Work Package 6, Deliverable 3

What are the challenges and opportunities for developing and expanding aqua thermal energy (AE) systems?

To answer this, we explore policies and other factors that help AE systems grow, especially in early pilot projects. We also look at what blocks AE development and what helps these systems grow bigger or spread to other areas.

The report focuses on the AE pilot projects in the Interreg North Sea WaterWarmth Project. It is based on interviews and documents from these pilots. We asked a set of key questions to understand how AE projects are managed and what helps or hinders their success. We paid special attention to the struggles the pilots faced, and the things that helped them succeed and grow.

We studied nine pilot projects using an exploratory case study method. First, we collected responses from an online survey in April 2024. Then, we held a workshop in Caen in May 2024, followed by interviews in Fall 2024 with key people involved in the projects. The results are presented first per project and then summarized across all nine. We end with key takeaways and policy suggestions.

Key findings:

All nine pilot projects faced barriers but also mentioned helpful enablers. A major challenge in every case was unclear or complex policy and regulations. Rules for AE systems were often confusing or inconsistent. However, working closely with government and policy makers was seen as a positive factor, especially at the start of the projects.

Another issue was the lack of a clear internal vision within the projects. Without a strong vision, it was hard to create a solid business plan, which made getting funding more difficult. Many projects struggled with financial support, including problems getting bank guarantees or covering costs for equipment and permits.

In some countries, AE technology is still new, making it harder to convince permit authorities and financial backers that the projects are reliable. Some teams also lacked technical knowledge, but this could often be solved by learning from similar

projects nearby or abroad. Sharing experiences and peer-to-peer feedback helped projects become stronger.

Government support for fossil fuels was another barrier. It limits subsidies and incentives for clean energy solutions like AE, creating unfair competition. Some stakeholders also doubted AE systems, showing reluctance or skepticism toward renewable energy in general. On top of that, lack of public awareness was a problem. In some cases, important stakeholders held back useful information instead of sharing it, which slowed down progress.

What helped the projects succeed:

Strong networks and collaboration between stakeholders were key to project success. Good communication helped everyone understand the project goals and what was expected of them.

By analyzing both the barriers and enablers, this report lays the groundwork for the next phase: Deliverable 6.4, which will focus on strategies and policy pathways to overcome these challenges. This might include new policy tools, policy combinations, or ways to strengthen collaboration and stakeholder involvement.

- Nthabi Mohlakoana
  Delft University of Technology, The Netherlands
- Sara Brogaard and Barry Ness
  LUCSUS, Lund University, Sweden
- Thomas Hoppe
  University of Twente, The Netherlands