HyTRAN

Hydrogen and fuel cell technologies for road transport

Motivation and Objectives

Hydrogen and fuel cell technologies are seen as promising alternatives for road transport. However, components and sub-systems are still a major bottleneck to the development of fuel cell systems for transport. The objective of the project HyTRAN is to advance the fuel cell technology towards solutions that are commercially viable, by developing the required components and subsystems and by demonstrating them in two fuel cell systems.

Project Plan, Milestones and Deliverables

Technology Platform 1: 80 kW direct-hydrogen, PEM fuel cell-based propulsion system

- Fuel cell stack design. Components characterisation. Air supply, water and thermal management studies. Definition of specifications for subsystems and components.
- Manufacturing and delivery of the fuel cell stack and of the twin-screw compressor with water injector and silencers. Design and manufacturing of cooling system and hydrogen feeding line.
- Layout and virtual installation of Fuel Cell (FC) power system, control strategies, HAZOP, Fault Tree Analysis and global system model in MatLab/Simulink completed.
- Integration of the fuel cell system and auxiliary components in the Fiat Panda started.

Last years:

- Fuel cell system and powertrain completed and implemented on the Fiat Panda HyTRAN.
- Vehicle targets and requested performances tested and validated in laboratory test (Figure 1) and on the road session.
- The Panda HyTRAN demonstrated on the road and some rally competitions performed (Figure 2).

Figure 1 – Technology Platform 1: Panda HyTRAN FC vehicle laboratory tests and on road session

Figure 2 – Technology Platform 1: Panda HyTRAN FC vehicle on the road demonstration and rallies participation

Technology Platform 2: 5kW diesel reformate PEM fuel cell-based Auxiliary Power Unit

- System design and development of key components.
- Successful testing of key system components.
- Laboratory APU system manufactured and tested during 2008. Failed during testing.
- Post-mortem analysis, redesign and manufacture of critical components ongoing.
- Successful redesign of compressor/water separator. Start-burner operation proven in lab.
- Test of new components scheduled for fall 2011.

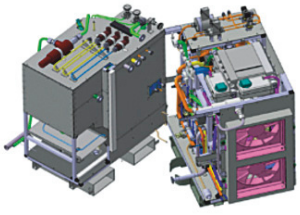

Figure 3 - Technology Platform 2: Fuel cell APU – representation of modular build-up and interface between hot and cold areas in the laboratory system.

Figure 4 - Technology Platform 2: Fuel cell APU laboratory prototype during assembly.

Budget	16.8 M€	Funding	8.8 M€
Duration	99 months	Start	January 2004
DG	Research	Contract n°	502577
Coordinator	Per Salomonsson, Volvo	Contact	info@hytran.org
Partners	Volvo, CRF, DAF, VW, Nuvera Fuel Cells, Johnson, Matthey Fuel Cells, Opcon Autorotor, Tenneco, Weidmann Plastics, ADROP, RWTH Aachen, ECN, Politecnico di Torino, Paul Scherrer Institut, Institut für Mikrotechnik Mainz, Imperial College London, Environment Park		