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**Innovative compact HYbrid electrical/thermal storage systems  
for low energy BUILDings**

Project Acronym:

**HYBUILD**

**Grant Agreement N°: 768824**

**Collaborative Project**

## Deliverable Report

Deliverable number:

**D7.4**

Deliverable title:

## Business Model

<b>Related task:</b>	7.4
<b>Lead beneficiary:</b>	R2M
<b>Authors and institutions:</b>	R2M – Régis Decorme, Sophie Dourlens-Quaranta, Thomas Messervey, Pascal Torres
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### DISSEMINATION LEVEL

PU	Public, fully open, e.g. web	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC.	



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DOCUMENT STATUS HISTORY		
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2019/02/28	1 <sup>st</sup> Draft with R2M contribution	R2M
2019/03/04	2 <sup>nd</sup> Draft reviewed by COMSA and UDL	COMSA/UDL
2019/03/29	Final draft compiled by R2M	R2M

## Publishable executive summary

HYBUILD dissemination and exploitation activities aim at demonstrating that hybrid energy storage solutions are a key component in providing flexibility and supporting renewable energy integration in the energy system and can efficiently contribute to the decarbonisation of buildings.

The HYBUILD Business Model deliverable presents an analysis of the market potential of each HYBUILD Exploitable Result (ER – see also Deliverable 7.5) together with the key criteria allowing to define a business model for their future exploitation.

The work was supported by an ad-hoc questionnaire completed through bilateral semi-structured interviews organized by R2M with each ER owner(s).

The views collected amongst HYBUILD ER owners and presented in this report show a broad variety of situations. In most cases, some uncertainty remains regarding the business model definition, since the performance of the overall HYBUILD systems and of their building blocks still has to be demonstrated. In particular, the time to market of the overall HYBUILD solutions for Mediterranean and Continental climates will be assessed when the installation at the demo sites is done and initial results and costs are known.

However, regarding other HYBUILD ERs, ER owners have already identified target markets and exploitation routes, and they have in general a clearer vision of the time to market for their individual results.

The implementation of the exploitation path associated to each ER will be reported through the project periodic reports as well as through further upcoming deliverables which include HYBUILD patent filings (D7.7 – M48), HYBUILD Replication plan (D7.8 – M48) and Partner exploitation agreement (D7.9 – M48).

## Acronyms and Abbreviations

<b>AA</b>	Acronyms and Abbreviations
<b>Al</b>	Aluminum
<b>BEMS</b>	Building Energy Management System
<b>CA</b>	Consortium Agreement
<b>COP</b>	Coefficient of performance
<b>CPC</b>	Cooperative Patent Classification
<b>CSH</b>	Concentrated Solar Heat
<b>CTeam</b>	Coordination Team
<b>DC</b>	Direct Current
<b>DHC</b>	Domestic Hot Water
<b>DL</b>	Deadline
<b>DR</b>	Demand Response
<b>DSO</b>	Distribution System Operator
<b>EC</b>	European Commission
<b>EeB</b>	Energy efficient Buildings
<b>EMS</b>	Energy Management System
<b>ER</b>	Exploitable Result
<b>EU</b>	European Union
<b>FTO</b>	Freedom To Operate
<b>GA</b>	Grant Agreement
<b>HP</b>	Heat Pump
<b>HVAC</b>	Heating, Ventilation and Air-Conditioning
<b>IP</b>	Intellectual Property
<b>IPR</b>	Intellectual Property Rights
<b>JV</b>	Joint Venture
<b>JVC</b>	Joint Venture Company
<b>M&amp;A</b>	Mergers and Acquisition
<b>MTA</b>	Material Transfer Agreement
<b>NDA</b>	Non-disclosure Agreement
<b>OpenADR</b>	Open Automated Demand Response
<b>PCM</b>	Phase Change Material
<b>TRL</b>	Technology Readiness Level
<b>USP</b>	Unique Selling Point

## 1 Introduction

### Aims and objectives

This deliverable presents a market potential and business model analysis for each HYBUILD Exploitable Result (ER). The analysis for each ER included:

- A list of the owners / developers, their background declaration and management ideas in the case of shared ERs;
- A description of the result, its targeted customers & market segment, customer relationships, channels and value proposition;
- An update on the state of development, including current and expected TRLs;
- A short-term exploitation vision, strategy and actions, 2 years after the project end;
- A mid-term exploitation vision, 5 years after the project end.

The process to collect these data was supported by an ad-hoc questionnaire completed through bilateral semi-structured interviews organized by R2M with each ER owner(s).

Given that a large part of the data collected is strategic for each ER owner, the public version of this deliverable only presents the methodology which has been used, as well as aggregated and non-confidential global results. On the other hand, a confidential supplement to the report includes an appendix with the detailed complete market analysis and business model templates for each ER.

Finally, for some ERs, some information was shared within the interviews but is not reflected in the completed templates, in order to preserve confidentiality of the data between HYBUILD partners.

This analysis will be further updated in the next phases to reflect the latest progress of the project as well as exploitation intentions of the various project partners.

### Relations to other activities in the project

The overall Dissemination and Exploitation plan is presented in D7.1 - Dissemination and Exploitation plan. The overall plan includes the identification and management of the ERs which was conducted in Task 7.5 (Exploitation activities) and reported in Deliverable 7.5 – Exploitable Results table, and which is now further detailed in the present report with complementary market analysis and preliminary business model definition.

The progress of the management of ERs will be monitored and reported through the project periodic reports as well as through further upcoming deliverables which include HYBUILD patent filings (D7.7 – M48), HYBUILD Replication plan (D7.8 – M48), and Partner exploitation agreement (D7.9 – M48).

### Report structure

Chapter 2 presents the methodology which was used to build the present report: description of the supporting questionnaire / template which was used to gather the data and conduct the analysis, how and many interviews were conducted.

Chapter 3 presents global aggregated results of the analysis, which are non-confidential.

Chapter 4 concludes the report.

Appendix 1 presents the ER market analysis and business model questionnaire which was used.

Appendix 2 – available in a confidential separate document. It compiles the detailed completed questionnaires for each HYBUILD ER.

### Contributions of partners

R2M as WP7 leader is the main editor of this report. All ER leaders as well as ER co-owners / developers have interacted with R2M which conducted dedicated semi-structured interviews. The completed market analysis and business model templates were then validated by each involved partner.

## 2 Methodology for market analysis and business model definition

The baseline for the work presented in this report is the Exploitable Results’ (ER) descriptions which were presented in the D7.5 report – Exploitable Results – table.

To conduct a preliminary market analysis and business model definition for each ER, an ad-hoc questionnaire was designed. The questionnaire, presented in Appendix 1, is the integration of:

- The former Exploitable Result description template developed by R2M (see D7.5)
- Elements from an ad-hoc exploitation-oriented questionnaire developed by R2M and already successfully used in earlier collaborative R&D projects (see D7.5 – Annex 1)
- Selected questions from the Business Model Canvas template (Alexander Osterwalder)
- Selected questions from the Innovation Radar Questionnaire (European Commission)

Figure 1 presents the overall process which was implemented to conduct the preliminary market analysis and business model analysis for each ER: the questionnaire was sent to each ER Leader in an email in which they were asked to setup a skype / phone meeting with R2M using the Calendly online scheduling appointment tool (Step 1). During the semi-structured interview (Step 2), R2M discussed each question with the ER leader, took notes and wrote a synthesis of the key points discussed, and then sent a first draft by email of the completed questionnaire after the interview. Several iterations were then conducted by email to further collect inputs, including from the ER co-owners / developers, before finalizing each ER market analysis and business model (Step 3).

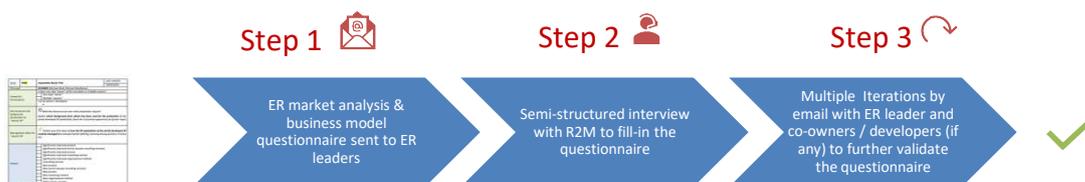


Figure 1 - Process for the ER Market analysis and business model definition

Given that the work presented in this report is delivered at Month 18 (March 2019) of the project and that many of the tasks related to the ER developments are still ongoing (or in some cases not started yet), the market analysis and business model shall be considered as preliminary and will be updated in the forthcoming work of WP7.

### 3 Aggregated non-confidential results

#### Overview of Exploitable Results (ERs)

The list of HYBUILD ERs is presented in Table 1. From the multiple interviews conducted, it emerged the need to create an additional ER led by OCHSNER. The ER is introduced as **ER03b** (Speed controlled split air/water heat pump for a thermal hybrid tank integration and integration in building's DC distribution network), since it is close to ER03a led by DAIKIN but also sufficiently different to justify setting up a separate ER.

Table 1 - HYBUILD Exploitable Results overview

#	Output	Exploitable Result name	ER Leader
ER01	New Product	HYBUILD integrated system for the Mediterranean climate	COMSA
ER02	New Product	HYBUILD integrated system for the Continental climate	COMSA
ER03a	Significantly improved Product	DC bus controller solution for heat pump market	DAIKIN
ER03b	Significantly improved Product	Speed controlled split air/water heat pump for a thermal hybrid tank integration and integration in building's DC distribution network	OCHSNER
ER04	Significantly improved Product	Innovative adsorber (high specific surface + in-situ crystallized SAPO 34)	FAHR
ER05	Significantly improved Product	PCM thermal storage module for HVAC applications (and possible scale up for waste heat recovery)	AKG
ER06	Modification of an existing product	Low temperature CSH collector for domestic large building applications	FRESN
ER07	Product / Service	Innovative solutions for smart BEMS	ENG
ER08	Organisational method	Design Methodology for Smart BEMS	ENG
ER09	Consulting service	Consulting offer for designers, engineers, planners and support to the commercialization of HYBUILD's exploitable results	R2M
ER10	Significantly improved Product	Adapted stainless-steel water storage	PINK
ER11	Other	Stakeholder Advisory Board (SHAB)	R2M
ER12	Other	HYBUILD Patent(s)	TBD

ER01 and ER02 correspond to the overall HYBUILD solutions (the first one designed for the Mediterranean climate, and the second one for the Continental climate), while the other ERs are interrelated elements, either individual technical components of the overall HYBUILD solution that could be exploited independently, or services and knowledge which are built on top of HYBUILD.

ER09 is not a typical ER resulting from technological advances from one or several partners. ER09's exploitation is in fact closely linked to the exploitation of the other ERs' exploitation:

- R2M Solution could support the deployment of ER01 and ER02 (HYBUILD integrated systems) by accompanying buildings' owners to obtain of a green certification such as LEED, BREEAM or equivalent. For instance, an energy storage installation earns points for certification for both LEED's Building Operations + Maintenance (O+M) and LEED's Building Design + Construction (BD+C).
- R2M Solution could support the commercialisation of other ERs – especially those which are considered as the most promising ones and with high TRL. For instance, within another

EU project (PVSITES – GA N° 691768), the collaboration between R2M Solution and another partner, namely Onyx Solar, has led to a new commercial development and partnership, with R2M Solution now being the official Onyx Solar distributor in both Italy and France.

Therefore, at this stage ER09 is not detailed in the present report.

In the same way, ER11 is not a typical ER since the HYBUILD Stakeholder Advisory Board (SHAB) will be used as a tool for promotion, dissemination and exploitation of the project results. The experts within the SHAB – see Deliverable 7.6) are also potential vehicles for further exploitation and replication of HYBUILD results. Therefore, ER11 is not detailed in the present report.

ER12 is not detailed either in the present report since the HYBUILD patents are still being developed at this stage, in connection with the other ERs (see the section on related Intellectual Property Rights of each ER, which indicate when a patent is foreseen in relation with each ER).

### HYBUILD ERs’ unique selling points and targeted customers

Table 2 summarizes for each ER its unique selling point(s) and the customers or market segments which are targeted.

Table 2 - HYBUILD Exploitable Results overview

#	Exploitable Result name	Unique selling point	Targeted customers / market segment
<b>ER01</b>	HYBUILD integrated system for the Mediterranean climate	Balancing and optimization of thermal and electrical energy flows and state of charges, maximizing the usage of free renewable energy and optimizing the energy procurement costs. Enabling flexibility services both for thermal and electrical upon request from electrical and thermal grid operators.	Buildings with DHW and cooling Demands in Mediterranean or Mediterranean to Continental climates. In particular, single family homes/units will be targeted in these regions.
<b>ER02</b>	HYBUILD integrated system for the Continental climate		Buildings with DHW and cooling demands in Continental climates. In particular, multi-storey, multi-family homes with apartments of 80-90m <sup>2</sup> will be targeted.
<b>ER03a</b>	DC bus controller solution for heat pump market	High efficiency of the heat pump: DC bus controller solution ideal for the interconnection with PV systems.	Residential heating, cooling, hot water production. Commercial users for hot water production.
<b>ER03b</b>	Speed controlled split air/water heat pump for a thermal hybrid tank integration and integration in building’s DC distribution network	High energy efficiency. High quality in terms of robustness, lifetime, etc.	System partners, technical planners, installers and end customers.

<b>ER04</b>	Innovative adsorber (high specific surface + in-situ crystallized SAPO 34)	Highly cost-effective porous Aluminum (Al) heat exchangers.	The market addressed is the one of highly efficient heat exchangers. The aim is to sell the adsorption machine for which the heat exchanger part is essential.
<b>ER05</b>	PCM thermal storage module for HVAC applications (and possible scale up for waste heat recovery)	Reduced space requirements compared to sensible storage: 500%. Increased heat transfer by integrated high-performance aluminum heat exchanger; fast load/unload cycles. Significant peak load reduction.	The targeted market is the one of highly efficient heat exchangers. The second field is applying AKG's technology to integrate PCM directly into a heat exchanger for new applications (either large-scale thermal storage for buildings but also for use of waste heat or increasing the efficiency of conventional refrigerant based HVAC applications).
<b>ER06</b>	Low temperature CSH collector for domestic large building applications	Constant temperature even at low radiation, easy to install, possible to "shut off" the energy input by defocusing the mirrors	Heating and cooling applications for domestic large buildings. Customers are suppliers of heating and cooling systems (they would buy the product and integrate it in a larger package).
<b>ER07</b>	Innovative solutions for smart BEMS	Unique combination between the optimization techniques (coming from academia) and the commercial tools from ENG, which may be provided as software suites developed for the Energy & Utilities sector and PAs.	Aggregators. DSOs, TSOs, Utilities. Public Administrations.
<b>ER08</b>	Design Methodology for Smart BEMS	The Smart BEMS developed by ENG addresses the energy management problem as an optimisation one (e.g. performed by genetic algorithms, such as NSGA-II) with the definition of tailored objective functions and constraints not commonly used in all commercial BEMS.	This methodology is primarily used for internal use at Engineering and it can be used for other related research projects. It can also be of interest for the European Commission and national or regional bodies which are supporting research projects dealing with energy management of buildings.
<b>ER10</b>	Adapted stainless-steel water storage	High energy efficiency, low maintenance. Super flat, invisible.	Multifamily houses

## Ownership of HYBUILD ERs

HYBUILD ERs are almost equally distributed between multiple-owner ERs and single-owner ERs, as illustrated by Figure 2.

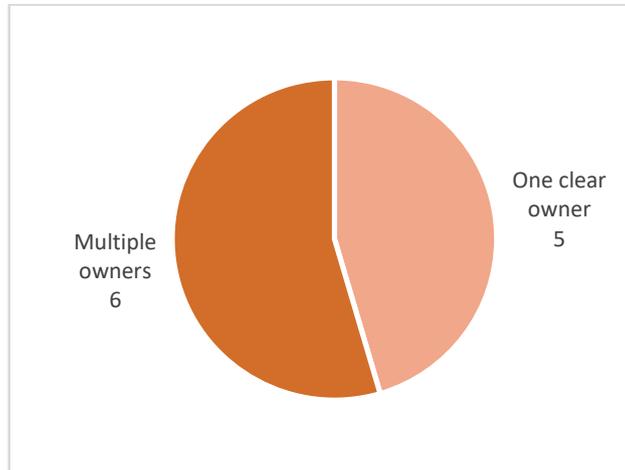


Figure 2 - HYBUILD ERs' ownership

## Current and expected level of development (TRL) at the end of the project

The level of development of each ER is assessed by using the Technology Readiness Level (TRL) scale, which is going from TRL 1 for the most basic research to TRL 9 for the results with the highest maturity:

- TRL 1 – basic principles observed,
- TRL 2 – technology concept formulated,
- TRL 3 – experimental proof of concept,
- TRL 4 – technology validated in lab,
- TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies),
- TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies),
- TRL 7 – system prototype demonstration in operational environment,
- TRL 8 – system complete and qualified,
- TRL 9 – actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space).

The current TRL of HYBUILD's technological ERs, as well as their expected TRL at the end of the project, are presented on Figure 3.

ER01 and ER02, which correspond to the overall HYBUILD solutions for respectively the Mediterranean and Continental climates, should be brought from TRL 4 to TRL 6.

The other ERs, corresponding to the various building blocks of the overall HYBUILD solution, have a TRL which should be brought from 3-6 to 6-9 as shown by Figure 3.

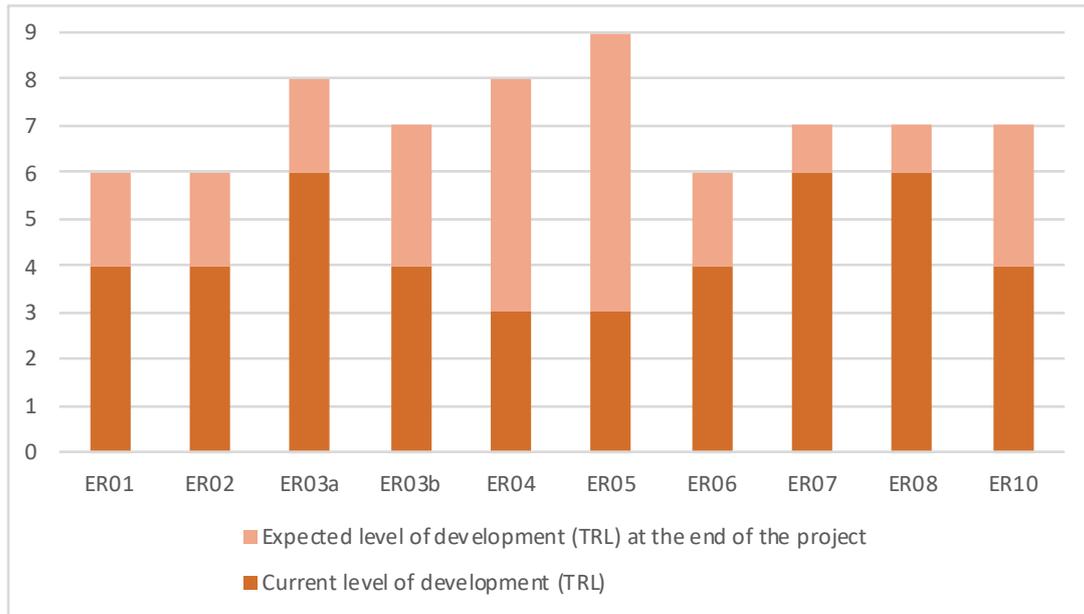


Figure 3 - HYBUILD ERs' current TRL and expected TRL at the end of the project

### Expected time for marketability

In line with the various TRL levels which are expected at the end of the HYBUILD project in 2021, the expected time for marketability varies for the different HYBUILD ERs, as illustrated by Figure 4. In some cases, it is too early to assess this time, since it will depend on the results obtained from the HYBUILD demonstrations. In one case on the contrary, the product could be marketed in parallel as soon as technical results are validated (even during HYBUILD project lifetime).

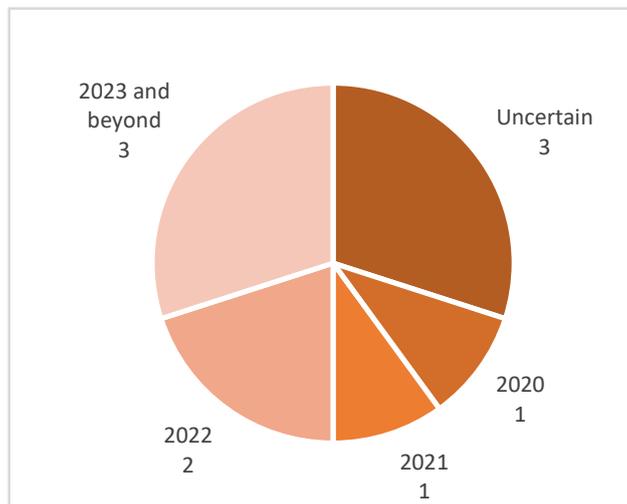


Figure 4 - HYBUILD ERs' expected time to market

### Preliminary exploitation vision

The following possibilities have been submitted to ER owners in order to identify the main exploitation routes for their ER, these routes being non-mutually exclusive:

- Internal use,
- Further research needed,

- Enabling technology (for subsequent product, service, etc.),
- Training,
- Open distribution,
- Establishment of industry standard,
- Direct sales / Consultancy service,
- Licensing the innovation to a third party,
- IP sale,
- Joint Venture,
- Launch a start-up or spin-off,
- Other.

Most ER owners consider direct sales as the main exploitation route as shown by Figure 5. A wide range of complementary routes are considered as well.

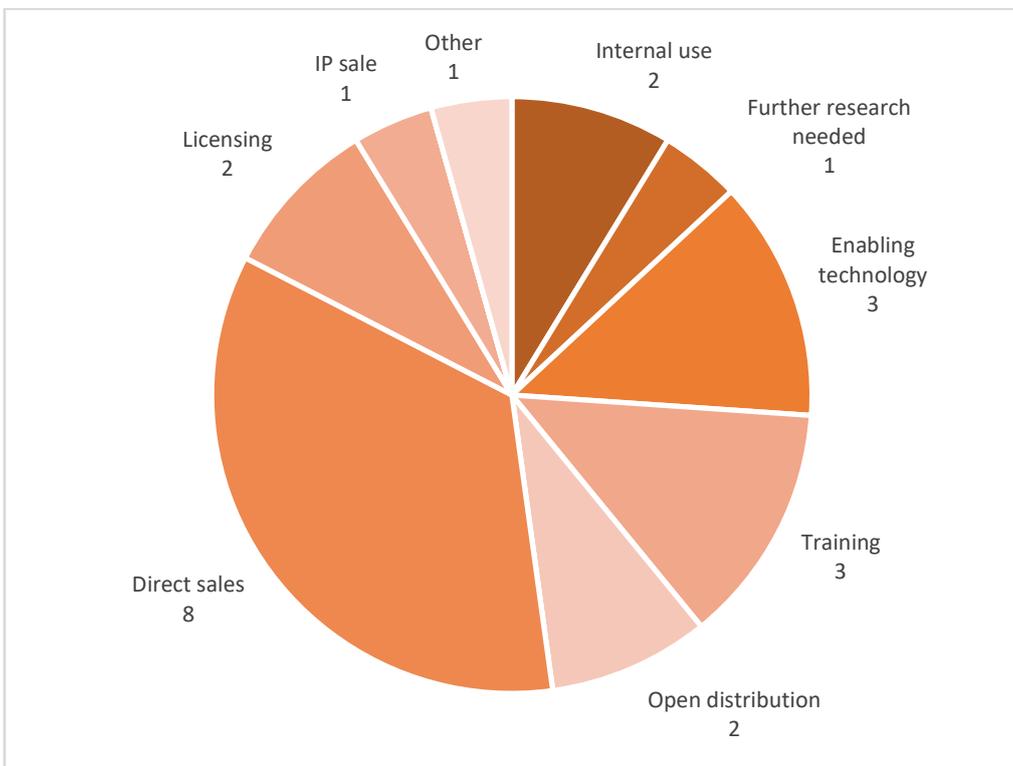


Figure 5 - HYBUILD ERs' preliminary exploitation vision

### Market maturity, dynamics, competition

Four choices have been submitted to ER owners in order to assess the maturity of the market targeted:

- **No market:** The market is not yet existing, and it is not yet clear that the innovation has potential to create a new market
- **Market creating:** The market is not yet existing, but the innovation has clear potential to create a new market
- **Emerging market:** There is a growing demand and few offerings are available
- **Mature market:** The market is already supplied with many products of the type proposed.

Figure 6 shows how HYBUILD ERs' owners are considering the maturity of the markets they are targeting. In some cases, HYBUILD ERs have the potential to create a new market (this is the

case for the overall HYBUILD solutions ER01 and ER02 for instance). In other cases, HYBUILD ERs are targeting emerging markets. Finally, some ER owners have ticked several choices: for instance, in some cases, the overall market is mature, but the niche addressed by the product is emerging.

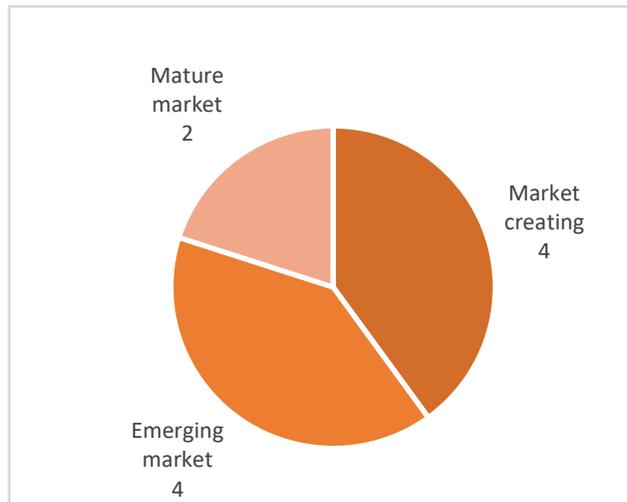


Figure 6 - HYBUILD ERs' targeted market maturity

In terms of market dynamics, ER owners have been asked whether the market targeted was:

- **In decline,**
- **Holding steady,**
- **Growing.**

Figure 7 shows how HYBUILD ERs' owners are considering the dynamics of the markets they are targeting. Most of them consider the targeted markets are growing.

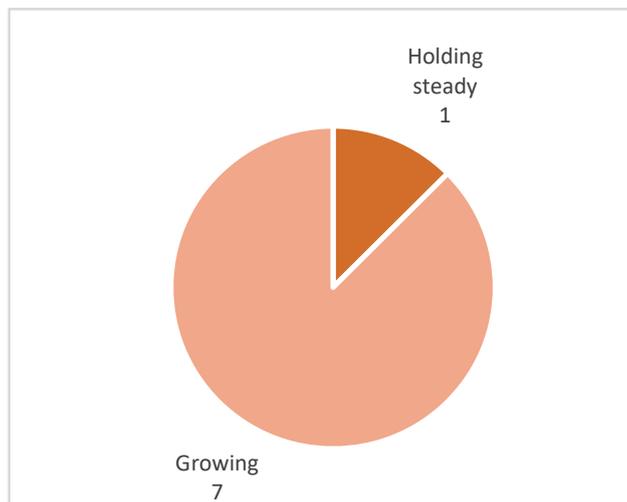


Figure 7 - HYBUILD ERs' targeted market dynamics

Finally, ER owners have assessed how strong competition was in the markets targeted, according to the following categories:

- **Patchy,** no major players,
- **Established competition** but none with a proposition like the one under investigation,
- **Several major players** with strong competencies, infrastructure and offerings.

Figure 8 shows how HYBUILD ERs’ owners are considering the competition level of the markets they are targeting. In general competition is rather low, since in only one case major players are competing.

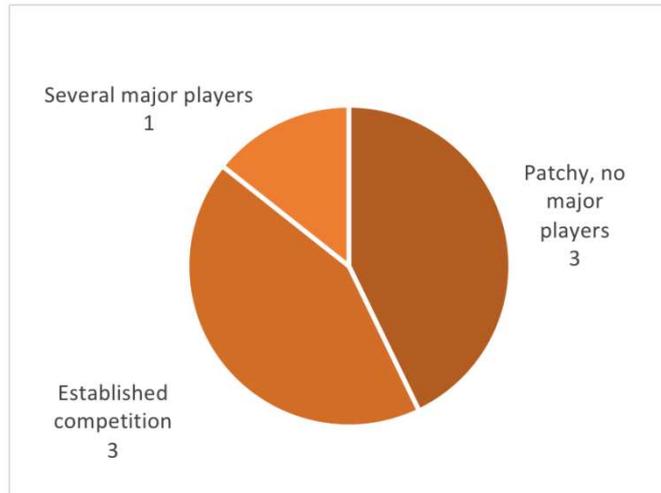


Figure 8 - HYBUILD ERs’ targeted market competition level

#### 4 Conclusions

The views collected amongst HYBUILD ER owners and presented in this report show a broad variety of situations. In most cases, some uncertainty remains regarding the business model definition, since the performance of the overall HYBUILD systems (ER01 and ER02) and of their building blocks have to be demonstrated. In particular, the time to market of the overall HYBUILD solutions for Mediterranean and Continental climates will be assessed when the installation at the demo sites is done and initial results and costs are known.

However, regarding other HYBUILD ERs, ER owners have already identified target markets and exploitation routes, and they have in general a clearer vision of the time to market for their individual results.

The implementation of the exploitation path associated to each ER will be reported through the project periodic reports as well as through further upcoming deliverables which include HYBUILD patent filings (D7.7 – M48), HYBUILD Replication plan (D7.8 – M48) and Partner exploitation agreement (D7.9 – M48).

## APPENDIX 1: ER market analysis & business model questionnaire template

ER N°	ER number	ER name	LAST UPDATE
			Date
ER leader		Partner name	
Owner(s) / Developer(s)		Is there one clear "owner" of the innovation or multiple owners?	
		<input type="checkbox"/>	One clear "owner"
		<input type="checkbox"/>	Multiple "owners"
		List all owners / developers	
Key resources and background declaration for "shared ER"		 What Key Resources do your value proposition require? Explain <b>which background from whom has been used for the production</b> of the jointly developed ER (potentially check the Consortium agreement for former input)	
Management Ideas for "shared ER"		 Outline your first ideas of <b>how the ER exploitation of the jointly developed ER could be managed</b> (for example market splitting, licensing among partners, JV setup etc)	
Output		<input type="checkbox"/>	Significantly improved product
		<input type="checkbox"/>	Significantly improved service (except consulting services)
		<input type="checkbox"/>	Significantly improved process
		<input type="checkbox"/>	Significantly improved marketing method
		<input type="checkbox"/>	Significantly improved organisational method
		<input type="checkbox"/>	Consulting services
		<input type="checkbox"/>	New product
		<input type="checkbox"/>	New service (except consulting services)
		<input type="checkbox"/>	New process
		<input type="checkbox"/>	New marketing method
<input type="checkbox"/>	New organisational method		
<input type="checkbox"/>	Other (please specify)		
Description of the result			
Illustration (s)			
Unique selling point			
Targeted Customers / Market Segment		 For whom are you creating value? Who are your most important customers?	
Customer relationships		 What type of relationship does each of your Customer Segments expect us to establish and maintain with them? Which ones have you established? How are they integrated with the rest of your business model? How costly are they?	
Channels		 Through which channels do your customer segments want to be reached? How are you reaching them now? How are your channels integrated? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines?	
Value proposition		 What value do you deliver to the customer? Which one of your customer's problems are you helping to solve? What bundles of products and services are we offering to each Customer Segment? Which customer needs are we satisfying?	

State of development at present date	•																								
Performed trials and achieved results at present date	•																								
Current level of development for the result (TRL)	Research Market <table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td style="background-color: #d9ead3;">6</td><td>7</td><td>8</td><td>9</td> </tr> </table>	1	2	3	4	5	6	7	8	9															
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Expected level of development for the result (TRL)	Research Market <table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td style="background-color: #d9ead3;">8</td><td>9</td> </tr> </table>	1	2	3	4	5	6	7	8	9															
1	2	3	4	5	6	7	8	9																	
Short-term (project end + 2y) exploitation vision, strategy and actions <table border="1" style="float: right; text-align: center; font-size: small;"> <tr> <td>Y1</td><td>Y2</td><td>Y3</td><td>Y4</td><td>Y5</td> </tr> </table>		Y1	Y2	Y3	Y4	Y5																			
Y1	Y2	Y3	Y4	Y5																					
Objective(s) of foreground exploitation	 Please explain your <b>goal(s)</b> with respect to the <b>ER exploitation for the first 2 years</b> after project closing (this <u>should include a quantification to be measurable</u> )																								
Expected time for marketability	Is the innovation developed within the project: <table border="1" style="width: 100%;"> <tr><td><input type="checkbox"/></td><td>Under development</td></tr> <tr><td><input type="checkbox"/></td><td>Already developed but not yet being exploited</td></tr> <tr><td><input type="checkbox"/></td><td>being exploited</td></tr> </table>  Estimate a realistic <b>readiness timeline of the ER after project closing</b>	<input type="checkbox"/>	Under development	<input type="checkbox"/>	Already developed but not yet being exploited	<input type="checkbox"/>	being exploited																		
<input type="checkbox"/>	Under development																								
<input type="checkbox"/>	Already developed but not yet being exploited																								
<input type="checkbox"/>	being exploited																								
Exploitation collaboration with external partners	 Give an overview which <b>external partners might be necessary</b> for you to be successful in the <b>ER exploitation</b> in the first 2 years after project closing. Which key resources are you acquiring from these partners? Which key activities do they perform?																								
Preliminary exploitation vision	<table border="1" style="width: 100%;"> <tr><td><input type="checkbox"/></td><td>Internal use</td></tr> <tr><td><input type="checkbox"/></td><td>Further research needed</td></tr> <tr><td><input type="checkbox"/></td><td>Enabling technology (for subsequent product, service, etc.)</td></tr> <tr><td><input type="checkbox"/></td><td>Training</td></tr> <tr><td><input type="checkbox"/></td><td>Open distribution</td></tr> <tr><td><input type="checkbox"/></td><td>Establishment of industry standard</td></tr> <tr><td><input type="checkbox"/></td><td>Direct sales / Consultancy service</td></tr> <tr><td><input type="checkbox"/></td><td>Licensing the innovation to a 3<sup>rd</sup> party</td></tr> <tr><td><input type="checkbox"/></td><td>IP sale</td></tr> <tr><td><input type="checkbox"/></td><td>Joint Venture</td></tr> <tr><td><input type="checkbox"/></td><td>Launch a start-up or spin-off</td></tr> <tr><td><input type="checkbox"/></td><td>Other → Please specify</td></tr> </table>	<input type="checkbox"/>	Internal use	<input type="checkbox"/>	Further research needed	<input type="checkbox"/>	Enabling technology (for subsequent product, service, etc.)	<input type="checkbox"/>	Training	<input type="checkbox"/>	Open distribution	<input type="checkbox"/>	Establishment of industry standard	<input type="checkbox"/>	Direct sales / Consultancy service	<input type="checkbox"/>	Licensing the innovation to a 3 <sup>rd</sup> party	<input type="checkbox"/>	IP sale	<input type="checkbox"/>	Joint Venture	<input type="checkbox"/>	Launch a start-up or spin-off	<input type="checkbox"/>	Other → Please specify
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Foreground exploitation strategy	 Explain your <b>strategy</b> with respect to the foreground exploitation in a few bullet points (i.e. what do you have in mind to reach your above stated objective).																								
In case of commercialisation, target market	 Define which <b>market you want to serve in the first 2 years</b> after project closing if you are planning on exploiting the ER commercially. In particular, give details about the geographic area, application/user circle and your estimated size of the market.																								
Market maturity	The market targeted by this innovation is ... <table border="1" style="width: 100%;"> <tr> <td><input type="checkbox"/></td> <td>The market is not yet existing, and it is not yet clear that the innovation has potential to create a new market</td> </tr> </table>	<input type="checkbox"/>	The market is not yet existing, and it is not yet clear that the innovation has potential to create a new market																						
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	Market creating: The market is not yet existing ,but the innovation has clear potential to create a new market																				
	Emerging: There is a growing demand and few offerings are available																				
	Mature: The market is already supplied with many products of the type proposed																				
Market dynamics	<i>Is the market ...</i>																				
	In decline																				
	Holding steady																				
Market competition	Growing																				
	<i>How strong is competition in the target market?</i>																				
	Patchy, no major players																				
Preliminary roadmap or milestones of activities	Established competition but none with a proposition like the one under investigation																				
	Several major players with strong competencies, infrastructure and offerings																				
	 Specify which (commercialisation) <b>actions for the ER exploitation you want to take in the first 2 years</b> after project closing (ex. which development/marketing/sales actions such as the production of a particular packaging/communication material/ advertisement campaign, organisation of promotion events, training of resellers etc.).																				
Possible limitations/risks in exploitation	 Identify which <b>limitations and risks</b> could occur in this first 2-year phase of ER exploitation and <b>classify their nature in technical (T), financial-economical (FE), regulatory (R), market-commercial (MC) or social-environmental (SE)</b> (ex. a potentially cheaper technological alternative you identified as threatening, currently missing resources in staffing and specific knowledge needed, potential changes of governmental subsidiary schemes etc), <b>assess their likelihood in high (65-100%), medium (35-65%) or low (0-35%)</b> and their respective impact in <b>severe, moderate, minimal</b> .																				
	<table border="1"> <thead> <tr> <th><i>Risk description</i></th> <th><i>Classification (T/FE/R/MC/SE)</i></th> <th><i>Likelihood (high/medium/low)</i></th> <th><i>Impact (severe, moderate, minimal)</i></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	<i>Risk description</i>	<i>Classification (T/FE/R/MC/SE)</i>	<i>Likelihood (high/medium/low)</i>	<i>Impact (severe, moderate, minimal)</i>																
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Mitigation measures for identified limitations/risks	 Initial ideas on how to compensate for these <b>limitations/risks in the exploitation of the ER</b> .																				
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Cost structure	 What are the most important costs inherent in our business model? Which key resources are most expensive? Which key activities are most expensive?																				
Revenue streams	 For what value are your customers really willing to pay? For what do they currently pay? How are they currently paying? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenues?																				

Source of external funding required	
<p><b>Mid-term (project end + 5y) exploitation vision</b> </p>	
Objective(s) of foreground exploitation	 Explain your <b>goal(s) of the ER exploitation for the following 3 years</b> after the 2-year initial phase (this should include a quantification to be measurable)
Foreground exploitation strategy	 Explain your <b>strategy</b> with respect to the <b>mid-term foreground exploitation</b> in a few bullet points (i.e. what do you have in mind to reach your above stated objective):
Preliminary roadmap/ milestones of activities	 Name a few <b>actions for the ER exploitation you want to take in the following 3 years</b> (for example due to geographical expansion plans the search for partnerships or setup of commercial offices abroad, broadening of the target market via more applications, etc.)
<p><b>Related Intellectual Property Rights</b> </p>	
Market competition	<p>Tick <b>all possible protection forms</b> of the entire/parts of the ER that you might want to explore.</p>
	Patent
	Industrial design rights
	Copyright
	Trademark
	Trade secret
	Database rights
Other (specify):	
Protection strategy details	 Explain <b>your protection strategy in more detail</b> here:
Understanding of prior Art/Fto relevant to ER (only for technical ERs)	 Give information about any relevant prior art or freedom to operate that you are aware of with respect to the ER
Required funding for protection	 Give an understanding of the related fees that are inherent with your possible options of IP protection (registration, translation, legal costs etc)

## **APPENDIX 2: Detailed completed questionnaires for each HYBUILD ER (CONFIDENTIAL)**

In order to facilitate the HYBUILD business models to act as a living document that will be updated throughout the project, and to allow for partners to include some information that is necessarily confidential at the Consortium level, the living version of Appendix 2 featuring the detailed HYBUILD business models has been made accessible via the HYBUILD project's shared ownCloud.

The documents can be accessed here:

[https://mare.istc.cnr.it/owncloud/index.php/apps/files/?dir=/shared\\_HYBUILD/2\\_Key\\_documents/8\\_HYBUILD\\_Business\\_Models](https://mare.istc.cnr.it/owncloud/index.php/apps/files/?dir=/shared_HYBUILD/2_Key_documents/8_HYBUILD_Business_Models)