



Country Update

FRANCE

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- **French Government multiannual energy program** – “The objective of the electromobility development for passenger cars and utility vehicles of at least 1 ton is of 2 400 000 electrical and plug-in hybrid vehicles by 2023”.
- Call for proposals on “**Hydrogen in the territories**”. 30 French territories have sent proposals for about 100 projects. Selection process is ongoing.



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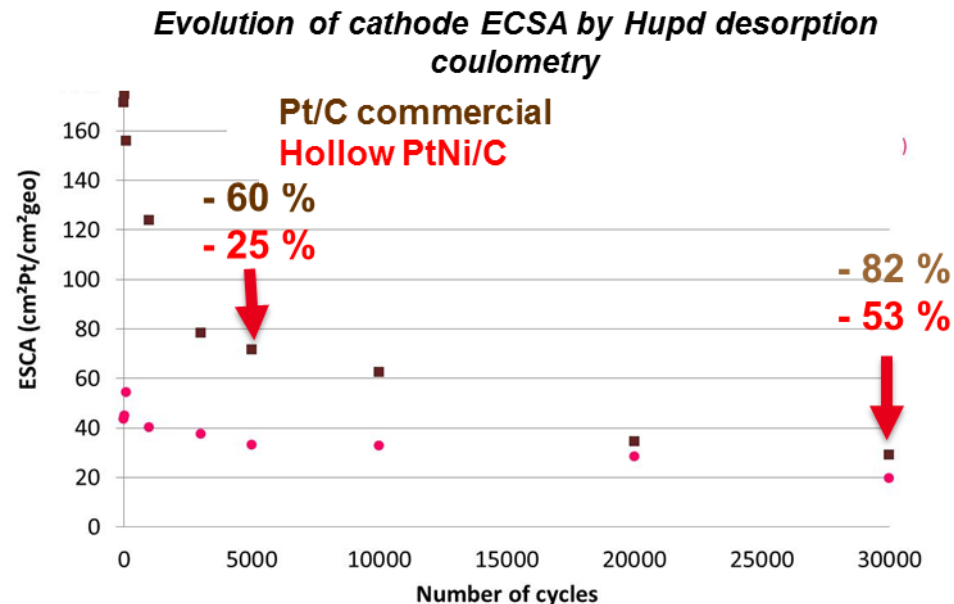
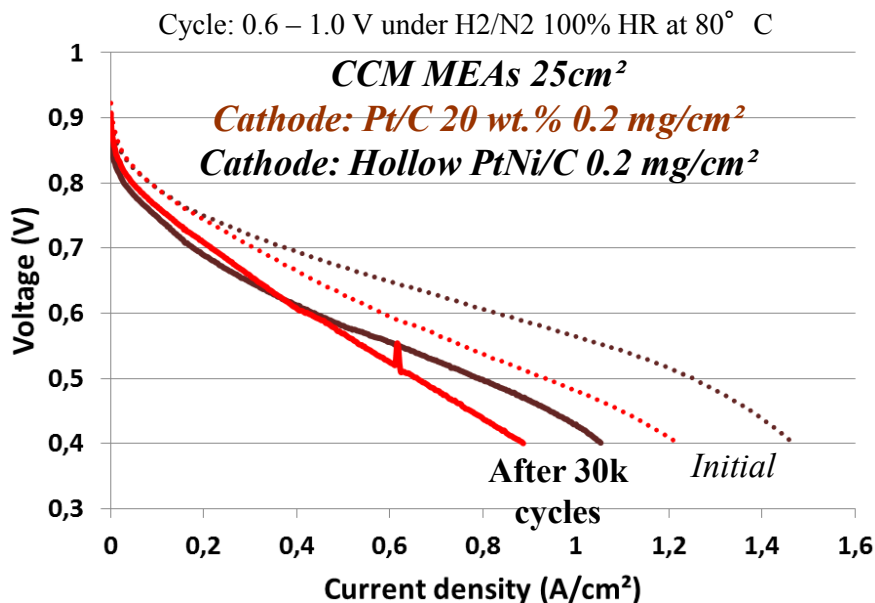
- The first Toyota Mirai in France has been delivered on September 9, 2016 to Air Liquide
- **AREVA H2Gen:** first manufacturing factory of PEM electrolysers in France, in Les Ulis (Ile de France)
- **ENGIE joins Michelin in Symbio FCell capital**
- **150 Forklifts in Carrefour Group new distribution centre**
- **HYWAY:** world record established by CETUP during the Electromobility Days in Grenoble September 23 for the longest drive with a Kangoo ZE H2 equipped with 22 kWh of batteries and 1.8 kg of H2: 367 km.



Up-Scaling the Pt Hollow Nanoparticle Materials: From the Laboratory Synthesis up to PEMFC Cell Integration



PtNi/C hollow catalysts from 0.350g up to 4 g per batch

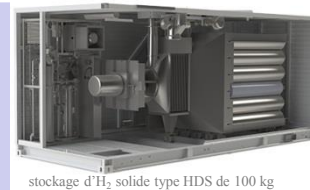
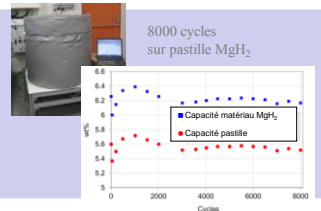


- **After 30,000 cycles in AST:** Higher performances for « hollow » vs. Pt/C up to 0.35 A/cm²
- **High catalytic activity preserved** despite 50 % less active surface vs. Pt/C
- **Adaptation of the MEA formulation and MEA manufacturing process**
- **High ECSA loss for Pt/C 20% over the first 5,000 potential cycles**
- Important Ostwald ripening due to small initial nanoparticle size (3.5 – 5 nm)
- **Limited ECSA loss for hollow PtNi/C : larger initial NPs**
- Better particle stability as previously measured in RDE configuration



From R&D to Industrial Transfers

H₂ Solid Storage: McPhy Energy



2010



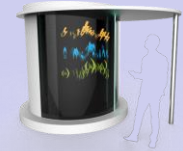
2011

2013

2013

2015

H₂ production & conversion: SYLFEN



2008

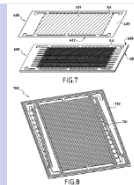
2010

2012

2014

2016

Fuel Cell: SYMBIO FCELL



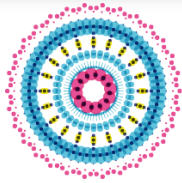
2010

2012

2013

2013

2015

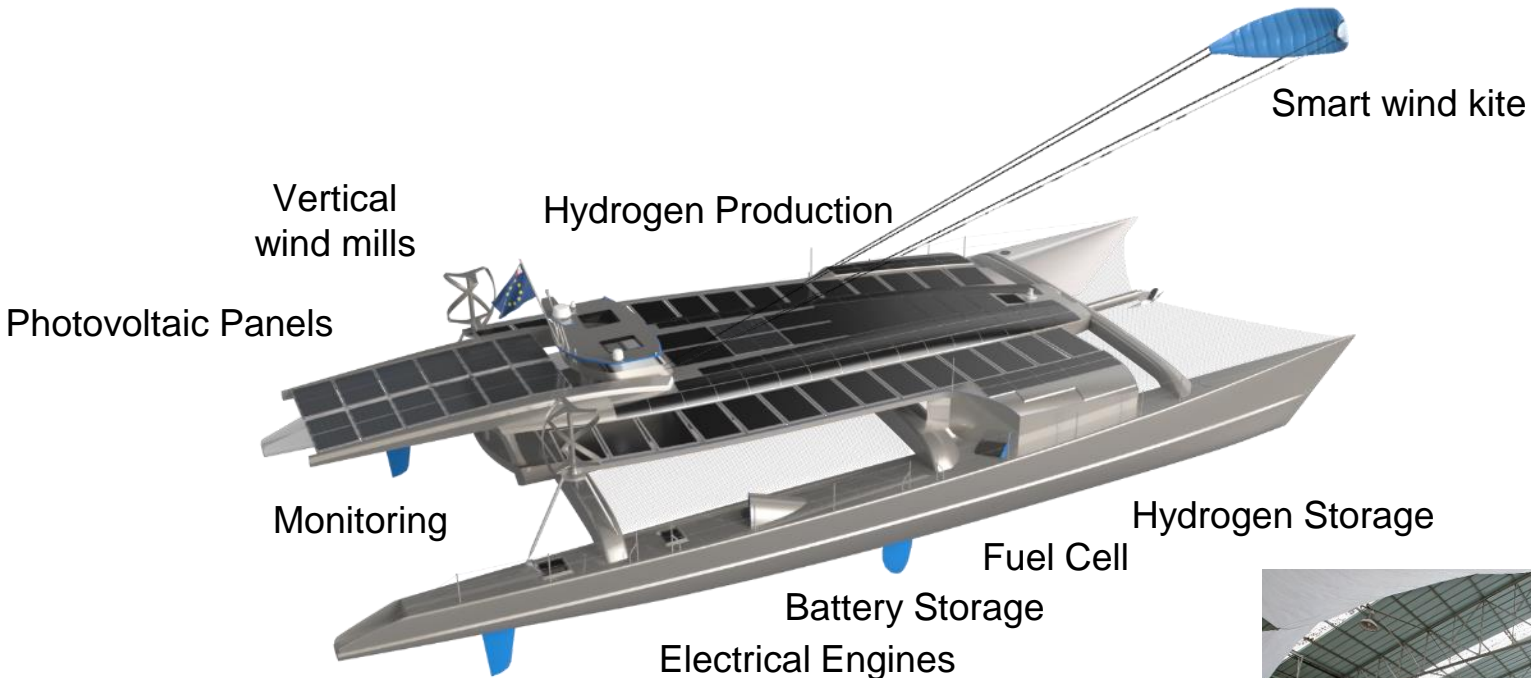


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