATERIALS DEVELOPMENT PROJECTS	
8:30 – 8:45	Introduction to Transport portfolio: Lionel Boillot (Lord Jenkins Room, ground floor)	Introduction to Energy portfolio: Dionisis Tsimis (Alcide de Gasperi Room, 2nd floor)
8:45 – 8:50	Q&A	Q&A
	Panel 2 - Transport RTD: MEAs, bipolar plates, stacks and subsystems, hydrogen refuelling stations	Panel 4 - Energy RTD: Materials, components, performance phenomena, subsystem design and production
	Moderators: Lionel Boillot and Daria Vladikova	Moderators: Dionisis Tsimis and Laurent Antoni
	Panel - MEAs	Panel - Materials and subsystems design and production
8:50 – 9:05	CATAPULT	T-CELL
9:05 – 9:20	IMPACT	SECOND-ACT
9:20 – 9:35	CATHCAT	EURECA
9:35 – 9:50	NANO-CAT	ONSITE
9:50 – 10:00	Q&A	Q&A
10:00 – 10:30	Coffee Break and Networking	
	Panel - Bipolar plates, stacks and subsystems, HRS	Panel - Performance phenomena
10:30 – 10:45	STAMPEM	PROSOFC
10:45 – 11:00	COPERNIC	DEMSTACK
11:00 – 11:15	PHAEDRUS	CISTEM
11:15 – 11:25	Q&A	Q&A
11:25 – 12:10	Poster Session - Panels 2 and 4 Manned (2nd floor)	
12:10 – 12:55	Lunch and Networking	

Programme Review Day 2(2): 18/11/2014

	PLENARY SESSION ON PRE-NORMATIVE, SAFETY ISSUES, EDUCATION, TRAINING, SOCIO-ECONOMIC AND BENCHMARKING
12:55 – 13:10	Introduction to Cross-Cutting portfolio: Alberto Garcia (Alcide de Gasperi Room, 2nd floor)
13:10 – 13:15	Q&A
	Panel 6 - Cross-cutting: Pre-normative research, safety issues, education, training, socio-economic and benchmarking
	Moderators: Alberto Garcia and Jari J. Kiviaho
	Panel - Pre-normative research and safety issues
13:15 – 13:30	STACKTEST
13:30 – 13:45	MATHRYCE
13:45 – 14:00	SUSANA
14:00 – 14:10	Q&A
	Panel - Socio-economic and benchmarking
14:10 – 14:25	CERTIFHY
14:25 – 14:40	HYACINTH
14:40 – 14:50	Q&A
	Panel - Education and training
14:50 – 15:05	HYRESPONSE
15:05 – 15:20	KNOWHY
15:20 – 15:30	Q&A
15:30 – 16:00	Coffee Break and Networking

Programme Review Day 2(3): 18/11/2014

15:30 – 16:00	Coffee Break and Networking
	PLENARY SESSION ON HYDROGEN PRODUCTION, DISTRIBUTION AND STORAGE
16:00 – 16:15	Introduction to hydrogen production, distribution and storage portfolio: Nikolaos Lymperopoulos (Alcide de Gasperi Room, 2nd floor)
16:15 – 16:20	Q&A
	Panel 5 - Energy RTD and demonstration: Hydrogen production, distribution and storage
	Moderators: Nikolaos Lymperopoulos and Bernard Dam
	Panel - Low carbon hydrogen production - Electrolysis
16:20 – 16:35	RESELEYSER
16:35 – 16:50	ELECTROHYPEM
16:50 – 17:00	Q&A
	Panel - Low carbon hydrogen production - Other routes
17:00 – 17:15	ARTIPHYCTION
17:15 – 17:30	HYTIME
17:30 – 17:50	Green Hydrogen Study
17:50 – 18:00	Q&A
	Panel - Hydrogen storage, handling and distribution
18:00 – 18:15	HYTRANSFER
18:15 – 18:30	EDEN
18:30 – 18:40	Q&A
18:40 – 18:50	**Concluding Remarks**
	Eden Mamut, Chair of Scientific Committee (Alcide de Gasperi Room, 2nd floor)
18:50 – 19:00	**Event key message and closure**
	Bert de Colvenaer, FCH 2 JU Executive Director (Alcide de Gasperi Room, 2nd floor)
19:00 – 19:45	Poster Session - Panels 5 and 6 Manned (2nd floor)
19:45 – 21:00	Cocktail Dinner and Networking

Thank you for your attention

Enjoy your stay

Do not hesitate to contact project coordinators and members of the FCH JU for any query you may have.