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Kick-off meeting minutes

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Dissemination level (mark with an x the relevant)		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Report title Kick-off meeting minutes	Deliverable No 1
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Author(s)	
Summary This Deliverable provides the full minutes of the first project meeting held in Rome 9-10 January 2019	
Key words Project targets, project relations, project first steps	

AD ASTRA

Kick-off Meeting – Minutes

Dates: January 9-10, 2018
Location: ENEA Headquarters
 Lungotevere Thaon di Revel, 76
 00196 Roma

Participants: Stephen McPhail, Massimiliano Della Pietra, Davide Pumiglia, Stefano Frangini, Livia Della Seta (ENEA); Dario Montinaro (SOL); Jérôme Laurencin (CEA); Cesare Pianese, Pierpaolo Polverino, Marco Gallo, Ennio Andrea Adinolfi, Fabio Postiglione (UNISA); Jan Van Herle, Manuel Bianco (EPFL); Aline Leon, Annabelle Brisse (EIFER); Barbara Bosio, Fiammetta Bianchi, Roberto Spotorno, Paolo Piccardo (UNIGE); Kai Herbrig, Christian Walter (SUN); Daria Vladikova, Blagoy Burdin (IEES); Anke Hagen (DTU)

Day 1

9 January		14:00
Welcome, opening, roundtable and approval of agenda		14:00
Work Package 1: Coordination		14:15
<ul style="list-style-type: none"> Grant Agreement: key information 	Coord.	
An overview was given of project history, objectives and key requirements and details for project reporting		-
<ul style="list-style-type: none"> Consortium Agreement: handing in signature pages 	All	
Signature pages for the CA were handed in by UNISA, UNIGE, SUNFIRE, SOLIDPOWER; IEES; EPFL. DTU has sent 2 originals by courier but a third will be required. Missing: EIFER, CEA, ENEA.		Action: EIFER, CEA, ENEA
<ul style="list-style-type: none"> Pre-financing: updates 	Coord.	
The guidelines to the amount and timing of the payout of the Prefinancing were explained: when the bank account details of <u>all partners</u> are communicated to ENEA, the prefinancing will be paid out to each partner. Details are in so far from: IEES, SUNFIRE, SOLIDPOWER, DTU, UNIGE, EIFER. Missing: UNISA		Action: UNISA
<ul style="list-style-type: none"> Objectives, project structure, work plan of the project 	Coord.	
A brief synopsis of the project scientific objectives and milestones was given, with a draft schedule of experimental campaigns which will need to be further defined based on technical discussions to be undertaken between the specific partners. A monthly telco and a physical meeting every 6 months have been proposed.		-
Coffee break		15:15
Presentation by ID-FAST (AST for PEM) & discussion	Sylvie Escribano (CEA/IDFAST)	15:45
ID-FAST is entering year 2 and has already faced some challenges. An important point is that current-generation (automotive) stacks have progressed from available field-tested stacks (that provide the post-test analyses and of which there is a known operational history). This poses challenges to representativeness of the observed degradation phenomena vs. ASTs being developed on the latest stacks. Also, there is a strong challenge in terms of time to correlate ASTs with real-world behaviour: that is why stacks are being run for 1000-2000 hours instead of target (real-world) lifetimes of 5000 hrs to provide		-

<p>benchmarks for ASTs. Furthermore, validation of selected ASTs (replication of tests) will only be carried out at the end of the project.</p> <p>Recommendations are to look at the evolution of current-voltage derivatives for more resolution, and to separate local (cell/stack) conditions from material conditions, e.g. by testing cell segments tested in segmented stacks each in different conditions after the segmented test. This allows to verify if the material conditions (due to the location in the segmented stack) can be regenerated if the operating conditions are changed to those corresponding to other locations.</p> <p>Existing ASTs for PEM are only on catalysts and catalyst layers. ID-FAST is attempting to carry out ASTs both for single mechanisms and – through dynamic load cycles derived from the standardised drive cycle – application-driven conditions.</p> <p>The JRC acts as advisor to the project, and part of the aim is to carry out tests on the standardised differential cell as proposed by JRC to compare different MEAs. ID-FAST will organise a workshop in M24: this could be the right timing to have a joint session/meeting with AD ASTRA to exchange possible findings.</p>		
Work Package 2: Database		16:15
<ul style="list-style-type: none"> Objectives, programming, infrastructures, approach 	IEES	
<p>The approach to generating a user-friendly database for AD ASTRA was presented. First issue is to find an appropriate server to host the AD ASTRA database. ENEA will verify the possibility to host it in conjunction with the project website. The second issue will be to select the appropriate software to run the database. DTU suggested a number of open source programmes that could be used. Another option proposed is to ask to Sylvie Escribano what kind of data-base/server/software are used in ID-FAST. UNISA flagged the concern for data security and the confidentiality and the consideration to pay for a reliable product.</p> <p>The database will consist of 6 sections: Project resources pool (documents, references, templates, inventory), knowledge pool (selected references), book of samples (nomenclature and required level of detail to be defined, as well as options for notifications), data bank (raw data and filtered data), handbook of protocols (to be taken up from ENDURANCE project), modelling communication (linking WP5 and WP3/4).</p> <p>IEES will send templates for the input to the first database (inventory of experimental equipment and models) and partners are required to send info to respective WP leaders and IEES.</p> <p>IEES and the stack manufacturers (SOL, SUN) will discuss the samples to be made available to the project. UNISA points out that the management of confidential information coming from manufacturers has to be defined: the approaches used in ENDURANCE and IN-SIGHT projects might be adopted.</p> <p>All partners should start sending selected references to build up the knowledge pool, which will serve as working material for the Review Paper to be drafted in the first half of the project.</p>		<p>Action: ENEA, IEES, UNISA (server & software) IEES, DTU, UNIGE (inventories) IEES, SUN, SOL (samples) ALL (references)</p>
Work Package 3: Experimental		17:15
<ul style="list-style-type: none"> Objectives, programming, infrastructures, approach 	DTU	
<p>Partners are required to send info regarding the inventory of test set-ups relevant for AST. Next a focused discussion should take place regarding the experimental approaches (chemical, electrochemical, in situ, ex situ, SOFC/SOEC).</p> <p>The operating histories of the samples that will be supplied of field tested stacks will be crucial to define the first experimental campaigns. So far, 5 partners have</p>		<p>Action: All (test set-ups for ASTs) WP3 partners (establish geometries of</p>

<p>experience (and set-ups) with SolidPower stacks (EPFL, UNIGE, CEA, DTU, SOL), 2 with Sunfire stacks (EIFER, SUN). Test item geometries will determine how to further divide the testing tasks between the 2 cell architectures. Therefore a technical discussion will have to take place on sample geometries.</p> <p>To prepare for the first attempts of assembling a stack with ex situ aged components (interconnects should be feasible, electrodes is challenging, but first attempts in terms of cell sintering temperatures are proposed), stack-size samples have to be ex-situ aged.</p> <p>First milestone for WP3 is in M2 (delivery of virgin samples for testing)!</p>		samples that can be tested)
Preparation of topics for discussion over working dinner, transfer to hotels & restaurant	All	18:30
Working Dinner offered by ENEA		20:00
Close of day 1		22:00

Day 2

10 January		9:00
Work Package 4: Post-test analysis		9:00
<ul style="list-style-type: none"> Objectives, programming, infrastructures, approach 	UNIGE	
<p>Also here the inventory of available equipment is the first step to assess the feasible methods and programme the analysis of samples (including contingency plans). It is important to establish the analysis protocols to ensure data shall be comparable. Also protocols for the preparation of samples for <i>shipping</i> need to be defined. UNIGE will provide a first proposal based on the equipment available (as done in ENDURANCE). This includes the format of the data that should be shared (images, spectra, raw numbers).</p> <p>The terms <i>parent</i> (original field-tested item) and <i>child</i> samples (pieces from parent samples) were defined. Also <i>macro</i> and <i>micro</i> samples: these need to be properly defined although they should be equivalent to <i>parent</i> and <i>child</i>.</p> <p>First milestone for WP4 is in M2 (delivery of field-tested samples)!</p>		Action: All (analysis equipment) UNIGE, WP4 partners (agree on shipping and measurement protocols)
Coffee break		10:00
Work Package 5: Modelling		10:30
<ul style="list-style-type: none"> Objectives, programming, infrastructures, approach 	UNISA	
<p>The complete modelling programme was presented, which embraces all possible modes of simulation and covers 6 Tasks: complementarities and feed-ins from one model/stage to the others was explained. Work will start in M2 but input is required immediately to start inventorising available models and assess the experimental parameters that will be evaluated during testing.</p>		Action: UNISA, WP5 partners (model inventory)
Wrap-up of scientific approach and confirmation of imminent deadlines	All	11:30
<p>CEA and EPFL gave presentations with suggestions of experimental and modelling approaches that could be used for AD ASTRA, ranging from Design of Experiments to all kinds of test architectures (symmetric cells, segmented cells, interconnect-coating combinations, etc.).</p> <p>High-pressure testing was proposed by CEA (can also be done at higher temperature for SUN samples) and they identified mechanical damaging (micro-indentation e.g.) or partial reoxidation of cells as ex situ aging approaches that could address effects such as Ni agglomeration/LSCF destabilisation and delamination respectively.</p> <p>EPFL underlined that it is fundamental to identify the input and output variables to be correlated in the definition of ASTs. On-purpose defect introduction was carried out by EPFL already for interconnects and seems feasible though should</p>		-

still be determined for electrodes. Many impressive results were presented, including observations that imperfect flatness of the components can have a large influence on local conditions, that Ni particle rounding is an effect related to SOEC operation only, and that the assembly stage of the stack probably has the largest influence on the stack performance decay.		
Work Package 6: Dissemination		12:15
• Objectives, programming, templates/logo, approach	ENEA	
The approach to dissemination, communication and exploitation was presented. A few project logos proposed by ENEA were considered and suggestions were put forward for ENEA to incorporate in a new version of the logo to be circulated for final vote.		Action: ENEA, All (Logo vote)
Other business, next meeting		
The next plenary meeting will be held at the DTU campus at Risø on 25-26 June 2019. This meeting will also host the External Advisors. As immediate actions, a number of technical telcos were programmed, as in the Table below.		Action: All
Working Lunch offered by ENEA		13:00
Transfer to Casaccia Research Centre	All	14:00
Close of day 2		17:00

Topics	subtopics	partners	deadline	proposed actions
WP2				
2.1 Server + software		ENEA, IEES, UNISA	week 5	tbd wk 4
2.2 Inventory of Equipment	elchem testing, WP3	DTU+ all testing partners	week 3	send info to Daria
	posttest analysis WP4	UNIGE + all analysis partners	week 3	send info to Paolo
	models WP5	UNISA, EPFL, UNIGE, EIFER	week 8	template wk 4 webcall wk 8
2.3 Samples (parent)	elchem testing, WP3	IEES, SUN, SOL, others	week 5	IEES provides template to manufacturers v
	posttest analysis WP4	IEES, SUN, SOL, others	week 5	IEES template to manufacturers wk 3
2.4 Data formats	elchem testing, WP3	DTU+ all testing partners	follows inventory + samples	
	posttest analysis WP4	UNIGE + all analysis partners		
	models WP5	UNISA, EPFL, UNIGE, EIFER		
2.5 Background knowledge	articles etc related to info presented at KoM	All	week 5	send info to Daria
WP3				
discussion/prioritisation of degradation phenomena		DTU+ all testing partners	week 8	modified phenomena table circulated wk 3, input by wk 6 + discussion by telco
3.1 preliminary schedule of				
3.2 testing campaigns		DTU+ all testing partners	week 9	follows outcome previous topic
WP4				
4.1 allocation of samples to analysis partners		UNIGE + all analysis partners	week 6	UNIGE sends scheme of samples+analysis to partners
4.2 discussion of protocols + results templates		UNIGE + all analysis partners	week 9	doodle sent wk 3 telco wk 4-5
WP5				
5.1 prioritisation of model development			ongoing	follows outcome of Topic 3.1
5.2 discussion of TIPS and TOPs		WP3 and WP5 partners	first version week 10	follows outcome of Topic 3.1