



## D7.5: Up-dated Dissemination and communication plan

### Public Document

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### Executive summary

This report gives an update of the communication and dissemination plan of the project GAMER. A description of the communication activities is provided with actions directed to a wide audience using a webpage, flyer, press release and videos, as well as to the scientific community via participation and organization of conferences and workshops.

Finally, it presents the dissemination activities to maximize impact and foster further exploitation of the results with participation in conferences, fairs and workshops, and publications in peer reviewed journals. The project is well in line with its key performance indicator targets in terms of communication. Additional efforts will be dedicated to writing of publications in the second period.

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# 1 Introduction

## 1.1 GAMER project

The GAMER project aims at developing a novel cost-effective tubular Proton Ceramic Electrolyser (PCE) stack technology integrated in a steam electrolyser system to produce pure dry pressurized hydrogen. The electrolyser system will be thermally coupled to renewable or waste heat sources in industrial plants to achieve higher AC electric efficiency and efficient heat valorisation by the integrated processes. The project aims at establishing a high volume production of novel tubular proton conducting ceramic cells. The cells will be qualified for pressurized steam electrolysis operation at intermediate temperature (500-700°C). They will be bundled in innovative single engineering units (SEU) encased in tubular steel shells, a modular technology, amenable to various industrial scales. GAMER focuses on designing both system and balance of plant components with the support of advanced modelling and simulation work, flowsheets of integrated processes, combined with robust engineering routes for demonstrating efficient thermal and electrical integration in a 10 kW electrolyser system delivering pure hydrogen at minimum 30 bars outlet pressure.

Partners of GAMER are:

<i>Partner (short name)</i>	<i>Country</i>
<i>SINTEF (SINTEF)</i>	<i>Norway</i>
<i>Coorstek Membrane Science AS (CMS)</i>	<i>Norway</i>
<i>CSIC, Instituto de Tecnología Química (CSIC)</i>	<i>Spain</i>
<i>Carbon Recycling International (CRI)</i>	<i>Iceland</i>
<i>University of Oslo (UiO)</i>	<i>Norway</i>
<i>MC2 Ingeniería y Sistemas SL (MC2)</i>	<i>Spain</i>
<i>Shell Global Solutions International B.V. (SGSI)</i>	<i>The Netherlands</i>

The consortium covers the full value chain of the hydrogen economy, from cell and SEU manufacturer (CMS), system integrators (MC2, CRI), through researchers (SINTEF, UiO, CSIC), to end users in refineries, oil and gas, chemical industry (CRI, SGSI, with advisory board members YARA and Air Liquide). All along the project, these experienced partners will pay particular attention to risk management (technical, economic, logistic, business) and ensure progress of the technology from TRL3 to TRL5. The overall consortium will perform strategic communication with relevant stakeholders in order to ensure strong exploitation of the project's results.

## 1.2 Deliverable D7.5

All partners in GAMER are committed to large dissemination of the project results to maximize impact and foster further exploitation of the results during and after the completion of the project. All stakeholders are addressed, including the scientific community, industry, policymakers, NGOs and the general public.



This communication and dissemination plan is continuously updated by the partners and monitored by the dissemination manager (C. Denonville, SINTEF). It is made available in the GAMER's e-room for all partners and is exhaustively reviewed at least every 6 months at the semi-annual progress meeting in order to strategically plan and maximize the impacts of the project results. It is also monitored on a monthly basis during the EB meetings.

All communication and dissemination activities have to follow a strict dissemination procedure defined at the start of the project in order to respect the right of every partner to protect its work and results and to avoid possible conflict with the exploitation plan.

## 2 Communication activities

### 2.1 Communication plan

A detailed communication plan has been set for the first period of the project, as shown in the figure below. This plan is overlooked by the WP7 leader and the coordinator on a regular basis.

Year	2018		2019												
Month	November	December	January	February	March	April	May	June	July	August	September	October	November	December	
Interactions ML-CDEN (1/month)		w49	w1	w6	w10	w14	w18	w23	w27	w29	w33	w38	w42	w46	w49
Timeline finished / up-date															
Define interface items		w51													
Define plans for interaction with stakeholders		w51	w3	w8						review w35					
Request to WP7 for executive summary		w51				w16				w27					
Update of GAMER flyer												43			
Updated exploitation and business plan						w14	w21			27					
Updated dissemination and communication plans						w16		23	27						
Video about manufacturing: case definition										w33		43			w49
Update of website (major updates independent of continuous upload of information)			w2				w19				w38				
Meetings with stakeholders											w39				
Conference attendance									ICE2019	ICCMR14			PPCC		
Publications: first drafts						w14 / 15									
First exploitation workshop Amsterdam						w14 / 15									
Positioning paper												w39			
WP leader communicates with others		w50 (12-13)									w38-39			w47	
	ML	Marie-Laure as project leader													
	CDEN	Christelle Denonville													
	CDEN ML PV														
	ML - CDEN														
	AB - ML														
	GAMER partners														

Figure 1: Communication plan of GAMER.

### 2.2 Webpage, flyers and press releases

At the beginning of the project, a public website was established to present the project objectives, work plan and expected results. In addition, it gives access to published results (presentations, videos, articles...), informs about events organised by the project and presents flash news about breakthrough results. It also includes a contact form for enabling externals to contact GAMER consortium. It can be found here:

<https://www.sintef.no/gamer>

A first GAMER flyer was created to give general information about the project. It is distributed at national and international events organised by the project and/or at attended conferences, fairs, workshops or meetings with external parties. The information in this flyer can be easily communicated



to a wider public. The flyer can be downloaded from the GAMER webpage. An up-dated flyer presenting the results of GAMER will be prepared in the second half of the project.

In addition, few slides presenting general information about GAMER are made available on the project e-room for all partners to use at their convenience in various events. In this way, partners are free to communicate about GAMER without going through the dissemination procedure each time.

A twitter account [@GAMEREU2](https://twitter.com/GAMEREU2) was recently opened to keep a broader audience updated on what is happening in GAMER project.

Press releases are done to inform about important results reached in GAMER in order to sensitize the business and political community about the project's achievements and raise their awareness about proton conducting electrolyser technology. Three press releases have been made by CRI (for the start of the project), CSIC and SINTEF (to announce the publication of the results in Nature Materials Journal).

<https://gemini.no/2019/06/nyutviklet-materiale-spalter-hydrogen-mer-effektivt/>

In order to identify relevant stakeholders for GAMER, a stakeholder mapping strategy related to GAMER activities has been implemented with leading activities from SINTEF and SGSI. It was presented during the semi-annual meeting at M16 and received positive feedback from the partners. It also gave the incentive of defining a mapping strategy looking at the electrolysis technology on a broader integration level, with joined efforts from CMS and SGSI. These mapping activities are detailed in the exploitation plan of GAMER.

### 2.3 Participation in conferences and workshops

During the half period of the project, the consortium mainly focused on presenting the project's goals and activities to various stakeholders (scientific community, industry, schools...). As several results are identified as possibly patentable, there is a strict monitoring of dissemination of the results to avoid any conflict with the exploitation of the project.

Conferences and workshops where GAMER results have been presented are listed in table 1, while table 2 indicates new presentations to be given after July 2019. The list of conferences where GAMER's results should be presented is up-dated on a regular basis and discussed during progress meetings and Executive board meetings.

### 2.4 Videos

In order to present the results of the project to a wider audience, GAMER will produce two videos to be published on mass e-media and on the project website: one about the production of cells and electrolyser technology, and one about production and demonstration of the 10 kW electrolyser. These videos will aim at attracting the interest of the research society, as well as a larger public, and the business and political community. They are planned at the end of year 2 and year 3 in the project.



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## 2.5 Education and training activities

Master students, PhD and post docs work in GAMER in order to increase their qualification and knowledge. They are highly encouraged to exchange their experience with the partners of GAMER as well as with the external scientific community through conferences, workshops and scientific publications. The project counts so far 1 Post-doc at UiO; 1 Post doc at CSIC; 2 PhD students at CSIC; 1 Master Student at SINTEF. 1 Master might start at Shell in 2020.

The participation in a school event is planned in November in Oslo to promote scientific career in general and in particular in material sciences for energy conversion.



Table 1: List of conferences where GAMER has been presented until mid-2019

NO.	Type of activities <sup>1</sup>	First leader	Name of event	Date/Period	Place	Countries addressed
1	Webpage	SINTEF		April 2018		International
2	Flyer	SINTEF		April 2018		International
3	Press release	CRI	CRI and other GAMER consortium partners aim to conquer fossil-based hydrogen with green hydrogen	April 6, 2019	Iceland	National
4	Oral	CSIC	Workshop on Ion conducting ceramic electrochemical devices: how interfaces and surfaces affect performance and lifetime	April 18, 2018	Oslo, Norway	International
5	Oral	SINTEF	Workshop on Ion conducting ceramic electrochemical devices: how interfaces and surfaces affect performance and lifetime	April 18, 2018	Oslo, Norway	International
6	Poster	CRI	Status conference BMBF Funding measure CO2Plus	April 17-18, 2018	Berlin, Germany	International
7	Oral	SINTEF	ICIM –The International Conference on Inorganic Membranes	June18-22, 2018	Dresden, Germany	International
8	Oral	CSIC	ICIM –The International Conference on Inorganic Membranes	June18-22, 2018	Dresden, Germany	International
9	Oral	SGSI	EMS Membrane Summer school	June 28, 2018	Twente, The Netherlands	International
10	Oral	UiO	Asian conference in solid state ionics (ACSSI)	August 5-9, 2018	Shanghai, China	International
11	Oral	SGSI	Gordon Research School "Membranes: Materials and Processes"	August 12, 2018	New London, New Hampshire, US	International
12	Oral	SINTEF	SSPC	Sep-16-21, 2018	Vermont, US	International

<sup>1</sup> dissemination activity: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.



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13	Oral	UiO	NKS FJM 2018- The chemistries of proton ceramic electrochemical cells	Oct.16-17,2018	Lillestrøm, Norway	National
14	Oral	UiO	NKS FJM - Gulberg Waage lecture 2018	Oct.16-17, 2018	Lillestrøm, Norway	National
15	Press release	CSIC		Jun.05, 2019	Spain	National
16	1 Oral and 1 Poster	SINTEF	ICE-2019	Jun.09-13, 2019	Loen, Norway	International
17	Opening presentation	SGSI	ICE-2019	Jun.09-13, 2019	Loen, Norway	International
18	Press release	SINTEF	Gemini.no	Jun 25, 2019	Norway	National



Table 2: List of conferences for the second half of 2019

<b>Conference name</b>	<b>Conference date</b>	<b>Place</b>
<b>ICCMR - 14 International conference on catalysis in membrane reactor</b>	July 8-11th, 2019	Eindhoven, The Netherlands
<b>PPCC2019</b>	Oct.16-18th, 2019	Montpellier, France

## 2.6 List of planned communication activities

Table 3 lists the communication activities as planned and carried out in the project. A stakeholder's map has been prepared, and several actions were identified to interact with the stakeholders (see exploitation plan - Deliverable 7.4).

Table 3: Communication activities in GAMER

<b>Channels and topics</b>	<b>Audience</b>	<b>Status</b>	<b>Plan</b>
<i>Public website:</i> presents the project objectives, work plan and expected results; gives access to publishable results (presentations, videos, articles, etc.); informs about events organized by the project; presents flash news about breakthrough results.	All audience	Done  Regularly updated	Should continue
<i>Articles and appearance using scientific media outlets</i> such as international conferences and workshops and high impact peer reviewed journals (at least 20)	Research community	Active participation:  11 orals and 2 posters	Should continue  Plan for 2019 defined
<i>Articles and appearance using popular media outlets</i> (trade magazines, YouTube, twitter, Facebook, school events)	Citizens, NGO	Twitter account established	1 school event planned in 2019  2 You tube videos planned in 2019 and 2020
<i>Trade fairs:</i> will be used for dissemination of results that lead to significant multiplier effect. Throughout the year, the team will select several industry events from	Research community  Business community	Not active yet due to patenting action of the core technology	Will be considered by end of 2019



the fields of interest of the project to disseminate information.			
<i>Leaflets</i> will be disseminated to important events aiming at increasing interest of industries, scientists, students and public (e.g. WHEC, EFCH...).	Business community Research community	1 flyer prepared and made available to all partners	1 updated leaflet in preparation
<i>Press releases, policies briefs and positioning papers</i> will communicate intermediate results and important milestones: - at the start, at mid-term and one at the end.	Business community, Political, public bodies	3 press releases	Should continue  (Project Officer to be informed in advance)
<i>Education and training activities:</i> Ph.D. students will work on their degrees along with Post-Docs increasing their qualifications in the research fields of the project.	Research community	2 Post-docs, 2 PhD and 1 Master student	Will continue
<i>Two exploitation workshops with representatives from various instruments</i> (e.g. Hydrogen Europe, N.ERGHY, Hydrogen Council, JRC, EERA FC&H2 and AMPEA, EMIRI, national funding programs – e.g. ENERGIX in Norway ...) will be organized to maximize exploitation of the project's results	Public bodies, NGO  EC, Research community  Business community	1 internal exploitation workshop organised  3 meetings with advisory board members organised	1 exploitation workshop with relevant stakeholders planned in 2020  1 meeting with AB scheduled in Sept 2019
<i>Videos</i> presenting overall achievement from cells to electrolyser engineering and testing	All audience		2 videos planned

### 3 Dissemination plan per partner

The project's results are disseminated via popular and specialized channels (websites, press release, conferences and workshops participation, articles in peer reviewed journals, etc.). The initial plan for each partner's dissemination activities is reported below. The current status of the dissemination activities are reported in table 5. All the presentations can be downloaded from GAMER website.

It should be noted that two patenting actions have been considered (see exploitation plan) and have therefore contributed to reduce the dissemination of the project's results. It is planned that all partners will now focus on preparing scientific publications. They will be submitted to peer reviewed journal as soon as the patents are filed.



Table 4: Initial plan of dissemination for GAMER as drafted in GAMER description of work

<b>SINTEF</b>	<ul style="list-style-type: none"> <li>- At least 2 publications in peer reviewed journals: WP2: durability study of PCE cells in pressurized electrolysis environment; WP4: durability and performance of SEU unit in pressurized electrolysis environment.</li> <li>- Presentations of overall project results (4-6) in SSI, ECFC, SSPC18, WHEC and trade fairs</li> <li>- One positioning paper for targeted dissemination to FCH JU, ministries, NGO, industries</li> <li>- Contribution to factsheets and videos showing development on cells, SEUs, system development</li> </ul>
<b>CMS</b>	<ul style="list-style-type: none"> <li>- Presentations in conferences WHEC (1) and trade fair (2)</li> <li>- Co-authoring publications related to single components, cells and SEU qualification (at least 3)</li> <li>- Contribution to one video showing demonstration of electrolyser system</li> <li>- Contribution to preparation of factsheets for SEU and system production</li> </ul>
<b>CSIC</b>	<ul style="list-style-type: none"> <li>- At least 3 publications of the main breakthroughs in peer-reviewed journals: WP1: CFD simulation and design of the SEU; WP2: failure mechanisms of PCE, optimization of components and tubes; WP5: Durability and performance test of pressurized electrolyser system;</li> <li>- Presentations in conferences such as SSI (2-4) and PPCC workshop (2), WHEC (1)</li> <li>- Contribution to one video showing demonstration of electrolyser system</li> </ul>
<b>UIO</b>	<ul style="list-style-type: none"> <li>- At least 4 publications in peer reviewed journals on materials science; especially related to anode materials, mechanisms, performance, application, and stability/durability.</li> <li>- Presentations at international conferences, notably SSPC (2018), SSI (2019), and workshops, notably PPCC (2018).</li> </ul>
<b>CRI</b>	<ul style="list-style-type: none"> <li>- Publication of LCA results of ETL technology integrated with PCE with GAMER partners (1)</li> <li>- Joint presentations at WHEC conference on the topics of PCE: techno-economics and LCA (1)</li> <li>- Contribution to preparation of factsheets for techno-economics/LCA aspects (at least 1)</li> </ul>
<b>MC2</b>	<ul style="list-style-type: none"> <li>- Presentations in conferences and trade fair (at least 3) in WHEC, EHEC and FC Seminar</li> <li>- Contribution to preparation of factsheets for dissemination of electrolyser system (at least 1)</li> </ul>
<b>SGSI</b>	<ul style="list-style-type: none"> <li>- Presentations in the two planned exploitation workshops</li> </ul>

Table 5: Status of the dissemination activities at mid-term per partner (KPI: Key performance indicator)

Type of activities	Partner	Title	Date/Period	Total vs KPIs
Webpage	SINTEF		April 2018	1 of 2 papers
Flyer	SINTEF		April 2018	5 oral of 4-6



Oral	SINTEF	ICIM	June18-22, 2018	0 posit. paper of 1 1 flyer 0 factsheets + video
Oral	SINTEF	Workshop on Ion conducting ceramic electrochemical devices: how interfaces and surfaces affect performance and lifetime	April 18, 2018	
Oral	SINTEF	SSPC	Sep-16-21	
Oral and Poster	SINTEF	ICE2019 (1 oral + 1 poster) + ICCMR (1 oral)	June – July 2019	
Papers	SINTEF	1 in Nature Materials	2019	
Press release	SINTEF	Gemini.no	June 25, 2019	
Oral	UiO	Asian conference in solid state ionics (ACSSI)	August 5-9, 2018	1 paper of 4 3 oral of 3
Oral	UiO	NKS FJM 2018- The chemistries of proton ceramic electrochemical cells	Oct.16-17	
Oral	UiO	NKS FJM - Gulberg Waage lecture 2018	Oct.16-17	
Oral	UiO	ICE2019 (1 oral)	2019 June 9-14	
Papers	UiO	1 in Nature Materials	2019	
Press release	CRI	CRI and other GAMER consortium partners aim to conquer fossil-based hydrogen with green hydrogen	April 6, 2018	0 paper of 1 1 poster 0 oral of 1
Poster	CRI	Status conference BMBF Funding measure CO2Plus	April 17-18, 2018	0 Factsheets
Oral	SGSI	Gordon Research School "Membranes: Materials and Processes"	August12, 2018	1 of 2 oral in exploitation Workshop + 3 extra oral
Oral	SGSI	Exploitation workshop	May 2019	
Oral	SGSI	ICE2019	June 2019 9-14	
Oral	SGSI	EMS Membrane Summer school	June 28, 2018	
Paper	CMS	1 in Nature Materials	2019	1 paper of 3 0 oral of 3



				0 Factsheets + video
Oral presentation	CSIC	Workshop on Ion conducting ceramic electrochemical devices: how interfaces and surfaces affect performance and lifetime	April 18, 2018	1 paper of 3 2 oral of 5-7 0 Video
Oral	CSIC	ICIM –The International Conference on Inorganic Membranes	June18-22, 2018	
Paper	CSIC	1 in Nature Materials	2019	

The consortium is very pleased with the publication of a scientific article In NATURE Materials, which results from the work carried out in the former ELECTRA project (FCH JU 621244) and GAMER.



Article | Published: 03 June 2019

## Mixed proton and electron conducting double perovskite anodes for stable and efficient tubular proton ceramic electrolyzers

Einar Vøllestad, Ragnar Strandbakke, Mateusz Tarach, David Catalán-Martínez, Marie-Laure Fontaine, Dustin Beeaff, Daniel R. Clark, Jose M. Serra & Truls Norby ✉

Nature Materials 18, 752–759 (2019) | [Download Citation](#) ↓

## 4 Additional information

### 4.1 E-room

For the exchange of information within the consortium, a collaborative space is used, which is password protected. All shared documents are up-loaded and easily accessible to all partners. Access (read and write) is granted by the coordinator to all partner representatives. It guarantees a strict confidentiality of daily exchanges of information.

<https://project.sintef.no/eRoom/facility/GAMER>



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## 4.2 GAMER logo

A logo was created for the project and is used in all public documents, where GAMER project is presented.



## 5 Acknowledgements

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