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VELIXIA

BUILDINGS AS ACTIVE UTILITY NODES

Smart Grid-Efficient Interactive Buildings

Deliverable D7.6

Exploitation Roadmap

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Website	https://www.evelixia-project.eu/
Cordis	https://cordis.europa.eu/project/id/101123238

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Copyright Message

ACKNOWLEDGMENT

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Deliverable D7.6

Exploitation Roadmap

Deliverable number	D7.6
Deliverable name	Exploitation Roadmap
Lead beneficiary	RINA-C
Description	This deliverable is directly linked to the activities foreseen in Task 7.2. This report is considered as the first version of D7.7, consolidating EVELIXIA's KERs definition, exploitation planning and IPR management activities.
WP	WP7
Related task(s)	T7.2
Type	Report
Dissemination level	Public
Delivery date	18.04.2025.
Main author	Marco Ariagno (RINA-C)
Contributors	Elisa Crocco (RINA-C), Elena Gallo (RINA-C)

Document history

Version	Date	Changes	Author
V1 – first draft	28.02.2025	First version of D7.6	RINA-C
V1 – reviews	21.03.2025	Deliverable review	EI-JKU
V1 – consolidated version	24.03.2025	Consolidated Version	RINA-C
2nd review	24.03.2025	Deliverable reviews	NTT-DATA
V2 – consolidated version	30.03.2025	Consolidated Version	RINA-C
Final Version	15.04.2025	Final version of D7.6	RINA-C
Final Deliverable Submission	18.04.2025		CERTH

EXECUTIVE SUMMARY

The Deliverable 7.6 provides a first version of the exploitation and IPR management plan. Although the development activities of the project are still under progress, initial results are starting to become clearer. The report clearly identifies the Key Exploitable Results (KER) that have already surfaced as well as the methodology and particular mechanisms for the protection, exploitation, and sharing of the results produced by the project.

For each of the KERs that have been so far discovered, the following details are provided:

- A brief overview of the key characteristics for the KER;
- The idea's uniqueness in comparison to the market (comparison with alternative solutions);
- The unique selling proposition (value proposition), or competitive advantage;
- A preliminary strategy for future market positioning;
- The market timing and a preliminary overview of the first actions after the end of the project;
- If applicable, a patent scenario analysis;
- The current and future methods to protect the IPRs (Intellectual Property Rights).

Out of the 14 KERs identified, 6 represent products (hardware), while the other 8 are software solutions:

KER #	KER Name	Relevant WP(s)	KER leader(s)	Responsible Partners
1 + 4	**EVELIXIA platform / Stakeholders Interaction Platform (SW)**	WP3, WP5	CERTH	CERTH, SOLVUS, UniGe, CEA, R2M, UBE, IES, CIRCE
2	**Autonomous Building Digital Twin (SW)**	WP4	CERTH	CERTH, UniGe, CEA, R2M, IES
3	**Autonomous District Digital Twin (SW)**	WP4	UBE	CERTH, UBE, IES
5	**Interoperability and Abstraction Services (SW)**	WP3	CIRCE	CERTH, CIRCE
6	**Geothermal Wall System – (IS24) (HW)**	WP2	TUCN	TUCN
7	**Window Solar Shading Control Using Recycled PV Cell (IS25) (HW)**	WP2	TUCN	TUCN
8	**V2G EV Charger (IS26) (HW)**	WP2	TUCN	TUCN
9	**Power-to-Hydrogen-to-Power Compact System – MOSE (IS27) (HW)**	WP2-5	BER	BER, CERTH
10	**Hybrid Long-Term Storage System (IS28) (HW)**	WP2	ENTECH	ENTECH
11	**Decentralized DHW preparation solution "enerbox" (IS29) (SW/HW)**		PINK	PINK, FHB
12	**Building Aggregator Service (BAS) (SW)**	WP5	Neogrid	Neogrid
13	**ESesoft Platform (SW)**	WP2	ENTECH	ENTECH
14	**SRI Advisor tool (IS7)**	WP4	R2M	R2M, CERTH
15	**SRI Calculation Methodology at District Level**	WP6	R2M	R2M, CERTH

As result of the first analysis, the five KERs showing the highest exploitation potential (based on degree of innovation, exploitability and impact criteria) are:

1. The Autonomous District Digital Twin – KER 3;
2. The Hybrid Long-Term Storage System – KER 10;
3. The Power-to-Hydrogen-to-Power Compact System – MOSE – KER 9;
4. The EVELIXIA Platform – KER 1 + 4;
5. The Autonomous Building Digital Twin – KER 2.

The current document will be updated and completed to be delivered in its final official form at the end of the project's activities. This report must be considered as a living document as new results/competitors/alternative solutions could emerge before the end of the project.

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1 INTRODUCTION AND OBJECTIVES

1.1 Scope and objectives

D7.6 “Exploitation Roadmap” has as objective to present the preliminary findings of Task 7.2 “EVELIXIA’s Exploitation and IPR management”, which started at M1 and will end at M48. The document is being created while development efforts are still ongoing but preliminary findings are becoming apparent. The report entails the first official definition of EVELIXIA Key Exploitable Results (KER) which are being developed. The information contained in the report will be updated and integrated into D7.7 “Exploitation Roadmap – update”, due at the end of the project.

D7.6 aims to offer a complete list of innovative and exploitable results, which are likely to have an impact when completely developed. Each KER is thoroughly described, with deep dives on their value propositions, target markets, alternative solutions and innovativeness.

The activities performed during the task, which are described in this document, aim to maximize the impact of EVELIXIA results on the scientific community, industry and society at large. Furthermore, the document communicates to relevant stakeholders how the project outcomes will be adopted and sets the basis for the realization of complete and comprehensive exploitation plans.

1.2 Structure

The report consists of 6 chapters:

- Chapter 1 represents the introduction of the report;
- Chapter 2 explains the methodology for the development of the first phase of the exploitation strategy;
- Chapter 3 details the first exploitation and IPR workshop;
- Chapter 4 reports the final list of KERs. Furthermore, the results of the prioritization of KERs are presented;
- Chapter 5 offers the characterization of all the Key Exploitable Results and reports the results of the patent analysis for the hardware KERs;
- Chapter 6 reports the conclusion of the document.

1.3 Relation to Other Task and Deliverables

T7.2 is not strictly connected with other tasks but builds on contributions and input from all the partners of the project.

2 METHODOLOGY

2.1 Characterization Table

As already anticipated in deliverable D7.1, a Key Exploitable Result (KER) is an identified interesting result, which has been selected due to its high potential to be "exploited" – meaning to make use and derive benefits – downstream the value chain of a product, process or solution, or act as an important input to policy, further research or education. The identified KERs are listed in Section 4.1.

To adequately develop the exploitation strategy and decide with the partners the Intellectual Property Rights they want to claim on each KER, the main results must be characterized.

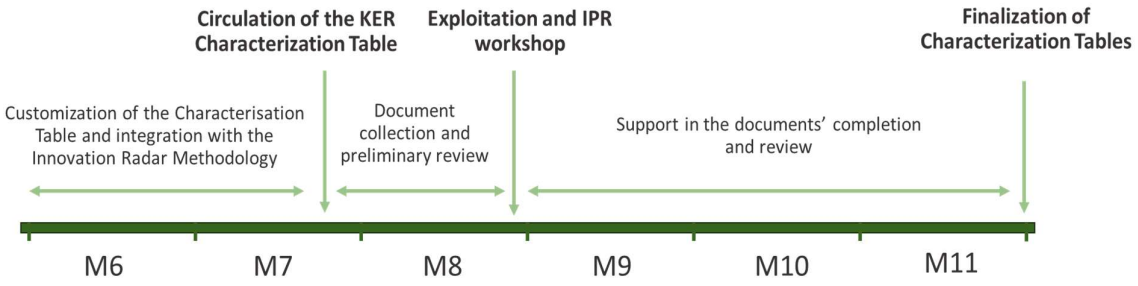
The **Characterization Table is a questionnaire designed by RINA-C to initiate the collection of information on KERs**, to be reviewed, updated, and further integrated during the life of the project. The Table includes questions extracted from the Innovation Radar Methodology[1] (such questions were integrated into the already existing questionnaire between M6 and M7).

In M7, RINA-C sent the Characterization Table to all the responsible partners (the nine KER Leaders). Between M7 and M8, RINA-C collected, reviewed and updated on the shared folder the documents received.

At the end of M8 (the 30th of May 2024), RINA-C organized a workshop to point out the main issues and open points identified in the Characterization Tables and then supported the partners in the following months in the document's completion and review. The Characterization Tables were then finalized at the end of M11.

[1] https://innovation-radar.ec.europa.eu/methodology/

Figure 1: Methodology for Characterization Table completion



The aim of the questionnaire is to explore the needs or barriers that results are going to solve or overcome, to define who are customers and relevant segments and who are the competitors and their competitive solutions.

The Characterization Table (whose blank template is reported in Table 1) has 6 sections:

- **Problem/Need**: it investigates the problem or need that triggered the development of the KER.
- **Description**: short description of the result.
- **Alternative solution**: it investigates alternative solutions, and their differences compared to the solution developed by the Consortium.
- **Early adopters**: it indicates the expected early adopters of the solution.
- **Value proposition**: it investigates what is the unique selling point of the solution, indicating what problems and needs are solved and how.
- **Market**: it indicates the target market, the competitors, the feasible business models, the go-to-market timing and the presence of IPR Background and Foreground.

Table 1. Characterization Table blank template. Source: RINA-C

Name of the KER: ..... **Involved partners: XXXXXXX** **KER Leader(s): XXXXXXX** **Other owners (if any):**	
Problem /need	**Is this:** • ☐A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards....) ..... • ☐A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment....) ..... • ☐A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact....)..... • ☐All of them
	Geographical level: • ☐Local /national (please specify) • ☐Local, linked e.g. to climate zones or other specific local contexts (please specify) • ☐European • ☐Global
	Does the need come from: • ☐Private customers • ☐Business/industrial customers • ☐Public entities • ☐ Other (please specify)
Description	**What is the nature of the KER?** • ☐Significantly improved product • ☐Significantly improved service (except consulting services) • ☐Significantly improved process • ☐Significantly improved marketing method • ☐Significantly improved organizational method • ☐Consulting services • ☐New product • ☐New service (except consulting services) • ☐New process • ☐New marketing method • ☐New organizational method • ☐Other (please specify)
	Please provide a description of the KER. ....
	What is the level of innovation? • ☐Some distinct, probably minor, improvements over existing products • ☐Innovative but could be difficult to convert customers • ☐Obviously innovative and easily appreciated advantages to customers • ☐Very innovative
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☐It doesn't solve the full problem • ☐It is difficult to implement • ☐It is not commercially mature • ☐It is mature but not robust enough • ☐It is expensive • ☐Other (please specify)
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. A. ..... - Link: ..... B. ..... - Link: ..... C. ..... - Link: ..... D. ..... - Link: ..... **Can you find a main drawback or a limitation for each of the alternative solutions you provided?** A. .....

B. .....
C. .....
D. .....

Has your company (or someone in the consortium) already developed a solution for the identified need before this project started?

- ☐Yes
- ☐No

Can we say that this solution is the starting point of the current project development activities?

- ☐Yes
- ☐No

If "Yes" then please specify the product or service already developed ("the starting point").

.....
.....

Let's compare the KER with what we already had in the consortium. What are the main advancements respect to the "starting point" (the initial solution available in the consortium)? If possible, please give numerical figures that can quantify advancements.

- ☐Decreased production (manufacturing) time
- ☐Decreased production (manufacturing) costs
- ☐Increased lifetime and or robustness
- ☐Improved flexibility for diverse applications
- ☐Improved technical performances (please specify)
- ☐Improved design, size, weight, efficiency, materials
- ☐New features
- ☐Improved customizability
- ☐Improved user friendliness
- ☐Improved connectivity
- ☐Remote operability
- ☐Improved interoperability
- ☐Improved safety
- ☐Improved logistics, distribution
- ☐Improved construction/installing phase
- ☐Improved maintenance plan
- ☐Improved environmental impact
- ☐New business model (e.g. for self-payback)
- ☐Other – please specify

Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements.

Alternative solution A

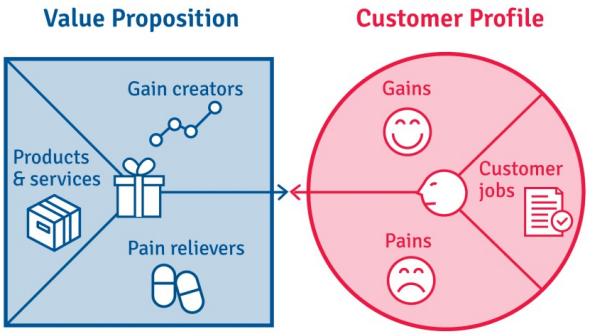
- ☐Decreased production (manufacturing) time
- ☐Decreased production (manufacturing) costs
- ☐Increased lifetime and or robustness
- ☐Improved flexibility for diverse applications
- ☐Improved technical performances (please specify)
- ☐Improved design, size, weight, efficiency, materials
- ☐New features
- ☐Improved customizability
- ☐Improved user friendliness
- ☐Improved connectivity
- ☐Remote operability
- ☐Improved interoperability
- ☐Improved safety
- ☐Improved logistics, distribution
- ☐Improved construction/installing phase
- ☐Improved maintenance plan
- ☐Improved environmental impact
- ☐New business model (e.g. for self-payback)
- ☐Other – please specify

Alternative solution B

- ☐Decreased production (manufacturing) time
- ☐Decreased production (manufacturing) costs
- ☐Increased lifetime and or robustness

	• ☐Improved flexibility for diverse applications • ☐Improved technical performances (please specify) • ☐Improved design, size, weight, efficiency, materials • ☐New features • ☐Improved customizability • ☐Improved user friendliness • ☐Improved connectivity • ☐Remote operability • ☐Improved interoperability • ☐Improved safety • ☐Improved logistics, distribution • ☐Improved construction/installing phase • ☐Improved maintenance plan • ☐Improved environmental impact • ☐New business model (e.g. for self-payback) • ☐Other – please specify **Alternative solution C** • ☐Decreased production (manufacturing) time • ☐Decreased production (manufacturing) costs • ☐Increased lifetime and or robustness • ☐Improved flexibility for diverse applications • ☐Improved technical performances (please specify) • ☐Improved design, size, weight, efficiency, materials • ☐New features • ☐Improved customizability • ☐Improved user friendliness • ☐Improved connectivity • ☐Remote operability • ☐Improved interoperability • ☐Improved safety • ☐Improved logistics, distribution • ☐Improved construction/installing phase • ☐Improved maintenance plan • ☐Improved environmental impact • ☐New business model (e.g. for self-payback) • ☐Other – please specify
"Market" – *Early Adopters*	**Difference between Customer and User** → The customer is the entity (person, company) that buys the product/service/solution. The user is the entity (person, company) that uses the product/service/solution, once bought and implemented. To be effectively proposed to the market, the product/service/solution must pay attention to needs and reflect expectations of both. Example 1: I buy a car: I am the customer AND the user Example 2: I buy a toy for my kids: I am the customer, my kids are the users Example 3: My company buys a new SCADA system: the procurement office is the buyer, the employees and technicians are the users **Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☐Individuals • ☐Associations of individuals • ☐Private Small or medium enterprises • ☐Private Large enterprises • ☐Non-profit organizations • ☐Public bodies / authorities • ☐Research and academic bodies • ☐Other, please specify **Please name a few potential customers:** 1. …… 2. …… 3. ……
	Who are the potential final users? • ☐Individuals

	• ☐Industry:
	  o ☐One or several managers
	  o ☐One specific technical profile
	  o ☐One specific department/team
	  o ☐Individuals
	  o ☐Other
	• ☐Non-profit organizations
	  o ☐One or several managers
	  o ☐One specific technical profile
	  o ☐One specific department/team
	  o ☐Individuals
	  o ☐Other
	• ☐Public bodies / authorities
	  o ☐One or several managers
	  o ☐One specific technical profile
	  o ☐One specific department/team
	  o ☐Individuals
	  o ☐Other
	• ☐Research and academic bodies
	  o ☐One or several managers
	  o ☐One specific technical profile
	  o ☐One specific department/team
	  o ☐Students
	  o ☐Other
	• ☐Other, please specify
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ☐Current customers
	• ☐New customers

Value proposition – Customer profile	*INFOBOX: Let's identify the value proposed by the KER under investigation.*  The potential customer can be profiled by considering: • The typical activities the customer usually performs **(Customer Jobs**) • The typical pains that the customer feels or has during these activities or that can be caused by the activity itself, if not properly managed **(Customer Pains)** • The typical gains that the customer can achieve during or thanks to these activities, if properly managed **(Customer Gains)** Let's see what's relevant for the KER under investigation: **What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** *Example: the customer checks regularly the energy consumption* *Example: the customer must make seasonal adjustments of settings in energy management* *Example: the customer needs pre-heating for some processes* 1. ..... 2. ..... 3. .....

	4. ..... 5. ..... **What are the pains the customer encounters while doing the previous activities?** *Example: the customer does not have a tool for monitoring energy consumption* *Example: the customer only has rough, aggregated data* *Example: the customer has no direct access to the control dashboard and should ask a third party for adjustments* 1. ..... 2. ..... 3. ..... 4. ..... 5. ..... **What are the gains the customer aims at, while doing the previous activities?** *Example: the customer wants to reduce the energy bill* *Example: the customer wants to keep comfort parameters under control, according to outside conditions* *Example: the customer has environmental targets to achieve* 1. ..... 2. ..... 3. ..... 4. ..... 5. .....

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	• Activity 1: How much is the KER crucial to perform the activity?
	  • ☐Indispensable
	  • ☐Core, but needs to work in synergy with other components/processes
	  • ☐Complementary to a core solution
	  • ☐Nice to have
	• Activity 2: How much is the KER crucial to perform the activity?
	  • ☐Indispensable
	  • ☐Core, but needs to work in synergy with other components/processes
	  • ☐Complementary to a core solution
	  • ☐Nice to have
	• Activity 3: ☐ The KER can be integrated ☐ The KER cannot be integrated How much is the KER crucial to perform the activity?
	  • ☐Indispensable
	  • ☐Core, but needs to work in synergy with other components/processes
	  • ☐Complementary to a core solution
	  • ☐Nice to have

	CUSTOMER PAINS: **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** 1. ..... How? ..... 2. ..... How? ..... 3. ..... How? .....
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** 1. ..... How? ..... 2. ..... How? ..... 3. ..... How? .....
"Market" – *Target market*	**What is the primary target market?** • ☐Energy production/distribution/consumption • ☐Heavy process Industry (energy intensive) • ☐Manufacturing Industry • ☐Information Technology and telecommunication • ☐Construction • ☐Real estate management • ☐Other (please specify) **Please specify the most relevant sub-sector(s) of the KER, within the selected market:**

	…… **The market targeted by this innovation is**: • ☐ The market is not yet existing, and it is not yet clear that the innovation has potential to create a new market • ☐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 (services, processes, …) of the type proposed **Market dynamics: is the market…?** • ☐ In decline • ☐ Holding steady • ☐ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ☐ Yes • ☐ No **Market competition: How strong is competition in the target market?** • ☐ 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
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** ☐ SMEs: 1. …… 2. …… 3. …… ☐ Large enterprises: 1. …… 2. …… 3. …… ☐ Research bodies /academic bodies: 1. …… 2. …… 3. …… ☐ Others: 1. …… 2. …… 3. ……
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Not applicable	Scarcely applicable	Applicable	Very well applicable
Subscription model				
Bundling model				
Freemium model				
Razor blades model				
Product to service model				
Leasing model				
ESCO - energy performance contract				
ESCO - energy supply contract				
ESCO - build-own-operate-transfer				
Franchise model				
Distribution model				
Manufacturer model				
Retailer model				
Peer-to-peer model				

	Hidden revenue model				
	Direct sales model				
	Affiliate marketing model				
	Consulting model				
	Data licensing model				
	Pay as go model				
	Software as a service				
	Product as a service				
	Other				

Go to Market - Timing

Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):

- ☐ During the first month after the project:
  1. .....
  2. .....
  3. .....
- ☐ Within 6 months after the project:
  1. .....
  2. .....
  3. .....
- ☐ Within 12 months after the project:
  1. .....
  2. .....
  3. .....
- ☐ Within 24 months after the project:
  1. .....
  2. .....
  3. .....

Go to Market – IPR Background

Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	

Go to Market – IPR Foreground

Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	
Trade secret	
Copyright	
Trademark	

2.2 IPRs and patent analysis

2.2.1 IP protection tools

The most appropriate type of IP protection, its length, and its geographic scope are determined by the product as well as by the economic strategies for its exploitation. The main IP protection tools are patent, utility model, industrial design, copyright, trademark and trade secret.

2.2.1.1 Patent

As defined by the U.S. Patent and Trademark Office (USPTO), a patent is a type of limited-duration protection that can be used to protect inventions (or discoveries) that are new, non-obvious, and useful, such as a new process, machine, article of manufacture, or composition of matter. When a property owner holds a patent, others are prevented, under law, from offering for sale, making, or using the product[2].

2.2.1.2 Utility model

A Utility Model is an exclusive right granted for an invention, which allows the right holder to prevent others from commercially using the protected invention, without his authorization and for a limited period (usually between 7 and 10 years, without the possibility of extension or renewal). It may be any useful machine, implement, tools, product, composition, process, improvement or part of the same, that is of practical utility, novelty and industrial applicability. In practice, protection for utility models is often sought for innovations of a rather incremental character that may not meet the patentability criteria. Although a utility model is like a patent, it is generally cheaper to obtain and maintain, it has shorter grant lag, and less stringent patentability requirements[3].

2.2.1.3 Industrial design

Industrial Design is a type of protection dedicated to the intellectual creation used by designers; it is provided for a shape, configuration, surface pattern, color, or line (or a combination of these), which, when applied to a functional product, produces or increases aesthetics, and improves the visual appearance of the design, be it a two-dimensional or a three-dimensional product. The subject of design protection is the outwardly visible appearance of the product or its part, packaging or the ornamentation itself[4].

[2] Patents (wipo.int)
[3] Utility models (wipo.int)
[4] Industrial Designs (wipo.int)

2.2.1.4 Copyright

Copyrights protect non-technical intellectual creations; in practice, it refers to all the rights owned by creators over their literary or artistic work. To be protected by copyright, a work must first have sufficient originality and, second, have taken form. Protection arises automatically giving the holder the exclusive right to control reproduction or adaptation[5].

2.2.1.5 Trademark

Trademarks refer to phrases, words, or symbols that distinguish the source of a product or services of one party from another. For example, the Nike symbol–which nearly all could easily recognize and identify–is a type of trademark. While patents and copyrights can expire, trademark rights come from the use of the trademark and therefore can be held indefinitely. Like copyright, registration of a trademark is not required, but registering can offer additional advantages[6].

2.2.1.6 Trade secret

Trade secrets refer to specific, private information that is important to a business because it gives the business a competitive advantage in its marketplace. If a trade secret is acquired by another company, it could harm the original holder. Examples of trade secrets include recipes for certain foods and beverages (like Mrs. Fields' cookies or Sprite), new inventions, software, processes, and even different marketing strategies. When a person or business holds a trade secret protection, others cannot copy or steal the idea. To establish information as a "trade secret," and to incur the legal protections associated with trade secrets, businesses must actively behave in a manner that demonstrates their desire to protect the information. Trade secrets are protected without official registration; however, an owner of a trade secret whose rights are breached–i.e. someone steals their trade secret–may ask a court to ask against that individual and prevent them from using the trade secret[7].

[5] Copyright (wipo.int)
[6] Trademarks (wipo.int)
[7] Trade Secrets – Everything you need to know (wipo.int)

2.2.2 Patent analysis

Patent analysis is the systematic examination and evaluation of patents to gain insights into technological advancements, competitive landscapes, and intellectual property strategies, enabling informed decision-making and fostering innovation.

For this purpose, the comprehensive tool for IP research PATSNAP has been used by RINA-C. It offers a platform for patent research and analytics that provides access to internationally recognized patents and scholarly publications. Its improved content, in-house search engines, and data intelligence technology aid IP experts in finding solutions to challenging problems.

PATSNAP allows users to perform several activities:

- Clearance, state-of-the-art search, right-to-use and freedom-to-operate searching. This examination verifies if you have the right to work in a certain technological field and minimize the possibility of infringement. With the use of the technology, companies can analyze patents in many different nations' native tongues (such as Germany, Japan, Korea, and China) and continuously perform analyses to reduce the likelihood of infringement. Reviewing published patents, applications, non-patent literature, and technological trends might help with this.
- Competitive and technical intelligence searching. With the use of artificial intelligence, the instrument assists in performing competitive, technical, and strategic intelligence.

The report will show charts and numbers regarding the competitive scenario, beneficial to handle the exploitation difficulties of the project, rather than a one-to-one analysis of findings. Patent analysis is, in fact, a very powerful tool to investigate the market in which the proposed solutions are intended to be commercialized/used and should be performed even if the developed technologies will not be protected by a patent. This is the case for EVELIXIA, as these considerations (on which kind of IP protection tools will be used for project results) will be developed at a later stage.

For each KER, the patents found by means of PATSNAP were analyzed in terms of their application trend, their IPC category, the geographic area to which they belong and the main assignees. Each of these characteristics and the information that can be derived from it in terms of exploitability is described below.

In the scope of EVELIXIA, patent analysis was performed only for the hardware solutions. As software is generally not patentable in the EU, performing the analysis for the software solutions could generate misleading results.

2.2.2.1 Patenting trend

The number of patent applications filed annually is the first statistic that appears for each analysis (only patents published from 2010 were analyzed). This graphic provides key details about the technology/industry considered. First, the quantity of patents reflects the level of industry commitment and worldwide interest in creating new intellectual property for a specific technology.

2.2.2.2 Top IPC and key areas of research

The IPC (International Patent Classification) code is a crucial piece of patent information. The technological cluster to which the patent belongs is revealed by this code, which may be deciphered digit by digit to the required degree of detail. The examination of IPCs makes it feasible to identify the most active research subdomains on a worldwide scale.

By examining the recurring keywords (found, for example, in the patents' titles and abstracts) and clustering the discovered patents in accordance with them, a parallel analysis may be carried out.

2.2.2.3 Geographic areas and markets

A patent can be filed in one country or many nations (national patent), on a whole continent (as in the case of EU patents), or anywhere in the globe, regardless of the nationality or geographic location of the assignee. This reveals the patents' territorial scope, or the nations in which the protected intellectual property can be "used" (commercialized, licensed, or sold). The top nations and regions of coverage are displayed in the charts.

2.2.2.4 Assignees

The individual who is the owner of the IP created and disclosed in a patent is known as the applicant (assignee). To comprehend who generated the know-how and gain some insight into the engagement of major firms, small businesses, colleges, etc., a chart with the primary applicant will be supplied for each use case.

3 EXPLOITATION AND IPR WORKSHOP

An exploitation and IPR workshop were held online by RINA-C on the 30th of May 2024, involving all the partners. It was aimed at reviewing the KER table and the characterization of every single KER.

For each KER, three different slides were prepared:

- A slide with the name of the KER, involved partners, KER nature and a short description of the result (see Figure 2);
- A slide focusing on the IPRs connected to the KER (see Figure 3);
- A slide with the open points (see Figure 4).

Figure 2. Exploitation workshop - KER overview

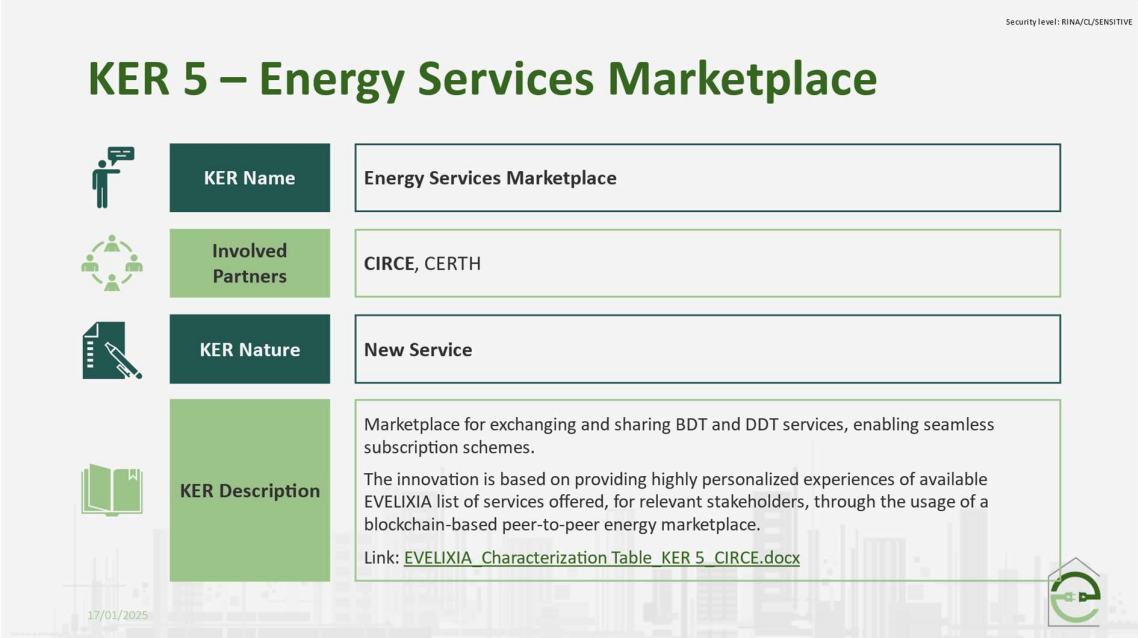


Figure 3. Exploitation workshop - IPRs connected to the KER

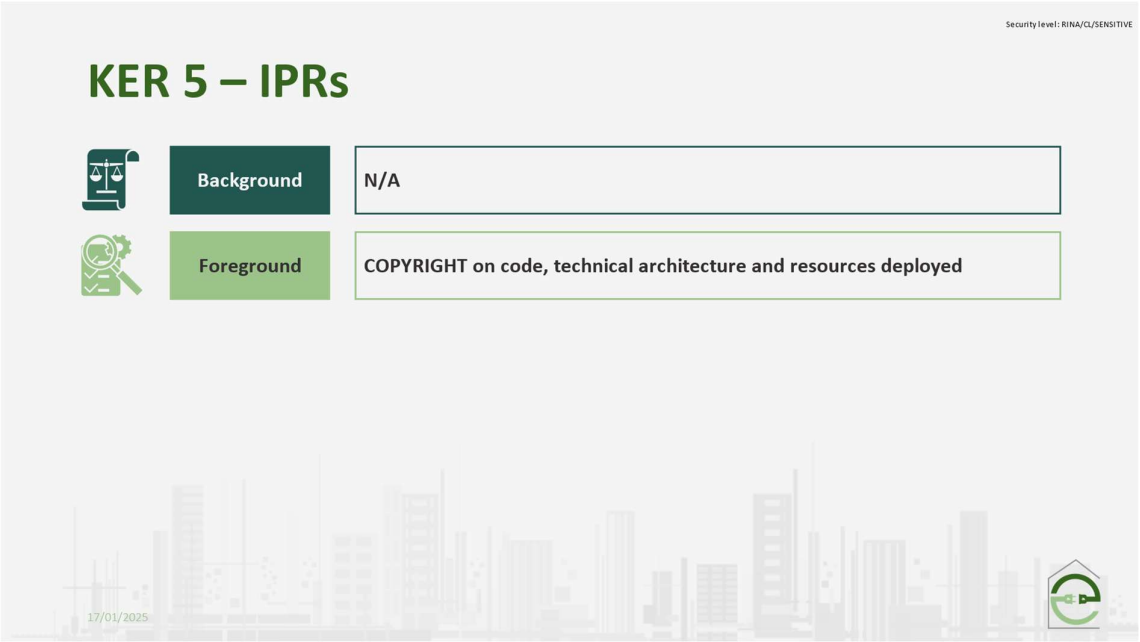
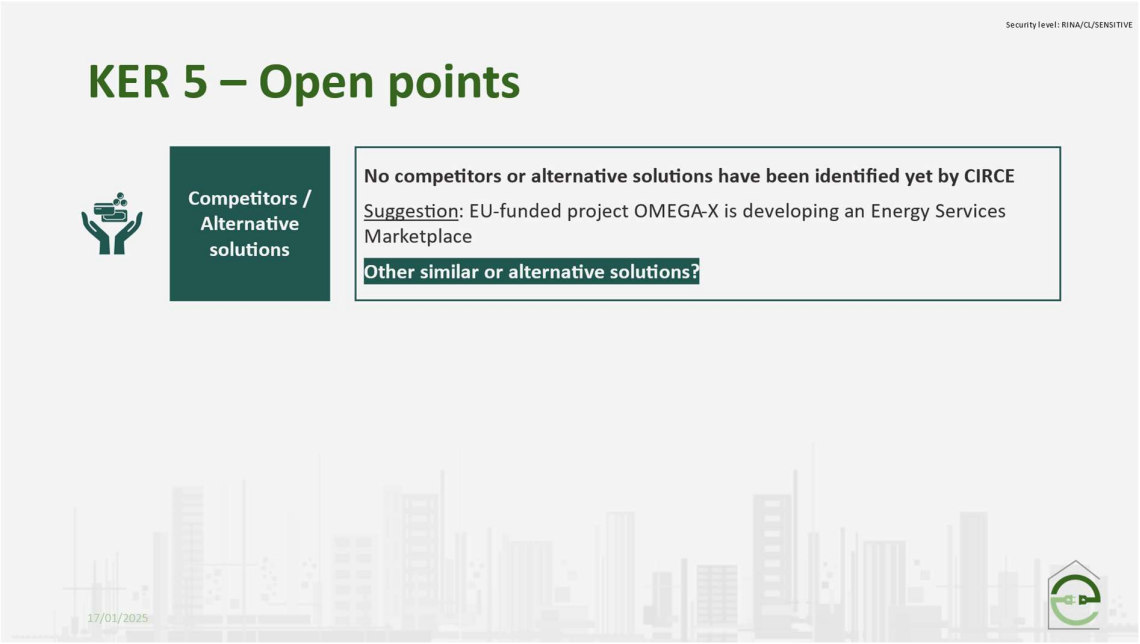


Figure 4. Exploitation workshop - Open points



4 KEY EXPLOITABLE RESULTS

4.1 KERs identification

The KERs identification is the starting point for the exploitation activities, as already described in D7.1.

The main purpose of the Key Exploitable Results list is to establish the results developed throughout the project so far. The list, which will be constantly updated during the project, includes the following information:

- **Name of KER**: clear and concise label for the KER. It is technically accurate and visually appealing for dissemination purposes.
- **Relevant WP(s)**: work package(s) where the KER is designed, developed, demonstrated, and tested.
- **Leading partner**: the partner responsible for developing the KER. Generally, it is the one with the most significant responsibilities (task leaders, WP leaders, intellectual property owners).
- **Involved partners**: all partners involved in the relevant WP(s) and directly connected to actions related to the KER.

Table 2. KERs List

KER #	KER Name	KER description	Relevant WP(s)	KER leader (s)	Responsible Partners
1 + 4	**EVELIXIA platform / Stakeholders Interaction Platform (SW)**	Incorporate Web3 technologies to collect and organize energy services and users into a federated blockchain ecosystem.	WP3, WP5	CERTH	CERTH, SOLVUS, UniGe, CEA, R2M, UBE, IES, CIRCE
2	**Autonomous Building Digital Twin (SW)**	ABDT employs cutting-edge technology and data-driven algorithms to create a real-time model of a building's energy systems. This enables optimal management, automation, and decision-making, enhancing sustainability and efficiency within the broader context of Building as Utility Nodes (BAUNs).	WP4	CERTH	CERTH, UniGe, CEA, R2M, IES

3	**Autonomous District Digital Twin (SW)**	ADDT extends the BAUNs vision to districts and aims to optimize energy management at a district scale. Addressing diverse energy goals, it optimizes inter-building energy exchanges and enables automated decision-making for holistic system planning, operation, and maintenance across building and grid levels.	WP4	UBE	CERTH, UBE, IES
5	**Interoperability and Abstraction Services (SW)**	Enable the federation of heterogeneous data sources originating from multiple vendors, multiple vectors, and devices through the EVELIXIA Interoperability Abstraction Services.	WP3	CIRCE	CERTH, CIRCE
6	**Geothermal Wall System – (IS24) (HW)**	Install an exterior piping system on underground walls, efficiently extracting renewable energy from the surrounding geothermal field. Seamlessly connected to a soil-water heat pump with a COP of ~4, it ensures effective heating and cooling. This technology able to overcome the limitations of conventional geothermal applications in urban areas for the first time applied to existing buildings.	WP2	TUCN	TUCN
7	**Window Solar Shading Control Using Recycled PV Cell (IS25) (HW)**	Revamp micro-PV panels with modern components for customizable BIPV modules, ensuring local PV circularity. Rigorous performance tests will determine the optimal on-grid or microinverter configuration, in the context of Maximum Power Point Tracking.	WP2	TUCN	TUCN
8	**V2G EV Charger (IS26) (HW)**	Develop a targeted micro-regulation strategy for V2G chargers (IS26) using local building insights from TUCN's upcoming monitoring system. This approach aims to enhance the cost-effectiveness of V2G operations by optimizing energy usage from EV batteries during peak demand, reducing costs.	WP2	TUCN	TUCN

9	**Power-to-Hydrogen-to-Power Compact System – MOSE (IS27) (HW)**	Small scale (10-100 kW) easy to install (from a safety point of view) Power-to-hydrogen-to-power system for single family/multi-family buildings composed by a PEM electrolyzer, Metal Hydride storage and a fuel cell integrated with a smart controller to optimize the management and able to dialogue with BEMS to maximize RES consumption	WP2-5	BER	BER, CERTH
10	**Hybrid Long-Term Storage System (IS28) (HW)**	Design and integrate an optimized hybrid storage system for the long-term storage of renewable energy, ensuring interoperability among all components and optimal system control. The system includes a 50 kWe electrolyzer combined with a 20-30 kWe fuel cell, hydrogen storage, and a Li-ion storage system. Bidirectional AC/DC converters, specifically designed for EV charging station applications, will be utilized to reduce costs and enhance stability and efficiency.	WP2	ENTECH	ENTECH
11	**Decentralized DHW preparation solution "enerbox" (IS29) (SW/HW)**	System of thermal storage tanks providing temporal flexibility of heating and DHW loads, while leading to the minimization of thermal losses and peak demand, and thus, acting as a provider of load balancing services for the district heating operators.		PINK	PINK, FHB
12	**Building Aggregator Service (BAS) (SW)**	An IT tool for monitoring and control of flexible energy resources within a local area supplied with electricity and district heating. The BAS can also optimize the operation of the devices according to various goals, such as maximized self-consumption, reduced peak load on grid etc.	WP5	Neogrid	Neogrid
13	**ESesoft Platform (SW)**	Develop a hypervisor solution in a secure cloud computing environment to manage and oversee industrial self-consumption with storage operations, providing optimal	WP2	ENTECH	ENTECH

		energy dispatch and necessary control input.			
14	**SRI Advisor tool (IS7)**	The tool provides building owners and managers with tailored recommendations on how to improve their SRI score.	WP4	R2M	R2M, CERTH
15	**SRI Calculation Methodology at District Level**	An expanded replicable methodology, which quantifies the amount buildings can contribute to actively storing and dispatching energy within a district.	WP6	R2M	R2M, CERTH

4.2 KERs prioritization

Given the high number of results and the importance of setting priorities, the list of KERs has been prioritized.

The prioritization was based, as suggested by the European Commission[8], on three factors:

- **Degree of Innovation (DI)**: it refers to how much something is new or different compared to what already exists. It's a measure of how groundbreaking or inventive the KER is. If it introduces a lot of fresh and unique elements, it has a high degree of innovation. On the other hand, if it's more similar to existing things, the degree of innovation is lower.
- **Exploitability (Ex)**: it refers to how easily and effectively it can be used or taken advantage of for practical purposes. It's about assessing how well the KER can be applied to create value or solve problems. The more exploitable an innovation is, the more accessible and usable it is in real-world situations. It's a measure of how readily the benefits of the innovative solution can be harnessed or "exploited" for practical or economic gain.
- **Impact (Im)**: is the influence or effect it has on the world. It measures how much of a difference or change the KER brings in society, economy, or a particular field. The greater the impact, the more significant and far-reaching

[8] EC, European Commission, https://ec.europa.eu/newsroom/informatics/items/689551

the consequences of the innovation. In simple terms, it's about understanding how much the KER shakes things up or makes a difference in the real world.

Partners were asked to perform an evaluation on a Likert scale of 1 to 5 for degree of innovation, exploitability and impact for each one of the KERs via an online form. The form was distributed to the entire Consortium, and 15 responses were collected.

The final Priority Value (*PV*) for each KER is calculated as follows:

PV (KER_x) = AVG[DI(KER_x)] + AVG[Ex(KER_x)] + AVG[Im(KER_x)]

The list of prioritized KERs is then obtained ordering the KERs by *PV* descending value. **The most prioritized result is the one with the highest *PV***.

Table 3. List of KERs sorted by priority

KER #	KER Name	Degree of Innovation (DI)	Exploitability (Ex)	Impact (Im)	Priority Value (PV)
3	Autonomous District Digital Twin (SW)	**4,20**	3,80	**3,93**	**3,98**
10	Hybrid Long-Term Storage System (IS28) (HW)	4,07	3,73	**3,93**	**3,91**
9	Power-to-Hydrogen-to-Power Compact System – MOSE (IS27) (HW)	4,00	3,73	3,80	**3,84**
1 + 4	EVELIXIA platform (SW)	3,87	3,80	3,70	**3,80**
2	Autonomous Building Digital Twin (SW)	3,80	3,67	**3,93**	**3,80**
11	Decentralized DHW preparation solution "enerbox" (IS29) (SW/HW)	3,67	**4,00**	3,60	**3,76**
12	Building Aggregator Service (BAS) (SW)	3,73	3,67	3,73	**3,71**
15	SRI Calculation Methodology at District Level	3,73	3,80	3,53	**3,69**
13	ESesoft Platform (SW)	3,47	3,80	3,60	**3,62**
6	Geothermal Wall System – (IS24) (HW)	3,93	3,53	3,33	**3,60**
8	V2G EV Charger (IS26) (HW)	3,13	3,93	3,73	**3,60**
7	Window Solar Shading Control Using Recycled PV Cell (IS25) (HW)	3,87	3,53	3,33	**3,58**
14	SRI Advisor tool (IS7)	3,27	3,73	3,27	**3,42**
5	Interoperability and Abstraction Services (SW)	3,60	3,13	3,13	**3,29**

5 KERS CHARACTERIZATION AND INTERNATIONAL PATENT SCENARIO OVERVIEW

5.1 KER 1 + 4: EVELIXIA Platform / Stakeholders Interaction Platform

5.1.1 KER 1 + 4 Characterization Table

Table 4. KER 1 + 4 - Characterization Table

Name of the KER: EVELIXIA Platform / Stakeholders Interaction Platform (SW) **Involved partners: CERTH, CIRCE, R2M** **KER Leader(s): CERTH**	
Problem /need	**Is this:** • ☒A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards....) - **This is the core platform of the project and the single point of entry for the stakeholders**
	Geographical level: • ☒European • ☒Global
	Does the need come from: • ☒Private customers • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒New product • ☒New service (except consulting services) • ☒New process • ☒New organizational method
	Please provide a description of the KER. The integrated digital EVELIXIA platform will be used for testing and pilot deployments. The platform will be modular and customizable, so that different instances of the platform, which may include potentially different subsets of the overall components, will be seamlessly produced to be used in each pilot, considering the specificities of each pilot.
	What is the level of innovation? • ☒Obviously innovative and easily appreciated advantages to customers
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It doesn't solve the full problem
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. No alternative solutions were identified at this stage.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒Yes **Can we say that this solution is the starting point of the current project development activities?** • ☒No
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Individuals • ☒Associations of individuals • ☒Private Small or medium enterprises • ☒Private Large enterprises • ☒Public bodies / authorities • ☒Research and academic bodies **Please name a few potential customers:** 1. Building owners/ users / facility managers. 2. Transition or Distribution System Operators (TSO & DSO)

	3. Aggregators
	Who are the potential final users? • ☒Individuals • ☒Industry: • ☒Public bodies / authorities • ☒Research and academic bodies **For the private company/companies, will this innovation be used by mainly current or new customers?** • ☒Current customers • ☒New customers
Value proposition – Customer profile	Let's see what's relevant for the KER under investigation: **What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. The customer wants to be informed about the energy performance of their asset 2. The customer wants to change some things to increase the energy performance/ lower energy cost (e.g. subscribe to services that help them with the operation of their assets) **What are the pains the customer encounters while doing the previous activities?** 1. The customer usually doesn't have a common place to access and review all the operational data and building documentation 2. The customer isn't aware of the possible building operation actions that can increase the energy efficiency while providing flexibility services to the grid **What are the gains the customer aims at, while doing the previous activities?** 1. The customer reduces the cost of energy 2. The customer is better informed to take advantage of the possible opportunities provided by the grid operation by enabling an automated service to do it

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	• Activity 1: How much is the KER crucial to perform the activity?
	  • ☒Core, but needs to work in synergy with other components/processes
	• Activity 2: How much is the KER crucial to perform the activity?
	  • ☒Indispensable

"Market" – *Target market*	**What is the primary target market?** • ☒Energy production/distribution/consumption - primary • ☒Real estate management **The market targeted by this innovation is**: • ☒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 **Market dynamics: is the market…?** • ☒ Growing **Market competition: How strong is competition in the target market?** • ☒ Established competition but none with a proposition like the one under investigation • ☒ Several major players with strong competencies, infrastructure and offerings
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** No competitors were identified at this stage.
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Scarcely applicable	Applicable	Very well applicable
Subscription model			X
Freemium model		X	
ESCO - energy performance contract		X	
ESCO - energy supply contract		X	
ESCO - build-own-operate-transfer		X	

	Peer-to-peer model	X		
	Hidden revenue model	X		
	Direct sales model	X		
	Data licensing model		X	
	Pay as go model		X	
	Software as a service		X	
	Product as a service	X		

Go to Market - Timing

Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):

- During the first month after the project:
  1. Develop a prototype ready for commercial customers.
  2. Disseminate the software through conferences, research papers, and online platforms
- Within 6 months after the project:
  1. Gather user feedback from early adopters (academia and industry) and refine features based on input.
  2. Explore funding opportunities (grants, industry partnerships) for further software development.
  3. Conduct research to identify the initial group of target clients for the platform.
- Within 12 months after the project:
  1. Release an improved version of the software, incorporating user feedback and additional features.
  2. Establish collaboration agreements with academia, and companies from industry interested in using or further developing the tool.
- Within 24 months after the project:
  1. Expand industry adoption through licensing agreements or consulting services.
  2. Secure long-term funding or commercial revenue streams to sustain development.
  3. Define a long-term roadmap for future improvements, scalability, and potential spin-off projects.

Go to Market – IPR Background

Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	

Go to Market – IPR Foreground

Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	
Trade secret	
Copyright	
Trademark	

5.2 KER 2: Autonomous Building Digital Twin

5.2.1 KER 2 Characterization Table

Table 5. KER 2 - Characterization Table

Name of the KER: Autonomous Building Digital Twin **Involved partners: CERTH,UniGe,CEA,R2M,IES** **KER Leader(s): CERTH**	
Problem /need	**Is this:** • ☐A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards….) - **The Autonomous Building Digital Twin (ABDT) includes advanced building digital twinning and forecasting features, allowing model-based decision-making and support services, leveraging state-of-the-art technology, reinforcement learning (RL) methods, model predictive control (MPC), and data-driven algorithms to optimize building energy management and operations to provide services to the grid.** • ☐A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment….) - **The ABDT aims to reduce operational costs and improve economic viability by enabling proactive demand planning, optimizing energy performance, and providing tools for investment planning and cost-benefit analysis (CAPEX). Moreover, ABDT enables energy efficiency and flexibility management (OPEX) according to tariffs.** • ☐A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact….) - **The ABDT focuses on enhancing energy efficiency, reducing greenhouse gas (GHG) emissions, and improving overall environmental impact. It supports the integration of renewable energy sources (RES), optimal energy management, and predictive maintenance to ensure sustainable building operations.** • ■All of them
	Geographical level: • ■European
	Does the need come from: • ■Private customers • ■Business/industrial customers (e.g., building managers, owners, and energy market players seeking optimized energy management and cost savings) • ■Public entities (e.g., utilities and grid operators interested in efficient energy management and integration with grid services)
Description	**What is the nature of the KER?** • ■New service (except consulting services) - **The ABDT provides new services like proactive demand planning, continuous energy performance management, and building investment planning assistance.**
	Please provide a description of the KER. The Autonomous Building Digital Twin (ABDT) is an advanced, data-driven solution designed to optimize energy management and decision-making processes for buildings and districts. Leveraging state-of-the-art technologies, reinforcement learning (RL) methods, multi-timescale model predictive control (MPC), and ensemble decision trees, the ABDT aims to enhance energy efficiency, reduce operational costs, and support sustainable practices. Key features of the ABDT include: • Proactive Demand Planning Service: Utilizes novel episodic RL methods and cost-benefit matrices to reshape day-ahead energy demand, achieving energy cost savings without compromising efficiency. • Continuous Energy Performance Manager: Optimizes building systems and operations to ensure user comfort and energy efficiency through black-box policy optimization, multi-timescale MPC, and decision-tree models. • Building Investment Planning Assistant: Assesses energy and environmental impacts of investments, focusing on economic benefits and viability, using the VERIFY platform and SRI advisor. • Enhanced Building Situation Assessment and Forecasting: Develop a comprehensive set of tools for detailed assessment and forecasting of building conditions using a simulation engine calibrated with real-time sensory and static BIM data. • Implementation of Specialized Forecasting and Maintenance Services: Integrate black-box (data-driven) and white-box (analytic) models to provide specialized services such as microgrid maintenance, indoor air quality assessment, thermal and electricity flexibility forecasting, and local energy consumption and generation forecasting.

	• Creation of a Multi-dimensional Digital Building Awareness Toolbox: Establish a sophisticated digital toolbox with an advanced web GUI to assess multiple building vectors and features, serving as a virtual testbed for validating various control scenarios. The ABDT coordinates building infrastructure, smart devices, and energy management systems to reveal financial opportunities and manage energy flows efficiently. It also supports both short-term operational decisions and long-term strategic planning, addressing grid reinforcement, smart readiness, and predictive maintenance. By enabling seamless interoperability among various systems and stakeholders, the ABDT fosters a collaborative environment for effective energy management and innovation in the building sector.
	What is the level of innovation? • ■Very innovative - The ABDT introduces novel approaches to energy management, decision-making, and optimization within buildings and districts, offering significant advantages in terms of energy efficiency, cost savings, and sustainability. Its integration of cutting-edge techniques and technologies demonstrates a high level of innovation that is likely to be easily appreciated by customers seeking advanced solutions for building energy management.)
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ■It doesn't solve the full problem • ■It is not commercially mature
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. A. Siemens - Link: Desigo CC Energy Management (siemens.com) B. ABB - Link: Building Energy Management Systems - Smart Building | Intelligent Building Management System | ABB C. Intesis - Link: Building Energy Management System | BEMS | Intesis **Can you find a main drawback or a limitation for each of the alternative solutions you provided?** A. They are based on less elaborate simulation models (not digital twins). B. The control and decision making mechanisms' structures consider less elaborate rule-engines, PID or linear schemes.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ■Yes **Can we say that this solution is the starting point of the current project development activities?** • ■Yes **If "Yes" then please specify the product or service already developed ("the starting point").** The IS tools comprising ABDT (considered under Task 4.1 and Task 4.2) have already been developed and validated in previous projects (or in the market). Their average starting TRL was already 5 at the beginning of the project.
	Let's compare the KER with what we already had in the consortium. What are the main advancements respect to the "starting point" (the initial solution available in the consortium)? If possible, please give numerical figures that can quantify advancements. • ■Improved flexibility for diverse applications • ■Improved technical performances (please specify) a. Reduction in energy consumption through proactive demand planning and continuous energy performance management. b. Increase in energy cost savings without compromising energy efficiency. c. Enhancement in building operations efficiency through optimized control strategies. • ■New features a. Introduction of advanced decision-making algorithms and methodologies such as reinforcement learning and model predictive control. b. Development of novel services for proactive demand planning, continuous energy performance management, and building investment planning assistance. • ■Improved customizability • ■Improved user friendliness • ■Improved connectivity a. Integration of diverse building systems and operations for seamless data exchange and communication. b. Enhanced interoperability among different stakeholders and systems for efficient energy management. • ■Remote operability a. Considering cloud deployment for different IS constituting ABDT • ■Improved interoperability a. Leveraging WP3 platform and T4.6 broker

	Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements. **Alternative solution A** • ■Improved technical performances (please specify) • ■Improved customizability • ■Improved user friendliness • ■Improved connectivity • ■Remote operability • ■Improved interoperability **Alternative solution B** • ■Improved technical performances (please specify) • ■Improved customizability • ■Improved user friendliness • ■Improved connectivity • ■Remote operability • ■Improved interoperability **Alternative solution C** • ■Improved technical performances (please specify) • ■Improved customizability • ■Improved user friendliness • ■Improved connectivity • ■Remote operability • ■Improved interoperability
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ■Associations of individuals (Energy Communities) • ■Private Small or medium enterprises • ■Private Large enterprises • ■Public bodies / authorities

	Who are the potential final users?
	• ■Individuals
	• ■Industry:
	  o ■One or several managers
	  o ■One specific technical profile
	  o ■One specific department/team
	• ■Public bodies / authorities
	  o ■One or several managers
	  o ■One specific technical profile
	  o ■One specific department/team
	• ■Research and academic bodies
	  o ■One or several managers
	  o ■One specific technical profile
	  o ■One specific department/team
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ■Current customers - **The innovation may primarily be used by current customers if the company's existing clients have expressed interest in advanced energy management solutions or if the company aims to enhance its offerings to retain and expand its customer base.**
	• ■New customers - **The innovation could also attract new customers if the company plans to market the Autonomous Building Digital Twin (ABDT) to potential clients who are seeking innovative solutions for energy optimization and sustainability in buildings.**

Value proposition – Customer profile	Let's see what's relevant for the KER under investigation: **What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. Real-time Energy Monitoring: The customer regularly monitors energy consumption patterns and identifies areas for improvement in energy efficiency based on the capacity of the elaborate Digital Twin framework. 2. Occupancy Optimization: The customer adjusts building settings and resources based on occupancy patterns to optimize energy usage and occupant comfort. 3. Predictive Maintenance Planning: The customer plans maintenance activities based on predictive analytics and real-time monitoring data to prevent equipment failures and optimize maintenance schedules.

	4. Demand Response Management: The customer participates in demand response programs and manages energy demand in real-time to reduce costs and support grid stability. **What are the pains the customer encounters while doing the previous activities?** **N/A** **What are the gains the customer aims at, while doing the previous activities?** 1. Cost Reduction: The customer aims to reduce energy bills and operating expenses by optimizing energy consumption and costs (OPEX). 2. Optimized Comfort and Conditions: The customer seeks to maintain optimal comfort parameters within the building while aligning with outside conditions, ensuring a comfortable and productive environment for occupants. 3. Environmental Sustainability: The customer has environmental targets to achieve, such as reducing carbon emissions, conserving natural resources, and minimizing the ecological footprint of building operations through smart investment planning (CAPEX). 4. Operational Efficiency: The customer aims to improve operational efficiency by streamlining energy management processes, reducing downtime, and enhancing overall productivity.

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	• Activity 1: How much is the KER crucial to perform the activity?
	  • ■Indispensable
	• Activity 2: How much is the KER crucial to perform the activity?
	  • ■Indispensable
	• Activity 3 How much is the KER crucial to perform the activity?
	  • ■Indispensable
	• Activity 4: How much is the KER crucial to perform the activity?
	  • ■Indispensable

	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** 1. Cost Reduction: The customer aims to reduce energy bills and operating expenses by optimizing energy consumption and costs (OPEX). 2. Optimized Comfort and Conditions: The customer seeks to maintain optimal comfort parameters within the building while aligning with outside conditions, ensuring a comfortable and productive environment for occupants. 3. Environmental Sustainability: The customer has environmental targets to achieve, such as reducing carbon emissions, conserving natural resources, and minimizing the ecological footprint of building operations through smart investment planning (CAPEX). 4. Operational Efficiency: The customer aims to improve operational efficiency by streamlining energy management processes, reducing downtime, and enhancing overall productivity.
"Market" – *Target market*	**What is the primary target market?** • ■Real estate management **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** • Commercial real estate • Residential real estate • Facility management services **The market targeted by this innovation is**: • ■Emerging: There is a growing demand and few offerings are available **Market dynamics: is the market…?** • ■Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ■Yes **Market competition: How strong is competition in the target market?** • ■Established competition but none with a proposition like the one under investigation

"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)**
	□ SMEs:
	  1. Rething IoT
	  2. Energenius SRL
	  3. Econerg SRL
	□ Large enterprises:

	1. SIEMENS 2. ABB 3. Intesys 4. Evon
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Scarcely applicable	Applicable	Very well applicable
Subscription model			
ESCO – energy performance contract			
Software as a service			

Go to Market – Timing	**Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market – TRL9(ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):** ☐ Within 12 months after the project: 1. EC certification 2. ISO 50001 certification 3. Joint venture establishment
Go to Market – IPR Background	Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	**CERTH, UniGe, CEA, R2M, IES**
Trademark	

Go to Market – IPR Foreground	Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	
Trade secret	
Copyright	**CERTH, UniGe, CEA, R2M, IES**
Trademark	

5.3 KER 3: Autonomous District Digital Twin

5.3.1 KER 3 Characterization Table

Table 6. KER 3 - Characterization Table

Name of the KER: Autonomous District Digital Twin (ADDT) **Involved partners: UBE, IES, CERTH** **KER Leader(s): UBE**	
Problem /need	**Is this:** • ☐A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards….) - **Electrical grid resilience** • ☐A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment….) - **Energy cost savings** • ☐A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact….) - **RES maximization** • ☒All of them
	Geographical level: • ☒Global
	Does the need come from: • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒Consulting services
	Please provide a description of the KER. ADDT extends the BAUNs vision to districts and aims to optimize energy management at a district scale. Addressing diverse energy goals, it optimizes inter-building energy exchanges and enables automated decision-making for holistic system planning, operation, and maintenance across building and grid levels.
	What is the level of innovation? • ☒Innovative but could be difficult to convert customers
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It is difficult to implement • ☒It is expensive
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. 1. OPAL RT Digital Twins - Link: https://www.opal-rt.com/digital-twins/ 2. ALTAIR - Link: https://altair.com/one-total-twin 3. ANSYS Twin Builder - Link: https://www.ansys.com/products/digital-twin/ansys-twin-builder **Can you find a main drawback or a limitation for each of the alternative solutions you provided?** 1. Expensive, Generic-Complicated to implement 2. Expensive, Generic-Complicated to implement 3. Expensive, Generic-Complicated to implement
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒Yes **Can we say that this solution is the starting point of the current project development activities?** • ☒Yes **If "Yes" then please specify the product or service already developed ("the starting point").** IES iVN - https://www.iesve.com/products/ivn
	Let's compare the KER with what we already had in the consortium. What are the main advancements respect to the "starting point" (the initial solution available in the consortium)? If possible, please give numerical figures that can quantify advancements. • ☒Improved flexibility for diverse applications • ☒New features • ☒Improved interoperability
	Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements. **Alternative solution A** • ☒Improved user friendliness • ☒Remote operability **Alternative solution B**

	• ☒Improved user friendliness • ☒Remote operability **Alternative solution C** • ☒Improved user friendliness • ☒Remote operability
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Associations of individuals • ☒Private Large enterprises • ☒Public bodies / authorities **Please name a few potential customers:** 1. Greek DSO (DEDDIE) 2. UKPN DSO (UK)

	Who are the potential final users?
	• ☒Industry:
	  o ☒One specific department/team
	• ☒Public bodies / authorities
	  o ☒One specific department/team
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ☒New customers

Value proposition – Customer profile	Let's see what's relevant for the KER under investigation: **What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. Evaluation of DSO energy/flexibility products and scenario testing 2. Evaluation of aggregators services and scenario testing **What are the pains the customer encounters while doing the previous activities?** 1. The customer does not have a tool for multi energy carrier networks optimization. 2. The customer may not have the technical expertise to use a more complicated software tool. 3. The customer may not be able to interpret the results and extract useful recommendation on their own (e.g., from raw data). **What are the gains the customer aims at, while doing the previous activities?** 1. The customer wants to have user friendly results. 2. The customer wants to reduce energy supply costs.

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	• Activity 1: How much is the KER crucial to perform the activity?
	  • ☒Core, but needs to work in synergy with other components/processes
	• Activity 2: How much is the KER crucial to perform the activity?
	  • ☒Nice to have
	• Activity 3: ☒ The KER can be integrated ☐ The KER cannot be integrated How much is the KER crucial to perform the activity?
	  • ☒Nice to have

	CUSTOMER PAINS: **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** 1. Environmental targets. How? Optimal management 2. Electricity Costs. How? Optimal management
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** 1. Environmental targets How? Optimal management 2. Electricity Costs How? Optimal management
"Market" – *Target market*	**What is the primary target market?** • ☒Energy production/distribution/consumption **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** Energy markets **The market targeted by this innovation is**:

	• ☒The market is not yet existing but the innovation has clear potential to create a new market **Market dynamics: is the market…?** • ☒ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ☒ No **Market competition: How strong is competition in the target market?** • ☒ Several major players with strong competencies, infrastructure and offerings
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** ☐ Large enterprises: 1. ANSYS 2. ALTAIR 3. OPAL RT
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Scarcely applicable	Applicable	Very well applicable
Subscription model		✓	
Bundling model		✓	
Direct sales model		✓	
Consulting model		✓	
Software as a service		✓	

Go to Market - Timing	**Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):** ☐ During the first month after the project: 1. Develop the software to full-scale, incorporating all features and functionality. ☐ Within 6 months after the project: 1. Ensure the software meets all performance, security, and usability standards. ☐ Within 12 months after the project: 1. Integrate the software with all intended hardware and other system components. ☐ Within 24 months after the project: 1. Ensure the software operates as intended in real-world conditions, addressing any issues identified during previous testing phases.
Go to Market – IPR Background	Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	IES

Go to Market – IPR Foreground	Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	
Trade secret	
Copyright	
Trademark	UBE

5.4 KER 5: Interoperability and Abstraction Services

5.4.1 KER 5 Characterization Table

Table 7. KER 5 - Characterization Table

Name of the KER: Energy services Marketplace (IS18) **Involved partners: CIRCE and CERTH** **KER Leader(s): CIRCE**	
Problem /need	**Is this:** • ☒A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards....) - **The need for a meeting place for energy consumers and producers to exchange data on energy use and consumption, as well as to find different energy services.**
	Geographical level: • ☒European
	Does the need come from: • ☒Private customers • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒New service (except consulting services) - **Although Marketplaces already exist as such, it is a new way of selling energy services.**
	Please provide a description of the KER. Establishing a marketplace for exchanging and sharing BDT and DDT services, enabling seamless subscription schemes, through four main components: data management, subscription management, data upload management and metadata exploration component. The innovation of the proposed solution is based on providing highly personalized experiences of available EVELIXIA list of services offered, for relevant stakeholders, through the usage of a blockchain-based peer-to-peer energy marketplace. The innovation will focus on not only allowing the testing of all the functionalities implemented inside the interoperability and abstraction services layer, but also allow the exploration of available data and metadata (datasets, ML pretrained models, results).
	What is the level of innovation? • ☒Obviously innovative and easily appreciated advantages to customers.
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It is expensive.
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. No alternative solution was identified at this stage.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒No
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Private Small or medium enterprises • ☒Private Large enterprises **Please name a few potential customers:** 1. DSOs 2. TSOs

	Who are the potential final users?
	• ☒Industry:
	  ○ ☒One or several managers
	  ○ ☒One specific department/team
	  ○ ☒Individuals
	• ☒Non-profit organizations
	  ○ ☒One or several managers
	  ○ ☒One specific department/team
	  ○ ☒Individuals

	• ☒Public bodies / authorities
	  ○ ☒One or several managers
	  ○ ☒Individuals
	• ☒Research and academic bodies
	  ○ ☒One or several managers
	  ○ ☒One specific department/team
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ☒Current customers

Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** • DSOs have to make seasonal adjustments of settings in energy management. • Building tenants and managers check the energy consumption of all the residents regularly. • Building tenants and managers manage the self-consumption of the buildings. **What are the pains the customer encounters while doing the previous activities?** 1. Too much information to navigate through. 2. Not all the solutions that customers want or are looking for are available now. High costs of some particular services. **What are the gains the customer aims at, while doing the previous activities?** 1. Information presented in a friendly, clear, and precise manner. 2. Ability to test all the functionalities of the marketplace. 3. Seamless subscription schemes.

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	• Activity 1: How much is the KER crucial to perform the activity?
	  • ☒Core, but needs to work in synergy with other components/processes
	• Activity 2: How much is the KER crucial to perform the activity?
	  • ☒Core, but needs to work in synergy with other components/processes
	• Activity 3: How much is the KER crucial to perform the activity?
	  • ☒Core, but needs to work in synergy with other components/processes

	CUSTOMER PAINS: **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** • Too much information to navigate through. **How**? Smart GUI design. • Not all desired services will be available to use **How**? Initial approach of all services available as long as they will land on the marketplace. • High prices of some particular services. **How**? Ensure fair prices according to data-driven services quality.
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** • Information presented in a friendly, clear, and precise manner. **How**? Better insights and user experience. • Ability to test all the functionalities of the marketplace. **How**? By using the PoC/MVP approach, according to efforts distribution. • Seamless subscription schemes. **How**? Easy interaction between data-driven energy services.
"Market" – *Target market*	**What is the primary target market?** • ☒Energy production/distribution/consumption **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** DSOs, Aggregators, buildings managers. **The market targeted by this innovation is**: • ☒ Emerging: There is a growing demand, and few offerings are available. **Market dynamics: is the market…?** • ☒ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ☒ No **Market competition: How strong is competition in the target market?**

<table>
<tr><td></td><td>• ☒ Established competition but none with a proposition like the one under investigation.</td></tr>
<tr><td>"Market" - Competitors</td><td>Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)

No competitors were identified at this stage.</td></tr>
<tr><td>Go to Market – Business model</td><td>What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.
<table>
<tr><th>Business Model</th><th>Not applicable</th><th>Scarcely applicable</th><th>Applicable</th><th>Very well applicable</th></tr>
<tr><td>Subscription model</td><td></td><td></td><td></td><td>X</td></tr>
<tr><td>Software as a service</td><td></td><td></td><td></td><td>X</td></tr>
</table></td></tr>
<tr><td>Go to Market - Timing</td><td>Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):
CIRCE's intention is to exploit this solution internally and look for further private or public projects to continue with the development and improve the features so to offer a better solution to the market. This will be done after the project ends, is difficult to estimate concrete amount of time as it will depend on the type of project.</td></tr>
<tr><td>Go to Market – IPR Background</td><td>Please check if there is any type of Intellectual property already secured (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.
<table>
<tr><th>Type</th><th>Owner</th></tr>
<tr><td>Patent</td><td></td></tr>
<tr><td>Trade secret</td><td></td></tr>
<tr><td>Copyright</td><td></td></tr>
<tr><td>Trademark</td><td></td></tr>
</table></td></tr>
<tr><td>Go to Market – IPR Foreground</td><td>Please check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property:
<table>
<tr><th>Type</th><th>Owners</th></tr>
<tr><td>Patent</td><td></td></tr>
<tr><td>Trade secret</td><td></td></tr>
<tr><td>Copyright</td><td></td></tr>
<tr><td>Trademark</td><td></td></tr>
</table></td></tr>
</table>

5.5 KER 6: Geothermal Wall System

5.5.1 KER 6 Characterization Table

Table 8. KER 6 - Characterization Table

Name of the KER: Geothermal Wall System – (IS24) (HW) **Involved partners: TUCN** **KER Leader(s): TUCN**	
Problem /need	**Is this:** • ☒A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact….)
	Geographical level: • ☒Local /national
	Does the need come from: • ☒ Other (please specify) – CO_2 emissions reduction
Description	**What is the nature of the KER?** • ☒New product
	Please provide a description of the KER. Part of the underground wall of the dorm facing South Façade will be thermally activated. - Special layering and system will be developed, focusing on both structural and architectural "health" of the wall that will include a pipe system. - FOCUS on the scalability and optimization of the system • Two type of pipe layout on the exterior of the wall to compare the influence of pipe layout, in order to transform the wall into an energy wall • Development of an interior GeoWall system, which consists of prefabricated modular panels that are designed to be easily installed on the interior walls of underground spaces such as basements. The GeoWall system is engineered to ensure the thermal insulation of these spaces while simultaneously capturing and repurposing waste heat that is typically lost in conventional underground environments. - Heat pump system connected • Distribution system to be installed in some of the Dorm Rooms (3 rooms)
	What is the level of innovation? • ☒Innovative but could be difficult to convert customers
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It is difficult to implement • ☒It is not commercially mature
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. 1. Energy geostructures - Link: https://greentags.ro/en/about-energy-geotructures/ 2. Energy geostructures - Link: https://solarimpulse.com/solutions-explorer/energygeostructures **Can you find a main drawback or a limitation for each of the alternative solutions you provided?** 1. This solution can be used only for new buildings when the foundation is executed 2. Small scale commercialization
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒Yes **Can we say that this solution is the starting point of the current project development activities?** • ☒Yes **If "Yes" then please specify the product or service already developed ("the starting point").** We developed the energy geostructures, but just for the new buildings, please see the link: https://greentags.ro/en/about-energy-geotructures/
	Let's compare the KER with what we already had in the consortium. What are the main advancements respect to the "starting point" (the initial solution available in the consortium)? If possible, please give numerical figures that can quantify advancements. • ☒Improved flexibility for diverse applications • ☒Improved design, size, weight, efficiency, materials • ☒New features • ☒Improved customizability • ☒Improved environmental impact
	Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements.

	Alternative solution A • ☒Improved flexibility for diverse applications • ☒Improved design, size, weight, efficiency, materials • ☒New features • ☒Improved customizability • ☒Improved environmental impact **Alternative solution B** • ☒Improved flexibility for diverse applications • ☒New features • ☒Improved customizability
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Individuals • ☒Associations of individuals • ☒Private Small or medium enterprises • ☒Research and academic bodies

	Who are the potential final users?
	• ☒Individuals
	• ☒Industry:
	  o ☒One specific technical profile
	  o ☒One specific department/team
	• ☒Research and academic bodies
	  o ☒One specific technical profile
	  o ☒One specific department/team
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ☒Current customers
	• ☒New customers

Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. Sets the temperature set point in the room **What are the pains the customer encounters while doing the previous activities?** 1. To pay the electricity bills **What are the gains the customer aims at, while doing the previous activities?** 1. The customer wants to keep comfort parameters under control, according to outside conditions 2. The customer wants to reduce the CO2 emissions
Value proposition	**CUSTOMER JOBS:** **Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):** • Activity 1: How much is the KER crucial to perform the activity? • ☒Nice to have
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** 1. The customer wants to reduce the CO2 emissions. **How?** Reduces environmental impact by up to 60% compared to gas boilers and air conditioners
"Market" – *Target market*	**What is the primary target market?** • ☒Real estate management • ☒Other (please specify) Residential and tertiary existing buildings **The market targeted by this innovation is**: • ☒The market is not yet existing but the innovation has clear potential to create a new market **Market dynamics: is the market…?** • ☒ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ☒ No **Market competition: How strong is competition in the target market?** • ☒ Patchy, no major players

Go to Market – Business model

What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.

Business Model	Scarcely applicable	Applicable	Very well applicable
Product to service model	x		
ESCO - energy performance contract		x	
ESCO - energy supply contract		x	
Franchise model		x	
Distribution model	x		
Manufacturer model		x	
Peer-to-peer model		x	
Direct sales model		x	
Affiliate marketing model		x	
Consulting model		x	
Product as a service		x	

Go to Market - Timing

Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):

- Within 6 months after the project:
  1. Improvement of the implemented solution
- Within 12 months after the project:
  1. Technology transfer to a third party interested, potential industrial partner
  2. Find an industrial partner to upscale the solution and to launch it into the market

Go to Market – IPR Background

Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	

Go to Market – IPR Foreground

Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	X (modular solution to be patented)
Trade secret	
Copyright	X
Trademark	

5.5.2 KER 6 international patent scenario overview

The query submitted to Patsnap, which revolved around the concepts of geothermal wall system, geothermal heat exchange wall, geothermal building envelope and synonyms, revealed 53 INPADOC families. An INPADOC family is a "collection of patent documents covering a technology. The technical content covered by the applications is similar, but not necessarily the same. Members of an extended patent family will have at least one priority in common with at least one other member - either directly or indirectly" (European Patent Office)[9].

5.5.2.1 Patenting trend

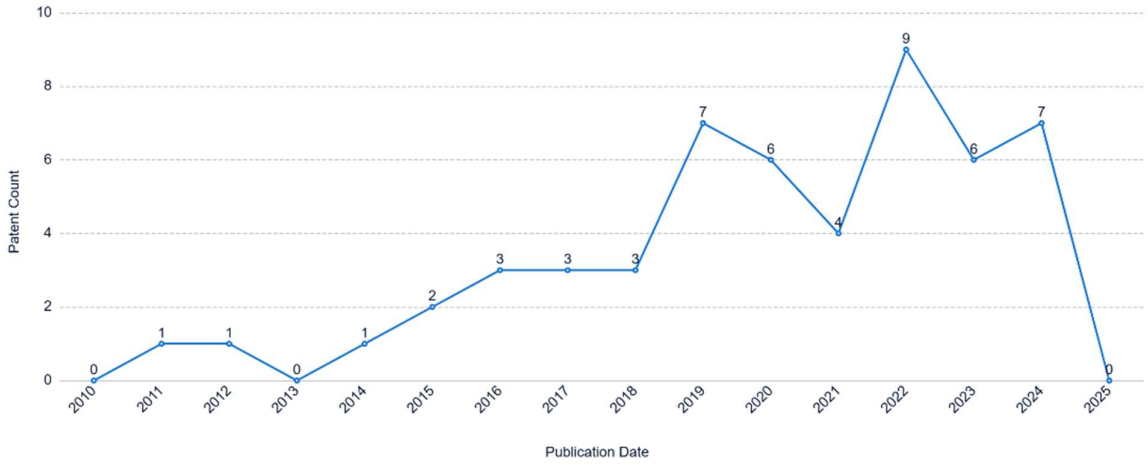


Figure 5. KER 6 - Patenting trend

The patent publication trend suggests that KER 6 is a quite novel technology, as the majority of patents were submitted from 2019. The trend is rising, which suggests that there may be a further increase in patenting in the coming years. Of the 53 patent families identified, 25 are active (47%), 24 are inactive and 4 are pending.

For all the KERs, it has to be noted that 2025 results are not representative, as the analysis was conducted in January 2025.

[9] European Patent Office (EPO)

5.5.2.2 Top IPCs

Figure 6. KER 6 - Top IPCs

In Figure 6 are shown the major technology areas. The majority of patents is part of the IPC subclass E04B, which represents “General building constructions; walls, e.g. partitions; roofs; floors; ceilings; insulation or other protection of buildings”.

5.5.2.3 Top authorities

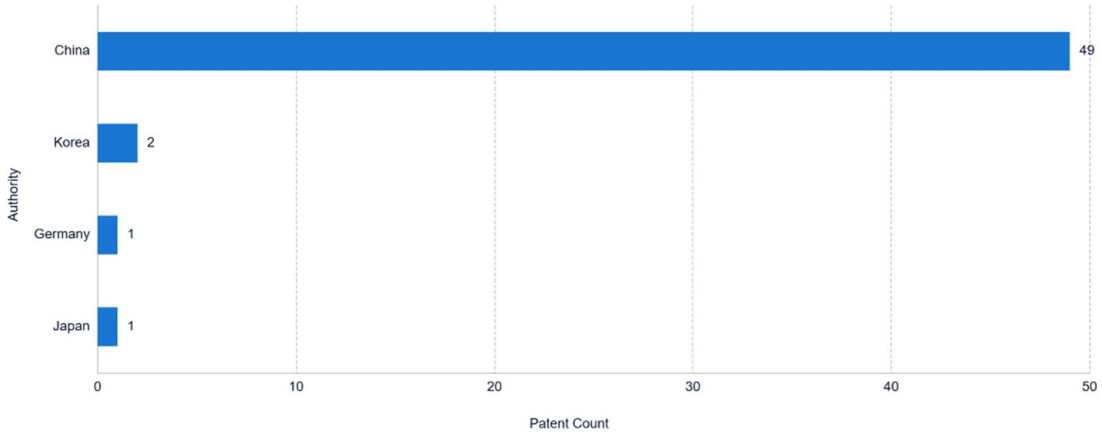


Figure 7. KER 6 - Top authorities

Almost the entirety of the applications was performed in China, which appears to be the most active country in the research related to geothermal wall systems.

5.5.2.4 Top assignees

Figure 8. KER 6 - Top assignees

The most interesting outcome of the top assignees analysis is that the research on this topic is very fragmented, as there is no organization with more than two patents submitted. This also means that, at the moment, there are no large companies heavily investing in this technology (by performing R&D or by acquiring already existing patents).

5.6 KER 7: Window Solar Shading Control Using Recycled PV Cell

5.6.1 KER 7 Characterization Table

Table 9. KER 7 - Characterization Table

Name of the KER: Window Solar Shading Control Using Recycled PV Cell (IS25) **Involved partners: None** **KER Leader(s): TUCN**	
Problem /need	**Is this:** • ☒A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards....) - **Life cycle assessment for damaged PV panels** • ☒A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact....) - **Window shading and renewable energy production in the same time using recycled PV cells**
	Geographical level: • ☒European • ☒Global
	Does the need come from: • ☒Business/industrial customers
Description	**What is the nature of the KER?** • ☒Other (please specify) - **Damaged PV cells recycling**
	Please provide a description of the KER. PV modules with electrical faults, repaired and installed as BIPV curtain shade on buildings facades.
	What is the level of innovation? • ☒Some distinct, probably minor, improvements over existing products
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It doesn't solve the full problem • ☒It is difficult to implement • ☒It is not commercially mature
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. No alternative solutions were identified at this stage.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒No
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Private Large enterprises • ☒Research and academic bodies
	Who are the potential final users? • ☒Individuals **For the private company/companies, will this innovation be used by mainly current or new customers?** • ☒New customers
Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. Daily Office Activities **What are the pains the customer encounters while doing the previous activities?** 1. Too much and too bright sunlight **What are the gains the customer aims at, while doing the previous activities?** 1. Better work conditions and some PV electricity generation
Value proposition	**CUSTOMER JOBS:** **Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):** • Activity 1: How much is the KER crucial to perform the activity?

	• ☒Nice to have **CUSTOMER PAINS:** **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** 1. Too much and too bright sunlight. How? By providing shading **CUSTOMER GAINS:** **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** 1. Local electricity production. How? Through the PV cells used for shading
"Market" – *Target market*	**What is the primary target market?** • ☒Real estate management **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** Tertiary building sector **The market targeted by this innovation is**: • ☒The market is not yet existing but the innovation has clear potential to create a new market **Market dynamics: is the market…?** • ☒ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ☒ No **Market competition: How strong is competition in the target market?** • ☒ Patchy, no major players
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** No competitors were identified at this stage.
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Scarcely applicable	Applicable	Very well applicable
Bundling model	X		
Leasing model	X		
ESCO - energy performance contract			X
ESCO - energy supply contract	X		
ESCO - build-own-operate-transfer	X		
Franchise model	X		
Distribution model		X	
Manufacturer model			X
Retailer model		X	
Peer-to-peer model		X	
Direct sales model			X
Affiliate marketing model	X		
Product as a service	X		

Go to Market – IPR Background

Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	

Go to Market – IPR Foreground

Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	
Trade secret	
Copyright	
Trademark	

5.6.2 KER 7 international patent scenario overview

The query submitted to Patsnap, which revolved around the concepts of PV window shading and window solar shading, revealed 10 INPADOC families.

5.6.2.1 Patenting trend

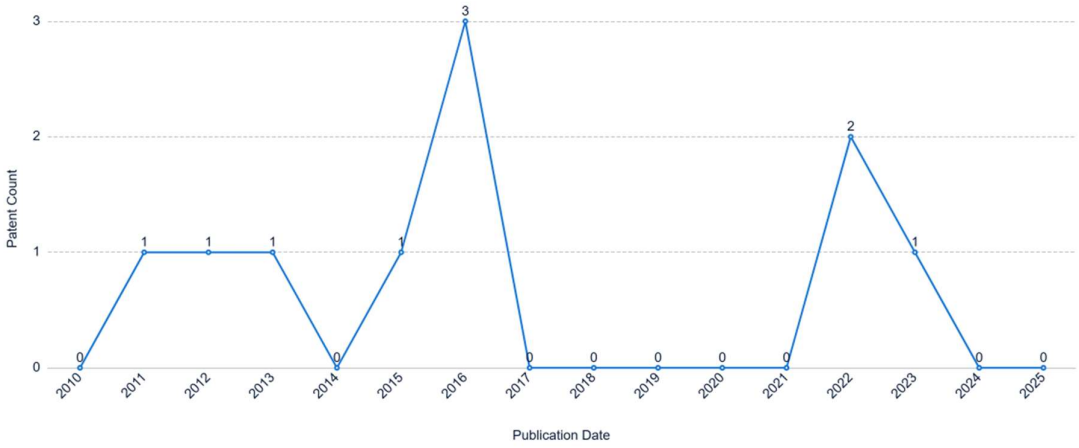


Figure 9. KER 7 - Patenting trend

The low number of records (result of a quite specific query) does not allow to identify a trend in the patent applications. However, research on new PV panels applications is currently a very important research field, so it is likely that new patent applications will be performed in the coming years.

5.6.2.2 Top IPCs

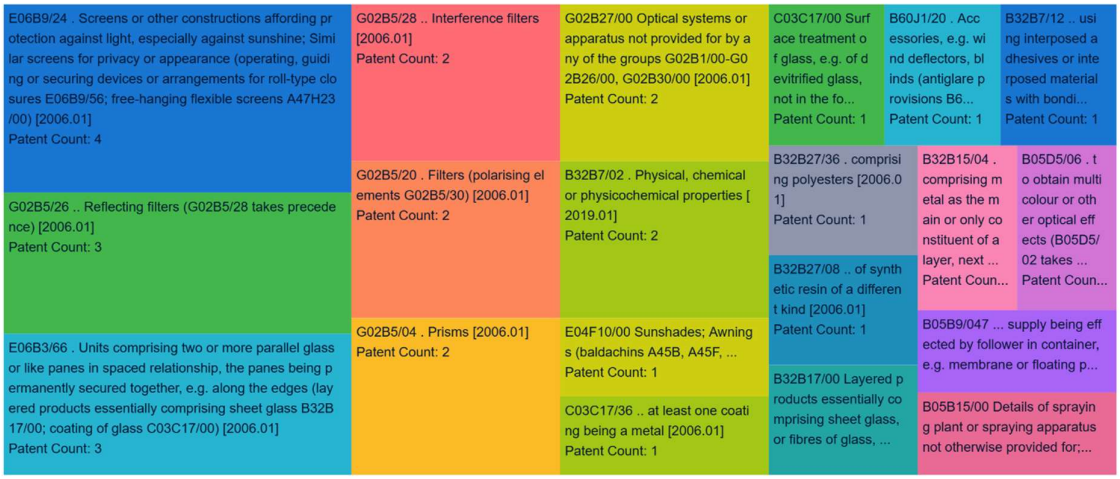


Figure 10. KER 7 - Top IPCs

The majority of patents is part of the IPC subclasses E06B "Fixed or movable closures for openings in buildings, vehicles, fences, or like enclosures, in general, e.g. doors, windows, blinds, gates" and G02B "Optical elements, systems or apparatus".

5.6.2.3 Top authorities

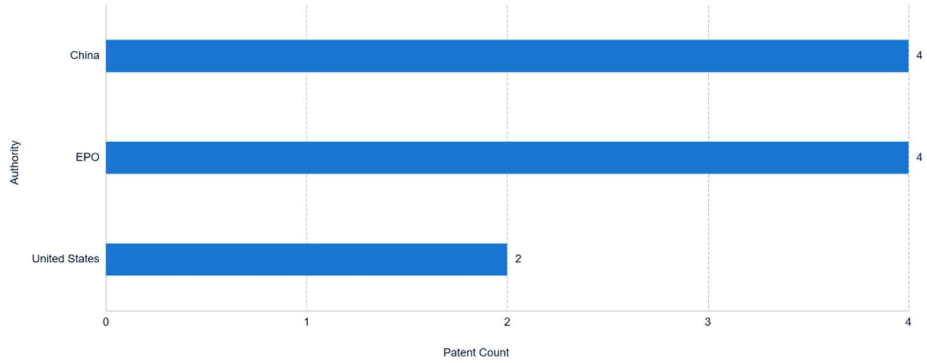


Figure 11. KER 7 - Top authorities

It is very interesting to note the role of Europe, as 4 applications were for EPO patents, which offers protection in all the EU countries and in the following non-EU countries: Albania, Iceland, Liechtenstein, Monaco, North Macedonia, Norway, San Marino, Serbia, Switzerland, Turkey, and the United Kingdom.

5.6.2.4 Top assignees

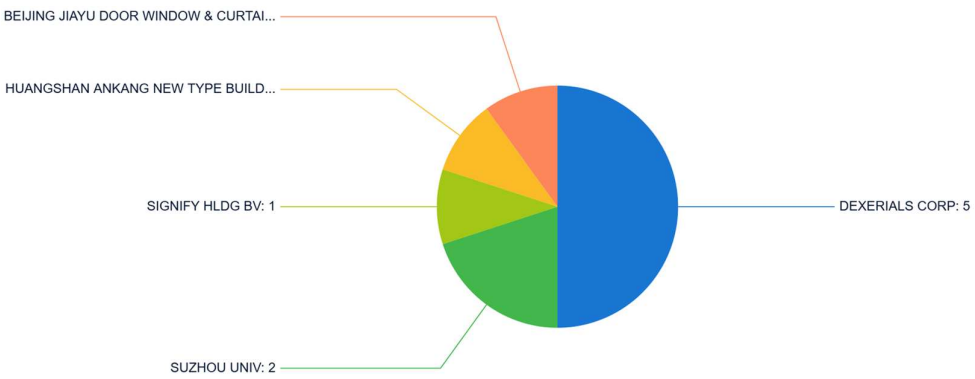


Figure 12. KER 7 - Top assignees

Dexerials Corporation has performed 5 of the 10 patent applications. Interesting is also the patent application performed by the Dutch corporation Signify, a leading company in connected LED lighting systems, software and services.

5.7 KER 8: V2G EV Charger

5.7.1 KER 8 Characterization Table

Table 10. KER 8 - Characterization Table

Name of the KER: V2G EV Charger **Involved partners: None** **KER Leader(s): TUCN**	
Problem /need	**Is this:** • ☒A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment….) - **Cost-effectiveness study of EV under V2B conditions**
	Geographical level: • ☒European • ☒Global
	Does the need come from: • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒New service (except consulting services)
	Please provide a description of the KER. TUCN will demonstrate the cost-effectiveness of the V2G system, under V2B conditions, which utilizes the stored energy in electric vehicle (EV) batteries during periods of peak electricity demand, to provide cost savings to facility operators who incur high costs for power consumption during these periods. The V2G EV charger software will interface with the local TUCN's BEMS to demonstrate a functioning demand response V2G solution.
	What is the level of innovation? • ☒Some distinct, probably minor, improvements over existing products
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒Other (please specify)
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. No alternative solution was identified at this stage.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒No
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Private Large enterprises • ☒Research and academic bodies
	Who are the potential final users? • ☒Individuals • ☒Industry: o ☒One or several managers **For the private company/companies, will this innovation be used by mainly current or new customers?** • ☒New customers
Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. Balancing day ahead energy consumption **What are the pains the customer encounters while doing the previous activities?** 1. The customer does not have a convenient way of storing energy **What are the gains the customer aims at, while doing the previous activities?** 1. The customer wants to reduce energy bill
Value proposition	**CUSTOMER JOBS:** **Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):** • Activity 1: How much is the KER crucial to perform the activity? • ☒Nice to have

	CUSTOMER PAINS: **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** 1. The customer does not have a convenient way of storing energy How? By providing on-site temporary energy storage
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** 1. Customer reduces energy bill How? Demand response scenarios, energy peak shaving
"Market" – *Target market*	**What is the primary target market?** • ☒Real estate management **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** Tertiary building sector **The market targeted by this innovation is**: • ☒ The market is not yet existing and it is not yet clear that the innovation has potential to create a new market **Market dynamics: is the market…?** • ☒ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ☒ No **Market competition: How strong is competition in the target market?** • ☒ Patchy, no major players
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** No competitors were identified at this stage.
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Scarcely applicable	Applicable	Very well applicable
Freemium model		x	
Peer-to-peer model		x	
Software as a service		x	

Go to Market – IPR Background	Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	

Go to Market – IPR Foreground	Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	
Trade secret	
Copyright	
Trademark	

5.7.2 KER 8 international patent scenario overview

The query submitted to Patsnap, which revolved around the concepts of V2G, EVs and charging system revealed 447 INPADOC families.

5.7.2.1 Patenting trend

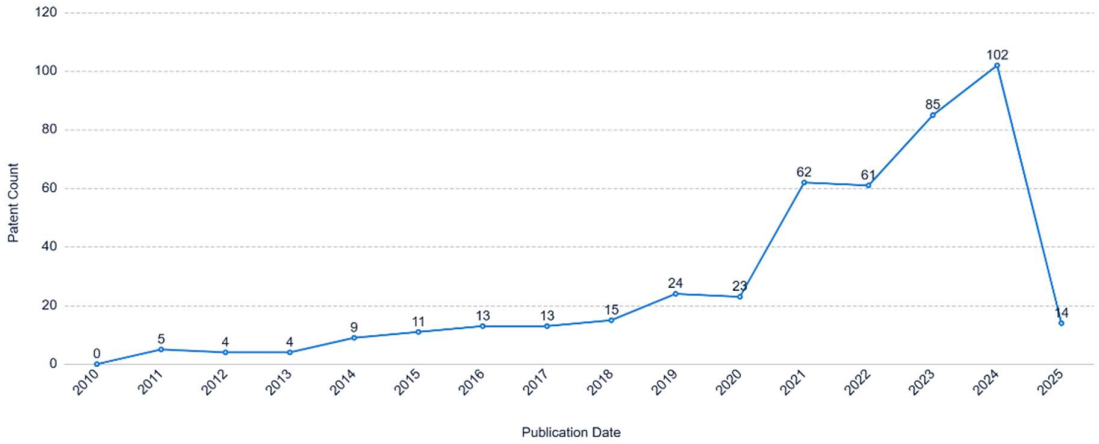


Figure 13. KER 8 - Patenting trend

The trend is clearly a growing one, with patent publications rising significantly from 2021. This trend indicates that the market is in its initial stages, where a lot of R&D is performed; a plateau in the patenting trend would, instead, indicate a mature and established market.

5.7.2.2 Top IPCs

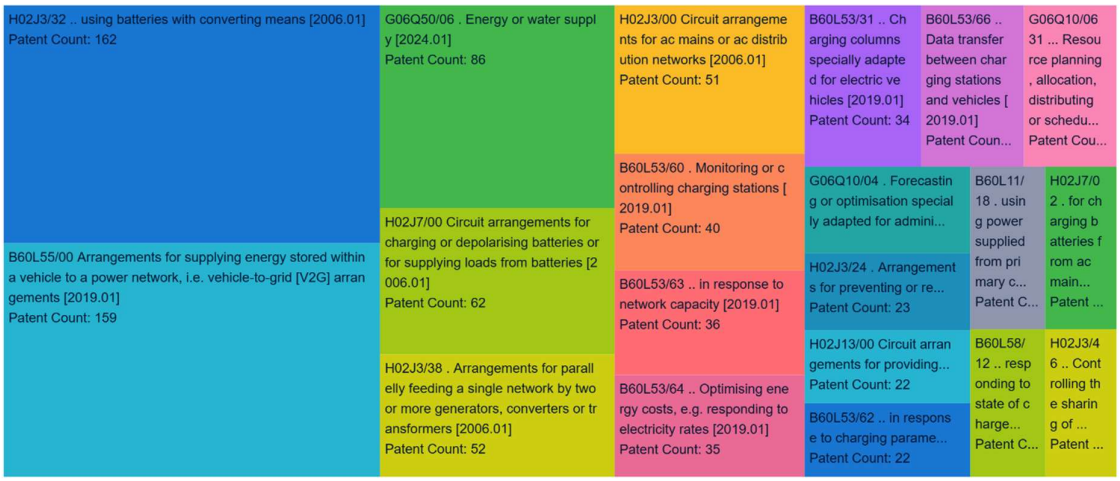


Figure 14. KER 8 - Top IPCs

The majority of patents is part of the IPC subclasses H02J “Circuit arrangements or systems for supplying or distributing electric power; systems for storing electric energy” and B60L “Propulsion of electrically-propelled vehicles; supplying electric power for auxiliary equipment of electrically-propelled vehicles; electrodynamic

brake systems for vehicles in general; magnetic suspension or levitation for vehicles; monitoring operating variables of electrically-propelled vehicles; electric safety devices for electrically-propelled vehicles".

5.7.2.3 Top authorities

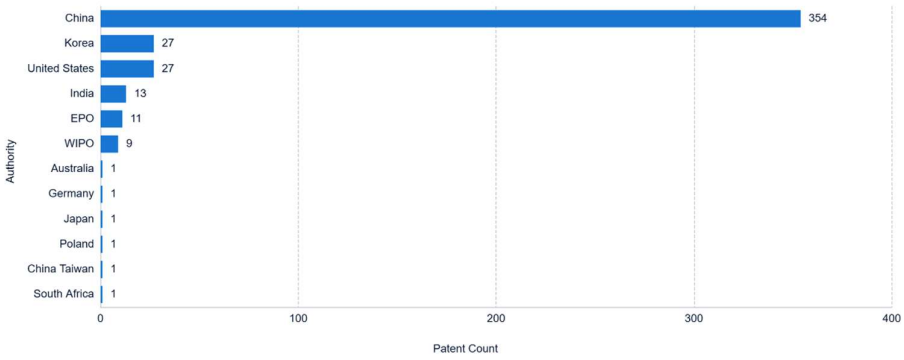


Figure 15. KER 8 - Top authorities

China is by far the country where the most patent applications are submitted. Research is also active in Korea, US and India. 9 patent applications required global protection (WIPO patents).

5.7.2.4 Top assignees

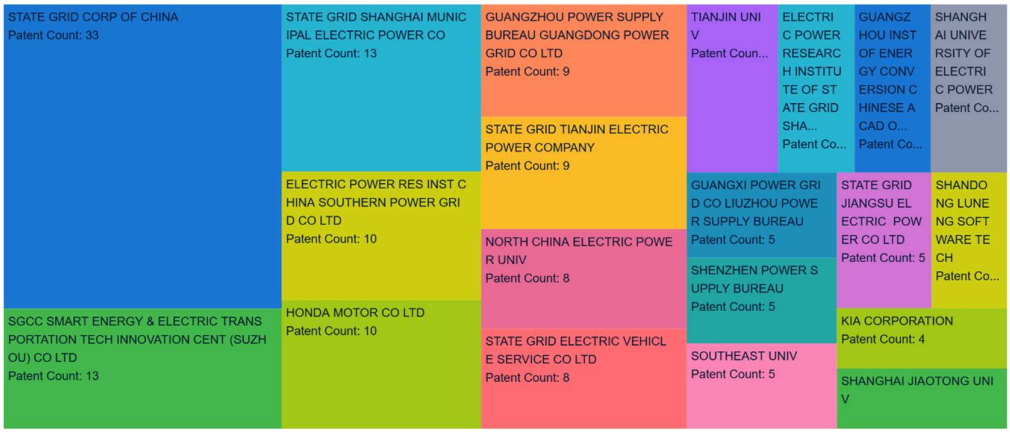


Figure 16. KER 8 - Top assignees

Usually, for novel technologies, the top assignees are mostly universities and research centers, which are the main actors in the research at low TRLs. In this case it's easy to note the predominance of large companies which are very interested in commercializing the technology.

5.8 KER 9: Power-to-Hydrogen-to-Power Compact System

5.8.1 KER 9 Characterization Table

Table 11. KER 9 - Characterization Table

Name of the KER: Power-to-Hydrogen-to-Power Compact System – MOSE (IS27) (HW)" **Involved partners: CERTH** **KER Leader(s): BER**	
Problem /need	**Is this:** • ☒A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards….) - **FULL CERTIFICATION, TESTS ALSO TO CHECK THE FINAL LIFETIME OF SYSTEM** • ☒A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment….) - **OPTIMIZING THE CAPEX**
	Geographical level: • ☒Global
	Does the need come from: • ☒Private customers
Description	**What is the nature of the KER?** • ☒New product
	Please provide a description of the KER. Power-to-hydrogen-to-power-solution based on PEM Fuel Cell and Electrolyzer and a metal hydride storage for an easier installation: everything integrated in a 10 ft container and managed by a single controller.
	What is the level of innovation? • ☒Some distinct, probably minor, improvements over existing products
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It is mature but not robust enough • ☒Other (please specify) - **BATTERY SOLUTIONS ARE LESS SUSTAINABLE AND CANNOT STORE ENERGY FOR LONG TIME**
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. 1. Batteries 2. Whatever other type of Electrolyzer + FC + compressed hydrogen storage **Can you find a main drawback or a limitation for each of the alternative solutions you provided?** 1. Limited Energy capacity – less sustainable materials 2. Permitting issues due to compressed H2
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒Yes **If "Yes" then please specify the product or service already developed ("the starting point").** MOSE ELECTROLYSER as a single solution or coupled (also for thermal management of the metal hydrides) with HYDOR Rack
	Let's compare the KER with what we already had in the consortium. What are the main advancements respect to the "starting point" (the initial solution available in the consortium)? If possible, please give numerical figures that can quantify advancements. • ☒Other – Larger energy storage capacity
	Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements. **Alternative solution A** • ☒Other – Larger energy capacity – higher environmental sustainability **Alternative solution B** • ☒Other – Easier permitting (H2 storage at lower pressure for MH)
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Private Large enterprises • ☒Research and academic bodies • ☒Other, Energy community's managers
	Who are the potential final users? • ☒Industry:

<table>
<tr><td></td><td>

☒Other ENERGY MANAGERS

☒Public bodies / authorities

☒Other ENERGY MANAGERS

☒Research and academic bodies

☒Other ENERGY MANAGERS/WHO HAVE A SMART GRID LABORATORY

For the private company/companies, will this innovation be used by mainly current or new customers?

☒Current customers

</td></tr>
<tr><td>Value proposition – Customer profile</td><td>
What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?

Operate the smart grid/smart building and maximize self consumption of the local RES production

What are the pains the customer encounters while doing the previous activities?

Look the CAPEX minimization
<ol type="a">
Look the amount of energy to be stored –> maximization
Look at O&M of the storage à minimum bothering and costs

What are the gains the customer aims at, while doing the previous activities?

See above

</td></tr>
<tr><td>Value proposition</td><td>
CUSTOMER JOBS:
Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):

<u>Activity 1</u>: How much is the KER crucial to perform the activity?

☒Complementary to a core solution

</td></tr>
<tr><td>"Market" – Target market</td><td>
What is the primary target market?

☒Energy production/distribution/consumption
☒Other (please specify) Laboratories of RTOs – energy communities

The market targeted by this innovation is:

☒ Emerging: There is a growing demand and few offerings are available

Market dynamics: is the market…?

☒ Growing

Are there other markets for this innovation that the innovators are not yet targeting?

☒ Yes

Market competition: How strong is competition in the target market?

☒ Established competition but none with a proposition like the one under investigation
☒ Several major players with strong competencies, infrastructure and offerings - PARTICULARLY IN BATTERY SECTOR

</td></tr>
<tr><td>"Market" - Competitors</td><td>
Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)

<u>SMEs</u>:

Hybitat (https://hybitat.tech/)

</td></tr>
<tr><td>Go to Market – Business model</td><td>
What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.
<table>
<tr><th>Business Model</th><th>Scarcely applicable</th><th>Applicable</th><th>Very well applicable</th></tr>
<tr><td>Product to service model</td><td></td><td></td><td>X</td></tr>
<tr><td>Leasing model</td><td></td><td>X</td><td></td></tr>
<tr><td>ESCO - energy performance contract</td><td>X</td><td></td><td></td></tr>
<tr><td>ESCO - energy supply contract</td><td>X</td><td></td><td></td></tr>
<tr><td>ESCO - build-own-operate-transfer</td><td>X</td><td></td><td></td></tr>
<tr><td>Franchise model</td><td>X</td><td></td><td></td></tr>
<tr><td>Distribution model</td><td></td><td>X</td><td></td></tr>
<tr><td>Manufacturer model</td><td></td><td></td><td>X</td></tr>
<tr><td>Retailer model</td><td></td><td>X</td><td></td></tr>
<tr><td>Direct sales model</td><td></td><td></td><td>X</td></tr>
<tr><td>Affiliate marketing model</td><td></td><td>X</td><td></td></tr>
<tr><td>Data licensing model</td><td>X</td><td></td><td></td></tr>
<tr><td>Pay as go model</td><td>X</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

	Product as a service	X		
Go to Market - Timing	**Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):** □ During the first month after the project: 1. Certify the product 2. Identify further potential test opportunities □ Within 6 months after the project • Test at higher scale □ Within 12 months after the project: • Test at higher scale, thanks to test optimize the BoP and minimize footprint/costs etc. □ Within 24 months after the project: 1. Identify companies for facilitate the installation and distribution			
Go to Market – IPR Background	Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.			
	Type	**Owner**		
	Patent			
	Trade secret			
	Copyright			
	Trademark			
Go to Market – IPR Foreground	Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:			
	Type	**Owners**		
	Patent	BER could patent the management of the system particularly looking at the coupling of ELY and MH		
	Trade secret			
	Copyright			
	Trademark			

5.8.2 KER 9 international patent scenario overview

The query submitted to Patsnap, which revolved around the concepts of power to hydrogen to power, power to X and hydrogen, revealed 8 INPADOC families.

5.8.2.1 Patenting trend

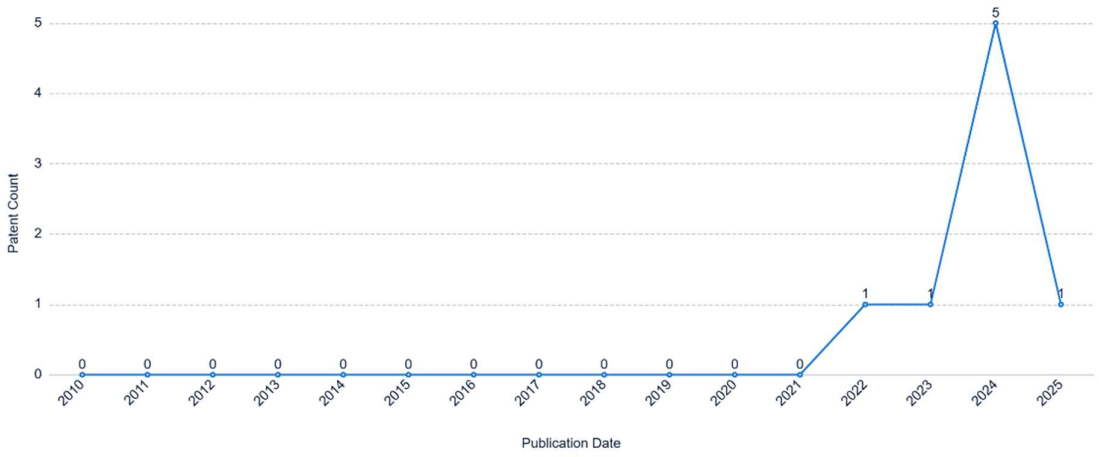


Figure 17. KER 9 - Patenting trend

The trend clearly indicates that this is a novel technology and that we are in the first stages of research. The number of patent applications is likely to increase rapidly in the next years.

5.8.2.2 Top IPCs

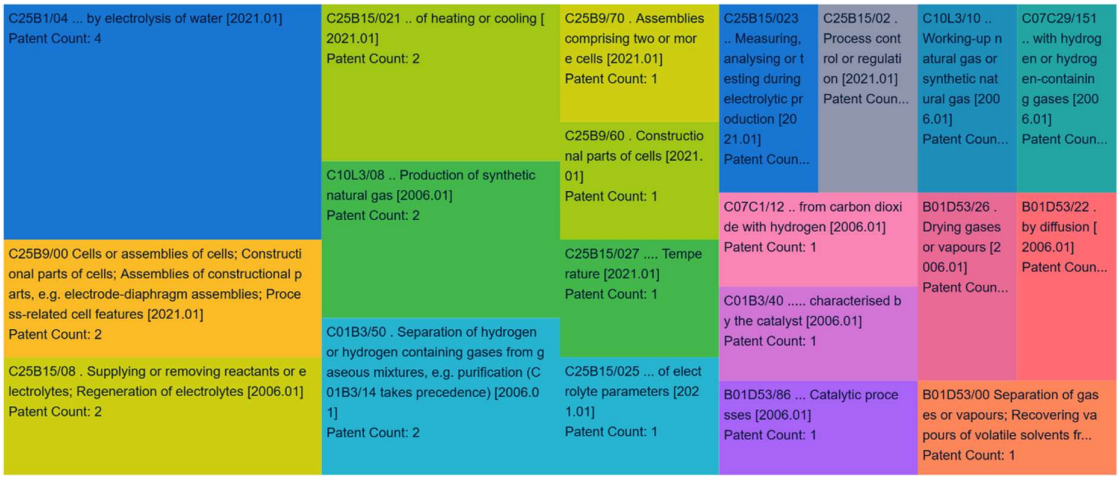


Figure 18. KER 9 - Top IPCs

The majority of patents is part of the IPC subclass C25B "Electrolytic or electrophoretic processes for the production of compounds or non- metals; apparatus therefor".

5.8.2.3 Top authorities

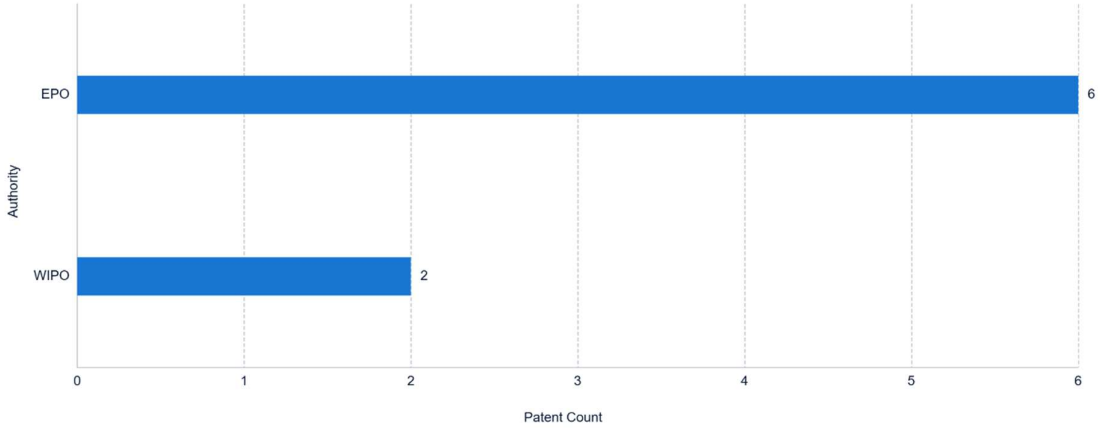


Figure 19. KER 9 - Top authorities

Very interesting is the fact that all the patent applications required European or global protection. Obtaining this type of protection is quite expensive, indicating that companies are very interested in this technology and foresee profitable applications in their reference markets.

5.8.2.4 Top assignees

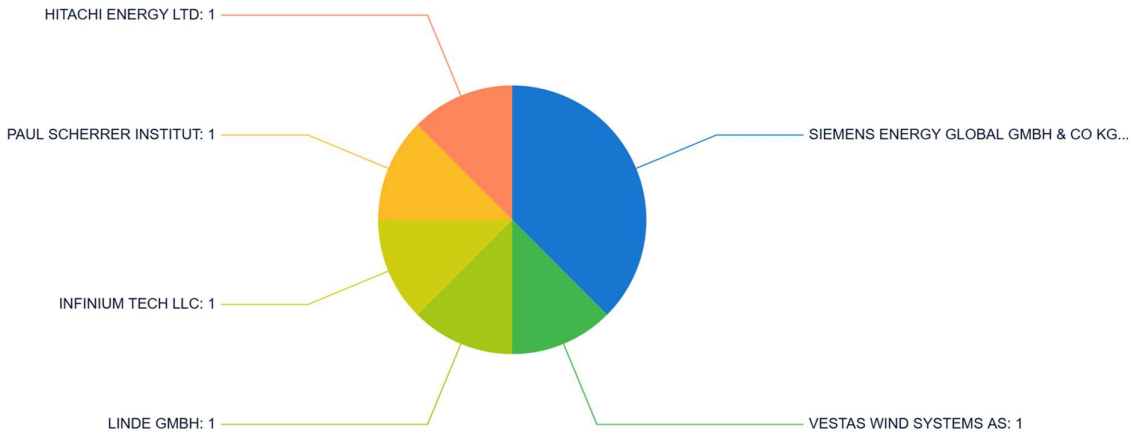


Figure 20. KER 9 - Top assignees

As anticipated, large and famous companies are investing in this technology. In particular, Siemens Energy applied for three different patents. The company already offers services related to Power to X (https://www.siemens-energy.com/global/en/home/products-services/solutions-usecase/hydrogen.html).

5.9 KER 10: Hybrid Long-Term Storage System

5.9.1 KER 10 Characterization Table

Table 12. KER 10 - Characterization Table

Name of the KER: KER10 Hybrid Long-term storage System **Involved partners: ENTECH** **KER Leader(s): ENTECH**	
Problem /need	**Is this:** • ☒A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards….) long duration storage • ☒All of them
	Geographical level: • ☒Global
	Does the need come from: • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒New product
	Please provide a description of the KER. Optimized hydrogen-based hybrid long-term storage system comprising a 30 kW electrolyzer, 10 kW fuel cell, 10 kg hydrogen gaseous storage and dedicated controllers
	What is the level of innovation? • ☒Very innovative
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It doesn't solve the full problem • ☒It is difficult to implement • ☒It is not commercially mature • ☒It is expensive
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. No alternative solutions were identified at this stage.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒No
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Private Small or medium enterprises • ☒Private Large enterprises • ☒Non-profit organizations • ☒Public bodies / authorities • ☒Research and academic bodies **Please name a few potential customers:** 1. Industrial site 2. Tertiary building

	Who are the potential final users?
	• ☒Industry:
	  ○ ☒One specific technical profile
	• ☒Non-profit organizations
	  ○ ☒One specific technical profile
	• ☒Public bodies / authorities
	  ○ ☒One specific technical profile
	• ☒Research and academic bodies
	  ○ ☒One specific technical profile
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ☒Current customers

<table>
<tr><td></td><td>• ☒New customers</td></tr>
<tr><td>Value proposition – Customer profile</td><td>What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?
1. The customer produces solar energy and injects a portion into the grid.
2. The customer purchases electricity from a supplier to meet their electricity consumption
What are the pains the customer encounters while doing the previous activities?
1. The customer does not have a means to store electricity during peak PV production to consume it during periods of higher consumption
What are the gains the customer aims at, while doing the previous activities?
1. The customer wants to reduce the energy bill.
2. The customer has environmental targets to achieve.</td></tr>
<tr><td rowspan="3">Value proposition</td><td>CUSTOMER JOBS:
Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
• Activity 1: How much is the KER crucial to perform the activity?
  • ☒Complementary to a core solution
• Activity 2: How much is the KER crucial to perform the activity?
  • ☒Complementary to a core solution</td></tr>
<tr><td>CUSTOMER PAINS:
What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?
1. Customer does not have a means to store electricity during peak PV production to consume it during periods of higher consumption. How? The objective of the KER is to address this pain</td></tr>
<tr><td>CUSTOMER GAINS:
What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?
1. The customer wants to reduce the energy bill. How? By using the KER to maximize self-consumption, electricity bills can be reduced
2. The customer has environmental targets to achieve. How? By using the KER to maximize self-consumption, the carbon impact of electricity consumption can be reduced</td></tr>
<tr><td>"Market" – Target market</td><td>What is the primary target market?
• ☒Heavy process Industry (energy intensive)
• ☒Manufacturing Industry
• ☒Real estate management

Please specify the most relevant sub-sector(s) of the KER, within the selected market:
Industrial sites

The market targeted by this innovation is:
• ☒ Emerging: There is a growing demand and few offerings are available

Market dynamics: is the market…?
• ☒ Growing

Market competition: How strong is competition in the target market?
• ☒ Patchy, no major players</td></tr>
<tr><td>"Market" - Competitors</td><td>Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)

No competitors were identified at this stage.</td></tr>
<tr><td>Go to Market – Business model</td><td>What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.
<table>
<tr><th>Business Model</th><th>Scarcely applicable</th><th>Applicable</th><th>Very well applicable</th></tr>
<tr><td>Bundling model</td><td></td><td>X</td><td></td></tr>
<tr><td>Razor blades model</td><td>X</td><td></td><td></td></tr>
<tr><td>Leasing model</td><td></td><td>X</td><td></td></tr>
<tr><td>Distribution model</td><td>X</td><td></td><td></td></tr>
<tr><td>Manufacturer model</td><td></td><td>X</td><td></td></tr>
<tr><td>Retailer model</td><td>X</td><td></td><td></td></tr>
<tr><td>Direct sales model</td><td></td><td>X</td><td></td></tr>
<tr><td>Pay as go model</td><td>X</td><td></td><td></td></tr>
<tr><td>Product as a service</td><td>X</td><td></td><td></td></tr>
</table></td></tr>
</table>

Go to Market – IPR Background	Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	

Go to Market – IPR Foreground	Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	X
Trade secret	X
Copyright	
Trademark	

5.9.2 KER 10 international patent scenario overview

The query submitted to Patsnap, which revolved around the concepts of energy storage, hydrogen and fuel cells, revealed 812 INPADOC families.

5.9.2.1 Patenting trend

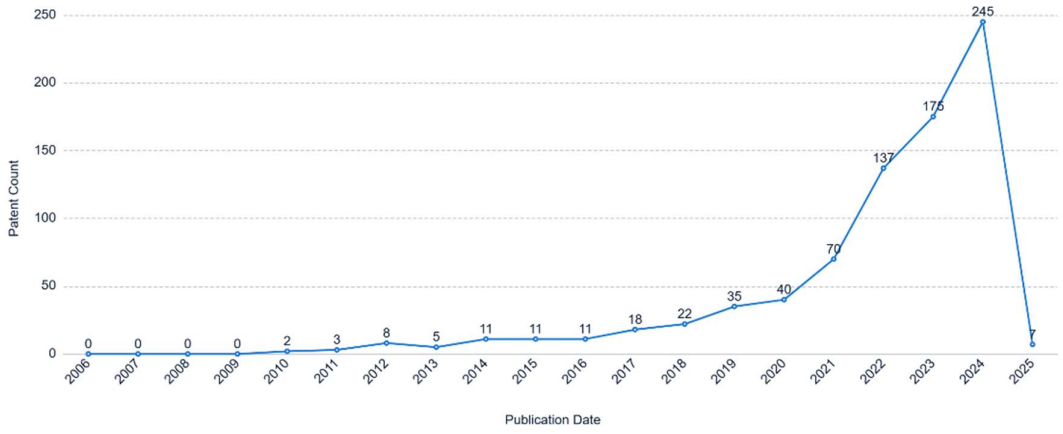


Figure 21. KER 10 - Patenting trend

The trend is clearly a growing one, with patent publications exponentially growing in the past years. This trend indicates that the market is in its initial stages, where a lot of R&D is performed.

5.9.2.2 Top IPCs

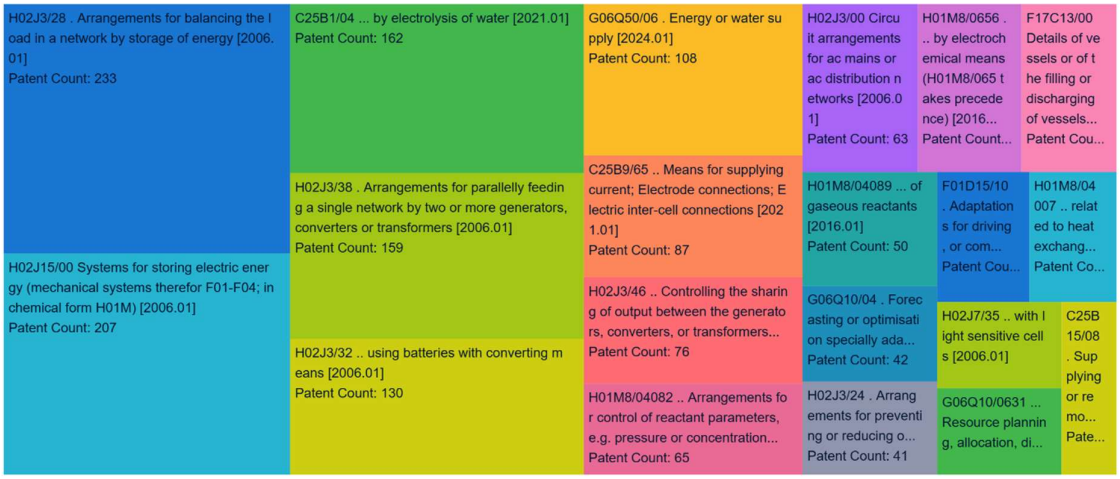


Figure 22. KER 10 - Top IPCs

The majority of patents is part of the IPC subclasses H02J “Circuit arrangements or systems for supplying or distributing electric power; systems for storing electric energy” and C25B “Electrolytic or electrophoretic processes for the production of compounds or non- metals; apparatus therefor”.

5.9.2.3 Top authorities

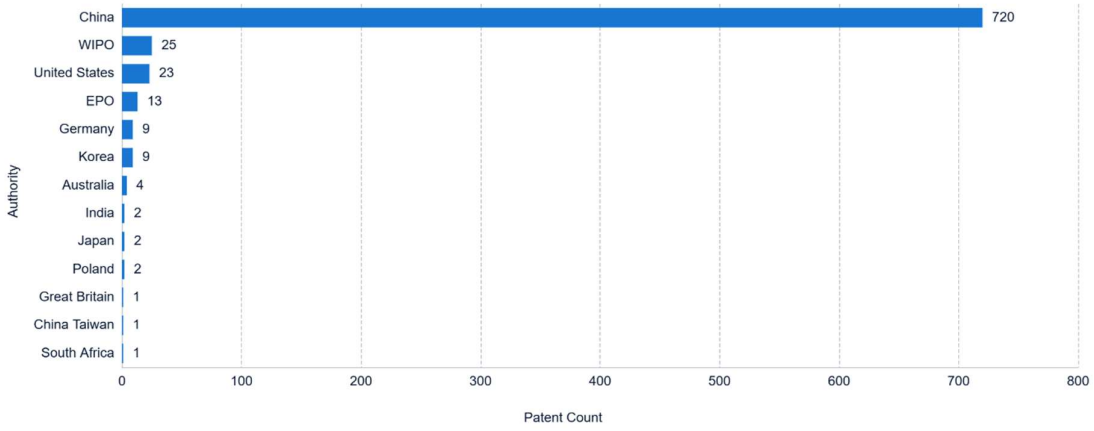


Figure 23. KER 10 - Top authorities

Similar to KER 8, China is by far the country where the most patent applications are submitted. US, WIPO and EPO patents are top authorities after China.

5.9.2.4 Top assignees

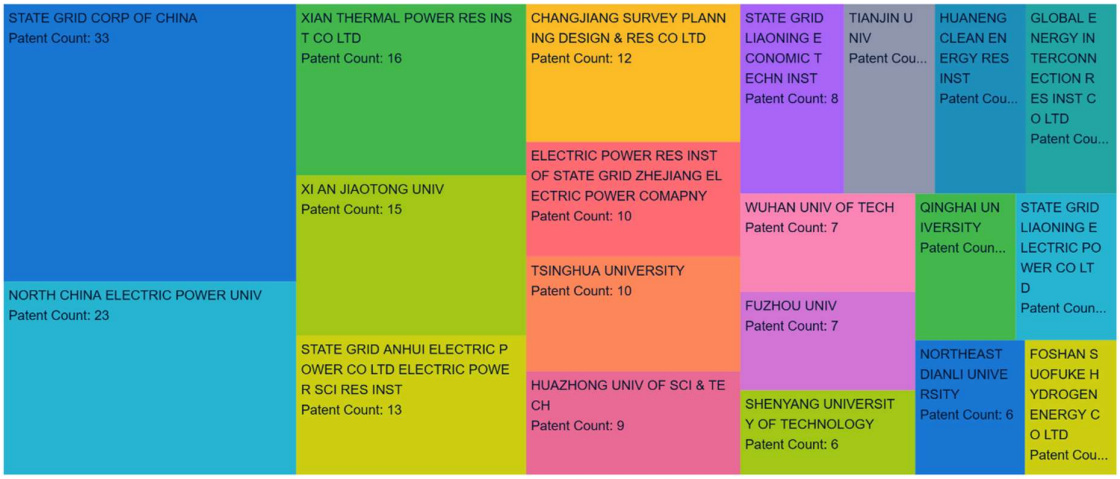


Figure 24. KER 10 - Top assignees

As usual for novel technologies, universities and research institutes represent most patent applications. Excluding the State Grid Corporation of China, the top assignees are all universities and research centers.

5.10 KER 11: Decentralized DHW preparation solution "enerbox"

5.10.1 KER 11 Characterization Table

Table 13. KER 11 - Characterization Table

Name of the KER: Decentralized DHW preparation solution "enerbox" **Involved partners: PINK** **KER Leader(s): PINK**	
Problem /need	**Is this:** • ☒A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards….) - **Thermal flexibility, Use or RES** • ☒A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact….) - **Use of RES**
	Geographical level: • ☒Local /national
	Does the need come from: • ☒Private customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒New product
	Please provide a description of the KER. The solution aims to provide temporal flexibility of heating and domestic hot water loads, while leading to the minimization peak demand and thermal loss, and thus, acting as a provider of load balancing services for the Austrian DH operator. The first variant of the system consists of a thermal storage tank for domestic hot water with a volume of 140 litres, which is installed in the heating system and the water supply of the building, and which is charged with heating water via a heat exchanger. The second variant is a thermal buffer tank with as volume of 5…10 m³, which is integrated directly into the district heating system and therefore can be charged directly via an inlet flow of supply water (without heat exchanger). In addition to the thermal charging of the storage tank, it is also possible for both variants to be charged via electric heating elements and electrical energy (0,5 kW DHW-tank / 20…50 kW buffer tank).
	What is the level of innovation? • ☒Innovative but could be difficult to convert customers
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒Other (please specify)
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. No alternative solutions were identified at this stage.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒Yes **Can we say that this solution is the starting point of the current project development activities?** • ☒Yes **If "Yes" then please specify the product or service already developed ("the starting point").** Standard buffer tank, decentralized DHW tank (space optimized), both without EVELIXIA services
	Let's compare the KER with what we already had in the consortium. What are the main advancements respect to the "starting point" (the initial solution available in the consortium)? If possible, please give numerical figures that can quantify advancements. • ☒Improved flexibility for diverse applications • ☒Improved technical performances (please specify) • ☒New features • ☒Remote operability • ☒Improved environmental impact
"Market" – *Early Adopters*	**Difference between Customer and User** à The customer is the entity (person, company) that buys the product/service/solution. The user is the entity (person, company) that uses the product/service/solution, once bought and implemented. In order to be effectively proposed to the market, the product/service/solution must pay attention to needs and reflect expectations of both.

	Example 1: I buy a car: I am the customer AND the user Example 2: I buy a toy for my kids: I am the customer, my kids are the users Example 3: My company buys a new SCADA system: the procurement office is the buyer, the employees and technicians are the users **Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Private Small or medium enterprises • ☒Public bodies / authorities **Please name a few potential customers:** 1. Construction companies 2. District heating suppliers 3. Housing companies
	Who are the potential final users? • ☒Individuals • Private Small or medium enterprises - > (See above) **For the private company/companies, will this innovation be used by mainly current or new customers?** • ☒Current customers • ☒New customers
Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. The customer has to install an energy supply system with low cost 2. The customer has to install a flexible energy supply system 3. The customer has to provide reliable/stable energy supply system **What are the pains the customer encounters while doing the previous activities?** 1. The customer does not have a precise knowledge of suitable technologies 2. The customer has possibility of designing the technology appropriately 3. The customer has no detailed knowledge of the energy system has to be operated **What are the gains the customer aims at, while doing the previous activities?** 1. The customer has to provide reliable energy 2. The customer has to provide energy with a high level of comfort 3. The customer has to provide cost-effectively energy

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	• Activity 1: How much is the KER crucial to perform the activity?
	  • ☒Nice to have
	• Activity 2: How much is the KER crucial to perform the activity?
	  • ☒Core, but needs to work in synergy with other components/processes
	• Activity 3: How much is the KER crucial to perform the activity?
	  • ☒Nice to have

"Market" – *Target market*	**What is the primary target market?** • ☒Energy production/distribution/consumption **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** District heating, Housing companies, Construction companies **The market targeted by this innovation is**: • ☒ Mature: The market is already supplied with many products (services, processes, ...) of the type proposed **Market dynamics: is the market...?** • ☒ Holding steady **Are there other markets for this innovation that the innovators are not yet targeting?** • ☒ No **Market competition: How strong is competition in the target market?** • ☒ Established competition but none with a proposition like the one under investigation • ☒ Several major players with strong competencies, infrastructure and offerings
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** ☐ Large enterprises: 1. Austria Email

<table>
<tr><td></td><td>2. Drazice
3. LAM industries</td></tr>
<tr><td>Go to Market – Business model</td><td>What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.
<table>
<tr><th>Business Model</th><th>Scarcely applicable</th><th>Applicable</th><th>Very well applicable</th></tr>
<tr><td>ESCO - energy performance contract</td><td>x</td><td></td><td></td></tr>
<tr><td>Franchise model</td><td></td><td></td><td></td></tr>
<tr><td>Distribution model</td><td>x</td><td></td><td></td></tr>
<tr><td>Manufacturer model</td><td></td><td></td><td>x</td></tr>
<tr><td>Retailer model</td><td>x</td><td></td><td></td></tr>
<tr><td>Direct sales model</td><td>x</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Go to Market - Timing</td><td>Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):
☐ Within 12 months after the project:
1. Contacting potential customers and IS introduction
2. Use of IS after product inquiries by customers</td></tr>
<tr><td>Go to Market – IPR Background</td><td>Please check if there is any type of Intellectual property already secured (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.
<table>
<tr><th>Type</th><th>Owner</th></tr>
<tr><td>Patent</td><td>National electrical charging System</td></tr>
<tr><td>Trade secret</td><td>Software for charging System</td></tr>
<tr><td>Copyright</td><td></td></tr>
<tr><td>Trademark</td><td>enerboxx</td></tr>
</table></td></tr>
<tr><td>Go to Market – IPR Foreground</td><td>Please check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property:
<table>
<tr><th>Type</th><th>Owners</th></tr>
<tr><td>Patent</td><td></td></tr>
<tr><td>Trade secret</td><td></td></tr>
<tr><td>Copyright</td><td></td></tr>
<tr><td>Trademark</td><td></td></tr>
</table></td></tr>
</table>

5.10.2 KER 11 international patent scenario overview

The query submitted to Patsnap, which revolved around the concepts of thermal storage tanks and heating systems, revealed 295 INPADOC families.

5.10.2.1 Patenting trend

Figure 25. KER 11 - Patenting trend

The trend is slightly growing, but it is plausible to assume that it will soon reach a plateau, indicating a mature market.

5.10.2.2 Top IPCs

Figure 26. KER 11 - Top IPCs

The majority of patents is part of the IPC subclass F28D “heat-exchange apparatus, not provided for in another subclass, in which the heat-exchange media do not come into direct contact; heat storage plants or apparatus in general”.

5.10.2.3 Top authorities

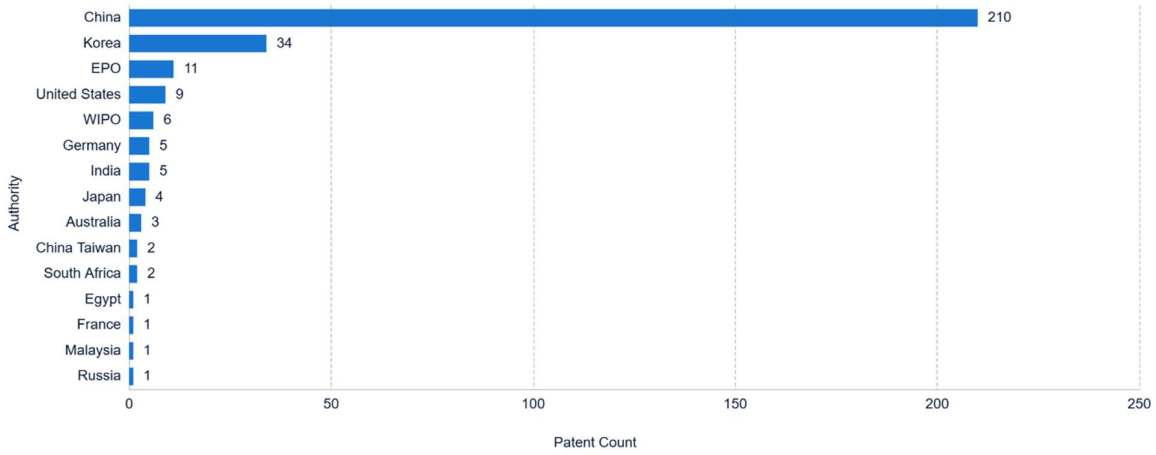


Figure 27. KER 11 - Top authorities

Like KER 8 and 10, China is by far the country where the most patent applications are submitted. Korea is a very relevant country in research related to this technology (34 patent applications).

5.10.2.4 Top assignees

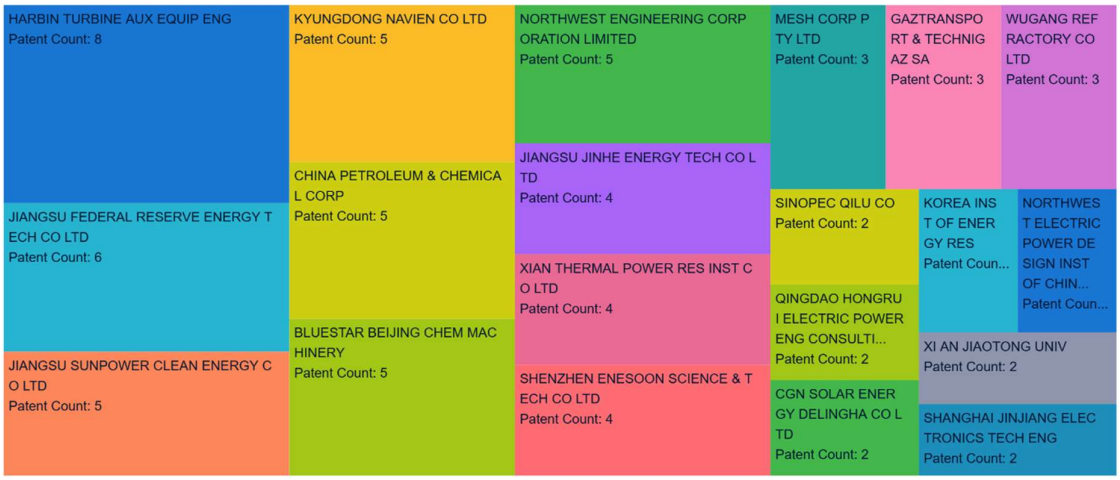


Figure 28. KER 11 - Top assignees

From the graph, it appears that there is not a single dominant player in the market, as many companies applied for 4+ patents (with the maximum being 8). The top assignees are companies (instead of universities and research centers, which can be expected in more mature markets such this one.

5.11 KER 12: Building Aggregator Service (BAS)

5.11.1 KER 12 Characterization Table

Table 14. KER 12 - Characterization Table

Name of the KER: Building Aggregator Service **Involved partners: Neogrid, Sustain, SALUS, Aabenraa DH, European Green Cities** **KER Leader(s): Neogrid**	
Problem /need	**Is this:** • ☒A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment….) - **Lower OPEX** • ☒A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact….) - **Green image**
	Geographical level: • ☒Local, linked e.g. to climate zones or other specific local contexts (please specify) DSO/TSO level
	Does the need come from: • ☒Private customers • ☒Business/industrial customers
Description	**What is the nature of the KER?** • ☒New product • ☒New service (except consulting services)
	Please provide a description of the KER. An IT tool for monitoring and control of flexible energy resources within a local area supplied with electricity and district heating. The BAS can also optimize the operation of the devices according to various goals, such as maximized self-consumption, reduced peak load on grid etc.
	What is the level of innovation? • ☒Obviously innovative and easily appreciated advantages to customers
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒Other (please specify)
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. No alternative solutions were identified at this stage.
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒No
	Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography) • ☒Associations of individuals • ☒Private Small or medium enterprises • ☒Private Large enterprises **Please name a few potential customers:** 1. Private and Social housing associations 2. IT solution provider for the energy sector

	Who are the potential final users?
	• ☒Individuals
	• ☒Industry:
	  ○ ☒One specific technical profile
	  ○ ☒Individuals
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ☒Current customers
	• ☒New customers

Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. Monitoring energy installations in buildings 2. Administering energy contracts for a building

<table>
<tr><td></td><td>What are the pains the customer encounters while doing the previous activities?
1. Difficult to get an overview on operating status
2. Not sure how to reduce energy bill and operate the building more sustainable
What are the gains the customer aims at, while doing the previous activities?
1. Easier operation, alarms on bad operation
2. Lower energy cost</td></tr>
<tr><td rowspan="3">Value proposition</td><td>CUSTOMER JOBS:
Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
• Activity 1: How much is the KER crucial to perform the activity?
  • ☒Complementary to a core solution
• Activity 2: How much is the KER crucial to perform the activity?
  • ☒Complementary to a core solution</td></tr>
<tr><td>CUSTOMER PAINS:
What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?
1. Easy overview and warning. How? Reporting and alarm
2. Complicated to enter many energy markets. How? Part of platform</td></tr>
<tr><td>CUSTOMER GAINS:
What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?
1. Same as 1) in pains
2. Lower energy bill. How? Using platform to activate flexibility</td></tr>
<tr><td>"Market" – Target market</td><td>What is the primary target market?
• ☒Energy production/distribution/consumption
• ☒Real estate management

The market targeted by this innovation is:
• ☒ Emerging: There is a growing demand and few offerings are available

Market dynamics: is the market…?
• ☒ Growing

Are there other markets for this innovation that the innovators are not yet targeting?
• ☒ Yes

Market competition: How strong is competition in the target market?
• ☒ Patchy, no major players</td></tr>
<tr><td>"Market" - Competitors</td><td>Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)
☐ Large enterprises:
1. Danfoss' Leanheat portfolio</td></tr>
<tr><td>Go to Market – Business model</td><td>What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.
<table>
<tr><th>Business Model</th><th>Scarcely applicable</th><th>Applicable</th><th>Very well applicable</th></tr>
<tr><td>Subscription model</td><td></td><td></td><td>x</td></tr>
<tr><td>Freemium model</td><td></td><td></td><td>x</td></tr>
<tr><td>ESCO - energy performance contract</td><td></td><td></td><td>x</td></tr>
<tr><td>Franchise model</td><td></td><td></td><td>x</td></tr>
<tr><td>Distribution model</td><td></td><td>x</td><td></td></tr>
<tr><td>Direct sales model</td><td></td><td></td><td>x</td></tr>
<tr><td>Data licensing model</td><td></td><td></td><td>x</td></tr>
<tr><td>Software as a service</td><td></td><td></td><td>x</td></tr>
</table></td></tr>
<tr><td>Go to Market - Timing</td><td>Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):
☐ During the first month after the project:
1. Create a first prototype ready for commercial customers
☐ Within 6 months after the project:
1. Market research
☐ Within 12 months after the project:
1. Roll out commercially to a few local customers
2. Get relevant approval from energinet.dk</td></tr>
</table>

	Within 24 months after the project: 1. Decide on how to sell and operate the solution
Go to Market – IPR Background	Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document. **Type** / **Owner** Patent Trade secret Copyright Trademark
Go to Market – IPR Foreground	Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**: **Type** / **Owners** Patent Trade secret Copyright Trademark

5.12 KER 13: ESesoft Platform

5.12.1 KER 13 Characterization Table

Table 15. KER 13 - Characterization Table

Name of the KER: KER13 ESEsoft Platform **Involved partners: ENTECH** **KER Leader(s): ENTECH**	
Problem /need	**Is this:** • ☐A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards….) - **Higher performance of storage system, longer duration of storage system, higher security performances, optimal dispatch of energy generation** • ☐A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment….) - **Lower LCOE (Levelized Cost of Electricity) of storage system** • ☐A sustainability need. Please detail (e.g. lower consumption, lower level of pollutants, different social impact….) - **High renewable energy self-consumption, possibly lower carbon emissions** • ☒All of them
	Geographical level: • ☒Global
	Does the need come from: • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒Significantly improved product • ☒Significantly improved service (except consulting services)
	Please provide a description of the KER. ESEsoft is ENTECH's proprietary existing generic cloud-based platform that brings together a set of features and modules to meet all of control, diagnostic, monitoring and management needs for power plants. Specific ESEreg and ESEview solutions will be developed to control the H2 based long-duration storage system and to optimize functionality and interoperability between all components of the system. A new energy management system (comprising ESEmanage and ESEdiag) will be deployed to maximize the annual self-consumption ratio, while ensuring an optimal use of the storage system. ESEmanage will calculate optimal energy dispatch every ten minutes based on PV production, with an optimization algorithm running in the backend able to consider a multi-time scale energy management, adopting a model predictive control strategy for the long-term storage system. ESEdiag software will allow the supervision of assets to ensure that they function effectively.
	What is the level of innovation? • ☒Very innovative
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It doesn't solve the full problem • ☒It is difficult to implement

- ☒It is not commercially mature
- ☒It is mature but not robust enough
- ☒It is expensive

Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information.

1. Schneider Electric - EcoStruxure- Link: EcoStruxure : IoT - Internet des Objets - Professionnels | Schneider Electric France (se.com)
2. SMA - Link: SMA Commercial Storage Solution | SMA Solar
3. Huawei - Link: Micro-grid - FusionSolar Global (huawei.com)

Can you find a main drawback or a limitation for each of the alternative solutions you provided?

1. Lack diagnostic and prognostic services for storage systems.
2. Platform not independent of SMA hardware systems, lack forecasting services
3. Lack dedicated services for EV load management and prognostic services for storage systems.

Has your company (or someone in the consortium) already developed a solution for the identified need before this project started?

- ☒Yes

Can we say that this solution is the starting point of the current project development activities?

- ☒Yes

If "Yes" then please specify the product or service already developed ("the starting point").
The solution is based on existing ENTECH's proprietary ESEsoft generic platform which brings together a set of features and modules.
Existing modules includes first version of ESEreg (which manages all real-time communication with the equipment and acts as the Power Management System) and ESEview (local SCADA system).

Let's compare the KER with what we already had in the consortium. What are the main advancements respect to the "starting point" (the initial solution available in the consortium)? If possible, please give numerical figures that can quantify advancements.

- ☒Increased lifetime and or robustness
- ☒Improved flexibility for diverse applications
- ☒Improved technical performances (please specify) higher performance of hybrid H2-based storage system used.
- ☒Improved design, size, weight, efficiency, materials
- ☒New features
- ☒Improved user friendliness
- ☒Remote operability
- ☒Improved interoperability
- ☒Improved safety
- ☒Improved maintenance plan
- ☒Improved environmental impact

Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements.

Alternative solution A

- ☒Increased lifetime and or robustness
- ☒Improved technical performances (please specify) - Implementation of a multi time scale EMS strategy taking into account performances of hybrid storage system
- ☒Improved design, size, weight, efficiency, materials
- ☒Improved safety
- ☒Improved maintenance plan

Alternative solution B

- ☒Increased lifetime and or robustness
- ☒Improved flexibility for diverse applications
- ☒Improved technical performances (please specify)
- ☒Improved design, size, weight, efficiency, materials
- ☒Remote operability
- ☒Improved interoperability
- ☒Improved safety
- ☒Improved maintenance plan

Alternative solution C

- ☒Increased lifetime and or robustness
- ☒Improved technical performances (please specify)
- ☒Improved design, size, weight, efficiency, materials
- ☒Improved safety
- ☒Improved maintenance plan

"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** • ☒Private Small or medium enterprises • ☒Private Large enterprises • ☒Non-profit organizations • ☒Public bodies / authorities • ☒Research and academic bodies **Please name a few potential customers:** 1. Industrial site 2. Tertiary building

	Who are the potential final users?
	• ☒Industry:
	  ○ ☒One or several managers
	  ○ ☒One specific technical profile
	• ☒Non-profit organizations
	  ○ ☒One or several managers
	  ○ ☒One specific technical profile
	• ☒Public bodies / authorities
	  ○ ☒One or several managers
	  ○ ☒One specific technical profile
	• ☒Research and academic bodies
	  ○ ☒One or several managers
	  ○ ☒One specific technical profile
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	• ☒Current customers
	• ☒New customers

Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. The customer monitors and manages energy consumption. 2. The customer monitors and manages solar energy production **What are the pains the customer encounters while doing the previous activities?** 1. The customer does not have a means to optimally manage and monitor self-consumption 2. The customer does not have a means to optimize and monitor assets performances 3. The customer does not have a tool for monitoring the overall performances of the energy system. 4. The customer does not have a tool to detect defaults and predict maintenance needs for energy assets. **What are the gains the customer aims at, while doing the previous activities?** 1. The customer wants to maximize self-consumption while reducing energy bills. 2. The customer wants to improve lifetime duration of storage systems. 3. The customer wants to minimize default risks by receiving notification on predictive maintenance. 4. The customer has access to historical data and KPI reporting

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	• Activity 1: How much is the KER crucial to perform the activity?
	  • ☒Complementary to a core solution
	• Activity 2: How much is the KER crucial to perform the activity?
	  • ☒Complementary to a core solution

	CUSTOMER PAINS: **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** 1. The customer does not have a means to optimally manage and monitor self-consumption 2. The customer does not have a means to optimize and monitor assets performances 3. The customer does not have a tool for monitoring the overall performances of the energy system 4. The customer does not have a tool to detect defaults and predict maintenance needs for energy assets.
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?**

<table>
<tr><td></td><td>1. The customer wants to maximize self-consumption while reducing energy bills. How? By using the KER to maximize self-consumption, electricity bills can be reduced
2. The customer wants to improve lifetime duration of storage systems. How? By using the diagnostic and prognostic services included in the KER
3. The customer wants to minimize default risks by receiving notification on predictive maintenance. How? By using the diagnostic and prognostic services included in the KER
4. The customer has access to historical data and KPI reporting. How? By using the reporting tool included in the KER</td></tr>
<tr><td>"Market" – Target market</td><td>What is the primary target market?
• ☒Heavy process Industry (energy intensive)
• ☒Manufacturing Industry
• ☒Real estate management

Please specify the most relevant sub-sector(s) of the KER, within the selected market:
Industrial sites

The market targeted by this innovation is:
• ☒ Emerging: There is a growing demand and few offerings are available

Market dynamics: is the market…?
• ☒ Growing

Market competition: How strong is competition in the target market?
• ☒ Several major players with strong competencies, infrastructure and offerings</td></tr>
<tr><td>"Market" - Competitors</td><td>Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)
☐ SMEs:
1. Elum energy
2. Sonnen
3. Victron energy
☐ Large enterprises:
1. Schneider Electric
2. SMA
3. Huawei</td></tr>
<tr><td>Go to Market – Business model</td><td>What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.
<table>
<tr><th>Business Model</th><th>Scarcely applicable</th><th>Applicable</th><th>Very well applicable</th></tr>
<tr><td>Subscription model</td><td></td><td>X</td><td></td></tr>
<tr><td>Bundling model</td><td></td><td>X</td><td></td></tr>
<tr><td>Freemium model</td><td></td><td>X</td><td></td></tr>
<tr><td>Direct sales model</td><td></td><td>X</td><td></td></tr>
<tr><td>Data licensing model</td><td>X</td><td></td><td></td></tr>
<tr><td>Software as a service</td><td></td><td>X</td><td></td></tr>
<tr><td>Product as a service</td><td>X</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Go to Market – IPR Background</td><td>Please check if there is any type of Intellectual property already secured (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.
<table>
<tr><th>Type</th><th>Owner</th></tr>
<tr><td>Patent</td><td>X</td></tr>
<tr><td>Trade secret</td><td>X</td></tr>
<tr><td>Copyright</td><td></td></tr>
<tr><td>Trademark</td><td></td></tr>
</table></td></tr>
<tr><td>Go to Market – IPR Foreground</td><td>Please check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property:
<table>
<tr><th>Type</th><th>Owners</th></tr>
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<tr><td>Trade secret</td><td>X</td></tr>
<tr><td>Copyright</td><td>X</td></tr>
<tr><td>Trademark</td><td>X</td></tr>
</table></td></tr>
</table>

5.13 KER 14: SRI Advisor tool

5.13.1 KER 14 Characterization Table

Table 16. KER 14 - Characterization Table

Name of the KER: SRI Advisor tool **Involved partners: R2M, CERTH** **KER Leader(s): R2M**	
Problem /need	**Is this:** • ☒A technical need. Please detail (e.g. higher performance, longer duration, different features, different standards….) - **Recommendations about smartness upgrades of technical building systems** • ☒A financial/cost need. Please detail (e.g. lower CAPEX or OPEX, lower price, faster return on investment….) - **Evaluation of the costs (CAPEX and OPEX) of the recommended smartness upgrades**
	Geographical level: • ☒European
	Does the need come from: • ☒Private customers • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒New product
	Please provide a description of the KER. The Smart Readiness Indicator Advisor will provide Building Owners and Managers with tailored recommendations on how to improve their SRI score (i.e., both the overall SRI score, score of key functionalities, and the score of the 7 SRI impact categories (e.g. energy efficiency, comfort, energy flexibility etc.). The tool will perform different sensitivity analyses based on possible technology renovation packages and/or different flexibility scenarios, with a view to determining the most cost-effective building upgrades to achieve a higher SRI score-performance.
	What is the level of innovation? • ☒Innovative but could be difficult to convert customers **(at the beginning of the EVELIXIA project, as the SRI is not broadly known)** • ☒Obviously innovative and easily appreciated advantages to customers **(at the end of the EVELIXIA project, as the SRI is progressively becoming a mandatory instrument)**
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It doesn't solve the full problem • ☒It is not commercially mature • ☒It is mature but not robust enough
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. A. Ecopulse Masselin - Link: https://www.masselin-energie.fr/nos-savoir-faire/smart-building/ecopulse/ B. Audit Decret BACS Nextiim - Link: https://www.nextiim.com/metiers/audit-decret-bacs/ **Can you find a main drawback or a limitation for each of the alternative solutions you provided?** A. They help to do a BMS/BACS audit to define the efficiency class of BMS/BACS accordingly to the standard EN ISO 52120-1 and propose renovation measures to raise this efficiency class, but not the SRI class B. They help to do a BMS/BACS audit to define the efficiency class of BMS/BACS accordingly to the standard EN ISO 52120-1 and propose renovation measures to raise this efficiency class, but not the SRI class
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒No
	Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements. **Alternative solution A** ☒New features **Alternative solution B**

	☒New features
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** ● ☒Private Small or medium enterprises ● ☒Private Large enterprises ● ☒Public bodies / authorities **Please name a few potential customers:** 1. GreenFlex 2. Bureau Veritas 3. Socotec

	Who are the potential final users?
	● ☒Individuals
	● ☒Industry:
	  o ☒One or several managers
	  o ☒One specific technical profile
	  o ☒One specific department/team
	● ☒Public bodies / authorities
	  o ☒One or several managers
	  o ☒One specific department/team
	● ☒Research and academic bodies
	  o ☒One specific department/team
	  o ☒Students
	
	For the private company/companies, will this innovation be used by mainly current or new customers?
	● ☒New customers

Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. After conducting their audit, **BMS/BEMS/BACS auditors** propose improvement measures and design to increase the efficiency class of the BMS/BEMS/BACS and improve comfort and accompany it by a ROI calculation of these measures. 2. **Facility managers** monitor and analyze costs and budgets for maintenance and service operations, do planning and implementation of facility renovation projects as well as management of equipment and installations (heating, air conditioning, electricity, plumbing, etc.). 3. **Energy managers** manage energy efficiency projects, such as the installation of energy management systems or the implementation of energy-saving measures. **What are the pains the customer encounters while doing the previous activities?** 1. **BMS/BEMS/BACS** auditors have incomplete information about how to improve the BACS efficiency and smartness (SRI score) of their buildings and how much it would cost. The full scope of the SRI (9 technical domains) is not addressed by current commercial tools. 2. **Facility managers** and **Energy managers** don't know how to improve the energy efficiency and smartness (SRI score) of their buildings and how much it would cost. **What are the gains the customer aims at, while doing the previous activities?** 1. Building use optimization 2. Building use cost-effectiveness 3. Renovation measures of BACS 4. Reduce energy bills 5. Optimize comfort conditions for occupants 6. Reduce technical building systems maintenance cost

Value proposition	**CUSTOMER JOBS:**
	Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):
	● **Activity 1 (BMS/BEMS/BACS audits):** How much is the KER crucial to perform the activity?
	  ● ☒Core, but needs to work in synergy with other components/processes
	● **Activity 2 (Facility management):** How much is the KER crucial to perform the activity?
	  ● ☒Complementary to a core solution
	● **Activity 3 (Energy management):** How much is the KER crucial to perform the activity?
	  ● ☒Nice to have

	CUSTOMER PAINS: **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** **For the 3 activities:** They don't know how to improve the smartness (SRI score) of their buildings and how much it would cost.

	How? By providing tailored recommendations and most cost-effective technology upgrade packages on how to level up their SRI class by 1 letter.
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** Renovation measures of BACS and Optimize comfort conditions for occupants **How?** By providing tailored recommendations and most cost-effective technology upgrade packages on how to level up their SRI class by 1 letter Other gains are also addressed but in an indirect manner, as upgrading the SRI helps e.g., saving energy and reducing maintenance costs, but these gains are not quantified.
"Market" – *Target market*	**What is the primary target market?** ● ☒Real estate management **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** BACS audit, facility management and energy management. **The market targeted by this innovation is**: ● ☒ Emerging: There is a growing demand and few offerings are available **Market dynamics: is the market…?** ● ☒ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** ● ☒ No **Market competition: How strong is competition in the target market?** ● ☒ Patchy, no major players
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** € SMEs: 1. Masselin Energie 2. Nextiim
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Scarcely applicable	Applicable	Very well applicable
Subscription model		X	
Bundling model		X	
Pay as go model		X	
Software as a service		X	

Go to Market - Timing	**Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):** € During the first month after the project: 1. List potential customers 2. Discuss the business model € Within 6 months after the project: 1. Finetune the business model 2. Demonstration to potential users
Go to Market – IPR Background	Please check **if there is any type of Intellectual property already secured** (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.

Type	Owner
Patent	
Trade secret	
Copyright	
Trademark	

Go to Market – IPR Foreground	Please **check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property**:

Type	Owners
Patent	
Trade secret	
Copyright	R2M, CERTH
Trademark	

5.14 KER 15: SRI Calculation Methodology at District Level

5.14.1 KER 15 Characterization Table

Table 17: KER 15 - Characterization Table

Name of the KER: SRI Calculation Methodology at District Level **Involved partners: R2M, CERTH** **KER Leader(s): R2M**	
Problem /need	**Is this:** • ☒All of them: **Monitor the development of load shifting potentials and renewable integration in an area and thus assess critical conditions of energy infrastructure through the estimation of SRI on a district scale**
	Geographical level: • ☒European
	Does the need come from: • ☒Business/industrial customers • ☒Public entities
Description	**What is the nature of the KER?** • ☒Significantly improved service (except consulting services) • ☒Other (please specify): **Significantly improved service for smartifying districts**
	Please provide a description of the KER. The SRI methodology at district level will allow to quantify how much buildings can contribute to actively store and dispatch energy within a district or a larger urban quarter, by calculating the SRI on a district scale for the seven Pilot Sites of EVELIXIA and will provide a coherent quantitative assessment based on the district's overall energy storage capacity, load shifting potential, its ability to actively interact with the energy grids and the resulting CO2 emission savings compared to a non-interactive system. The estimation of an SRIDist_Max for an area or the maximum Load shift potential for the whole district (LPDist_Max) which the network infrastructure can endure and thus monitor the development of load shifting potentials and renewable integration in the area to be vigilant of potentially critical conditions related to the energy infrastructure will be included.
	What is the level of innovation? • ☒Obviously innovative and easily appreciated advantages to customers **(at the end of the EVELIXIA project, as the SRI is progressively becoming a mandatory instrument)**
Alternative solution	**Probably, there's already one (or several) solution to the problem available in the market, but:** • ☒It is difficult to implement • ☒It is not commercially mature
	Can you make a list of 3/4 products (or services) already available in the market that are trying to solve the same need as this KER? If possible, please provide a link to a reference website for further information. A. Urban Building Energy Modeling with the open-source City Energy Analyst (CEA) tool - Link: https://www.cityenergyanalyst.com/ B. CityCalc tool from CityCalc research project. Being a product from the portfolio of A-NULL Development GmbH, AT is not more commercialized - Link: https://nachhaltigwirtschaften.at/en/sdz/projects/citycalc-calculation-tool-for-energy-efficiency-in-urban-planning.php C. 2 scientific publications: Supporting the Smart Readiness Indicator—A Methodology to Integrate A Quantitative Assessment of the Load Shifting Potential of Smart Buildings - Link: https://www.mdpi.com/1996-1073/12/10/1955 + Extending the Application of the Smart Readiness Indicator—A Methodology for the Quantitative Assessment of the Load Shifting Potential of Smart Districts - Link: https://www.mdpi.com/1996-1073/13/13/3507 **Can you find a main drawback or a limitation for each of the alternative solutions you provided?** A. XXXX B. XXXX C. It is not based on actual definition of the SRI: in these publications it is based on assumptions that the SRI is calculated per grid type (SRI electrical, SRI thermal and SRI gas) and it depends from an activity coefficient (if this coef =1, so the SRI is between 0 and 1, if this coef =2, so the SRI is between 0 and 2)
	Has your company (or someone in the consortium) already developed a solution for the identified need before this project started? • ☒No **Can we say that this solution is the starting point of the current project development activities?** • ☒No

	Let's make some comparison with the benchmark. What are the main advancements respect to the alternative solutions (A, B, C, D) you have previously identified? If possible, please give numerical figures that can quantify advancements. **Alternative solution A** ● ☒New features **Alternative solution B** ● ☒New features **Alternative solution C** ● ☒New features
"Market" – *Early Adopters*	**Who are the potential early customers for this KER? Please make sure they reflect your choices in the Need/Problem section (e.g. type of customer, geography)** ● ☒Private Large enterprises ● ☒Public bodies / authorities ● ☒Research and academic bodies **Please name a few potential customers:** 1. Energy utilities and operators: EDF (FR), ENGIE (FR), PPC (GR), HEDNO (GR) etc. 2. Real estate and infrastructure developers: Skanska (SE), Bouygues Immobilier (FR) etc. 3. National energy agencies: ADEME (FR), Danish Energy Agency (DK) etc.
	Who are the potential final users? ● ☒Industry: o ☒One or several managers o ☒One specific technical profile o ☒One specific department/team ● ☒Public bodies / authorities o ☒One or several managers o ☒One specific department/team ● ☒Research and academic bodies o ☒One specific department/team o ☒Students **For the private company/companies, will this innovation be used by mainly current or new customers?** ● ☒New customers
Value proposition – Customer profile	**What are the activities (Customer jobs) the customer usually performs, where our KER would be needed?** 1. Energy infrastructure planning & policy development; 2. Feasibility studies & technical assessments; 3. System design & engineering; 4. Project implementation & management; 5. Digitalization & Smart energy systems; 6. Funding & investment advisory; 7. Community engagement & social impact. **What are the pains the customer encounters while doing the previous activities?** 1. Data availability issues (incomplete or outdated energy consumption data). 2. Complexity in energy storage capacity, load shifting potential and the ability of buildings to interact with energy grids assessment due to non-existing data. 3. Renewable systems integration challenges with existing energy infrastructure of districts and cities. 4. High initial costs of feasibility studies and assessments. 5. Availability and interoperability of smart and IoT devices + **What are the gains the customer aims at, while doing the previous activities?** 1. Optimization of district and urban energy infrastructure planning (electricity, gas and heating and cooling networks); 2. Clustering buildings with different thermal qualities and connected energy generation, supply and storage systems; 3. Aggregated energy management in clustered buildings (districts); 4. Use of SRI for urban planning.
Value proposition	**CUSTOMER JOBS:** **Please confirm in which customer activity/process the KER can be integrated and how much it is relevant (refer to the activities identified in the previous section):** ● **Activity 1 (Energy infrastructure planning):** How much is the KER crucial to perform the activity? ● ☒Core, but needs to work in synergy with other components/processes ● **Activity 2 (System design & Engineering):** How much is the KER crucial to perform the activity? ● ☒Complementary to a core solution ● **Activity 3 (Digitalization & Smart Energy Systems):** How much is the KER crucial to perform the activity?

	• ☒Core, but needs to work in synergy with other components/processes
	CUSTOMER PAINS: **What are the pains – among those previously listed – the KER can help reducing or avoiding (refer to the pains identified in the previous section)?** **For all activities:** Complexity in energy storage capacity, load shifting potential and the ability of buildings to interact with energy grids assessment due to non-existing data AND renewable systems integration challenges with existing energy infrastructure of districts and cities. **How?** By evaluating load shifting potentials of buildings, renewable integration in an area and assessing the SRI on a district scale.
	CUSTOMER GAINS: **What are the gains – among those previously listed – the KER can help achieving (refer to the gains identified in the previous section)?** Optimization of district and urban energy infrastructure planning (electricity, gas and heating and cooling networks) + Use of SRI for urban planning. **How?** By evaluating load shifting potentials of buildings, renewable integration in an area and assessing the SRI on a district scale. Implementing the Smart Readiness Indicator (SRI) at a district scale can significantly enhance energy efficiency and user comfort while reducing operational costs. The integration of smart technologies in districts can optimize energy usage, improve indoor air quality, and provide personalized comfort settings for occupants while accounting for grid requirements. Additionally, the SRI supports sustainability goals, helping districts reduce their carbon footprint and comply with regulatory standards.
"Market" – *Target market*	**What is the primary target market?** • ☒Energy production/distribution/consumption • ☒Real estate management **Please specify the most relevant sub-sector(s) of the KER, within the selected market:** • Identifying optimal energy generation, storage and distribution technologies, • Designing district heating & cooling networks, microgrids and smart grids, • Evaluating energy efficiency measures and demand-side management. **The market targeted by this innovation is**: • ☒ The market is not yet existing and it is not yet clear that the innovation has potential to create a new market **Market dynamics: is the market…?** • ☒ Growing **Are there other markets for this innovation that the innovators are not yet targeting?** • ☒ No **Market competition: How strong is competition in the target market?** • ☒ Patchy, no major players
"Market" - Competitors	**Please make a list of the competitors working in the same field (e.g. the manufacturers / providers of the alternative solutions previously mentioned + others)** € Others: 1. CEA community (Zurich, CH) developing the open-source City Energy Analyst software.
Go to Market – Business model	**What are the relevant Business models and how much are they applicable. For definition and examples of business models, please refer to the last pages of this document.**

Business Model	Not applicable	Scarcely applicable	Applicable	Very well applicable
Freemium model			X	
Pay as go model		X		
Other			Open-source	

Go to Market - Timing	**Please make an initial high-level description of the actions to be performed after the end of the project, to make the solution ready to market - TRL9 (ATTENTION! The detailed list of actions will be managed in the Exploitation Checklist):** € During the first month after the project: 1. List potential customers. € Within 6 months after the project: 1. Demonstration to potential customers. 2. Collect their feedback for improvement. € Within 12 months after the project: 1. Learn and adapt the service to customer requirements 2. Test the service again with potential customers € Within 24 months after the project: 1. Sell the adapted service to first customers

<table>
<tr><td>Go to Market – IPR Background</td><td>Please check if there is any type of Intellectual property already secured (before the project started) and that helped the development of the solution. For definition and examples of IP instruments, please refer to the last pages of this document.
<table>
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<tr><td>Trade secret</td><td></td></tr>
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<tr><td>Trademark</td><td></td></tr>
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<tr><td>Go to Market – IPR Foreground</td><td>Please check if the developed solution (within the end of the project) could be protected with one (or more) type of Intellectual property:
<table>
<tr><th>Type</th><th>Owners</th></tr>
<tr><td>Patent</td><td></td></tr>
<tr><td>Trade secret</td><td></td></tr>
<tr><td>Copyright</td><td>R2M, CERTH</td></tr>
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6 CONCLUSIONS

Deliverable 7.6, which is the result of numerous interactions and exchange of information with all the partners, highlights the preliminary findings related to exploitation in EVELIXIA. Workshops, one-to-one meetings and email exchanges fostered formative discussions on the project's results and were crucial to drafting the present report.

The reported results set the basis for the development of complete and comprehensive exploitation plans which will indicate the path to market for EVELIXIA technologies. The updated version of this document (D7.7) will report at M48 the mentioned exploitation plans, the partners' intentions and expectation in the exploitation of project results, the evaluation of risks associated with each KER and the IPR management strategy for all the project's partners.