



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

Demonstration of Small 4-Wheel fuel cell passenger vehicle Applications in Regional and Municipal transport

John Jostins

Microcab



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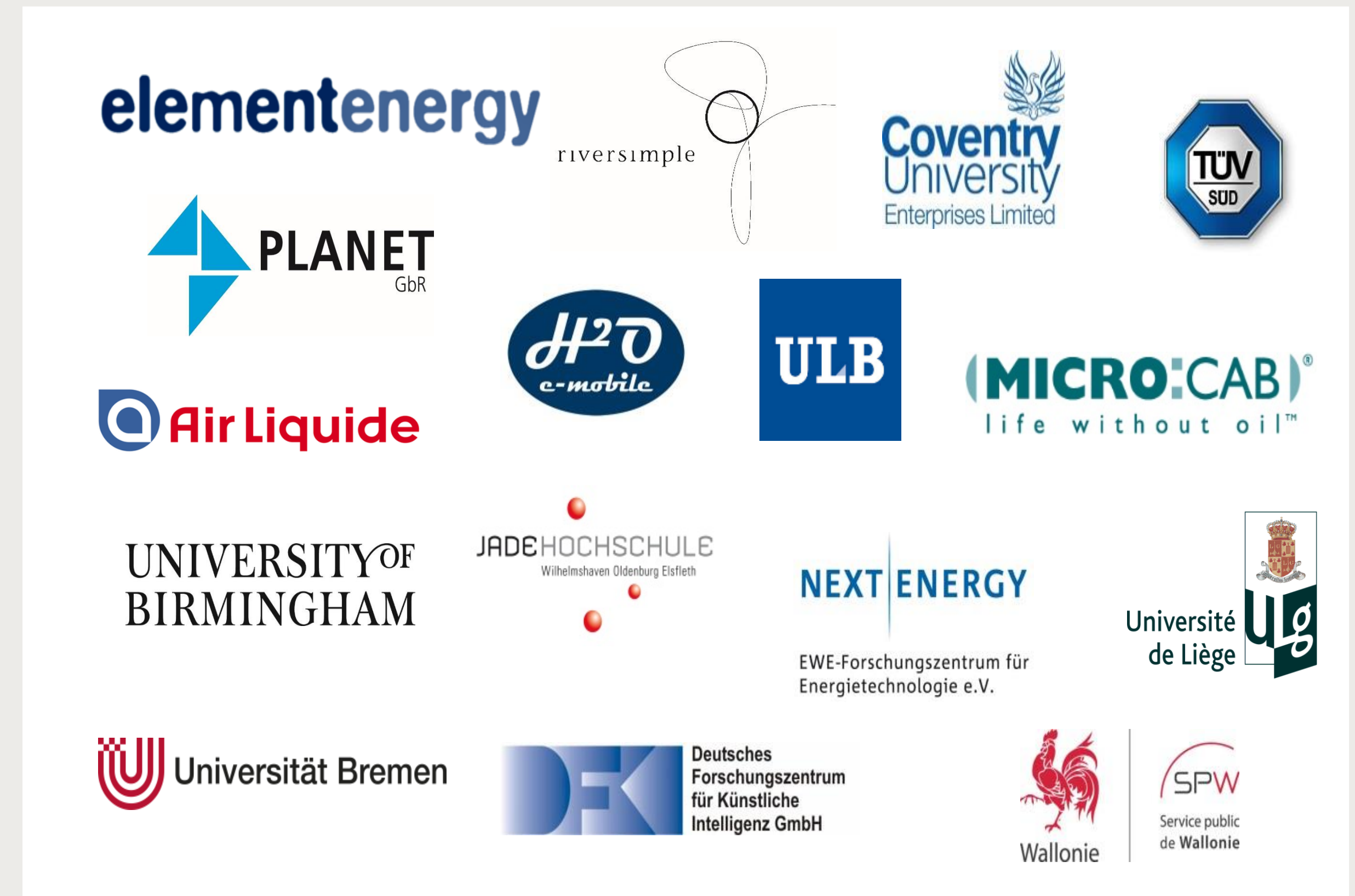
Programme Review Days
2018

Brussels, 14-15 November 2018

PROJECT OVERVIEW



- **Call year:** 2011
- **Call topic:** Call topic SP1-JTI-FCH.2011.1.1 (Transportation & Refuelling Infrastructure)
- **Project dates:** 01/10/2012 to 31/10/2018
- **% stage of implementation 01/11/2018:** 100 %
- **Total project budget:** 15.6 M €
- **FCH JU max. contribution:** 6.8 M €
- **Other financial contribution:** Government and others
- **Partners:** consortium of 18 partners



PROJECT SUMMARY



ElanoFC by H²O E-mobile



H2EV by Microcab

- ▶ The project SWARM is establishing a demonstration fleet of small passenger vehicles that builds on and expands existing hydrogen refuelling infrastructure
- ▶ Novel vehicles developed and deployed in three European regions: the British Midlands and Wales, the Brussels area and Wallonia, and the Weser-Ems region in North West Germany
- ▶ University and research institutes contribute to continued improvement and optimisation of the vehicles

SWARM (“Demonstration of Small 4-Wheel fuel cell passenger vehicle Applications in Regional and Municipal transport”)



Rasa by Riversimple



Air Liquide HRS in Zaventem

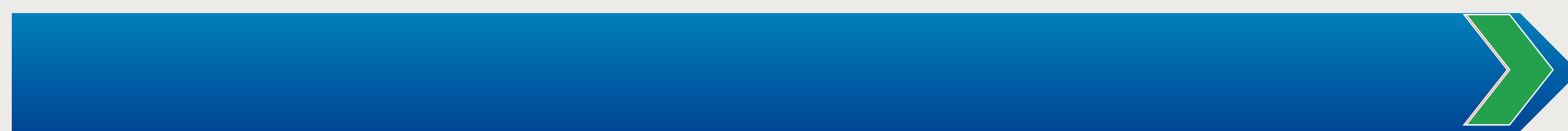


PROJECT PROGRESS – OVERVIEW



Achievement to-date

PROJECT START



PROJECT END

British Midlands and Wales

Abergavenny, Monmouthshire County Council



Rasa by Riversimple



McFilling HRS, McPhy

Coventry and Birmingham



H2EV and Vianova by Microcab



Brussels area and Wallonia

Zaventem, Brussels

Air Liquide HRS

H2EV by Microcab



Spa Francorchamps circuit, Liege



University of Liege and University of Brussels



West Germany

Frechen



Air Liquide HRS

Bremen and Jade

ElanoFC by H₂O E-mobile and Jade University



H2EV by Microcab (and Toyota Mirai)



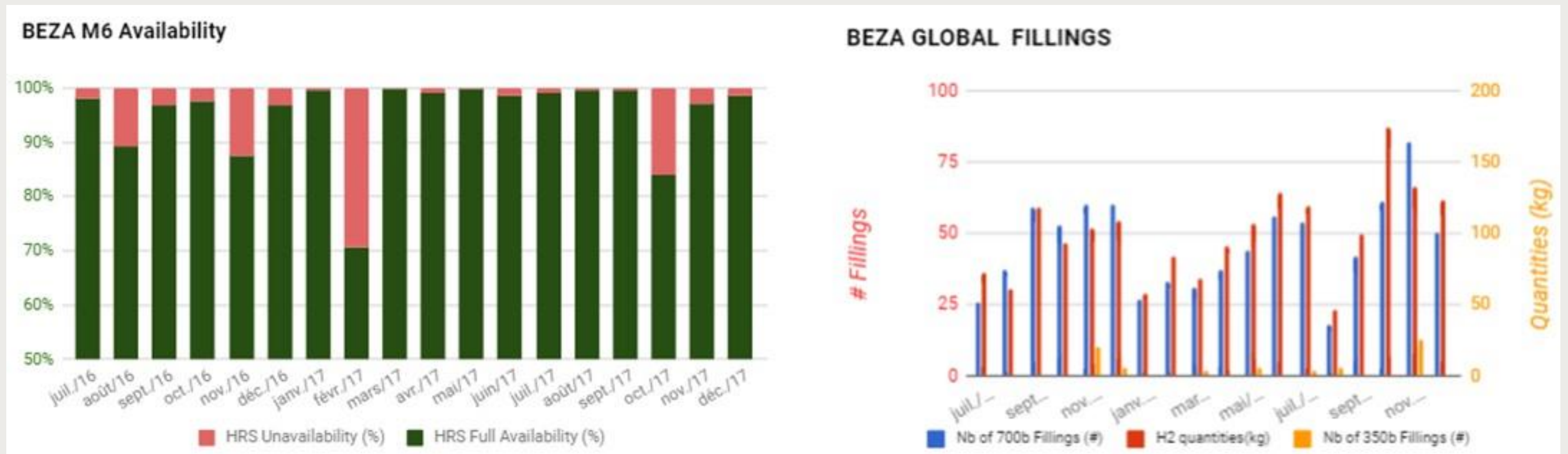
BRUXELLES HRS – PERFORMANCES DURING AND POST PROJECT



- ▶ Opening Ceremony in April 2016
- ▶ Station in operation since > 2 years
- ▶ Station is currently running with a small fleet
- ▶ Upgrade required to accommodate BREATH fleet of vehicles (60 vehicles)
 - ▶ Improve Back-to-back performance
 - ▶ Improve the robustness / availability

Main events that impacted availability:

- November 2016: Maintenance on compressor check valves
- February 2017: Station maintenance
- October 2017: Maintenance on compressor check valves



PROJECT PROGRESS/ACTIONS – H2EV DEVELOPMENT (MCROCAB)



Achievement to-date

Car development

Trial for 10 car, 3 generation and 3 years

Fuel cell system history

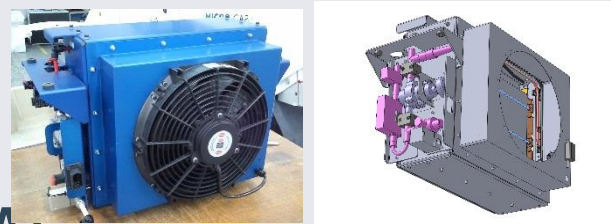
2013-2015
H2EV

Horizon LTPEM 3.0 kW



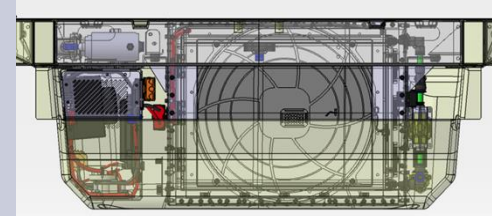
2015-2016
H2EV

Ballard AC 70 cell 3.0kW



2016-2018
H2EV

Ballard AC 80 cell 3.3kW



2018 onwards

Integrate Ballard 10kW water cooled system

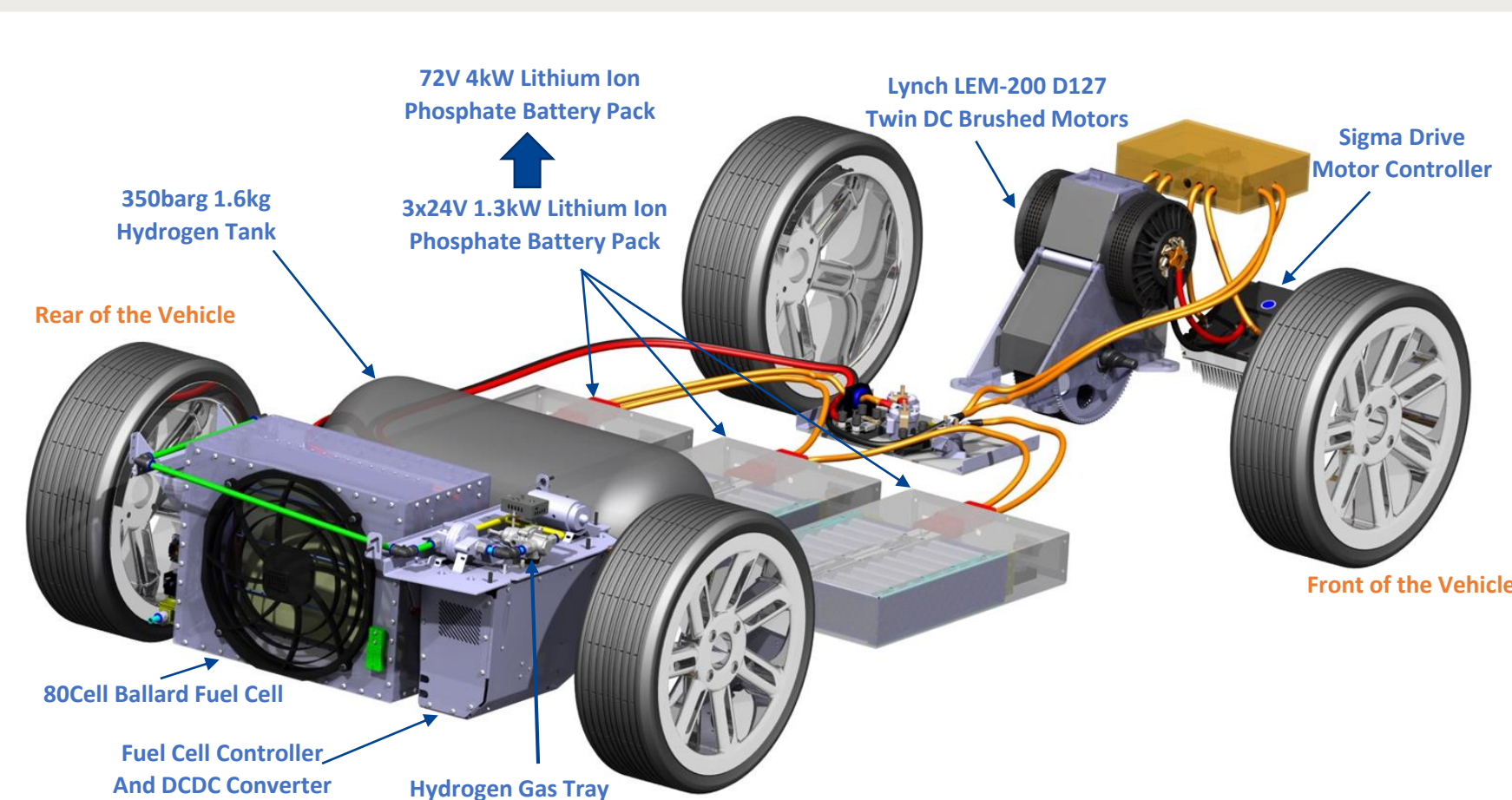


25%

50%

75%

3 generation of powertrains, VCU and overall control systems, collaboration with MAHLE, 18 000 km driven in trial



PROJECT PROGRESS/ACTIONS – RASA DEVELOPMENT (RIVERSIMPLE)



Achievement to-date

Car development



Trial start
c.240 participants
driving 20 vehicles

Trial location selection, development of car and of service, building of refueling, selection of trialists

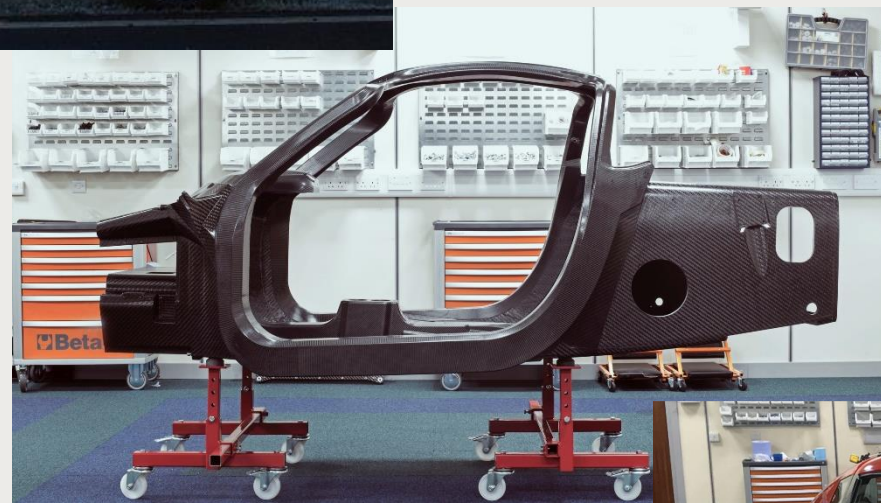


Rasa Alpha



The Riversimple Service

- The car
 - Insurance
 - Service and Maintenance
 - All fuel
- All in one monthly payment



Rasa Beta



The Riversimple Rasa:

0-100km/h:

Energy consumption:

Range:

8.5kW and 580kg

9.6 secs

1.2 litres/100km equivalent

480km



Communications Activities



Coventry
Birmingham
Sheffield



SWARM final event
Coventry university



Isle of Wight

Round the island challenge vs hydrogen boat Air Liquide, first HRS in Belgium (Zaventem)

Daily telegraph



Air Liquide, 51st HRS in Germany (Frechen)



Coventry
Birmingham



London
Heathrow



Lloyds of London



EXPECTED IMPACT



SMEs and University collaboration

- Real world trial experience for Universities and researchers
- Gain of expertise for smes
- Technical improvements of technology
- Training of personnel



Fostering additional activities in these regions and for partners

- Monmouthshire Council
 - Opening of Alternative Vehicles center at Coventry University
 - Collaboration Microcab-Mahle
 - Birmingham Tyseley Energy park
 - ZEFER Taxi fleet in Zaventem
 - Frêchen part of the H2Mobility Deutschland network
-

Development of new FCEVs models and services

- Three generations development during the course of the project for Microcab H2EV and Riversimple Rasa

Initiating deployment in three additional European regions

- Refuelling infrastructure commissioned and supporting vehicles fleets from projects and outside
- Reaching out to stakeholders





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