

HOW TO MAKE INNOVATION IN POSITIVE ENERGY DISTRICTS MORE RESPONSIBLE

A QUICK GUIDE FOR PED PRACTITIONERS

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Positive energy districts (PEDs) are about innovation. They are about new technologies, new infrastructures, new social arrangements and practices.

Innovation involves exploring new pathways, choosing between alternatives, taking risks and – importantly – drawing lessons. The more ambitious or transformative a solution, the more important it is to translate it into practice with responsibility towards society and ecosystems. This concretely means that unintended social and ecological side-effects are considered all the way through the innovation process. Innovation then doesn't merely serve as a means to increase profits or deploy novel technology for its own sake, but as a means to satisfy social needs without intensifying ecological crises.

REFLECTIVE LEARNING¹ AS A KEY PROCESS

Learning is a key element of responsible innovation. However, learning may take different shapes. So far, a lot of learning in PEDs is focused on monitoring, quantitative indicators, or other performance measures. However, in order to enhance the level of responsibility in PEDs, it is crucial to engage in reflective learning.

Reflective learning questions the basic assumptions made in and about PEDs. Risks and side-effects are articulated, and the social and ecological impacts of possible solutions are scrutinised. Reflective learning is about uncovering and “doing better things” in the future.

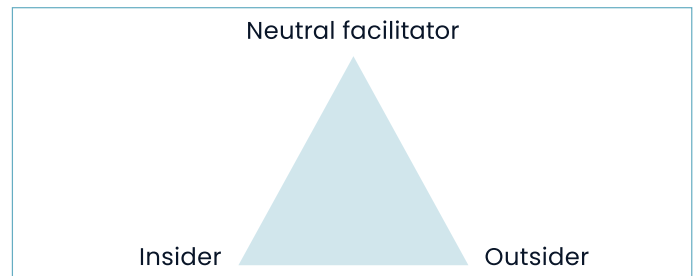
To ensure a more sustainable impact and consolidate findings, it is necessary to set up reflective learning as a longer-term project that may occur in loops of action-reflection-adaptation or depart from initial meetings that then result in larger follow-up projects. This way, knowledge and experiences can be documented, solidified and passed on to other, similar urban transition initiatives.

MOMENTS OF REFLECTION AS A WAY TO LEARN IN PEDS

Moments of reflection are one relatively easy way to create settings that allow for reflective learning. Reflective learning goes beyond improving a solution, but involves scrutinising a possible solution and carefully thinking about its implications and alternatives. A method for implementing this approach are so-called “bridging events”, which bring together actors with different roles and who identify to different degrees with the discussed solution.

MOMENTS OF REFLECTION IN PRACTICE

The “reflective learning conversations” organised in the TRANS-PED project are an example for how moments of reflection can bring about reflective learnings. We selected the following basic arrangement of actors for the learning process: an “insider”, i.e., someone who has a large degree of knowledge about and experience with a solution and identifies with it; an “outsider”, who critically but constructively engages with the given solution, challenges it and motivates to think about alternative pathways; and a neutral facilitator, who is responsible for bringing together the different parties and moderating the exchange. We refer to this basic form as a “triangle for reflective learning”.



LEARNINGS FROM MOMENTS OF REFLECTION IN TRANS-PED

The following examples result from a workshop in the TRANS-PED project based on this principle.

Radical urban renewal through civic engagement

The example of **Hammarby Sjöstad** (Sweden) shows that neighbourhoods can be redirected towards a PED development even after an unsuccessful first attempt involving green gentrification and unsatisfactory energy solutions. Key for the success of Hammarby 2.0 has been the creation of a lively PED community based on local citizen engagement, including regular energy meetings, workshops with experts, school education, and multimedia information material.

Hammarby Sjöstad, based in the Stockholm suburbs, is a primarily residential neighbourhood that has been under construction with sustainability intentions from 1990 onwards. Yet, only in 2012, when the citizen-driven initiative ElectricITY became responsible for the district, was it organised as a testbed with the aim of achieving climate neutrality by 2030.

Consequences and further research:

Although less than ideal, neighbourhoods may be redirected towards a more ambitious PED development even if most of the infrastructure has been established. Local citizen engagement is essential to the creation of a PED community, and enables joint procurements for housing associations and collective demands towards suppliers. The avoidance of green gentrification in PEDs requires further research and policy attention.

Individual vs. collective energy systems

The example of **Sonnendorf** (Austria) reveals the intertwinement of energy solutions with social, political and economic preconditions. In Sonnendorf, a more sustainable energy solution (a local energy network) could not be realised due to the lack of a fitting non-profit operating unit (public or private). Instead, each house was equipped with its own geothermal probe.

Sonnendorf Schwoich is a village development project based in the Austrian federal state of Tyrol. The project aims to address core challenges faced by the region such as limited building land due to the Alps by employing ecological construction methods, i.e., wood construction, and reducing land use.

Consequences and further research:

Municipalities might have to prepare the conditions for and develop an openness towards taking on new roles in regard to PEDs, which might mean accepting the role of energy suppliers and providers. In addition, new energy solutions will likely require novel ways of interacting and engaging as communities, including new ownership models for energy production.

Mediation between public and private interests

The example of **Brunnshög** (Sweden) provides an insight into the repercussions of private ownership of public infrastructure on future-oriented city planning. There, master-planning by technological infrastructure competes against liveable streets. Given different pipe owners' accessibility needs, streets become wider and reduce options for green space. Ideally, independent mediators could facilitate between the city and the pipe owners, or legal requirements could better protect green spaces.

The district of Brunnshög is being developed in the outskirts of Lund until 2050. It aims to host the world's largest low-temperature heating network by using the excess heat from the research installations MAX IV and ESS based in the neighbourhood. The project aims to create mixed-use neighbourhoods and prioritise the construction of green areas.

Consequences and further research:

Beyond independent mediators between pipe owners and municipalities, a neutral keeper of the underground could be appointed who closely collaborates with city planners to understand overground space requirements (e.g., green spaces). Research could focus on how expensive, rigid (underground) infrastructure such as pipe systems can be designed in a manner that overground areas such as liveable, playable areas and green spaces are not compromised.

Other contexts supporting learning and reflection

PEDs as RRI projects

Responsible research and innovation (RRI) is an approach developed in the context of EU research projects. There is plenty of literature on the concept and related criteria (e.g., stakeholder involvement), as well as methods for implementation. RRI projects can support responsible innovation in technologically challenging PED developments. It is suitable for highly ambitious projects associated with a great degree of uncertainty. However, it involves a relatively high administrative burden. Find out more about RRI and connected tools here:

<https://rri-tools.eu/>

More information on Responsible Innovation

For more information on this topic, see the "RESPONSIBLE INNOVATION IN AND FOR PEDS" report at the Trans-PED [website](#)



PEDs as real-world experiments

Experimental designs often have learning as their very goal, hence an entire project or specific sub-projects are planned and implemented as learning processes. The literature shows a large array of different approaches to real-world experiments, each of them with specific characteristics. Some of them are urban living labs, niche experiments, bounded socio-technical experiments and transition experiments. They have in common the inclusion of a broad range of stakeholders for knowledge-sharing. Find out more about urban living labs here:

<https://jpi-urbaneurope.eu/urbanlivinglabs/>

All about the Trans-PED project

Check out the Trans-PED [website](#) for details on the project, the international consortium of partners, as well as the participating PEDs.

