# Project idea form - small projects

Version 2.1

Registration no. (filled in by MA/JS only) _____

## Project Idea Form

Date of submission 05/06/2025

### 1. Project idea identification

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|---|---|
| Project idea name | Transnational Networking for Shared PV-and-Heat Microgrids in Public Buildings of Small Baltic Municipalities |
| Short name of the project | PV-HEAT-PUBLICNET |
| Previous calls | yes ◯ no ◉ |
| Seed money support | yes ◯ no ◉ |

### 2. Programme priority

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| | 3. Climate-neutral societies |

### 3. Programme objective

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| | 3.2. Energy transition |

### 4. Potential lead applicant

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| Name of the organisation (original) | Instytut Maszyn Przepływowych Polskiej Akademii Nauk |
| Name of the organisation (English) | Institute of Fluid-Flow Machinery<br>Polish Academy of Science |
| Website | imp.gda.pl |
| Country | PL |

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|---|---|
| Type of Partner | Higher education and research institution |

| **Contact person 1** | |
|---|---|
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Which organisation(s) in the planned partnership take part in a project within the Interreg Baltic Sea Region Programme for the first time? Please list the respective partners.

At this stage, no organisation in the draft consortium is a first-time participant in the Interreg Baltic Sea Region Programme. However, we are actively looking for newcomers to join, as bringing in organisations that have not worked with the Programme before directly supports the small-project objective of building trust and widening networks across the region.

### 5.1 Specific challenge to be adressed

Between 2021 and 2024, electricity and heat costs for public buildings in the Baltic Sea Region increased by over 35%, disproportionately affecting small municipalities with limited technical capacity. More than 80% of these towns lack in-house energy engineers, resulting in frequent mismanagement of existing renewable systems such as PV arrays, heat pumps, and thermal storage tanks. Inverters trip due to oversizing, tanks are overheated, and system faults often go undetected for weeks. The fragmentation of vendor protocols (Modbus-TCP, LoRa, M-Bus) hinders the creation of unified dashboards, while public funding tends to prioritize hardware over control logic. This leads to inflated operational costs (OPEX), unrealised $CO_2$ savings, and disillusionment among citizens expecting quick returns from “green roofs” and local energy upgrades. The challenge is both technical and systemic: to empower municipalities to operate decentralised systems effectively, using open, user-friendly tools that reduce costs, engage citizens, and strengthen public trust in the energy transition.

### 5.2 Focus of the call

The project directly supports the call's focus on cohesive development in small and rural municipalities, which often face high energy costs and lack the capacity to operate modern infrastructure efficiently. By providing a modular, open-source package—combining IoT-based control, AI diagnostics, and energy education—we enable local actors to turn fragmented, underperforming installations into replicable, data-driven systems. The approach reduces dependence on proprietary vendors and external consultants, fostering self-reliance and long-term cost control. Additionally, the project includes tools for public engagement (e.g. digital foyer displays, classroom challenges), helping communities understand and value the role of EU funding. It also builds capacity through mentoring networks, making it easier for resource-poor municipalities to take their first steps toward digitisation and integrated energy management. This supports territorial cohesion by bridging the skills and infrastructure gap between urban hubs and rural peripheries across the BSR.

## 6. Transnational relevance

Energy systems and regulations across the Baltic Sea Region differ significantly. Denmark uses dynamic Nord Pool tariffs, Latvia has municipal LoRaWAN-based metering, while Poland still applies fixed block tariffs. These national differences affect how public buildings consume, store, and optimise energy. A single-country solution would not be transferable or scalable. Through transnational cooperation, the project will map and compare tariff structures, regulatory barriers, and optimisation strategies across five countries (PL, LV, DK, LT, DE). It will also establish a "protocol lab" to cross-test Modbus and LoRa drivers, ensuring that any BSR municipality can adopt the tools regardless of local infrastructure. Shared KPIs and a central repository will allow comparison of results and benchmarking. Without this cross-border approach, municipalities would face isolated, incompatible solutions—undermining the goal of a cohesive and resilient regional energy transition.

## 7. Specific aims to be adressed

Building trust that could lead to further cooperation initiatives

To build lasting trust among partners and external stakeholders, all core outputs of the project—source code for device drivers, AI fault-detection logic, and interface modules—will be openly published under permissive licenses (MIT/GPL). These tools will be co-developed during biannual "code-sprints" hosted in different countries, where municipal IT staff, researchers, and SMEs work together to test, refine, and document the toolkit. By making all contributions transparent and traceable in a public GitHub repository, the project demystifies digital energy systems and empowers small municipalities to take control of their own infrastructure. This inclusive and participatory development model lays the foundation for a future core project, ensuring that trust is not only technical but institutional—built on open dialogue, shared learning, and equal access to innovation.

Initiating and keeping networks that are important for the BSR

The project will establish the "Public Energy Circle", a permanent and scalable online network for local energy managers and technical officers from municipalities across the Baltic Sea Region. Using the

Mattermost platform, the network will support informal exchanges, structured webinars, thematic working groups, and a “buddy system” pairing experienced and newcomer towns. Outputs such as tariff calculators, API templates, and replication guides will be stored in a searchable, tagged repository, ensuring continuity after the project ends. Additionally, the network will be linked to the Covenant of Mayors, expanding its visibility and policy relevance. By creating a space for peer support and knowledge sharing, the project ensures that even small or under-resourced municipalities can remain engaged, build capacity over time, and contribute meaningfully to regional energy transition efforts.

Bringing the Programme closer to the citizens

The project includes a dedicated citizen engagement package, designed to make the technical aspects of the energy transition visible and meaningful to local communities. In each reference building, a digital foyer screen will display real-time data on solar generation, heat pump activity, and $CO_2$ savings. These displays will be integrated into school programs via a “Zero-Emission Day” challenge, where students try to operate the facility using only stored and renewable energy. They will document the results in short videos posted under the #InterregBSR hashtag. Local media and community groups will be encouraged to participate, turning a technical demonstration into a public campaign. This approach not only enhances visibility of the Interreg Programme, but also fosters youth engagement, climate awareness, and pride in local efforts to reduce emissions—all while developing digital and STEAM-related skills.

Allowing a swift response to unpredictable and urgent challenges

To help municipalities respond to technical and financial shocks—such as tariff spikes, equipment faults, or extreme weather—the project will develop and deploy a real-time monitoring and alert module. This software component continuously analyses live data from inverters, heat pumps, and storage tanks to detect anomalies such as overheating, inverter trips, or consumption spikes. When thresholds are exceeded, the system automatically sends alerts via Telegram and email to facility staff, including a suggested action checklist. Because the API is open, any public building in the region can adopt the logic without coding. This lightweight, adaptive layer provides critical early warnings without the need for expensive SCADA upgrades, and enables faster, more informed responses to urgent challenges—supporting the resilience of small municipalities with limited technical capacity.

## 8. Target groups

The project focuses on public-sector buildings where municipal departments, elected authorities and local citizens directly experience rising energy costs. We therefore involve actors who (i) control day-to-day operation of PV, heat-pump and storage assets, (ii) take budget decisions on CAPEX/OPEX and grant applications, (iii) supply or further develop the technical solutions, and (iv) translate results into citizen engagement and policy uptake. Each chosen group has both the mandate and the technical capacity to influence the challenge during implementation and a vested interest in using the project’s open-source outputs after its end.

| | Please use the drop-down list to define up to five target groups that you will involve through your project's activities. | Please define a field of responsibility or an economic sector of the selected target group | Specify the countries and regions that the representatives of this target group come from. |
|---|---|---|---|
| 1. | Local public authority | Mayors, treasurers and technical committees approving heat-and-power budgets, loans and EU-fund applications for public buildings | Poland (Pomorskie), Latvia (Vidzeme), Denmark (Zealand), Lithuania (Kaunas), Germany (Mecklenburg-Vorpommern) |
| 2. | Higher education and research institution | University labs on PV/HP optimisation, AI fault diagnostics and open-source stewardship of the controller code | PL (IMP PAN, Gdańsk Tech), LT (LEI), DE (IWEN), LV (RTU) |
| 3. | NGO | STEAM educators, consumer & climate groups that run "Zero-Emission Day" contests, citizen panels and local media outreach | Pomorskie (PL), Vidzeme (LV), Zealand (DK) |
| 4. | Small and medium enterprise | Installers and vendors for PV, heat pumps, SCADA, LoRa gateways; provide hardware, EPC services and after-sales support | PL, DK, LT, DE |
| 5. | Interest group | hese entities are not formal project partners but will actively support the work by providing access to:<br><br>SCADA system logs and energy performance data;<br><br>Configuration details of their existing PV and | Representing a typical educational building with solar PV and electric heating. Providing access to administrative building operations and energy profiles. |

## 9. Contribution to the EU Strategy for the Baltic Sea Region

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| Please indicate if your project idea has the potential to contribute to the implementation of the Action Plan of the EU Strategy for the Baltic Sea Region (https://eusbsr.eu/implementation/). |
| yes ◉ no ◯ |

Please select which policy area(s) of the EUSBSR your project idea contributes to most.

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| PA Energy |
| PA Innovation |

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| The MA/JS may share your project idea form with the respective policy area coordinator(s) of the EUSBSR. You can find contacts of PACs at the EUSBSR website (https://eusbsr.eu/contact-us/). |
| ☐ If you disagree, please tick here. |

## 10. Partnership

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| Institute of Fluid-Flow Machinery of the Polish Academy of Sciences (IMP PAN)<br>One of Poland's top-tier institutes for applied energy systems and fluid dynamics. IMP PAN will support system-level validation of the microgrid logic under variable load and heat-storage dynamics. They bring expertise in thermal systems integration, energy efficiency modelling, and real-time control algorithms tailored for public-sector applications.<br><br>Lithuanian Energy Institute (LEI, LT)<br>Based in Kaunas, LEI is a leading centre in the Baltic region for energy technologies and system modelling. Their Renewable Energy and Efficiency group will contribute to cross-border replicability by analysing Lithuanian tariff structures and proposing policy integration strategies. They will also support open-source governance of the toolkit beyond the pilot phase.<br><br>IWEN Energy Institute gGmbH (Rostock, DE)<br>A German non-profit institute focused on sustainable energy systems, sector coupling, and smart grids. IWEN will take the lead on KPI development related to grid impact, supporting the project with insights on dynamic pricing and the regulatory perspective of network operators. They will also coordinate DACH-region knowledge transfer and act as an interface to municipal DSOs in Germany.<br><br>Geographic Coverage and Rationale:<br>The partnership covers five Baltic Sea countries—Poland, Latvia, Denmark, Lithuania, and Germany—ensuring that project solutions address a range of regulatory, climatic, and technological conditions. This diversity is essential for developing a transnational, modular control and monitoring system for public microgrids.<br><br>By combining hands-on testing in schools, municipal offices, and fire stations with deep institutional |

knowledge from renowned research centres, the partnership ensures technical robustness, policy relevance, and high replicability. Additional partners from Sweden and Norway may still be invited to further strengthen cold-climate replication and Nordic compatibility.

## 11. Workplan

The PV-HEAT-PUBLICNET project will be carried out as a co-creation process with functional testing based on real operational data from public-sector buildings (e.g. schools, municipal offices, volunteer stations). The aim is to develop a modular, user-friendly toolkit for managing PV–heat pump–thermal storage microgrids, compliant with European interoperability standards and accessible to small municipalities.

The work plan includes:

M1–M2 – Kick-off and data audit: collecting technical specifications and operational profiles from PV/HP systems in selected reference buildings. Drafting a common API schema for the control and monitoring platform.

M3–M6 – Open controller v0.1: development of a Home Assistant extension with Modbus and LoRa drivers; GitHub publication and quick-start guide.

M5–M9 – Fault prediction module: training of an AI-based model using collected datasets, integration of alert mechanisms and automated response logic.

M7–M12 – Operational environment verification: implementation of test configurations in reference locations (PL, LV, DK), deployment of tariff-optimisation scripts and performance indicator logging.

M10–M15 – Validation and optimisation: monthly code sprints with municipal staff, gathering user feedback and releasing incremental updates.

M12–M16 – Finance Guide: analysis of public-sector tariff frameworks in partner countries, development of CAPEX/OPEX templates for decision-makers.

M14–M18 – Citizen engagement package: design of educational resources and visual interfaces that communicate energy savings and live system status to the public.

M16–M20 – Public Energy Circle network: thematic webinars, peer mentoring between municipalities, and a searchable repository of best practices.

M21–M24 – Consolidation and scaling-up: release of the final replication toolkit, KPI summary report, and outline for a follow-up core project. The closing conference will be streamed to over 50 municipalities across the BSR.

## 12. Planned budget

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| ERDF budget (planned expenditure of partners from the EU) | EUR 500,000.00 |
| Norwegian budget (planned expenditure of partners from Norway) | *EUR XXX* |
| **Total budget (including preparatory costs)** | **EUR 500,000.00** |

## 13. Project consultation

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| Please indicate if you wish to have a consultation (online meeting) with the MA/JS to discuss your project idea |

yes ◉ no ◯

## 14. Questions to the MA/JS

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| Questions related to the content of the planned project | Our project output is a live, open-source repository with full version history (on GitHub) and open API access. Will this be accepted as a durable output, or do we need to provide additional static PDF documentation?<br><br>We implement digital testbeds using real SCADA data and configuration scripts in existing municipal buildings. Do such non-physical test environments still qualify as "piloted solutions" under output indicator RCO 84?<br><br>Will endorsement letters from regional or national energy agencies (supporting replication of the toolkit) be accepted as proof of "solution uptake" under RCR 104, even if no legal implementation has occurred yet? |
| Questions related to budgeting and expenditure | Can costs related to hosting open-source infrastructure (e.g. GitHub premium features, cloud dashboards, API gateways) be declared under “external expertise and services,” even if they are recurring monthly charges?<br><br>In a small project involving public and private partners, is it possible to mix unit-cost and real-cost methods for staff costs, depending on the institutional type?<br><br>If software development exceeds €30,000 in total but consists of modular components (open-source drivers, dashboard templates, AI module), can one open call be issued for the entire package, or must each subtask be tendered separately to stay under procurement thresholds?<br><br>Can we declare costs related to non-commercial digital pilots (e.g. |

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| | integration of open-source tools in municipal SCADA environments) as eligible expenditures under "external expertise" or "equipment," even if no new physical assets are purchased? |
| Any other questions | What is the expected timeframe between PIF submission and BAMOS+ account activation to allow work on the full application? |

## 15. Additional information

No need.

**Your account in BAMOS+**

Please remember that to officially submit your application you need to access our electronic data exchange system BAMOS+. More information about the process of applying for your account in BAMOS+ you will find here:
https://interreg-baltic.eu/gateway/bamos-account