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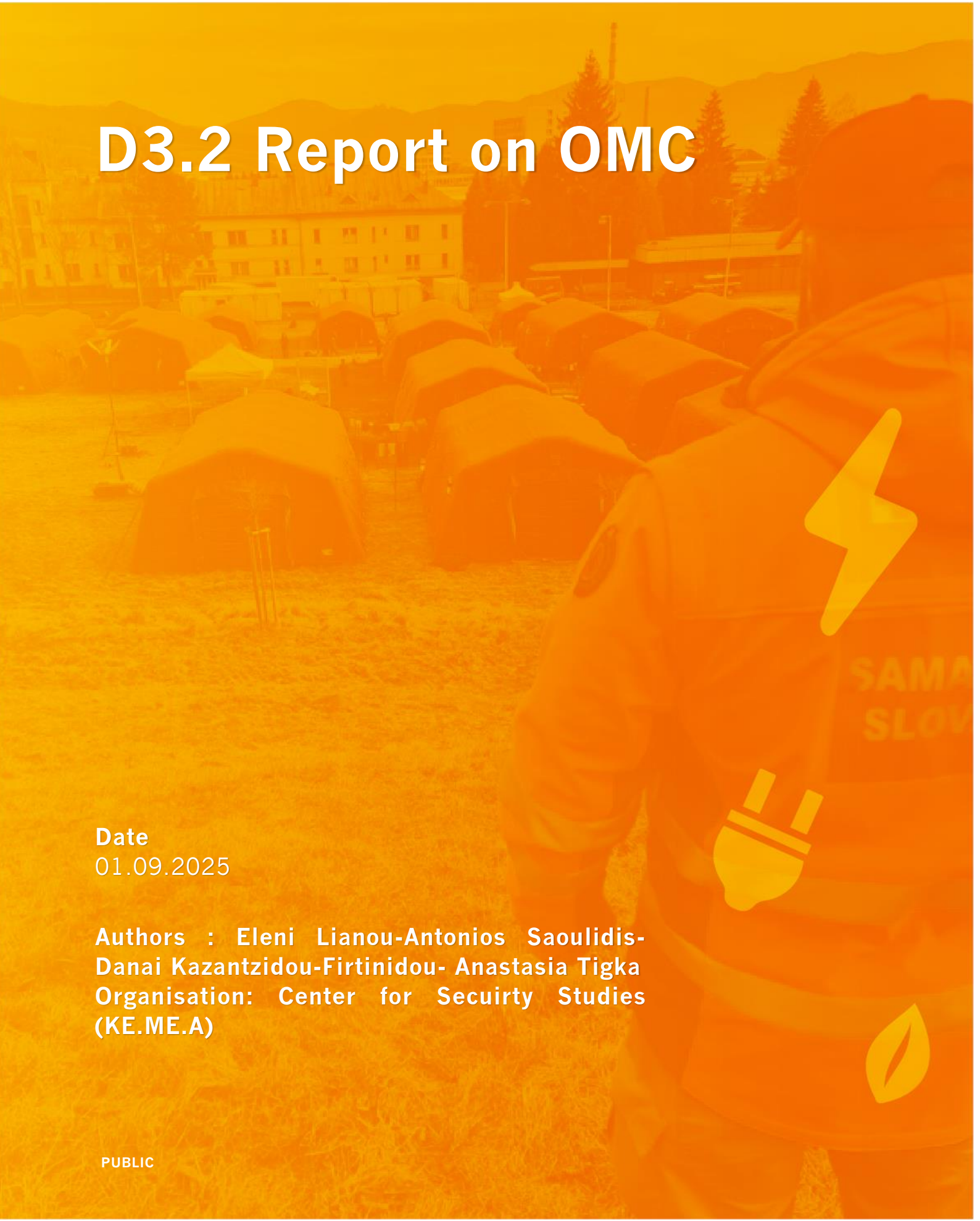
POWERBASE

D3.2 Report on OMC



Date
01.09.2025

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Organisation: Center for Secuirty Studies (KE.ME.A)

PUBLIC

D3.2 Report on OMC

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Lead Beneficiary	Center for Security Studies (KE.ME.A)

About the document

This deliverable provides an overview of dissemination and communication activities undertaken.

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0.1	31.07.2025	WP leader	Eleni Lianou, Antonios Saoulidis, Danai Kazantzidou-Firtinidou, Anastasia Tigka (KE.ME.A)	31.07.2025
0.2	08.08.2025	VIEIRA	Filomena Vieira	08.08.2025
0.3	30.08.2025	PNO	Marijn van Jaarsveld	30.08.2025
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Nature of the deliverable[1] **R**

Dissemination level

PU	Public, fully open. e.g., website	**X**
SEN	Sensitive, limited under the conditions of the Grant Agreement	
CL	Classified information under the Commission Decision No2015/444	

Copyright notice

[1] Deliverable types:
R: document, report (excluding periodic and final reports).
DEM: demonstrator, pilot, prototype, plan designs.
DEC: websites, patent filings, press and media actions, videos, etc.
OTHER: software, technical diagrams, etc.

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Abbreviations

BoO	Base of Operation
CBRN	Chemical, Biological, Radiological or Nuclear Threats
CMINE	Crisis Management Innovation Network Europe
ERO	Emergency Response Organisation
EERO	External Emergency Response Organisation
ES	Emergency Shelter
GHG	Greenhouse gas
IFAFRI	International Forum to Advance First Responder Innovation
IoT	Internet of Things
OMC	Open Market Consultation
PAB	Policy Advisory Board
PCP	Pre-Commercial Procurement
PERO	Partner Emergency Response Organisation
PPI	Public Procurement of Innovative Solutions
REA	European Research Executive Agency
RFI	Request for Information
SEO	Search Engine Optimization
TED	Tenders Electronic Daily
TRL	Technology Readiness Level
USDHS	United States Department of Homeland Security

Executive summary

The present report presents the process of the Open Market Consultation (also referred to as “OMC”), together with the input from external parties. The resulting analysis and decisions are also outlined, including the recommendations for further activities beyond the end of the POWERBASE project.

As a public document, this “Report on OMC” will be made publicly accessible on the project website (https://www.powerbaseproject.eu/).

This document provides:

- An overview of the important role played by the Open Market Consultation in the procurement process,
- A presentation of the Open Market Consultation events and their expected impact,
- An analysis of the feedback collected through the activities organised during the Open Market Consultation

and, based on the above-mentioned analysis,

- Recommendations for future innovation procurement.

Introduction

This report presents the activities undertaken by POWERBASE Consortium during this preparatory phase of “Open Market Consultation”. It is a public document, as its purpose is to openly share the analysis resulting from OMC activities.

Within OMC process, several activities have been organized during the overall innovation procurement methodology, aiming to actively approach the market (solution providers) when the identified needs by the procurers must be communicated openly and clearly to all potentially interested bidders.

Based on Europe-wide needs assessment and analysis of the State-of-the Art (SOTA), market feedback has been collected to understand if suppliers are able to satisfy the unmet needs and market players get the unique opportunity to give feedback on the requirements of the foreseen pre-commercial tender.

The Open Market Consultation led to the optimization of the requirements catalogue, complementing the SOTA analysis, feeding into the final version of the business case and the procurement strategy, and allowing POWERBASE Consortium to decide on participation in future Pre-Commercial Procurement (PCP) process.

The constructive dialogue organised during the OMC has taken the following forms: a) the Prior Information Notice on the TED website, b) four technology showcases to provide suppliers the opportunity to interact with end-users/potential buyers, c) a central (hybrid) ‘OMC event’ in Brussels, d) a Request for Information Questionnaire available to all interested solution providers and research institutions; e) a follow-up OMC webinar on lessons learns and workshop in Athens and f) a Q&As document.

1. POWERBASE Open Market Consultation Process

1.1 Overview

The POWERBASE Open Market Consultation phase is part of the phase 0 which corresponds to the curiosity driven research step, to provide primarily the POWERBASE Consortium with information about the technology state-of-the-art, that will or might be able to address future procurement specifications and strategies in the area of interest.
The scope of the OMC is on the one hand to raise the awareness of the industrial sector and potential R&D providers regarding the identified need and common challenge, the disaster scenarios and the requirements set and on the other hand to collect insights on industry skills which can be used to finalize procurement documents.
Following a Prior Information Notice (PIN) published in the in the Official Journal of the European Union, OMC activities have been organized in order to optimize the requirements catalogue, complement the SOTA analysis, feed into the final version of the business case and the procurement strategy, and allow POWERBASE Consortium to decide on participation in future Pre-Commercial Procurement (PCP) process.

1.2 Open Market Consultation Methodology

The OMC represents a specific phase during the overall innovation procurement methodology, aiming to actively approach the market (solution providers) when the identified needs by the procurers must be communicated openly and clearly to all potentially interested bidders. POWERBASE OMC aimed to inform the market operators on the identified common needs and the POWERBASE challenge to develop Renewable Energy-based / low-emission solutions for power supply for Emergency Shelters (ES) and Bases of Operation (BoO), as well as on the willingness for a future innovation procurement ensuring that emergency response organizations are equipped with highly innovative low-emission energy solutions for ES and BoO that meet their real operational needs (reliable, self-sufficient, mobile, economical, improved working conditions etc.) in the decades to come.
The OMC was announced the 21.02.2025 via the publication of the Prior Information Notice on TED (Annex I) and of the OMC scope document on the project website (Annex II).
The OMC started on the date of its publication in the EU's Supplement to the Official Journal (TED) and ended with the publication of this report in 31.08.2025.
Interested parties were requested to register through the website, in order to participate in the events and receive additional information of the project. The POWERBASE Consortium has been engaged in supporting interested parties throughout the whole OMC period during the webinars and hybrid events, and by answering questions, which will formulate a Q&A document to be published in the project's website.

Additional written contributions in the form of a Request For Information (RFI) questionnaire aiming to collect market information on innovative and commercial solutions have been requested.
All potentially interested economic operators on the market were invited to participate in the open market consultation process, to fill in the RFI and attend the OMC events.
Participants were informed that the OMC is not a call for tenders, nor a pre-qualification exercise, nor the request of Expression of Interest, that the participation does not oblige any project partners to enter a contractual agreement with any interested party, that public procurement procedure will be conducted separately with an open and advertised public procurement procedure and that POWERBASE project cannot cover participants' travel and subsistence costs for this event.
The market consultation took place in the form of:

- Four (hybrid) technology showcases to provide suppliers the opportunity to interact with end-users/potential buyers;
- A central (hybrid) OMC event that took place in Brussels on 12.06.2025;
- A Request for Information Questionnaire available to all interested solution providers and research institutions;
- An OMC workshop that took place in Athens on 28.08.2025 and;
- A Q&As document.

2. Open Market Consultation Event

2.1 Overall description

The POWERBASE OMC main event took place in Brussels, on the 12.06.2025. In total there were 55 participants on-site and online, representing 13 technology providers from Germany, the Netherlands, Sweden, Italy, Slovenia and Poland and 15 EROs. A total of 13 companies offering renewable energy generation or storage solutions signed up for the event. Ten companies attended physically the event and presented their solutions. Other attendees included representatives of the European Commission, national governments, and emergency response organisations.
Concerning the type of organisations, SMEs and star-ups constitute the main groups of participants. The second group gathers large companies.
It is a clear sign that the communication put in place for the OMC activities was successful, as those types of companies are considered as those fostering innovation. Still, we can underline a balanced distribution of participants within the different categories.
The event served as a vital step in the preparation for procurement of mobile, renewable energy solutions, allowing suppliers, innovators, research institutions, and public authorities to explore the project's needs, provide feedback on the technical challenges, and assess the state of the market. The consultation focused on identifying low-emission, mobile energy solutions that can be rapidly deployed in crisis situations — aligning with the project's mission to support more resilient and environmentally responsible disaster response operations.
Participants gained insights into the challenges of emergency response operations, needs and technical requirements. The event also provided a platform for networking and knowledge exchange, strengthening collaboration between technology providers.

2.1.1 Agenda

The OMC started with an introduction to POWERBASE project and a presentation on the OMC objectives, followed by a presentation given on the Pre-Commercial Procurement tool.
Moreover, POWERBASE Consortium presented the findings of the SOTA and the scenarios and needs identified during the POWERBASE project, including the presentation of the requirements.
A dedicated Q&As session was followed by the suppliers presentations (as part of the Technology Showcase, see below, section 3.2). The event was successfully ended by a networking and matchmaking session among the suppliers.
The agenda and the presentations are included in Annex III.

2.1.2 Hybrid event

The POWERBASE OMC main event took place in Brussels. The location was chosen by the POWERBASE Consortium during the proposal stage as easily accessible by consortium members as well as suppliers and external attendees. Moreover, the event was planned during the European Sustainable Energy Week (EUSEW) (10-12.06.2025) and in location in very close proximity to the buildings that the EUSEW activities were taking place. This allowed the participation of POWERBASE partners to the Energy Fair of EUSEW for disseminating the OMC events of POWERBASE, as well as the joint attendance by interested suppliers and other attendees. At the same time, it seemed appropriate to give the possibility to follow and participate to the OMC either on-site or online. A hybrid event appeared as both the most realistic and optimal formula, despite the limited networking opportunities. Nevertheless, it should be noted that all suppliers presented physically during the main OMC event in Brussels.

Photo 1 Introducing POWERBASE project during OMC event

2.2 GDPR Compliance

For the participation to this event, a participant Privacy Information was drafted, providing information about the processing of personal data associated with the POWERBASE OMC Event (Annex IV).
Personal data collected in connection with this event were processed in accordance with the EU General Data Protection Regulation 2016/679, the purpose of the collection and processing of personal data for the event being the management and organization of the event and for maximising the outcomes of the project, including management of lists for contacts, invitations, participants, information sharing and publication on POWERBASE website dedicated to the event and other POWERBASE social media channels.

2.3 Dissemination activities

2.3.1 Communication activities undertaken

A series of communications activities have been undertaken, at Consortium and at partners level:
In terms of external communication, many partners have used their newsletters, websites and social media pages to share information on the ongoing OMC process. Communication on social media was organised either on the pages of partners organisation or on personal accounts of the POWERBASE team members.
Information about the project was also shared with the networks in which partners participate and in particular networks of first responders / potential public buyers, of special interest to the project's requirements collection.
The communication has also been oriented directly towards technology suppliers and industrial companies, universities and research centres, after thorough research of the market of renewable energy generation, innovative storage technologies and optimization and monitoring systems. The aim of POWERBASE was communicated to them together with the OMC scope document containing the preliminary functional requirements and an invitation to present their current solutions, to the different technology showcases, irrespectively of their TRL.
Other external actors have also been targeted due to their position as industry leaders. To that extend, National Contact Points for the Horizon Europe Programme have been contacted as well as the European Enterprises Network. In addition, organisations such as clusters, local development agencies or commerce chambers were contacted requesting promotion of POWERBASE vision and OMC activities.
In particular were contacted 21 multipliers (e.g. battery/renewable energy technology associations), 13 institutes, 31 cluster of companies, while more than 100 companies in Europe were reached out. The latter were filtered out and selected from a large list of companies established during the State-Of-the-Art Analysis of Deliverable 2.2 (POWERBASE, 2025), the review of "The 100 most promising energy & climate tech start-ups of 2025" (SET, 2025) and companies present in Horizon research projects relevant to energy as well as from recommendations made by different partners establishing contacts via different channels (see below).
Moreover, partners, with their participation to a number of conferences and other research oriented meetings, had the opportunity to reach out to leaders of R&D in the area of energy transition, as well as to interested end-users actively engaged in needs collection activities.
Finally, the Open Market Consultation was particularly promoted by the participation of different partners to the following fairs: E-World Energy and Water Fair (Germany, 10-12/2/25), Energy Transition Expo (Italy, 4-6/3/25), Intersolar (Germany, 7-9/5/25), Energy Fair (10-12/6/25). Participation to the specific topic-oriented fairs allowed POWERBASE Consortium to make targeted dissemination and to meet a number of potential suppliers who subsequently got involved in the showcases of POWERBASE.

2.3.2 Website

In October 2024, the domain address https://www.powerbaseproject.eu/) was purchased.
The website contained a dedicated section where all news about the OMC activities was provided, providing a link to OMC resources (e.g OMC scope document, Q&A document) and to registration forms for the OMC event and technology showcases. A popup also appeared on the home page, redirecting visitors to the information about the OMC procedure.
The resources were also directly retrievable through the "Resources" subsection.

2.3.3 Social Media

In addition to the website creation, the social media presence was also remarkable.
The social media presence of POWERBASE is based on the page created on LinkedIn (02.10.2024). During the OMC activities, all the emails sent to participants included a link to those pages. This account has been used to spread the word on the OMC activities.

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3. Feedback from the market

The OMC provided several opportunities to gather feedback from the Market: a comprehensive "Request For Information Questionnaire", the technology showcases and the OMC Lessons Learnt webinar.
Those are presented in the following sections.

3.1 The Request For Information questionnaire

3.1.1 RFI Questionnaire presentation

The RFI (Annex V) consists of 31 questions divided in four sections and should take around 20 to 30 minutes to complete. Only answers in English were considered, whereas respondents were invited to answer all the questions in this survey (one survey per company).
The results helped POWERBASE Consortium to evaluate existing and emerging Renewable Energy (RE) technologies that can enable the transition towards a low-emission, reliable, self-sufficient, mobile power supply for ES (for emergency response organizations, contributing to EU Green Deal 2050 target of 55% Greenhouse Gas (GHG) emission reduction. This transition will also significantly improve the accommodation conditions of emergency responders, sheltered people in ES, and acceptance within local communities. Respondents were also informed that they could participate in a Technology Showcase and/or the OMC event and /or the OMC workshop, whereas taking part in this survey was not a prerequisite for the participation in the POWERBASE future call for tenders and does not give any advantage to any supplier. However, they were informed that the Open Market Consultation shall provide POWERBASE end-users/ buyers, key information that will shape the call for tenders adequately.

3.1.2 Responses analysis

In total, 15 technology providers responded to the RFI, which can be considered as an important number to extract conclusions.
The respondents were mainly SMEs/Srart ups/ Spin offs (Figure 1), established mainly in Germany (Figure 2).

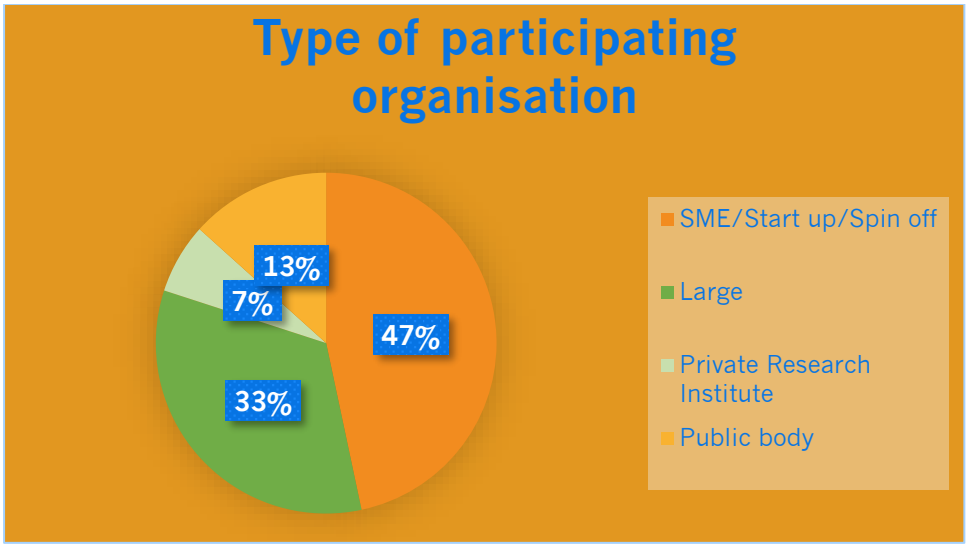

Figure 1 Type of participating organisation

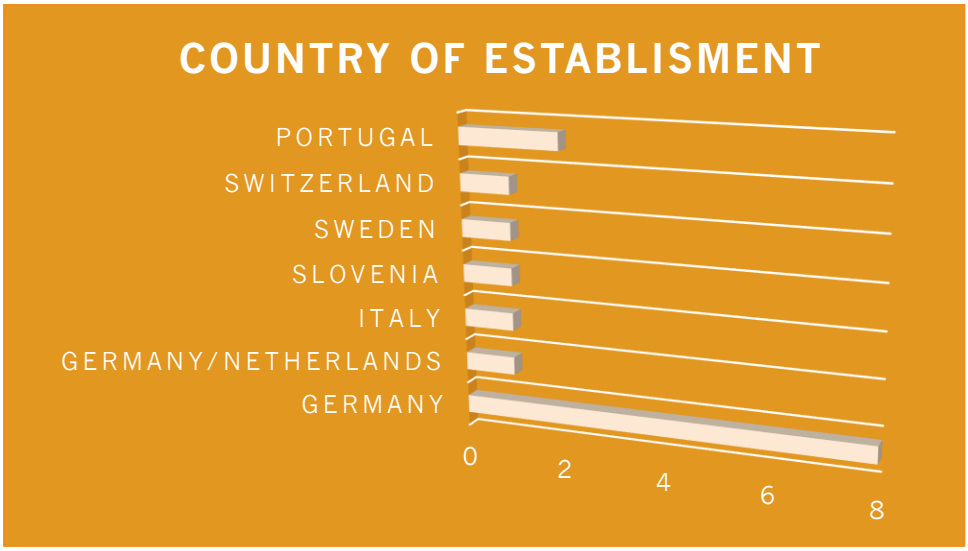

Figure 2 Country of establishment

Regarding the responses analysis, all of them replied positively to the fact that the need identified, and the requirements presented by the POWERBASE Consortium are clear and feasible; all of them positively responded that they could develop a solution to address all the above, although the majority underlined the market risk due to the fact that energy needs in emergency situations are highly unpredictable and institutional clients often have diverse technical specifications and complex procurement processes.

3.2 Technology showcases

The POWERBASE project invited technology providers, from the industry or research world, to demonstrate their solutions that are considered to fulfil the overarching requirements of mobile power supply for Emergency Shelters and Bases of Operation.
These solutions can range from fully commercialized technologies to low TRL innovative products under ongoing R&D.

The **first technology showcase** took place in Brussels (Belgium) on 27 March 2025 within the CERIS Workshop on Solutions for First Responders. Three technology providers presented their solution to the CERIS participants, including POWERBASE Consortium. CERIS workshop and subsequently the POWERBASE showcase could be attended physically or online. Two of the technologies presented belong to the sector of energy storage with mobile and resistant solutions and one was about energy generation with alternative fuel presenting the advantages against the conventional diesel generator. The companies had also to opportunity to demonstrate their products during the *Networking reception & walking exhibition* of CERIS event.

Photo 2 Introducing POWERBASE technology showcase during CERIS workshop

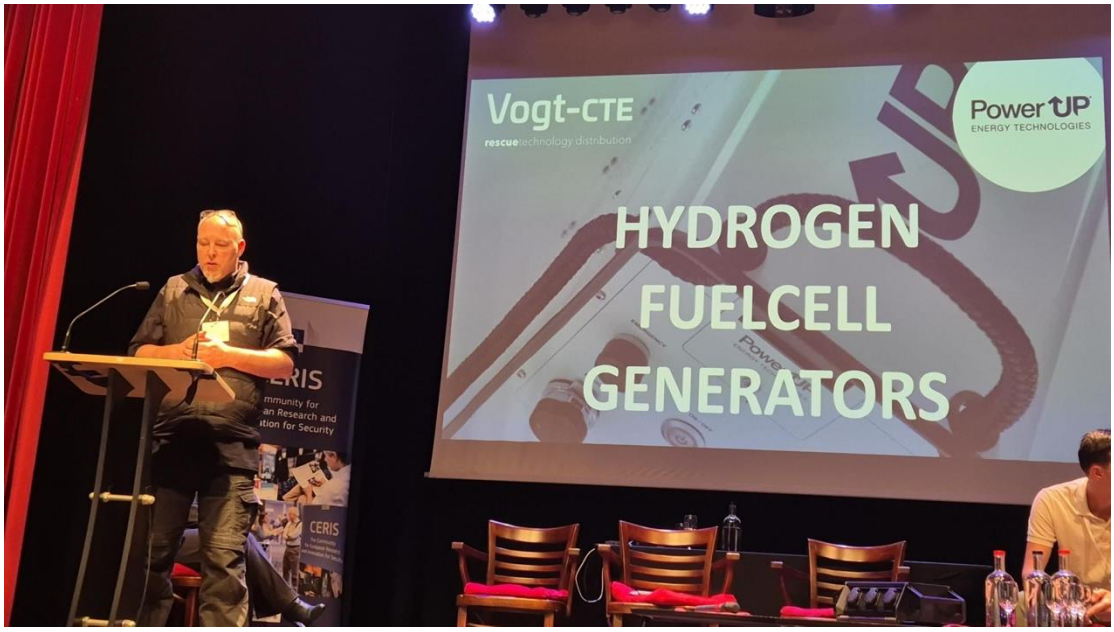

Photo 3 A supplier presenting their solution during CERIS workshop

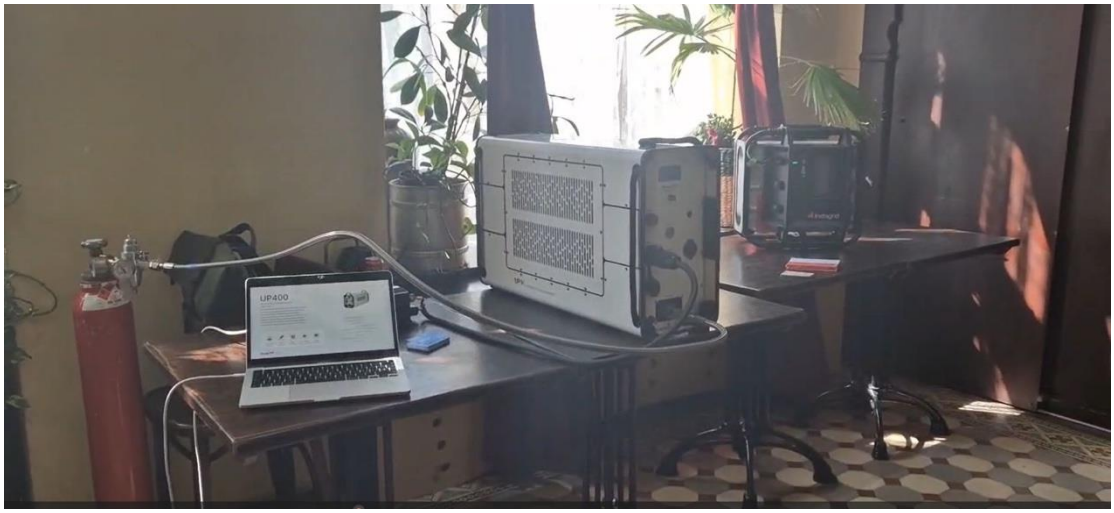

Photo 4 Suppliers demonstration of their technologies within the exhibition of CERIS workshop

The **second technology showcase** took place during the Open Market Consultation Event on 12 June 2025 in Brussels. 10 technology providers presented their solution to the POWERBASE Consortium. The majority of the attendees were physically present, while possibility for remote attendance was also given. All suppliers presented physically in Brussels. Four suppliers presented innovative solutions for power generation, one of which consists of an integrated system of power generation and storage, while five suppliers had mobile, durable, innovative solutions for energy storage of different capacities. One solution presented consists of and IoT energy management system adding to the diversity of the technologies that POWERBASE is addressed to. Moreover, the companies had the opportunity to demonstrate their products during the dedicated networking and matchmaking session.

Photo 5 Snapshot of suppliers presentations.

The **third technology showcase** was organised online together with the International Forum to Advance First Responder Innovation (IFAFRI) on 15th of July 2025. During the showcase, 5 companies from across the EU and US presented their solution to the 36 participants, to emergency responders and other stakeholders including POWERBASE Consortium. The US companies were reached by IFAFRI representatives with whom collaboration is established and in particular by United States Department of Homeland Security (USDHS). Acknowledging that they are not eligible for funding under the future PCP, three US companies were willing to present their technologies to the operational audience that IFAFRI and POWERBASE have gathered. Two suppliers presented integrated systems of power generation and storage with advanced technologies, two more companies were in the sector of power generation, while one company had mobile energy storage solutions.

This showcase had significant benefits to POWERBASE consortium as, it allowed us to get insights on the technological advancement also across the ocean. Moreover, POWERBASE vision and activities were disseminated in a very large network, that of IFAFRI, attracting more suppliers interested to showcase their solutions (in the 4th showcase) and to eventually participate to the future PCP. A large number of first responders who, even without attending the showcase, have been informed about POWERBASE's scope through IFAFRI channels, being alone an added value.

Photo 6 Flyer for joint dissemination of the online event by POWERBASE and IFAFRI

Photo 7 Introduction to the technology showcase jointly made by POWERBASE coordinator and IFAFRI representative from USDHS

The **fourth technology showcase** took place on 28th of August in Athens (Greece) during the OMC workshop. During this event, 9 suppliers presented their solutions, 3 of which were physically present demonstrating their products and the other 6 presented their technologies online. Two US companies, that found out about POWERBASE during the joint showcase with IFAFRI, with affiliations in Europe, expressed strong interest in presenting their technologies online. A diversity of innovative technologies was discussed during this showcase: energy generation from solar energy, airborne wind, biomass gasification and electrolysis were presented, while storage systems

with different technologies were also presented as well as one integrated system of energy generation, conversion and storage. More than 40 participants followed the event – mainly physically and few online, partners of the consortium, suppliers, members of the Advisory Board and representatives of the Greek organizations dealing with camps and emergency management (Hellenic Police, Ministry of Migration, regional Civil protection authority).

Photo 8 Snapshot of a supplier presenting during the OMC workshop

3.3 OMC Workshop

3.3.1 Workshop presentation

The OMC Workshop started with an introduction to POWERBASE project and a presentation on the OMC objectives, followed by a presentation entitled Driving Innovation: OMC for a PCP.
Moreover, POWERBASE Consortium presented the findings of the SOTA and the scenarios and needs identified during the POWERBASE project, including the presentation of the requirements and the survey results.
A dedicated Q&As session was followed by the suppliers presentations (as part of the Technology Showcase, see below, section 3.2). The event was successfully ended by a networking and matchmaking session among the suppliers.
The agenda and the presentations are included in Annex VI.

Photo 9 Group photo of participants of OMC workshop

3.3.2 Results synthesis

During the OMC workshop, the results of a survey conducted to suppliers (in total 24 responses) were briefly discussed, mainly as far as the requirements that are mostly and less met by their existing solutions. More details on the content of the survey and its outcomes can be found in Deliverable 2.5.
In addition, the technologies of 22 companies presented during the 4 technology showcases were clustered in energy generations/conversion, storage, integrated solution and energy management system, in order to quickly summarize the available technologies of the interested market so far.
Cross-comparison of the requirements quasi-finalised, as presented during the event, with the survey outcome and in particular the requirements more difficult to be met, as well as with the overall impression obtained from the presentations of the suppliers and the consultation with the market, led to the following conclusion:
Although (a combination of) technologies may meet the operational requirements for uninterrupted power provision, demanding logistics (especially volume/size and the need for air transportation) and the strong

request for an integrated system of renewable energy generation, conversion with commercially available fuel for backup, and storage for continuous efficiency describe a system that is not yet in the market.
Hence, the delivery of a modular, interoperable, easily and safely transportable integrated system for energy generation/storage/conversion with given specifications requires significant R&D that need to be funded and acquired by the interested public buyers in a future PCP project.

3.4 Miscellaneous

3.4.1 Q&As document

Within the OMC process, technology providers were requested to submit questions by email to communication@powerbaseproject.eu or as part of the OMC events.
The Q&As document was uploaded in the project website and was regularly updated (Annex VII).

3.4.2 Matchmaking sessions

Within the OMC events in Brussels and in Athens, a dedicated matchmaking and networking session was organised to provide participating technology providers with the opportunity to introduce their companies and demonstrate their capabilities in addressing the specific needs of public buyers.
Following the introductory presentations and discussions, technology providers were given the opportunity to engage directly with one another. This allowed participants to exchange ideas, discuss potential areas of collaboration, and initiate conversations that could lead to future consortium formation in the context of upcoming procurement activities.

4. Conclusions and Recommendations

4.1 General conclusions and recommendations

There is consensus among the contributors on the fact that currently there is no solution available in the market that meets the totality of the needs identified by the POWERBASE Consortium. Neither is such solution expected to be available in the near future, unless a special request arises. Even though some solutions partially address POWERBASE requirements, R&D is needed to fully address them.
In a nutshell, it is a common consideration that there is room for innovation when it comes to address the POWERBASE challenge. Therefore, a Pre-Commercial Procurement procedure does fit the POWERBASE challenge and appears justified to both the POWERBASE Consortium and the market.

4.2 Recommendation based on OMC activities

The series of OMC events have provided the Consortium with recommendations and concerns of the industry that were considered during the formulation of the procurement strategy and the drafting of the Call for Tenders for the future POWERBASE PCP.

In this context, procedural concerns have been expressed specifically regarding the aspect on whether the time and budget will be available for covering the broad spectrum of requirements within the scope of the future POWERBASE PCP.

Due to the fact that POWERBASE PCP solution should cover a minimum of 50% R&D services, and the other 50% could be part of developments that are mature enough, POWERBASE does not require from the suppliers to develop a complete solution from the scratch. So, the resulting recommendation, also expressed as part of the OMC focuses in foreseen at least ten (10) months for Phase 2 and eight (8) months for Phase 3, so the suppliers to have as much time as possible to work on the development.

Further to the above, it has been explained that procedural wise, altering the composition of a contracted consortium sometime during the process would constitute in a sense a violation of the equal treatment principle as this would grant access to entities not participating in the process (to that moment) in work delivered by competitors. Finally, stemming from relevant discussions held during the event, a clear evaluation mechanism will have to be incorporated in the relevant documentation in view of the tender publication for avoiding any confusion that could delay the process.

4.3 Recommendation based on RFI questionnaire

Main concerns expressed form the industry was the potential market risks that could jeopardise the return on investment and business goals.

Therefore, it was recommended to avoid complex and fragmented procurement processes and opt for a joint cross border procurement, innovation oriented, and set a clear procurement strategy and terms and conditions within the Call for Tenders of the future POWERBASE PCP, enabling also innovation uptake beyond the end of the PCP.

Bibliography

Deliverable 2.2 (POWERBASE, 2025), (SET, 2025)

Deliverable 2.5 (POWERBASE, 2025), (SET, 2025)

ANNEXES

Annex I-Prior Information Notice

117389-2025 - Planning

See the notice on TED website

Greece, Germany, Austria, Sweden, France, Italy, Slovakia, Hungary, Netherlands – Research and Development services on security and defence materials – POWERBASE OPEN MARKET CONSULTATION
OJ S 37/2025 21/02/2025
Notice of the publication of a prior information notice or a periodic information notice on a buyer profile
Services

1. Buyer

1.1. Buyer
Official name: KENTRO MELETON ASFALEIAS
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Activity of the contracting authority: Public order and safety

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Activity of the contracting authority: Public order and safety

1.1. Buyer
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Legal type of the buyer: Group of public authorities
Activity of the contracting authority: Public order and safety

1.1. Buyer
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Legal type of the buyer: Group of public authorities
Activity of the contracting authority: Public order and safety

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Legal type of the buyer: Group of public authorities
Activity of the contracting authority: Public order and safety

1.1. Buyer
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Legal type of the buyer: Group of public authorities
Activity of the contracting authority: Public order and safety

2. Procedure

2.1. Procedure
Title: POWERBASE OPEN MARKET CONSULTATION
Description: The POWERBASE project aims to provide the basis for future procurement of low-emission, reliable, mobile power supply that meets the identified special need of emergency responds organizations (e.g. fire services, search and rescue and medical teams). In this context, POWERBASE project maps commercially available and emerging technologies that can fulfill the unmet need and will validate their innovation potential. Based on the above, an identified significant innovation gap will form the foundation of a Pre-Commercial Procurement (PCP) project to procure R&D services with the purpose to develop innovative solutions. In this context, this Prior Information Notice announces the POWERBASE Open Market Consultation (OMC) to engage with the market and understand the capabilities of solution providers to address the POWERBASE challenge to develop low-emission solutions for power supply for Emergency Shelters(ES) and Bases of Operations(BoO). POWERBASE project is funded by the European Union, under the Horizon Europe Programme (GA 101167787).

2.1.1. Purpose
Main nature of the contract: Services
Main classification (cpv): 73400000
Research and Development services on security and defence materials

2.1.2. Place of performance
Country subdivision (NUTS): Κεντρικός Τομέας Αθηνών (EL303)
Country: Greece

2.1.4. General information
Additional information: POWERBASE will prepare for future procurement processes ensuring that emergency response organizations are equipped with highly innovative low-emission energy solutions for Emergency shelters (ES) and Bases of Operation (BoO) that meet their real operational needs (reliable, self-sufficient, mobile, economical, improved workplace conditions, etc.), in the decades to come. Functional and operational requirements of energy supply ES and BoO will be assessed in three scenarios: 1. Wildfire on a Mediterranean island in very hot climatic conditions. 2. Crossborder flooding in central Europe with a high number of displaced people and large scale destroyed critical infrastructure in winter. 3. An Earthquake in

a rural Himalayan region with complex logistics. The OMC will take place through: (i) Four technology showcases. The first technology showcase will take place in Brussels on the 27.03.2025, during the CERIS (Community for European Research and Innovation for Security) event “Solutions for First Responders”. Three more Technology Showcases will follow until September 2025; (ii) A central (hybrid) ‘OMC event’ in Brussels, on 12.06.2025; (iii) A Request for Information questionnaire available to all interested solution providers and research institutions in order to gather their input; (iv) An OMC workshop in September, 2025; (v) A Q&As document to be published in the project’s website. For more information, registration to the events and updates, please visit: https://www.powerbaseproject.eu /omcprocedure. In case of any updates or modifications, announcements will be made on the website.
Legal basis:
Other

8. Organisations

8.1. ORG-0001
Official name: KENTRO MELETON ASFALEIAS
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Postcode: 10177
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Roles of this organisation:
Buyer

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Roles of this organisation:
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Roles of this organisation:
TED eSender

11. Notice information

11.1. Notice information

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Annex II Open Market Consultation Scope Document

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Table of contents

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1. The POWERBASE Coordination and Support Actions (CSA)

1.1. Context and objectives

Recent floodings, earthquakes and wildfires have led to large-scale emergency rescue operations. As critical infrastructure is often damaged, emergency responders rely on diesel generators for energy supply. The use of diesel leads to greenhouse gas emissions, poor air quality, and generators produce heat, vibrations and noise, and pose safety threats to emergency responders and sheltered people. Additionally, diesel generators necessitate a consistent supply of diesel fuel along with the associated logistics.
The EU-funded POWERBASE project is a Coordination and Support Action (CSA) which aims to provide the basis for future procurement of green, mobile power supply that meets the needs of emergency responders.
Working from an end-user perspective, POWERBASE will analyse the needs of emergency operations for different disaster situations. The project will map the available technologies and potential new innovations that can meet the needs in future. This will help Emergency Response Organisations (EROs) to bridge the gap and facilitate the investment in low-emission, reliable, self-sufficient, mobile power supply.

1.2. POWERBASE challenge

The POWERBASE challenge is to develop Renewable Energy-based / low-emission solutions for power supply for Emergency Shelters (ESs) and Bases of Operation (BoO). Therefore, POWERBASE CSA will prepare for a future innovation procurement ensuring that emergency response organizations are equipped with highly innovative low-emission energy solutions for Emergency Shelters (ES) and Bases of Operation (BoO) that meet their real operational needs (reliable, self-sufficient, mobile, economical, improved working conditions etc.)in the decades to come.

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1.3. Public buyers/ end users involved

POWERBASE consortium comprises a unique mix of 8 Emergency Response Organisations (EROs) across Europe with expertise in humanitarian aid, civil protection and a variety of response activities relevant for this project i.e. German Federal Agency for Technical Relief (THW) Austrian Red Cross (AuTRC), Swedish Civil Contingencies Agency (MSB), Ministry of Interior-France (MoIF), Corpo Nazionale dei Vigili del Fuoco (CNVVF), Hungarian Charity Service of the Order of Malta (HCSOM), Asociácia Samaritánov Slovenskej Republiky (ASSR), Openbaar Lichaam Gezamenlijke Brandweer (GB). Out of these, 7 entities are also public procurers.
They are complimented by leading research institute – Fraunhofer Gesellschaft (FhG), the lead procurer organization – Center for Security Studies (KEMEA), legal experts in public procurement – VIEIRA LEGAL and management consulting and dissemination partner ARTTIC. Specifically, **THW** stands out for its commitment to civil protection, disaster response, and technical assistance with 98 % of its workforce consisting of volunteers showcasing a widespread and dedicated network. **AuTRC** is a non-profit organization based on the Red Cross law in Austria bringing expertise in provision of emergency shelters from previous disasters and in developing end user requirements and community engagement.
MSB is a government agency focusing on safety, emergency preparedness, civil protection, and international humanitarian operations. MSB is adept at deploying personnel, equipment, and resources within 6 to 72 hours notice. MSB is actively developing temporary RescEU shelter capacities, one specifically for Ukraine's war-affected population and another as an EU emergency shelter reserve, enhancing the EU Civil Protection Mechanism responsiveness in emergencies.
MoI-F is one the largest contributors to the EUCPM in terms of the number of deployed teams. It has extensive experience in managing bases of operation and emergency shelters for first responders and civilian populations.
The Department of firefighters, public rescue, and civil defense in Italy (**CNVVF**), operates under the Ministry of the Interior. With 35,000 professional and volunteer units, it ensures urgent technical rescue and fire prevention services nationwide.
HCSOM, specializes in setting up and operating emergency shelters, with a notable history of providing assistance globally. Committed to innovations and sustainability, it brings extensive experience in these areas to its operations, aligning with its core mandate on disaster resilience.
ASSR, is part of the Ministry of the Interior of the Slovakian Republic and also brings expertise in the area of setting up of shelters, Euracare Flight and Shelter module, Emergency Temporary Camp module and is also a Sphere Standards Focal Point.
GB, Joint Fire Department is a partnership between approximately sixty companies in the port and industrial area of Rotterdam and the Municipality of Rotterdam. The organization provides firefighting and emergency services.
Fraunhofer-Gesellschaft (**FhG**) is a leading German applied research organization. The FhG Institute for Technological Trend Analysis (INT) is a trusted institution that offers comprehensive assessments and guidance on a wide range of technological developments. The institute specializes in Technology Forecasting, enabling long-term strategic research planning serving defense and international clients from both public bodies (especially related to civil security) and various industries. Its research portfolio includes RE topics since 2011, and currently, it is involved in the INDY and NOMAD projects with the aim of reducing emissions for European remote military camps.
KEMEA, with expertise in Emergency Management and Civil Protection, has served as Contracting Authority in FP7 and Lead Procurer in H2020 projects. KEMEA has conducted studies on civil protection and emergency sheltering and has provided valuable insights into standards, the market, and expert networks.
VIEIRA Legal Procurement Services offers public procurement advisory expertise, specializing in R&D covering the entire procurement process, from defining procedures

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to auditing oversight, including Court of Auditors and European Commission audits. With a deep understanding of public budgetary matters, VIEIRA has contributed to legislative proposals.
ARTTIC is the leading European management services provider for collaborative Research Development & Innovation (RDI) undertakings and has a long track record in EU research project management and Dissemination and Communication support.

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2. Purpose and Scope of the Open Market Consultation

2.1. Scope and expected benefits

As part of the Open Market Consultation (OMC), this document describes the scope and initial requirements of the POWERBASE CSA project. The OMC represents a specific phase during the overall innovation procurement methodology, aiming to actively approach the market (solution providers) when the identified needs by the procurers must be communicated openly and clearly to all potentially interested bidders.
Based on Europe-wide needs assessment and analysis of the State-of-the Art (SOTA), or so-called –Prior-Art analysis, market feedback will be collected to understand if suppliers are able to satisfy the unmet needs and market players get the unique opportunity to give feedback on the requirements of the foreseen pre-commercial tender.
The Open Market Consultation will optimise the requirements catalogue, will complement the SOTA analysis, and will allow POWERBASE to decide on participation in future Pre-Commercial Procurement (PCP)[1] or Public procurement of innovative solutions (PPI)[2] processes.

2.2. Who Can Participate

All potentially interested economic operators on the market are invited to participate in the open market consultation, to fill in the request of information (RFI) and attend the OMC events.

2.3. Activities and Timetable

The OMC is taking place through:

- The Prior Information Notice on the TED website
- Four technology showcases to provide suppliers the opportunity to interact with end-users/ potential buyers. The first technology showcase took place in Brussels on March 27, 2025, during the CERIS event "Solutions for First Responders". An online Showcase is scheduled for May 2025. Another showcase will take place during the OMC event (June 12, 2025) in Brussels, and a final showcase is scheduled for 28 August in Athens, Greece

[1] Pre-commercial procurement (PCP) is an approach to public procurement of research and development services (R&D), enabling the public sector to steer the development of new solutions directly towards its needs. For more information https://www.powerbaseproject.eu/procurement/
[2] Public procurement of innovative solutions (PPI) facilitates wide diffusion of innovative solutions on the market and happens when the public sector uses its purchasing power to act as early adopter of innovative solutions which are not yet available on large scale commercial basis. For more information https://www.powerbaseproject.eu/procurement/

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- A central (hybrid) 'OMC event' in Brussels, on June 12, 2025, with in-depth discussion and match-making session. The POWERBASE **Open Market Consultation event** takes place on **June 12, 2025** in **Brussels, Belgium**! Register here;
- A Request for Information Questionnaire available to all interested solution providers and research institutions;
- A follow-up **OMC workshop in Athens, on 28 August, 2025**;
- A Q&As document. Questions may be submitted by email to commmunication@powerbaseproject.eu

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3. The three POWERBASE scenarios

The following disaster scenarios depict common emergency response operations of European EROs under diverse challenging conditions.

1. Wildfire on a Mediterranean Island (Corsica, France)

A severe wildfire breaks out in the Asco Valley (Corsica, France), a rugged, remote, mountainous and forested area in the Haute-Corse department, fueled by a combination of extreme drought, high temperatures, and strong winds as it is in the middle of the summer season. It overwhelms local resources, which forces international support and creates challenges in establishing effective bases of operations and shelters.

2. Winter Floods in Ostrava, Czech Republic

Extreme winter conditions, marked by heavy snowfall followed by rapid snowmelt, trigger widespread flooding in an industrial and urban region, leading to infrastructure damage, hazardous contaminant spills, and complex logistical challenges for emergency response.

3. Earthquake in a Rural Himalayan Region (Nepal)

A powerful earthquake in Nepal causes extensive destruction and landslides in mountainous terrain, isolating communities and complicating search & rescue. The establishment of temporary shelters and bases of operational that can withstand the approaching monsoon season is necessary.

These three scenarios serve as a framework for identifying shared requirements and potential technical solutions or performance gaps that are applicable not only to these specific situations but also to broader emergency response missions.

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4. IV. Functional requirements and needs that the POWERBASE solution should fulfil

The requirements for a suitable low-emission power supply solution for emergency response organizations identified in POWERBASE, focus on delivering a reliable, efficient, and easy-to-use system. POWERBASE functional requirements are still under validation therefore we would like to encourage also solutions providers with smaller or larger energy solutions to participate in the POWERBASE Open Market Consultation. Moreover, we would like to get in contact with solution providers that partially fulfil our requirements e.g. only energy storage or energy generation. A summary of requirements can be found next. The annex provides a more detailed list.

- It must provide renewable energy on-site and shall generate renewable energy as well as store sufficient power for continuous operation of a Base of Operation or Emergency Shelter unit for a small group of responders or beneficiaries. The system should be able to generate at least 120 kWh per day and store 20 kWh renewable energy. A power output of at least 10 kW is needed.
- Moreover, it has to be quickly deployable without special training, support smart monitoring and fault detection, and manage energy intelligently to ensure continuous operation.
- The design should be modular, scalable (at least up to 5 times the minimum energy output/ storage/ generation), and compatible with standard equipment, allowing both standalone use and integration into larger setups.
- To ensure field readiness, the system must be compact, low-noise, and resilient to harsh environments. For transportation, individual components should be transportable by four persons and the system should be also capable to be transported by an airplane.
- Safety, sustainability, and cost-efficiency are essential, with long operational life, minimal emissions, and compliance with key international standards.

5. State of the Art Analysis

5.1. Possible approaches and solutions

Several commercial systems already address mobile, low-emissions energy supply. They typically combine an energy harnessing component (often photovoltaic panels, though not limited to them) with a storage unit (including, but not limited to, lithium-ion batteries). Many also include a diesel generator as a backup, along with software to optimize energy flow based on demand. However, most of these solutions are housed in large containers (for instance, 20-foot units) on set trailers, creating significant logistical and transportation challenges for rapid deployment in emergency response where space and mobility are critical. Conversely, small portable devices, such as power banks or smaller foldable energy harnessing technologies (smaller PV panels or wind turbines), are easy to transport but cannot meet the higher energy demands of a base of operations or an emergency shelter. The unmet challenge is to develop a compact, easily deployable and robust mobile low-emission energy system that delivers sufficient power for emergency operations without the logistical burdens of heavy bulky containerized solutions or the limited capacity of small portable devices.

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6. Annex I Requirements

The following categories for functional requirements were identified

Functionality
- Ready-to-use with minimal setup.
- Advanced performance monitoring (SMART/ AI).
- Continuous operation with fault detection.
- Loud and flashing critical alerts.
- Easy management of energy carriers.

Applicability / Staff Handling
- Usable by first responders without special training.
- Deployable inside and outside Europe.
- Plug-and-play design for simple setup, repair, and maintenance.
- Design prevents incorrect connections.

Safety / Security
- Must follow “Safety First” principle.
- Fire and explosion protection required.
- Includes de-energizing measures and overvoltage protection.
- Low noise levels for health and operational comfort.

Logistics / Transportation
- System Components are transportable by max. 4 people (~100 kg)
- Air transport-ready without restrictions.
- Adaptable to road, rail, and sea transport.
- Compatible with standardized pallets/ containers; ideally with foldable parts.

Sustainability / Multi-Use
- Modular and usable beyond disaster response (e.g. daily operations).
- Recyclable components.
- Minimized transport emissions.
- Long operational periods without support.

Standards / Procedures
- Must align with relevant standards
- Support standardization and regulatory awareness.
- Compatible with standard battery solutions and equipment.

Financial Aspects
- Cost-efficient purchase, transport, service, and storage.
- Long lifespan to reduce replacement needs.
- No monthly operational fees for practitioners.

Efficiency
- Smart energy optimization
- Operates independently for first deployment days.
- Capable of reusing waste heat.
- Supports multiple (including renewable) energy sources.

Performance
- Durable with long lifespan.
- “(Energy) Service Island” mode (e.g. tent-level operation ca. 15 people).
- Supports energy storage (e.g. night use).
- Cascading system for load reduction or shutdown.

Scalability / Modularity
- Modular storage and application design.
- Expandable with optional add-ons (Lego-like concept).

Interoperability
- Compatible with global battery connectors and common systems.
- Supports power exchange and camp-level distribution.
- Uses standardized plugs for input/ output.

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Resistance

- Water/ dust-resistant.
- Designed for harsh environmental resilience (climate, terrain, urban, remote).

Availability / Maintenance

- Globally available without major restrictions.
- Swappable storage parts for extended use.
- 4-week maintenance-free operational capability.

Annex III OMC event

POWERBASE

OPEN MARKET CONSULTATION EVENT

AGENDA 12.06.2025

01 INTRODUCTION	REGINE GERHARDS (THW)	13.00
02 OMC OBJECTIVES	MARIJN VAN JAARSVELD (ARTTIC)	13.10
03 PRE-COMMERCIAL PROCUREMENT	ELENI LIANOU (KEMEA)	13.20
04 STATE-OF-THE-ART	BJÖRN HOOG (FRAUNHOFER INT)	13.30
05 SCENARIOS AND NEEDS	JAKUB LIŠČINSKÝ (ASSR) SANDRA NESTLINGER AUTRC)	13.45
06 QUESTIONS & ANSWERS		14.15
COFFEE BREAK		
07 SUPPLIER PRESENTATION (5 MIN EACH) ROUND 1 HYBRIDEL SE ~ VOLTA ENERGY ~ ENDRESS GENERATORS ~ SFC ENERGY AG ~ WATERLAMP ~ AXSOL GMBH		15.15
BREAK		
08 SUPPLIER PRESENTATION (5 MIN EACH) ROUND 2 AVL ITALY ~ HYPOSTO ENERGY ~ TAB D.D. ~ LEAB AUTOMOTIVE ~ INSTAGRID ~ OHS ENERGY		16.15
09 MATCHMAKING SESSION		17.00
10 MEETING END		18.00

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POWERBASE project key facts

- 12 partners (8 Emergency Response Organisations)
- 10 European Countries
- Duration: 10/2024 – 09/2025
- Funding: ~1 Mio. €

HORIZON EUROPE

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POWERBASE OMC event 12 June 2025

POWERBASE

Partners

Technisches Hilfswerk

MINISTÈRE DE L'INTÉRIEUR ET DES OUTRE-MER
Liberté
Égalité
Fraternité

Fraunhofer INT

VIEIRA PROCUREMENT LEGAL SERVICES

MINISTERO DELL'INTERNO

Myndigheten för samhällsskydd och beredskap

KEMEA

ARTTIC BY PNO GROUP

ASSR

ÖSTERREICHISCHES ROTES KREUZ

GB gezamenlijke brandweer

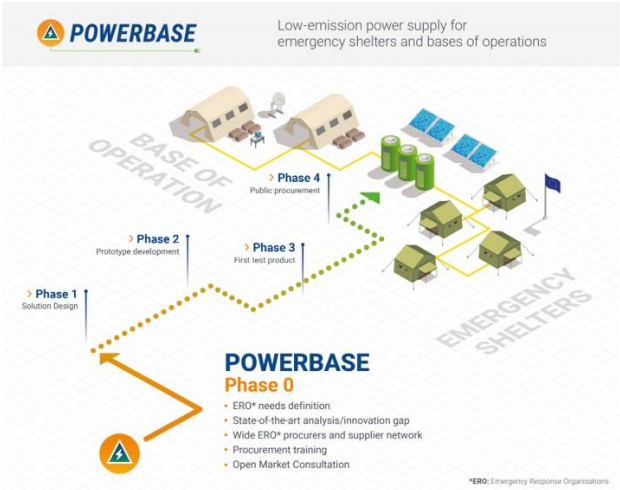
MAGYAR MÁLTAI SZERETETSZOLGÁLAT

Coordinator:
Technisches Hilfswerk (THW) = Federal Agency for Technical Relief

POWERBASE

Vision

- Groundwork for future **innovation procurement processes**
- Aiming at highly innovative **low-emission energy solutions for emergency shelters and bases of operation**
- End user driven approach



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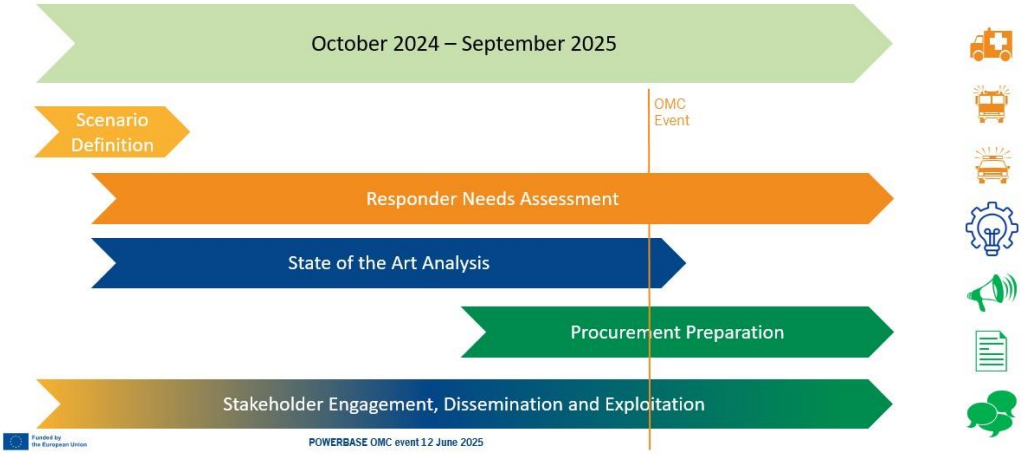
Objectives

- Describing **unmet needs** for renewable energy supply in future relevant emergency response scenarios
- Developing a holistic **State-of-the-Art-Analysis** of commercially available renewable energy solutions and emerging technologies
- Accelerating innovation uptake by **strengthening public procurers** on innovation procurement
- Fostering **cross-sectoral stakeholder engagement** on end-user needs and renewable energy solutions

POWERBASE

Activities and Milestones



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Project activities: scenario definition & needs assessment

consortium workshops

national workshops

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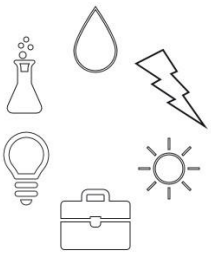
Technologies presented today

- Energy storage solutions
- Power supply solutions
- Transport solutions



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Thank you

Regine Gerhards
communication@powerbaseproject.eu

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OMC Objectives

Marijn van Jaarsveld
ARTTIC Innovation GmbH

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Open Market Consultation

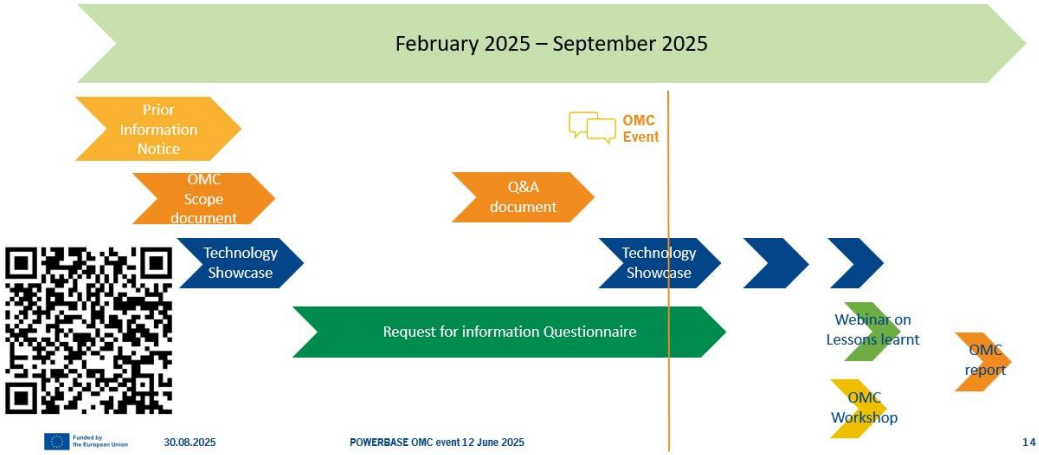
Structured dialogue between public buyers, end users and the market

Key step in preparing for innovation procurement – especially when the solution does not yet fully exist or is still emerging

Collection of input from suppliers, researchers and innovators before a formal procurement process begins

POWERBASE

Timeline OMC



POWERBASE

Collection of feedback from the market if suppliers are able to satisfy the unmet needs

Assess whether POWERBASE will proceed with innovation procurement

POWERBASE

Why do we need an OMC?

- To avoid a mismatch between buyer needs and market capabilities
- To ensure we aren´t overlooking novel or unconventional solutions
- To promote innovation and competition – especially from SMEs and start-ups who might not typically respond to public tenders

POWERBASE

Benefits for stakeholders

Early insights into Procurement Plans

Understand the technical, operational and environmental requirements before tenders are published

Showcase your Capabilities

Build partnerships and visibility

POWERBASE

How it works

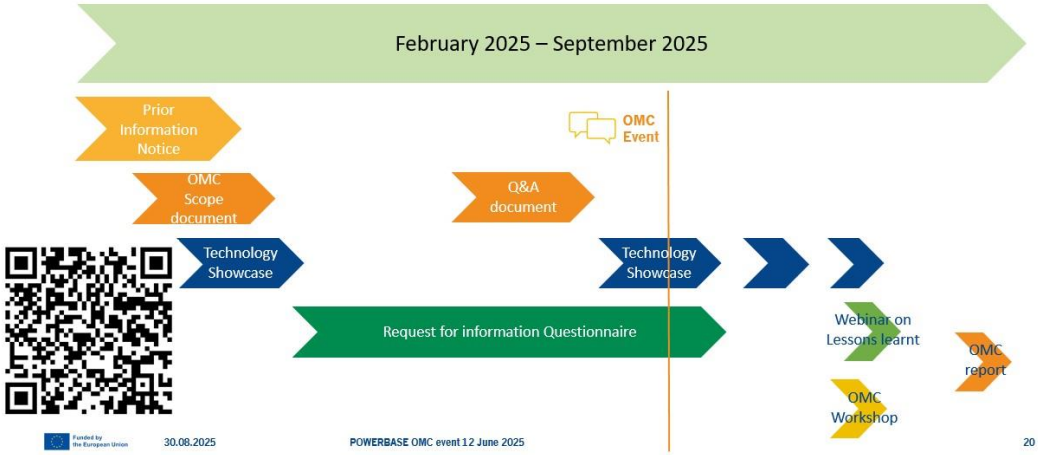
We present our preliminary state-of-the-art analysis, our needs and expectations

The market is invited to react: by providing feedback, showcasing relevant solutions, or flagging development trends

Fill out our Request for Information Questionnaire!

- https://www.powerbaseproject.eu/powerbase-omc-request-for-information/

Timeline OMC



POWERBASE

Thank you!

Marijn van Jaarsveld

communication@powerbaseproject.eu

POWERBASE

Pre-Commercial Procurement

Eleni Lianou

Center for Security Studies (KE.ME.A)

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POWERBASE OMC event 12 June 2025

Coordination and Support Action (CSA)

POWERBASE

✓ a preparatory action

✓ builds the grounds of a future Pre-Commercial Procurement (PCP) action oriented to the acquisition of R&D services

✗ no procurement

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POWERBASE

POWERBASE OMC

Is there an available solution of the market?

No ➡ Innovation procurement

Is there an innovation gap?

- No ➡ Public Procurement of Innovative Solutions (PPI)
- Yes ➡ Pre-commercial Procurement (PCP)

Directive 2014/24/EU (Art.2 par.22) defines innovation:

POWERBASE

"the implementation of a **new or significantly improved** product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organization or external relations inter alia with the purpose of **helping to solve societal challenges** or to support the **Europe 2020 strategy for smart, sustainable and inclusive growth**"

POWERBASE

What is Innovation Procurement

Commission notice (2021 C 267/01) :

"Innovation procurement" refers to any procurement that has one or both of the following aspects:

- **buying the process of innovation** – research and development services – with (partial) outcomes;
- **buying the outcomes of innovation**.

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Buying the process of innovation – research and development services – with (partial) outcomes

The public buyer buys the research and development services of products, services or processes, which do not exist yet.

The public buyer describes its need, prompting businesses and researchers to develop innovative products, services or processes to meet the need.

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Buying the outcomes of innovation

The public buyer, instead of buying off-the-shelf, acts as an early adopter and buys a product, service or process that is **new to the market** and contains **substantially novel characteristics**

POWERBASE

Pre-commercial Procurement (PCP)

R&D is needed to identify an innovative solution to satisfy public procurers' needs.

No solutions exist yet on the market that meet public procurers' needs and based on a search conducted by the procurers, it does not seem that such a solution will be available on a short-term notice.

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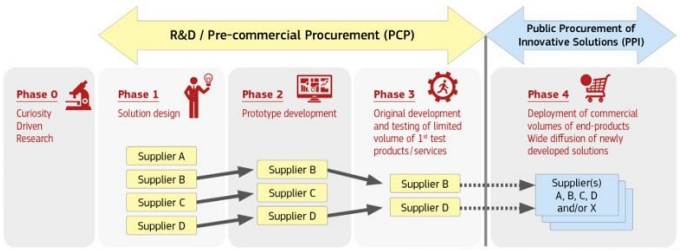
Pre-commercial Procurement (PCP)



Source: European Commission COM(2007) 799 final

PCP is a public procurement of Research and Development **(R&D) services** characterized by:

- **competitive** development in **phases** with the number of competing R&D providers being reduced after each phase subsequent to intermediate evaluations.
- **risk-benefit sharing** under market conditions related to the IPRs resulting from the R&D.
- a clear **separation** between the procurement of the R&D from the deployment of **commercial volumes of end-products**

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Pre-commercial Procurement (PCP)

Advantages of PCP

For the public sector

1. Improves the quality and/or efficiency of public services.
2. Allows obtaining better quality products at lower price.
3. Reduces risk of failure in follow-up PPI procurements.

For the market

1. Accelerates the process of bringing scientific results to market.
2. Shortens time-to-market for innovative products and services
3. Facilitates the access of new innovative players to the market.
4. Stimulates company growth and attract private investment.

For the society

1. Better use of public resources.
2. Helps tackling environmental and social challenges.
3. Creates high added-value jobs in Europe and contributes to sustainable economic growth.

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Intellectual property rights (IPRs) issues

- Ownership of results (foreground)
- Declaration of pre-existing rights (background IPRs)
- Protection of the results
- Commercial exploitation of results
- Promotion of R&D by the Buyers' Group

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Thank you!

Eleni Lianou

communication@powerbaseproject.eu

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State-of-the-Art

Björn Hoog
Fraunhofer INT

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What is a State-of-the-Art / Prior-Art Analysis

Purpose: produce a structured, critical synthesis of the latest technologies, methods and research in a domain, mapping what exists and how well it performs at the cutting edge.

Primary goal: establish quantitative metrics, strengths/limitations and emerging trends in both research and market offerings, creating a solid reference point before launching an Innovation Procurement Project or direct procurements

Decision support: gives stakeholders a shared, evidence-based picture, directing investment to significant gaps and de-risking subsequent projects.

Benchmarking step: the capabilities/performance identified are benchmarked against target requirements, highlighting viable solutions or any performance gaps

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Methodology

Narrowing the Research Scope: focusing of Bases of Operation and Emergency Shelters and technologies that are expected to be commercially ready by 2035

Systematic "4-Pillar Scan": Inputs from emergency-response practitioners, recent R&D projects, literature/market review, and partner data input + Patent and Bibliometric Analysis

Technology Fact Sheets: Detailed for commercial and high-promise tech; mini-TFS for other low-emissions energy system technology

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Examples of analysed technologies

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Categories of analysed technology

Energy Harvesting & Direct Electricity Generation: Capturing ambient or waste energy (e.g., sunlight, wind) and directly converting it into small-scale electric energy

Energy Conversion: Transforming energy from one form (chemical, thermal into another form e.g. electricity), like a fuel cell, gas turbines, diesel generator but also electrolysis technology for making hydrogen as for the other way.

Energy Storage: Storing energy (in batteries, capacitors, mechanical systems, or fuels/ chemical storage) when it's available and releasing it later on demand directly or with an Energy Conversion technology.

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Technology Fact Sheets

- Description of the Technology
- Current R&D and Market Trends
- Considerations for using this technology for a Basis of Operations or an Emergency Shelter

3.1.1. Crystalline silicon photovoltaic cells

Status:	Market available
Energy focus of the component:	Electricity-Generation
Key words:	PV, Solar, Sunlight, C-Si PV

Summary

Crystalline silicon photovoltaic cells provide a reliable and efficient renewable energy solution for various applications. Their high efficiency, long lifespan, and durability make them well-suited for both permanent and mobile power generation. Key advantages include strong performance under direct sunlight, scalability, and relatively low maintenance. However, c-Si PV systems require significant space, have high initial costs, and depend on sunlight, necessitating energy storage solutions for continuous power supply.

I. Definition, Motivation and Purpose

Photovoltaic (PV) cells are semiconductor devices that convert sunlight directly into electrical power, distinguishing them from solar thermal systems, which harness concentrated heat to generate energy. Initially developed for autonomous electricity generation in space for satellites, the motivation behind PV technology has evolved substantially to address pressing global energy challenges. At present, crystalline silicon (c-Si) PV or C-Si PV cells are central PV-technology aimed at reducing dependence on fossil fuels, mitigating climate change, and supplying clean electricity to remote regions [1]. Their high efficiency, reliability, and long-term stability have established them as the most widely adopted solar technology, suitable for both residential and large-scale commercial applications.

PUBLIC 27

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Conclusion of the State of the Art Analysis (so far)

› Component maturity

Most technologies that could form parts of a mobile energy-supply system are already well-developed and proven.

› Limited options

Only a few complete systems are on the market, generally and they are usually container-sized, on trailers, stationary, or very small units with modest capacity.

› Capability gaps

Existing products still seem to fall short of the demands posed by typical emergency-response scenarios and their derived requirements.

Partially, AI-generated images were used because the actual/real relevant pictures of products and innovations are protected.*

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What we expect from Suppliers for the State of the Art Analysis

Hints on further relevant technologies for our specific focus on Bases of Operations and Emergency Shelters.

Performance indication and clarification of the products you have developed and the matching other technologies a comprehensive mobile system solution.

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Thank you!

Björn Hoog

communication@powerbaseproject.eu

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Scenarios

Jakub Liščinský

Samaritan Slovakia

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Scenario Definition

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Scenario Definition

- Wildfire in the Mediterranean 🔥
  - 2 SUBSCENARIOS – Emergency shelter + Base of Operation
- Winter Floods – Central Europe ❄️
  - 2 SUBSCENARIOS – Emergency shelter + Base of Operation
- Earthquake in the Himalayas ⛰️
  - 2 SUBSCENARIOS – Emergency shelter + Base of Operation

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Scenario Definition

Where it all started...

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Scenario Definition

› Each scenario consist of:

1. Brief overview
2. Geographical overview and context
3. Description of the event
4. Health and Safety Risks
5. Infrastructure
6. Local, national and international response
7. Natural disasters in the region

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Wildfire on a Mediterranean Island

- **Location:** Asco Valley, Corsica, France
- **Causes:**
  - Extreme drought
  - High temperatures
  - Strong winds
- **Consequences:**
  - Rapid fire spread
  - Threat to population and infrastructure

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Wildfire on a Mediterranean Island

- **Need for international assistance**
- **Challenges for rescue teams:**
  - Establishing a Base of Operation
  - Setting up an Emergency Shelter
  - Operating in extreme heat and humid conditions

Winter Floods – Central Europe

POWERBASE

- **Location:** Ostrava, Czech Republic
- **Causes:**
  - Heavy snowfall in December
  - Sudden warming and rainfall in January
  - Frozen ground unable to absorb excess water

Winter Floods - Ostrava

POWERBASE

- **Consequences:**
  - River overflow
  - Damage to infrastructure (power plants, hospitals, heating systems)
  - Risk of hypothermia and shortages of food and water
- **Challenges for rescue Teams:**
  - Establishing a Base of Operations
  - Providing aid to evacuees
  - Operating in extreme freezing conditions

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Earthquake in the Himalayas

- **Location:** Nepal, Langtang National Park
- **Causes:**
  - 7.9-magnitude earthquake
- **Consequences:**
  - Over 15,000 casualties
  - 35,000 injured
  - 1.2 million displaced people

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Earthquake in the Himalayas

- **Challenges for rescue teams:**
  - Access only via helicopters
  - Low oxygen levels at high altitude
  - Unpredictable weather (approaching monsoon season) and unstable terrain
  - Rapid evacuation due to landslides

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Thank you!

Jakub Liščinský

communication@powerbaseproject.eu

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Needs & Requirements

Sandra Nestlinger

Austrian Red Cross

Funded by the European Union

POWERBASE OMC event 12 June 2025

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Needs & Requirements

Generation – Conversion – Storage

Pictures: Powerbase Consortium Partners

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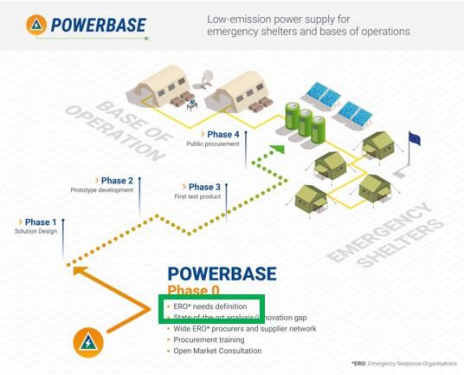
Why are requirements needed?

R&D is needed to identify an innovative solution to satisfy public procurers' needs.

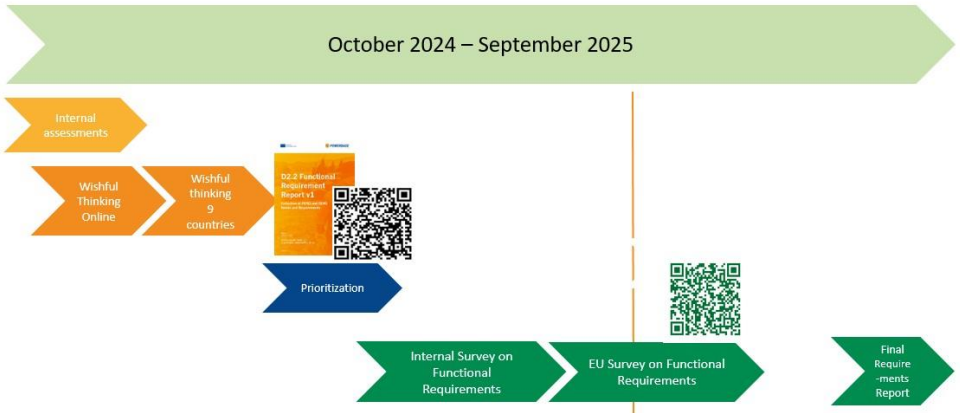
No solutions exist yet on the market that meet public procurers' needs and based on a search conducted by the procurers, it does not seem that such a solution will be available on a short-term notice.



Graph: Powerbase Consortium

POWERBASE

When and how are the needs defined?



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Who is defining the needs?

Technisches Hilfswerk

MINISTERO DELL'INTERNO

ASSR

GB gezamenlijke brandweer

MINISTÈRE DE L'INTÉRIEUR ET DES OUTRE-MER
Liberté
Égalité
Fraternité

MSB Myndigheten för samhällsskydd och beredskap

ÖSTERREICHISCHES ROTES KREUZ

MAGYAR MÁLTAI SZERETETSZOLGÁLAT

Logos: Powerbase Consortium Partners

Picture: Powerbase Requirements Survey

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Which needs have been identified?

Pictures: Austrian Red Cross, Powerbase Workshop and Deliverables

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What is re-fined in the surveys?

Generation – Conversion – Storage

- Electricity
- Noise
- Weight
- Size
- Speed
- Time

- Safety
- Control
- SMART Management

- Interlocks
- Connectors
- Output sockets

- Standards
- Manual
- Trainings
- Lifecycle

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What are the preliminary results?

Internal Survey on Functional Requirements → EU Survey on Functional Requirements

!Caution! This results are preliminary from an ongoing survey process and may be subject to change!

The system generates electrical energy from renewable or renewable-based sources (e.g., solar, wind, bio-based, or hybrid combinations) in proximity to the base of operation or emergency shelter.

The system produces a minimum of 120 kWh of usable electrical energy per 24 hours, r

The system provides at least 20 kWh of usable electrical energy storage, measured as net energy available for consumption after internal conversion losses.

The system includes a smart integrated energy management and distribution solution capable of coordinating energy generation, storage, and output in real-time, ensuring optimized operation according to varying energy demands, being remotely controlled and enabling monitoring.

The systems power converter (such as inverters, DC/DC, AC/DC units) always operates in a way that maximizes energy efficiency, with an average electrical conversion efficiency of ≥92%,

The system offers automatic or user-selectable energy output distribution at 230V or 400V, maintaining voltage within ±5% of nominal values, with frequency stability .

The system has a nominal output 10 kW (Nominal output=power that can be delivered 24h/7days).

One system provides sufficient electrical power output for an entire Base of Operation or Emergency Shelter for at least 15 persons at all times during the ongoing operation with different demands.

The system can deliver 300% of it`s nominal output for at least one hour (10 kW nominal -> 30 kW for one hour).

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What are the preliminary results? II

Internal Survey on Functional Requirements → EU Survey on Functional Requirements

!Caution! This results are preliminary from an ongoing survey process and may be subject to change!

The energy conversion system supports the use of at least one commercially available fuel, including but not limited to bio-based fuels, hydrogen, methanol, or sustainably produced synthetic fuels.

The energy conversion system achieves a minimum energy conversion efficiency of 50%, defined as the ratio of net electrical energy output to the chemical energy content of the fuel, measured under standard operating conditions.

System components fit on an EU pallet (weight max. 1500kg, 800mm 1200mm).

Every system sub- component is carriable by 4 persons.

The system operates reliably in ambient temperatures ranging from -40 °C to +80 °C, without significant safety risks and limited performance degradation (-10° to 60°).

All components function at altitudes up to 4,500 m above sea level.

Wind speeds up to 120 km/h without loss of structural integrity or stability are covered.

The system has a minimum operational lifespan of 10 years under typical deployment and usage conditions.

The system supports continuous 24/7 operation for at least 10 consecutive days without requiring any maintenance, servicing, or component replacement.

Non-specialized personnel (with no prior technical background) is able to safely operate the system including starting, stopping, and monitoring basic functions, after a familiarization session not exceeding 30 minutes, guided by visual aids and multilingual quick-start instructions.

When are the results fully charged?

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Final Require -ments Report

- **Survey European Union** and Union Civil Protection Mechanism Participating States (Jun + Jul 2025)
- Evaluation of Survey results and **cumulation of all needs & requirements** (Jul – Sep 2025)
- **Published** Final Requirements **Report** (Sep 2025)

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Thank you!

communication@powerbaseproject.eu

POWERBASE

Q&A Session

Moderator: Danai Kazantzidou-Firtinidou

Panelists:
Regine Gerhards – Federal Agency of Technical Relief (THW)
Eleni Lianou – Center for Security Studies (KEMEA)
Björn Hoog – Fraunhofer Institute
Jakub Liszinsky – Samaritans Slovakia (ASSR)
Benjamin Harting – Federal Agency of Technical Relief (THW)

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POWERBASE OMC event 12 June 2025

Basic Functional Requirements

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System for renewable energy generation and storage for small units

Performance
- ✓ System to generate at least 120kWh/day & store 20kWh energy
- ✓ Power output of at least 10kW
- ✓ Durable with long lifespan
- ✓ (Energy) Service island mode (tent-level-operation ca. 15 people)
- ✓ Cascading system for load reduction or shutdown

Efficiency
- ✓ Smart energy optimization
- ✓ Independent operation for quick deployment
- ✓ Supports multiple energy sources

Scalability / Modularity
- ✓ Modular storage and application design
- ✓ Expandable (lego-like concept) - at least 5 times up the min energy

Interoperability
- ✓ Compatible with standard equipment (for standalone use and integration into larger setups)
- ✓ Supports power exchange and camp-level distribution

Resistance
- ✓ Water / dust resistant
- ✓ Design for harsh environmental resilience (climate, terrain, urban, remote)
- ✓ Long operational periods without support/maintenance

Functionality
- ✓ Minimal setup
- ✓ Advanced performance monitoring

Applicability
- ✓ Usable with no special training
- ✓ Plug-and-play design for simple setup, repair, maintenance

Safety/Security
- ✓ Fire, explosion, overvoltage protection
- ✓ Low noise levels

Logistics/Transportation
- ✓ Air-transport ready with no restrictions
- ✓ Transportable by max 4 people (~100kg)
- ✓ Compatible with pallets

Sustainability / multi-use
- ✓ Usable beyond disasters
- ✓ Min transport emissions
- ✓ Long operational periods without support/maintenance
- ✓ Recyclable components

OMC Scope Document
(09.04.2025)

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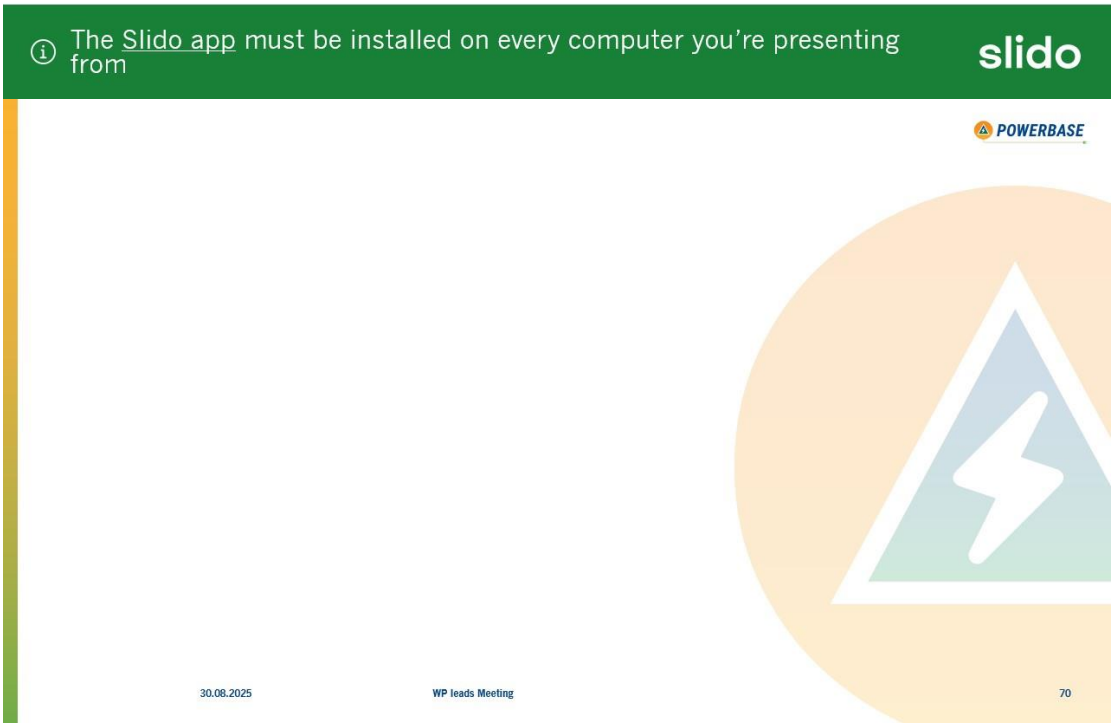
Do not edit
How to change the design

Type in your questions to the panelists



Annex IV Participant Privacy Information Notice

Participant Privacy Information Notice for POWERBASE Open Market Consultation Event

12 June 2025
Brussels, Belgium

On these pages you will find information about the processing of personal data associated with the POWERBASE Open Market Consultation (OMC) Event.

This event IS NOT a call for tenders, NOR a pre-qualification exercise, NOR the request of Expression of Interest. Following the definition of the European Commission this event has been developed to provide primarily the POWERBASE Consortium with information about the technology state-of-the-art, that will or might be able to address future procurement specifications and strategies in the area of interest.

The participation to this event does not oblige any project partners to enter a contractual agreement with any interested party.

Any public procurement procedure will be conducted separately with an open and advertised public procurement procedure.

POWERBASE project cannot cover participants' travel and subsistence costs for this event.

Description: Personal data collected in connection with this event as described below will be processed in accordance with the EU General Data Protection Regulation 2016/679.

Purpose: The purpose of the collection and processing of personal data for the event is the management and organization of the event and for maximising the outcomes of the project, including management of lists for contacts, invitations, participants, information sharing and publication on POWERBASE website dedicated to the event and other POWERBASE social media channels.

Personal data collected and further processed are:

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101167787

- Data necessary for the organization and management of the meeting, such as name, surname, organization, position, email addresses.
- Photographs/pictures of groups of participants (attendees and/or speakers) and organizers

Providing this information is necessary for your registration and access to the event premises.

Your consent is required for:

- photos, video recordings and web streaming related to the event;
- event attendee list containing your name and affiliation which will be shared among participants;
- invitations to future events POWERBASE may organize.

Data controller:

ARTTIC INNOVATION GMBH (ARTTIC) as the meeting organizer and partner of the POWERBASE project, is the Data controller. ARTTIC will collect and use the above-mentioned personal information only to the extent necessary for organizational purposes, to provide you with information about the event (before, during and after) and process your application to participate. Where necessary, we may also share your information with service providers for the purposes of organizing the event and associated events.

Recipients: POWERBASE consortium staff, service providers (where necessary)

Personal Data Retention: Your personal data will be part of a list of contact details shared internally among the POWERBASE Consortium and will be retained for no more than 12 months following the event or at the latest after the last follow-up action and in case you provide you permission for the purpose of contacting you in the future exclusively in the context of inviting you to future events of interest.Under certain conditions outlined in law and Horizon Europe, we may disclose your information to third parties, (such as the European Anti-Fraud Office, the Court of Auditors, or law enforcement authorities) if it is necessary and proportionate for lawful, specific purposes. We will not use personal data for any other purpose. If a new legal foundation exists before your personal data is deleted, you

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will be notified or asked for renewed consent ensuring lawful practices for every step of data management, from collection to storage.

Subject's Data Protection Rights: By law you have the right to:

- Request information about whether we hold personal information about you, and, if so, what that information is and why we are holding/using it.
- Request access to your personal information (commonly known as a "data subject access request"). This enables you to receive a copy of the personal information we hold about you and to check that we are lawfully processing it.
- Request correction of the personal information that we hold about you. This enables you to have any incomplete or inaccurate information we hold about you corrected.
- Request erasure of your personal information. This enables you to ask us to delete or remove personal information where there is no good reason for us continuing to process it.
- Request the restriction of processing of your personal information. This enables you to ask us to suspend the processing of personal information about you.
- Request transfer of your personal information in an electronic and structured form to you or to another party (commonly known as a right to "data portability"). This enables you to take your data from us in an electronically useable format and to be able to transfer your data to another party in an electronically useable format.
- Withdraw consent. When our use of your personal data is based on your consent, you have the option to withdraw your consent to our processing and delete your personal data at any time by sending us an email at communication@powerbaseproject.eu. Once we have received notification that you have withdrawn your consent, we will no longer process your information for the purpose or purposes you originally agreed to, unless we have another legitimate basis for doing so in law.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101167787

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How we use your personal data if you are an event attendee

Registration

If you register to attend the POWERBASE Open Market Consultation Event, we will collect some of your personal data for the purposes of processing your registration and for organizational matters.

When submitting the registration form for the event, registrants are asked if they would like their details to be added to the conference attendee list which will be shared with all attendees.

Registrants can choose if they would like to be included in the conference attendee list or not.

The personal data may be shared with selected service providers in context with the OMC necessary for organizational purposes. Any and all service providers that may be selected for the event will be contractually bound to process personal data on behalf of us, keep confidential any data they handle and protect it from unauthorized access, use and retention and to delete it right after all related organizational matters are completed.

POWERBASE Consortium will delete these data twelve months following the event or at the latest after the last follow-up action, unless you explicitly agree that we keep your contact details in order to invite you to future similar events. We provide you with the possibility to express your consent in the registration form.

If you want us to delete these data from our internal repositories at any point in time after you have given your consent, please contact us and we will do so within ten working days upon receipt of your request or the latest correspondence with you about your request.

Photos and videos

POWERBASE staff may take photos and videos of the event and publish them on this POWERBASE website and other POWERBASE social media channels (LinkedIn: https://www.linkedin.com/company/powerbase-project/). Should you wish not to be photographed or not to appear in the photos and/or videos you are requested to contact communication@powerbaseproject.eu as soon as possible before the event so that suitable arrangements can be made, as far as is practicable.

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In any case, we provide you with the possibility to express your consent in the registration form. In the event you do not consent, we will make arrangements, such as a special seating area or an indication on the conference lanyard, to implement your wishes as far as is practicably possible.

If you are a speaker/presenter, your presentation will be recorded & broadcasted and the information you provide us, such as your biography or presentations may be published.

The website will be sustained for at least two years after the end of the funded period of the POWERBASE Project conformingly with Grant Agreement

Contact: If you want further information regarding the event please contact communication@powerbaseproject.eu or if you want to exercise any of the above-mentioned rights, please send us an email at communication@powerbaseproject.eu.

Recourse: Complaints, in case of conflict, can be addressed to the Federal Commissioner for Data Protection and Freedom of Information (poststelle@bfdi.bund.de).

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101167787

Annex V Request for Information

Welcome to the POWERBASE Open Market Consultation.
The Open Market Consultation (OMC) is a series of activities/ events organized by POWERBASE to obtain an in-depth knowledge of the available technologies, market structure, its players as well as of the technical and feasibility aspects of the procurement, to design and implement an efficient procurement procedure.
For more on the POWERBASE Open Market Consultation, please visit the OMC scope document.
This survey consists of 31 questions divided in four sections and should take around 20 to 30 mins to complete. Only answers in English will be considered. Respondents are invited to answer all the questions in this survey (one survey per company).
The results will help us evaluate existing and emerging Renewable Energy (RE) technologies that can enable the transition towards a low-emission, reliable, self-sufficient, mobile power supply for Emergency Shelters (ESs) for disaster evacuees and Bases of Operation (BoO) for emergency response organizations, contributing to EU Green Deal 2050 target of 55% Greenhouse Gas (GHG) emission reduction. This transition will also significantly improve the accommodation conditions of emergency responders, sheltered people in ES, and acceptance within local communities.
Respondents will be able to participate in a Technology Showcase meeting and/or the OMC event and /or the OMC workshop.
Participation will be approved on a first-come, first-serve basis.
Please note that taking part in this survey is not a prerequisite for the participation in the POWERBASE future call for tenders and does not give any advantage to any supplier. However, the Open Market Consultation shall provide POWERBASE end-users/ buyers, key information that will shape the call for tenders adequately.

Your personal data will be collected, processed, stored, and used by the POWERBASE consortium with the sole purpose of gathering information from the market within the framework of the POWERBASE project.
Personal data will be treated as strictly confidential according to the General Data Protection Regulation (GDPR).
You may exercise your rights by contacting: communication@powerbaseproject.eu
All information provided during the Open Market Consultation and other background information will be anonymized, summarized and published online in English on the project website.

PART 1. GENERAL INFORMATION ABOUT YOUR Organization

Please provide the following information about your organization:
Company.....
.....
Creation date.....
.....
Country.....
.....
Number of employees.....
.....
Annual income.....
.....
Contact name and email address
.....
Website.....
.....

Please select the type of company that describes your organization:

- □ Public authority, public entity or public equivalent body
- □ SME*
- □ Large company
- □ Academia / Public Research institute
- □ Private Research institute
- □ Not-for-profit organization
- □ Start up / spin off
- □ Other (please specify)

**For SMEs definition see https://single-market-economy.ec.europa.eu/smes/sme-fundamentals/sme-definition_en#:~:text=Small%20and%20medium%2Dsized%20enterprises,targeted%20specifically%20at%20these%20enterprises.*

Describe the purpose of your company and, if applicable, the field(s) of R&D you are involved in (max 250 words):
.....
.....
.....

Your presence on the market is:

- □ Local
- □ Regional
- □ National
- □ European
- □ International
- □ Not applicable

Do you or does your organization consider Renewable Energy (RE) technologies and the related technologies as a core part of your work?

- □ Yes, it is a core part of our work
- □ No, it is not a core part of our work, but we are interested in understanding innovation procurement (PCP/PPI)

□ No, it is not a core part of our work, but we are interested in the potential technologies developed

Do you have relevant experience in any of the relevant fields below? Please respond to the question by mentioning the average years of experience your company has in the corresponding boxes. Multiple selections allowed]

Activity Field	Collaboration	Service Provider	Supplier	No experience
Crisis response				
Humanitarian work				
Health or civil protection				

In addition, do you have experience in researching, developing, buying or selling Renewable Energy (RE) / low emission technologies? Please respond to the question by mentioning the average years of experience your company has in the corresponding boxes. [Multiple selections allowed]

Activity / Technology	Research	Development	Acquisition/Procurement	Sales	No experience
Solar energy based technology					
Hydrogen based technology					
Biomethanol based technology					
Hybrid solutions					
Energy storage systems Li-ion Technologies					
Energy storage systems Sodium-ion Technologies					

Are you qualified in relevant research and development areas which are not listed in question 6?
If so, please list them and mention the years of experience your company has:
1.....
.....
2.....
.....
3.....
.....
4.....
.....
5.....
.....

Do you have any background in Renewable Energy (RE) technologies for the transition towards a low-emission, reliable, self-sufficient, mobile power supply Emergency Shelters (ESs) and Bases of Operation (BoO)?

□ Yes (Please precise your activities): .....
.....
.....)
□ No
□ No, but my organization researches or has an interest in technology applicable which meet this need (please, give examples and mention the average years of experience:.....
.....
.....)

PART 2. STATE OF THE ART

The project's ambition is to deliver Renewable Energy (RE) technologies for the transition towards a low-emission, reliable, self-sufficient, mobile power supply for Emergency Shelters (ESs) and Bases of Operation (BoO)**. To guarantee the level of innovation required for the POWERBASE project, we need to identify the technologies available on the market which could answer to our needs, based on the following criteria or preliminary functional requirements. In particular:**

Scalability
Modularity: Flexibility in peak energy handling, capable of integrating generator, battery, and solar sources composed components suitable to the specific operation
Environmental adaptability and robustness
Mobility and transportability (e.g. airplane, truck, ship)
Ease of maintenance
Integration with existing Infrastructure
Rapid deployment capability into remote areas
Grid independence: Energy self-sufficiency
Easy and brief installation, low-complexity assembly.
Data monitoring and remote maintenance

What are the gaps and/or weaknesses to be overcome to address POWERBASE needs, i.e. to address the aforementioned features altogether ? (max 250 words)

Is your company already able to provide solutions answering to one or several of the main features described above?
□ No
□ Yes (Please precise which features are available and the level of performance reached:
.....
.....

What is the Technology Readiness Level (TRL) of your solution? (TRL 1-9)

Is your technology categorized as research, prototype, or commercial off-the-shelf (COTS)?

Based on your experience, what are the potential market risks that could jeopardize the return on investment and business goals of suppliers? (max 250 words)

PART 3. THE FUTURE OF THE PROJECT

Considering what you know so far from Powerbase project

What features/technologies do you think should be included in the POWERBASE solution? If you think some components are more essential than others, we kindly ask you to specify it. (Please list a maximum of 5 solutions in decreasing order of importance)

1.....
.....
2.....
.....
3.....
.....
4.....
.....
5.....
.....

According to you, what are the essential conditions for the POWERBASE technology to be economically successful on the market? (Please list a maximum of 3 conditions in decreasing order of importance)
1.....
.....
2.....
.....
3.....
.....

Which core technologies can your company provide to address POWERBASE needs and challenges? (250 words max) Please upload photos/pdf files (for leaflets) etc

From a financial perspective, how would you evaluate the investment required to deliver the expected innovation? Please provide an evaluation of both the global investment and the main cost items (project management, R&D, development, test and pilots, HR...)

From a human resources perspective, how much time is required to deliver the expected innovation?

What concerns do you have about POWERBASE project?
□ Technological limitations
□ Business model
□ Cooperation
□ Timing
□ Legal constraints (GDPR legislation and data protection)
□. Process Confidentiality /Patents
□ Available funding
□ Intellectual Property Rights
□ Acceptance by the general public
□ Acceptance /adoption by the professionals/ emergency response organizations
□ Other (please specify) :
.....
.....

Which criteria do you consider will be relevant to evaluate the POWERBASE solutions?
□ Scalability

□ Modularity
□ Environmental adaptability and robustness
□ Mobility and transportability (e.g. airplane, truck, ship)
□ Ease of maintenance
□ Integration with existing Infrastructure
□ Rapid deployment capability into remote areas
□ Grid independence: Energy self-sufficiency
□ Easy and brief installation, low-complexity assembly.
□ Data monitoring and remote maintenance
□ Interoperability
□ Price
□ Innovation degree
□ Commercialization Plan
□ Other (please specify) : .....
.....

According to you, does the POWERBASE challenge foster breakthrough innovation?
□ Yes
□ No, explain what circumstances hinder innovation

What other research areas should we invest in to answer POWERBASE needs? Do you think that POWERBASE needs would be better addressed if the solution were to integrate other relevant technological solutions? (priority order)
1.....
.....
2.....
.....
3.....
.....
4.....
.....
5.....
.....

Have you ever collaborated with other companies to carry out a R&D project?
□ Yes,
□ No,
If no, are you reluctant about this?

If you were to join a consortium for POWERBASE future call for tenders, which concerns would you have regarding intellectual property rights and protection of industrial and commercial secrets? (max 200 words)

If you were to join a consortium for POWERBASE future call for tenders, which concerns would have regarding potential legal and commercial threats or risks your solution could face? (max 200 words)

Do you consider the possibility to collaborate with other organization(s)/ company(ies)/ consortium (a) to submit a tender?
□ Yes, specify the sector

□ No

At this stage, is your organization/ company/ consortium interested in taking part in the POWERBASE innovation challenge?
□ Yes
□ No
□ Uncertain. Please mention your areas of concern and/or the reasons for your uncertainty.
□ Not applicable

PART. 4 The POWERBASE Open Market Consultation activities
The activities organized within the OMC will enable interaction with potential participants and collect market feedback for the planned PCP and **constitute a unique opportunity for networking and cross-disciplinary collaboration between companies and research institutions.**

Do you intend to attend the Open Market Consultation event to be held in Brussels on 12.06.2025?
□ Yes, on site
□ Yes, online
□ No
□ Uncertain
□ Not applicable

Do you intend to participate in a Technology Showcase to be held from March to August 2025?
□ Yes
□ No
□ Uncertain

Do you intend to participate in the OMC workshop to be held in Athens, on XX.09.2025?

□ Yes, on site
□ Yes, online
□ No
□ Uncertain
□ Not applicable

Are there any other questions or ideas you would like to share with the POWERBASE Team? (max 250 words)

Final information
This form collects data and will save it in our database in accordance with European GDPR regulations. Please see our privacy policy for further information on how we protect and manage your submitted data.*

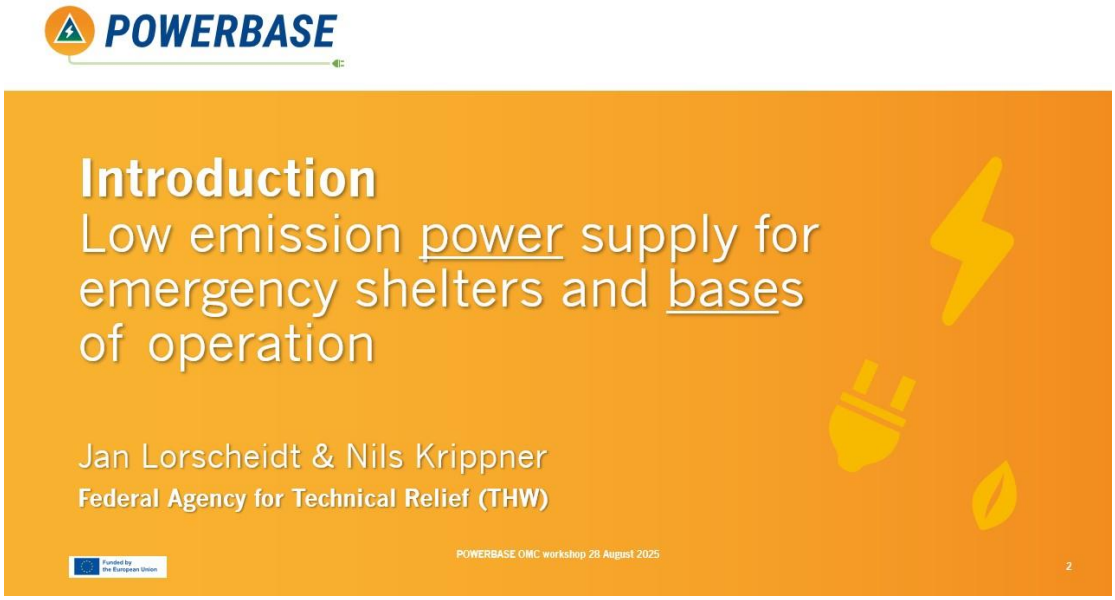
I consent to having POWERBASE collect my data from this form so that the POWERBASE team can contact me! *

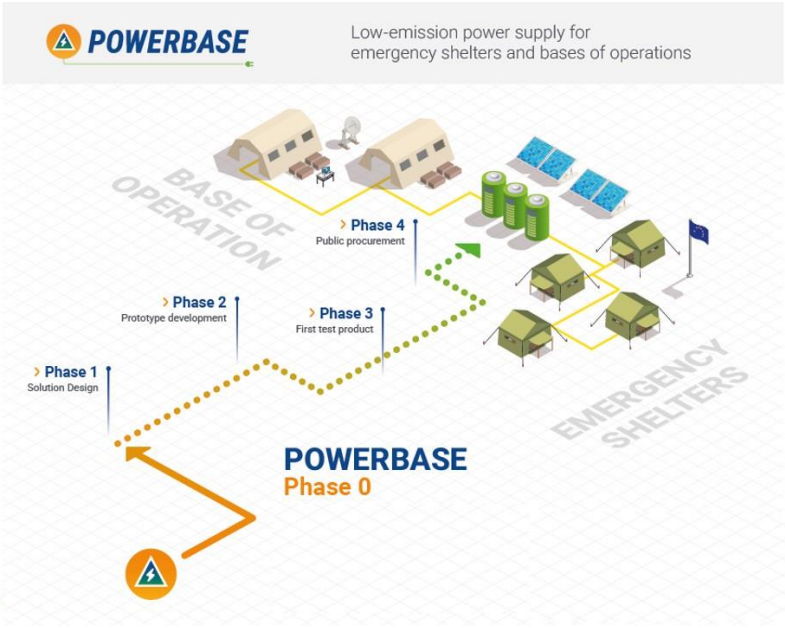
Receive important information about project events by e-mail.

I agree to receive emails about project events (e.g. Open Market Consultation).

The receipt of this information via e-mail can be cancelled at any time. To do so, send an e-mail to communication@powerbaseproject.eu.

Annex VI OMC Workshop





POWERBASE

Background

- **Power is a necessity** in all missions
- **Fossil fuels** are the primary energy source
- UCPM Units are by definition **self-sufficient**
- UCPM Units buy often fuels on the **local market**
- Green Deal: **Climate neutral Europe** by 2050

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Fossil Fuel Generators

Advantages

› Cheap, mobile, reliable, easy to maintain, scalable

Disadvantages

› Heat, noise and greenhouse gas emission, vibrations, availability of fossil fuels, logistics

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Key Facts

› 12 partners (8 Emergency Response Organisations)
› 10 European Countries
› Duration: 10/2024 – 09/2025
› Coordination and Support Action
› Funding: ~1 Mio. €

POWERBASE

Partners

Technisches Hilfswerk

MINISTÈRE DE L'INTÉRIEUR ET DES OUTRE-MER
Liberté
Égalité
Fraternité

Fraunhofer INT

VIEIRA PROCUREMENT LEGAL SERVICES

MINISTERO DELL'INTERNO

Myndigheten för samhällsskydd och beredskap

KEMEA

ARTTIC BY PNO GROUP

ASSR

ÖSTERREICHISCHES ROTES KREUZ

GB gezamenlijke brandweer

MAGYAR MÁLTAI SZERETETSZOLGÁLAT

Coordinator:
Technisches Hilfswerk (THW) = Federal Agency for Technical Relief

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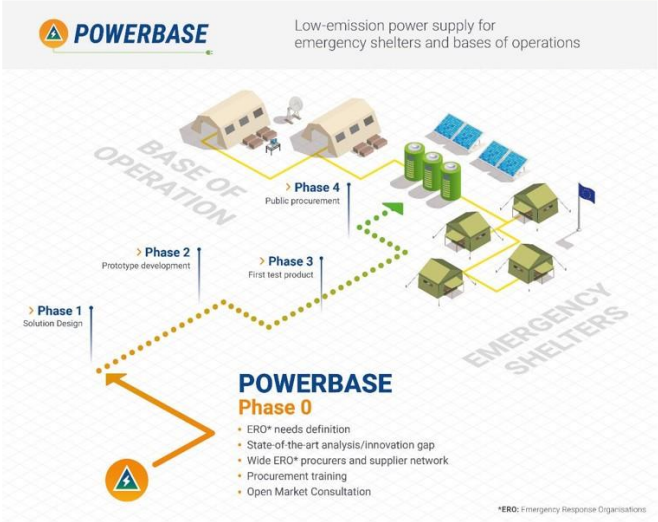
Vision

- Groundwork for future **innovation procurement** processes
- **End-user driven approach**
- Aiming for highly innovative **low-emission energy solutions** for emergency shelters and bases of operation



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Objectives

- Describing **common unmet needs** for renewable energy supply in future relevant emergency response scenarios
- Developing a holistic **State-of-the-Art-Analysis** of commercially available renewable energy solutions and emerging technologies
- Accelerating innovation uptake by **strengthening public procurers** on **innovation procurement**
- Fostering **cross-sectoral stakeholder engagement** on end-user needs and renewable energy solutions

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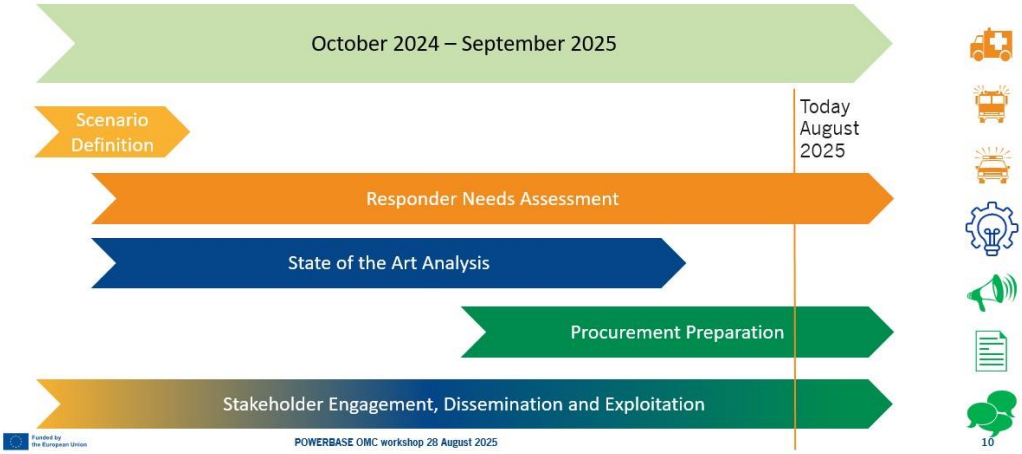
Activities and Milestones



Project activities: scenario definition & needs assessment

consortium workshops

national workshops

What is Innovation Procurement?

Commission notice (2021 C 267/01) :

"Innovation procurement" refers to any procurement that has one or both of the following aspects:

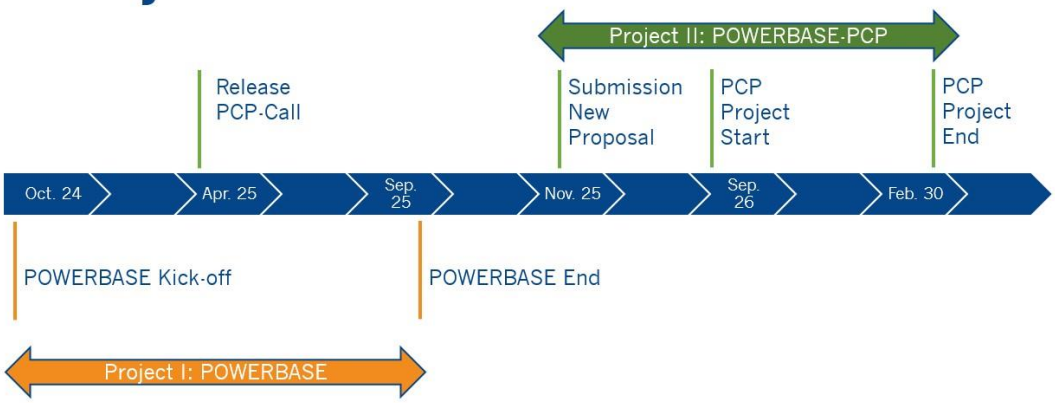
- **buying the outcomes of innovation;**
- **buying the process of innovation** – research and development services – with (partial) outcomes.

Pre-commercial Procurement (PCP)

R&D is needed to identify an innovative solution to satisfy public procurers' needs.

No solutions exist yet on the market that meet public procurers' needs and based on a search conducted by the procurers, it does not seem that such a solution will be available on a short-term notice.

Projects Timeline



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Thank you

POWERBASE Team THW
project-powerbase@thw.de

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Driving Innovation: Open Market Consultation for a Pre-Commercial Procurement

Eleni Lianou & Antonis Saoulidis
Center for Security Studies (KE.ME.A)

Funded by the European Union

POWERBASE OMC workshop 28 August 2025

Coordination and Support Action (CSA)

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✓ a preparatory action

✓ builds the grounds of a future Pre-Commercial Procurement (PCP) action oriented to the acquisition of R&D services

✗ no procurement

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Open Market Consultation

Structured dialogue between public buyers, end users and the market

Key step in preparing for innovation procurement – especially when the solution does not yet fully exist or is still emerging

Collection of input from suppliers, researchers and innovators before a formal procurement process begins

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POWERBASE OMC

Is there an available solution of the market?

No ➡ Innovation procurement

Is there an innovation gap?

- No ➡ Public Procurement of Innovative Solutions (PPI)
- Yes ➡ Pre-commercial Procurement (PCP)

Directive 2014/24/EU (Art.2 par.22) defines innovation:

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"the implementation of a **new or significantly improved** product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organization or external relations inter alia with the purpose of **helping to solve societal challenges** or to support the **Europe 2020 strategy for smart, sustainable and inclusive growth**"

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What is Innovation Procurement

Commission notice (2021 C 267/01) :

"Innovation procurement" refers to any procurement that has one or both of the following aspects:

- **buying the process of innovation** – research and development services – with (partial) outcomes;
- **buying the outcomes of innovation**.

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Buying the process of innovation – research and development services – with (partial) outcomes

The public buyer buys the research and development services of products, services or processes, which do not exist yet.

The public buyer describes its need, prompting businesses and researchers to develop innovative products, services or processes to meet the need.

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Buying the outcomes of innovation

The public buyer, instead of buying off-the-shelf, acts as an early adopter and buys a product, service or process that is **new to the market** and contains **substantially novel characteristics**

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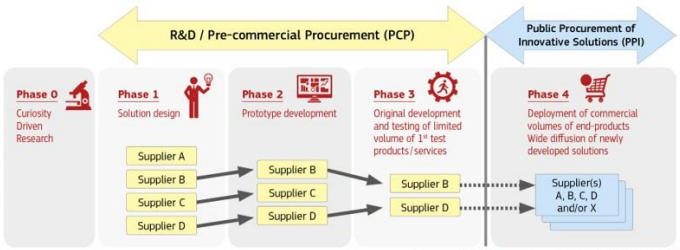
Pre-commercial Procurement (PCP)

R&D is needed to identify an innovative solution to satisfy public procurers' needs.

No solutions exist yet on the market that meet public procurers' needs and based on a search conducted by the procurers, it does not seem that such a solution will be available on a short-term notice.

Pre-commercial Procurement (PCP)



Source: European Commission COM(2007) 799 final

PCP is a public procurement of Research and Development **(R&D) services** characterized by:

- **competitive** development in **phases** with the number of competing R&D providers being reduced after each phase subsequent to intermediate evaluations.
- **risk-benefit sharing** under market conditions related to the IPRs resulting from the R&D.
- a clear **separation** between the procurement of the R&D from the deployment of **commercial volumes of end-products**

Pre-commercial Procurement (PCP)

Advantages of PCP

For the public sector

1. Improves the quality and/or efficiency of public services.
2. Allows obtaining better quality products at lower price.
3. Reduces risk of failure in follow-up PPI procurements.

For the market

1. Accelerates the process of bringing scientific results to market.
2. Shortens time-to-market for innovative products and services
3. Facilitates the access of new innovative players to the market.
4. Stimulates company growth and attract private investment.

For the society

1. Better use of public resources.
2. Helps tackling environmental and social challenges.
3. Creates high added-value jobs in Europe and contributes to sustainable economic growth.

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Intellectual property rights (IPRs) issues

- Ownership of results (foreground)
- Declaration of pre-existing rights (background IPRs)
- Protection of the results
- Commercial exploitation of results
- Promotion of R&D by the Buyers' Group

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Thank you!

POWERBASE team KE.ME.A

communication@powerbaseproject.eu

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Scenarios

Author: Jakub Liščinský

Samaritan Slovakia

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Scenario Definition

Pictures: Flickr, Wikimedia

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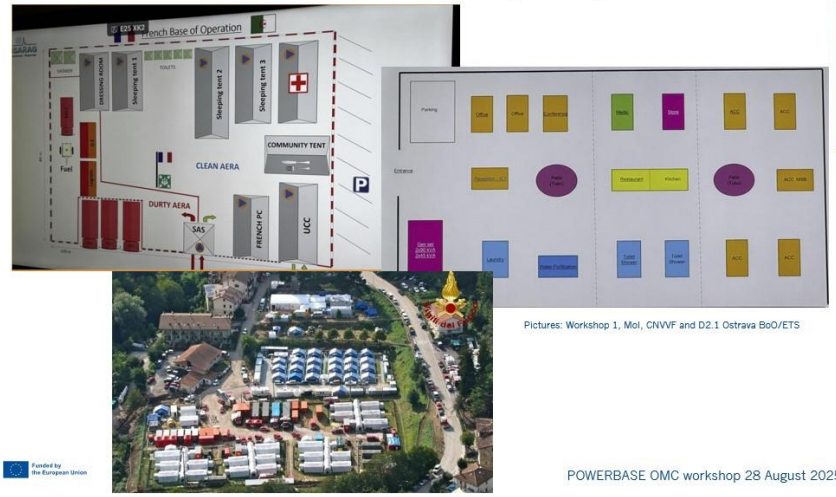
Scenario Definition (ctd)



Pictures: Workshop 1, MoI, CNVVF and D2.1 Ostrava BoO/ETS

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Needs & Requirements

Sandra Nestlinger

Austrian Red Cross

Funded by the European Union

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POWERBASE

Needs & Requirements?!

Generation – Conversion – Storage

Pictures: Powerbase Consortium Partners

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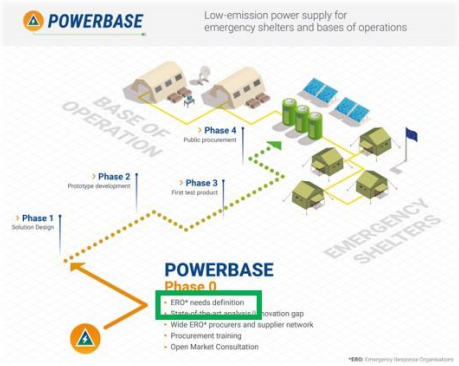
Why are requirements needed?

R&D is needed to identify an innovative solution to satisfy public procurers' needs.

No solutions exist yet on the market that meet public procurers' needs and based on a search conducted by the procurers, it does not seem that such a solution will be available on a short-term notice.



Graph: Powerbase Consortium

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When have requirements been defined?

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Who was defining the needs?

Logos: Powerbase Consortium Partners

Picture: Powerbase Requirements Survey

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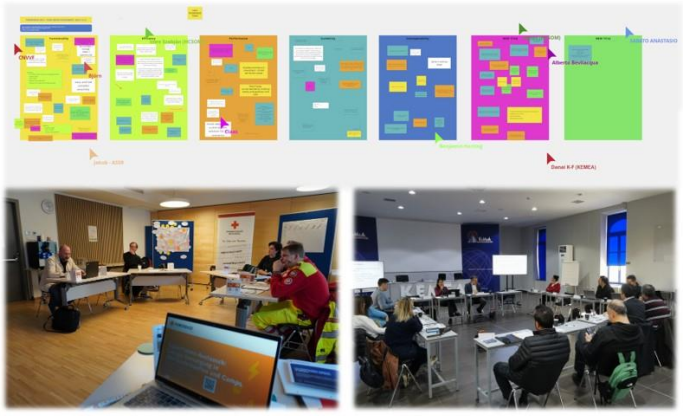
How have needs been identified?



3.3. Consolidated Clustered Results

Pictures: Austrian Red Cross, KEMEA and Deliverables

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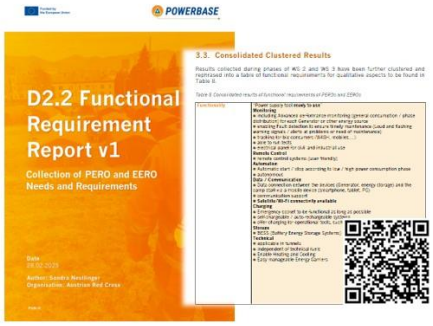
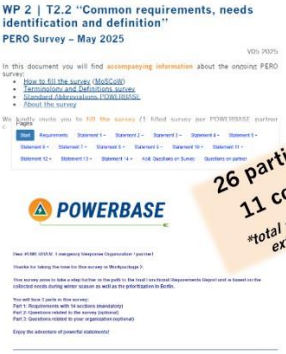
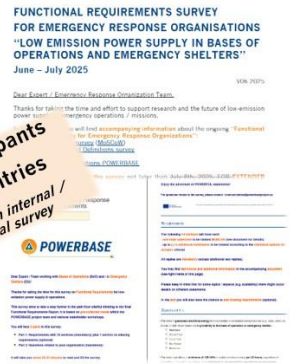
Where have needs been published?



Pictures: Powerbase Deliverables, www.powerbaseproject.eu

How have needs been re-fined?





26 participants
11 countries
*total from internal / external survey

Pictures: Powerbase Consortium (WS4), Excerpts Powerbase EU Surveys

What are the preliminary results?

Final Require -ments Report

!Caution! This results are preliminary from a Deliverable in progress!

The system generates electrical energy from renewable or renewable-based sources (e.g., solar, wind, bio-based, or hybrid combinations) in proximity to the base of operation or emergency shelter.

~30% Must
>60% Should / Could
~4% Won't

The system produces a minimum of 120 kWh of usable electrical energy per 24 hours, regardless of prevailing local weather conditions, when deployed in representative operational environments. Performance to be verified through simulated or field tests across diverse climate zones and during different seasons.

>60% approved
~19% each for >80 and >150 kWh

The system includes an integrated solution for storing energy at the base of operation or emergency shelter to ensure reliable power availability for required use.

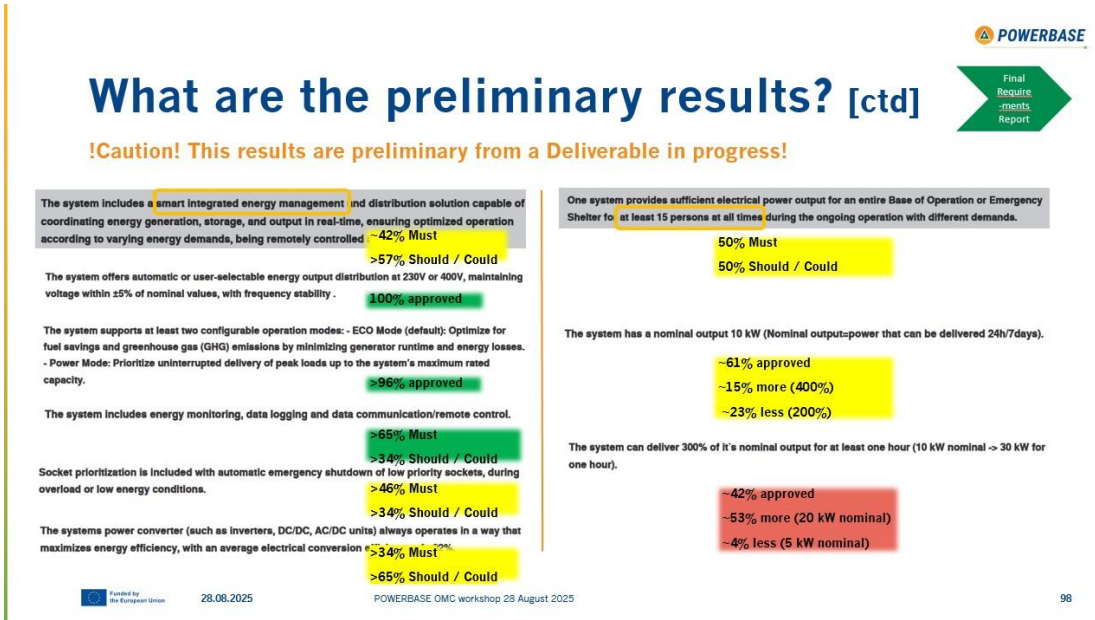
~46% Must
~53% Should

The storage supports variable energy input and output profiles and function in standalone and hybrid generation setups.

~46% Must
>53% Should / Could

The system provides at least 20 kWh of usable electrical energy storage, measured as net energy available for consumption after internal conversion losses.

~60 % approved,
>25% for more >50 kWH


POWERBASE
What are the preliminary results? [ctd]
Final Require -ments Report
!Caution! This results are preliminary from a Deliverable in progress!
The system includes a smart integrated energy management and distribution solution capable of coordinating energy generation, storage, and output in real-time, ensuring optimized operation according to varying energy demands, being remotely controlled
~42% Must
>57% Should / Could
The system offers automatic or user-selectable energy output distribution at 230V or 400V, maintaining voltage within ±5% of nominal values, with frequency stability .
100% approved
The system supports at least two configurable operation modes: - ECO Mode (default): Optimize for fuel savings and greenhouse gas (GHG) emissions by minimizing generator runtime and energy losses. - Power Mode: Prioritize uninterrupted delivery of peak loads up to the system's maximum rated capacity.
>96% approved
The system includes energy monitoring, data logging and data communication/remote control.
>65% Must
>34% Should / Could
Socket prioritization is included with automatic emergency shutdown of low priority sockets, during overload or low energy conditions.
>46% Must
>34% Should / Could
The systems power converter (such as inverters, DC/DC, AC/DC units) always operates in a way that maximizes energy efficiency, with an average electrical conversion
>34% Must
>65% Should / Could
One system provides sufficient electrical power output for an entire Base of Operation or Emergency Shelter fo at least 15 persons at all times during the ongoing operation with different demands.
50% Must
50% Should / Could
The system has a nominal output 10 kW (Nominal output=power that can be delivered 24h/7days).
~61% approved
~15% more (400%)
~23% less (200%)
The system can deliver 300% of it´s nominal output for at least one hour (10 kW nominal -> 30 kW for one hour).
~42% approved
~53% more (20 kW nominal)
~4% less (5 kW nominal)
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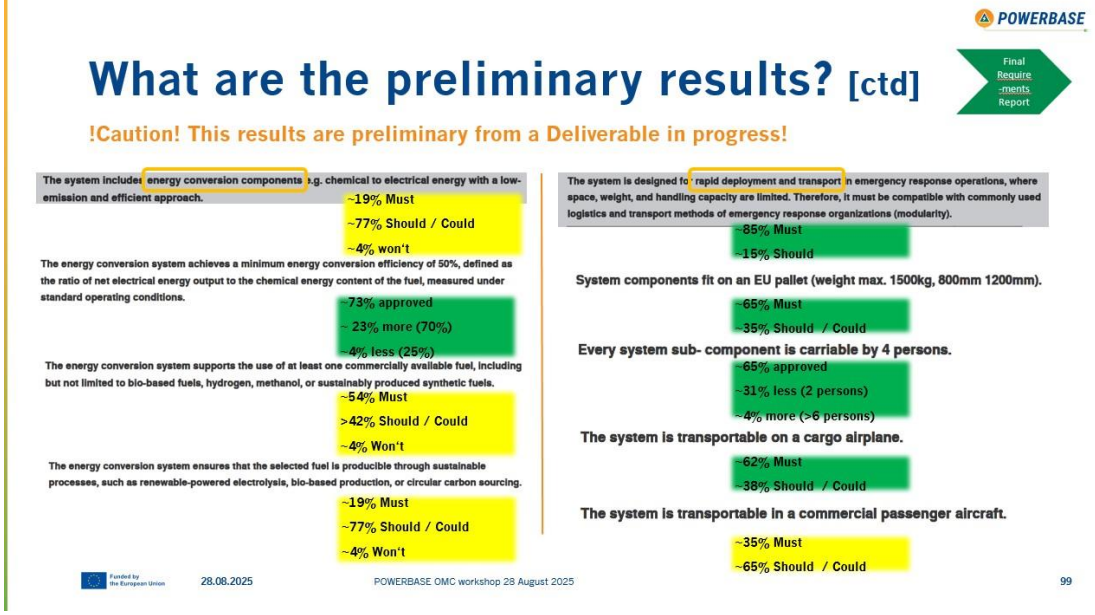
POWERBASE
What are the preliminary results? [ctd]
Final Require -ments Report
!Caution! This results are preliminary from a Deliverable in progress!
The system includes energy conversion components e.g. chemical to electrical energy with a low-emission and efficient approach.
~19% Must
~77% Should / Could
~4% won't
The energy conversion system achieves a minimum energy conversion efficiency of 50%, defined as the ratio of net electrical energy output to the chemical energy content of the fuel, measured under standard operating conditions.
~73% approved
~ 23% more (70%)
~4% less (25%)
The energy conversion system supports the use of at least one commercially available fuel, including but not limited to bio-based fuels, hydrogen, methanol, or sustainably produced synthetic fuels.
~54% Must
>42% Should / Could
~4% Won't
The energy conversion system ensures that the selected fuel is producible through sustainable processes, such as renewable-powered electrolysis, bio-based production, or circular carbon sourcing.
~19% Must
~77% Should / Could
~4% Won't
The system is designed fo rapid deployment and transport in emergency response operations, where space, weight, and handling capacity are limited. Therefore, it must be compatible with commonly used logistics and transport methods of emergency response organizations (modularity).
~85% Must
~15% Should
System components fit on an EU pallet (weight max. 1500kg, 800mm 1200mm).
~65% Must
~35% Should / Could
Every system sub- component is carriable by 4 persons.
~65% approved
~31% less (2 persons)
~4% more (>6 persons)
The system is transportable on a cargo airplane.
~62% Must
~38% Should / Could
The system is transportable in a commercial passenger aircraft.
~35% Must
~65% Should / Could
Funded by the European Union
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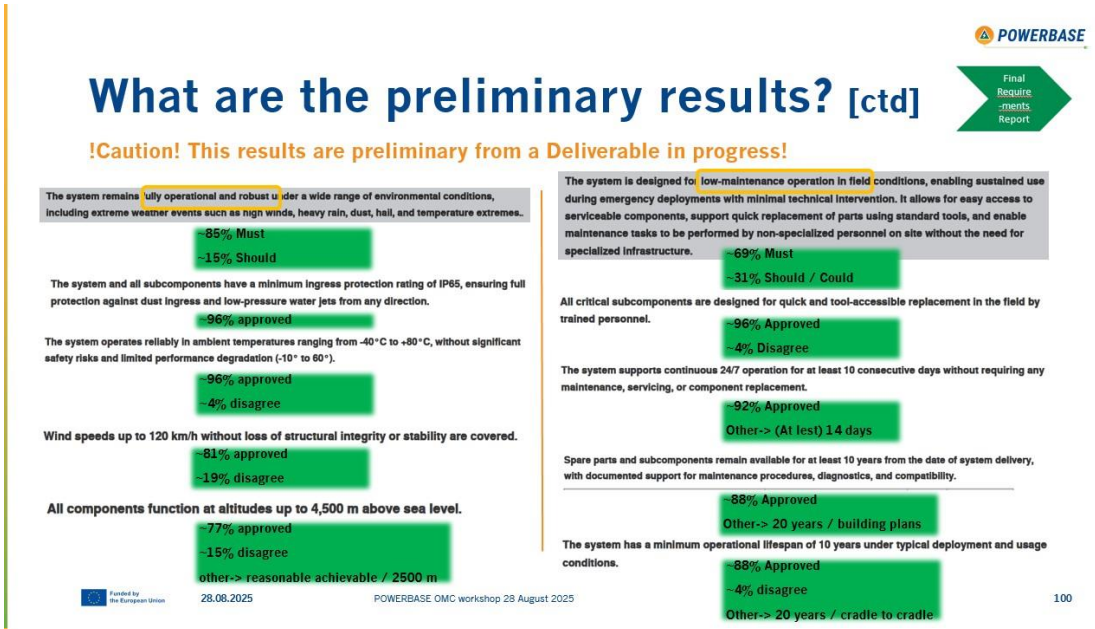
POWERBASE
What are the preliminary results? [ctd]
Final Require -ments Report
!Caution! This results are preliminary from a Deliverable in progress!
The system remains fully operational and robust under a wide range of environmental conditions, including extreme weather events such as high winds, heavy rain, dust, hail, and temperature extremes..
~85% Must
~15% Should
The system and all subcomponents have a minimum ingress protection rating of IP65, ensuring full protection against dust ingress and low-pressure water jets from any direction.
~96% approved
The system operates reliably in ambient temperatures ranging from -40°C to +80°C, without significant safety risks and limited performance degradation (-10° to 60°).
~96% approved
~4% disagree
Wind speeds up to 120 km/h without loss of structural integrity or stability are covered.
~81% approved
~19% disagree
All components function at altitudes up to 4,500 m above sea level.
~77% approved
~15% disagree
other-> reasonable achievable / 2500 m
The system is designed for low-maintenance operation in field conditions, enabling sustained use during emergency deployments with minimal technical intervention. It allows for easy access to serviceable components, support quick replacement of parts using standard tools, and enable maintenance tasks to be performed by non-specialized personnel on site without the need for specialized infrastructure.
~69% Must
~31% Should / Could
All critical subcomponents are designed for quick and tool-accessible replacement in the field by trained personnel.
~96% Approved
~4% Disagree
The system supports continuous 24/7 operation for at least 10 consecutive days without requiring any maintenance, servicing, or component replacement.
~92% Approved
Other-> (At lest) 14 days
Spare parts and subcomponents remain available for at least 10 years from the date of system delivery, with documented support for maintenance procedures, diagnostics, and compatibility.
~88% Approved
Other-> 20 years / building plans
The system has a minimum operational lifespan of 10 years under typical deployment and usage conditions.
~88% Approved
~4% disagree
Other-> 20 years / cradle to cradle
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28.08.2025
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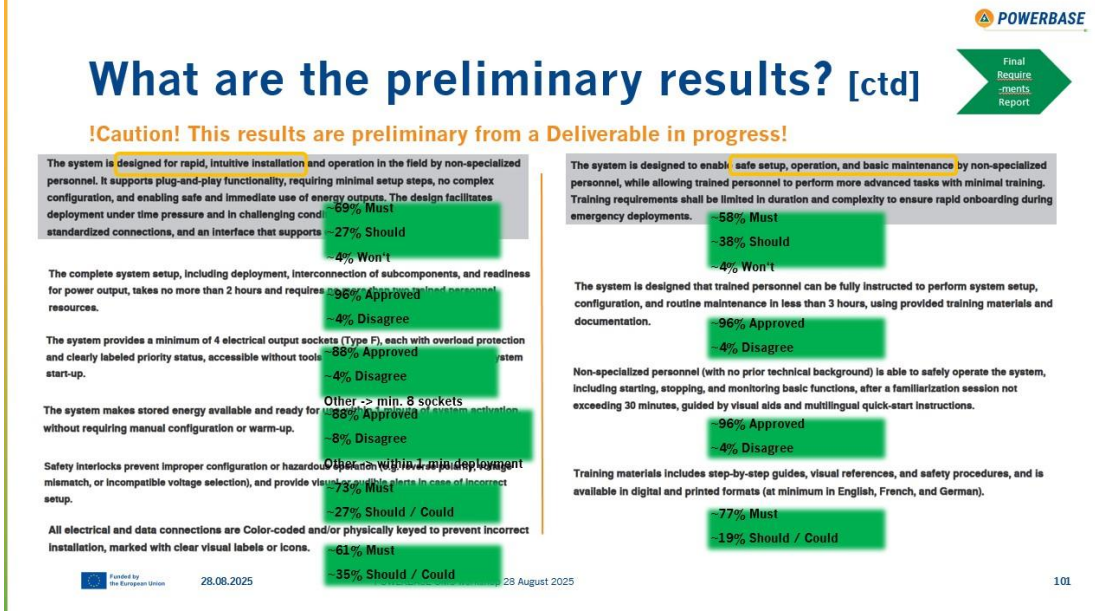
100


POWERBASE
What are the preliminary results? [ctd]
Final Require -ments Report
!Caution! This results are preliminary from a Deliverable in progress!
The system is designed for rapid, intuitive installation and operation in the field by non-specialized personnel. It supports plug-and-play functionality, requiring minimal setup steps, no complex configuration, and enabling safe and immediate use of energy outputs. The design facilitates deployment under time pressure and in challenging cond standardized connections, and an interface that supports
~69% Must
~27% Should
~4% Won't
The complete system setup, including deployment, interconnection of subcomponents, and readiness for power output, takes no more than 2 hours and requires no more than two trained personnel resources.
~96% Approved
~4% Disagree
The system provides a minimum of 4 electrical output sockets (Type F), each with overload protection and clearly labeled priority status, accessible without tools ystem start-up.
~88% Approved
~4% Disagree
Other -> min. 8 sockets
The system makes stored energy available and ready for u without requiring manual configuration or warm-up.
~88% Approved
~8% Disagree
Other -> within 1 min deployment
Safety interlocks prevent improper configuration or hazardou mismatch, or incompatible voltage selection), and provide visu setup.
~73% Must
~27% Should / Could
All electrical and data connections are Color-coded and/or physically keyed to prevent incorrect installation, marked with clear visual labels or icons.
~61% Must
~35% Should / Could
The system is designed to enable safe setup, operation, and basic maintenance by non-specialized personnel, while allowing trained personnel to perform more advanced tasks with minimal training. Training requirements shall be limited in duration and complexity to ensure rapid onboarding during emergency deployments.
~58% Must
~38% Should
~4% Won't
The system is designed that trained personnel can be fully instructed to perform system setup, configuration, and routine maintenance in less than 3 hours, using provided training materials and documentation.
~96% Approved
~4% Disagree
Non-specialized personnel (with no prior technical background) is able to safely operate the system, including starting, stopping, and monitoring basic functions, after a familiarization session not exceeding 30 minutes, guided by visual aids and multilingual quick-start instructions.
~96% Approved
~4% Disagree
Training materials includes step-by-step guides, visual references, and safety procedures, and is available in digital and printed formats (at minimum in English, French, and German).
~77% Must
~19% Should / Could
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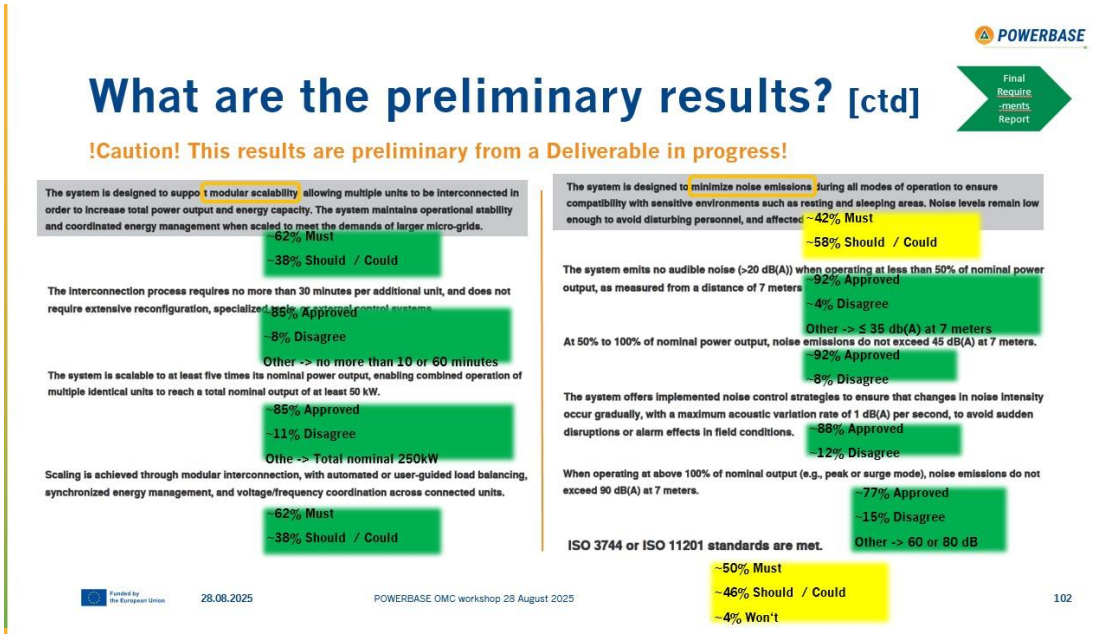
POWERBASE
What are the preliminary results? [ctd]
Final Require -ments Report
!Caution! This results are preliminary from a Deliverable in progress!
The system is designed to suppo t modular scalability allowing multiple units to be interconnected in order to increase total power output and energy capacity. The system maintains operational stability and coordinated energy management when scaled to meet the demands of larger micro-grids.
~62% Must
~38% Should / Could
The interconnection process requires no more than 30 minutes per additional unit, and does not require extensive reconfiguration, specialized tools, or advanced control systems.
~85% Approved
~8% Disagree
Other -> no more than 10 or 60 minutes
The system is scalable to at least five times its nominal power output, enabling combined operation of multiple identical units to reach a total nominal output of at least 50 kW.
~85% Approved
~11% Disagree
Othe -> Total nominal 250kW
Scaling is achieved through modular interconnection, with automated or user-guided load balancing, synchronized energy management, and voltage/frequency coordination across connected units.
~62% Must
~38% Should / Could
The system is designed to minimize noise emissions during all modes of operation to ensure compatibility with sensitive environments such as resting and sleeping areas. Noise levels remain low enough to avoid disturbing personnel, and affected
~42% Must
~58% Should / Could
The system emits no audible noise (>20 dB(A)) when operating at less than 50% of nominal power output, as measured from a distance of 7 meters
~92% Approved
~4% Disagree
Other -> ≤ 35 db(A) at 7 meters
At 50% to 100% of nominal power output, noise emissions do not exceed 45 dB(A) at 7 meters.
~92% Approved
~8% Disagree
The system offers implemented noise control strategies to ensure that changes in noise intensity occur gradually, with a maximum acoustic variation rate of 1 dB(A) per second, to avoid sudden disruptions or alarm effects in field conditions.
~88% Approved
~12% Disagree
When operating at above 100% of nominal output (e.g., peak or surge mode), noise emissions do not exceed 90 dB(A) at 7 meters.
~77% Approved
~15% Disagree
Other -> 60 or 80 dB
ISO 3744 or ISO 11201 standards are met.
~50% Must
~46% Should / Could
~4% Won't
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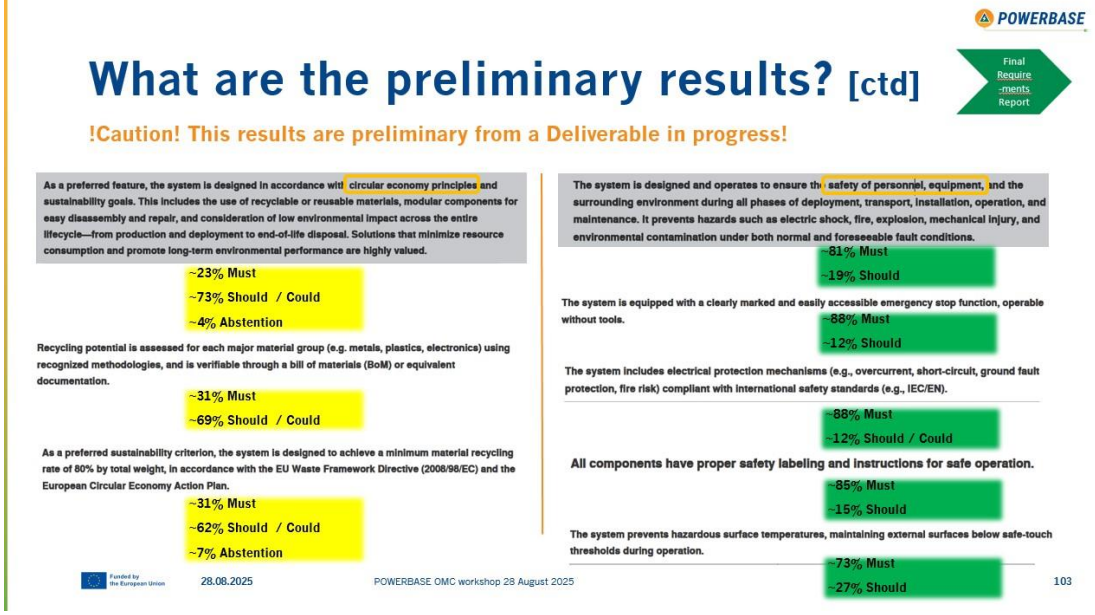
POWERBASE
What are the preliminary results? [ctd]
Final Require -ments Report
!Caution! This results are preliminary from a Deliverable in progress!
As a preferred feature, the system is designed in accordance with circular economy principles and sustainability goals. This includes the use of recyclable or reusable materials, modular components for easy disassembly and repair, and consideration of low environmental impact across the entire lifecycle—from production and deployment to end-of-life disposal. Solutions that minimize resource consumption and promote long-term environmental performance are highly valued.
~23% Must
~73% Should / Could
~4% Abstention
Recycling potential is assessed for each major material group (e.g. metals, plastics, electronics) using recognized methodologies, and is verifiable through a bill of materials (BoM) or equivalent documentation.
~31% Must
~69% Should / Could
As a preferred sustainability criterion, the system is designed to achieve a minimum material recycling rate of 80% by total weight, in accordance with the EU Waste Framework Directive (2008/98/EC) and the European Circular Economy Action Plan.
~31% Must
~62% Should / Could
~7% Abstention
The system is designed and operates to ensure the safety of personnel, equipment, and the surrounding environment during all phases of deployment, transport, installation, operation, and maintenance. It prevents hazards such as electric shock, fire, explosion, mechanical injury, and environmental contamination under both normal and foreseeable fault conditions.
~81% Must
~19% Should
The system is equipped with a clearly marked and easily accessible emergency stop function, operable without tools.
~88% Must
~12% Should
The system includes electrical protection mechanisms (e.g., overcurrent, short-circuit, ground fault protection, fire risk) compliant with international safety standards (e.g., IEC/EN).
~88% Must
~12% Should / Could
All components have proper safety labeling and instructions for safe operation.
~85% Must
~15% Should
The system prevents hazardous surface temperatures, maintaining external surfaces below safe-touch thresholds during operation.
~73% Must
~27% Should
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When are the results fully charged?

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Review in progress for Final Requirem. **Report** (Aug - Sep 2025)

Published Final Requirements **Report** (Sep 2025)

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How to link to other results?

Cross-check with results of D2.4 / D2.5 **State of the Art Analysis**

Summarizing with **OMC** on **Decision** on path forward to **Pre-Commercial-Procurement** (Proposal/Project)

Graph: Powerbase Consortium


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D2.2 Functional Requirement Report v1
D2.3 Final Functional Requirement Report
Coming Soon – Stay tuned!
Thank you!
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State-of-the-Art
Björn Hoog, Julian Bickmann, Sonja Grigoleit, Maike Overmeyer
Fraunhofer INT
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What is a State-of-the-Art / Prior-Art Analysis

Purpose: produce a structured, critical synthesis of the latest technologies, methods and research in a domain, mapping what exists and how well it performs at the cutting edge.

Primary goal: establish quantitative metrics, strengths/limitations and emerging trends in both research and market offerings, creating a solid reference point before launching an Innovation Procurement Project or direct procurements

Decision support: gives stakeholders a shared, evidence-based picture, directing investment to significant gaps and de-risking subsequent projects.

Benchmarking step: the capabilities/performance identified are benchmarked against target requirements, highlighting viable solutions or any performance gaps

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Methodology

Narrowing the Research Scope: focusing of Bases of Operation and Emergency Shelters and technologies that are expected to be commercially ready by 2035

Systematic "4-Pillar Scan": Inputs from emergency-response practitioners, recent R&D projects, literature/market review, and partner data input + Patent and Bibliometric Analysis

Technology Fact Sheets (TFS): Detailed ones for commercial and high-promise technologies; mini-TFS for emerging low-emissions energy system technology

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Categories of analysed technology

Energy Harvesting & Direct Electricity Generation: Capturing ambient energy (e.g., sunlight, wind) or waste heat and converting it directly into electrical energy.

Energy Conversion: Transforming energy from one form (e.g. chemical or thermal) into another (such as electricity), using technologies like fuel cells, gas turbines, or diesel generators, and conversely converting it back through electrolysis to produce hydrogen.

Energy Storage: Storing energy (in batteries, capacitors, or fuels/chemical storage) when it is available, and releasing it later on demand, either directly or through an energy conversion technology.

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Examples of analysed technologies

Photovoltaic system
(https://commons.wikimedia.org/wiki/File:Photovoltaik_adlershof.jpg)

Fuel cells,
https://commons.wikimedia.org/wiki/File:Van_Hool,_Innotrans_2018,_Berlin_(P1070502).jpg

Thin Film Flexible Solar PV
(Ken Fields, https://de.m.wikipedia.org/wiki/Datei:Thin_Film_Flexible_Solar_PV_Installation_2.JPG)

Liquid Hydrogen
(https://www.energy.gov/sites/default/files/2021-10/doe-perspectives-lh2.pdf)

Wave energy converter
(https://commons.wikimedia.org/wiki/File:Pelamis_at_EMEC.jpg)

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Technology Fact Sheets

- Description of the Technology
- Current R&D and Market Trends
- Technical & Functional requirements
- Considerations for using this technology for a Basis of Operations or an Emergency Shelter

3.1.1. Crystalline silicon photovoltaic cells

Status:	Market available
Energy focus of the component:	Electricity-Generation
Key words:	PV, Solar, Sunlight, C-Si PV

Summary

Crystalline silicon photovoltaic cells provide a reliable and efficient renewable energy solution for various applications. Their high efficiency, long lifespan, and durability make them well-suited for both permanent and mobile power generation. Key advantages include strong performance under direct sunlight, scalability, and relatively low maintenance. However, c-Si PV systems require significant space, have high initial costs, and depend on sunlight, necessitating energy storage solutions for continuous power supply.

I. Definition, Motivation and Purpose

Photovoltaic (PV) cells are semiconductor devices that convert sunlight directly into electrical power, distinguishing them from solar thermal systems, which harness concentrated heat to generate energy. Initially developed for autonomous electricity generation in space for satellites, the motivation behind PV technology has evolved substantially to address pressing global energy challenges. At present, crystalline silicon (c-Si) PV or C-Si PV cells are central PV-technology aimed at reducing dependence on fossil fuels, mitigating climate change, and supplying clean electricity to remote regions [1]. Their high efficiency, reliability, and long-term stability have established them as the most widely adopted solar technology, suitable for both residential and large-scale commercial applications.

PUBLIC 27

Updated version will be available approx. October 25

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Technology Fact Sheets

33 Technologies described and analyzed in SOTA Fact Sheets

- 12 = Commercial of the Shelf technologies (COTS)
- 4 = Emerging highly promising technologies (EHPETs)
- 7 = Emerging moderately promising technologies (EMHPETs)
- 10 = Emerging lowly promising technologies (ELPETs)

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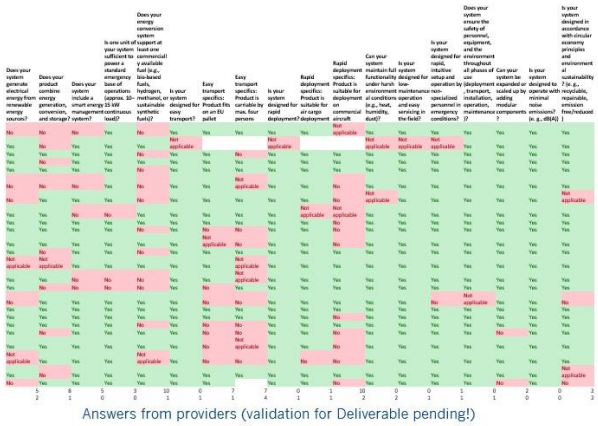
SOTA Survey preliminary insights

Answers from providers (validation for Deliverable prending)



Answers from providers (validation for Deliverable pending!)

Supplier Survey Results (24 Suppliers/Products):

	Sum of Products
> 5 Requirements Unmet	8
3-4 Requirements Unmet	7
1-2 Requirements Unmet	8
No Requirements Unmet	1

Sum of Unmet Requirements >10:

- Energy conversion system support commercially available fuel
- Product is suitable for deployment on commercial aircraft
- Product combine energy generation, conversion, and storage

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Conclusion of the State of the Art Analysis (so far)

› Component maturity

Most technologies that could form parts of a mobile energy-supply system are already well-developed and proven.

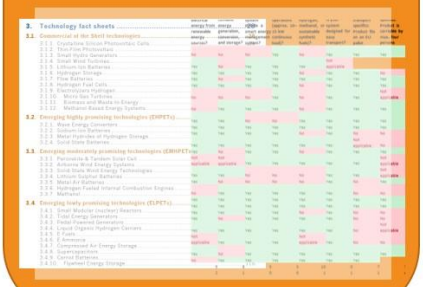
› Limited options

Only a few complete systems are on the market, generally and they are usually container-sized, on trailers, stationary, or very small units with modest capacity.

› Capability gaps

Existing products still seem to fall short of the demands posed by typical emergency-response scenarios and their derived requirements.

On basis of Fact Sheet analysis and ‚Supplier Survey' insights



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Thank you!

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Q&A Session

Audience Q&A

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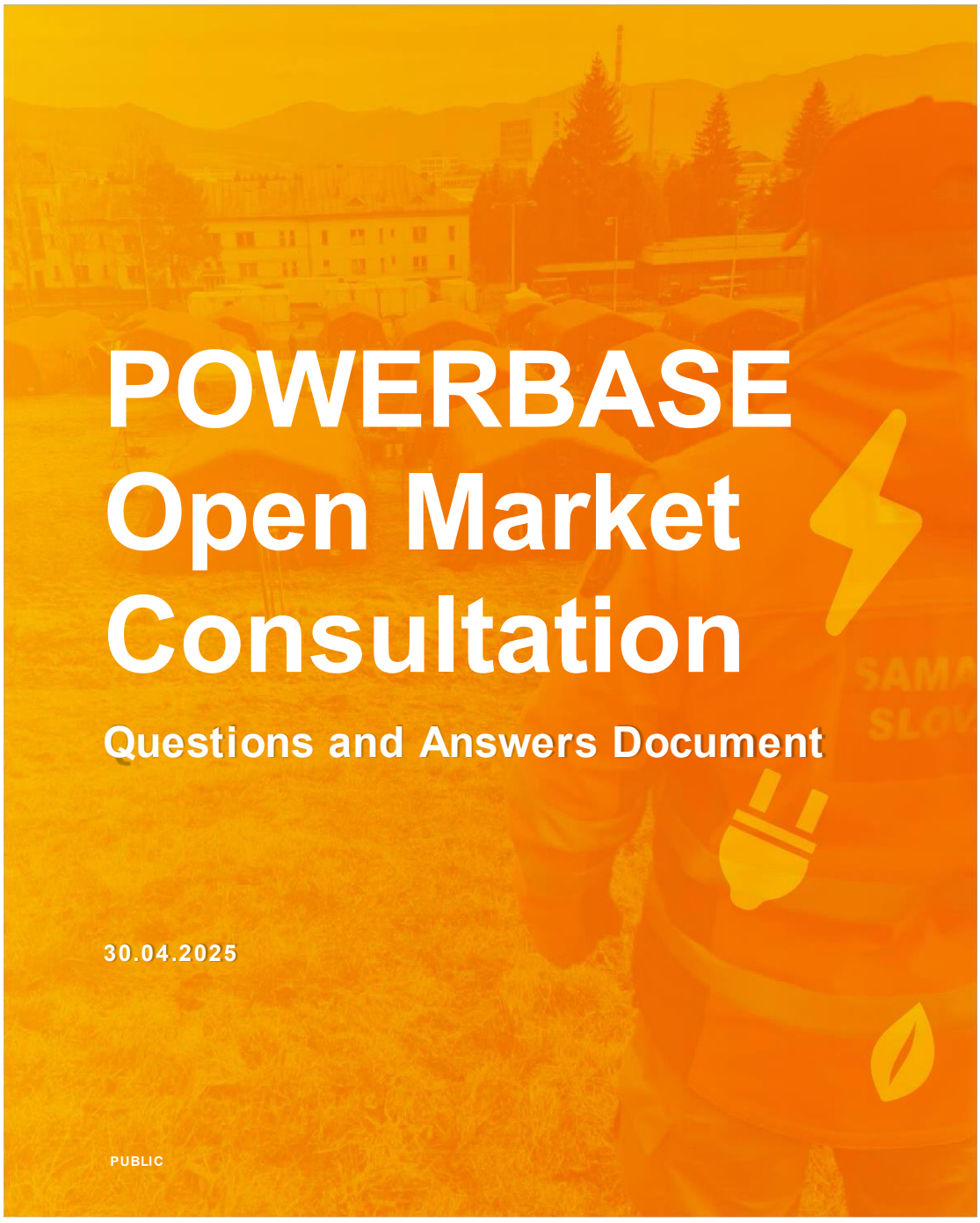

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1. Questions related to the POWERBASE Open Market Consultation

1.1. What is the POWERBASE Open Market Consultation? Who and how can we participate in the POWERBASE Open Market Consultation?

The Open Market Consultation (OMC) is a series of activities/ events organized by POWERBASE to obtain an in-depth knowledge of the available technologies, market structure, its players as well as of the technical and feasibility aspects of the procurement, to design and implement an efficient procurement procedure.

All potentially interested economic operators on the market are invited to participate in the open market consultation, to fill in the Request of information (RFI) and attend the OMC events.

Taking part in the POWERBASE OMC is not a prerequisite for the participation in the POWERBASE future call for tenders and does not give any advantage to any supplier. However, the OMC shall provide POWERBASE end-users/ buyers, key information that will shape the call for tenders adequately.

2. Questions related to the POWERBASE Open Market Consultation event in Brussels

2.1. We would like to understand how the OMC event in Brussels will run. Can you provide already a agenda for the event and in which venue it will take place?

The POWERBASE Open Market Consultation Event will take place on June 12, 2025 in the NH Brussels EU Berlaymont Hotel from 12.00-18.00. You can find the preliminary agenda here.

2.2. Could you please explain what the one-on-one matchmaking session consists of?

The matchmaking session is part of the preparatory activities for future procurement procedure. During this session technology providers interested to collaborate with other organization(s)/ company(ies)/

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consortium (a) to jointly submit a tender, will have the opportunity to interact and discuss the formation of potential bidding Consortia.

2.3. Can we present our products/ solutions during the OMC event in Brussels?

All interested technology providers, are welcomed to demonstrate their solutions that are considered to fulfil the overarching requirements of mobile power supply for Emergency Shelters and Bases of Operation.

These can be from fully commercialized technologies to low TRL innovative products under ongoing R&D.

If you have an innovative solution for power supply and storage, alternative to diesel generators, that is currently being used or has the potential to be employed for emergency shelters and Bases of Operations, and would like to showcase it, a dedicated session of 15 min. per company is foreseen. You can register here.

3. Questions about technologies

3.1. Can you tell me what technologies you are interested in? Are you interested in hydrogen fuel cell technology?

POWERBASE end-users/ buyers are interested in all existing and emerging Renewable Energy (RE) technologies that can enable the transition towards a low-emission, reliable, self-sufficient, mobile power supply. Innovative technologies in power generation and storage, as well as tools for energy management and optimization are more than welcome, keeping in mind that hybrid (with different renewable energy sources) and integrated (allowing for energy generation, storage and management) systems may also be developed.

4. Questions related to the Pre-Commercial Procurement

4.1. What is a Pre-Commercial Procurement?

Pre-Commercial Procurement is an approach to public procurement of research and development (R&D) services. It is an important tool to stimulate innovation as it enables the public sector to steer the development of new solutions directly towards its needs. PCP challenges industry from the demand side to develop innovative solutions for public sector needs and

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provides a first customer reference that enables companies to create a competitive advantage on the market. PCP enables public procurers to compare alternative potential solution approaches and filter out the best possible solutions that the market can deliver to address the public need.

4.2. When do you expect to launch a PCP Call for Tenders?

Powerbase project lays the grounds for a future Powerbase Pre-Commercial Procurement. You may visit the project website for regular updates.

4.3. In the future PCP, can a company submit a tender in collaboration with another company?

In the Call for Tenders, specific eligibility, exclusion, selection and award criteria will be set.
Tenders may be submitted by a single entity or in consortium with others (joint tenders and/or with subcontractors).

4.4. Can the consortium be made of an SME and a Research Institute? Or does it need to be composed of only for-profit companies?

In the Call for Tenders, there will be no rules for the composition of a consortium.