SET-PLAN IMPLEMENTATION

The Steering Group of the SET-Plan in its last meeting on October 28th, 2010 agreed to speed-up the execution of activities of the Implementation Plans (IPs) of the European Industrial Initiatives (EIIs). It was decided to collectively identify the possibilities for launching joint actions between Member States and/or Member States and the European Commission.

The mapping exercise carried out through this questionnaire builds upon this decision of the Steering Group. It aims to identify topics for leveraging best ongoing efforts with complementary joint actions, as prioritized by the Implementation Plans. In this phase the mapping will focus on projects and activities with a total budget higher than 1 M€.

We trust that you also consider the success of this exercise important for the immediate implementation of the SET-Plan.

MAPPING OF PROJECTS, ACTIVITIES, RESOURCES AND INVESTMENTS

To which EII(s) is your project, activity, resource or investment relevant? (multiple choices are possible)

<table>
<thead>
<tr>
<th>WIND</th>
<th>SOLAR</th>
<th>GRIDS</th>
<th>CCS</th>
<th>NUCLEAR</th>
<th>BIOENERGY</th>
<th>FCs &amp; H2</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
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</table>

A. PROJECTS AND ACTIVITIES

GENERAL INFORMATION

Name of project: Advanced Material Solutions for PEM Fuel Cells
Acronym: MARAPOKE
Location: Applicable only for demo/pilot project; enter specific location(s) and Member State(s)
Project partners:
List project partners; name coordinator first. For European & international projects mention the country affiliation of each partner

VTT Technical Research Centre of Finland, Aalto University, Tampere University of Technology, Åbo Akademi University, Ahlstrom Glassfibre Ltd., Beneq Ltd., Outokumpu Ltd, Premix Ltd.

Project website:

Contact details:
Name, affiliation and contact details of the project coordinator

Dr. Pertti Kauranen, VTT, pertti.kauranen@vtt.fi

Start date:

10-2007

Duration:
in months
29

SHORT PROJECT DESCRIPTION
Provide a short abstract of max. 100 words
Materials and components have been developed for polymer electrolyte fuel cells. The components studied include platinum catalysts supported on electrospun and carbonized ultrathin nonwovens, carbon papers for gas diffusion layer, electrically conductive corrosion protective coatings for stainless steel bipolar plates and injection mouldable compounds for graphite composite bipolar plates. Moreover, a multisinglecell setup has been developed for efficient in-situ screening of fuel cell materials. Finally, the most promising materials were tested in short 5 – 10 cell PEMFC stacks.

PROJECT GOALS & OBJECTIVES

Goals:
Indicate main qualitative goals

The main goal was to identify business opportunities for Finnish material companies in the PEMFC value chain.

Objectives:
Indicate quantitative objectives (similar to KPIs of the IPs of the EIIs). Also indicate intermediate milestones where applicable.

Feasibility of electrospun and carbonized polyacrylonitrile webs as Pt catalyst support for PEMFC, feasibility of low cost, non-carbonized carbon papers as gas diffusion media for PEMFC, efficient in-situ screening method for electrically conductive stainless steel coatings, injection moldable graphite-PPS compound for high temperature PEMFC with through plane conductivity of 10 S/cm.
**PERFORMANCE OF THE PROJECT**

<table>
<thead>
<tr>
<th>Assumed state-of-the-art:</th>
<th>Carbon black supported platinum printed as an ink for the catalyst layer, carbonized carbon papers or cloths as gas diffusion media, gold plated stainless steel as automotive bipolar plate, compression moulded thermosets as stationary bipolar plates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievements so far:</td>
<td>Submicron PAN nonwovens were produced and successfully carbonized but the catalytic activity could not be measured, the resistance of non carbonized carbon papers was 3 to 10 times higher than those of carbonized reference materials, efficient in-situ screening method was developed for SS-BPP, PVD coated CrN showed promising performance but long term stability could not be demonstrated, the conductivity target of 10 S/cm for the PPS-graphite compound was achieved but the melt viscosity should be further reduced</td>
</tr>
<tr>
<td>Difficulties and potential risks:</td>
<td>Indicate briefly problems encountered or to be encountered in the short term (e.g. overall legislative context, public acceptance, permitting, etc.)</td>
</tr>
</tbody>
</table>

**FUNDING & BUDGET**

<table>
<thead>
<tr>
<th>Funding programme:</th>
<th>Tekes Fuel Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding public entity:</td>
<td>Finnish Funding Agency for Technology and Innovation (Tekes)</td>
</tr>
<tr>
<td>Total (public &amp; private) project budget (€):</td>
<td>1.700.000 €</td>
</tr>
<tr>
<td>Public funding (€):</td>
<td>1.600.000 €</td>
</tr>
<tr>
<td>Total effort (person-months):</td>
<td>150</td>
</tr>
</tbody>
</table>
## DISSEMINATION OF PROJECT RESULTS

Publications, presentations in conferences and workshops, and other dissemination means:

*Give highlights only*


**Auvinen S., Tingelöf T, Ihonen J., Siivinen J., and Johansson M.,** *Stainless Steel In-situ Corrosion Testing in a PEFC Multisinglecell, 216th ECS Meeting, 4-9 October 2009, Vienna, Austria*


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## TOWARDS COMMERCIALISATION

Indicate (new) products and/or services expected from the project. Are new business models required for commercialisation of the project results?

*Highlight expected commercialisation benefits, e.g. patents, spin-offs, new products, business partnerships*

Further development of all the components is needed before commercialization.

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## SYNERGIES WITH THE IMPLEMENTATION PLANS OF THE EUROPEAN INDUSTRIAL INITIATIVES – NETWORKING – KNOWLEDGE SHARING

Contribution to/Relevance with the IPs: To your opinion, to which activities of the IPs of the EIIs is this project related to? Indicate contributions / complements.

*Please note that reference here is made to the activities of the IPs as published in*


All the results are relevant to FCH-JU.

Potential synergies with other projects and activities: Can you identify any other project(s) in your country, another MS or at European level that could be synergetic with this project?

*Stainless steel coatings are further developed in a Nordic project NORCOAT and an FCH-JU project CARPLATE is under negotiation.*

Networking: Would you be willing to share results with the projects identified above?

*Indicate willingness to networking and also potential conditions*

*Yes, the conditions are to be agreed upon.*
Knowledge sharing: Would the abovementioned Networking necessitate a formal knowledge sharing agreement? To your view would this be the preferred route?
Yes, and agreement is needed and this is the preferred route.

Future steps: Are there any follow-up activities considered after the completion of your project? Is there a need to scale up activities in this topic at European level?
Stainless steel coatings are further developed in a Nordic project NORCOAT and an FCH-JU project CARPLATE is under negotiation.

B. RESOURCES AND INVESTMENTS

RESOURCES AND INVESTMENTS
Describe in short any RD&D infrastructures that your project relies on. Are these available or do they need to be developed?
Electrospinning and electroplating equipment, PVD reactors, heat treatment furnaces, twin screw extruders, injection moulding machines, fuel cell test stations. These are available but should be continuously upgraded.

If these are to be developed, what is the corresponding investment required? What is the allocated budget (€) for this investment in your project?
Only minor upgrades worth 40,000 € could be done.

OTHER INFORMATION

Date: 11 March 2011
Information provider: Dr. Pertti Kauranen, VTT

Please send the completed form to JeanLuc.Delplancke@fch.europa.eu set-plan-secretariat@ec.europa.eu preferably by MARCH 15.

Thank you for your cooperation!