Introduction to portfolio of ENERGY FC-RTD projects

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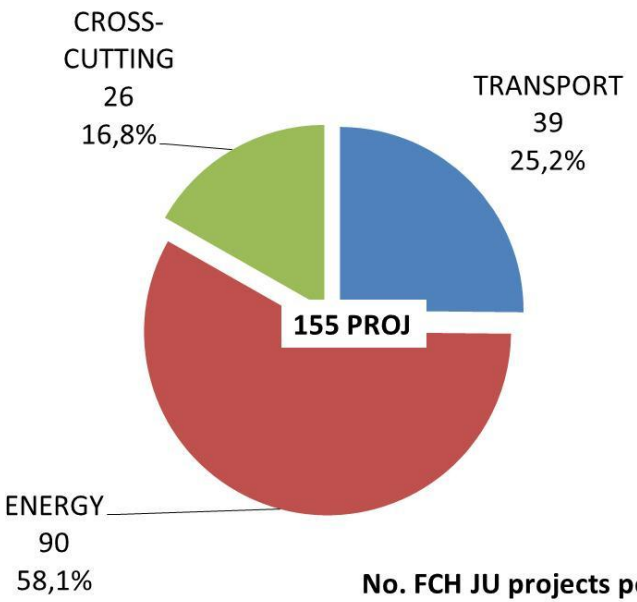
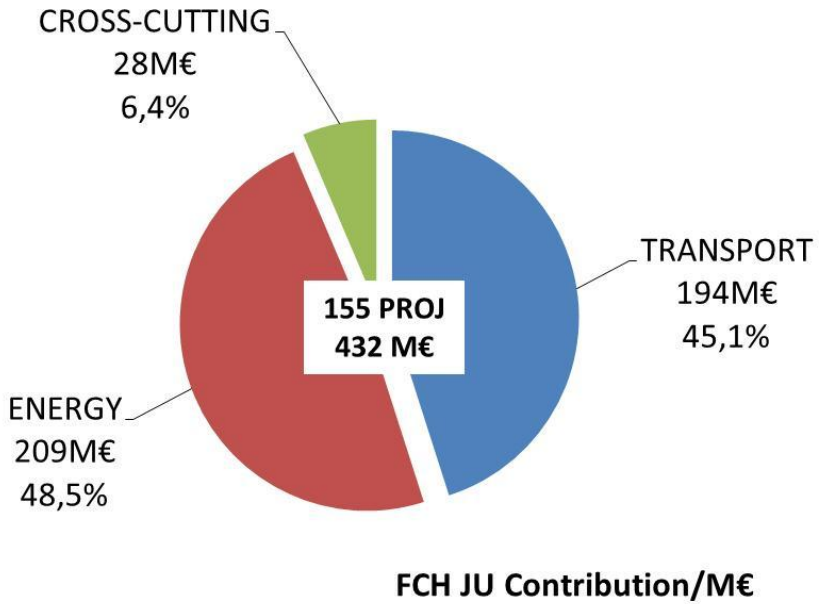
FCH for ENERGY: 90 projects
209 mill EUR committed by EU/FCH

- Currently distributed in 3 different application areas:
  - Hydrogen Production and Storage
  - Stationary applications and CHP
  - Early markets (Back-up power and off-grid systems)

Almost 50% of the budget committed to **ENERGY oriented projects**



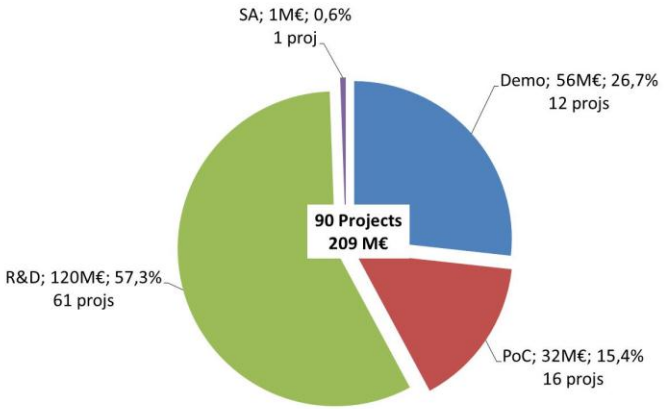
No. FCH JU projects per pillar



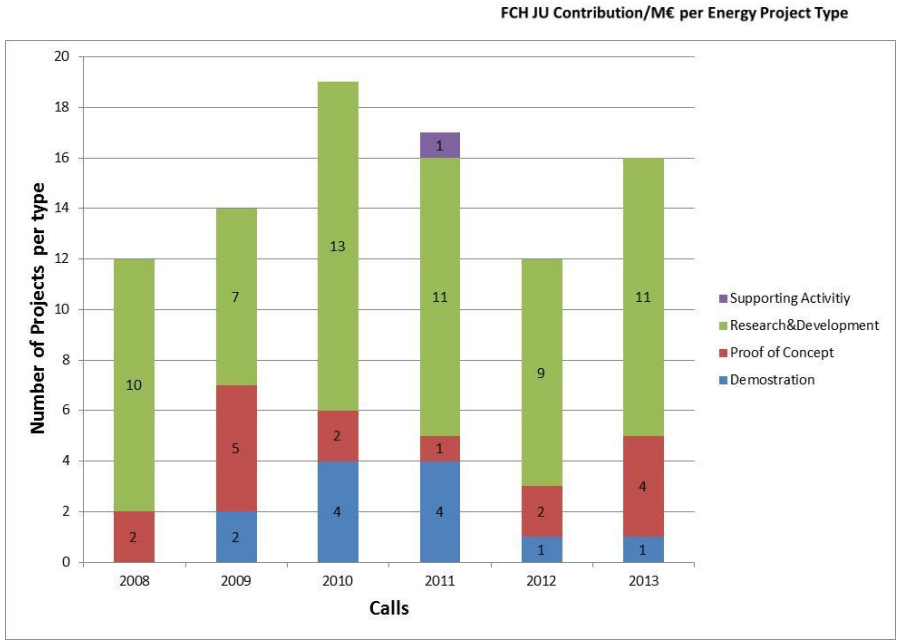
FCH JU Contribution/M€

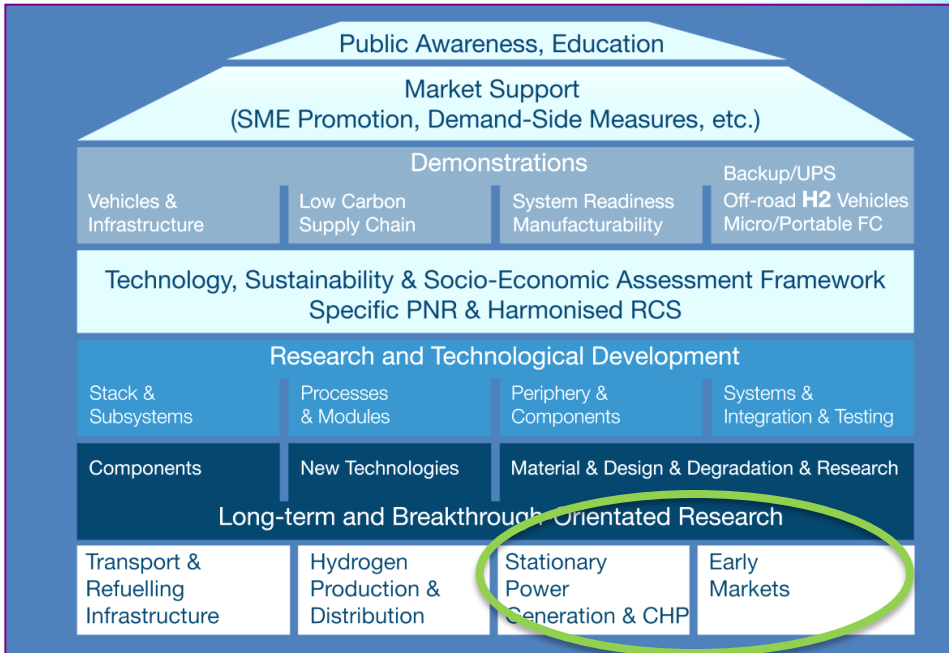
120 mill EUR in RTD-type projects for ENERGY applications

Energy projects still strongly R&D oriented



- 61 RTD type projects
  - 36 projects on FC:
    - Degradation aspects
    - New materials
    - Innovative stack design





MAIP Coverage

Technology/Activities Projects examples

Alkaline-FC design exploiting benefits of **laser-processing and novel materials** for mass manufacture, ease of assembly, recyclability

Tolerance levels of MCFC and reformer catalysts to specified sulphur-based pollutants downstream of clean-up or CO2 separation from power plant flue gas

Integration of **ammonia cracker and alkaline-FC** into a flawlessly functioning proof-of-concept system for remote power applications

Effect of **advanced Ni-based cermet anodes modified via doping with a second or a third metal in conjunction with triode operation**, in order to control the rate of carbon deposition and sulphur poisoning

Improved **membranes development and novel process route** (AST lifetime indications well over 40.000 hrs for the latest scavenger-containing membrane variation)

Ceramic fuel cell based on a strontium titanate ceramic to mitigate known failures in the operation micro CHP SOFCs, e.g. grid outage and desulfurizer breakdown, known to be harmful to SoA Ni-YSZ based SOFCs

Understanding and modeling of the **degradation mechanisms of State-of-the-Art (SoA) Ni-based anodes.**

Accelerated stress test (AST) protocols, sensitivity matrix and lifetime prediction model for stationary µ-CHP applications

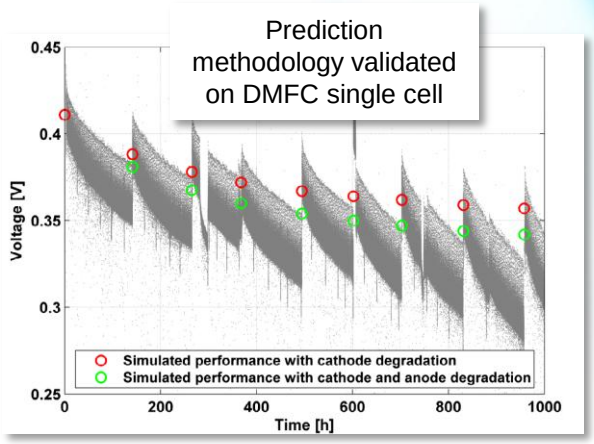
Understand the details of **SOFC continuous degradation effects** (stability of anode cermet and SotA cathode materials, Nickel-steel corrosion, cathode- and anode-interconnect interfaces)

Important achievements in FC-RTD

New material ceramic anode which shows promising redox stability and performance exceeding 0.5 W/cm^2 in single cell tests

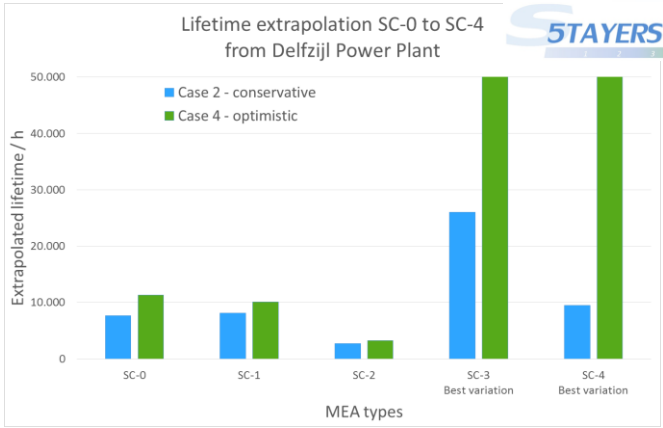
40 minutes start-up time; 5 kg/kw reduced materials – robust SOFC stacks

Lifetime prediction methodology including systematic experiments in reference and accelerated conditions and simulations to predict performance loss.



low-cost catalyst system (low-cost plastics, standard rubber gaskets) to reduce materials cost for alkaline fuel cells

> 20,000 hs proven in real life conditions; membrane estimated to surpass 40,000 hrs based on AST comparison



Thank you for your attention !

Further info :

- **FCH JU (Programme Office) http://fch-ju.eu**
- **NEW-IG http://www.new-ig.eu**
- **N.ERGHY http://www.nerghy.eu**