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>
</tr>
</thead>
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A. PROJECTS AND ACTIVITIES

GENERAL INFORMATION

Name of project: Generation IV and Transmutation Materials

Acronym: GETMAT

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

KIT Germany
CEA France
SCK-CEN Belgium
ENEA Italy
PSI Switzerland
NRG  Netherland
CIEMAT  Spain
EDF SA  France
HZDR  Germany
ULB  Belgium
KTH  Sweden
UL  United Kingdom
UEDIN  United Kingdom
UA  Spain
UH  Finland
MPA.USTUTTG  Germany
CNR  Italy
CNRS  France
UJV  Czech Republic
JRC  Belgium
VTT  Finland
CHALMERS  Sweden
UPM  Spain
ERSE  Italy


Contact details:
Name, affiliation and contact details of the project coordinator
Concetta Fazio, KIT
concetta.fazio@kit.edu

Start date:  February 2008

Duration:  60

SHORT PROJECT DESCRIPTION
Provide a short abstract of max. 100 words
Studies of structure and clad materials for core and primary systems of innovative nuclear systems to improve efficiency (higher temperature, higher fuel burn-up, mechanical stresses and corrosive environment). The focus is on 9Cr F/M and ODS steels. These materials are procured and tested in terms of mechanical behaviour at high temperature corrosion and mechanical resistance in relevant coolant media. Moreover, the welding/joining of these steels and corrosion protection barrier development are also performed. The PIE of relevant irradiation program on these two classes of materials will produce an important set of data. All these data together with theoretical models and model experiments will generate an improved understanding and assessment of these steel in relevant conditions.

PROJECT GOALS & OBJECTIVES
Goals:
Indicate main qualitative goals
Improvement and extension of 9-12 Cr F/M steels qualification
<table>
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<tr>
<th>ODS alloys development and characterisation</th>
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<tr>
<td>Joining and welding procedures qualification</td>
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<tr>
<td>(relevant for both ODS and F/M steels)</td>
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<tr>
<td>Development and definition of corrosion protection barriers</td>
</tr>
<tr>
<td>Multiscale modelling and model experiments</td>
</tr>
</tbody>
</table>

**Objectives:**

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

- ODS procurement and F/M steel procurement
- ODS characterisation at high temperature and in environment to assess the resistance of these materials and the ODS composition effect
- ODS and F/M steel welding and joining
- Qualification of corrosion protection barrier and process assessment
- Execution of PIE of samples irradiated in Phénix, SINQ, BR2, HFR, MEGAPIE and BOR6 and assessment of temperature, dpa, environment
- Fundamental understanding of Fe and FeCr alloys in aging conditions and under irradiation. Underpinning models with model experiments

**PERFORMANCE OF THE PROJECT**

Assumed state-of-the-art:
Describe quantitatively the state-of-the-art that the project objectives are based upon

- Knowledge on F/M is quite high however still data are needed to assess the use of this material in nuclear environment
- Knowledge on ODS steel in Europe is very limited. The activity in GETMAT represents a starting point to understand if it is worth to develop an European Program on ODS development
- PIE data are essential for the materials qualification in a nuclear environment. The PIE data generated within GETMAT will be an important asset for the material qualification
- Theoretical and Fundamental Science approaches are important task for the understanding of materials behaviour in extreme environment and to support the development of materials and the definition of test matrices for materials qualification and
validation programs. The combination of the theoretical approach with model experiments is a decisive step forward within this area.

Achievements so far:
If intermediate results are available, please indicate the current achievements (qualitative and/or quantitative)

- ODS has been procured and distributed
- The ODS characterisation program has started
- F/M steel characterisation has started and weld/join activities as well. A preliminary assessment of EB and TIG welding has been performed. As for the other weld techniques more results are needed.
- The optimal composition of corrosion protection barrier for HLM environment has been investigated. Two different technologies are assessed in GETMAT where the assessment of the HVOF/LASER technology was only preliminary and has been completed. The PS/GESA is still ongoing.
- PIE activities have been started but are very slow. The LEXUR II irradiation program has been put forward and has partially started.
- Interatomic potentials have been established and used in order to model Fe and Fe-Cr alloys. First comparison between models and model experiments has allowed to step forward in the fundamental understanding.

Difficulties and potential risks:
Indicate briefly problems encountered or to be encountered in the short term (e.g. overall legislative context, public acceptance, permitting, etc.)

All in all within the GETMAT project the difficulties and potential risks are mainly related to technical issues as e.g.:

- ODS steel procurement: the failure of one attempt had to be addressed and a back-up solution has been put in place. This has resulted in the revision of objectives, test programme and schedule.
- PIE programme: due to several technical problems the PIE program had to be completely revised. The revision has allowed to keep the schedule of the GETMAT project and on the other hand the objectives have not been changed too much.
FUNDING & BUDGET

Funding programme:  
Give the name of funding programme  
FP7

Funding public entity:  
Indicate which public entity is in charge of /manages the programme  
KIT

Total (public & private) project budget (€):  
14 M€

Public funding (€):  
14 M€

Total effort (person-months)  
~ 1200

DISSEMINATION OF PROJECT RESULTS

Publications, presentations in conferences and workshops, and other dissemination means:  
Give highlights only

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

The project has o be classified in the field of pre-competitive research. At this stage there is no commercialisation foreseen.

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 http://setis.ec.europa.eu/activities/implementation-plans

The activities performed in GETMAT can be of relevance for the ESNII systems considered, e.g. SFR, GFR, LFR/ADS. In particular the innovative materials as e.g. ODS being a material for industrial system can be tested in these systems as soon as their are available.

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?

Synergies are with: PERFORM60 (modelling), MATTER, LEADER, HELIMNET, the EERA Joint Program on Nuclear Materials
Indirect synergies are also with ESFR, GOFASTR, CDT
Networking: Would you be willing to share results with the projects identified above?
*Indicate willingness to networking and also potential conditions*

| We are already doing this through the GETMAT-user group |
| Knowledge sharing: Would the abovementioned Networking necessitate a formal knowledge sharing agreement? To your view would this be the preferred route? |
| Has been ruled out through the GETMAT – user group |
| 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? |

yes

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**B. RESOURCES AND INVESTMENTS**

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<tr>
<th>RESOURCES AND INVESTMENTS</th>
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<tbody>
<tr>
<td>Describe in short any RD&amp;D infrastructures that your project relies on. Are these available or do they need to be developed?</td>
</tr>
<tr>
<td>1. <em>Materials development technology park (to allow fabrication of materials at higher scale (~ 100kg) than laboratory scale – most probably not available)</em></td>
</tr>
<tr>
<td>2. <em>Irradiation Facilities (would be needed with the right neutron spectrum) and PIE (are available but more could help in improving PIE programs)</em></td>
</tr>
</tbody>
</table>

If these are to be developed, what is the corresponding investment required? What is the allocated budget (€) for this investment in your project?

No allocated budget for this investment in the GETMAT project

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**OTHER INFORMATION**

| Date: when the questionnaire was completed | 30.03.2011 |
| Information provider: Give the name and affiliation of the contact person for the questionnaire. If you are the project coordinator, check the box project coordinator | X |
Please send the completed form to set-plan-secretariat@ec.europa.eu preferably by FEBRUARY 15.

Thank you for your cooperation!