Programme Review Days 2016

Panel 2: Research activities for transport applications

Moderator: Lionel BOILLOT, FCH JU Project Officer
Co-moderator: Daria VLADIKOVA, Bulgarian Acad. Science

http://www.fch.europa.eu/

In the agenda

09:30	12:05	RESEARCH ACTIVITIES IN TRANSPORT APPLICATIONS: MEAs, components, stacks and subsystems, hydrogen refuelling stations (Panel 2) – Moderated by Lionel BOILLOT and Daria VLADIKOVA
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10:35	**11:10**	**Coffee Break and Networking**
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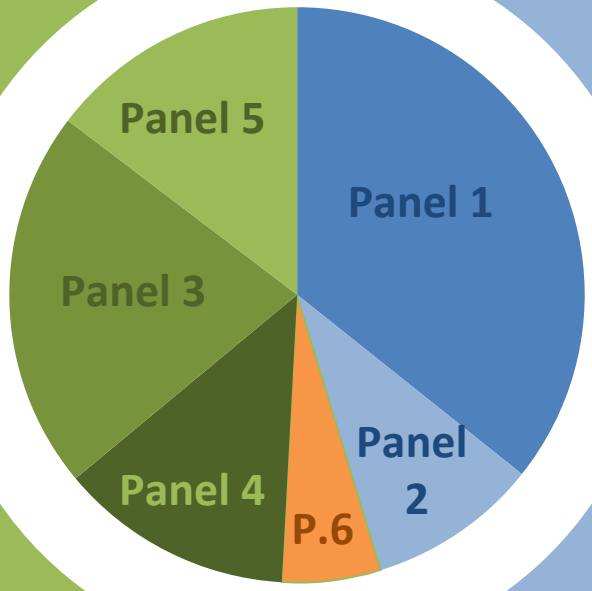
FCH JU portfolio 2008-2015: 185 projects, 638 M€

ENERGY

- Hydrogen production and distribution
- Hydrogen storage for renewable energy integration
- Fuel cells for power & combined heat & power generation



TRANSPORT

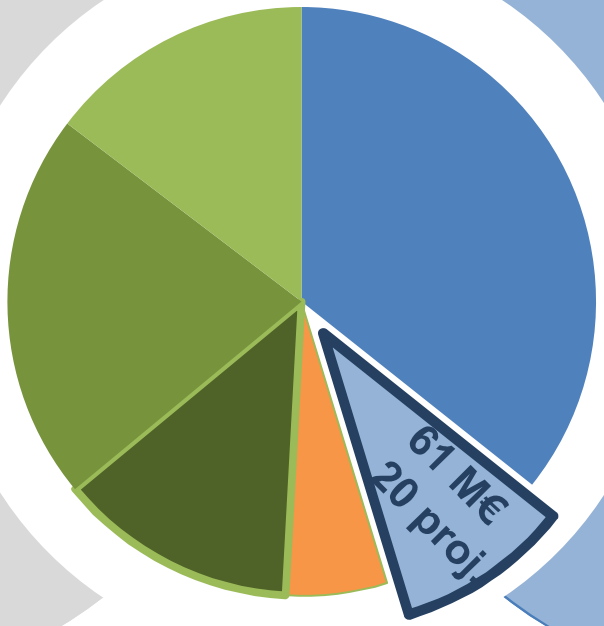
- Road vehicles
- Non-road vehicles and machinery
- Refuelling infrastructure
- Maritime, rail and aviation applications

Cross-cutting

(e.g. standards, safety, education, consumer awareness, …)

Panel 1 – Transport validation	Panel 2 – Transport research	Panel 3 – Stationary validation	Panel 4 – Stationary research	Panel 5 – H_2 prod, distrib., storage	Panel 6 – Cross-cutting

Panel 2: Research activities for transport applications



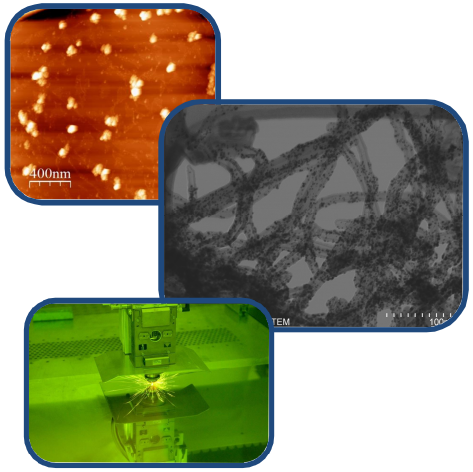
Related FCH JU goals

- Reduce fuel cell system costs for transport applications while increasing lifetime
- Reduce use of critical raw materials

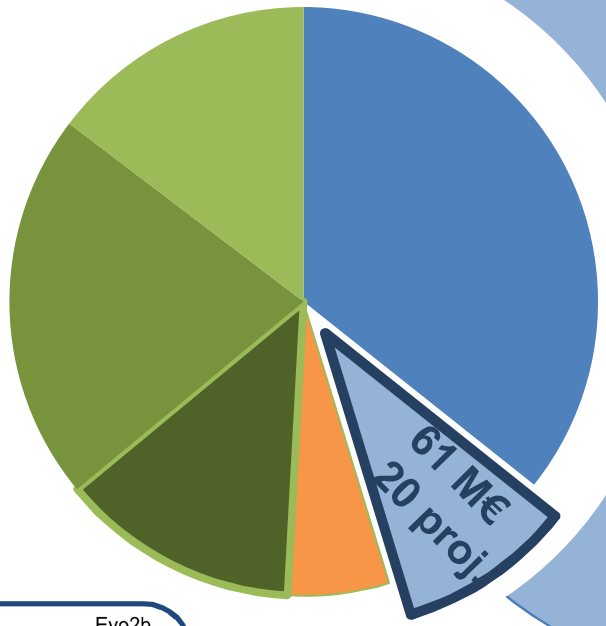
*Goals stated as objectives of the **Council Regulation (EU) 559/2014 of 6 May 2014** establishing the Fuel Cells and Hydrogen 2 Joint Undertaking*

Panel 2: Research activities for transport applications

From materials research …



… to the manufacturing of FC systems



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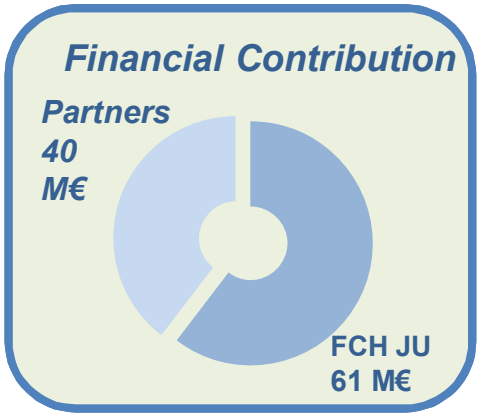
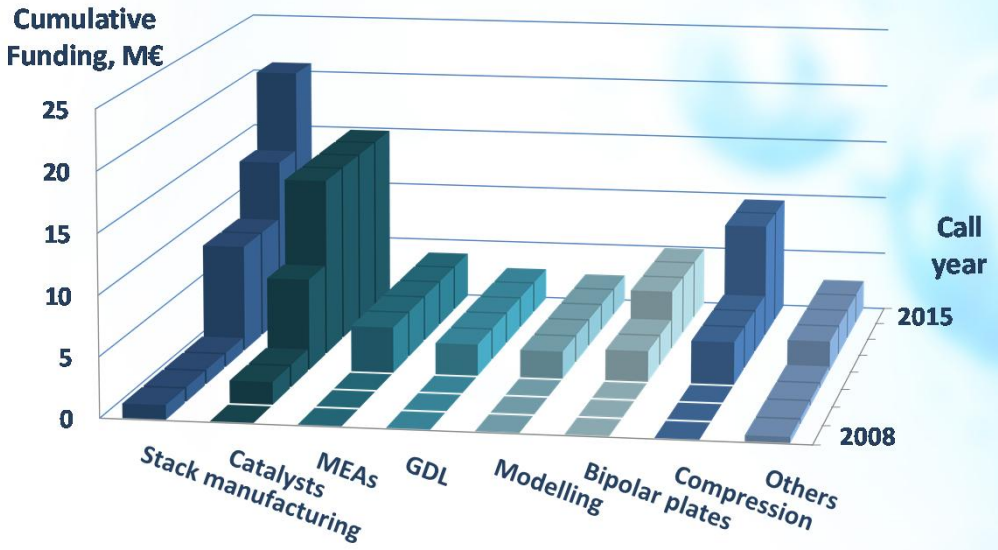
FCH JU supports all FCEV research aspects

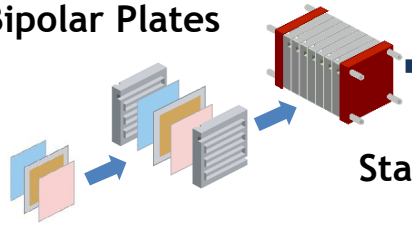
20 projects
61 M€





Fuel Cell

Bipolar Plates



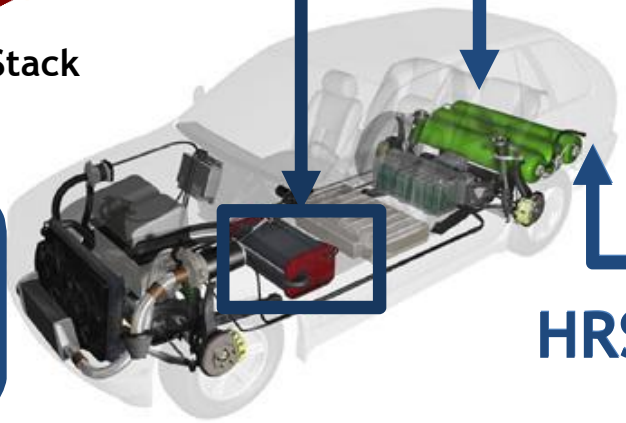
Stack

MEA

Low-costs and high-performance FC systems

Tank

Design optimisation and mass production

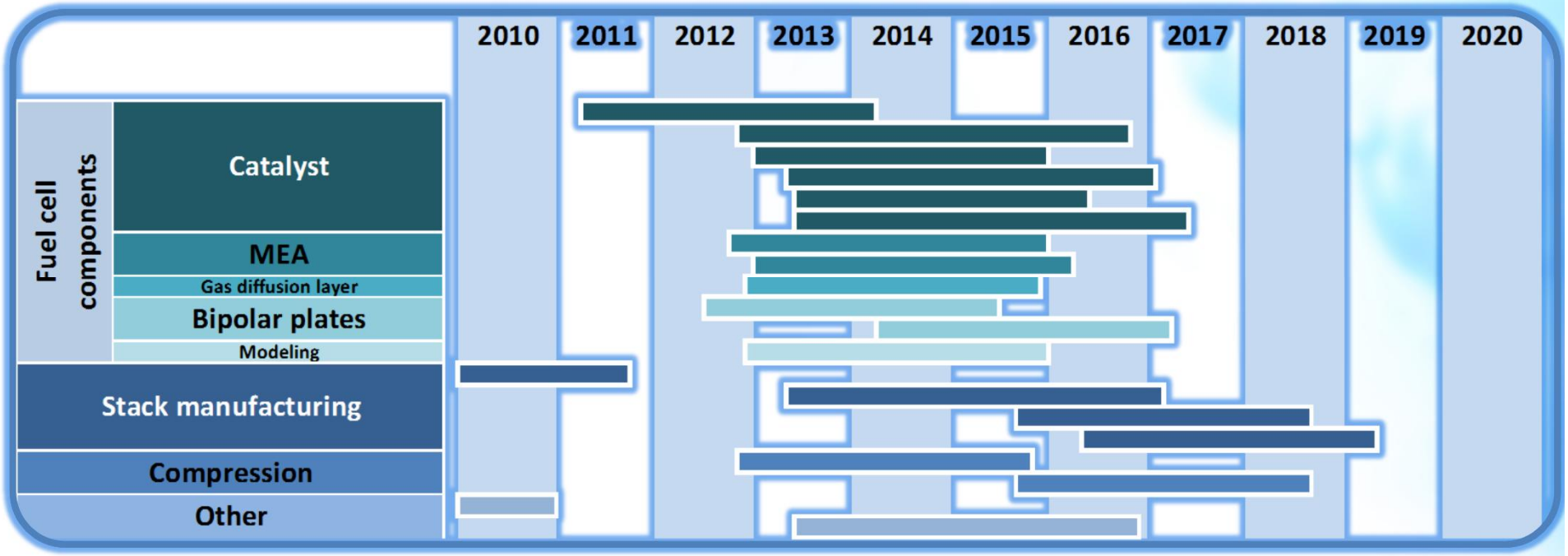


HRS

Optimised H_2 compression and storage systems

From fuel cell component improvements to stack manufacturing

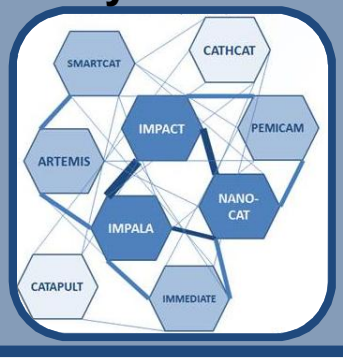
20 projects
61 M€



Cooperation value

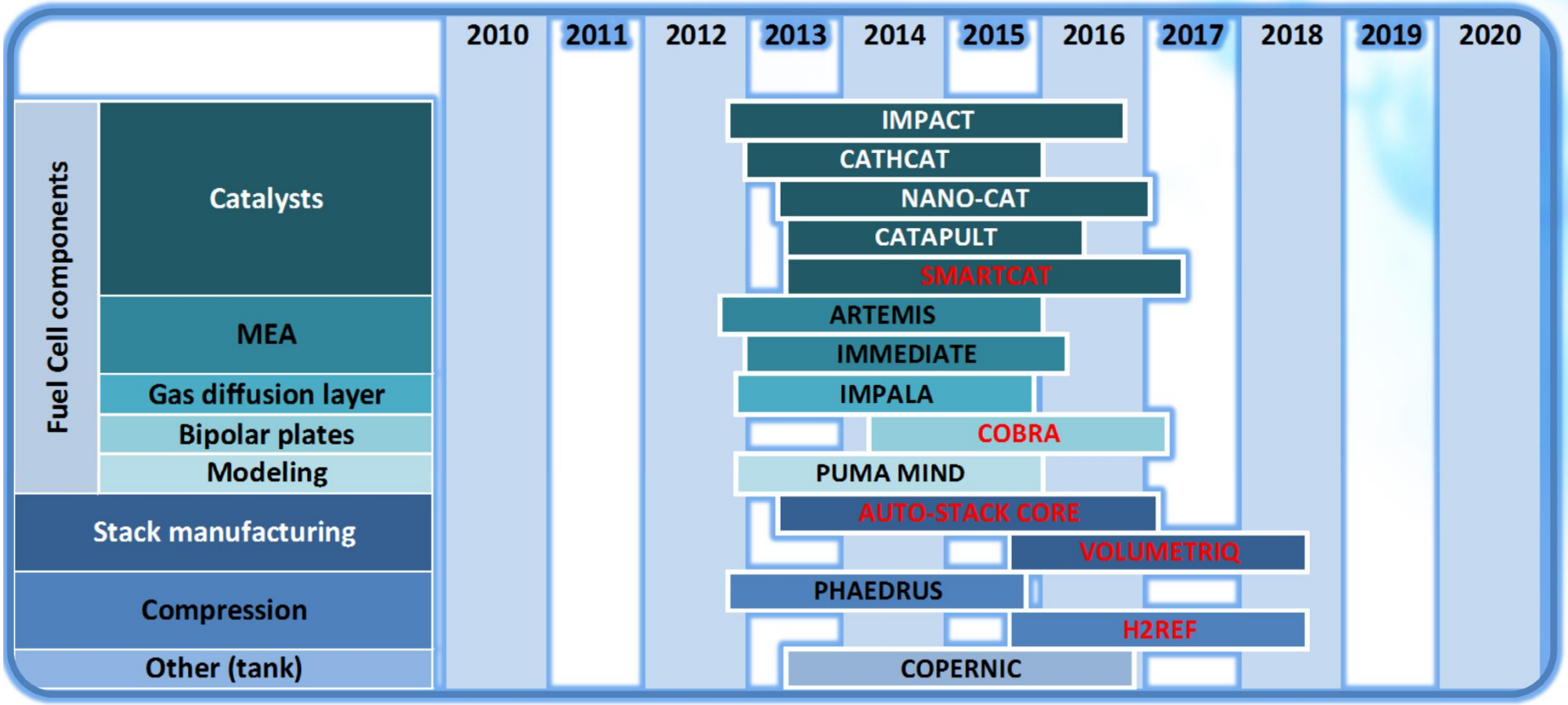
Cooperation amongst catalyst and MEA projects was sucessful.
It will continue for stack projects.

Catalysts & MEAs



Stacks

15 projects/48 MEUR in the 2016 Programme Review



Sciences and engineering to reduce FC system costs

No project has reached all indicators simultaneously

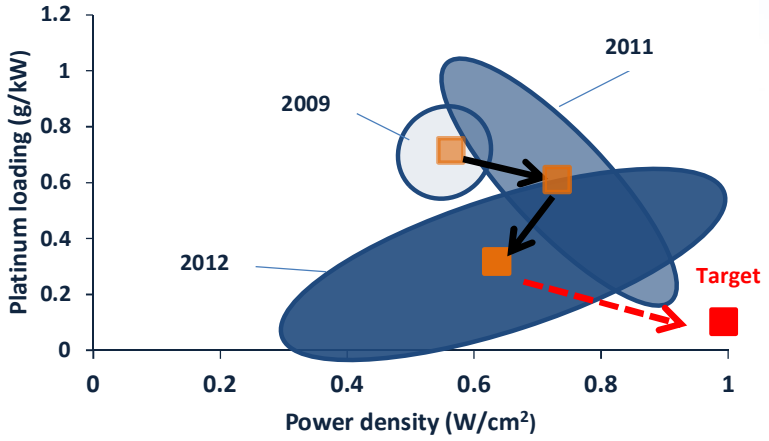
MEAs	FCH JU project results 2015	Objectives 2017*	
Pt loading, g/kW	⚠	<	0.1
Electrical efficiency, %	✓	>	55
Power density (BoL), W/cm^2	✓	>	1
Durability, h	✓	>	6,000
Min./max. operating temperature, °C	✓		-25/+95

*Based on AWP2014

Reduce FC system cost (targets)

- Material research < 0.1 g Pt/kW, 1 W/cm² @ 1.5 A/cm^2
- Production costs < 100 €/kW @ 50,000 units per year

@ ~1.5A/cm²



Based on 2015 project data gathered in the FCHJU 2016 data collection exercise

On-board H_2 storage – Improved performance and technology maturity

HYDROGEN STORAGE	FCH JU project results 2015	Objectives 2017**		Non-European SoA
Hydrogen storage system cost, €/kg H_2	⚠	<	800	1500
Volumetry capacity*, kg/l	✓	>	0.022	0.022
Gravimetric capacity*, %	✓	>	4	3.8

*H_2 tank system

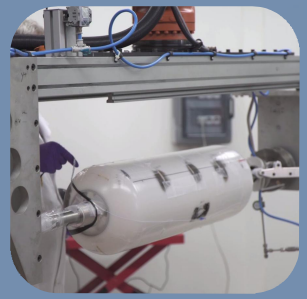
**Based on AWP2014

Reduced weight and volume

- New materials
- Improved components
- Integrated tank systems

Low cost production

New test methods



Horizontal aspects

Dissemination and exploitation

- 200+ conference presentations
- 110+ publications
- 10+ international workshops
- 12 patent priorities
- 1 company created
- Others (videos, LinkedIn group)

1st Summer School and Young Researcher's Conference on Lifetime and Degradation of Fuel Cells

Training and education

- ~15 PhD and ~17 post-doc trained/recruited
- ~5 MSc students involved
- Trainings and courses

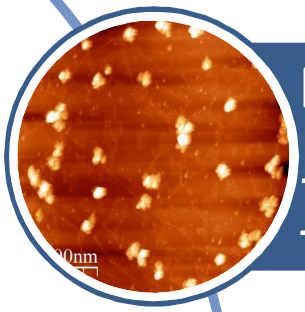
Harmonisation of testing protocols with JRC

Int. Conferences / Workshops

European Fuel Cell Car Workshop | March, 1st - 3rd 2017, Orléans, France

The 19 / 20 / 21 of September 2016
GRENOBLE - FRANCE
«MATERIAL CHALLENGES FOR FUEL CELL & HYDROGEN TECHNOLOGIES»
From innovation to industry
Material Challenges For Fuel Cell & H_2 technologies

Summary



PEMFC systems supported from labs to production lines

- Improved performance, robustness, cost and lifetime
- Better manufacturing, production efficiency and lower production cost

New concepts for H_2 refuelling

Novel compression and storage systems to increase HRS availability and performance

Hydrogen tanks

Reduction of costs through architectural optimisation and design of mass production processes

Thank you for your attention

Lionel Boillot

Lionel.Boillot@fch.europa.eu

Further info :

- **FCH JU : http://www.fch.europa.eu/**
- **HYDROGEN EUROPE : http://hydrogeneurope.eu/**
- **N.ERGHY : http://www.nerghy.eu**

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