AutoStack-CORE: Industry-Led European Consortium to develop Next Generation Automotive Stack Hardware

Objective

AutoStack CORE establishes a coalition with the objective to develop best-of-its-class automotive stack hardware with superior power density and performance while meeting commercial target cost.

The project consortium combines the collective expertise of automotive OEMs, component suppliers, system integrators and research institutes and thus removes critical disconnects between stakeholders.

Objective of the project is to develop, built and test three evolutions of an automotive PEM fuel cell stack fulfilling the specification set out in the AutoStack Project (FCH-JU GA 245142).

Consortium

Project budget: € 15m
Co-funded by: FCH JU Brussels
Partners: 14
Duration: 46 months

Automotive OEMs: BMW, VOLVO, VOLKSWAGEN AKTIENGESELLSCHAFT

Component and System Suppliers: DANA, FREUDENBERG INNOVATING TOGETHER, Greenerity, POWERCELL, SWISS HYDROGEN

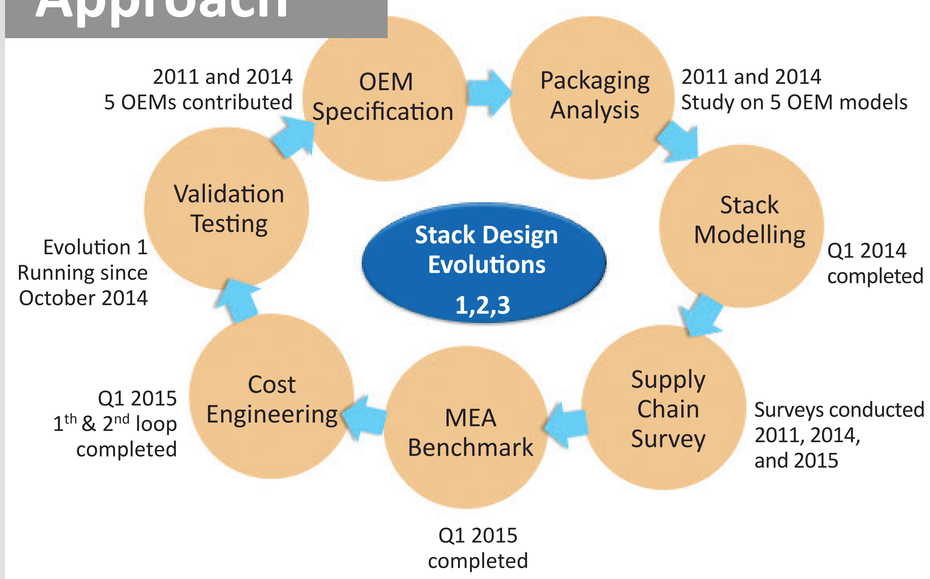
Research Institutes: CEA, Fraunhofer ISE, European Commission, PAUL SCHERRER INSTITUT PSI, ZSW

Step 1: 2010–2011
AutoStack
Assessments and Specifications

Step 2: 2013–2016
AutoStack-CORE
Stack Development

Step 3: from 2017, planned
AutoStack-Industry
Production Readiness and Manufacturing Concept

Approach

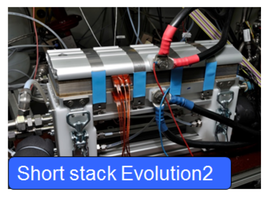


Selected Results

Common specification to boost economies of scale

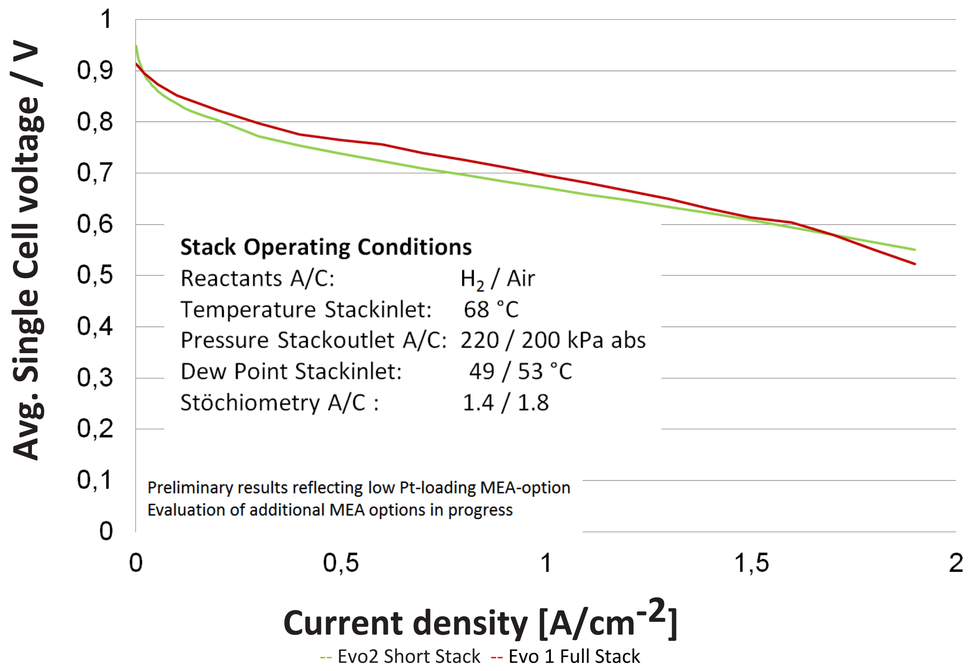
AutoStack Core	Specification	Evolution 1	Evolution 2 (preliminary)
Calculated power	**98kW max cont.** **118kW peak 30 sec**	**94 kW max cont** **99 kW peak 30 sec** (neat H_2, 331 cells)	**92 kW max cont** **105 kW peak (30sec)** (30% N_2 in H_2, 335 cells)
Stack power density	**2.8kW/l max cont.** **3.4kW/l peak**	**2.6 kW/l max cont.** **2.9 kW/l peak**	**3.3 kW/l max cont.** **3.8 kW/l peak**
PGM-loading / g/kW	**<0.4**	**0.54**	**0.33**
Operating Temperature	**74° C** (68° C in , 80° C out)	74 ° C (68 ° C in, 80° C out)	74 ° C (68 ° C in, 80° C out)
Humidification	**< 50%**	**50 % RH**	**50% RH**
Operating pressure / $bar_{absolute}$	**2.2...2.4 max cont.** **2.7 peak**	**2.0 max. cont** **2.0 peak**	**2.0 max. cont** **2.0 peak**
Lifetime	**12 µV·h^{-1}**	**26 µV·h^{-1}**	Under investigation
Freeze-start	**from -25 ° C**	**From -20 ° C**	Under investigation
Stack target cost	**< € 40.00/kW** (@ 120 000/year)	**€ 47.32 ·kW^{-1}** (@ 30 000 per year)	Under analysis

Achievements in Evolution 1 & Evolution 2

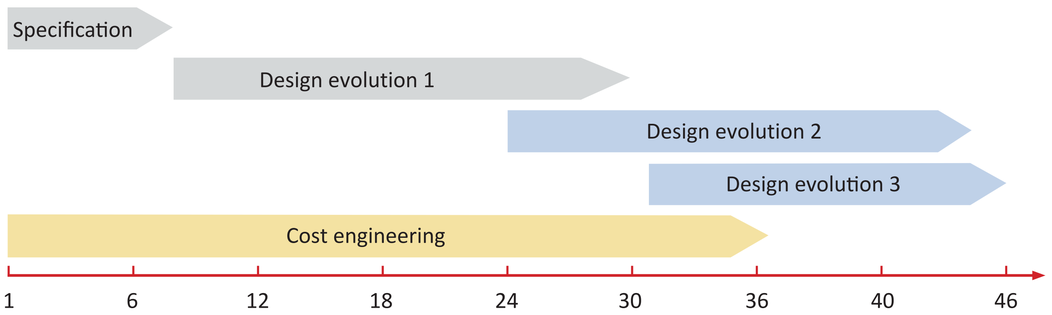


- Stack also available in IP67 housing (Evo 2b).
- Early Evo2 test data reflecting low Pt-loading.
- Improved power MEAs under investigation also analysing the impact of catalyst loading.

Performance maintained with significantly reduced platinum loading and footprint



Project schedule



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