H2020-EeB6-2015-680450-CREATE
Compact REtrofit Advanced Thermal Energy storage

D 9.3 Initial plan for the dissemination and exploitation of the project's results and communication plan

	Name	Signature and date
Prepared by	Anna Smidova Martina Bakesova	30.9.2016
Checked by	Wim van Helden, AEE INTEC	30-9-2016
Approved by	Christophe Hoegaerts (on behalf of General Assembly)	30/9/2016

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Executive summary

This deliverable (D9.3) aims to describe the initial plan for the dissemination and exploitation of the project's results and communication plan in the framework of the CREATE project. The document is a draft, which summarizes the beneficiaries' detailed exploitation and dissemination strategies and concrete actions related to the protection, dissemination and exploitation of the project results.

In general, the document is structured into two parts – dissemination and exploitation plans.

The first part (Chapter 3) highlights the initial CREATE dissemination and communication plan. The goal is to reach the widest dissemination of the foreground generated by the CREATE project and raise public awareness about the compact heat battery based on innovative Thermo-Chemical Materials storage system. In this framework a strong communication strategy must be set up in order to reach the targeted impact. To reach these goals, the whole consortium is obliged to conduct dissemination activities as previously agreed. This part offers a report on completed and planned dissemination activities and communication tools.

In the second part, the preliminary exploitation plan is introduced, reporting key project exploitable results, potential exploitation routes, partners' individual exploitation plans and priority map emphasizing risks associated with project exploitation. As the project is still in its very beginning stage and only one project meeting (except of the kick-off) was held, communication among partners occurred only via online communication tools. The first exploitation workshop is anticipated to take place during the fourth project meeting (approximately M20). Moreover, due to the early stage of the project, results should be understood as preliminary.

Thanks to the partners' contribution, this document is enriched with the project's achievements.

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1 References

1.1 Applicable Documents

	Document	Reference	Issue
AD-01	CREATE Grant Agreement	No. 680450	
AD-02	CREATE Consortium Agreement	No. 0100289706	
AD-03	D2.1 Economic value of heat storage systems	EDF-CREATE-RP-060-i1	Iss. 1
AD-04	D3.1 System requirements and specification document of the CREATE heat battery	Vai-CREATE-RP-046	Iss. 2, 13-07-2016
AD-05	Annex B (technical) to [AD-01]	H2020-EeB-06-2015	26-06-15

1.2 Reference Documents

	Document	Reference
RD-01	European Commission, Technology readiness levels (TRL) definition, Horizon 2020 – Work Programme 2016-2017, Annex G	http://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2016_2017/annexes/h2020-wp1617-annex-g-trl_en.pdf

1.3 Terms, definitions and abbreviated terms

DHW	Domestic Hot Water
DSWH	Domestic Solar Water Heater
SCS	Solar Combined System
TCM	Thermo-Chemical Material
SH	Space heating
ER	Exploitable Result
IP	Intellectual Property
TRL	Technology Readiness Level
KPI	Key Performance Indicator
WP	Work Package
D	Deliverable
EC	European Commission
IPR	Intellectual Property Rights
SME	Small and Medium-sized Enterprises
RTO	Research and Technology Organisation
ESCO	Energy Service Company

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2 Introduction and background context

The objective of CREATE is to develop and demonstrate a heat battery, i.e. an advanced thermal storage system based on Thermo-Chemical Materials (TCMs), which enables compact, loss-free and economically affordable storage of heat in existing buildings.

The CREATE project thus represents a market opportunity and paves ways to new markets. It is a chance for project partners to reinforce their market positions or enter these new markets, properly exploiting the results developed within the project. To maximize the potential benefits for each partner, a proper exploitation, dissemination and communication plan, respecting IPR issues, is crucial.

Developing a clear vision on the objectives of the project and a well-planned strategy for protection, exploitation and dissemination of results will ensure the maximum visibility, accessibility and promotion of the project. It will further ensure project results during the project period and an efficient exploitation of its results by the partners after the end of the project.

The plan for dissemination and exploitation of project's results and communication plan will be updated and adjusted during the implementation of the project, and periodic reports will be delivered informing about progress (D9.4 "Interim report" and D9.5 "Final report"). It must be noticed that at this stage of the project (M12) the research activities are still developing and much work is to be done. Consequently, the project results are far from being fully characterized and the existing information provides only drafts of exploitation and dissemination plans. Therefore, this document is only a preliminary version and its purpose is to provide internal guidelines for partners to approach dissemination and exploitation in a common and structured way.

Along with the project implementation several exploitation-strategy seminars will be organized to enhance exploitation. At the end of the project, the final report (D9.5) will summarize the clear vision and the final version of strategy for exploitation, dissemination and protection of results that will enable the assessment of the project's impact. The design

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of the exploitation and dissemination strategy will evolve in line with results of WP2 ("Cost analysis and planning for future commercial products"). It will address key non-technical barriers and include an analysis of legislation and standardization issues. Developed business cases and business models aim at wide implementation and exploitation of the heat battery (project results).

This document was compiled by Anna Smidova (Fenix TNT) and Martina Bakesova (Fenix TNT). All CREATE project participants were involved to ensure efficient exploitation, dissemination and protection of the project results. They provided valuable contributions related to individual exploitation plans, aims and claims, description and characterization of key project exploitable results and dissemination and exploitation activities. To track the progress, all partners will follow the development of the project to the final stage.

This document has also been reviewed by the partners within the CREATE project prior to its publication.

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3 Dissemination and communication strategy

The goal of communication activities is to reach the widest dissemination of the foreground generated by the CREATE project and raise public awareness about compact heat battery based on innovative Thermo-Chemical Materials (TCMs) storage system. In this context a strong communication strategy must be set up in order to reach the targeted impact. The whole consortium should commit to perform dissemination activities and proactively look for dissemination opportunities (dissemination channels, contribution to presenting project results publicly, prepare scientific publications). These basic criteria should be the following:

- target audiences and contents carefully identified
- communication messages formulated in accordance with the target audience
- information channels and tools carefully identified in order to optimally reach the target audience and to clearly convey the project ideas.

Objectives

The objectives of the dissemination activities within the framework of the CREATE project:

- ✓ to provide up-to-date information about the CREATE project
- ✓ to increase the level of awareness of the CREATE results in the industrial community
- ✓ to share the technical results of the CREATE project with the scientific community
- ✓ to promote the research and receive useful inputs from other scientists and communities
- ✓ to create a strong base for future partnerships, collaborations, and information exchange between relevant communities
- ✓ to create European communication channels within industry and scientific communities
- ✓ to attract potential customers
- ✓ to gather feedback from peers, experts, scientists, researchers, potential customers, industry, and the general public

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Target audience

The main focus for all dissemination activities is on the energy savings, energy efficiency and the building sector in general. Possible target groups will be all players involved in construction industry and renovation projects:

- policy makers
- business representatives
- public authorities (*local, municipal authorities granting building permits*)
- sectorial and industry associations
- education institutions and society
- investors (*financial institutions, bankers, project developers*)
- service providers *(thermo-technical companies, engineers, construction companies, ESCOs)*
- Industry/Manufacturers *(raw materials producers, heat battery manufacturers/providers, installers, reactor components and other equipment)*
- Civil society/End-users *(building managers, public buildings owners, homeowners, and housing associations)*
- Standardization/certification bodies *(technical chambers, National standard organizations)*

Commitment of partners

Each CREATE partner will proactively participate in communication and dissemination activities related to the CREATE project by exploiting their communication channels to reach the widest audience. This should be performed in a structured way, such that the coordinator is able to track these activities. The partner who is the most experienced one and who possesses the greatest expertise in a certain dissemination activity will carry out the just mentioned activity. For the tracking of actions executed by CREATE partners a set of tools for the collection of inputs in regards to planned activities has been developed:

- dissemination plan table
- tracking of dissemination and communication actions table (template for dissemination activities, Appendix 1).

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Permission to publish any information from the CREATE project will need to be submitted to General Assembly following EC rules (ensuring that the sensitive material is not disclosed).

Dissemination tools

Dissemination activities will be targeted both nationally and internationally. Tools that will be used for dissemination are:

- internet *(project website, social network profiles)*
- journal publications *(scientific, technical, industrial, economic journals, popular magazines, mailings related to construction, technology and innovation, building and environment, energy savings etc.)*
- regional, national and international conferences, workshops, seminars, fairs, exhibitions etc.
- webinars to convey training to students and professionals
- organization of demo sites tour in order to show to different audiences the results achievements and innovations.
- press releases, E-newsletter
- links to other projects
- project description, PPT presentation, leaflets, brochures, posters
- video production, gadgets *(pens, stickers, bags for conferences, etc.)*
- info-graphics, common graphic identity

3.1 Monitoring

Dissemination actions performed by the partners will be monitored. A Tracking list of dissemination actions table has been prepared to be used for tracking of dissemination and communication actions by partners. The template contains details about the specific events and publications. The template will be updated by the responsible partner (FENIX) any time an action is concluded. A central master file grouping all dissemination and communication actions carried out by all partners is kept updated by FENIX and stored on the CREATE website.

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3.2 Project identity and public image

A clear and coherent visual and graphical appearance will allow an easier identification for the public as well as an easier visibility to obtain a branding for the CREATE project during the dissemination activities as shown in the following section.

Project logo and logo manual

A CREATE logo was created at the beginning of the project in order to define a project identity. In such a way any kind of internal or public document (deliverables, reports, internal communications, publications, etc.) can be identified.

Figure 1: CREATE logo

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The project logo should be used in the following cases:

- in all documents developed within the framework of the CREATE project; in documents to be submitted to the EC (e.g. deliverables)
- in PowerPoint presentations to be used for communication and dissemination activities to be carried out by each participant within the framework of the project
- on the CREATE website, and on websites of the participants with a link to the project website and social profiles

It is important to follow and respect the project visual identity in order to maximize the impact on the audience. For this reason a Logo manual was prepared, outlining the visual identity guidelines (types of project logo, colour, logo usage, logo clear zone, relation to other logos, typography, file formats, applications and errors to avoid). The CREATE logo manual is available on the project website.

Figure 2: CREATE logo manual

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Partners' logos

Partners' logos will also be included according to the dissemination activity such as events, presentations, publications, brochures, posters and the website. An important factor for successful dissemination during the project is its awareness on the market and attention about the CREATE project, especially when the project is completed.

Figure 3: CREATE partners' logos

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EU emblem and H2020 logo

Figure 4: European Union emblem

Figure 5: EC Horizon 2020 logo

Statement of financial support

All dissemination relating to foreground shall include the following statement to indicate that the foreground was generated with the assistance of financial support from the European Community:

""This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 680450".

H2020-EeB-2014-2015/H2020-EeB-2015

3.3 Completed dissemination activities

The following sections consist of the descriptions of the completed activities in the course of dissemination within the first 6 months of the CREATE project (October 2015 – March 2016).

3.3.1 CREATE website

A website was set up in the early stage of the project for both, consortium members and public access. The website is actively maintained during the project period by FENIX. The aim of the website is to increase the recognition of the CREATE project to the public. The CREATE website provides a reference to be updated during the project. It is divided into two sections.

The public area of the project website provides all relevant project information for the public at large. Public information includes: background information of the project, public documents with the possibility of downloads (brochures, working papers, presentations, reports, etc.),

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news and events (workshops, seminars, conferences etc.), information about the consortium partners (including links to their homepages). The private section is available only for the project's partners and offers several documents with sensitive content.

The website link: www.createproject.eu

Main objectives:

- The content is in a clear, understandable language
- The website provides private area (password protected) for the consortium members
- Coordinator and all partners' information are included
- Illustrations, designs, photos, videos, brochures and a downloadable informative poster available
- Information regarding forthcoming events and conferences is included
- Web address is registered to search engines
- Social network profiles included

The website was developed and is maintained by FENIX, which updates the website after any progress on the project has been made.

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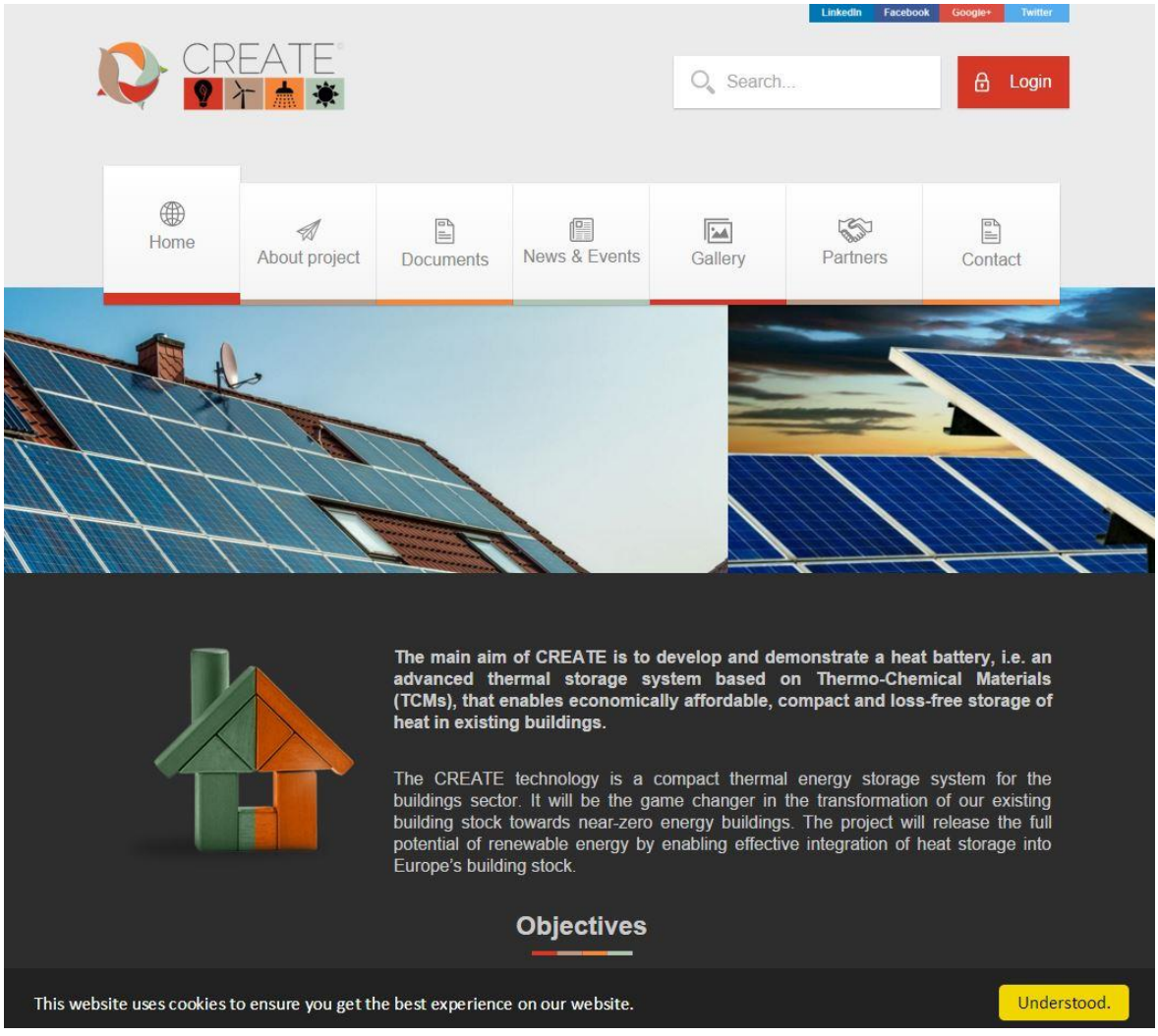
A) Public website sections:

Home: The starting page is called 'Home' and is dedicated to summarize the concept and objectives of the project.

Figure 6: CREATE website - Homepage section



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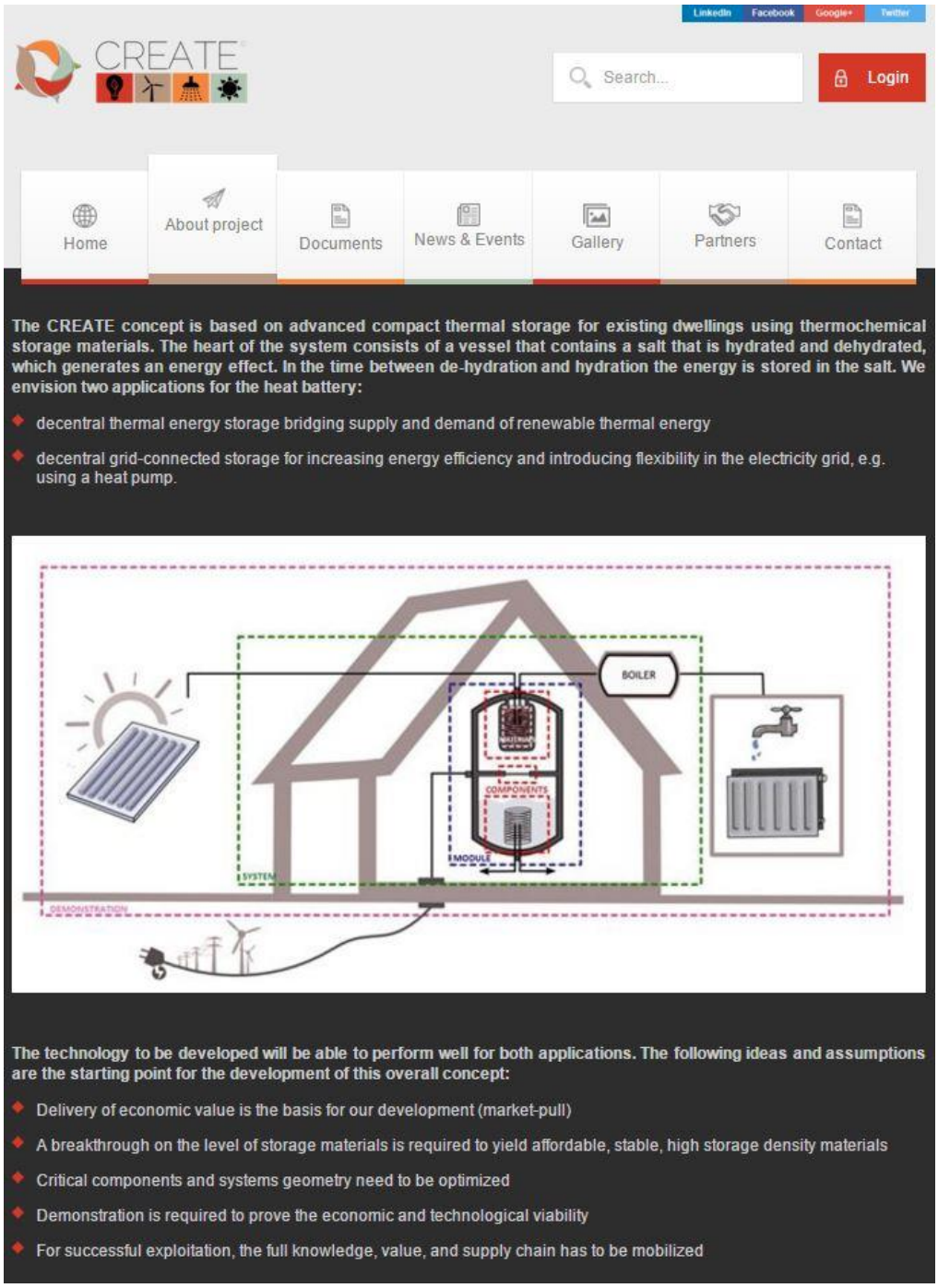
***About project*:** In this section, a detailed description of the CREATE project, following the Grant Agreement, is included. It also states the main project targets, system features and info about demonstration buildings.

Figure 7: CREATE website - About project section



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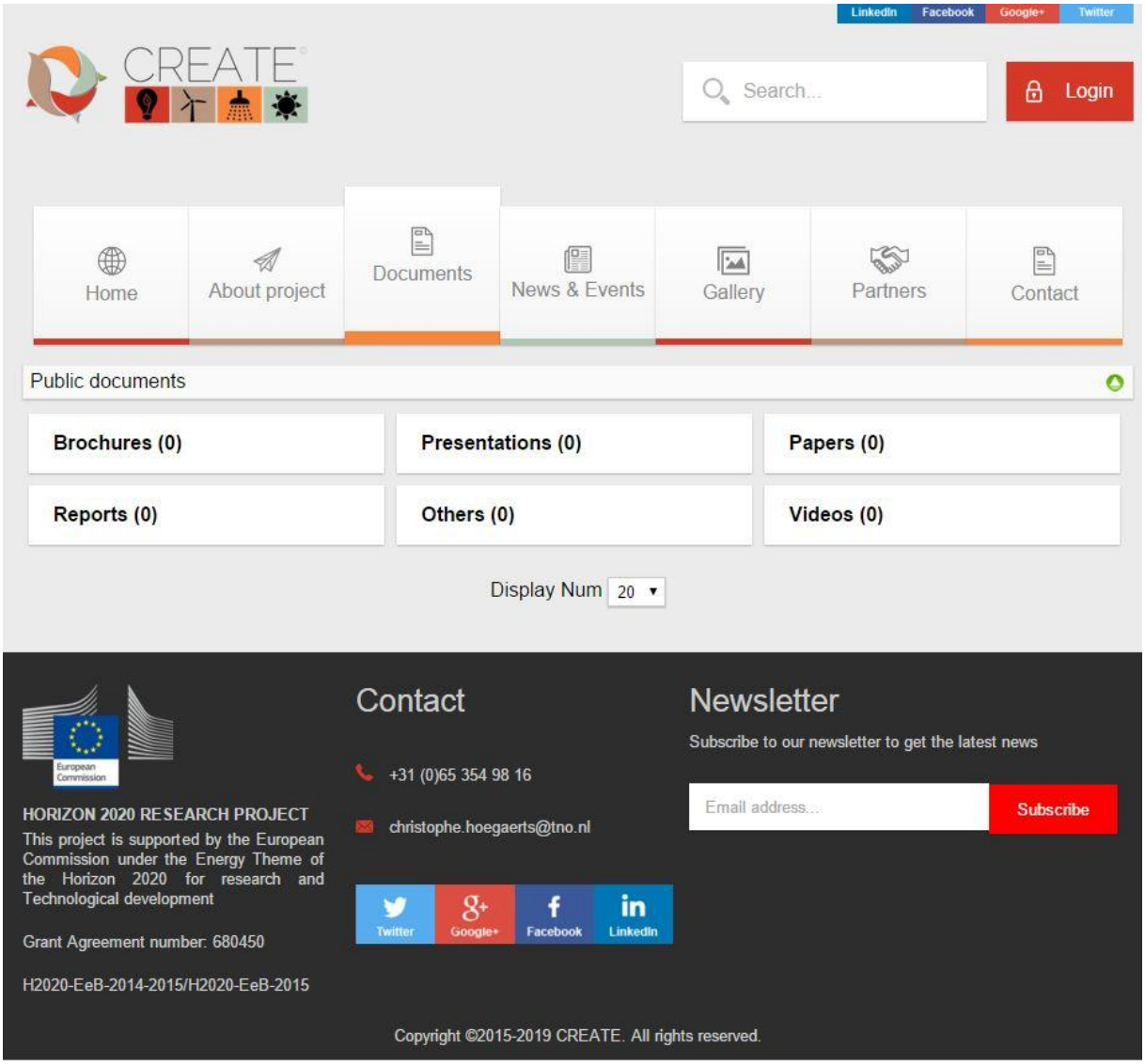
Public documents: In this section, a user is able to download dissemination material such as scientific papers, presentations, posters, brochures, photos of the consortium, etc. The Documents section is divided into six subsections. They are Brochures, Presentations, Papers, Reports, Videos and Others (subsections can be added based on the project requirements at any time) and will contain all material that has been published and publicly available (respecting copyright issues).

Figure 8: CREATE website - Public documents section



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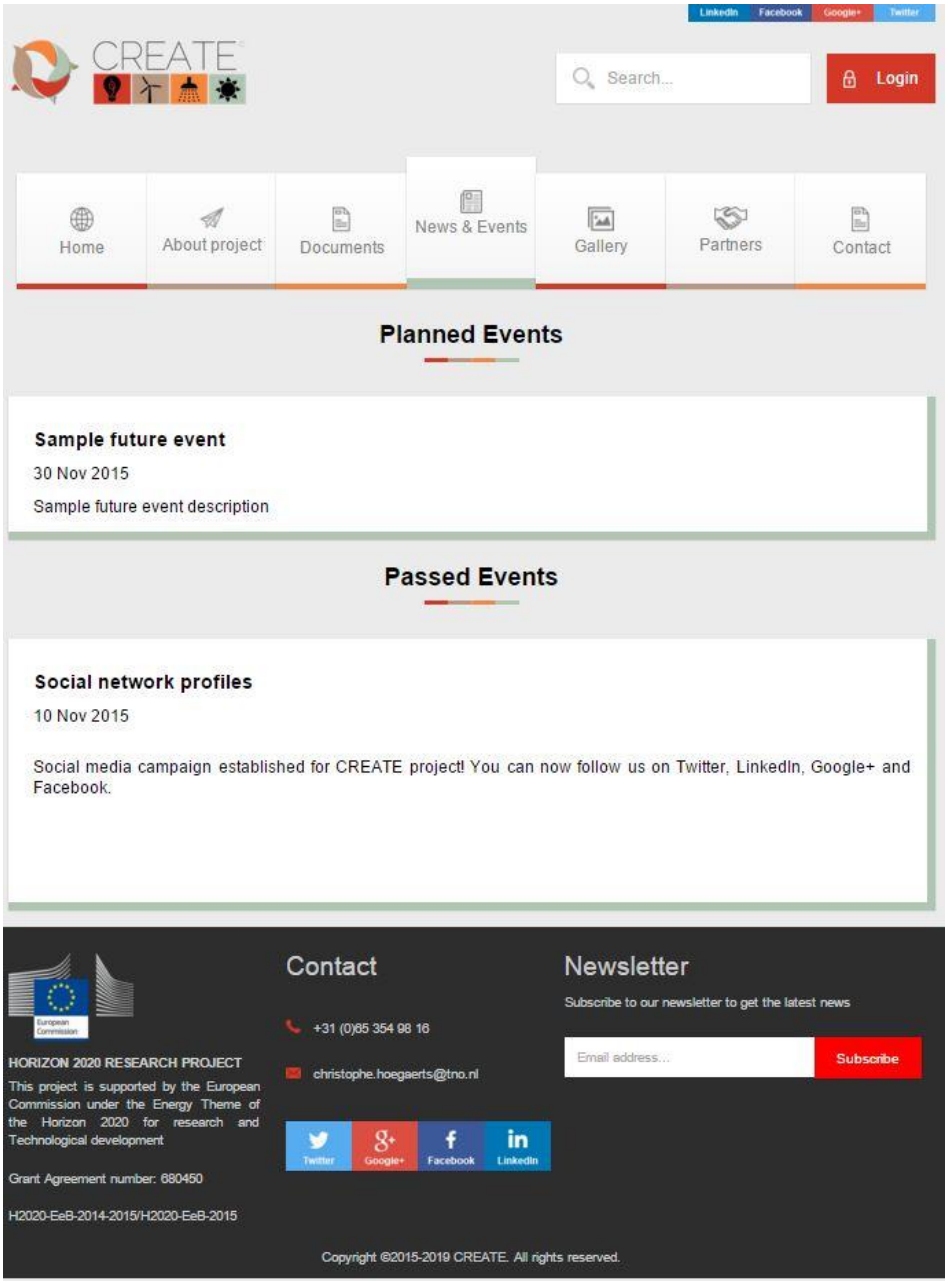
News and events: Here, a user is informed about news in regards to the CREATE project, the latest events (including all meetings of the project partners and important events in which a large group of the consortium partners participate, such as conferences, fairs, workshops, etc.).

Figure 9: CREATE website - News and Events section



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Partners: This section is dedicated to list the project consortium partners; it includes their short description and their logos.

Figure 10: CREATE website - Partners section

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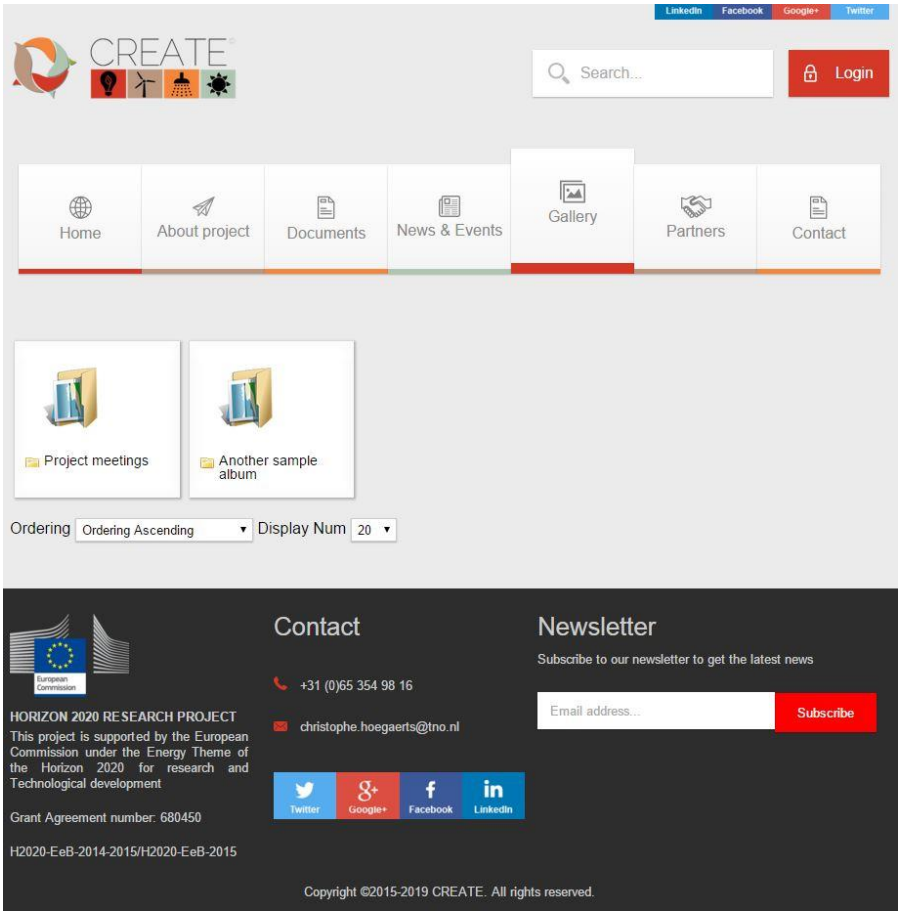
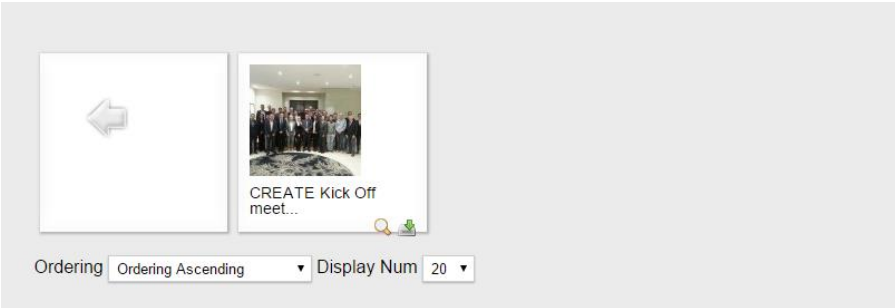
Gallery: In this section, a user is able to have a look at and download images from meetings, events, etc.

Figure 11: CREATE website - Gallery section





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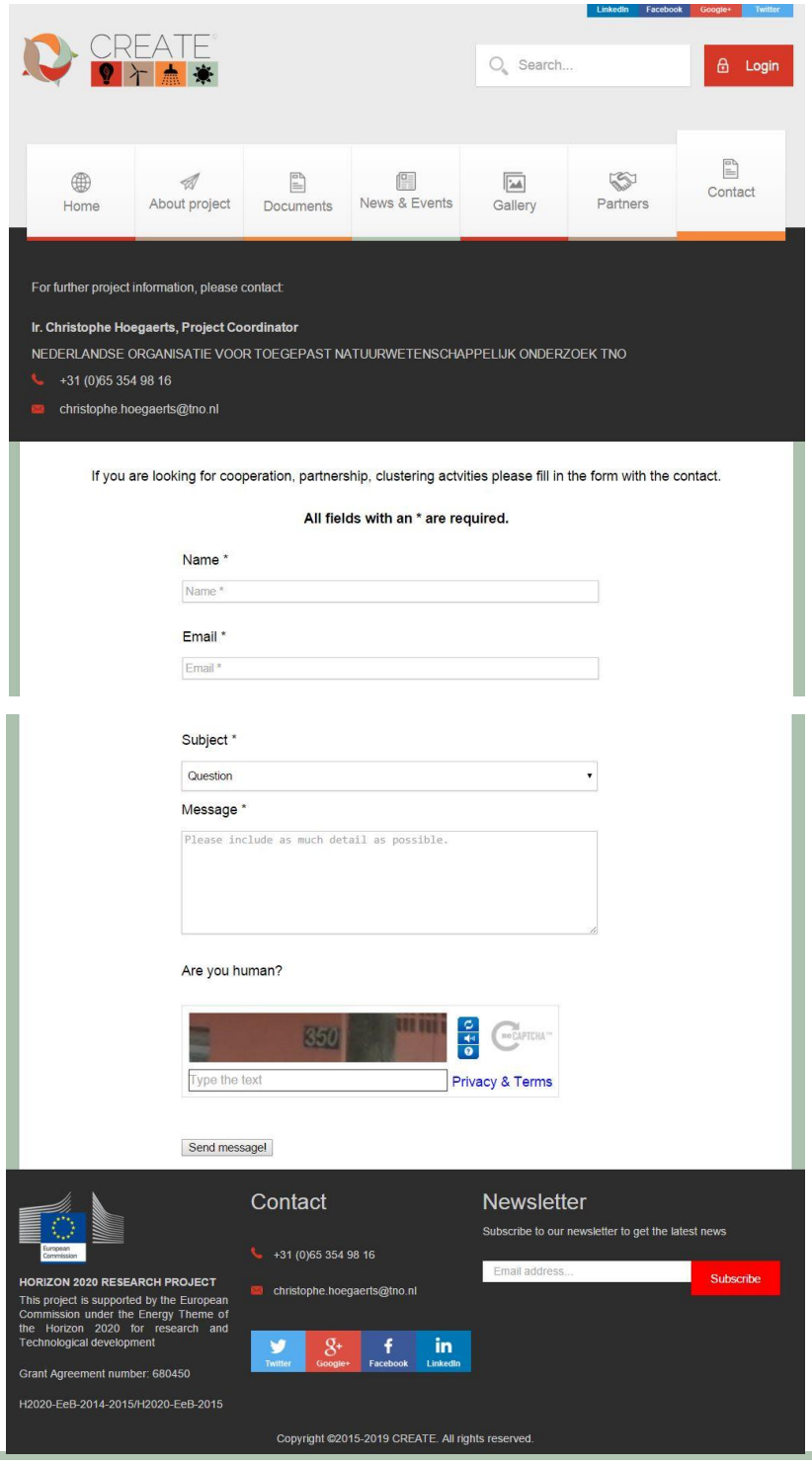
Contact us: This section allows the user to communicate with the administrator of the web page for obtaining information regarding the project.

Figure 12: CREATE website - Contact us section



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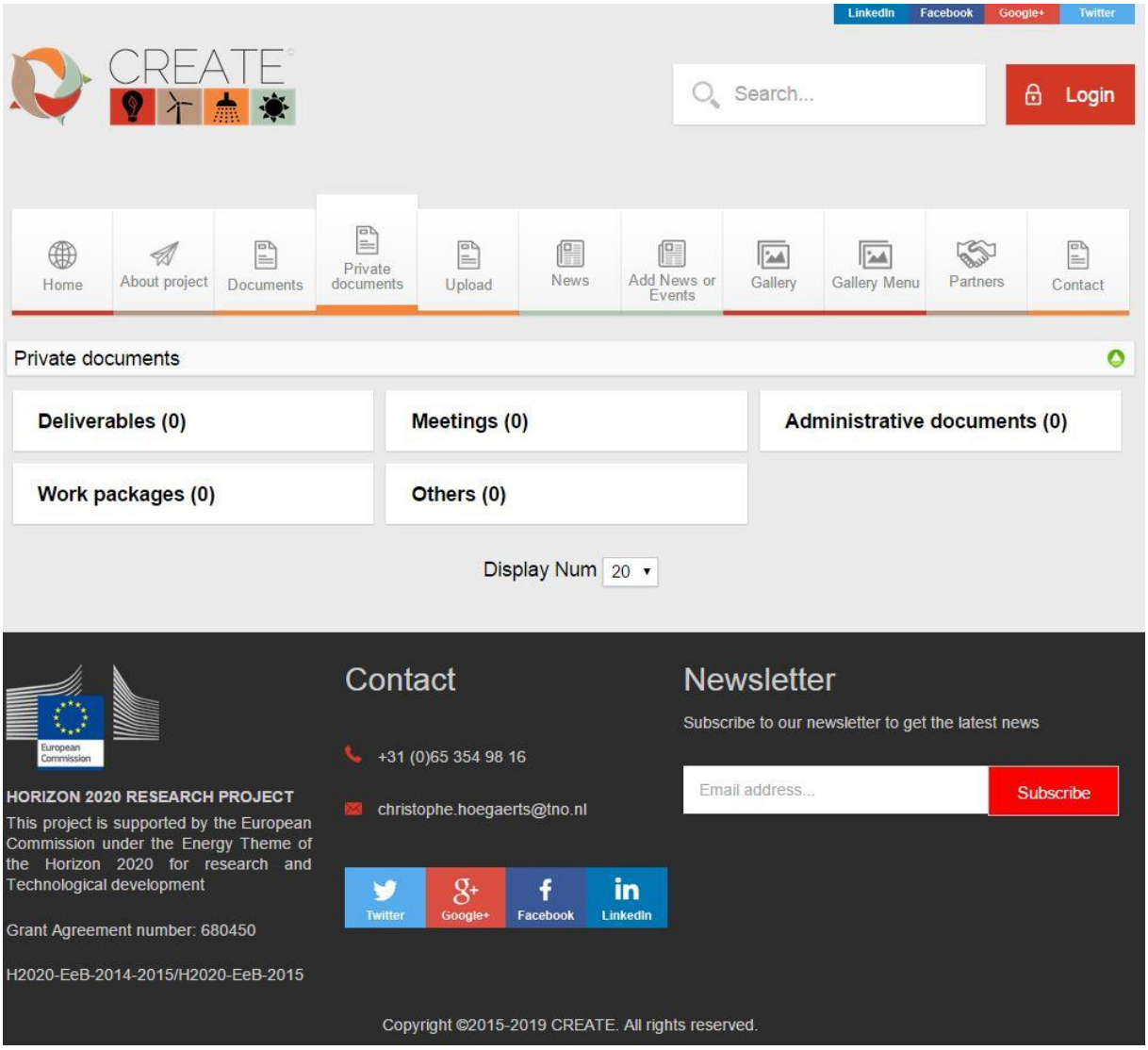
B) Private website sections (secure area)

The second part of the website is a private section that is available only for FENIX, as an administrator and WP leader, and it can also be accessed by the partners via login credentials.

Figure 13: CREATE website - Private section



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Website statistics

The website administrator has statistics regarding the number of visits as well as the visitors' worldwide distribution available. All these information are gathered and provided by the official Google tool, 'Google Analytics'. Current statistics are showing a wide interest and public awareness regarding the project (8362 total page views).

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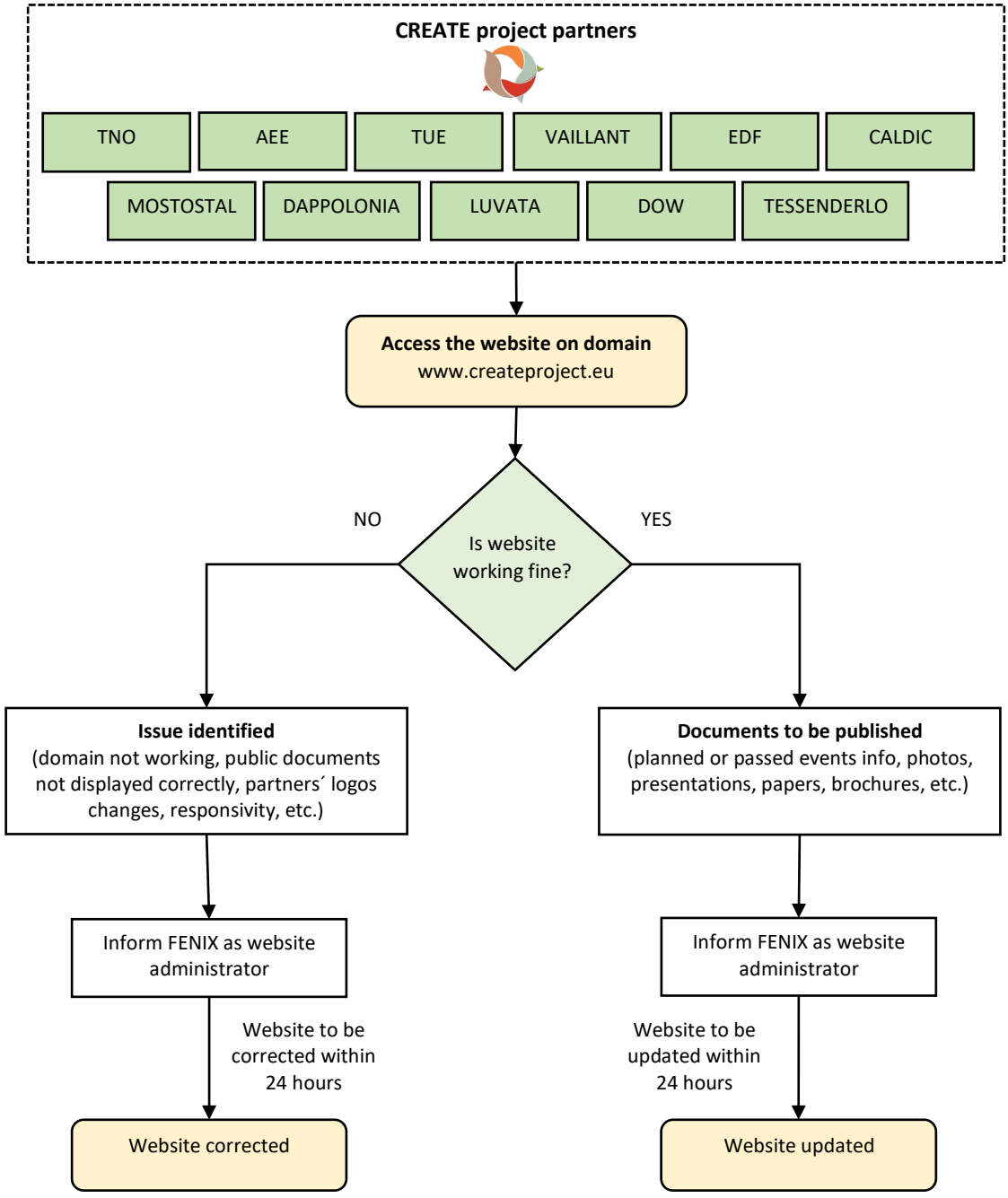
Working with the website

How to solve issues with the website is shown in the flow chart below.

Figure 14 Working with the CREATE website (problem solving, updating)



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3.3.2 Project presentation

The project presentation in PowerPoint has been designed for the CREATE project at the end of the third month. The project presentation describes the context and the concept of the project, the objectives and the sub-objectives, and it gives information about work packages, prototypes and piloting. Furthermore, contact information, i.e. a website link and a QR code, of the partners and the statement of financial support to indicate that the foreground was generated with the assistance of financial support from the European Commission are given. The project presentation is a crucial part of the dissemination of the project as it serves as a tool to inform the public about the basic characteristics of a newly developed product. The aim is to address a wide range of prospect consumers and ensure its memorability.

Figure 15: CREATE project presentation

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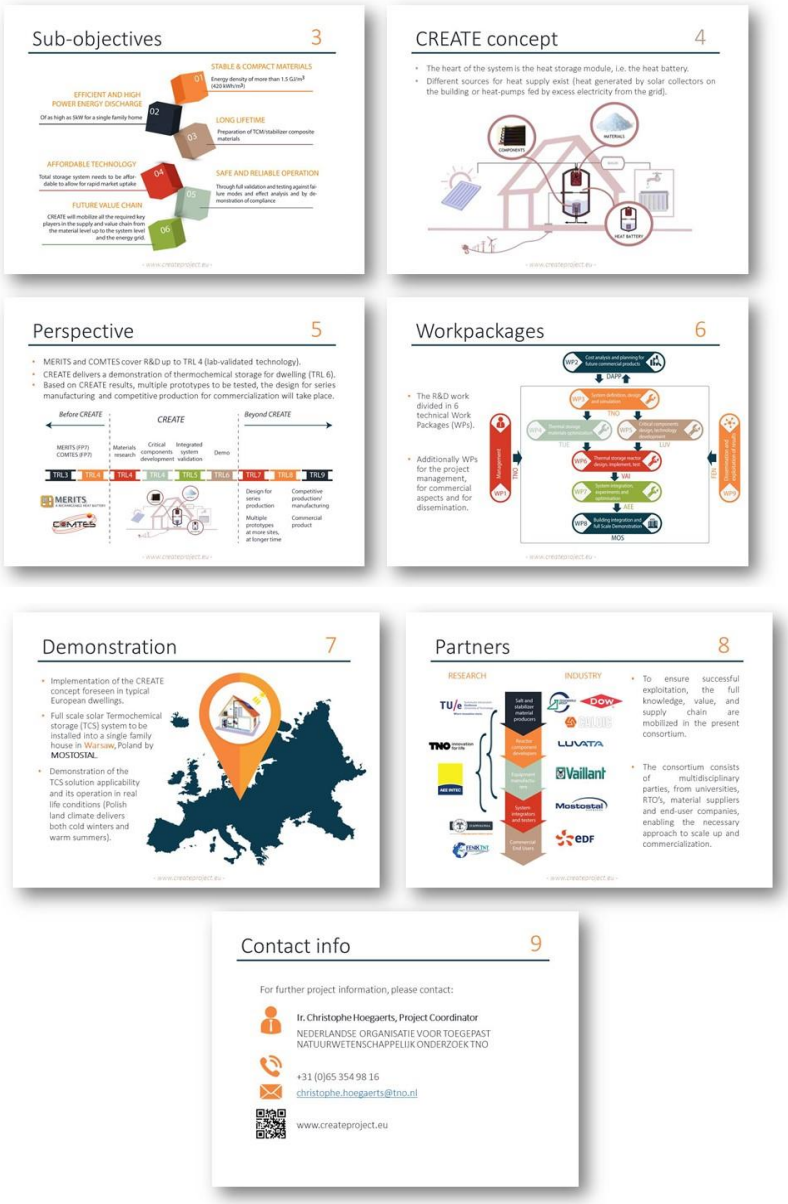
European Commission



3.3.3 Project description, brochure and roll-up poster

The following pictures display the two pages project description, four page brochure, and one page roll-up poster that were prepared for the CREATE project in order to increase the awareness of the project.

The two pages project description in the form of a flyer has been designed for the CREATE project at the end of first month, describing context and concept of the project, prototype and

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pilot information, project objectives, and containing a website link and QR code, logos of partners and the statement of financial support to indicate that the foreground was generated with the assistance of financial support from the European Commission.

The brochure and poster were created at the end of the sixth month with a more general overview about the project following the Grant Agreement. They were developed by FENIX, which is responsible for any dissemination update related to any progress of the project.

The brochure describes the project goals, scientific and technological targets, the concept of the project, possible applications, project objectives, information about demo versions, website link, QR code, logos of partners and statement of financial support to indicate that the foreground was generated with the assistance of financial support from the European Commission. The roll-up poster contains project goals, methodology, demo versions, website link, QR code, logos of partners and statement of financial support as well.

The brochure and the roll-up poster should built a basis for a later exploitation strategy by drawing the interest of the target groups. Future results and outcomes from the work packages will be included in a future version of the brochure and poster, since it is under constant revision.

Figure 16: CREATE project description

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Figure 17: CREATE brochure

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Figure 18: CREATE roll-up poster

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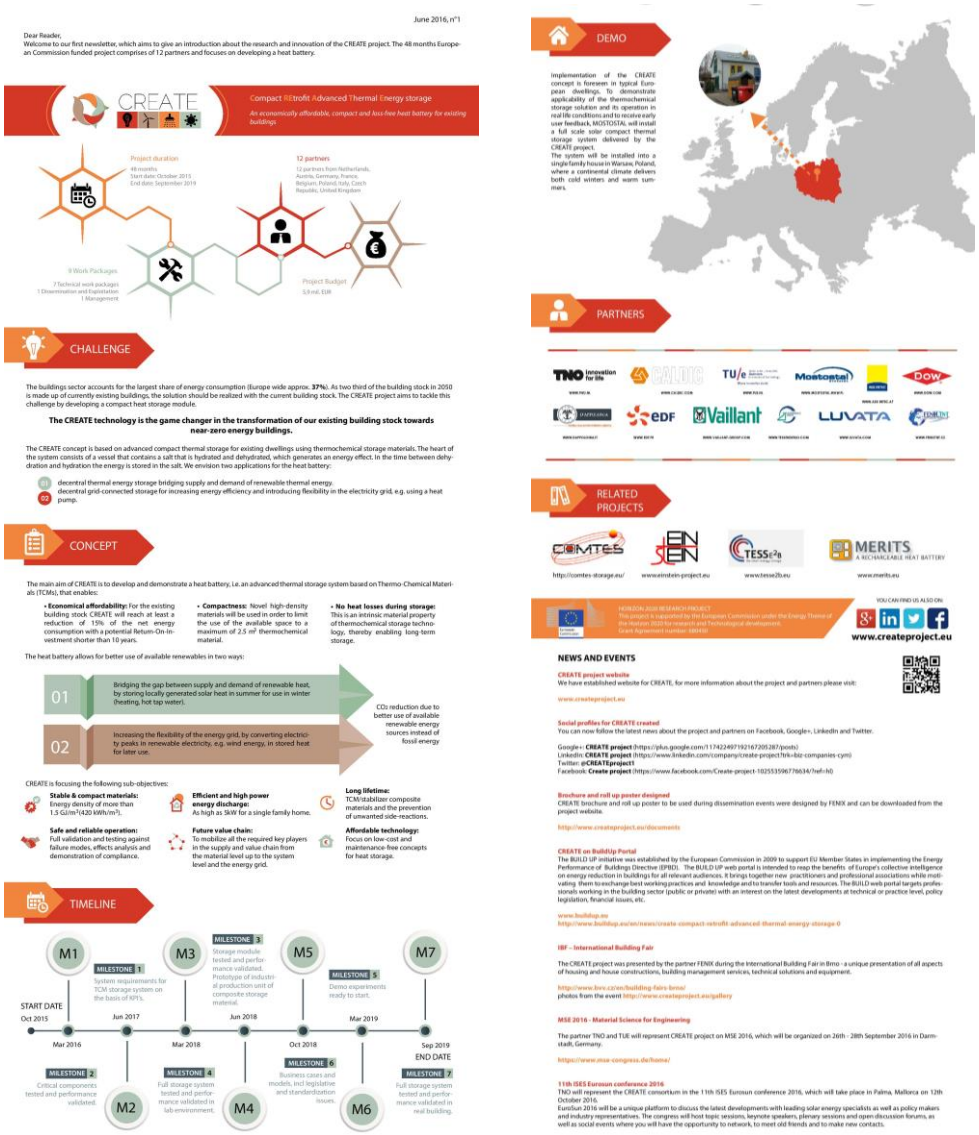
3.3.4 Newsletter

First newsletter as shown in the figure below was designed by FENIX in M6. It is planned that new versions of the newsletter will be sent to mailing database every 6 months according to the project progress. FENIX will use its comprehensive database of contacts and also partners' contacts to spread the newsletter. Newsletter will be placed on social network profiles as well as on the CREATE website, where a user can subscribe for it under the section "Subscribe for newsletter".

Figure 19: CREATE newsletter



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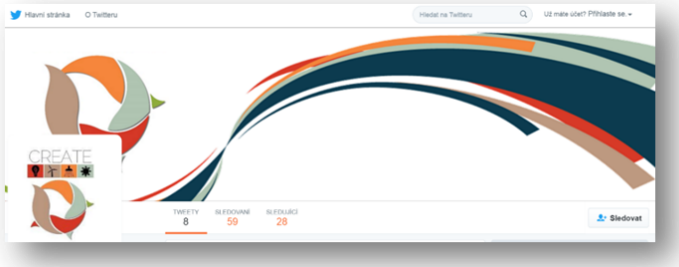
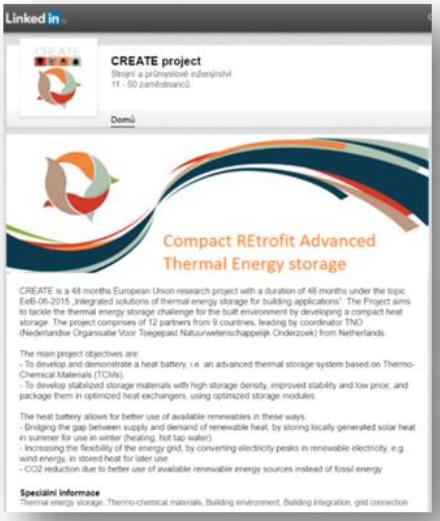
3.3.5 **Social network profiles**

In order to raise a public awareness about the CREATE project, social network profiles were created – LinkedIn, Google+, Twitter and Facebook – and their links were added to the CREATE website. FENIX, as the administrator of the profiles, will manage the updates and posts.

Figure 20: CREATE social network profiles





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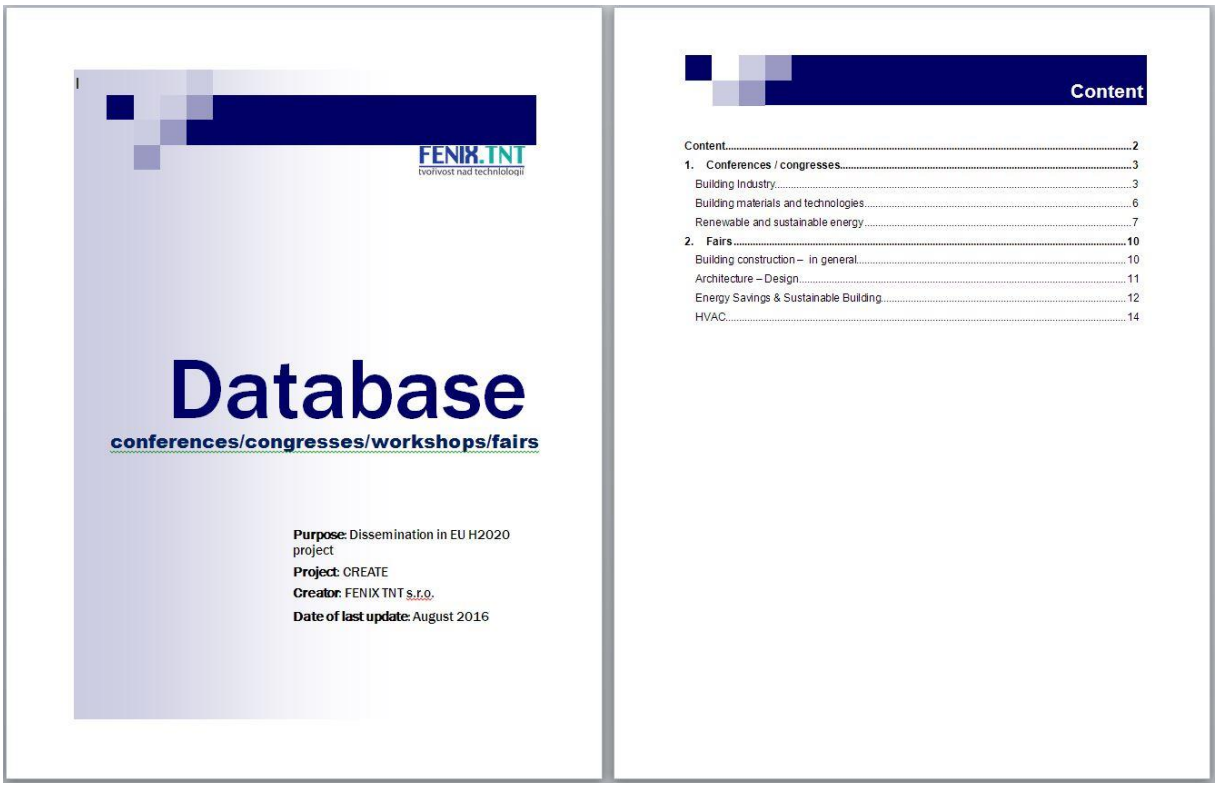
3.3.6 Database of dissemination events

Database of European conferences/congresses/fairs/workshops regarding the construction and building sector was created by FENIX for the dissemination purpose of H2020 projects. The list is updated every 3 months and is shared with the consortium for deciding at which events the CREATE project should be presented.

The database is divided into two sections: Conferences/congresses and Fairs in Europe. Next separation is done based on sectors in the construction industry. A current version of the database is available in Appendix 2.

Figure 21: CREATE Database of dissemination activities



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3.3.7 Scientific publications, dissemination events and other dissemination activities

Unless it goes against their legitimate interests, each beneficiary must - as soon as possible - 'disseminate' its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium).

A beneficiary that intends to disseminate its results must give advance notice to the other beneficiaries of - unless agreed otherwise - at least 45 days, together with sufficient information on the results it will disseminate.

Any other beneficiary may object within - unless agreed otherwise - 30 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard these legitimate interests.

Any dissemination of results (in any form, including electronic) must display the EU emblem and include the following text: *"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 680450".*

When displayed together with another logo, the EU emblem must have appropriate prominence.

Scientific publications

Each beneficiary must ensure open access (free of charge online access for any user) to all peer reviewed scientific publications relating to its results.

In particular, it must:

1) as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications; moreover, the beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.
2) ensure open access to the deposited publication — via the repository — at the latest:
    a. on publication, if an electronic version is available for free via the publisher, or

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b. within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.

3) ensure open access — via the repository — to the bibliographic metadata that identifies the deposited publication.

The bibliographic metadata must be in a standard format and must include all of the following:

- the terms “European Union (EU)” and “Horizon 2020”;
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

Dissemination events

- ✓ EMN3CG Collaborative Conference on Crystal Growth (September 2016, San Sebastian (ES), TUE)
- ✓ IBF – International Building Fair (April 2016, Brno (CZ), FENIX)
- ✓ Open event organized by the Dutch agency – RVO (October 2015, Den Haag (NL), TNO)
- ✓ 6th Workshop on Impact of the Energy Efficient Buildings (April 2016, Brussels (BE), TNO)
- ✓ Info day regarding the NMBP in Horizon 2020 (June 2016, Prague (CZ), FENIX)

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3.4 Planned dissemination activities

3.4.1 Video preparation

Production and publication of a graphical promo video (M15) and project video (in the end of the project) designed by FENIX was agreed as the key method for effective product dissemination. The assigned role was justified with the persisting FENIX's experience in the field of marketing and advertising, with special focus on campaign planning. A preliminary storyboard and a list of questions for the key partners, were prepared to introduce the CREATE project to a scientific audience. A list of questions was prepared in order to conduct an interview with key partners, which were further used in the project video. The goal of both videos is to introduce the CREATE project to a scientific audience. The video presentation is meant to follow the successive introduction to the strategies regarding the "WWW campaigns": social media promotions, online workshops and web advertising in general.

3.4.2 Scientific publications, dissemination events and other dissemination activities

In the field dissemination activities it is planned:

- to present the project and its outcomes at least at 3 events with talks/posters.
- to participate in at least 3 major trade fairs focused on energy efficiency and buildings as an important measure to reach industrial stakeholders.
- to perform publications in at least 3 peer-reviewed international journals to make the obtained results available to the scientific community.

Scientific publications

- ✓ NPT process technologie (Magazine, September 2016, TNO)
- ✓ 11th ISES Eurosun conference 2016 (paper in conference, October 2016, TNO)
- ✓ Journal publication on thermochemical storage materials characteristics (paper in conference, TNO/TUE)
- ✓ Journal publication: review of materials suitable for heat storage (scientific journal paper, TUE)

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Dissemination events

- ✓ IBF – International Building Fair (April 2017, Brno (CR), FENIX)
- ✓ 7th ECTP Conference - Innovative Built Environment (November 2016, Brussels (BE), FENIX)
- ✓ MSE 2016 Material Science for Engineering (September 2016, Darmstadt (GER), TUE/TNO)
- ✓ Press/media conference (Warsaw, MOSTOSTAL)
- ✓ Meeting for the existing or potential stakeholders (Warsaw, MOSTOSTAL)
- ✓ Academic meeting/workshop (Warsaw, MOSTOSTAL)

Partners will develop a number of future dissemination activities such as interactive tools and training workshops leading to the public awareness. ***Training workshops*** will be organized for engineers, students, end-users, journalists etc. Academic partners will provide support in the ***preparation of scientific papers*** and technical articles that will inform the RTD community about the project results

Newsletters and ***press releases*** for media will be provided and announcements of project results will take place during conferences, events (some press release already performed).

The research partners will write articles in the scientific journals, such as “Construction Science”, “Construction and Building Materials” and the “Journal of Civil Engineering and Construction Technology”. The authors list will include technically involved SMEs. Target groups are the scientific communities and special interest groups.

Final dissemination conference with wide participation from European industry, research community, policy makers and media will be organized at the end of the project, possibly in conjunction with the final General Assembly of the project in order to present the project results and to introduce the product design, manufacturing process operation and control to the industry.

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4 Exploitation strategy

This chapter describes the way each project partner individually, and the project consortium as a whole, intend to turn their involvement in the project and the project outcomes into profit. It is further aimed to support the development of partner's current activities and possibly to lead to the launch of new activities.

4.1 Exploitable results

The first step for developing an appropriate and comprehensive Exploitation Plan is to identify the list of Exploitable Results (ERs) developed in the project. The table below (Table 1) summarizes the expected results to be generated through the project, together with short description and the partner identified as responsible for the ER development (not necessary the same owner of the ER as that of the future). Furthermore, partners contributing to the development of the particular results are also presented, as well as the Work-package designated to each expected result.

Table 1: CREATE Exploitable Results

Nu.	Exploitable Result	Description of the result	Lead Partner	Contributors	Dedicated WP, Task
			Responsible partner	Partners involved	
1	Optimized TCM materials for thermal storage	Development of stable & compact materials with an energy density of more than 0,6 GJ/m3 (420 kWh/m3), normalized on bulk material volume (including the porosity volume).	TUE	TNO, TES, DAP, DOW, CAL	WP4
2	Heat exchangers for absorbers (liquid-to-solid energy transfer)	Search for the most appropriete structures, use proper materials, maximize the efficiency of energy conversion, minimize the total cost, and guarantee 20 year operating life.	LUV	TNO, AEE, VAI	WP5
3	Evaporator/condenser (water evaporation and	Design method for water evaporators/condensors at low pressures	AEE	TNO, Luvata	WP5,WP6

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	condensation to liquid energy transfer)				
4	Vessel/containment: optimal form, with minimal material	Design method for containment of absorber and other critical components, tested containment	AEE	TNO, Koenig Metall	WP5,WP6
5	Storage valve	Design method for storage valve, optimised and tested storage valve	AEE	TNO, Koenig Metall	WP5,WP6
6	Anti-corrosion coatings: low-cost long life	Development of anti/corrosion coatings that minimize the outgassing rate, apply hydrophilic, or hydrophobic coating to different surfaces with thermal fatigue.	LUV	TNO, AEE, VAI	WP5
7	Heat battery: advanced thermal energy storage system – size of 2.5 m3	Developing and designing the real-size storage modules and integration with other components for the storage system. Developing a prototype demonstrating exploitation potential.	AEE	All partners	WP1, WP2, WP3, WP4, WP5, WP6, WP7
8	Control algorithms for the storage system	Design the control system that consider the weather condition and forecast and other predictions, e.g. resident behavior and thus enable better efficiency and advanced energy management. The control system consists of software and hardware.	VAI	AEE, LUV, TNO	WP7 Task 7.3
9	New standards	New standards for implementation of the heat storage devices will be developed. Including also test methods for evaluating performance of the heat battery.	DAPP	VAI, EDF, FEN	WP2 Task 2.4

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10	Training materials and installation guidelines	Design of guidelines for full-scale set-up, system testing, installation and safety aspects of TCM storage operation.	MOS	AEE, VAI, LUV,AEE, EDF, TES, CAL, DOW, DAPP, TNO, FEN	WP5 Task 5.3 WP6 Task 6.4 WP7 Task 7.4 WP8 WP9 Task 9.1

After the project ends, each beneficiary will implement measures, which will be defined to ensure exploitation of its results (either directly or indirectly) by one or more of the following steps:

(a) using them in further research activities (outside the action);

(b) developing, creating or marketing a product or process;

(c) creating and providing a service, or

(d) using them in standardisation activities.

4.2 Exploitable routes for the results

Preliminary plans for the future exploitation routes for the project results have been taken into consideration. The results from the ER's point of view are presented in Table 2. Furthermore, the topic is described in detail as part of Individual Exploitation Plans (8.2). Final exploitable routes and detailed description will be provided at the end of the project.

Table 2: Exploitable routes and IP proposal

No	Exploitable result	Exploitable routes	Innovative content	IP proposal
1	Optimized TCM materials for thermal storage	Use for further research (in case of TUE & TNO) In case that TUE foreground knowledge leads to patents, the IP rights will be sold	The new materials will be innovative when all of the following requirements are met: • The E/V is bigger than 0.6 GJ/m3,	Patent/ Utility model

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		In case that crucial foreground knowledge originates from other partners than the TUE, different scenarios could be explorated: a) Spin-Off activities, b) Joint Ventures, c) Selling IP	normalized on bulk material volume (including the porosity volume) • They are stable over multiple cycles • Do not lead to outgassing of (toxic) gasses • Deliver heat suitable for DHW and SH.	
2	Heat exchangers for absorbers (liquid-to-solid energy transfer)	Developing and selling own products/services	1. Salt side fin designs to reduce the temperature gradient 2. Flow channel arrangement to minimize the pressure drop of vapor flows during charging and discharging 3. Corrosion resistant	Patent/Utility model
3	Evaporator/condenser (water evaporation and condensation to liquid energy transfer)	Design method will be used for other applications; Luvata or other industries to take over the manufacturing and further optimisation	N/A	Patent/Utility model Industrial design
4	Vessel/containment: optimal form, with minimal material	Spin-Off activities Design method will be used for other applications; Koenig Metall to take over the manufacturing and further optimisation	Compactness Reduce cost	Patent/Utility model Industrial design
5	Storage valve	Design method will be used for other applications; Koenig Metall to take over the	Reliable leak-free vacuum valves	Patent/ Utility model Industrial design

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		manufacturing and further optimisation		
6	Anti-corrosion coatings: low-cost long life	Licensing IP rights (out-licensing)	1. Coatings to minimize outgassing 2. Corrosion resistance 3. Thermal fatigue	Patent/Utility model
7	Heat battery: advanced thermal energy storage system – size of 2.5 m3	Spin-off Joint venture	Compact thermal energy storage enabling seasonal thermal energy storage, high energy density, minimal amount of contaminants, easy installation, low maintenance, long life time	Patent Industrial design Trade Marks
8	Control algorithms for the storage system	Providing services	Safe operation and efficient power usage	Patent/Copyright
9	New standards			Copyright
10	Training materials and installation guidelines	Creating internal training services. Direct training and Webinars.	Cheap and space saving installation concepts will pave the way of the technology to be used in buildings	Patent/ Utility model/Copyright

4.3 Assessment of exploitable results Technology Readiness Level (TRL)

The **TRL** scale is a metric for describing the maturity of a technology. The acronym stands for **T**echnology **R**eadiness **L**evel. The scale consists of 9 levels. Each level characterizes the progress in the development of a technology, from the idea (level 1) to the full deployment of the product in the marketplace (level 9).

Table 3: Technology Readiness Levels definition by the EC

Level 1	Basic principles observed
Level 2	Technology concept formulated
Level 3	Experimental proof of concept

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Level 4	Technology validated in lab
Level 5	Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Level 6	Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Level 7	System prototype demonstration in operational environment
Level 8	System complete and qualified
Level 9	Actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies, or in space)

The preliminary evaluation of the Technology Readiness Level is expected to be achieved by the end of the project (according to table 3). The CREATE project aims to reach TRL of 6 with many R&D activities starting at 4 - the R&D level covered by previous projects (COMTES and MERITS) which CREATE follows. Aforementioned MERITS and COMTES projects covered R&D up to TRL 4 (lab-validated technology). In CREATE, materials, components, storage module and system work deliver a demonstration of thermochemical storage for an actual dwelling (thereby reaching TRL 6). Going from materials, through components and modules, to a full system demonstration, the project covers TRL from 3-6; the majority of work will be done between TRL 4-6.

For each project results both TRLs at the start of the project and the targeted levels at the end of the project are documented.

Table 4: CREATE exploitable results technology readiness levels

No	Exploitable result	From TRL	To TRL
1	Optimized TCM materials for thermal storage (based on Na2S technology)	**3**	**6**
2	Heat exchangers for absorbers (liquid-to-solid energy transfer)	**3**	**5**
3	Evaporator/condenser (water evaporation and condensation to liquid energy transfer)	**5**	**6**
4	Vessel/containment: optimal form, with minimal material	**4**	**6**
5	Storage valve	**4**	**6**
6	Anti-corrosion coatings: low-cost long life	**3**	**5**

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7	Heat battery: advanced thermal energy storage system – size of 2.5 m3	**3**	**6**
8	Control algorithms for the storage system	**3**	**6**
9	New standards	**-**	**-**
10	Training materials and installation guidelines	**-**	**-**

4.4 Characterization of ERs

As mentioned before, the project is still in the beginning phase dealing with its R&D activities mainly. In this stage of the project, characterization of the ERs is transforming, information is being collected and only preliminary results are available so far.

At this stage, we can deliver preliminary information about the whole system (heat battery). Considering the whole system (i.e. an advanced thermal storage system based on TCMs), there are already first results available relevant for the market exploitation, such as target price of the heat battery for various scenarios, KPI (key performance indicators) defining system performance and efficiency, and a preliminary market assessment providing view on potential geographical locations. Within WP2[1] of the project and particularly T2.1[2], target price was evaluated with aim to assess economic value of the heat battery for individual customer, as future market success of the battery highly depends on customers, their needs and satisfaction. End consumers/users of the product are expected to be private houses (residential-single family) owners. The battery can be integrated in the existing domestic thermal systems, which are supplying hot water and space heating. Several scenarios were designed to study the economic balance of investing in a heat battery for a customer's residencies. Results show that, for the current market situation, the price ranges between 3080 and 3531[3] €/MWh for combination of the battery with Domestic Solar Water Heater[4] (DSWH) and 651-2781 €/MWh for Solar Combined System (SCS), the combination of Domestic Hot Water and Space Heating.

Production costs, as well as material costs (as substantial part of total costs) are important aspect for future exploitation between potential stakeholders, particularly those interested in exploitation through industrial production of the battery. Calculations of cost predictions of the

[1] WP2: "Cost analysis and planning for future commercial products"
[2] T2.1: „Economic value of heat storage systems"
[3] Considering 100% solar fraction.
[4] Solar thermal collectors will be used to harvest the thermal energy for charging the heat battery.

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thermal storage system production (WP2, T2.2) are currently under development, due in M30. So far, the allowable material costs have been indicated as part of D2.1[5], assuming the heat battery as "ready to market" product (TRL9), thus calculated with the target range of the whole unit of 1500-3000 €/MWh (SCS). Then, the dedicated range of the allowable material cost is about 161.7 €/MWh to 424.5 €/MWh and overall unit costs 840 to 1470 €/MWh.

However, the study proves that the heat battery has difficulties to find its profitability because the calculated target prices are relatively low compared with the expected system costs (5000 €/MWh)[6]. Thus, the results (D2.1) that have been achieved will be studied further and various configurations for the systems will be analysed. Further analyses will be carried out to test the sensitivity of the results to different assumptions. Moreover, results (D2.1) will be used in T2.3[7] to develop extra values for the storage system so that it becomes profitable for an individual customer.

The current market situation, in particular the cheap price of fossil energy and the unpredictable energy prices, may prevent an immediate straightforward business case for the heat battery developed in the CREATE project. However, the introduction of flexible while partially predictable energy prices might open up a new business case, in particular when creating a seasonal price difference. It is also important to note that thermal energy storage can provide an important contribution to a global reduction of CO2 emissions. As such, changes in legislations in order to support the transition to renewable energies will in many cases aid the thermal energy storage technology to enter the market.

Benefits for the future customers can be demonstrated on expected value propositions described in D3.1[8]. The overall goal is to reduce the consumption of primary energy in residencies by at least 15%.

[5] In Appendix 1 of the D2.1
[6] As stated in the Grant Agreement, according to preliminary calculations conducted before the project beginning. The costs will be studied further deeply in the T2.2 of WP2 and reported in D2.2.
[7] T2.3:"Business case and exploitation models for heat storage systems"
[8] D3.1:"System requirements and specification document of the CREATE heat battery", issue 2, 13-07-2016

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Table 5: Value propositions of the heat battery

Benefits	**Answering the end user's needs[9]**
Energy reduction	Enable customers to save money otherwise spend for thermal energy. Increase self-sufficiency.
Low needs for scheduled maintenance	Customers seek for easy, long-life solutions.
Easy installation	
Compact in terms of storage density of thermal energy and in terms of physical size.	Enable seasonal storage of thermal energy in compact 2.5 m3 unique retrofitting solution. Awareness of innovative product.
Low CO^2 missions	Environmental consciousness, enable reach a nearly zero-energy building, a customer's participation on sustainable development.
Environmentally friendly	
Quit operation	Demand for comfort
Low cost of ownership versus either state-of-the-art technologies and or incumbent technologies of EU projects COMTES and MERITS	Acceptable price, the price adequate to energy savings.

In order to meet the end user needs and demonstrate all benefits of the system, business cases and models that put fundamentals for an effective exploitation and dissemination strategy, will be created.

Profitability of the system, and the impact on the customer satisfaction are driven by many variables across the European countries. These can be different heat demand, whether conditions, energy prices, solar thermal market status, building profiles, as well as member states legislation etc. All these key parameters influence profitability of application. The preliminary market assessment conducted by Fenix aimed to defining most suitable potential geographical location, taking into account many of these aspects[10].

[9] Based on market assessment
[10] Summary of the assessment is a part of the D2.1

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More detailed characteristics of each exploitable result will be delivered in the "Interim Plan for the dissemination and exploitation of the project results and Communication Plan". ERs leaders will be asked to provide several questions according to the Table 6 structure.

Table 6: Characterization table of ERs

Market oriented	Who will be the customer?
	What are the benefits for the customer?
	When is the expected time to market (month/year)?
	What is the approximate price range of this result / price of licences?
	What is the market size in M€ for this result and relevant trend?
	Who are the competitors for this result?
	How this result will rank against competing products in terms of price / performance?
Towards exploitation	When is the expected date of achievement in the project (month/year)?
	What are the costs to be incurred after the project and before exploitation?
	Which partners are involved in the development?
	Which partners are involved in the commercialization?
	Which could be barriers for implementation?
IPR related	Have you protected or will you protect this result? How? When?

4.5 Individual exploitation plans

This part aims to design the Individual Exploitation Plans for the partners involved in the project. First, a BFMULO Analysis is applied to evaluate the involvement of each partner in related exploitable results. Second, based on this analysis, the main expectations of partners involved in the project are described.

4.5.1 Exploitation claims and aims

In order to assess the better exploitation strategy for each Exploitable Result the BFMULO Matrix will be implemented. According to each partner IPR intentions:

- **B** = IPR's on background information, information excluding foreground information, brought to the project from existing knowledge, owned or controlled by project partners in the same or related fields of the work carried out in the research project.
- **F** = IPR's on foreground information, Information including all kind of exploitable results generated by the project partners or 3rd parties working for them in the

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implementation of the research project. To have an F in an exploitable result it is necessary that a partner has a task(s) in the project related to that very result.

- **M** = Making the products, manufacturing and selling or directly implementing it through own facilities and skills.
- **U** = Using the result, implemented with own knowledge to develop new ranges of products or newer processing. Furthermore, the direct or indirect utilization of foreground in further research activities other than those covered by the project, or for developing, creating and marketing a product or process, or for creating and providing a service.
- **L** = Licensing the result, therefore earning from a negotiation towards third parties outside the Consortium.
- **O** = Other, any other exploitation means (e.g.: consultancy, provide services, etc).

The final check for compliance will be performed through the following questions:

- ✓ Are any exploitation intentions (M, U, L, O) addressed for results not covered by B, F?
- ✓ Are partners developing (B, F) results not exploited (M, U, L, O)?
- ✓ Are exploitable results without exploitation intentions (M, U, L, O)?

For each of the identified Key Exploitable Results (KERs), the exploitation claims and aims have been investigated. Preliminary exploitation intention of the partners is reported in the table below

Table 7: Preliminary CREATE BFMULO matrix[11]

Partner		ER 1	ER 2	ER 3	ER 4	ER 5	ER 6	ER 7	ER 8	ER 9	ER 10
1	TNO	B,F,U,O	B,F,U,O	B,F,U,O	B,F,U,O	B,F,U,O	B,F,U,O	B,F,U,O	B,F		B,F
2	AEE		B,F	B,F,M,U,O	B,F,M,U,O	B,F,M,U,O		B,F,U,O	B,F		B,F
3	TUE	B,F,U,O									
4	VAI							B,F,M,L		B,F,M,O	B,F,M,O
5	EDF							B,F,M,O		B,F,M,O	
6	TES	B,F,M									
7	MOS	B,F	B,F	B,F	B,F	B,F		B,F,O	B,F,M,U		
8	DAP							B,F,O		B,F,U,O	
9	FEN							B,F,O		B,F,O	B,F,O
10	LUV	B,F	B,F,M,L,O	B,F,M,L,O	B,F,M,L,O		B,F,M	B,F			
11	DOW	B,F,M									
12	CAL	B,F,M,L									

[11] For an explanation of respective ERs see Table 1.

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4.5.2 Description of individual exploitation plans and strategies

The preliminary analysis of each partner were carried out to provide a short description of the partners, their interest, and the opportunities partners expect from exploiting results they are involved in and/or responsible for within the CREATE project. The following paragraphs aim to take into account the different partners' expectations according to their targets. These preliminary plans for the partners to undertake exploitation actions are expected to be updated in the following years. It will be done to ensure that the widest communication and dissemination of the foreground generated by the project can be reached and the foreground can be adequately protected and exploited.

The CREATE consortium consists of 12 partners from 9 countries: Netherlands, Austria, Germany, France, Belgium, Poland, Italy, Czech Republic and United Kingdom. The consortium is mainly industry oriented with 1 SME, 2 RTO's, 8 Large Industries and 1 University. Because of the broad geographical presence of partners in the consortium, results will find their way to markets throughout Europe and beyond.

The consortium claims to be the first full chain in Thermal Batteries, with an inherent competitive advantage. It covers the complete prospective knowledge-, value-, and supply chain that is needed for the development, manufacturing as well as commercialization and implementation of the thermal energy storage solution.

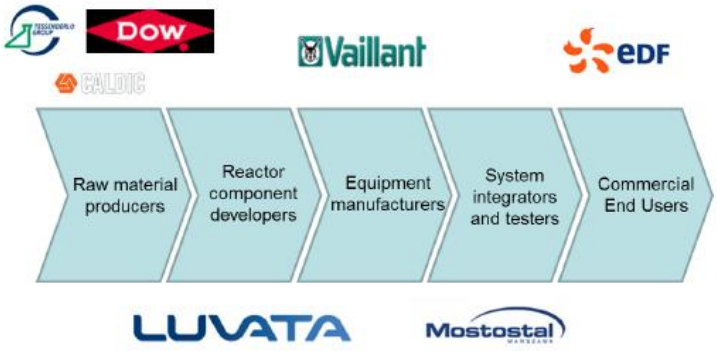

Figure 22: The value chain for thermal batteries within CREATE' consortium

Through mobilization of the entire supply and value chain (from materials producers, composite manufacturers, component manufacturers, system and product developers, implementers and users) the chances for successful market uptake of thermal battery technology are higher. Moreover, key industrial players have strong competitive position in

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their respective markets, which pave the way for developing and introduction of innovative products and services related to the thermal battery.

Participation of market pull and technology push partners will enable for broader dissemination and exploitation of project results, and bring benefits to all industries included in the supply chain.

TNO – Nederlandse Organisatie voor Toegepast, Natuurwetenschappelijk Onderzoek (RTO, NL)

Description

Description

TNO (Nederlandse organisatie voor Toegepast Natuurwetenschappelijk Onderzoek TNO; the Netherlands organisation for Applied Scientific Research TNO) is one of the major internationally oriented contract research and technology organisations in Europe. With staff of approximately 3500 people and an annual turnover of 580 million Euros, TNO is carrying out research in fields, which have an impact on the following five transitions: Energy, Urbanisation, Industry, Healthy living, and Defence Safety & Security. TNO functions as an intermediary between basic research organisations and industry. By translating scientific knowledge into practical applications, TNO contributes to the strengthening of the innovation capacity of businesses and government. TNO is involved in many international projects (about 30% of the market turnover), including EU-funded collaborations, be it research or service contracts, for the European Commission, the European Parliament or European agencies.

Background bringing to the project

TNO has a broad experience in European projects (> 100 FP5, FP6 and FP7 projects) both as a coordinator, a partner, and/or as a WP leader in the development of new technology. TNO possesses excellent laboratory and pilot facilities and has a profound knowledge and expertise in the field of definition, design, simulation, and testing of sustainable energy systems, heat transfer, fluid dynamics and process control engineering. Expertise in heat exchanger, reactor and process design will be combined with knowledge of energy systems for the built environment and materials expertise. Moreover, TNO has profound expertise in the field of design and synthesis of engineered particles and development of innovative

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(nano)composites. The activities related to the project will be carried out by an experienced team of researchers from the fields of thermochemical storage, heat exchanger and process design, and materials science. The main scientific contribution of TNO to the CREATE project will be:

- System definition, design and simulation
- Lab-scale thermal storage materials and components development, modelling and testing
- Safety assessment of storage system
- Overall project coordination

Furthermore, TNO brings in its background knowledge gained from MERITS, national and TNO internal programs, especially on thermo-chemical materials (TCMs) development and characterization, components and system development and field-testing.

IPR attached to the background

Materials definition, development and testing, components development and testing, system engineering, field-testing, specifically:

- Patent “Composite material for heat storage, method for preparation and use”, R. Cuypers, A.J. de Jong, J. Eversdijk, H.P. Oversloot, J.C. van ‘t Spijker, N.E. Papen-Botterhuis (International publication number WO2014/104886 A1)
- Patent “System and method for thermochemical storage of energy”, A.J. de Jong, J.C. van ‘t Spijker, R. Cuypers, H.P. Oversloot, C. van Soest, C. Finck (European patent application No. 14183276.6)
- Patent application, at TNO known as “enhanced TCM production and use” with number 2015068.
- TNO Report “Up-scaled production and characterization of (stabilized and unstabilized) Na2S for use in heat batteries” (ref. TNO 2015 R10999)
- TNO Report “Stabilization, characterization and modelling of thermochemical materials for energy storage” (ref. TNO 2014 R11905)
- Na2S Material research (ref. TNO-MERITS-RP-141)
- All knowledge, know-how and tools of TNO related to compact heat storage with thermo-chemical materials in the built environment and industry, including e.g.

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thermo-chemical material preparation, reactor design, physical models, experimental results and facilities, system design, system engineering.

Expectations

TNO wants to obtain / retain its right-to-play in the field of thermal storage, by obtaining an IP position and critical know-how, in order to be(come) the logical partner to orchestrate the innovation process involving the complete value and knowledge chain.

Potential Customers

Material developers, component developers and OEM's in the field of thermal storage.

Commercialization Plan

Providing its services in orchestrating the innovation process of thermal storage and licensing its IP to product development and/or production companies.

AEE - AEE INTEC (RTO, AT)

Description

AEE – Institute for Sustainable Technologies (AEE INTEC) was founded in 1988 as a non-profit research association and currently is the leading organisation for applied research in the field of solar thermal energy in Austria with a total of about 45 employees. AEE INTEC has a very long experience in the development of components and systems and the integration of renewable heating systems for the built environment and industry. It has specialized designated experimental indoor and outdoor test facilities and experience in the development for optimized control algorithms and control hardware.

The main fields of research topics in the CREATE project lie within the development of components (collector, storage, heat exchanger, hydraulic components, etc.) as well as in the system processing (domestic hot water preparation in single family houses and residential buildings, combined domestic hot water and space heating systems, solar cooling, solar process heat, solar district heat, etc.).

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Background bringing to the project

Experiences and developments from the COMTES project: evaporator/condenser design, system configuration and optimisation, component development, component and system simulation, design of experiments, data-acquisition, control strategy and hardware development.

IPR attached to the background

Probable patents on component designs.

Expectations

AEE INTEC aims to develop further experiences and developments from the previous related projects. AEE INTEC focuses on helping to accelerate the introduction of new technology into buildings and energy systems and thereby acquires a strong position as a leading institute on renewable and sustainable technology development. In addition, it strives to use the project's results for further R&D. Under the design method, project results will be used for other applications. Luvata, Koenig Metall or other industries will take over the manufacturing and further optimisation. Within the CREATE project AEE is set to claim IP on ER3, ER4, ER5 and ER7.

Potential Customers

Component manufacturers and heating equipment manufacturers.

TUE - TU/e (UNIV, NL)

Description

TU/e (Eindhoven University of Technology) is among the top-50 university in Europe. University specialises in fields of engineering sciences and design and serves as a facility for approximately 8000 students and 3000 employees. The research groups have been pioneering in heat storage materials for a decade and have a strong track of record in experimenting and multi-scale modelling of these materials.

The research groups Transport in Permeable Media (TPM) and Energy Technology (ET) recently joined forces within The Darcy Center, which focuses its research on energy storage. The center has an institutionalised cooperation on heat storage with TNO and ECN. Furthermore, the center is involved in national and European programs in the field of heat

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storage materials such as the Dutch ADEM Innovation lab on advanced energy materials, the CCO TKI program, SAMSSA and IEA Task 42/24.

Role in the project

The main task of the TU/e in the CREATE project will be Leader of WP4, and the main scientific contribution:

- System definition
- Finding stabilization methods for salt hydrates by formulating composites
- Characterizing the formulated composites by studying the (de)hydration processes with advanced experimental tools like NMR imaging and XRD and multi-scale modelling.

Expectations

TU/e, as an academic partner, expects to strengthen its technical knowledge and expertise based on experiences gained during the project. It will participate particularly in ER1 (Optimized TCM materials for thermal storage) and its results will be used for further R&D for other applications or provide consulting to interested parties.

Potential Customers

TES based on TCMs, Thermal energy storage materials R&D, manufacturers, and energy storage systems developers

VAI - Vaillant GMBH (LE, DE)

Description

Vaillant GmbH is a company operating in the international market in the field of heating and ventilation technologies. The company was founded in 1874 and became one of the world's market and technology leaders, which develops and produces products, systems and services for heating, cooling, hot tap water and cogeneration of heat and power. In 2013 the Group achieved sales of about €2,38 billion with over 12,000 employees worldwide. Thermal storage devices play an important role in the majority of system concepts that Vaillant develops and brings to the market. With a dedicated department for Future Technologies, Vaillant wants to incorporate new technological developments into the company R&D tracks

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already in an early stage. Compact thermal energy storage technology has been identified as one of the important technologies for the Companies' middle and long-term development.

Role in the project

In the CREATE project, Vaillant will be working on the specification of the system requirements, the development of components and the system layout, including the control strategy for the compact storage system. Due to its knowledge of market and customer needs and development of systems for the heating appliance sector, Vaillant will be leading the Work Package 6 on Thermal energy storage design, the implementation, and the testing.

Expectations

Vaillant is among the strongest actors in the market of thermo-technical equipment for domestic applications, delivering heating solutions for households and buildings in Europe. Through this project, Vaillant wishes to improve the understanding of the market potential of compact thermal energy storage solutions, as well as to create an estimated timeline which will show when such equipment will be needed. It will be done so in order to adequately prepare for introduction of these systems among their products portfolio, should the technology prove to be viable from all perspectives (not only technical, but also economic, financial, etc.). The objective for Vaillant is to maintain their strong position as innovation leader and increase their market share by introducing a new business opportunity aimed at the commercialization of compact thermal energy storage solutions. By creating new products and services for customers, Vaillant estimates that their annual turnover could be increased by € 2.5-5 million in Germany due to commercialization of these new systems, with an estimated potential of TCS systems being roughly 300-600 per year at retrofit rate of 2.8%. Extrapolation of this estimation to the EU28 will enhance these figures even further. CREATE will take advantage of the strong market position and their expertise of the market.

Potential customers

Thermo-technical equipment

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EDF – Electricite de France SA (LE, FR)

Description

EDF is a global energy supplier with its headquarters located in Paris, France. In 2013, its sales reached €75.6 billion. EDF operates a diverse portfolio of 120,000+ megawatts of generation capacity worldwide and has competencies covering all EDF activities, with a notable expertise on efficient energetic systems for buildings and territories, and in the field of economy of the electric system. Historically, it focused on electricity; however, it now integrates large activities in renewable energies and energy services. EDF has experience in thermo-chemical materials and economy of energy storage. EDF is one of the leading partners of the European Association for Energy Storage in Europe (EASE).

Role in the project

Within the CREATE project, EDF will be Task Leader of WP2-1 – Economic value of heat storage systems. The economic value of the thermal storage will depend on the discrepancy between the demand and the supply of heat. This heat can be obtained through renewable sources generating electricity or heat, or by the grid. The economic value of thermal storage will be evaluated by the selection of relevant energy scenario including time dependant demand and supply of heat. This value will be an input for the specification of the total system cost. Furthermore, EDF will be involved in WP9.3 Policy implications and workshops.

Expectations

As a global energy supplier including an energy service activity, EDF is particularly interested in better understanding the value and the cost of storage for different energy scenarios. Evaluating the economic potential of thermal energy storage in buildings will contribute to optimization of future investments in the method of energy transition. In addition, advanced thermal energy storage solutions will provide new perspectives of energy services providing added value for the customers and for the global energy system. Energy storage is a key element that will enable smart grids to be developed. As existing electric storage capabilities are limited or too expensive, advanced thermal storage systems at the decentralized level of buildings should provide new sources of flexibility to the grid that will become an escalating necessity in the future.

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Potential Customers

As EDF participates in the last part of the CREATE value chain, the aim is to satisfy end customers and users of the CREATE heat battery, i.e. households/residential family buildings seeking for energy efficient retrofitting.

TES – Tessenderlo Chemie NV (LE, BE)

Description

Tessenderlo is an international chemical company, which produces, amongst other compounds, salts, which have unique properties for thermochemical storage. Tessenderlo has an excellent knowledge in chemical processes and product features, and has a wide experience on scale-up properties.

Role in the project

Tessenderlo Chemie is a chemical producer of two of the salts that are important starting materials within the project. Their participation leads to detailed knowledge being available on the process and product features. Tessenderlo Chemie will participate in the evaluation of the cost analysis of the chemical salt component, which serves as the “heart” of the complete storage system, taking into account a range of production quantities and economy-of-scale effects (part of WP 2). In addition, in its role as chemical producer of the salt, Tessenderlo Chemie will take part in the definition, design and simulation of the overall system (part of WP 3). Main task will be the contribution of Tessenderlo Chemie in WP 4, the thermal storage materials optimization. The company can use its experience in the synthesis of chemicals and downstream processing, built up from past and current projects, for the development and optimization of the required chemicals. In this role, Tessenderlo Chemie can use its well-equipped 8100m^2 pilot lab, part of TG Development Center, as a scale-up and test center facility.

Expectations

Tessenderlo aims to use its high quality salts for thermochemical storage and expects to increase their sales volumes and market share by doing so. Accordingly, they are particularly interested in achieving a better understanding on what properties of their products are important features that drive new developments in the field of thermal energy storage, and

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potentially improve these properties leading to new products and improved production methods, which could deliver them a competitive advantage. In particular by supplying high quality TCMs (in particular sodium sulfide hydrates), Tessenderlo estimates that their annual turnover could be increased by €25 million.

Potential Customers

Supply sodium sulfide salts and its know-how on it to thermochemical storage providers and developers.

MOS – Mostostal Warszawa SA (LE,PL)

Description

Mostostal is a company that operates in the construction sector and is particularly interested in integrating new elements into the design process. Building their offer upon new technological option that will be demanded in the future is a way for the company to remain competitive in the market. Mostostal is actively interested in construction of facilities such as industrial, environmental and energy. Innovation in business is one of the key values. Mostostal is constantly looking for new solutions, use state-of-the-art technologies. The R&D division prepares innovative technologies used to strengthen the company's competitive edge and leading to increases profitability in the area of sustainable development.

Role in the project

Mostostal is Leader of WP8 (Building integration and full Scale Demonstration). In overall, they contribute:

- to system level concept and control concept design
- to scale-up of storage modules
- to selection of other system components and integration of storage modules with other system components
- to storage system level tests and optimisation
- to system requirements definition
- to safety aspects of TCM storage operation

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Expectations

Mostostal has an interest in acquiring significant experience in developing and integrating advanced thermochemical storage systems within the CREATE project. Mostostal aims to better understand the market potential of compact thermal storage solutions.

Potential Customers

Energy construction, energy efficiency, building retrofitting market.

DAP – D'Appolonia SPA (LE, IT)

D'Appolonia is the largest fully independent Italian firm providing consulting & engineering services to clients belonging both to the public and private sectors, with special emphasis on market requirements, regulatory aspects and safety. The company operates in the markets of Energy, Transport and Infrastructures, Industry and Investor Support. With a staff of about 700 engineers, scientists and associated professionals located in 20 offices worldwide, D'Appolonia offers high-end services to investors, promoters, operators and contractors, as well as to insurers and public administrations, to support their initiatives. D'Appolonia is a team of engineers, consultants, designers, planners and specialists supporting public and private clients from concept to decommissioning, through consultancy, design, management, operation and maintenance. The company provides a wide range of services covering the whole project life cycle from feasibility and specialized technical studies to conceptual and detailed design, prototyping and testing, project management, site engineering as well as operation and maintenance management.

Role in the project

In the CREATE project, D'Appolonia leads WP2 and Task 2.4 aiming to assess the legislation and the standardization issues. Furthermore, it participates in:

- Task 3.1 aimed at System requirements definition
- Tasks 4.1 and 6.4 aimed at assessing Safety aspects of TCM materials as well as storage respectively

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- Task 8.1 aimed at the Integration of storage system in existing building
- Task 9.2 aimed at preparing Communication material
- Task 9.3 aimed at assessing Policy implications
- Task 9.4 aimed at assessing the Social impact

Expectations

The intention of D'Appolonia is to develop business coming from the increased expertise in the energy efficiency and compact thermal storages for building, providing advanced services of engineering and consultancy in the building energy efficiency sector. In addition, through the know-how growth with new standardization development (Result 9), D'Appolonia expectations are to refine and further improve its offers in building retrofitting.

Potential Customers

On the basis of CREATE Results, such services could be applied to several stakeholders in the energy efficiency building retrofitting market, such as engineering, construction and installations companies as well as to the development of new R&D and industrial project at national and international level. In both cases, relevant advantages are expected to be transferred to the partners of CREATE project as direct contact matching the technological demand with the offer developed in CREATE project and as follow up R&D actions.

FEN – Fenix TNT SRO (SME, CZ)

Description

Fenix is a company actively involved in the development of business opportunities in the construction sector, including the promotion of real estate and infrastructure projects. Under this framework, the company has a deep understanding of the value chains involved, business models and emerging business propositions which relates to the field of energy efficiency, retrofitting, demolition and reuse. Fenix has access to a wide network of architects, designers and stakeholders in the key sectors, which have internal construction

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and building assessment knowledge. Said knowledge is elementary for the drafting of techno-economic feasibility studies, business modelling and market research across Europe. Fenix's main focus is on material efficiency, product life extension and product recycling. Fenix has long experience in communication activities and dissemination planning related to the construction sector, capable design specific dissemination campaigns made of various dissemination methods with in-house production capabilities and expertise oriented towards audience's needs.

Role in the project

Fenix will cover the role of WP9 leader for Exploitation, Dissemination, communication and user awareness of the new system and will be working together with D'Appolonia in the WP2. Together they will deal with the description of business cases and models for heat storage system, and provide market analysis of most potential geographical location for the system.

Expectations

Fenix has an interest in exploiting the knowledge developed within the CREATE to expand their current knowhow on dissemination, communication and business modelling and to implement new working tools for the purpose of enlarging their offering for consulting services related to dissemination, communication and business modelling activities.

Potential Customers

Energy efficiency building retrofitting market - construction and installations companies, engineering companies, building owners, designers.

Commercialization Plan

Providing new consulting services on energy efficiency aspects.

LUV – Luvata U.K. Ltd. (LE, UK)

Description

Luvata is world's largest manufacturer making heat exchangers, coolers, and coatings for the residential, commercial, and industrial HVACR markets. Luvata Tubes Division is known as a technology leader in making heat transfer tubes for HVAC/R heat exchangers and

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electronic cooling devices. Luvata team brings expertise on designing, fabricating, and testing of different types of heat exchangers for adsorbers, evaporators, and condensers.

Role in the project

In the CREATE project, Luvata will be working on the development of the main heat exchanger in the storage vessel and on the dedicated heat exchanger for evaporation/condensation. The focus is on the corrosion resistance, the heat transfer optimisation, structural integrity and costs minimisation. Luvata is responsible leader for WP 5 – "Critical components design and technology development" and contributes to other WPs by:

- Performing material compatibility tests including outgassing and corrosion tests
- Building a lab scale module to prove design concepts
- Develop a model for system performance simulations and predictions
- Define the geometry of adsorber, evaporator/condenser, including shapes, dimensions, and connections
- Provide capacity/load calculations
- Search for TCM for building a lab scale module

Expectations

Luvata as a leading company in metal solutions manufacturing and heat transfer technology and is interested in delivering especially the reactor components as well as heat exchangers that will make up the TCM based storage system. Similarly to the role of Vaillant and that of the potential suppliers of materials, Luvata is interested in better understanding of the market potential of compact thermal energy storage solutions, which will allow them to take informed decisions on establishing dedicated manufacturing capacity for system components. In addition, CREATE will generate a better understanding of Luvata's products and capabilities related to thermal storage technology.

The expected use of the Exploitable result n.2: Selling as its own product.

The expected use of the Exploitable result n.6: Licensing IP rights (out-licensing)

Potential Customers

Thermal energy storage developers, builders and providers. Developer, producers of wide range of applications requiring heat exchangers or anti-corrosion coatings.

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DOW – Dow Wolff Cellulosics Gmbh (LE, DE)

Description

DOW Chemical is a leading supplier of specialty chemicals, advanced materials, agriculture sciences and plastics with a focus on clean energy generation and storage. They offer technology based products and services to clients in about 160 countries, in high growth sectors like electronics, water, energy, coatings, and agriculture. In 2013 Dow reached annual sales of $57 billion and had 53,000 employees globally. Over 6,000 products are manufactured at 201 sites in 36 countries throughout the world. They have significant experience in heat exchange technology and are currently field-testing a compact waste energy storage system, based on use of phase change materials, for the automotive market.

Role in the project

Dow's primary contribution is to WP4 Thermal Storage Materials optimization as a leading manufacturer of ethyl cellulose materials. Dow also contributes its experience in the fields of material synthesis and encapsulation technology. Dow further relays on its experience from the pharmaceutical industry and in-depth understanding of controlled release mechanisms required for drug delivery to optimise the encapsulant for this project.
As a producer of the envisaged stabilizer material for the salt, Dow shall also participate in the design of the overall system in WP3.

Expectations

As a potential supplier of among others polymer materials for the TCM-based composite to be used as thermal energy storage materials, DOW's strategic interests in relation to this project are related to the assessment of the potential of their materials and related systems, which may determine the start of a new growing market thanks to which they may increase their market share. Accordingly, DOW may complement by TCMs the existing product line based on PCMs, in line with their sustainability policy. Thereby, DOW estimates that their annual turnover could be increased by several million €.
The expected use of the ER1: Manufacturing and selling as its own product (extend its existing product line)

Potential Customers

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TES based on TCMs, Thermal energy storage materials R&D, manufacturers, energy storage systems developers

CAL – Caldic Nederland b.v. (LE, NL)

Description

Caldic Nederland is a major player in chemical distribution with its own production facilities. They act as a valuable intermediary between customers and suppliers by adding value to products and by being a customer-oriented company. Caldic NL are a subsidiary of the Caldic group, founded in 1970 and headquartered in Rotterdam, The Netherlands. The multinational group of Caldic companies have developed a prominent position within chemicals, food products and technical materials worldwide. Nowadays, Caldic is a dynamic enterprise with a total amount of 33 locations, offices, warehouses, distribution centres and production facilities, present in 13 countries. Caldic is in the top 10 companies in the league of European distributors.

Role in the project

In the CREATE project, Caldic is in pursuit after the most sufficient way of production of the mixture of the different materials used. Next to the production capabilities, it also delivers a broad knowledge of all kinds of materials used in the above-mentioned markets, which have properties that can be used in the project, such as water binder, water repellent or hydrophilic substance.

Expectations

As potential supplier of salts and stabilizers for the TCM-based compounds to be used as thermal energy storage materials, and pursuing a philosophy of sustainable company, Caldic is strategically interested to develop new handling/processing methods of the specific chemicals and to achieve possible future market shares for these chemicals. By participating in CREATE, Caldic fulfils and emphasizes their philosophy of a sustainable company. Thereby, Caldic estimates that their annual turnover could be increased by approximately 5 million €.

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The expected use of ER1: Manufacturing and selling as its own product (extend its existing product portfolio), Licensing the handling/processing method

Potential Customers

Developers and providers of TCM composites, TES based on TCMs, other application of salts and stabilizers.

4.6 Risk assessment

A risk is defined as any area of uncertainty that represents a threat or an opportunity to the project. To manage and mitigate risks, there is a need to identify them first, then assess the likelihood of them and finally estimate the impact they might have on the project. The identification and consideration of risk is an integral part of project management. Actions should be taken to avoid or reduce the likelihood of events that might hamper the exploitation of the project results.

However, the project consortium has to be aware of the fact that some level of risk-taking is inevitable, for the project to achieve its objectives, and, decisions in the project will be taken based on evidence and reasonable assumptions. Outcomes, however, are never wholly predictable. It will be the role of the project management to manage the exposure of the project results to risk by driving actions to improve control of uncertainty and take steps to reduce the chance of failing to achieve the stated objectives. Regular review of exposure to risk will be conducted to design the steps to be taken in order to manage it. Exploitation leader will supervise that all project partners are actively engaged in the risk management process to ensure that members of the project will identify risks and that emerging risks are escaladed upwards.

The instrument for the identification of the most dangerous risks that may hinder the development and exploitation of the settled project results is the so-called Priority Map. The Priority Map's strength lies in its capacity to summarize in a picture the main exploitation-related activities risks connected to the project and to give an overall idea of the balance

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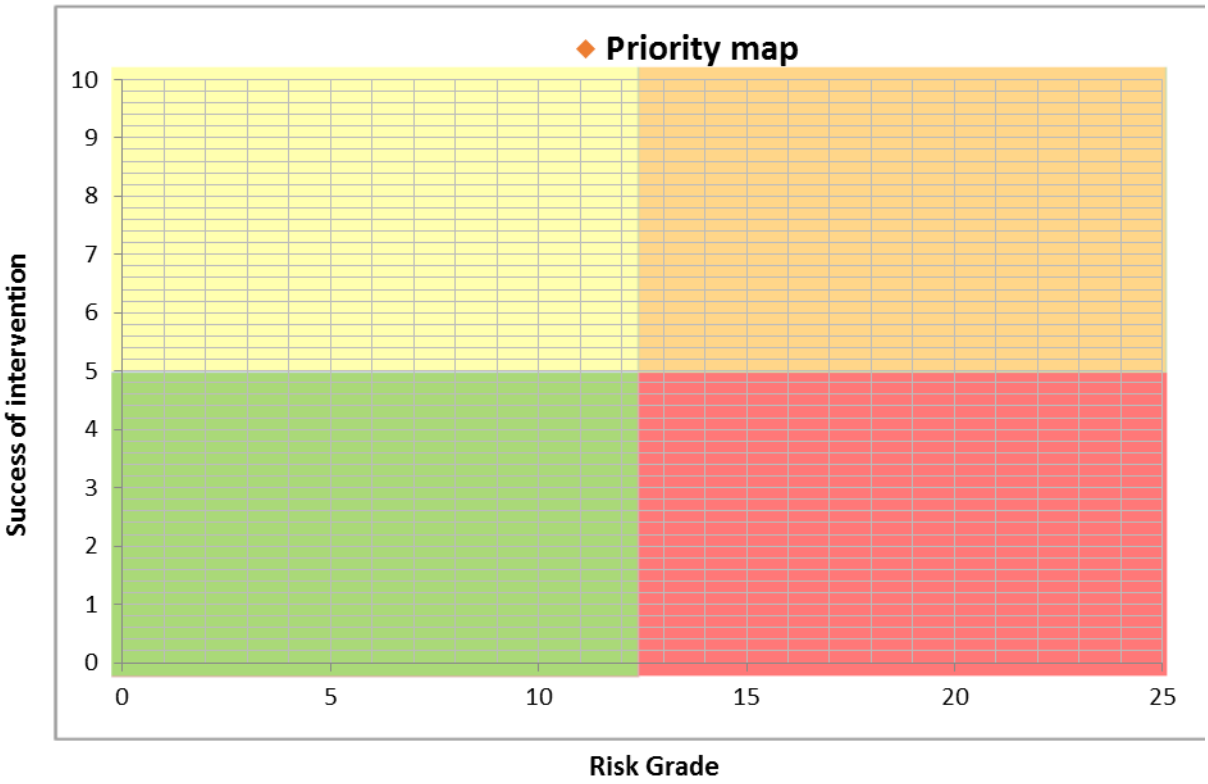
between opportunities and risks related to the result, thus helping the involved partners to make an evaluation of the state of the art and intervention needed for efficient exploitation. As highlighted in the following picture, the Priority Map is divided in 4 quadrants.

Figure 23: Priority map template for project exploitable results risks



Exploitable result n.7 "*Heat battery: advanced thermal energy storage system – size of 2.5 m^3*" has been selected as representant for Risk Assessment and the Priority Map generation. The reason for ER7 selection is that the result largely covers the previous results (storage materials, system component, coatings etc). The purpose of the draft Exploitation plan is to make project partners familiar with used methodology and to identify initial risk evolving for the whole system. With project evolution the Priority Map will be generated for each ERs and outputs will be discussed during Exploitation workshops where all partners' involvement will be assured. Partners involved in the project development were requested to identify and evaluate the risks associated to the potential exploitation of the battery according to the procedure reported in Appendix 3, including the Risk Grade identification through specific

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parameters (degree of importance of the risk related to the final achievement of the ER and the probability of risk happening) as well as the Priority Level definition (linked to the Risk Grade and the Success of mitigation intervention). Results have been processed[12] by the Exploitation leader (Fenix) and the following table (8) present the outputs.

[12] Outputs were collected from partners and averaged numbers were used to reach final assessment.

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Table 8: Risk Assessment table for ER7

ID	Risk identification	Likelihood		Impact		Grade	Risk Map	Mitigation	
		Value	Score	Value	Score			Description	Success rate
1	Technological risks								
1.1	The CREATE technology is not sufficiently economically affordable	Likely	4	Major	4	**16**	Very high	- Present prices for copper and the salt hydrates in combination with the volumes needed per system are to high (reference WP2) => Set up a global network for materials, sub-assemblies, and all purhased parts - A need to focus on WP2 on novel business cases (also see 3.2) - Mid-term it is almost certain due to low cost rate of secured energy => introduction into high-price niche markets, establischment of technology introduction programs	4
1.2	The storage materials are not stable enough for longterm use in storage module	Moderate	3	Major	4	**12**	High	- Mechanical stability can be achieved by matrix-stabilization or coating. Chemical stabilization of Na2S is unknown. - 20 years design life is hard to achieve. We have to prepare spare parts, or assemblies for field replacement - WP4 to focus on enhancement / stabilization of baseline material (composite), i.e. Na2S - It depends on the failure mode / material exchange / alternative materials / re-activiation	7
1.3	Salt hydrates are corrosive and deteriorate components, making a maintenance-free vacuum impossible	Likely	4	Catastrophic	5	**20**	Unacceptable	- Risks have been evaluated on the basis of Na2S, which is far more aggresive than other salts. Coatings that have been tested before and after aging. Defect-free application deserves attention. Switching from Na2S to other salts would greatly improve the chance op succesful mitigation. - Develop a list of possible solutions, then run tests by following protocols for accelerated testing - It depends on the failure mode / re-evacuation	5
1.4	The final product is not working because the various subsystems/components developed by various partners are not complementary	Unlikely	2	Major	4	**8**	Moderate	- TNO will perform a system engineering approach to develop a consistent heat storage system. - A team spirit is critical. Every member should make its best efforts to deliver good results. - Interface management; IOC tracking, V-model approach	7
1.5	Material requirements towards composite manufacture impose too strict requirements on manufacturing process that cannot be implemented.	Moderate	3	Moderate	3	**9**	Moderate	- Accept	8
1.6	Extreme natural events may damage the system (e.g. Flooding, earthquake, lightning strike etc.)		0		0	**0**	N/A	N/A	N/A
1.7	Salt impurity may lead to bad system performance, potential side reaction, reduced lifetime, H2S production						N/A	- Very high quality check on the row material to ensure suitable performances	N/A
2	Partnership risks								
2.1	Disagreement on further investments: some partners may leave	Unlikely	2	Major	4	**8**	Moderate	- Nurture trust among team members - All partners to openly discuss their drives, views and agenda's, in order to avoid partners leaving - Adapt strategy of program such that is focus is no longer only on the demonstration unit. - Search for a new partner and integrated into the team	5
2.2	Industrialization at risk: a partner declares bunkruptcy	Unlikely	2	Moderate	3	**6**	Moderate	- Accept - Every working package should be prepared and develop a contingency plan - Search for a new partner and integrated into the team	6
2.3	Disagreement on ownership rules	Moderate	3	Moderate	3	**9**	Moderate	- Trust each other and speak out all concerns and issues, search for solutions - - Discuss IP exploitation early in the project - Contracting and communication	8
2.4	Partners on the same market	Unlikely	2	Moderate	3	**6**	Moderate	- Follow project team agreement - Each Industrial partner keeps its role in the value chain - Joint venture	8

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3	Market risks								
3.1	Poor acceptance by customers - lack of confidence	Moderate	3	Major	4	**12**	High	- Lab scale system is very important for demonstration. It's better than any presentations on paper. - Image campagne, generate added value to the product, stakeholer analysis, trendsetter involvement	6
3.2	Poor customer cost-benefits rate	Likely	4	Major	4	**16**	Very high	- Include high risk - high gain development route in heat battery development with the aim to maximize cost reduction. - Marketing and sales need to deliver key benefits to convince customers - Image campagne, generate added value to the product	5
3.3	Lack of profitability in production	Likely	4	Moderate	3	**12**	High	- Consider a global network - Design to manufacturing	7
3.4	Worthless result: performance lower than market needs	Moderate	3	Major	4	**12**	High	- A proper analysis of market needs - As CREATE will deliver TRL6 result, further development will be required - Design of device should be made such that DHW supply is ensured. - Set up a deadline to build one complete system in six months. The concept needs to be proved ASAP. - Market research, specification of the product	6
3.5	Salt transportation restriction		0		0	**0**	N/A	- Verify local law with respect to possibility of salt transportation	N/A
4	IPR/Legal risks								
4.1	Lack of adequate policy hampers successful market uptake of the technology	Moderate	3	Moderate	3	**9**	Moderate	- Organize workshop with policy makers in WP9 - Streamline the communications among team members, identify any potential issues at early stage and figure out solutions - Na2S, lobbing	4
4.2	Patent infringement	Unlikely	2	Major	4	**8**	Moderate	- All partners to make patent map for the technology they are developing - Set up a database, do a prior arts search, free to operate search - Freedom to operate research	7
4.3	Worthless result: earlier patent exists	Moderate	3	Major	4	**12**	High	- All partners to make patent map for the technology they are developing - Develop a strategy to maximize the system performance - Freedom to operate research, can not hinder imitator; exclusive contracts, keep IP secret , binding know-how porter and establisch non-competition clause	4
5	Management and Financial								
5.1	Delay in schedule - not meeting the project milestones	Likely	4	Major	4	**16**	Very high	- Coordinator to regularly update integral project schedule with intermediate milestones and discuss this with CREATE partners - Link all tasks to show a critical path, missing deadline is not acceptable - Pushing selection of materials based on existing knowledge (assuming that no other problems with the material pop-up / assuming that it is a high TRL material) - Establisch project management	7
5.2	Inadequate or poor communication among partners	Likely	4	Major	4	**16**	Very high	- Coordinator to hold regular telco's / meetings and extraordinary meetings for urgent matters if required - Find out root causes, give constructive feedback, not critisize team members at back	6
5.3	Weak exploitation. Inadequate business plan	Unlikely	2	Moderate	3	**6**	Moderate	- Active participation of all partners in Exploitation workshops to strenghten exploitation plans ans strategies - Partners' cooperation (providing inputs) on business plans - Review business plan on a regular basis	6
5.4	Inadequate reporting procedures	Moderate	3	Moderate	3	**9**	Moderate	- Coordinator to define and monitor review procedure - Refine the reporting system, get feedback from teammembers - Re-work procedures	6
5.6	Lack of awareness (poor dissemination activities)	Unlikely	2	Major	4	**8**	Moderate	- Enhance dissemination channels and strengthen dissemination activities by partners	6
6	Environmental, regulation, safety and other risks								
6.1	Lack of standardized validation methods hamper successful evalution of the technology	Unlikely	2	Moderate	3	**6**	Moderate	- Validation of technology as much as possible via existing standards - Initiate standardization activities	5
6.2	Some salt hydrates are toxic or hazardous, which hamper accpetance of the technology in the build environ.	Likely	4	Major	4	**16**	Very high	- Evaluation based on the use of Na2S. The public has to be convinced that H2S emission from the device into the dwelling (in case of Na2S) is impossible given its design, construction and testing. The chance of mitigation would greatly improve in case of another salt. - Include HAZID and HAZOP activities in CREATE project. - Image campagne, generate added value to the product, stakeholer analysis, trendsetter involvement - Get help from local professional to develop procedures in case of accidents happen.	3
6.3	Interaction with extinguishing agents by fire brigade may lead to		0		0	**0**	N/A	- Provide information to authorities relevant to potential interaction with extinguishing media	N/A
6.4	Misuse/improper maintenance of the innovative system leading to		0		0	**0**	N/A	- Provide suitable plan to rise awareness of installation related risks	N/A

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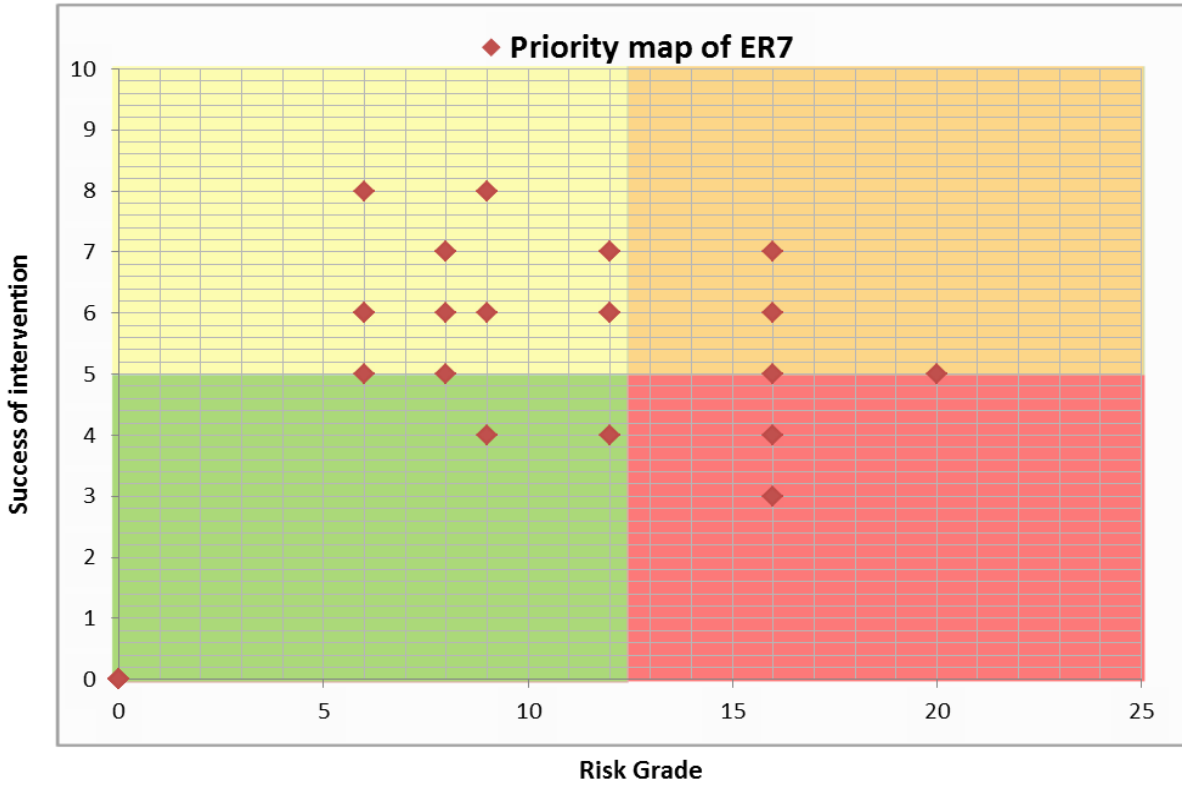
Figure 24: Priority Map for Heat battery: advanced thermal energy storage system – size of 2.5 m³



4.6.1 Main conclusions and further steps

Unfortunately, there are some risks evaluated by high grades with low expected success of interventions. These risks are identified under ID 1.1, 1.3, 3.2 and 6.2, meaning substantial threats for the heat battery potential exploitation.

Ad ID1.1 – Set up a global network for materials, sub-assemblies and other parts to find lower prices for materials. Close cooperation among WP2 partners.

Ad ID1.3 – Other salt should be weighted up, develop coating for corrosion protection, involve partner with advanced knowledge about salt hydrates corrosion and deterioration.

Ad ID3.2 – Consolidate cooperation between techno and economic partners within the project to design the best business cases for the market applications and use. Sharing

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knowledge between these partners would draw a way for finding best cost-benefits rate for customers. Usage of lab scale system is very important for demonstration, it is better than any theoretical calculations.

Ad ID 6.2 - As experience on TCMs' use in building environments nearly does not exist[13], CREATE carries out a comprehensive analysis of related hazards in order to provide the information required to safely build, maintain, and operate TCM-based storage systems in full compliance with established codes and standards. A comprehensive risk assessment, consisting of several phases (i.e. HAZID, HAZOP, QRA and FMEA) will be completed step-wise in parallel to the thermal storage development stages. Design of appropriate safety measures derived from the risk assessment will be accomplished to provide a suitable margin of safety during operation of TCMs-based thermal systems through prevention systems, containment systems, etc.

Furthermore, risks identified under **ID 5.1 and 5.2** need to be monitored carefully and mitigation actions executed. Coordinator will to regularly update integral project schedule with intermediate milestones and discuss this with CREATE partners. To strengthen communication among partners: all partners should bear the responsibility to provide required inputs/feedback/materials in time and in sufficient quality. Regular telco meetings will be hold to support the cooperation.

[13] In the past the demonstration of TCM storages was carried out in "container buildings" or simulated building environments in labs.

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Conclusion

This deliverable “Initial plan for the dissemination and exploitation of the project results and communication plan” can be regarded as preliminary since this document was created in M12 and represents the project overview and dissemination activities performed by the consortium only till that date. This document will be constantly updated based on the project development and supported by regular exploitation workshops.

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Appendix 1: Dissemination activities template

DISSEMINATION ACTIVITIES

This document includes:

- **Template A1**: List of scientific (peer-reviewed) publications related to the foreground of the project.
- **Template A2a**: List of dissemination events and other activities (conferences, workshops, exhibition fairs, congresses, web sites/applications, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, thesis, interviews, films, TV clips, posters, etc.)
- **Template A2b**: Description of events already performed (event description, partner contribution, type of audience, statistics, feedback, materials, attachments)

VERSION:	1
TEMPLATE REVIEWS:	N/A
DATE LAST RELEASE:	Mx
NEXT RELEASE DUE DATE:	My
FINAL RELEASE DUE DATE:	M46
CONTRIBUTIONS:	TNO, AEE, TUE, VAI, EDF, TES, MOS, DAP, FENIX, LUV, DOW, CAL

Project Title:
"Compact REtrofit Advanced Thermal Energy storage."

Project Acronym:	CREATE
Project Number:	680450
Project Start Date:	01.10.2015
Project End Date:	30.09.2019
Duration:	48 months

European Commission

Section A:
DISSEMINATION PLAN AND ACTIVITIES

Table A1: List of scientific publications (planned and performed)									
Publication title (website if applicable)	**Publication type** (paper in conference, magazine, etc.)	**Objective**	**Authors**	**Periodical name/ Publisher**	**Date**	**Place**	**Relevant pages**	**Responsible Partner**	**Status** (Performed/ Planned)

Table A2a: List of dissemination events and activities (planned and performed)								
Type of event/activity	**Event/activity title**	**Objective**	**Date**	**Place**	**Partner contribution** (project presentation, poster, brochure, stand, etc.)	**Countries addressed** (national/international)	**Responsible Partner**	**Status** (Performed/ Planned)

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Table A2b: Description of events already performed					
Event title		**Location**		**Type of event**	
Website		**Date**		**Responsible partner**	
Event description (main focus, organizers, topics addressed, periodicity, etc.)					
Partner contribution (Presentation name and purpose, topics addressed, main content, etc.)					
Type of audience (scientific community, industry, civil society, policy makers, authorities, media, etc.					
Statistics (number of attendants, countries, etc.)					
Feedback (summary, reactions, interests, conclusions)					
Materials (presentation, brochure, poster, video, etc.)					
Attachments (agenda, photos, pictures, etc.)					

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Appendix 2: Database of dissemination events

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Content

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1. Conferences / congresses

Building industry

- **Conference of 94th ICRIET (International Conference on Recent Innovations in Engineering and Technology) 2016**
  12-13 September, 2016
  Paris, France
  http://theiier.org/Conference/France/6/ICRIET/

- **Conference of 81st ICSIM (International Conference on Science, Innovation and Management) 2016**
  12-13 September, 2016
  Paris, France
  http://theiier.org/Conference/France/6/ICSIM/

- **European Research Funding & Networking Event**
  15-16 September, 2016
  Athens, Greece
  http://www.erfn.eu/

- **The 2016 International Conference on High Performance and Optimum Design of Structures and Materials**
  19-21 September, 2016
  Siena, Italy
  http://www.wessex.ac.uk/16-conferences/hpsmopti-2016.html

- **Construction industry summit**
  20-21 September, 2016
  London, UK
  http://www.constructionindustrysummit.com/

- **BUILD UPON: Leaders' Summit**
  20-21 September, 2016
  Madrid, Spain
  http://buildupon.eu/event/leaderssummit/

- **Disrupt to construct: Building the future starts today - UK GBC**
  20 September, 2016
  London, UK
  http://www.ukgbc.org/event/disrupt-construct-building-future-starts-today

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- **Conference of 96th ICRIET (International Conference on Recent Innovations in Engineering and Technology) 2016**
  21-22 September, 2016
  Stockholm, Sweden
  http://theiier.org/Conference/Sweden/2/ICRIET/

- **Conference of 83rd ICSIM (International Conference on Science, Innovation and Management) 2016**
  21-22 September, 2016
  Stockholm, Sweden
  http://theiier.org/Conference/Sweden/2/ICSIM/

- **Conference of 97th ICRIET (International Conference on Recent Innovations in Engineering and Technology) 2016**
  26-27 September, 2016
  Edinburgh, UK
  http://theiier.org/Conference/Scotland/1/ICRIET/

- **Conference of 84th ICSIM (International Conference on Science, Innovation and Management) 2016**
  26-27 September, 2016
  Edinburgh, UK
  http://theiier.org/Conference/Scotland/1/ICSIM/

- **Conference of 90th ICRIET (International Conference on Recent Innovations in Engineering and Technology) 2016**
  30-31 September, 2016
  Copenhagen, Denmark
  http://theiier.org/Conference/Denmark/1/ICRIET/

- **Conference of 77th ICSIM (International Conference on Science, Innovation and Management) 2016**
  30-31 September, 2016
  Copenhagen, Denmark
  http://theiier.org/Conference/Denmark/1/ICSIM/

- **LEAF (Leading European Architecture Forum) International**
  13-14 October**,** 2016
  London, UK
  http://www.arena-international.com/leaf/

- **SBE16 Thessaloniki International Conference, Sustainable Synergies from Buildings to the Urban Scale**
  17-19 October, 2016
  Thessaloniki, Greece
  http://sbe16-thessaloniki.gr/

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- **UK Construction Week**
  18-20 October, 2016
  Birmingham, UK
  www.ukconstructionweek.com

- **International Construction Engineering Conference**
  3-4 November, 2016
  Istanbul, Turkey
  http://www.dakamconferences.org/#!consteng/tvxka

- **CIBSE Building Performance Conference and Exhibition 2016**
  17-18 November, 2016
  Westminster, United Kingdom
  http://www.cibse.org/cibse-conference/conference

- **7th ECTP Conference - Innovative Built Environment**

  The 7th ECTP open conference will be dedicated to present and discuss current and anticipated innovation in the built environment. Innovation cases will be exhibited through booths set up in the conference room also dedicated to lunch and coffee breaks. Booth proposals dealing with innovations coming from EC-funded or transnational funded RDI projects will be given priority. Booths dedicated to other topics may be proposed but will be accepted only under room availability and interest. The selection is made by the organizers and is supposed to be fully accepted by the proposers.

  17-18 November, 2016
  Brussels, Belgium
  https://fr.xing-events.com/ECTPConference2016.html

- **NSB 2017 | Nordic Symposium on Building Physics**
  11-14 June, 2017
  Trondheim, Norway
  http://www.ntnu.edu/web/nsb2017/home

Building materials and technologies

- **The 6th International Conference on Structural Analysis of Advanced Materials**
  8-11 September, 2016
  Porto, Portugal
  http://materialsscience.conferenceseries.com/europe/events-list/materials-science-and-engineering

- **2nd International Conference on Efficient Building Design (ICEBD-MET2)**

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22-23 September, 2016
Beirut, Lebanon
https://www.ashrae.org/membership--conferences/conferences/2016-2nd-international-conference-efficient-building-design#reg

- **EuroSun 2016**
  International Conference on solar Energy for Buildings and Industry
  12-14 October, 2016
  Palme de Mallorca, Spain
  http://eurosun2016.org/

- **Yapex**
  16-19 November, 2016
  Antalya, Turkey
  http://www.yapex.com/

- **EUREKA 2016 – Heating, Cooling & Ventilation: Sustainable technologies for a better life**
  13 December, 2016
  The Hague, Netherlands
  http://www.eureka-hvacr.eu/

- **ICAEBT 2017 - 19th International Conference on Architectural Engineering and Building Technologies**
  13-14 January, 2017
  Zurich, Switzerland
  https://www.waset.org/conference/2017/01/zurich/ICAEBT

- **BAU**
  World's Leading Trade Fair for Architecture, Materials, Systems
  16-21 January, 2017
  Munich, Germany
  http://bau-muenchen.com/

- **ICBEST - International Conference on Building Envelope Systems and Technologies 2017**
  15-18 May, 2017
  Istanbul, Turkey
  http://icbestistanbul.com/

Renewable and sustainable energy

- **Sustainability in Energy and Buildings**
  11-13 September, 2016
  Turin, Italy
  http://seb-16.sustainedenergy.org/

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- **H2020 Energy Efficiency Info Day**
  19 September, 2016
  Brussels, Belgium
  https://ec.europa.eu/easme/en/horizon-2020-secure-clean-and-efficient-energy-info-day

- **7th International conference on Energy and Sustainability**
  20-22 September, 2017
  Sevilla, Spain
  http://www.wessex.ac.uk/conferences/2017/energy-and-sustainability-2017

- **International Conference on Renewable Power Generation**
  21-23 September, 2016
  London, UK
  http://conferences.theiet.org/rpg-europe/index.cfm

- **International Conference on Solar Technologies & Hybrid Mini Grids to improve energy access**
  21-23 September, 2016
  Frankfurt, Germany
  http://www.energy-access.eu/

- **World Green Building Week 2016**
  26 September – 2 October, 2016
  London, UK
  http://www.ukgbc.org/events/featured-event/world-green-building-week/overview

- **Info Day H2020: Smart Grids and Storage**
  3 October, 2016
  Brussels, Belgium
  https://ec.europa.eu/inea/en/news-events/events/2016-info-day-horizon-2020-smart-grids-and-storage

- **SBE16 - Build green and renovate deep**
  5-7 October, 2016
  Tallinn (Estonia) and Helsinki (Finland)
  http://sbe2016.org/

- **Advanced Building Skins Conference 2016**
  10-11 October, 2016
  Bern, Switzerland
  http://www.energy-forum.com/

- **Congress of Innovation on Sustainable Construction (CINCOS'16)**
  3-4 November, 2016
  Lisbon, Portugal

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http://cincos16.talkb2b.net/

- **European Utility Week**
  15-16 November, 2016
  Barcelona, Spain
  http://www.european-utility-week.com/

- **AMANAC WORKSHOP – "Bridging the gap between Research and Market Uptake: Innovative Energy Efficiency Building Solutions"**
  23 November, 2016
  Milan, Italy
  http://www.ecobinder-project.eu/en/workshop-registration

- **e-nova 2016: Sustainable Technologies conference - Buildings, Energy, Environment**
  24-25 November, 2016
  Pinkafeld, Austria
  http://www.fh-burgenland.at/news-presse/termine/e-nova-2016-english/

- **Stakeholders Infoday '"Responding to Societal Challenges through Nature and Cultural Heritage based solutions"**
  8 December, 2016
  Brussels, Belgium
  http://www.ectp.org/news-events/events/event-detail/?tx_ttnews%5Btt_news%5D=211&cHash=807fd419587c39a00ccf2a7af631f45f

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- **ENERGY STORAGE 2017**
  8-9 February, 2017
  Paris, France
  http://www.wplgroup.com/aci/event/energy-storage-conference/

- **World Sustainable Energy Days 2017**
  1-3 March, 2017
  Wels, Austria
  http://www.wsed.at/en/world-sustainable-energy-days/

- **South-East European Exhibition and Conference on Energy Efficiency & Renewable Energy**
  7-9 March, 2017
  Sofia, Bulgaria
  http://viaexpo.com/en/pages/ee-re-exhibition

- **All-Energy**
  UK's Largest Renewable Energy Conference and Exhibition
  10-11 May, 2017
  Glasgow, UK
  www.all-energy.co.uk

- **Healthy Buildings Europe**
  2-5 July, 2017
  Lublin, Poland
  http://hb2017-europe.org/

- **Global Solar Energy Summit**
  10-12 July, 2017
  Madrid, Spain
  http://solarenergy.conferenceseries.com/

- **Energy and Sustainability 2017**
  20-22 September, 2017
  Seville, Spain
  http://www.wessex.ac.uk/conferences/2017/energy-and-sustainability-2017

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2. Fairs

Building construction – in general

- **Zero Carbon Buildings Today and in the Future (ZCB 2016)**
  8-9 September, 2016
  Birmingham, UK
  http://www.zcb2014.org/2016/index2016.html

- **FOR ARCH**
  15-19 September, 2016
  Prague, Czech Republic
  http://forarch.cz/

- **TURKEYBUILD ANKARA**
  20-23 October, 2016
  Ankara, Turkey
  http://www.yapifuari.com.tr/
  International Building Fair

- **TURKEYBUILD IZMIR**
  International Building Fair
  3-6 November, 2016
  Izmir, Turkey
  http://www.yapifuari.com.tr/

- **BAUMESSE MEERBUSCH / DÜSSELDORF 2016**
  Home, Construction, Renovation & Energy Savings Expo
  4-6 November, 2016
  Dusseldorf, Germany
  http://www.baumesse.de/

- **Brussels Innova**
  17-19 November, 2016
  Brussels, Belgium
  http://brussels-innova.com/

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- **HOUSE I**
  9-12 March, 2017
  Riga, Latvia
  http://www.bt1.lv/bt1/maja1/

- **Construction Exhibition, Statyba**
  30 March – 2 April, 2017
  Klaipeda, Lithuania
  www.statyba.expo-vakarai.lt

- **Building Fairs Brno**
  25-29 April, 2017
  Brno, Czech Republic
  www.bvv.cz/stavebni-veletrhy-brno

- **TEKTÓNICA 2017**
  4-7 May, 2017
  Lisbon, Portugal
  http://www.tektonica.fil.pt/english/

- **Vision London**
  6-7 June, 2017
  London, UK
  www.visionlondon.com

- **Ineltec**
  12-15 September, 2017
  Masle, Switzerland
  www.ineltec.ch

- **Bygg Reis Deg**
  18-21 October, 2017
  Lillestrom, Norway
  www.byggreisdeg.no

Architecture – Design

- **ARCHITECT@WORK PARIS 2016**
  22-23 September, 2016
  Paris, France
  http://www.architectatwork.fr/

- **ARCHITECT@WORK BERLIN 2016**
  9-10 November, 2016

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Berlin, Germany
http://www.architectatwork.de/

- **Warsaw BUILD**
  16-18 November, 2016
  Warsaw, Poland
  http://www.warsawbuild.pl/

- **ARCHITECT@WORK BELGIUM 2017**
  27-28 April, 2017
  Kortrijk, Belgium
  http://www.architectatwork.be/

- **ARCHITECT@WORK - Switzerland 2017**
  10-11 May, 2017
  Zurich, Switzerland
  http://www.architect-at-work.ch/
  Also in: Düsseldorf, Stuttgart, Milan, Rome, Lyon, Marseille, Nantes, Luxembourg, Rotterdam

Energy Savings & Sustainable Building

- **FOR THERM**
  15-19 September, 2016
  Prague, Czech Republic
  http://for-therm.cz/

- **POWER EFFICIENCY. ENERGY-SAVING. INNOVATIVE TECHNOLOGIES AND EQUIPMENT 2016**
  4-7 October, 2016
  St. Petersburg, Russia
  http://www.en.farexpo.ru/energy/exhibition/about/

- **RENEXPO**
  6-9 October, 2016
  Augsburg, Germany
  http://www.renexpo.de/de.html

- **SMART ENERGY EXPO 2016**
  International Energy, Power Efficiency & Energy Saving Exhibition
  12 – 14 October, 2016
  Verona, Italy
  http://www.smartenergyexpo.net/en

- **ECOLINK 2016**
  International Environment, Water, Renewable Sources & Energy Saving Exhibition

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14-16 October, 2016
Athens, Greece
http://www.3ek.com.gr/

- **GREEN BUILDING EXPO**
  2-4 November, 2016
  Belgrade, Serbia
  http://www.greenbuildingexpo.rs/en/

- **ENERGIES + CONSTRUCTION**
  18-20 November, 2016
  Marche-en-Famenne, Belgium
  https://www.energiesplus.be/

- **Klimahouse**
  26-29 January, 2017
  Bolzano, Italy
  www.klimahouse.it

- **For Pasiv**
  9-11 February, 2017
  Prague, Czech Republic
  www.forpasiv.cz

- **HÄUSLBAUERMESSE - Building, Renovation & Energy Savings Trade Show**
  10-12 February, 2017
  Klagenfurt, Austria
  https://www.kaerntnermessen.at/

- **INFACOMA**
  16-19 February, 2017
  Thessaloniki, Greece
  http://www.helexpo.gr/en

- **Bauen & Energie**
  16-19 February, 2017
  Vienna, Austria
  www.bauen-energie.at

- **ECOBUILD 2017**
  7-9 March, 2017
  London, UK
  http://www.ecobuild.co.uk/

- **Renewable Energy Exhibition**
  8-10 March, 2017

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Lyon, France
http://www.bepositive-events.com/

- **ISH FRANKFURT 2017**
  14-18 March, 2017
  Frankfurt, Germany
  http://ish.messefrankfurt.com/frankfurt/en/aussteller/willkommen.html

- **EnergyMed**
  30 March – 1 April
  Naples, Italy
  www.energymed.it

- **For Energo**
  9-12 May, 2017
  Prague, Czech Republic
  www.forenergo.cz

- **Intersolar Europe 2017**
  31 May – 2 June, 2017
  Munich, Germany
  https://www.intersolar.de

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HVAC

- **AQUA-THERM WARSAW 2016**
  15-18 November, 2016
  Warsaw, Poland
  http://www.aquatherm-warsaw.com/main/

- **VVS – DAGENE 2016**
  HVAC Exhibition
  19-21 October, 2016
  Lillestrøm, Norway
  http://www.vvs-dagene.no/

- **Chillventa Nurnberg 2016 - International Expo Refrigeration, Air Conditioning & Ventilation, Heat Pumps**
  11-13 October 2016
  Nurnberg, Germany

- **KLIMAHOUSE**
  26-29 January, 2017
  Bolzano, Italy
  http://www.fierabolzano.it/klimahouse/de/

- **EXPOBAGNO 2017 - International Exhibition for the HVAC and Plumbing Sectors**
  days March 2017
  Milan, Italy
  http://www.mcexpocomfort.it/

- **RACIOENERGIA 2017**
  22-25 March, 2017
  Bratislava, Slovakia
  http://www.incheba.sk/?lang=en#&panel1-1

- **TESKON + SODEX 2017**
  International Trade Fair for Sanitary and HVAC
  19-22 April, 2017
  Izmir, Turkey
  http://www.teskonsodex.com/

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- **VVS-MÄSSAN 2017**
  26-27 April, 2017
  Malmö, Sweden
  http://www.easyfairs.com/sv/events_216/byggmaessan-syd-2017_76536/vvs-maessan-syd-2017_76643/

- **"Beyond NZEB retrofit of existing buildings" conference**
  10-11 May, 2017
  Matera, Italy
  http://www.rehva.eu/events/event-detail/article/50th-international-congress-beyond-nzeb-retrofit-of-existing-buildigs.html

- **Interclima + Elec**
  6-10 November, 2017
  Paris, France
  www.interclimaelec.com

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Appendix 3: Risk analysis methodology

The risk management process foresees the following steps:

- ***Risk identification*** – risks should be directly related to the project objectives and agreed by the whole project consortium. Risk management means identifying and managing uncertainties to delivery of objectives, not managing issues that might be constant. Focus on issues alone can lead to fire fighting.
- ***Risk evaluation*** **-** what is the impact of each risk should it occur? What impact might they have on benefits, time, cost, quality, reputation, people, etc. How likely is it that these risks will occur? The probability and impact can both be scored, e.g. using a High/Medium/Low scale.
- ***Risk prioritisation*** **-** what is the priority of each risk? The urgency and importance of a risk is not the same thing - deal with the urgent risks quickly, deal with the important risks comprehensively.
- ***Risk management planning*** **-** a strategy for mitigating the risks identified and preventing the project from being derailed? What actions and resources will be needed to reduce the impact and/or probability of the risk happening? It might be considered:

  - How to prevent it from happening - either by putting some counter-measures in place or putting the project in a position where it would have no impact
  - How to reduce the risk - what action is needed to reduce the probability of the risk happening and/or to reduce the impact if it does occur
  - Can you transfer the risk to a third party (e.g. take out insurance) or share it in some way (shared risk-shared gain)?
  - What to do to if the risk does occur - do you need a contingency plan?
  - What are the implications of accepting the risk - ensuring that all the stakeholders are aware of the possible consequences?
- ***Risk monitoring*** **-** the project's overall exposure to risk, must be reviewed throughout the life of a project and where necessary actions to mitigate risks must be changed or revisions to the project business case or assumptions must be considered, if circumstances alter.

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Risk identification

There are various risks that could affect the successful of the project results. The can be categorized in the following main different families:

- ***Technological risk*** - The technological risk is considered as a combination of technology and technical risks. Technology risk is concerning an underpinning technology necessary for a project. Technical risk is related with system/technology implementing and integration.
- ***Partnership risks*** are the risks deriving from the other partners involved in the project.
- ***Market risk –*** It is defined as the risk of economic losses resulting from price changes in the capital markets. This includes equity risk, general and specific interest-rate risk, property risk and currency risk. Other sources of market risk include recessions, political turmoil, changes in interest rates and terrorist attacks. Systematic (market risk) – cannot by eliminated, unsystematic (specific risk) – can be reduced to some extend through diversification.
- ***IPR/Legal risk*** – various legal issues related to the violation of laws and/or standars and/or regulations. Or, related to the IPR (the legal costs of protecting, enforcing of IPR, defending of IP from infringement etc.).
- ***Management and Financial risk*** – management risk can be defined as the risks associated with ineffective, destructive or underperforming project management. Financial risk is concerned with various financial inconsistencies, insufficieny or ineffective financial management within a project.
- ***Environmental, Regulation, Safety and Other Risks***- regulations of health, safety or environment can pose various risks for the project results exploitations.

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Risk evaluation

Particular risks will be evaluated based on Risk Assessment Tool assigned as below. The risk assessment tool acts as a guide to determine an appropriate risk rating for each risk.

Table 9: Impact assignment

Consequences (impact)	Assignment	Note
1	Insignificant	Minor problems easily handled by normal day to day processes.
2	Minor	Some disruption or modification of correct execution possible.
3	Moderate	Moderate modification on the correct execution and results.
4	Major	Results severely affected.
5	Catastrophic	Results are under crucial risk not to execute or of heavy delay.

Table 10: Likelihood assignment

Likelihood	Description
1	Rare
2	Unlikely
3	Moderate
4	Likely
5	Almost certain

Table 11: Risk Assessment Matrix

Likelihood	Impact				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	Low	Low	Low	Low	Moderate
Unlikely	Low	Low	Moderate	Moderate	High
Moderate	Low	Moderate	Moderate	High	Very high
Likely	Low	Moderate	High	Very high	Unacceptable
Certain	Moderate	High	Very high	Unacceptable	Unacceptable

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Risk monitoring and risk management planning

A Risk Register table was designed to act as a repository for all risks identified and includes additional information about each risk, e.g. category and brief desciption of the risk, impact and likelihood assessed by values, mitigation steps etc. As a result of first exploitation workshop a structure of Risk Register table will be established and its content will be regularly reviewed throughout the life of the project.

Table 12: Risk Register table template

ID	Risk identification	Likelihood		Impact		Grade	Risk Map	Mitigation	
		Value	Score	Value	Score			Description	Success rate
1	Technological risks								
1.1	Worthless result: ill-timed disclosure		0		0	0	Low		
1.2	Worthless result: earlier patent exists		0		0	0	Low		
1.3	Worthless result: better technology/methodology exists		0		0	0	Low		
1.4	Significant dependency on other technologies		0		0	0	Low		
1.5	The life cycle of the new technology is too short		0		0	0	Low		
1.6	Result aiming at replacing existing and well entrenched technologies		0		0	0	Low		
2	Partnership risks								
2.1	Disagreement on further investments: some partners may leave		0		0	0	Low		
2.2	Industrialization at risk: no manufaturer for the result		0		0	0	Low		
2.3	Industrialization at risk: an industrial parnter leaves the market		0		0	0	Low		
2.4	Industrialization at risk: a partner declares bunkruptcy		0		0	0	Low		
2.5	Disagreement on ownership rules		0		0	0	Low		
2.6	Partners on the same market		0		0	0	Low		
3	Market risks								
3.1	Exploitation disagreement: partners on the same market		0		0	0	Low		
3.2	Exploitation disagreement: partners with divergent interests		0		0	0	Low		
3.3	Worthless result: performance lower than market needs		0		0	0	Low		
3.4	Nobody buys the product. Nobody needs it		0		0	0	Low		
3.5	Nobody buys the product. Too expensive		0		0	0	Low		
3.6	Nobody buys the product. Unsuitable sales force		0		0	0	Low		
3.7	Nobody buys the product. The project hits against a monopoly		0		0	0	Low		
3.8	Nobody buys the product. Problems at the time of the first sales		0		0	0	Low		
3.9	Nobody buys the product. Rejected by end-users		0		0	0	Low		
4	IPR/Legal risks								
4.1	Legal problems: proceeding against Consortium		0		0	0	Low		
4.2	Legal problems: we are sued for patent infringement		0		0	0	Low		
4.3	Know- how risks: it is easy to counterfeit the patent		0		0	0	Low		
4.4	Know- how risks: a counterfeit cannot be proved		0		0	0	Low		
4.5	Know- how risks: the patent application is rejected		0		0	0	Low		
5	Management and Financial								
5.1	Nobody buys: Our licensee is not exploiting his exclusive license		0		0	0	Low		
5.2	Know- how risks: there are leaks of confidential information		0		0	0	Low		
5.3	Multiple change to original objectives		0		0	0	Low		
5.4	Lack of awareness of risk management		0		0	0	Low		
5.5	Inadequate communication among partners		0		0	0	Low		
5.6	Inadequate reporting procedures		0		0	0	Low		
5.7	Off time supply of financial means		0		0	0	Low		
5.8	Weak exploitation. Inadequate business plan		0		0	0	Low		
6									
6.1	Nobody buys the product. Does not comply with the standards		0		0	0	Low		
6.2	Nobody buys: Standards to make it compulsory don't yet exist		0		0	0	Low		
6.3	Research is socially or ethically unacceptable		0		0	0	Low		
6.4	Influence of laws and regulations		0		0	0	Low		

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