Energy Improvement Districts – Conceptual and Technical Guidance for Implementing Cooperative Energy Planning at the District Level

AREA 21
Baltic Smart City Areas
for the 21st Century

Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

AREA 21 Project Partners

Foreword

▲ *Prof. Jörg Knieling HafenCity University Hamburg, Lead Partner on behalf of the AREA 21 consortium.*

The main objective of the AREA 21 project is energy efficiency in the Baltic Sea Region. The project is a transnational cooperation co-funded through the Interreg Baltic Sea Region Programme 2014–2020. The project strives to bring together public authorities, energy providers, property owners and citizens in seven different cities in the Baltic Sea Region to foster energy efficiency initiatives at the district level. In this way, the AREA 21 project aims to decrease CO2 emissions in urban areas and help cities and regions meet their own and international goals to fight climate change.

We are delighted to share with you the results of the AREA 21 project. This publication introduces the central policy recommendations that are informed by transnational learning and the partners' and local policy makers' experiences. It represents the position of AREA 21 in terms of principles, goals and policy recommendations for existing issues.

The stimulating Interreg framework has enabled the AREA 21 consortium to set up this engaged and successful collaboration. All AREA 21 partners aspire to these results and recommendations finding their way into local practice in the Baltic Sea Region as well as throughout Europe. The Energy Improvement District is a suitable toolkit to foster local energy efficiency and thus contribute to the European Union's climate mitigation goals. It offers a framework that helps identify investment opportunities in future technologies which contribute to the ambitious European Green Deal. We invite you to join us on this path of green innovation towards a carbon neutral European future!

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Introduction

AREA 21 is a three-year transnational cooperation project being jointly carried out by 10 partner organizations in the Baltic Sea Region. The overarching goal of the project is concerned with the modelling of energy efficient urban areas. However, the collaborative character of its approach invites the development of synergetic solutions appropriate to the context of their implementation. Specifically, AREA 21 brings together the perspectives of public authorities, energy providers, property owners and citizens to promote inclusive and integrated strategic energy planning. Furthermore, the pilots developed within the project comprise a transferrable model for collaborative energy planning which will be explored throughout this book.

This publication is a collection of the three main outputs from the AREA 21 project: "Guidance for Cooperative Energy Planning at the District Level", "Energy Improvement District (EID) Concept" and "Process Model for Cooperation in Energy Improvement Districts".[1] Although these reports can be read independently, their themes are interwoven and relate to the processes and goals of the AREA 21 project. Moreover, the three texts provide a model that is transferrable to many other cities and regions. Together, they can be used as a holistic guide; they help in understanding and following the process from the starting point, via the set-up of a context-specific concept and strategy, to the implementation of the Energy Improvement District (EID) in practice.

The first output (guidance) explains the initial steps in determining an EID. The collaborative character inherent to the project's approach is fundamental to the development of synergetic cross-sectoral solutions. Therefore, this guidance highlights the potential of such an approach and its resulting solutions, exploring the motivations and multiple benefits of its adoption. However, the complexity of the approach results in various challenges. These are also explored to provide interested stakeholders with information so that potential risks in the model's implementation are mitigated. The core and final section of the document introduces the initial phase of the EID development process, including the first steps involved in the implementation of an EID.

The second output expands on the EID concept, offering a framework for its understanding and setting out the parameters for cooperative energy planning and the measures to achieve its goals. It introduces past applications of improvement districts, drawing lessons from various experiments and describing the development of a transferrable model for the EID. In its final section, the document identifies the pillars of establishing an EID and the features inherent to a transferrable model.

The final output addresses the processes that enable EID implementation and cooperation within EIDs. It appropriates the perspectives and experiences from the pilot case studies in AREA 21, producing a concise and straightforward guide for the implementation of an EID in other parts of the Baltic Sea Region.

1 *Throughout the book, these texts are referred to as follows: the Guidance for Cooperative Planning ("Guidance for Cooperative Energy Planning at the District Level"), the EID Concept ("Energy Improvement District (EID) Concept") and the Process Model ("Process Model for Cooperation in Energy Improvement Districts").*

Guidance for Cooperative Energy Planning at the District Level

Barriers and Factors for Success

Executive Summary

Authors: *Jonas Fischer, Alessandro Arlati, Janne Johst, Galya Vladova, Camila Camara, Emily Salvisberg; HafenCity University Hamburg*

This document describes the initial steps for the application of the Energy Improvement District (EID) concept as a key to unlock the potential for increased energy efficiency and reduced carbon emissions in district-level planning. The cornerstone of the EID model is the cross-sectoral collaboration of multiple stakeholders for the development of synergetic solutions within the energy scope, while incorporating environmental, social and economic aspects. The guidance highlights the potential for embracing cross-sectoral solutions, focusing on the motivations and ample benefits of pursuing this approach. Furthermore, the success of the pilot case studies concretely illustrates the scope of possible gains from EID implementation.

In the first place, this report addresses the motivations and benefits of implementing an EID and helping interested stakeholders identify what scope of gains could be achieved. The benefits are specified according to the participating stakeholders (e.g. authorities, energy agencies and utilities, end-users, etc.) and categorized in terms of their technical, financial and social scope. This approach illustrates the wide range of benefits achievable through the EID model.

A collaborative approach is the key to the multi-scope benefits inherent to the EID, however it is not free from complexity. Thus, this report also addresses the challenges that can be expected in establishing a collaboration. A knowledge of these challenges and the development of context-appropriate mitigation strategies is fundamental to the successful implementation of the EID model.

Finally, the report lists the necessary steps for initiating the implementation process for the EID model. These steps serve as a guideline for the organization of multiple stakeholders, how they reach consensus on what they want to achieve together and what is the best way to do this. The key message in this guidance is that a suitable implementation of the EID model within its various contexts, although challenging, has the potential to provide valuable advantages and a

concrete pathway to more energy efficient and decarbonized districts through context-appropriate and innovative initiatives.

The main outputs jointly published in this book are:

1. Guidance for Cooperative Energy Planning at the District Level, also referred to as the Guidance for Cooperative Energy Planning (this document).
2. Energy Improvement District (EID) Concept, also referred to as the EID Concept.
3. Process Model for Cooperation in Energy Improvement Districts, also referred to as the Process Model.

Acronyms

BSR: Baltic Sea Region
CSO: Community Self-Organization
EID: Energy Improvement District
ICT: Information and Communication Technology
PPP: Public-Private Partnerships
SPbPU: Peter the Great St. Petersburg Polytechnic University

Introduction

This document is one of the three main outputs from the AREA 21 project: "Guidance for Cooperative Energy Planning at the District Level" (also referred to as the Guidance for Cooperative Planning), "Energy Improvement District (EID) Concept" (also referred to as the EID Concept) and "Process Model for Cooperation in Energy Improvement Districts" (also referred to as the Process Model). They are published jointly and are interlinked. The first output explains the initial steps in determining the EID, including the challenges and potential of cooperative energy planning, and guides cities and regions through the initial phase of the EID development process. The second output elaborates on the EID concept and offers a framework for understanding and setting out the parameters for cooperative energy planning and the measures to achieve its goals. The final output addresses processes that enable EID implementation and cooperation within EIDs. All three documents offer insights that are transferrable to many cities and regions. Together, they can be used as a holistic guide; they help in understanding and following the process, from the starting point, via the set-up of a context-specific concept and strategy, to the implementation of the EID in practice.

Description and Aims

Against a background of increasing awareness, there are still several open questions on how to reduce CO2 emissions and increase energy efficiency, ultimately addressing the issue of climate change. In northern European cities there is still a high potential for emissions reduction, especially in the energy-related building sector, energy consumption for heat and electricity, energy infrastructure and energy production in urban neighbourhoods. The AREA 21 project tested the hypothesis that collaborative and cooperative energy planning at the district level is the key to unlocking this potential. Furthermore, the proposed approach is adaptable to different contexts, resulting in tailor-made solutions for increased energy efficiency.

In both the public and private sectors, there is already a high awareness and willingness to act. However, multi-stakeholder cooperation is not an easy process, since the different stakeholders usually have different perspectives and agendas. It is fundamental for stakeholders willing to participate in collaborative energy planning to have a model to guide them towards joint action for more energy efficient districts. Therefore, this guidance document aims to provide cities and regions, especially in the Baltic Sea Region (BSR), with knowledge on how to initiate a cooperative process that will lead to context-specific improvements in energy planning at the district level. Experiences from the AREA 21 project, as well as from literature and case studies, have been prepared with the aim of being transferrable to other contexts. In particular, this document will guide BSR cities and regions in the process of collaborative problem definition and analysis, collaborative goal formulation, cooperative integrated strategy development and decision-making support that leads to the establishment of an EID, i.e. it will introduce the benefits and challenges of cooperative energy planning at the district level inherent in applying the EID concept. This approach brings together stakeholders from different areas (i.e. public and private enterprises, housing associations and tenants, building owners and the public administration) to work collaboratively at the district level.

The high inclusivity intrinsic to the EID concept uses the ideas from collaborative governance where those impacted by a decision should be involved in the decision-making (Prehoda, Winkler, & Schelly, 2019, p. 13). As a result, any activity will encompass the perspectives of all interested parties, maximizing the benefits and mitigating the risks of conflicting policy developments, in addition to combating segmentation and silo mentality. Moreover, the implementation of initiatives will have their risks and costs shared among the involved stakeholders.

Success Factors and Potential of Cooperative Energy Planning

Key Messages

- The benefits of stakeholder participation outweigh the risks.
- Public and private stakeholders have different motivating factors (described in this chapter) for participating in collaborative energy planning.
- The main benefits of strategic district level cooperation include finances, better energy solutions, quality of life and "lighthouses".

This section outlines the positive aspects of voluntary cooperation for the involved partners and beneficiaries of cooperative energy planning.

Cooperation is the cornerstone of the EID concept since it relies on the development of solutions fuelled by multiple perspectives. This cooperation is undertaken by a group of interested stakeholders who will collectively share the risks and benefits from its realization. Although the idea is logical, it is not often applied, since cooperation can be overly complex. However, the significant benefits of cooperation can surpass the difficulties when the appropriate participative strategies and tools are applied.

Participative tools have become more popular for many purposes (see, for instance, living lab approaches). These processes are "designed to gain needed information, build political acceptance and address some important questions about legitimacy, representation and credibility. Stakeholders are included when there are good and prudent reasons to do so" (Bryson, Crosby, & Stone, 2006, p. 29). In this regard, a stakeholder is a person or group that has an interest in the field of action (e.g. tenants, citizens, topic-related cooperatives, building owners and developers, public authorities, energy suppliers, etc.). There is a large amount of literature on this topic relating to the pros and cons of stakeholder participation. These are summarized by Reed (2008, pp. 2420-2421) and shown in Table 1 below.

Benefits and Concerns for Stakeholder Participation

Benefits	Concerns
Participation processes are good when they are perceived to be transparent.	Empowerment may have unexpected and negative results.
Empower stakeholders through the co-generation of knowledge.	No will to participate anymore if the stakeholders notice it is useless or not so profitable.
Environmental decisions are perceived to be holistic and fair.	Delayed decision-making.
Promote social learning.	
Enable interventions and technologies to be better adapted to local socio-cultural and environmental conditions (capacity to meet local needs and priorities).	
It should lead to improved quality decisions.	

***Table 1**: Benefits and concerns for stakeholder participation, adapted from Reed (2008).*

The inclusion of qualitative criteria in decisions relating to technological infrastructure has increased in importance in the last decades. In addition to the environmental and financial criteria, the public authority is invited to participate and thus legitimate the planning process. Thus, social acceptance has become a central theme in these processes. Zaunbrecher and Ziefle (2015) argue that social acceptance should be included in the factors affecting the decision by involving citizens from the early stages of the process, thus making them real stakeholders (that are active in shaping the process). In so doing, the planning process should proceed with fewer hitches.

It is also fundamental to understand who the potential stakeholders participating in the EID process are, as some of their individual goals are likely to be incorporated within the EID. The various stakeholder categories could include local and regional authorities, energy agencies, energy utilities, end-users and others. The local and regional authorities are the most straightforward category. They fall under the public sector and are represented by regulators, legislators and planners responsible for the management of a district, municipality or region. Their interests should represent the needs of the citizens and their pursuit of a positive relationship with those who elected them.

The energy agencies serve users and public authorities through guidance, technical support and policy advice (European Commission, n.d.). Furthermore, they fulfil the role of intermediary for the transmission of information between EU policy makers, users and public authorities (European Commission, n.d.). Their goals are likely to be aligned with the acquiring and production of knowledge and the gain of recognition. In contrast, the energy utilities refer to the more operational aspect of the process, since they supply the energy and operate the networks. Their agenda is likely to be more concerned with the cost efficiency and quality of the service they are providing. In the case of private utilities, profit is a powerful motivator.

The end-users are the tenants and business owners that effectively use the energy services and will be those most impacted by the changes in the energy system. Their main interest is high quality service at a lower price range, which translates to higher living quality for residential use and lower operational costs for businesses. Other stakeholders identified in the project are building owners, investors, organizations, and associations. However, it is likely that other contexts will require the inclusion of other stakeholders. Such flexibility in the range of potential stakeholders allows for the identification of context-specific, cross-sectoral synergies within the EID.

In the AREA 21 cases, many local actors were interested in implementing their specific ideas for better and more sustainable urban areas in their cities. In this chapter, the reasons for cooperation are given based on research and the experience of the AREA 21 partners. In the first section, the authors examine the motivating factors for stakeholder participation. In the second section, the authors discuss the collected energy efficiency potential of the EID strategies of the AREA 21 partners. This potential, together with the benefits and their rationale are summarized in the subchapters below. They are clustered according (1) technical, (2) financial, (3) societal and (4) public sector aspects.

Motivating Factors for Stakeholders' Participation in Processes on Energy Planning

Many diverse factors drive stakeholders' motivation to participate in energy planning processes. To be successful, a participation process requires a comprehensive analysis of possible stakeholders. Therefore, the authors carried out an extensive literature review to determine not only these motivations, but also the challenges and opportunities involved. In addition to the literature review, they used the partners' experience to further elaborate on these factors. As a result of this ideation process, the authors found and established four criteria for the actor/stakeholder analysis:

- Function or role of the stakeholder, explaining the main activities that the stakeholder performs within the process.
- Motivation(s) of stakeholders to participate in an energy planning process, including their logic of action and core interests, as well as measures that motivate them to participate.
- Threats/risks relating to the participation of certain stakeholders.
- Strategies to avoid these risks, e.g. by addressing critical issues or finding solutions to deal with them.

For an overview of the motivations of the different stakeholder groups, see Table 2 below. The table includes four motivating factors per stakeholder type, comprising two factors for each of the public and private actors. For references from the literature, see Bal, Bryde, Fearon and Ochieng (2013), Cardullo and Kitchin (2018), de Waal and Dignum (2017), Hollands (2008), Jankowski (2009), and Wallbaum et al. (2010). The full stakeholder map, including the results of the literature review and partners ideation process, can be found in the annex to this book (i.e. the Stakeholder Motivation Map).

Motivation for Energy Planning (categorized by Stakeholder Type)

Stakeholder Type	Motivations of public Actors	Motivations of private Actors
Energy Planners & other Planners	• Gain knowledge of citizens' needs. • Satisfy citizens' needs and expectations.	• Gain recognition. • Gain knowledge.
Legislators, Regulators	• Provide legal incentives. • Interested in re-election.	• Lead in national benchmarking. • Share experiences and ideas.
NGOs & Citizens' Associations	• Receive additional financing. • Offer ready-to-use concepts to support citizens.	• Work for the public interest and democratic processes, advocate climate protection ideals. • Promote their activities and organization.
Property Owners	• Improve the quality of life of tenants by optimizing the condition of buildings and their surroundings. • Save costs as a result of, e.g., renovation measures.	• Assure e economic feasibility of renovation actions. • Improve the quality of life of tenants by optimizing the condition of buildings and their surroundings.
Tenants		• Be curious: acquire information about, e.g., own energy consumption, the possibilities of new information and communication technologies (ICTs). • Get sense of ownership.
Inverstors	• Improve the quality of life of tenants by optimizing the condition of buildings and their surroundings. • Gain a better image.	• Potential for publicity. • Return on investment.
Energy Suppliers	• Incentives for knowledge on how to improve services and practice (gather knowledge about clients wishes). • Ensure positive public opinion.	• Search for new business models; return on investment. • Assure budget security.
Energy Network Operators (Energy Transmission & Distribution)	• Provision of good services. • Gain know-how.	• Gain recognition/popularity. • Provide high quality services.
Technology Delivery	• Provide a platform for projects in which innovations can be tested and gather knowledge. • Cooperation possibilities in projects.	• Be the first (pioneer) to develop and test new technologies. • Possible sales market for new technical products.

***Table 2**: Overview of stakeholders' motivations.*

Involving the relevant stakeholders is not always easy. AREA 21 partners shared their experiences to develop strategies to avoid potential barriers to cooperation. Table 3 summarizes these coping mechanisms.

Strategies and Opportunities in AREA 21

What is your strategy to involve different types of stakeholders in the process?
How do you mobilize "reluctant" stakeholders?

1. Extra "carrots":
- For example, offers of other services linked to the workshop.
- Motivation system.
- Be open to "trade-offs".
- Mobilize a "door-opener" – someone who is in a position to make decisions about future strategic priorities and keep this person on your side.

2. Formalize cooperation:
- Letter of intent.
- Semi-formal agreements (e.g. student's union in St. Petersburg).

3. Communication:
- Communicate through trusted bodies.
- Increase visibility and understandability of benefits.
- Avoid abstract benefits.
- Tailor messages to the needs of the different stakeholders.
- Establish ongoing communication, also between the official meetings.

***Table 3**: Strategies for stakeholder involvement by AREA 21 partners.*

▼ *EID Hamburg (Barmwisch-Bramfeld), Germany.*

Table 4 shows which fields could benefit most from closer cooperation between the different stakeholder types. This is especially interesting for unlocking potential.

Potential Benefits of Stakeholder Cooperation in AREA 21

Which field (building renovation, energy production, etc.) could most significantly benefit from closer cooperation between different types of stakeholders? Where do you still see unused potential?

1. Funding and finances:
Provision of information about available funds.
Bundle financial strength, e.g. for renovation or energy production.

2. Renovation:
Cooperation helps to build trust between stakeholders with different degrees of experience and especially between professional and private actors.
Create win-win situations: undertake renovations while simultaneously contributing to strategies.
In some cases, it can be difficult to convince owners to renovate, especially if the energy prices are relatively low (e.g. Finland).

3. More structured involvement of end-users.

***Table 4**: Potential benefits to be unlocked via cooperation. Experiences of AREA 21 partners.*

Benefits of Energy Planning at the District Level

The AREA 21 partners identified several benefits that can be unlocked by implementing energy planning at the district level. These are shown in Table 5 and are further described according to their thematic areas. In addition, the project partners identified potential district-level actions or objectives that are examined below regarding their benefits for energy planning at the district level.

Opportunities in AREA 21

What are the main benefits arising from the establishment of strategic district-level cooperation and the implementation of integrated energy efficiency measures in urban districts?

- Investments: Share the burden between multiple parties and bundle strengths.
- System perspective might offer better solutions than building perspective in terms of energy supply and usage.
- Increase the quality of life and land value of the area.
- Peer support creates “lighthouses” which others would follow.
- System optimization helps keep prices lower.

***Table 5**: Main benefits of EID. Experiences of AREA 21 partners.*

Technical Aspects

Benefits specific to building owners, users/tenants and companies include the reappropriation of community spaces, new opportunities for cooperatives using renewable energy sources and supplying and redistributing energy supplies where required. In addition, apps can support the efficient use of energy and raise awareness. Benefits specific to associations, companies and public authorities are new and innovative ways of renovating the existing infrastructure, especially in terms of major measures or changes. This is an opportunity to combine several sectoral approaches together, such as the potential for recycling residual waste for the generation of power and heat (e.g. by biogas), the replacement or renovation of infrastructure and buildings, the introduction of photovoltaics, etc. Renewing technology (systems, infrastructure and appliances) increases reliability according to the energy requirements of the district, e.g. reducing peak energy loads that can affect energy supply and costs.

Financial Aspects

Benefits specific to building owners, users/tenants and companies are a possible aggregation of the heating requirements of multiple and diverse consumers on a scale that optimizes the use of renewable energy sources and higher efficiency equipment that would otherwise be economically unviable and unfeasible at the household or building level (using the potential of owner cooperation, the aggregation of demand and service models). Further, a reduction in operating costs is possible, e.g. if the utility operators of central power plants undertake scheduled maintenance by qualified operators. In addition, the individual operation and maintenance of boilers and chillers is no longer necessary (while the costs for the maintenance of individual high-efficiency equipment would be much higher). A reduction in upfront capital (capital costs) is viable by removing the need for building-level energy supplies. An interesting aspect regarding climate change in particular, is the reduced reliance on fossil fuels through thermal energy storage and the use of different sources of heat supply in the most cost-effective way. This reduces costs from energy price spikes, establishes stable prices and long-term certainty of energy bills for customers. In addition, it provides lower operating costs and better planning of long-term budgets for the system operator. In general, a high standard of energy efficiency (low primary energy factor) reduces the cost of rents and energy poverty for tenants and house owners. The pooling of funds – especially when it comes to the need for co-financing (when applying for funds from a state programme, for example) can reduce complexity and lower the formal barriers to applications. It can also reduce the costs of other measures of the applicants (time, accessibility, benefits of scale regarding materials, etc.). Furthermore, some initiatives require large initial investments (community energy plant, etc.) so that the pooling of funds from different stakeholders might be a way of raising initial capital (“critical mass”). Yet, the main concern here is the return on investment and time frame for this return (short-term investments vs. long-term benefits). Some city funding programmes are explicitly designed to support community-led initiatives (and not single flat renovations). This often requires a consortium of applicants (and not a single applicant) and supports pooled applications as used in the EID partner cities with an approach of collaborative

energy planning. Energy planning reduces the expense for municipalities and further stakeholders and increases their financial scope for (other) action.

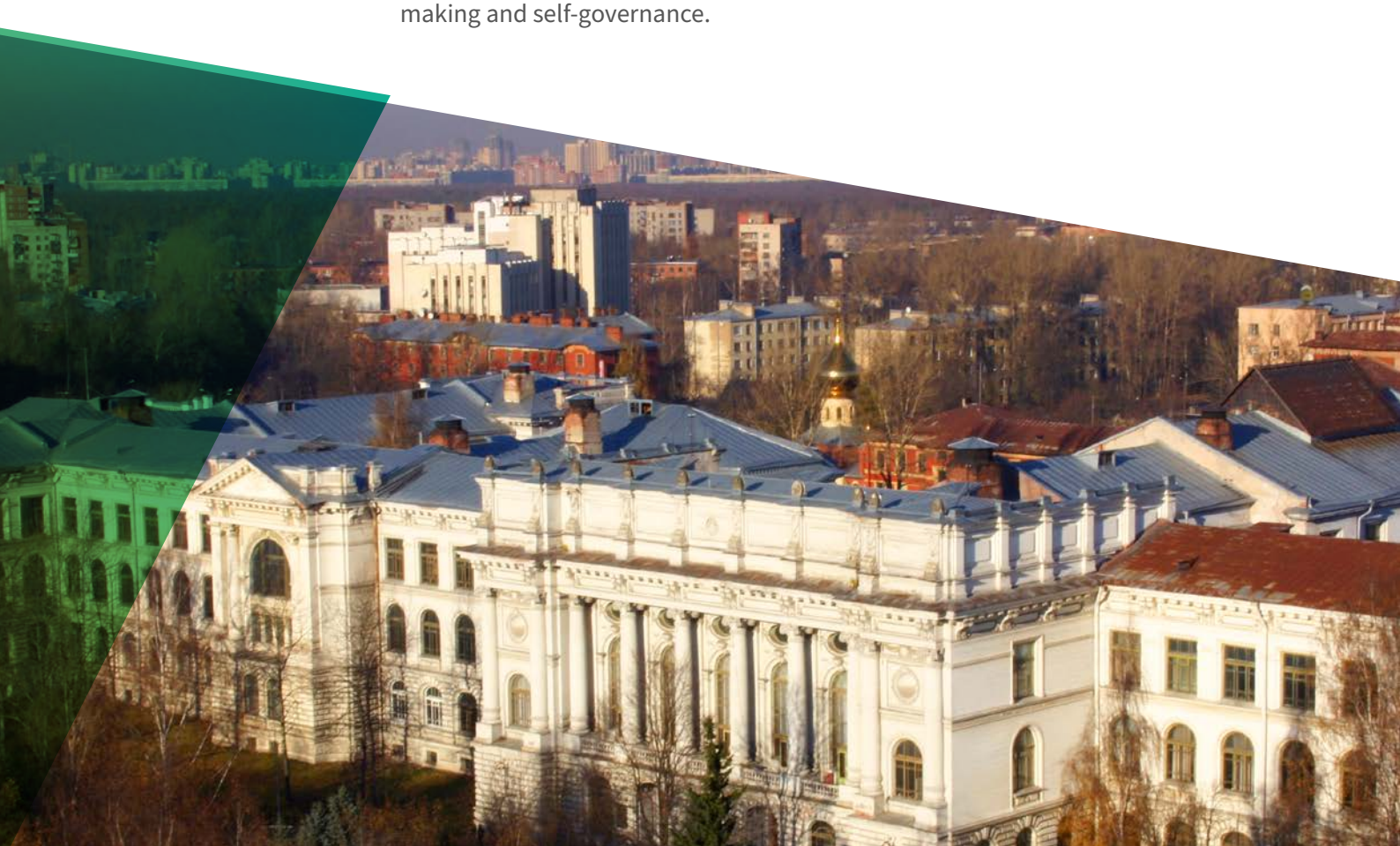
Societal Aspects

Benefits of energy planning, for tenants and property owners in particular, are manifold when they are included in the participation process. Possible effects include the strengthening of community bonds, behaviour changes (pro energy efficiency and climate protection), and increased knowledge on energy planning and reduction of energy use. Building on local knowledge and networks increases ownership, and participants can develop solutions appropriate to local contexts. Solutions to local challenges could include addressing fuel poverty, local economic development, emergent experiments in self-governance and participatory democracy. With respect to local pollution, refurbishment or the exchange of utilities result directly in an improved environment, thus supporting local living conditions. Strategic energy planning may also lead to a better environment (due to less pollution and improvement measures), increasing the well-being and living conditions of neighbours. In addition, financial benefits, such as lower costs for housing, could support low-income tenants. Finally, potential at the building level may results from small improvements, e.g. removing or renewing appliances or renovations that have an immediate effect towards reduction. This could help reduce energy poverty and increase living conditions for the tenants.

Public Sector Aspects

In addition to the above-mentioned benefits that also relate to the public sector, is the opportunity to regain community control over energy supply. Ownership of local infrastructure reduces the cash drain and allows the municipality to reinvest in community-specific projects. In addition, local ownership enables decision-making and self-governance.

▼ *EID Wieniawa from top: Green lungs in the heart of Lublin, Poland.*



Cooperative Retrofitting of Buildings

Gerőházi, Hegedüs and Szemző (2014) defined the term community self-organization (CSO) as "the activity of groups of individuals that have a decisive role in planning and implementing their new homes" (ibid. p. 1). AREA 21 intends to adapt the structures that support CSO, empowering housing associations to occupy a central role in the retrofitting of their buildings while collaborating with key stakeholders. This increases ownership and the willingness to cooperate in energy planning.

Cooperative Improvements to Public Infrastructure

The literature associated with cooperative improvements to public infrastructure target mainly public-private partnerships (PPPs). Hodge & Greve (2017) found a series of context-specific definitions and suggest focusing on five meanings when defining a PPP: project, project delivery form, symbol of private sector role in economy, governance tool or style, context and culture (Hodge & Greve, 2017, p. n.n.). Schaeffer and Loveridge (2002) also found a proliferation of the term PPP due to the "careless" use of the definition (ibid. 170). They argue that differences in characteristics are important for understanding the respective project. A definition that narrows the purpose of the partnership and fits with the AREA 21 case is given by the Ministry of Municipal Affairs of British Columbia: "Public private partnerships (PPPs) are arrangements between government and private sector entities for the purpose of providing public infrastructure, community facilities and related services. Such partnerships are characterized by the sharing of investment, risk, responsibility and reward between the partners" (1999, p. 5). For Latin America and the Caribbean, Serebrisky et al. (2017, p. 12) found that smart investment in infrastructure could save up to 40% of costs and increase efficiency. This includes improving project selection and optimizing infrastructure portfolios as suggested in the EID concept of the AREA 21 project. In addition, they suggest optimizing maintenance planning and expanding the use of demand management measures. This also supports the AREA 21 district-level planning approach.

The (cooperative) improvement of public infrastructure requires a long-term strategic vision that addresses service needs, provides guidance and still offers room for adjustment (OECD, 2017). The integration of stakeholders is considered important since the topic is complex and affects different public, civil and private stakeholders and disciplines. The relevant actors involved in the process should inspire dialogue and allow public access to user needs. In addition, OECD concludes that "consultation processes can enhance the legitimacy of the project amongst the stakeholders, as well-executed consultation can bring a sense of shared ownership" (2017, p. 8). Citizen engagement creates opportunities for communities and is necessary for good governance.

Community Awareness Building for Reduced Energy Consumption Patterns

The UK's Department of Energy & Climate Change identified actions towards reducing electricity consumption as a possible way for communities to tackle energy issues and climate change (2014, p. 4). The IPCC publication on buildings noted a strong agreement that "behaviors informed by awareness of energy and

climate issues can reduce demand by up to 20% in the short term and 50% of present levels by 2050" (Lucon, et al., 2014, p. 675). A more recent assessment indicated that the adoption of new behaviours and technologies could result in a 61% decrease in final energy demand for the building sector, reaching a demand lower than the 2015 values (Levesque, Pietzcker, & Luderer, 2019, p. 261). The proposal by AREA 21 is to inform and raise awareness on the importance of reducing energy consumption thus triggering behaviour changes towards reduced energy consumption patterns.

Implementing the Energy Improvement District: Success Stories

In addition to the development process relating to the measures taken in the AREA 21 case studies, the partners' experiences also provided clear examples on how the various stakeholders could benefit from their participation in the EID development.

The **EID Helsingborg**, Sweden, consists primarily of a hospital area with one hospital building and six detached houses. The project brings together the public property owner (Region Skane), the building management (including staff) and the local energy supplier (Öresundkraft) in the development of the EID. Cross-sectoral workshops (i.e. including stakeholders from the different sectors) fostered the identification of synergies between healthcare and effective energy and climate work. The energy savings resulting from the implementation of energy measures freed resources for investment in healthcare, benefiting the healthcare departments in the Helsingborg Hospital. Furthermore, the energy utility gained new opportunities for operating (services of flexible energy output and energy reuse) and knowledge relating to energy use within the EID. This will help to support them in optimizing local energy systems for increased efficiency, profit and meeting CO2 emission reduction targets. To highlight these efforts, the local project team created a movie of the energy-smart hospital: » https://www.youtube.com/watch?v=Qymj9YLB1y8.

The **EID Tampere Härmälä** in Finland consists of a mixed-use area. The EID development was based on workshops with building owners and local SMEs and received the support of local and energy authorities in addition to the energy utility and the non-profit energy agency Ecofellows Ltd. Their measures support the upgrading of heating systems in buildings, providing owners with tools, knowledge and funding information to facilitate the transition. Furthermore,

▲ *EID Tartu (Annelinn), Estonia.*

the success of the project within the EID resulted in plans for replicating this EID model nationwide.

The **EID Kohtla-Järve** in Estonia consists of a mixed-use area with residential and public functions. The fundamental goal of this project is to increase energy efficiency and quality of life for users of historical buildings in the area. Their measures included an audit of the historical buildings in the area and measuring the potential for improvement in terms of energy savings. As a result, they produced guidelines to support building owners with renovations. These contained step-by-step instructions informed by expertise the building owners might not otherwise have had access to.

The **EID St. Petersburg Polytechnic** (SPbPU) in Russia includes the area of the university. The target is to reduce energy use by means of awareness raising. The university initiated an "EcoGen Cup" championship for SPbPU students ("edutainment") as the end-users of communal infrastructure at the EID Polytechnic. A total of 37 students from different SPbPU institutes participated. They analysed the status quo of energy consumption on the SPbPU campus and proposed their own ideas and concrete measures aimed at energy saving. The main focus of the analysis was measures to involve end-users in energy saving, even though they have no direct economic motivation (SPbPU pays for the resources consumed, while the students and teachers who consume these resources do not pay for it). The high-level politician, Dmitry Peskov, Special Representative of the President of the Russian Federation on Digital and Technological Development and head of the division of the Agency for Strategic Initiatives, participated in the discussion of the presented ideas. He noted the importance and relevance of the issues discussed. Strategies suggested by the winning teams included an introduction of a rating system of incentives, a competition for the most energy efficient dormitory, social privileges, creating a mobile app with augmented reality content (with examples of 3D models), intellectual games in the "your own game" format, the placement of motivational posters, etc.

Challenges and Barriers to Cooperative Energy Planning

Key Messages

- There are costs involved in participation: it is time consuming and requires organizational, financial and personnel resources, which may differ from those originally planned.
- The main challenges of AREA 21 stakeholder cooperation include: (1) a diverse spectrum of stakeholders, (2) a lack of commitment and interest, (3) motivating citizens (to participate), (4) inexperience in the cooperation culture, (5) communication problems and (6) the long-term perspective of companies and public authorities.
- Challenges and barriers to AREA 21 partners are also discussed in the literature (e.g. studies).

Although cooperation for energy planning can be highly beneficial, it is often not carried out due to the various associated challenges. Additional costs for actors may arise (e.g. in the initiation, implementation and communication of the process), and, particularly when the cooperation includes actors of different levels of institutionalization, questions of power and capability are central (i.e. homeowners vs. energy utility). In addition, there is a risk of free-riding if there are many actors involved and short-term gains available (Olson, 2012). Therefore, being aware of the challenges and developing strategies to cope with them is fundamental in dealing with them and ensuring a higher likelihood of successful cooperation.

In this chapter, the authors reflect on the process of identifying the key elements that not only hinder the cooperation process, but also the implementation of actions or strategies to unlock the energy efficiency potential of urban districts. The first part looks at the observations of project partners and their experiences in implementing energy planning in their EID, while the second part comprises a review of the literature (i.e. studies of other energy planning projects).

The initial step in the identification of potential challenges resulted from a brainstorming session by the AREA 21 project partners. They listed the expected barriers to the implementation of strategies for cooperative energy planning, and through mediated discussion they clustered them into a thematic list of challenges. The challenges were categorized as follows:

1. **Financial challenges** relate to the real or perceived availability of short and long-term funding and the financial risks associated with cooperative energy projects.
2. **Technical or technological challenges** relate to the functionality of the system design, such as its integration with existing systems, as well as the approaches used to monitor its use.

▲ *Study visit Tampere EID (Härmälä), Finland.*

3. **Administrative or legislative challenges** relate to processes and regulations that govern the implementation of district-level energy planning.
4. **Societal challenges** relate to the stakeholder perception of district-level energy planning, which is inter-dependent with their knowledge of the system and its benefits that may influence their engagement with new technology and tolerance of disruption during the implementation phases.

Tables 6–9 show a selection of the challenges identified in the four areas.

Challenges in the Financial Sector

Issue	Rationale
Own financial contributions are not feasible for several actors, especially in countries with no or few funding schemes.	Actors without access to additional funds to fill the financial gap (i.e. own contributions) face difficulties when applying for, e.g., EU funding.
Lack of funding transparency.	Funding schemes are not always visible or easy to access. Different funds and funding organizations exist at the EU, national, regional and local levels. A central national website in the local language could function as a navigator to help find the right funding.
(Perceived) lack of financial support opportunities or insufficient financial opportunities.	There is the perception that there is insufficient funding relating to cooperative energy planning, as it is a very specific topic. This also concerns access to funds that enable investments in infrastructure.
Project timelines are currently too short (generally three years).	Short-term funding often only allows for the testing or reduced implementation of the project. Without longer-term funding, several projects will end, even if they are successful. Continuous funding is more sustainable and could increase success and impact.

***Table 6**: Financial sector challenges.*

Challenges in the Technical and Technological Sectors

Issue	Rationale
Data collection for monitoring of performance.	This relates to difficulties in designing data collection processes that are relevant, informative and easy to use for both consumers and operators, while also protecting users' privacy. Other challenges relate to low engagement, high running costs to monitor platforms, trust issues in data transparency, cyberattacks and energy pricing.
Lack of standardization of: • **Interfaces** • **Management protocols** • **Electrical deployment** • **Recharging infrastructure** • **Electrical reselling** • **Grid connection** • **Metering integration**	This includes a lack of guidance for the integration of a new system into an existing model. In particular, the standardization of interfaces between different equipment, management protocols, regulations on electrical deployment, recharging infrastructure and electrical reselling should be fostered. In addition, standard procedures for grid connection and metering integration are missing.

***Table 7**: Technical and technological sector challenges.*

Challenges in the Administrative and Legislative Sectors

Issue	Rationale
Implementation limited to a project-approach which is short-term.	This refers to the implementation of many different short-term measures and projects rather than solving the problem systematically in the framework of a long-term programme. This could be a model for future long-term district-level energy planning with a holistic approach. Short-term projects are more visible and thus politicians tend to implement these for political reasons.
No feed-in regulation due different responsible institutions.	Different institutions are responsible for buildings and for supplying energy. It is a challenge bringing different institutions/sectors together. A further complication arises when regulations are constantly changing.
Lack of regulation at the district level.	Legislation is only available at a building level, making it challenging to implement concepts at a district level.

***Table 8:** Administrative and legislative sector challenges.*

Challenges in the Societal Sector

Issue	Rationale
Lack of motivation to cooperate in the process and save energy, with money as the only motivation.	Many people have little interest in cooperating in energy planning processes. This also refers to improvements and saving energy. Financial incentives are low as several measures are cost intensive and pay off only in the long term. Cooperation costs also imply time and knowledge. In general, there is a (perceived) lack of good practices on cooperative processes that could show how to motivate tenants, building owners and other stakeholders to work together.
Lack of participation due to structural issues (finances, organizational degree, lobby).	Current projects often lack the participation of relevant parties. This is especially true for stakeholders with no lobby or level of organization or with lower financial resources. In addition, requirements for participation, including the financial support to implement these, are often missing. Projects relating to energy planning at the district level should be encouraged to use different (target group-oriented) approaches for active cooperation and should be supported to allow coordinated networking and involvement (active participation) with all relevant actors, including citizens.

***Table 9**: Societal sector challenges.*

The above challenges and barriers were perceived to be relevant in the initial stages of the project. During the implementation phases, the partners were asked to report their experiences of the EID implementation process. The main challenges they found are listed in Table 10.

Main Challenges in AREA 21

What were the main challenges or obstacles during the initiation and organization of local stakeholder workshops with public authorities?

1. A diverse spectrum of stakeholders:
   - Difficult to find the right focus and/or not lose some stakeholders.
   - Difficult to find common ground, interests too divergent.
   - Difficult to keep the focus of the discussion on the strategic goals.
   - Time overlaps (key stakeholders with busy schedules).
2. Lack of commitment, challenging to stimulate interest.
3. End-users/residents:
   - Expectations of residents: they do not care about strategies and related concepts, but rather about money.
   - Perception of residents: Am I really a "stakeholder"? Do I make any difference at all?
   - Residents need a proof-of-concept that it is worth investing in energy efficiency.
4. "Cooperation culture" unfamiliar; also the "workshop" as a working format was not familiar to everyone.
5. Lack of communication between stakeholders (students, professors, management of the university, management of the city).
6. Energy companies:
   - Energy companies need long-term conditions (to guarantee stability for their investments; changing local conditions, such as changes in laws and prices, are unfavourable for cooperation activities).
7. Public authorities:
   - Cities require long-term planning, currently around four years (based on election periods; a change of parties could often lead to a change of strategic priorities).

***Table 10**: Challenges of AREA 21 partners during the implementation phase.*

As mentioned above, within the EID concept, the AREA 21 partners identified district-level actions or objectives. The authors also identified challenges in these areas. These are described below.

Cooperative Retrofitting of Buildings

As previously mentioned, the intention of AREA 21 is to adapt structures to support CSO, empower housing associations to occupy a central role in the retrofitting of their buildings and collaborate with key stakeholders. The multiplicity nature of the housing associations is the initial challenge faced in this process, since this collective group participates actively in all stages of design and implementation (Piaia, Di Giulio, Sebastian, & Damen, 2017, p. 277). Piaia et al. add that traditional planners are likely to have difficulties working for multiple clients, and that the complexity of the process requires more explanation than what would be necessary when dealing with a single client (2017, p. 277).

Community Awareness Building for Reduced Energy Consumption Patterns

The proposal of AREA 21 is to inform and raise awareness of the importance of reducing energy consumption, thus triggering behaviour changes towards reduced energy consumption patterns. However, behaviour patterns are not easily changed; they take time and effort to adjust (Csobod, Grätz, & Szuppinger, 2009, p. 9). Shifting intrinsic habits towards pro-environmental behaviour is even more complex, since "such [pro-environmental] behaviour often brings no tangible benefit to those who engage in it" (Stern, 1999, p. 463). Moreover, even the inclusion of benefits or incentives to help encourage behaviour change may backfire. For instance, if a behaviour is adopted due to a powerful intrinsic motivation (pleasure or satisfaction in performing one's duty), the overlapping of extrinsic incentives (e.g. financial incentives) for the same behaviour can "crowd-out" the pre-existing satisfaction and lead to the abandonment of the desired behaviour (Frey & Oberholzer-Gee, 1997, pp. 746-747). This phenomenon is known as the crowd-out effect, and according to Ezzine-de-Blas, Corbera and Lapeyre, it has been found in a significant number of economic experiments in various fields (2019, p. 435). Finally, Axon et al. cited a study by Kevin Maréchal (2009) discussing the importance of ingrained habits in the non-adoption of energy-saving behaviour "due to habits not being a fully conscious form of behavior" (2018, p. 570).

▼ *Urban energy production in Hamburg, Germany – Energieberg Georgswerder.*

Image: © www.mediaserver.hamburg.de / Aufwind-Luftbilder

Cooperative Energy Planning at the District Level: Specific Guidance

Key Messages
There are ten main steps involved in addressing energy planning at the district level.

A. Collaborative problem definition and analysis:

1. Identify initiating organization(s).
2. Identify energy and climate goals and potential partners to achieve these.
3. Take the lead, initiate discussions and map key actors' motivations.
4. Form a group, identify the common problem to be addressed.

B. Collaborative goal formulation:

5. Elaborate and agree on common goals, objectives and activities.
6. Align behind goals and officiate cooperation.

C. Cooperative integrated strategy development:

7. Obtain data to define status quo in order to compare with later outcomes to measure progress.
8. Analyse data related to the requirements for possible areas of cooperation.
9. Select instrument, i.e. identify district(s) for EID implementation.

D. Decision-making support:

10. Use the three main output documents of AREA 21 for orientation and guidance: the Guidance for Cooperative Energy Planning, the EID Concept, and the Process Model.

The following section describes the ten steps needed to get started with cooperative energy planning, identify courses of action and methods, and ensure adaptability to the local context, actors and needs. These steps comprise the first actions to identify any strengths and weaknesses, challenges and opportunities, individual paths of future energy development and possibilities for integrating the results in local decision-making processes.

1. Identify initiating organization(s).

The first step towards collaborative energy planning involves self-introspection. Who are the actors initiating this process? What are their roles? In which networks

are they active and what is their relationship to energy? The initiator(s) can come from local authorities, energy producers, energy consumers (institutional or citizen), etc. The goals, needs and capacity for action of the initiators relating to this collaborative energy planning should be clearly defined, as well as the responsibilities involved in the following steps.

2. Identify energy and climate goals in the local context and potential partners to achieve them.

Drawing on information from local authorities and energy actor networks, identify national, regional and local energy and climate goals. These goals should be structured and split into suitable groups to fit the process initiating organization and context. The initiating organization must determine how to reach the goals and if external expertise or cooperation is required. For example, reaching the goals might be dependent on another organization, such as the local energy utility, where cooperation is necessary. It is advisable to investigate the cooperation with public and private actors as well as civil society or non-governmental organizations.

3. Take the lead, initiate discussions and map key actors' motivations.

The third step involves the process initiating organization assuming a leading role. They have already established the energy and climate goals and identified possible needs for cooperation with other organizations. This cooperation will be initiated by contacting the respective actors. Together, all key actors should broadly discuss goal synchronization, synergies and sustainable development. Before or during the process, the leading organization should map the external key actors' willingness and motivation for working on the energy and climate goals defined in step one. This is important at this early stage in order to become aware of challenges that may arise and how to address these with context-specific strategies.

4. Form a group, identify the common problem to be addressed.

In the fourth step, all the identified and interested key actors should form a group. The group should ideally consist of public or private property owners, an energy utility as well as public authorities. Non-governmental organizations or (housing) associations may also be relevant actors. In addition, citizens/tenants are encouraged to take an active role in the process. This strengthens ownership and may facilitate the implementation. Together, the actors investigate and determine the areas of interest and joint activities. Also ensure that the needs and interests of the stakeholders are focused on as much as possible without risking a weakening of the overall goals.

5. Elaborate and agree on common goals, objectives and activities.

As a fifth step, the group elaborates and formulates the common goals, objectives and activities to support the coordinated and collaborative work on energy efficiency and climate issues that are beneficial to all actors. The top management of the respective organizations will jointly decide on these common goals and ratify them.

6. Align behind goals and officiate cooperation.

The sixth step involves the group formulating and signing of a letter of intent. This alignment behind previously agreed goals is a clear indication of cooperation. The letter of intent, or a comparable document of cooperation, should include a clear vision of how the cooperation should be implemented, including supporting frameworks and measures (e.g. sharing data on energy use and production, etc.). These supporting frameworks for collaboration and participation are the goal posts for the specified targets and for implementing strategic recommendations and actions approved by the group. It is of great importance to initiate contact with the data suppliers early in order to ensure their commitment to the project. This letter of intent is followed by the officiating of a legally binding document of cooperation between the partners. At this early stage, it may be of interest to also gain the support of a higher level of governance. Who this is and how it should be approached and enlisted for support will be case-specific.

7. Obtain data to define status quo in order to compare with later outcomes to measure progress.

A further task is to access energy data and define a baseline with which to compare later stages in the process. It is critical that this aggregated energy data represents the region, city or district in focus. This data may reflect the energy use per inhabitant, household or building regarding the context-specific goals of the project. The baseline data will enable the challenges involved and any improvements made to be measured. Concerning the legal requirements, aggregated data could be used as the level that is considered sufficient for the target. At the same time, it will be in line with EU data regulations (GDPR, etc.) and thus no legal or formal barriers should exist. The only challenge is the data supplier's willingness to share data. Data could be provided by energy utilities, e.g. the electricity grid company, the gas grid company as well as the district heating company (a letter of intent could help in this matter, see above). In addition to the specific energy use, data relating to the environmental impact of the energy use is also required. This information will contribute to formulating the overall energy and climate goals of the area of interest.

8. Analyse data related to the requirements for possible areas of cooperation.
Data relating to the requirements for areas of cooperation should then be analysed. The data should highlight specific challenges that need to be targeted in order to reach the formulated goals.

9. Select instrument, i.e. identify district(s) for EID implementation.
The EID concept represents an instrument to achieve collaborative energy planning, producing concrete strategies and actions tailored to the local context and district level. The steps above can inform the local development and design of this specific tool and lay the groundwork for its implementation in the identified district(s). The jointly published Process Model document describes in detail the implementation steps of the EID towards creating specific and targeted strategies and action plans for emissions reduction and increased energy efficiency.

10. Decision-making support.
The main outputs of AREA 21 should be used for orientation and guidance. These include this Guidance for Cooperative Energy Planning document, which highlights the benefits and potential that can be unlocked when establishing an EID. However, it also highlights the challenges and barriers that may arise. Taking these into account is important in order to be aware of and prepare to deal with them at the beginning or to avoid them completely. Finally, the guidance describes the specific steps that should be taken to establish an EID.
The second main output, the EID Concept, explains the concept of the EID and its delimitations. Central to the concept are the transferrable modules showing the important frameworks for the initiation of an EID, area identification, organizational matters, financial aspects and time frame.
The third main output is the Process Model, which addresses the planning, implementation, and execution phases, describing the steps that should be considered when applying the EID concept.

▲ *EID Lublin (Wieniawa District), Poland.*

Conclusion

The goal of this document is to introduce the steps that lead to an instrument for improving energy planning at the district level, i.e. the EID concept. Urban and regional actors could follow the steps, adapt them to their specific context and establish cooperation with other actors in the energy and planning fields. With this instrument it will be possible to improve energy efficiency, reduce CO2 emissions and unlock further positive effects generated by the collaborative actions of key stakeholders. This is demonstrated by the many benefits listed in the chapter "Success Factors and Potential of Cooperative Energy Planning" and described below. However, the collaborative character of the EID model makes it inherently complex. Therefore, it is fundamental to be aware of the potential challenges and to invest time producing adequate risk mitigating strategies. The guidance also describes a list of expected challenges so that the participating stakeholders become aware of them and can deal with them in the most context-appropriate manner. In the following paragraphs, the success factors and challenges of EID implementation will be summarized, reinforcing the key messages and intentions of this report.

The success factors and potential for cooperative energy planning at the district level are manifold and impact several areas. For instance, in democracies, it is increasingly important to include participation processes in decision-making. Here, ownership and transparency (especially for citizens) strengthen sustainability and increase the likelihood of success in a project. In addition, proper participation reduces conflict and increases the acceptance and cooperation of all participants. Further, social learning and higher quality decisions have positive long-term effects for the projects and society. The motivations of stakeholders to participate in energy planning processes and projects differ. Identifying these motivations is a critical factor for a successful participation and collaboration. This identification process can be found in the Stakeholder Motivation Map in the annex to this book. The AREA 21 partners also identified strategies on how to manage cooperation barriers. These include (1) offering additional benefits to attract participants, (2) a formalized cooperation and (3) transparent and trustworthy communication. Additional main benefits of strategic district level cooperation include increasing quality of life, funding and finances and better energy solutions. Costs are reduced

as more stakeholders share them, there are increased opportunities of scale (lower procurement costs) and there are organizational benefits with shared tasks, etc. A system perspective allows solutions that are better than single or stand-alone measures. There is also potential to be unlocked in the area of cooperative renovations, thus creating win-win situations (increasing efficiency and living conditions while maintaining stable costs – e.g. higher costs for rent, lower costs for heating). More benefits can be found clustered according to the following areas: technical, financial, societal, public sector and district-level (cooperative retrofitting of buildings, cooperative improvements to public infrastructure and increased community awareness on reduced energy consumption patterns).

The challenges and barriers to cooperative energy planning hinder the successful implementation of instruments like the EID concept. It is important to be aware of these in order to avoid them completely or to address them in the early stages to better cope with them. In general, participation comes with costs: it is time consuming, requires organizational, financial and personnel resources and may differ from the original plan. Since not all participants have the same degree of organization, it may be challenging to reach out to them. The main challenges of stakeholder cooperation in AREA 21 are (1) a diverse spectrum of stakeholders, (2) a lack of commitment and interest, (3) motivating citizens (to participate), (4) an inexperienced cooperation culture, (5) communication problems and (6) the long-term perspective of companies and public authorities. Additional challenges can be clustered into four areas: (1) financial, (2) technical or technological, (3) administrative or legislative and (4) societal. The financial challenges include problems relating to own contributions in order to apply for project funding, a lack of funding that fits the holistic approach of energy planning at the district level and short project timelines that hinder long-term planning and project implementation. The technical or technological challenges can be related to, e.g., data collection issues, since most end-users are reluctant and afraid to share data, or other businesses and utilities are not willing to share them within a cooperation project. Public administration is also hindered in applying the best system approach since both political short-term thinking and short-term funding are critical issues. In some countries there is a lack of district-level regulations that could support the actions of the public administration. Finally, citizens may be reluctant to participate in the processes of energy planning because they do not feel addressed, responsible or relevant. Several of the challenges mentioned also apply to the cooperative retrofitting of buildings and increased community awareness building on reduced energy consumption patterns.

Finally, the specific guidance for cooperative energy planning at the district level highlights the transferrable steps needed in preparation for the establishment of the EID concept. These steps orientate stakeholders from cities and regions with respect to (1) collaborative problem definition and analysis, (2) collaborative goal formulation, (3) cooperative integrated strategy development and (4) decision-making support. These comprise the first actions to identify the strengths and weaknesses, challenges and opportunities, individual paths of future energy development and possibilities for integrating the results in local decision-making processes.

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Energy Improvement District (EID) Concept

An Integrated Strategic Approach to Cooperative Energy Efficiency Planning at the District Level

Executive Summary

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The goal of the Energy Improvement District (EID) documentation is to provide a framework for the implementation of cross-sectoral cooperation surrounding district energy planning. Target groups include local, regional and national actors in energy planning that are seeking instruments to reduce CO2 emissions and increase energy efficiency at the district level. The EID concept approach aims to unlock synergies and further potential that is often overseen or unused. This is related to a holistic approach which views the district as a system with specific energy demands and potential. It brings together diverse stakeholders in collaborations and thus applies a well-known approach in Urban Improvement Districts (UIDs). The project has appropriated and adapted the improvement district idea from other applications and tested its implementation in seven different countries in the Baltic Sea Region (BSR). Based on the pilot results, it was possible to test the potential of an EID and produce a transferrable framework for its further implementation in different contexts.

This report introduces the origin of the applications of improvement districts, highlighting which characteristics should be incorporated into the EID model. It also covers the transferrable framework developed according to the results of the pilot case studies, highlighting the main features of the EID. The main features are defined and condensed to form the central pillars of the concept that can be transferred to other context-specific cases. The pillars are (1) initiation of an EID, (2) area identification and definition of boundaries, (3) organization and cooperative formats, (4) financing and incentives and (5) the time frame. This document examines more closely the success stories, benefits and challenges that should be taken into account in order to successfully implement the EID concept as well as detailed, specific guidelines for planning, implementing and executing it. For further information on this, please refer to the three main output documents.

The main outputs jointly published in this book are:

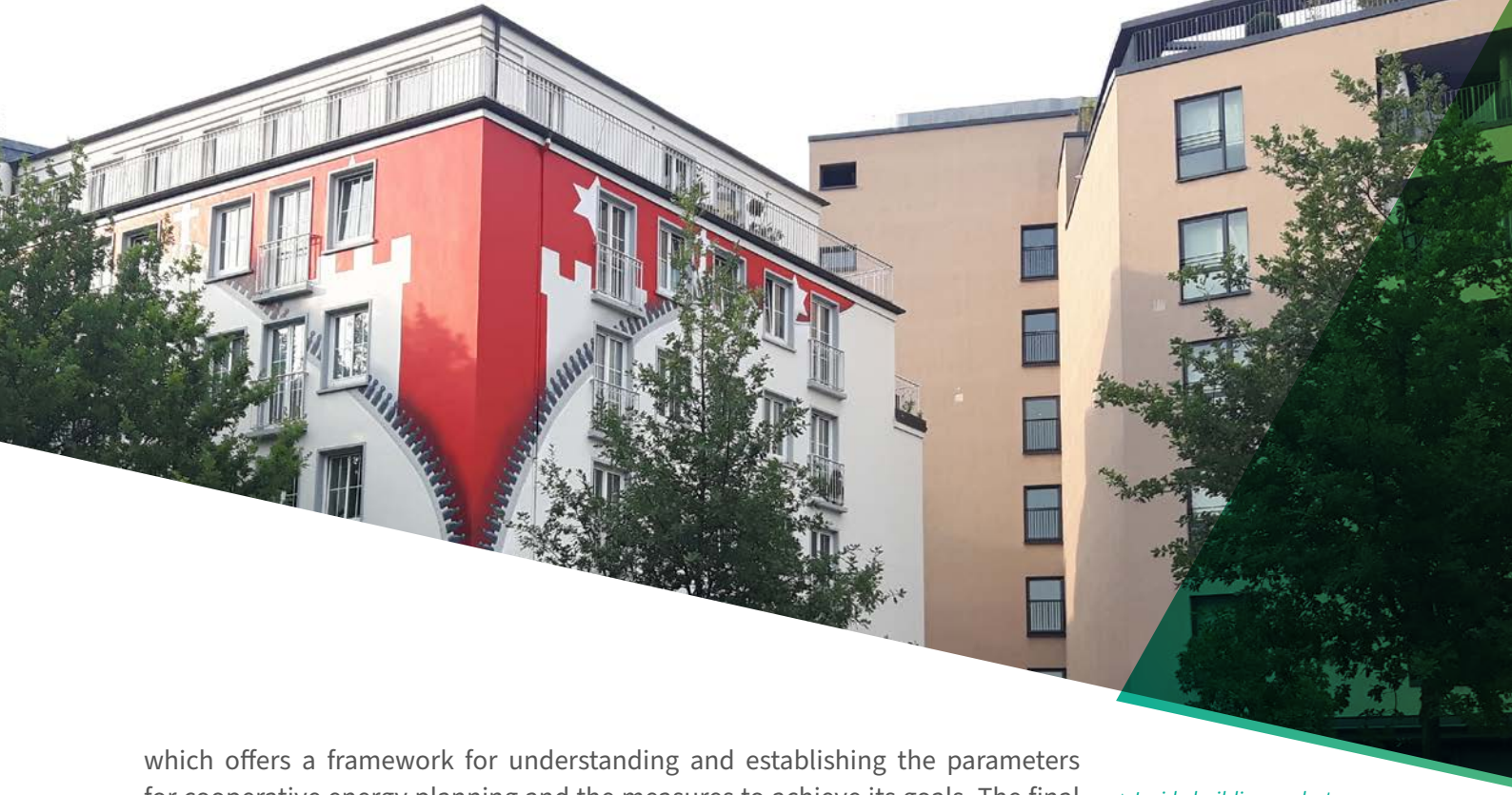
1. Guidance for Cooperative Energy Planning at the District Level, also referred to as the Guidance for Cooperative Energy Planning.
2. Energy Improvement District (EID) Concept, also referred to as the EID Concept (this document).
3. Process Model for Cooperation in Energy Improvement Districts, also referred to as the Process Model.

Acronyms

BSR: Baltic Sea Region
BSU: Behörde für Stadtentwicklung und Umwelt (Hamburg's Department for Urban Development and Environment)
BID: Business Improvement District
CHP: Combined Heat and Power
CID: City Improvement District
EID: Energy Improvement District
HID: Housing Improvement District
ICT: Information and Communication Technology
MUSH: Municipality, Universities, Schools, and Hospitals
NID: Neighbourhood Improvement District
PACE: Property Assessed Clean Energy
REScoop: European Federation of Renewable Energy Cooperatives
SID: Special Improvement District
UID: Urban Improvement District
US-EID: United States' Energy Improvement District

Introduction

This document is one of three outputs of the AREA 21 project: "Guidance for Cooperative Energy Planning at the District Level" (also referred to as the Guidance for Cooperative Planning), "Energy Improvement District (EID) Concept" (also referred to as the EID Concept) and "Process Model for Cooperation in Energy Improvement Districts" (also referred to as the Process Model). These documents are published jointly and are interlinked. They enhance each other and should therefore be used together. The first output explains the initial steps involved, including the challenges and potential (including success stories of the partners) of cooperative energy planning, guiding the interested cities and regions through the initial phase of the process until the determination of the Energy Improvement District (EID). The second output (this document) describes the EID concept



▲ *Inside buildings, what can be approved? – Hamburg, Germany.*

which offers a framework for understanding and establishing the parameters for cooperative energy planning and the measures to achieve its goals. The final output addresses processes that enable the implementation and cooperation of the process. All three documents offer insights that are transferrable to other cities and regions. In this way, they can be used together as a holistic guide, helping understand and follow, from the starting point, via the set-up of a context-specific concept and strategy, to the implementation of this in practice.

Description and Aims

Against a background of increasing awareness, there are several unanswered questions on how to reduce CO2 emissions and increase energy efficiency, ultimately addressing the issue of climate change. In northern European cities there is still high potential for emissions reduction, especially in the building sector where the potential relates to energy consumption in the form of heating and electricity, as well as energy production for urban neighbourhoods. The AREA 21 project tested the hypothesis that collaborative and cooperative energy planning at the district level is key to unlocking such potential. Furthermore, the proposed approach is adaptable to different contexts, resulting in tailor-made solutions for increased energy efficiency.

There is already a high awareness and willingness to act from both the public and private perspectives. In the EID Concept document, the authors want to provide cities and regions, especially in the Baltic Sea Region (BSR), with a framework that is transferrable and that can be applied to context-specific cases. This should be achieved by using a modular concept approach that breaks down the main concept stages and sheds light on the challenges, benefits, requirements and relevant considerations relating to energy planning at the district level. This concept supports the set-up of an EID frame that targets improvements in energy efficiency and planning at the district level. In this specific energy planning approach, several stakeholders from different areas (i.e. public and private enterprises, housing associations and tenants, building owners and public administration) are brought together to work collaboratively to achieve their goals. The authors will show that this EID approach is beneficial to the stakeholders and goes beyond standard or one-sided approaches through the following three steps:

1. Giving background information on the origin and evolution of the EID concept, including the different types of improvement districts, in order to better understand the issue and concept.
2. Delimiting the EID approach from the other existing improvement district models by highlighting the differences between the approaches, goals and benefits as well as their applicability to the EID presented by the AREA 21 project. Finally, the results from the study are checked against the project partners' experiences from their pilot EIDs, providing concrete insights into providing a clear concept and framework for EID implementation.
3. Presenting and explaining the AREA 21 concept as a transferrable and modular approach, describing the main pillars of the concept and its modules (initiation, area identification and definition of boundaries, organization and cooperative formats, financing and incentives, and time frame).

Background Information

Throughout this chapter, the authors explore the evolution of the improvement district models, proposing an investigation beyond their fundamental aspects. The first section explores the early applications of the model and how it transformed and expanded. The second section focuses on understanding the fundamental aspects of improvement districts in general and their field-specific applications (business, housing, neighbourhood and energy). The aim of this chapter is to learn from concrete experiments in establishing improvement districts.

Origin and Evolution of the Improvement District Model

As identified by Boehme and Warsewa (2017), the concept of "improvement districts" emerged in North America as a new instrument for urban governance. It is an instrument for promoting private initiatives to organize, coordinate and finance, mainly by beneficial owners, urban-related and additional measures to improve the quality of a limited area (Kreutz & Krüger, 2008).

This was first implemented in 1969 in the form of Business Improvement Districts (BID) in the Bloor West Village, Toronto and subsequently the concept was adopted across Canada and then the United States in the early 1970s (Galende & Pardo, 2018). Worldwide, the BID concept has now been applied in other continents and countries, including Australia, South Africa, Ireland, the UK and Germany (Galende & Pardo, 2018).

Later, the approach was transferred to other fields, for example in residential areas as Neighbourhood or Housing Improvement Districts (NIDs or HIDs). However, these forms only have limited representation, especially in Europe (HafenCity Universität Hamburg, 2016). It is important to note that improvement district approaches are inconsistent within and between different countries, since no uniform model exists (HafenCity Universität Hamburg, 2016).

Boehme and Warsewa (2017) explain that a special feature of the improvement districts concept is that it involves various actors in the expenditure of government budgets, especially citizens. The authors also highlight the inclusion of twofold participation in the project: first, responsibility for or participation in the definition of the project and its activities and second, the provision of the necessary additional resources (Boehme & Warsewa, 2017). Kreutz and Krüger (2008) state that the concept makes local actors responsible for the independent organization, development, design and financing measures, as for a private, bottom-up urban development. Since a BID is usually initiated as a bottom-up action, in most cases there is a newly established legal basis to support the approach. For example, in the Hamburg context, a new paragraph in the federal code of urban planning provides incentives for business collaboration (Galende & Pardo, 2018). Therefore, it can be summarized that the concept is based on a private initiative (by local landowners and traders), however, as stated by Vollmer (2011), the involvement of the city is still mandatory due to local laws and legal limits.

According to Kreutz and Krüger (2008), improvement districts are instrumental for increasing the participation of different stakeholders in urban developments. They aim to establish long-term, binding cooperation between stakeholders, beyond the improvement district lifetime and the inclusion of inactive stakeholders (Kreutz & Krüger, 2008). Even though the implementation period for an improvement district is predetermined, an extension of this period can also occur to establish long-term cooperative goals.

The Types of Improvement Districts

Krüger, Wickel and Kreutz (2007) introduced the generic term "Urban Improvement District" (UID), for which Hamburg's Department for Urban Development and Environment (*Behörde für Stadtentwicklung und Umwelt – BSU*) adopted the term "City Improvement District" (CID) to encompass various types of improvement districts. Table 11 gives a comprehensive definition of the terms and provides an overview of the goals, conditions and limitations for the establishment of the existing model.

Key Features of City Improvement Districts

City Improvement Districts (CIDs) are private initiatives involving the temporary cooperation between multiple property owners. The key features of CIDs are the following:

- Responsibility and organization lie with the participating owners.
- The initiatives are secured by state legislation and take place within a clearly defined area.
- The measures to be implemented aare jointly defined and should have no negative effects on public interests or the interests of those involved.
- They are based on reliable measures and financing concepts and are fully funded by all concerned owners.
- Their goal is to strengthen and develop the area through the commissioning of a body to implement the agreed upon measures.

***Table 11**: Definition of City Improvement Districts. Source: (Krüger, Wickel, & Kreutz, 2007, p. 3).*

Although the various types of UID/CID mostly work within the framework detailed in the table above, they still have defining specificities. Therefore, the authors will investigate the status quo of the different types of UID/CID, exploring some of their key features. The types of UID/CID explored are the BID, HID, NID and the US model for the EID (the US-EID).

As previously mentioned, the **BID model** was first implemented in Canada in the late 1960s and transferred to the US in the early 70s (Galende & Pardo, 2018). The BID focuses on district upgrading for the improvement of economic performance, and it is initiated based on a real or perceived lack of attractiveness of a certain area (HafenCity University Hamburg, n.d.). The conception of the planning process is bottom-up, with retailers, service providers and the municipality as the main actors. The BID exists within a clearly-defined area in a city (e.g. city centre, shopping streets). It depends mainly on private funding – private capital within the district, revenue from property owners and additional taxes – or on the support of public financing mechanisms (HafenCity University Hamburg, n.d.).

The **HID and NID models** were adaptations of the BID (HafenCity Universität Hamburg, 2016). The difference between the two models refers to the district land use: HID is characteristic of solely residential areas while NID applies to mixed-use areas. However, they function in the same way. Both focus on improving inner city housing areas owned by a group of companies or landowners who, together with the tenants and the municipality, are the main actors involved in the process. They have a bottom-up planning process, initiated to restructure urban areas suffering due to population decline and insufficient public investment. The area

encompassed by HIDs or NIDs can be of variable and adaptable scales, but it must be within city limits (HafenCity University Hamburg, n.d.).

Finally, the **US-EID model** is the most relevant to this study, as its focus is similar to the AREA 21 EID, i.e. increasing energy efficiency, reliability on energy supply and cleanliness. A US-EID is a combination of top-down and bottom-up processes. It is usually initiated at state or municipal government level by popular vote of the legislative body and authorized by ordinance at state government level. The process is also characterized as bottom-up via shifting member power and public-private partnership cooperation. Furthermore, it is initiated by the municipality's interest in independent energy generation. The US-EID concept is usually associated with the financing mechanism called the Property Assessed Clean Energy (PACE) programme.

The PACE mechanism derives from the concept of municipal improvement districts, since it "creates a voluntary special tax or special assessment district that funds the cost of energy improvements for commercial and industrial property owners that voluntarily join the district" (U.S. EPA State Clean Energy and Climate Program, 2011, p. 25). In this way, property owners can borrow money to cover the upfront investment on energy improvements and pay back the value over a period of 20 years – considering that the energy savings from the retrofitting of their property could surpass the amount they need to pay back (PACENation, 2016).

In their article about the PACE programme in Ohio, Headen, Bloomfield, Warnock and Bell also associate the term "special improvement district (SID)" – also described as a special financing district – with the establishment of the programme in Ohio (2011, p. 50). The authors explain that "traditionally, SIDs were used for the purpose of implementing locally controlled projects, such as sidewalk improvements" (Headen, Bloomfield, Warnock, & Bell, 2011, p. 51). However, in the case of an energy SID, some divergences apply, from which it is significant to mention that "the properties included within an Energy SID do not have to be contiguous" (Headen, Bloomfield, Warnock, & Bell, 2011, p. 51).

It is relevant to mention that not all states or local governments that offer PACE financing deliberately introduce the US-EID or SID concepts. According to the DSIRE platform, 34 states allow their local governments to offer PACE financing (DSIRE, n.d.), but only four mention the term EID: Northeast Ohio Advanced Energy District in Ohio (DSIRE, 2018), Fayetteville in Arkansas (DSIRE, 2015), Leon County in Florida (DSIRE, 2016) and Hartford in Connecticut (City of Hartford, 2017, pp. 30-31). Furthermore, the scope of financing differs, as not only energy improvements but also "seismic retrofits and storm hardening products are eligible for PACE financing in certain jurisdictions" (Kroll Bond Rating Agency, 2018, p. 1).

In the case studies in which the implementation of US-EIDs derive from the offers of PACE programmes of local governments, there seems to be little to no collective action from different stakeholders to improve energy efficiency. The term "district" does not necessarily refer to a specific area since the participating properties do not need to be contiguous, and thus the efforts towards energy efficiency come from a group of individuals with similar interests. Therefore, the main actors in the US-EID are the municipality and energy utilities, making the process predominantly top-down.

Delimitation of EIDs

The lessons from the existing models proposed in this section are divided into three parts. First, the general framework presented by Krüger, Wickel and Kreutz (2007), is analysed in terms of its applicability to the AREA 21 EID concept. Second, specific features from the BID, HID, NID and US-EID concepts are examined as they relate to the proposed EID. Finally, the results from the previous sections are compared with the project partners' experience in their pilot EIDs, providing concrete insights into developing a clear concept and framework for EID implementation.

Features of the UID

In their report on the UID/CID, Krüger, Wickel and Kreutz (2007) introduce the fundamental aspects of the improvement district models (see Table 11). In the following paragraphs, the authors discuss these characteristics and evaluate which of them are considered appropriate to the EID concept, and which should be excluded or adapted to better fit this vision.

In terms of responsibility, Krüger, Wickel and Kreutz (2007, p. 3) specify that the participating property owners would be responsible for organizing the proposed UID/CID and developing a financing concept for funding their proposed UID/CID. This arrangement is reasonable when property owners are the only participating stakeholders. However, the inclusion of diverse stakeholders (public and private sector, citizens, research institutes, etc.) is crucial to promote innovative and tailored energy solutions. Such an approach guarantees that all impacted stakeholders can contribute to the development of initiatives, thus reducing the chances of unplanned trade-offs and increasing the acceptance of the project within the district.

▼ *EID Tartu (Annelinn), Estonia – the kindergarten.*

Moreover, an expanded range of stakeholders allows for the identification of cross-sector synergies (i.e. solutions that address environmental, social, and economic issues). Therefore, this criterion needs to be adapted so that the responsibility is shared accordingly among the participating stakeholders. The same refers to the costs of planning and the implementation of initiatives. An increase in the number of stakeholders will logically result in the sharing of financial burdens, reducing the costs for each stakeholder, even if the overall costs of development for a more complex action are higher.

They also specify that the initiatives should be secured by state laws and take place within a clearly defined area (Krüger, Wickel, & Kreutz, 2007, p. 3). These conditions are inherent to the district or region-specific framework conditions. The EID must be organized according to the local legal framework, whereas the area definition will ideally be more flexible in terms of boundaries. Increased flexibility in boundary definition allows for increased adaptability to the EID goals and the local context. As a result, the model is more easily transferrable. The topic of the delimitation of boundaries will be further explored in the chapter on the features of the transferrable modular approach for EID implementation and during the analysis of the case studies conducted by the project partners (see *Area Identification and Definition of Boundaries*, p. 57; and *Features from the EID According to the Project Partners' Experiences*, p. 44).

Finally, the goal of any UID should be to strengthen and develop the district through the implementation of jointly defined measures, with no negative effects on the public interest or the interest of those involved (Krüger, Wickel, & Kreutz, 2007, p. 3). Such criteria are likely to be the most fitting for the proposed EID. The goal of involving a diverse group of stakeholders should promote the implementation of innovative and comprehensive solutions, in addition to guaranteeing that a larger sample of affected actors have a voice in the proposal and implementation of measures.

Although the EID proposal does not perfectly fit the UID/CID criteria introduced by Krüger, Wickel and Kreutz (2007), most of them are applicable. It is also important to note that the other specific types of UID/CID do not fit all the criteria perfectly (e.g. an area is not clearly defined in the US-EID).

Features of Field-Specific Improvement Districts

This section explores the key features of each specific type of UID/CID, assessing their compatibility with the EID goals and their applicability to the EID concept. The section titled *The Types of Improvement Districts* (p. 38), has already introduced these features for the various field-specific UID/CIDs. These include the focus of the improvement district, the main actors involved, the initiating factors, conception of the planning process, financing and area delimitation. Furthermore, although the EID concept was based on the establishment of a field-specific UID/CID, there are various key differences that should be clarified. Table 12 highlights these differences, and explores each area of focus in more detail, thus contributing to the definition of the EID concept in AREA 21.

Key Differences Between the AREA21 Concept and Field-Specific UIDs

Field-Specific UID/CID	EID in AREA 21
Main Actors Involved	
Energy utilities and municipality (US-EID). The US-EID focuses on public-private cooperation between energy utilities and local authorities as the main responsible parties for the planning, decision-making and implementing an EID.	**Main actors in the EID process depend on its characteristic and main thematic objective.** Apart from energy utilities and municipalities, further actors could also play a major role, such as housing companies or property owners.
Conception of Planning Process	
Municipalities' interest in independent energy generation as initial impulse (US-EID). The US-EID's processes are mainly initiated and planned top-down by the local municipality, but there is often a top-down/bottom-up combination, e.g. through public-private partnerships with energy utilities. **Local businesses' (BID) or residents' (NID/ HID) interest to improve their current situation in terms of economic strength or quality of life.** The need for upgrading and restructuring residential (NID/HID) or business (BID) areas brings those affected together to actively change their situation in a joint bottom-up effort.	**Combined and interactive bottom-up and top-down approach.** Different variants are conceivable, including those typical of the other improvement districts. The form depends on the characteristics and main objectives of the EID. However, in many cases a combined, interactive approach is considered appropriate.
Financing	
Financial obligation (BID). Most BIDs require all landowners and traders in the area to financially support the measures, even though they might not be interested in participating (Vollmer, 2011). Participants vote on previously developed measures and a financing plan, and a voluntary commitment to the plan is signed (Vollmer, 2011). This process could involve an obligatory "special tax" (Germany), a BID levy (USA) or a BID fee (Canada) (Galende & Pardo, 2018).	**Non-obligated financial participation.** To avoid social grievances in financial obligations for the project, AREA 21 does not enforce financial participation within the respective EID. No actor or stakeholder is obliged to financially contribute. Instead, it recognizes that each EID is different, and the costs involved might not need to be equally agreed upon or equitably shared.
Area Delimitation	
Large target areas initiated by the city (US-EID). The city primarily defines the EID boundaries and organizational aspects.	**Small, government-independent target areas.** The boundary and organization of target areas are open for discussion and influenced by district or region-specific framework conditions.

***Table 12**: Key differences between the AREA 21 concept and the other field-specific UIDs.*

The focus of all UID/CID types is on improvements at the district level, and in this case, the US-EID matches most closely with the EID since both focus on upgrades in the energy sector. However, the proposed EID aims to produce innovative and tailor-made solutions at the district level, and this is not prioritized in any of the UID/CID models. It is important to explain that the term “innovative” indicates innovation within the boundaries of the EID’s context. This means that initiatives adapted from other experiments in a different context also comprise “innovative solutions”. Moreover, specifying that “tailor-made solutions” are inherent to the development of the EID reinforces the importance of ensuring that any initiative to be implemented should strive to fit the specific needs of its context. This approach is reflected in the diversity of solutions and areas of focus in the case studies developed within AREA 21.

In terms of the main actors participating in the process, none of the UID/CID types fit with the focus of the EID, as the limited range of collaborating actors is insufficient to foster innovative and tailor-made solutions. The proposed model aims to be more flexible and inclusive with their participants. The logic behind the approach aims to maximize the number of perspectives engaged in the district’s development, reducing the risk of implementing a solution that does not fit the entirety of the community. Such an approach minimizes unplanned trade-offs and consequently reduces the risk of conflict and a rejection of the solutions by the affected groups. Furthermore, it expands the benefits to a larger group of interested stakeholders. Of course, coordinating the development of a solution with a diverse group of actors means that overall expenses are expected to be higher. However, the sharing of these costs should result in lower individual costs. Therefore, various actors should be actively involved, such as housing companies, property owners, tenants, research institutes, etc.

The initiating factor for any type of UID/CID is very particular to the specific needs of the area. However, it is possible to divide the types of improvement districts into two categories. The first encompasses the types of UID that are initiated as a response to a problem, i.e. a lack of necessary investment from the public sector. This includes the BIDs, HIDs and NIDs. The second refers to projects initiated from an opportunity for improvement, i.e. increasing the efficiency of energy systems, and includes the US-EID. The EID concept embraces both these categories. Although it stems from a problem, i.e. the need to curb carbon emissions in the energy sector, it also aims to use the opportunity to develop innovative solutions and find synergies when solving socio-economic issues. For example, the inclusivity anticipated in the project is expected to have a positive social resonance as a result of providing the various stakeholders with a space for dialogue in which all participants have a voice. Furthermore, financial gains are also likely to be realized, since the increase in energy efficiency within a district will lead to reduced energy costs for the end-users. If currently implemented, the costs of the improvements to energy efficiency are offset by the lower final energy costs (i.e. heating, electricity) resulting in a zero sum in the short to medium term and a return on capital in the long term.

In terms of the conception of the planning process, the combination of top-down and bottom-up approaches makes more sense within the inclusive character proposed by the EID. It should seek a combined and interactive bottom-up and

top-down approach. In this case, the private stakeholders should communicate their needs and ideas, propose and evaluate measures, and initiate and support their implementation. The public authorities, on the other hand, can validate the needs of the district by providing structures and/or resources. The balance between top-down and bottom-up will depend on different aspects, such as the leading actors and the characteristics and objectives of the EID.

The EID projects rely on non-obligatory financial participation. The aim of this is to avoid social grievances over financial obligations towards the project (Revez, et al., 2017). It is recognized that each EID is unique and it is not always necessary for the costs involved to be equally agreed upon or equitably shared, thus avoiding exclusion and/or overwhelming financial pressure (e.g. retrofitting programmes had negative effects on tenants) (Revez, et al., 2017). Overall, it is expected that most participants can contribute financially to the projects' development. However, in cases in which some stakeholders have no means to take on EID-related financial obligations, this should not result in the exclusion of these stakeholders from participating in the project, as they could have other valuable contributions to offer. Furthermore, an exclusion process will compromise legitimacy.

In terms of the delimitation of the UID area, each type of improvement district has their own approach. In the case of the EID, the flexibility of the boundary definition supports the possible objectives of a specific district. The delimitation of project boundaries will be further explored in the chapter describing the features of the transferrable modular approach for EID implementation and in the analysis of the case studies conducted by the project partners (see *Area Identification and Definition of Boundaries*, p. 57; and *Features from the EID According to the Project Partners' Experiences*, below).

Features from the EID According to the Project Partners' Experiences

In addition to the theoretical background presented in the previous chapters, the experiences of the AREA 21 project partners have contributed significantly to streamlining the EID concept. Their practical experience in implementing EIDs within their contexts has contributed significantly to the final EID concept. In this chapter, the authors explore the same key features from the previous chapter (*Features of Field-Specific Improvement Districts*, p. 41) through the project partners' perspective. Table 13 introduces an overview of the EIDs developed by the AREA 21 partners, summarizing the potential significance of an EID. The results achieved by the partners show how the application of the EID concept is highly adaptable to the specific context. Thus, above all, the concept fosters context-appropriate solutions.

The Potential Significance of an EID Based on the AREA 21 Cases

Participating Stakeholders	EID Description
EID Helsingborg (Hospital District), Sweden	
Regional authorities, energy utilities, regional services (maintenance and logistics) and representatives of healthcare (regional).	The EID consists of a hospital area and a few housing units. It aims to reduce energy use in electricity and heating parallel to expanding the hospital facilities. The savings in operating costs will be directed to healthcare investment. Some of the adopted initiatives include the upgrading of the hospital's energy system (e.g. the use of smart technologies and demand-response solutions) and the selling of surplus heat to be redistributed in the city network.
EID Lublin (Wieniawa), Poland	
District council, energy and heating companies, educational infrastructure (from kindergartens to universities), housing associations, military hospital, one office and one foundation.	The EID consists of a mixed-use area and aims to increase energy production from renewable sources and reduce energy consumption. Some of the adopted initiatives include the upgrading of buildings (e.g. insulation), the modernization of heating networks and measures towards the energy-saving behaviour of end-users.
EID Tampere (Härmälä), Finland	
Building owners, local SMEs, local and energy authorities, energy utility and the non-profit energy agency Ecofellows Ltd.	The EID consists of a mixed-use area and aims at drastically reducing CO2 emissions. Some of the adopted initiatives include the promotion of energy efficient renovations, the use of geothermal heat, and the application of information and communication technology (ICT) tools for a better supply-demand balance.
EID Kohtla-Järve (Järve), Estonia	
Property owners, local authorities, housing association, and building managers.	The EID consists of a mixed-use area of residences and public functions and aims at increasing energy efficiency in historic buildings and increasing the quality of life of residents. Some of the adopted initiatives include the development of strategies for improving energy efficiency in historical buildings, raising the awareness of building owners, the coordination of stakeholders in different sectors and the application of ICT tools for energy consumption monitoring.
EID Tartu (Annelinn), Estonia	
Property owners and users, citizens, officials, urban planners and energy operators in their strategy development process.	The EID consists of a predominantly residential area and aims to decrease energy consumption and emissions and improve indoor climates for residents. Some of the adopted initiatives include awareness building, the refurbishment of buildings and on-site renewable energy production.

The Potential Significance of an EID Based on the AREA 21 Cases

Participating Stakeholders	EID Description
EID St. Petersburg (Polytechnic), Russia	
Employees and students of the university, different departments as managing units, the student organization.	The EID consists of a predominantly educational facility with residential buildings for students and aims to increase the reliability of the energy system, reduce energy expenses and raise awareness of conscious energy consumption. Some of the adopted initiatives include the refurbishment and renovation of buildings and the use of ICT tools to foster the pro-environmental behaviour of end-users.
EID Hamburg (Barmwisch-Bramfeld), Germany	
Local housing cooperatives, energy suppliers and municipal stakeholders.	The EID covers a predominantly residential area and aims at reducing energy demand and increasing the attractiveness of the area through climate protection interventions (e.g. green roofs and facades). Some of the adopted initiatives include the updating of older heating systems, improvements to heating infrastructure, the introduction of on-site renewable energy production. Plans for the deep renovation of the building's insulation as well as for the construction of a new apartment building are also under discussion. This would include a systems approach for energy planning for all the buildings in the EID.

***Table 13**: Selected pilot EIDs developed within AREA 21; examples of what the EID can be.*

Focus

Although energy efficiency is a central element in all the EID cases, it will not always present itself alone. In the AREA 21 case studies, energy efficiency is accompanied by a synergetic focus. For example:

- In Sweden, the vision defined for the EID Helsingborg Hospital District is an energy smart hospital for improved healthcare and a reduced carbon footprint.
- In Poland, the vision of the EID Lublin Wieniawa aligns energy efficiency with the improvement of living conditions for the inhabitants together with the economic development of the area.
- In Finland, the EID Tampere Härmälä applies energy efficient measures to achieve the overarching vision of a carbon-neutral Härmälä by 2030.
- In Estonia, the vision of the EID Kohtla-Järve proposes energy efficiency measures for historical buildings, aligning energy saving, restoration and a higher quality of life for residents.
- In Estonia, the EID Tartu Annelinn combines energy efficiency with the increased awareness of its inhabitants.
- In Russia, the EID St. Petersburg Polytechnic places energy efficiency alongside a respect for natural green spaces and heritage.
- In Germany, the focus of the EID Hamburg Barmwisch-Bramfeld is the environment, especially with regard to adapting to climate change (i.e. through the unsealing of surfaces, roof greening, integrating water areas, etc.) and social aspects that enable affordable and comfortable housing and living for tenants.

The inclusion of these synergetic areas of focus, such as improved healthcare, living conditions or green spaces, increases the impact of the EID's actions and potentially activates a broader scope of participating stakeholders. Furthermore, the synergetic areas of focus are identified according to the specific context of the EID. This assists in promoting effective, innovative, and tailor-made solutions. Therefore, within the EID concept, the central focus will always be the increase of energy efficiency combined with solving local issues with the aim of generating innovative and context-appropriate solutions.

Main Actors and Conception of the Planning Process

The main actors and the conception of the planning process are interlinked features. The main actors are responsible for leading and supporting the design and implementation of solutions within the EIDs, and these actors and their dynamics define the balance of the top-down and bottom-up interactions within the conception of the planning process. As previously mentioned, the inclusivity of stakeholders is vital to decrease the risk of negative impacts and increase the suitability of the proposed solutions. For references and further information, see also the Guidance for Cooperative Energy Planning document.

The stakeholders involved in the process are also a function of its context and goals. For instance, an area predominantly occupied by public buildings and infrastructure is likely to have a higher share of public stakeholders and top-down planning. This is reflected in the AREA 21 case studies.

In the Swedish case, since the EID comprises a hospital area controlled by the regional authorities (EID Helsingborg Hospital District), most of the decision-making takes place in a top-down process. The key stakeholders include representatives of the regional authorities, the energy utility, regional services (maintenance and logistics) and healthcare (regional). In the EID Hamburg Barmwisch-Bramfeld, in addition to the municipality of Hamburg-Wandsbek, the main actors include local housing cooperatives where tenants are (part) shareholders of the buildings, the energy suppliers and the municipal stakeholders. In contrast, the Polish and Estonian EIDs had a broader set of participants. The stakeholders of the EID Lublin Wieniawa in Poland include the district council, the energy and heating companies, educational infrastructure (from kindergartens to universities), housing associations as well as one military hospital, one office and one foundation. The EID Tartu Annelinn in Estonia involved property owners and users, citizens, officials, urban planners and energy operators in their strategy development process, while the EID Kohtla-Järve (Estonia) brought together property owners, local authorities, housing associations and building managers. These three last examples are more balanced with respect to the bottom-up and top-down approaches. The EID St. Petersburg Polytechnic also has very specific stakeholder groups and organizations which include students and employees of the university. The case studies illustrate that the involved actors, and thus the subsequent conception and planning process, will depend on the EID's specific characteristics and goals.

Initiating Factors and Delimitation of Areas

There are different factors and reasons for choosing an EID district. For example, the delimitation of the hospital area in the Swedish EID was a function of its significant potential. The area has one of the highest energy consumptions in the city and thus has enormous capacity to lower its energy use in peak hours, thus supporting the city by serving as a power balancer within the regional energy system. A contrasting example is the Polish case, in which the choice of the Wieniawa district for the EID implementation derived from the significant number of buildings managed by housing associations and public buildings, thus facilitating the introduction of new measures. Furthermore, the overlapping of the EID boundaries with an administrative unit was crucial in establishing the Polish EID area. The EID St. Petersburg Polytechnic is another example of the area being appropriate to the needs and definition of the initiators. In terms of the EID Tampere Härmälä in Finland, the district was perceived as being representative of the building stock of the city of Tampere, where successful measures could subsequently be replicated across the city. These dissimilar situations show how the initiating factors can vary considerably from case to case, and the existence of a favourable scenario is key in making the implementation possible (e.g. a supporting legal framework).

Financing

As previously mentioned, a sharing of the financial responsibilities should take place in an equitable manner without resulting in injustices to the participating stakeholders. Furthermore, the proposed concept relies on identifying various

funding sources and avoiding costs to stakeholders who cannot carry such costs. This means that identifying potential sources of funds from within both the public and private sectors and successfully combining them is key to achieving the EID's goals.

In the Swedish case study, the predominance of public buildings facilitates the division of costs, as most is financed by the regional authority. The Tartu Annelinn and Kohtla-Järve EIDs in Estonia are also supported by the public sector through grants from the national funding association KredEx, to help finance the implementation of measures (e.g. renovations, photovoltaic panel installation). In contrast, the Wieniawa District in Poland struggles with a lack of co-financing programmes associated with a lack of resources from the residents of the area. Such examples illustrate that funding sources depend a lot on the context of the EID (availability of resources, beneficial framework, characteristics of the area, etc.).

The financing of an EID is as unique as its other characteristics. However, it will strongly depend on the participating actors and the legal framework inherent to the area, which will either hinder or facilitate the funding of necessary measures

The AREA 21 EID Concept: A Transferrable Modular Approach

Based on the lessons learned from the various UID/CID concepts, it is now possible to examine the proposed EID concept. The EID approach is a forward-thinking instrument to drive energy efficiency and innovation at a district level. EIDs are innovative energy efficient model areas which bring together public and private stakeholders who jointly plan and implement tailored energy solutions. Relevant stakeholders for EIDs to consider include:

- Energy companies,
- Property owners (housing cooperatives, households, offices),
- Companies,
- Local public authorities,
- Energy network operators,
- Research institutes,
- Tenants.

The collaboration of various stakeholders aims to build a strong partnership between the public and private actors from different sectors that continues throughout the life cycle of the EID to ensure integrated decision-making. Network and consensus-building activities foster the identification of tailor-made solutions, the piloting of new projects and the establishment of both informal cooperation and formalized partnerships. The resulting innovations can then be integrated

into other projects or implemented at a municipal level, where the overall goal is defined, e.g. in the form of a strategic master plan. For further information regarding the initiation phase, the challenges and barriers and strategies for addressing these, as well as the benefits, see also the jointly published Guidance for Cooperative Energy Planning document. For information on processes, strategy development and implementation, please see the Process Model document. Furthermore, the EIDs in the AREA 21 project aim to adopt an integrated approach. Therefore, the term **energy efficiency** must cover aspects beyond energy saving. Table 14 lists the action areas and objectives for energy improvement in the AREA 21 approach.

AREA 21 Action Areas and Thematic Objectives

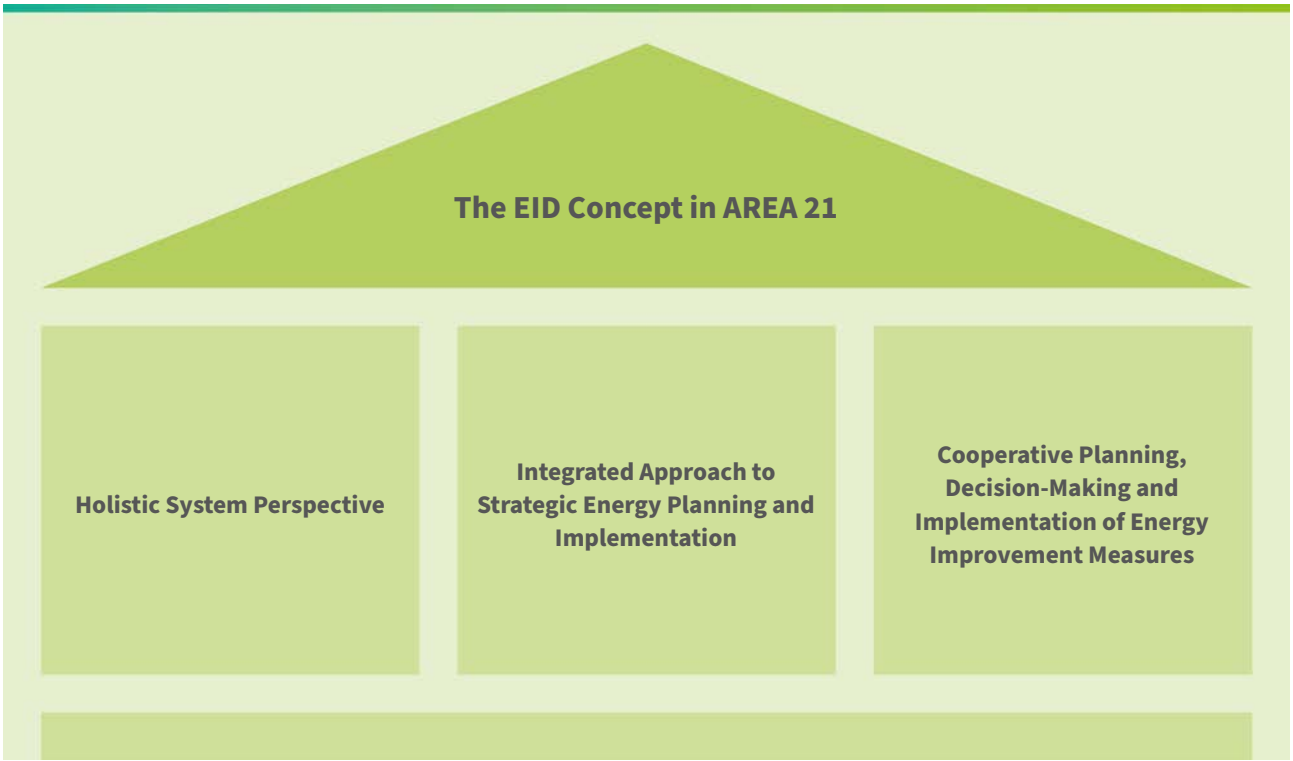
Thematic Objectives	Action Areas
Savings in Energy Demand	• Energy-related refurbishment of private buildings, public and commercial properties, industrial companies (building envelope as well as technical building equipment). • Energy consulting, campaigns, grants: changes in user behaviour and information on low-investment measures. • Energy efficient appliances in households or energy efficient production facilities in industry usage.
Efficiency Improvements in Energy Production	• Combined heat and power. • Waste heat utilization/recovery. • Optimized heating systems.
Use of Renewable Energies & Innovative Energy Technologies	• Intelligent grid/network of energy consumers and suppliers. • Demand response solutions. • Sector coupling. • Implementation of renewable energy sources (e.g. solar, geothermal energy, etc.).

***Table 14**: Thematic objectives and classified fields of action in the AREA 21 EID concept.*

The following sections will explore the main pillars of the EID concept and the modular approach adopted by AREA 21. The main pillars enrich the EID concept, while the modular approach describes of the conceptual framework for the establishment of an EID. The modular approach is merely introduced in this report, and its application is described in more detail in the Process Model document.

Main Pillars of the EID Concept

The final aspect of the EID concept to be assessed refers to the three key concepts that support it: (1) a holistic system perspective, (2) an integrated approach to strategic energy planning and implementation and (3) the cooperative planning, decision-making and implementation. These are the main pillars of the EID concept (see Figure 1) and are further described in this section of the document.



▲ ***Figure 1***: *Three main pillars of the AREA 21 concept.*

Holistic System Perspective

This pillar is the cornerstone of the AREA 21 approach: The EID concept is district-oriented, i.e. there is a shift from single building solutions to a holistic system approach for the entire district. Various actors, buildings, facilities and infrastructure units are grouped together with the aim of improving energy efficiency in the whole area and benefiting from technical, financial, and societal advantages. The benefits of such an approach are achievable on two fronts. The first refers to the economies of scale, since the refurbishment of multiple units, for example, can mean lower per unit costs of the refurbishment. Therefore, a greater number of refurbished units, upgraded facilities, infrastructures, etc., is likely to result in a lower costs for each stakeholder for a broader attained benefit. The second front refers to synergies, since these are more easily identified in a systemic approach than an individual one, i.e. aggregating multiple measures may result in cross-sectoral gains, and these are more easily recognized when looking at the system as a whole. For example, the upgrading of heating infrastructure combined with the renovation of residential units provides more than an energy efficient system; if applied correctly and effectively, it also reduces costs for the end-users and suppliers (lower demand and less energy losses in the network) and improves the living conditions of the tenants in the residential units. Depending on the case, deep renovations and changes in appliances lead to higher net prices per square meter but reduced costs for final energy use (heating or power to produce heat). Costs for tenants are thus often identical or lower than before the measures where the renovations are not used as an instrument of profit gain by the housing company. This point is not only important in terms of the legitimacy of the process, but also in terms of citizen support for and acceptance of the implemented measures.

Integrated Approach to Strategic Energy Planning and Implementation

In BIDs, intelligent regulatory instruments, such as agreements between the municipality and local businesses in which the municipality assures its financial support, are used for the commitment to and implementation of planned measures. Deriving from this idea, the EID approach has an implementation-oriented character: the EID brings together various actors as co-creators, not only in the definition phase of the strategic goals, but also in the practical implementation of the measures.

Strategic energy planning integrates energy savings, energy efficiency and the use of renewable energies in all sectors. At least two to three of the different action fields listed in Table 15 (e.g. building renovation, modernization of the technical energy infrastructure, healthy urban climate, attractive public space and use of renewable energies) should be addressed so that the EID follows an integrative approach.

Integrated strategic energy planning is a complex process that requires the coordination of multiple sectors, governance levels and numerous stakeholders (i.e. interdisciplinary EID thinking). In order to avoid sectoral fragmentation, the EID concept is based on an interdepartmental and cross-sectoral approach that moves away from a single sector perspective. In addition, the coordination of national and regional targets and local community planning should be ensured. The guidelines and established objectives of the overall urban planning concepts must be aligned and specialized at the district (EID) level, especially regarding energy issues. This should be supplemented by the consideration of long-term urban development plans and an integration with energy planning. Table 15 introduces the fundamental aspects to be considered in an integrated approach to strategic energy planning.

Overview of the Aspects of an Integrated Approach to Strategic Energy Planning

Technical	• Sector coupling: cross-sectoral interconnection of power, heating/cooling and transport (e.g. use surplus electricity from renewable energies for heating or cooling purposes, or feed into general electricity network in the case of feed-in tariffs). • Integration of renewable energy technologies into the existing energy system.
Financial	• Integration of financial incentives and funds. • Integration of different financial sources (e.g. pooling of private capital, incentives, grants).
Planning, Implementation and Cooperation	• Vertical (i.e. hierarchical) integration of stakeholders, plans and objectives (national → regional → city → district level). • Horizontal integration of stakeholders (i.e. cooperation at eye-level, including among different levels of public authorities).

***Table 15**: Fundamental aspects of the integrated approach to strategic energy planning.*

Cooperative Planning, Decision-Making and Implementation of Energy Improvement Measures

In this context, cooperation means that many types of actors decide on, develop and implement energy projects. Cooperative actors could include, for example, public authorities, energy utilities, property owners, housing cooperatives and local citizens. Cooperation formats and citizen participation instruments that can be used within the EID include:

- Public-private partnerships,
- Property owner meetings,
- Round tables (e.g. to discuss refurbishment issues),
- General information events,
- Workshops on specific topics,
- Mini publics (explained in more detail in the next chapter, The Modular Approach).

These formats can vary depending on the EID phase of planning, decision-making and implementation. Local networks that are formed as a result of the formats should develop into stable cooperation structures in the long term. As mentioned previously, multi-stakeholder cooperation is a key feature of the EID concept, since it secures the fusion of diverse cross-sectoral perspectives for the development of measures for a successful EID. The selection of the appropriate tools for collaboration is also fundamental to facilitate the communication of stakeholders, with the aim of developing highly beneficial and synergetic initiatives for the EID.

The Modular Approach

The main features and characteristics of an EID depend on the conditions of the district's existing framework and the energy objectives in response to those conditions. For example, a district's existing framework conditions could be strongly characterized by political structures, the level of leadership of the stakeholders, the urban layout or the current energy system. These conditions could then determine the selected spatial area or focus of energy efficiency measures, such as increasing the use of renewable energies or generating savings in energy demand. It is necessary to clarify the interdependency and influence of these measures, i.e. financing issues depend, for example, on the way the EID is initiated and organized. Therefore, since the district's framework conditions determine its approach, the process can be depicted as a modular system where its features are adjusted to the prevailing conditions.

Figure 2 represents the main features of the EID concept using a modular approach related to the thematic goals and the district's framework conditions. In the following sections, these individual modules – which are to be adapted to the existing framework conditions as well as to the overall energy objectives of the area – will be explored one at a time. To facilitate the understanding of each module, they will be summarized in one or more questions whose answers define the particularities of the established EID.

▲ ***Figure 2**: Scheme of the interplay between framework conditions, thematic goals and main features of an EID.*

Initiation of an EID

The introduction refers to the series of documents that target the specific stages and processes of the EID idea (initiation, conception and implementation). In terms of initiating an EID, together with the related benefits, barriers and challenges, as well as the strategies to overcome these, please refer to the jointly published Guidance for Cooperative Energy Planning document.

The initiation of the EID does not refer directly to the reason for its establishment, but rather mainly to the leading stakeholders pushing for the process. Therefore, the question that should be asked when defining the initiation module is: *Who is the (main) initiator of the EID process?*

EIDs can be classified according to which actor initiates the process or plays the most active role in the initial phase. From the classification of leadership models proposed by Leminen, Westerlund and Nystrom (2012), Table 16 summarizes the initiation types to provide a guide for a classification system.

Initiation Models (Categorized by Main Actors)

Model	Main Actors	Explanations
User-driven (civil society)	User communities (e.g. local citizens, property owners, local housing community).	Bottom-up principle. Built upon a significant problem or specific community of interest. Activities are at first organized informally. Other actors in the network participate by supporting the users in terms of providing resources, knowledge and guidance. Concerns: opportunity to have a say in energy-related issues and to co-create energy system.
Operator-driven (industry, companies)	Companies, businesses, and business clusters (e.g. energy utilities, businesses specialized in technology delivery).	• Bottom-up principle. • Concerns: align the future development of the business (develop and test products and services, collect data and information on users) and emphasize central position in network.
Provider-driven (academia)	Knowledge and educational institutes, universities, research and development bodies or organizations.	• Focus on improving users' everyday life. • Attract enablers and users to participate. • Concerns: generating useful knowledge and information, and having a platform to test new innovations.
Enabler-driven (public authority)	Government, municipality, public sector organizations, regional development agencies, policy makers.	• Top-down principle. • Developing a specific region/ city area in terms of energy improvement. • Multi-party cooperation. • Universities and educational organizations push development work close to the users. • Concerns: improve quality of life, and being re-elected.

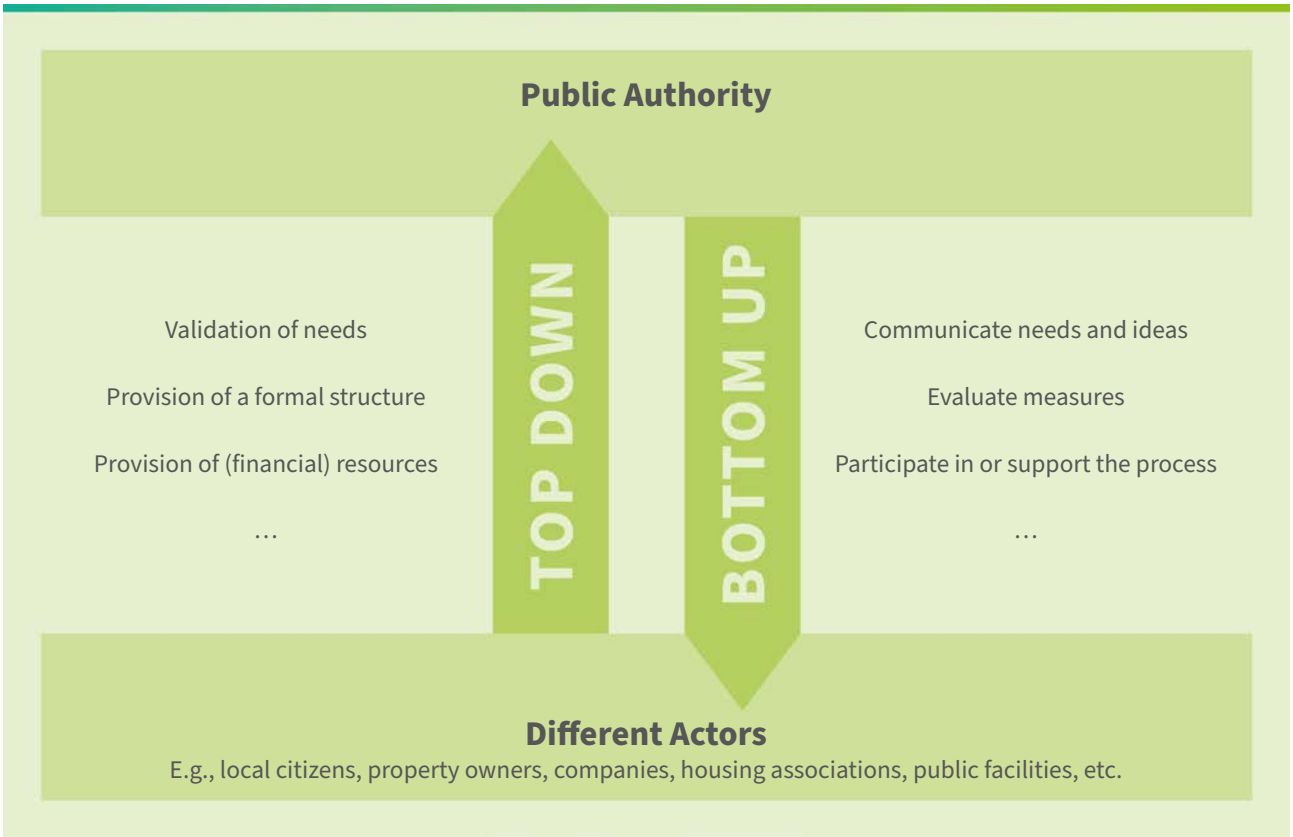
***Table 16**: Possible classification of models of EID initiation. Adapted from Leminen et al. (2012).*

The EID process can be initiated as a top-down process, for example, by the municipality (enabler-driven) or a bottom-up process by stakeholders, such as citizens or local businesses (user-driven). It is assumed that the type of main initiator depends on the prevailing conditions (e.g. share of public and private stakeholders or buildings) in the area and on the overall thematic objective derived from them (see *Features from the EID According to the Project Partners' Experiences*, p. 44).

While other improvement districts are often bottom-up initiatives, a **combined and interactive bottom-up and top-down approach** is recommended for the EID. The example of good practice in Lochem (the Netherlands) illustrates that such a path is possible. This improvement district was developed from an initial impulse generated by local citizens seeking to establish an independent renewable energy project (Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015). However, local government involvement is essential to assist with subsidies to achieve the initiatives. Therefore, the grassroots initiative of Lochem started with a common idea amongst residents and was developed in active consultation with the municipality (Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015).

In other cases, the local municipality acts as the main initiator and plays an important role in the establishment and support of the EID. Once the goals are predefined, the municipality invites citizens or selected stakeholders with specific profile attributes to share the responsibility of achieving the goals. The advantages of this approach include an improved coordination of activities, the mobilization of stakeholders (e.g. with incentives) and the procurement of financial resources. The interactions of the combined bottom-up and top-down approach (shown in Figure 3) results in a shift of power in the decision-making process and financing arrangements between the public and private actors.

▼ *EID Tampere (Härmälä), Finland.*



▲ ***Figure 3**: Interactive and combined bottom-up and top-down approach.*

This mixed approach involves both "structural" and "symbolic" resources for the establishment of an EID. Bomberg and McEwan (2012) describe these two types of resources and their mobilization as follows:

- **Structural resources** refer to the particularities of a political system (e.g. level of state support) and their general features (e.g. engagement with state or other policy makers, i.e. the political context will shape opportunities for action, either facilitating or hindering community energy projects (Bomberg & McEwan, 2012, pp. 437–438).
- **Symbolic resources** hold value for actors and can incentivize collective mobilization towards specific goals which include identity, legitimacy, authority and quest for autonomy (Bomberg & McEwan, 2012, p. 437).

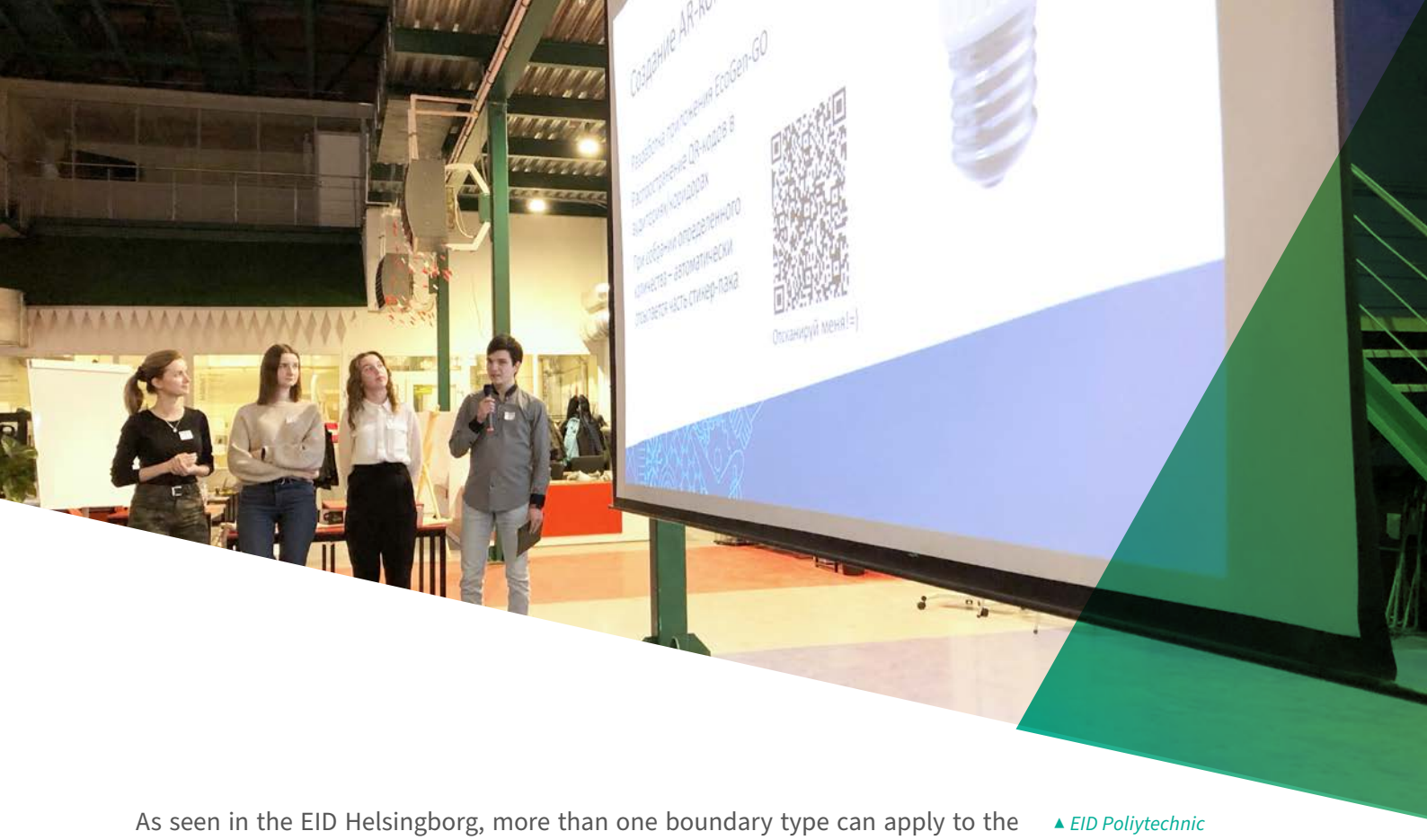
Area Identification and Definition of Boundaries

In improvement districts where the initiative is bottom-up, the area of improvement is identified by the actors involved. In BIDs, for example, the local companies would play a key role in establishing the preferred area, while in NIDs or HIDs, this would be the housing associations or property owners. This means that the leaders in the establishment of the EID play a central role in defining its boundaries. To support the decision, the following question should guide the definition of the EID area: *Which criteria define the scope of an EID?* Table 17 outlines several boundary types that refer to the criteria for defining an EID.

Identification of an EID Area (Categorized by Boundary Types)

Boundary Type	Explanation	AREA 21 Examples
Administrative	The EID is aligned to the boundaries of an existing administrative area. Advantages: • Competences, powers and responsibilities are clear. • Statistical data is usually collected at this level.	EID Lublin Wieniawa, where the municipality organizes and coordinates the cooperation in and implementation of the EID.
Informal	The EID is aligned to the boundaries of existing informal cooperation or organizational structures. In some countries or regions, there are no administrative units within a city (e.g. Finland). Instead, the city is "unofficially" divided into units. In these areas, certain cooperation formats or unofficial organizational structures may already exist.	EID Tampere Härmäla is the southern part of a "service district" where local stakeholders meet regularly to discuss and plan activities in their neighbourhood.
Structural	The EID is aligned to boundaries of specific infrastructures, buildings and facilities that belong to the same structure. These are often owned by the municipality.	EID Helsingborg Hospital District. University Campus (EID St. Petersburg).
Functional	The EID is aligned to the boundaries of a functional area defined by technical aspects. Such technical aspects can include: • Buildings or stakeholders are connected to each other through a heat supply concept (e.g. district heating network). • Refurbishment agreements between housing associations, cooperatives or property owners.	EID Hamburg Barmwisch-Bramfeld, where, as a result of cooperation, building cooperatives may recommend technical solutions for all buildings of the EID.
Potential	The EID is aligned to the boundaries of an area with significant energy improvement potential within a city.	EID Helsingborg Hospital District has one of the highest energy consumptions in the city and an enormous capacity to support the city by lowering its energy use in peak hours.
Model	EID is aligned to the boundaries of model districts within the framework of higher-level masterplans (city, regional and national level). These are usually transferable showcase projects, with characteristics that are typical of a city area.	EID Hamburg Barmwisch-Bramfeld in the scope of the city-wide climate strategy.

***Table 17**: Possible classification of types of identification for EID areas.*



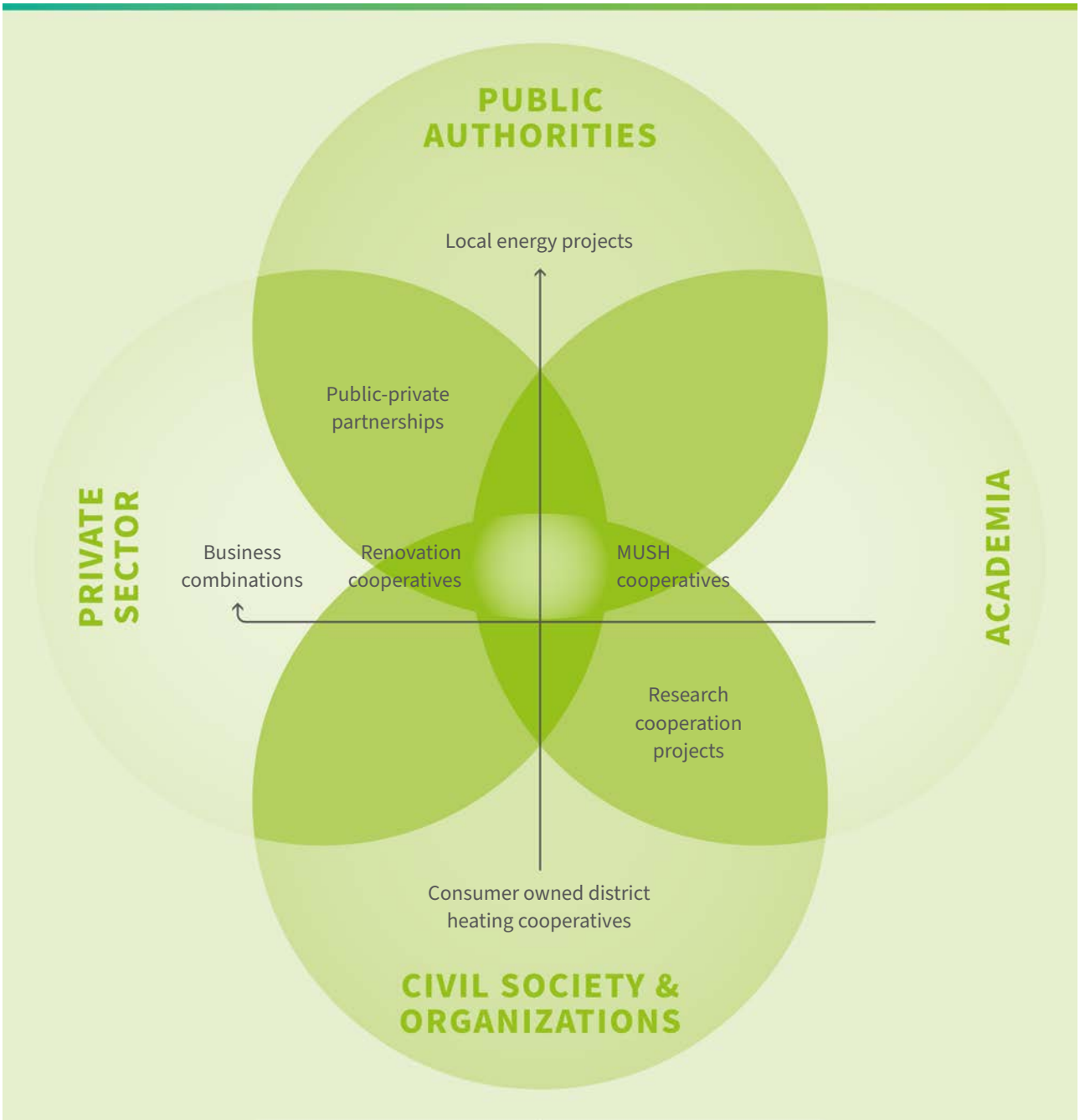
▲ *EID Poliytechnic St. Petersburg, Russia.*

As seen in the EID Helsingborg, more than one boundary type can apply to the same EID (structural and potential). These cases are favourable, as they illustrate synergetic dynamics within the area. In the case of the EID Helsingborg, the simultaneous existence of two boundary types combines the potential for the improved energy efficiency of the area with the advantages of it being mostly managed by the public sector, thus simplifying the pool of impacted stakeholders. Finally, the size of the EID area is also a significant aspect, since it must be compatible with the EID objectives. For example, a smaller area could be advantageous in terms of the successful implementation of efficiency and energy supply measures or cooperation between stakeholders. In the case of the refurbishment of buildings, a smaller EID area is also suitable. In contrast, the case of district heating and cooling systems requires the selection of a larger area, as this improves the technical feasibility. Furthermore, the size of the area is also instrumental in delimiting the costs. It is important to identify whether economies of scale within a larger area with more "units" to be upgraded result in a cost reduction for the individual participating stakeholders.

Organization and Cooperative Formats

Depending on who initiates the EID process and in which context it exists, both the organizational structure and possible cooperative formats will differ.

The **cooperative formats** refer to which stakeholders are involved and what their dynamics are. Identifying the possible cooperation formats within the EID is guided by determining *who the involved stakeholders are* and *how their practices are institutionalized?* Figure 4 illustrates possible cooperation formats within the EID using the quadruple helix model of Carayannis and Campbell (2009). Leifson describes the model as a "collaboration and innovation model with citizens […] perspective" (2018, p. 4), and it is also closely linked to the classification by Leminen, Westerlund and Nyström (2012) introduced in Table 16. The various cooperation formats represented in Figure 4 are explored below.



▲ ***Figure 4**: Cooperation formats within an EID illustrated by the quadruple helix.*

In general, **local or community energy projects** are related to community-owned renewable energy or energy efficiency projects and often include a diverse range of actors in their organizational structure. The term prosumer is associated with this type of project, as it refers to participants in formal or informal citizen-led community energy initiatives and defines a consumer who takes a more active role in a local energy system (Lennon, Dunphy, Sanvicente, Hillman, & Morrissey, 2018). Local energy cooperatives are examples of this type of project and are defined as profit-based and focus on renewable and community-based power. They enable residents and citizens to become members with voting rights through the purchasing of preference shares, and the generated renewable electricity is collectively sold to the grid based on feed-in tariffs agreed with the power authority. The membership elects a board, an advisory committee and a management team, and often 20-year

lease agreements are made with property owners for energy installation projects on their land. The energy cooperative "Lochem Energie" uses such a structure, with membership consisting of a management team and participants from civil society, national government, municipality, academic institutions, businesses and other energy initiatives (Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015). It is based on the Lochem Energy Agreement between the involved parties, in particular between the municipality and civil society (Hoppe, Graf, Warbroek, Lammers, & Lepping, 2015).

The European federation of renewable energy cooperatives (REScoop) also supports the establishment of local energy projects. It tests business models in which citizens collectively own and directly participate in renewable energy and energy efficiency projects (REScoop.eu, 2018). All citizens are eligible to become members by purchasing a cooperative share. Members share the profits and can actively participate in the cooperative, e.g. by co-deciding on what to invest (REScoop.eu, 2018). Advantages of direct citizen participation include encouraging the acceptance of and reducing local resistance to the development of new technologies, as well as the promotion of smaller-scale and lower-impact projects (REScoop.eu, 2018).

In addition to local energy cooperatives which focus on electricity supply, **consumer-owned district heating cooperatives** are another option. These are open to all citizens within a locality and consumers can become members by purchasing preference shares. For example, the ENTRUST project as described by Lennon et al. (2018) collectively owns a combined heat and power (CHP) plant that simultaneously generates electricity and heat for district heating. Some of the independent board members are appointed by the cooperative members themselves and others by the local council, and the CHP plant is managed by an engineer (Lennon, Dunphy, Sanvicente, Hillman, & Morrissey, 2018). One possible area of cooperation between the city and the surrounding area is the biogas supply of the CHP plant by farmers (Lennon, Dunphy, Sanvicente, Hillman, & Morrissey, 2018).

Heterogeneous ownership of buildings is a significant challenge in renovating existing buildings with new energy efficient measures. The position paper of the Urb.Energy (2012) project recommends the establishment of renovation communities, new **owners' associations or cooperatives** with a legal status and decision-making powers that represent individual owners in the development and implementation of the EID and its measures. The aim is to establish a local partnership with public and private organizations in the housing sector (e.g. housing associations, construction companies, architects, engineers, real estate officers and the municipality). Cooperative agreements having a legal status facilitate opportunities for grant funding, subsidies and credits, provided that an appropriate legal framework exists in the countries or regions concerned (Urb.Energy, 2012). An example of this arrangement is the Hamburg-Dulsberg district pilot project, which forms part of the energetic urban renewal programme of the German development bank Kreditanstalt für Wiederaufbau (Credit Institute for Reconstruction). This project involves various owners who sign a **voluntary cooperation agreement** committing themselves to concrete target values and creating mutual control.

In the ENTRUST project, Lennon et al. (2018) analyse **MUSH energy producers**. MUSH is an acronym for municipality (i.e. representative of communities), universities, schools and hospitals. As a public institution, the municipality is

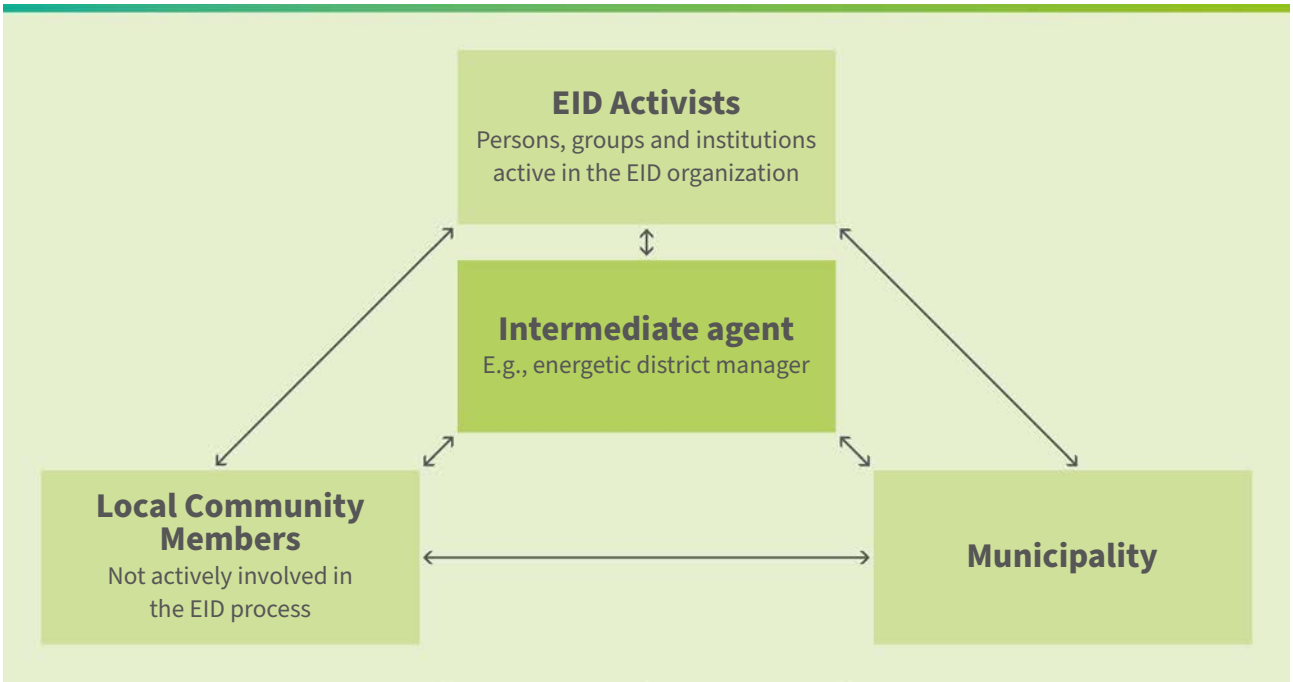
the owner and manager of these public facilities and plays a leading role in the initiation and establishment of local community energy projects, such as energy efficiency optimizing of heating systems (Lennon, Dunphy, Sanvicente, Hillman, & Morrissey, 2018). In addition to public actors, Lennon et al. (2018) note that residents can become members of the **MUSH cooperative** with voting rights and can invest in local renewable energy production through the purchase of preference shares. Financial resources are provided by the residents' capital, agreed feed-in tariffs and the sale of electricity (Lennon, Dunphy, Sanvicente, Hillman, & Morrissey, 2018). One advantage is that the energy projects are carried out directly in complex buildings which have high energy requirements (Lennon, Dunphy, Sanvicente, Hillman, & Morrissey, 2018).

Organizational structure refers to the management of the EID. Questions referring to the definition of the organizational structure within the EID are *who is responsible for which activities* and *what are the rules for the steering of the EID?* As in the case of the cooperation formats, the organizational structure also varies from case to case.

In some projects, an **energy district manager (i.e. EID coordinator)** is employed in an EID-like process, often as a part of the local administration. The manager's role could include:

- Involvement in strategy development, both in and beyond the implementation phase, so that they actively contribute to shaping the concept and assuming responsibility for its successful implementation.
- Responsibility as the direct contact person, both internally and externally – they advise interested local actors on the technical and financial aspects of measures and support them in applying for funding.
- Actively engage with and provide information to disinterested and apathetic actors in the project.
- Conduct inspections of individual properties with initial consultation to provide a discussion platform with experts.
- Request technical support from an authority that is familiar with the topics of environment and energy and technical experts for the concrete planning of individual measures.
- Attend regular meetings with energy managers from other districts in order to represent the EID externally and to facilitate an exchange of ideas.
- Network with various local stakeholders to coordinate their goals and needs to develop joint measures.

It is important to consider the concerns of local stakeholders in EID concept development so that measures are more widely accepted and there is greater success in their implementation. Stakeholder engagement will encourage the development of innovative and efficient energy solutions while also revealing meaningful synergies. Figure 5 illustrates how an intermediate agent such as an energy district manager/EID coordinator functions within an EID development.



▲ ***Figure 5**: Scheme of the dynamics of an intermediary coordination of activities in the EID on a superordinate level.*

The **integration of the EID into the municipality** can ensure political support. Depending on the size, scope and complexity of the EID and the related activities, either the energy district manager/EID coordinator (employed by the municipality as a public officer) or a central office or public administration unit (which would provide more support than a single person) could be responsible for the development and implementation process. In addition to the manager, organizational support could include an authority with environmental and energy competence. If no such authority exists, it may be helpful to set up an interdisciplinary expert working group consisting of key public and private actors with relevant technical expertise (e.g. engineers, scientists, economists, or residents from the EID area). Since the tasks are usually interdisciplinary, a team of skilled individuals is required to accompany the process. Together with the manager, the working group is actively involved in the process and should be in attendance at regular meetings where intermediate results are discussed and the measures and goals are continuously adjusted. The prerequisites of any organizational structure should be transparent rules and clear responsibilities.

In this context, **citizen participation** is fundamental. However, opinions on the extent of citizen involvement are varied. Revez et al. (2017) support the notion that governance should extend and promote influence beyond government authorities to local stakeholders. Others disagree and argue that citizens' organizations are not the most appropriate structure to make major decisions about energy projects, this being the responsibility of government (Revez, et al., 2017). Hoppe et al. (2015) share an intermediary view, i.e. that the government is a central actor in monitoring and commenting on major issues. There is a broad spectrum of citizen involvement in terms of intensity, depth, scope and influence. Gaffney et al. (2017) make the distinction between quantitative involvement (e.g. surveys) and qualitative involvement methods (e.g. interviews, focus groups, mini publics, workshops) and additional community activities.

According to Escobar and Elstub (2017), mini publics are a good example of a new mechanism for organizing citizen participation and integrating citizen concerns into political issues, processes and decision-making. A network of mini publics in a region creates a new space for a deliberative democracy, which goes hand in hand with the spread of regionally established political cultures (Escobar & Elstub, 2017). One example of mini publics are citizen juries, which Escobar and Elstub (2017) define as an assembly of randomly selected citizens representing the inhabitants of a specific area. The mini publics congregate to be informed by experts and to discuss certain topics and provide feedback to the public (Escobar & Elstub, 2017). The aim of this organization structure is to motivate "ordinary" citizens to participate in political processes and to achieve inclusiveness (Escobar & Elstub, 2017).

In general, it is considered relevant to question how cooperation format and organizational structure can be transferred within the EID approach. Like the other main features of the EID concept, these also depend on the context, the defined overall objective and the framework conditions of the district. In addition, each actor's role should be examined to determine who plays the most active role in the initial phase of the project and later participates in the leadership of activities in the EID. The organizational structure, together with the roles of the actors, may change over time and different cooperation formats are required depending on the various phase of the EID. It should also be emphasized that the main actor should not exercise greater power over others ("open innovation").

Finally, depending on the stakeholders involved, there are several benefits and incentives for participating in energy efficiency planning. Benefits are addressed in more detail in the separate Guidance for Cooperative Energy Planning document, but as a brief overview of selected examples, these include:

- Members in the business partnership have immediate cash flow due to reduced energy expenditure and the avoidance of power outage costs.
- Shorter payback times for investors.
- Lower energy prices for consumers.
- Energy independency, if planned as a micro-grid.
- Active participation in energy planning and decision-making.
- Economic benefits over a shorter time period.
- The possibility of implementing innovative energy solutions and an advanced system.

Financing and Incentives

Financing and incentives for the establishment of an EID refer to the means of dealing with the costs associated with the planning and implementing of measures for increasing energy efficiency. These costs depend on the type of measure to be undertaken, and the guiding questions that support the identification of potential financing methods are *what are the costs associated with achieving the desired measures* and *how can the necessary resources be acquired?*

The first potential source is the **pooling of private capital within the district**, e.g. creating associations of owners or attracting investors could improve economic viability. However, it is fundamental to reinforce that the pooling of private capital

should not lead to social grievances due to financial obligations for the project (Revez, et al., 2017). To avoid these problems, other sources of financial support may be combined with private capital.

It is advisable to explore the possibility of applying for **subsidies, incentives and grants** from the EU as well as national and regional programmes (i.e. public funding programmes). Regarding the availability of EU funds, there could be barriers in terms of project time frames (3–4 years), administrative requirements, expertise requirements for the application, etc. Actors interested in establishing an EID should therefore gather information on funds and requirements from an early stage. Receiving funding is particularly important for property owners to ensure economic viability. For example, the energy district manager described in the previous chapter (Organization and Cooperative Formats) is financially supported by the German national and public law development bank Kreditanstalt für Wiederaufbau (Credit Institute for Reconstruction). Whether such funding programmes also exist for the EID should be investigated.

In the context of **credit programmes** for the indirect financing of EIDs, the PACE model described previously is a promising example. It is "an innovative mechanism for financing energy efficiency and renewable energy improvements on private property" (Office of Energy Efficiency and Renewable Energy, n.d.), for both residential and commercial use. Property owners can borrow money from the programme to improve the energy performance of their property. The particularity of the programme is that the assessment is not linked to the individual but to the property, i.e. the debt is tied to the property tax assessment with low interest rates, rather than to the property owner. The improvement costs are repaid at a fixed rate over a set time period (typically 10–20 years) by property assessments as an addition to the owner's property tax bills (higher property taxes). One advantage is that the repayment obligation can be transferred together with the property if the buyer assumes the PACE obligation. This model could prevent a major obstacle to investment in innovative energy technologies and therefore enable "private investment for the purpose of energy savings" (Nierengarten, n.d.).

Another way to facilitate investment is the possibility of **renewable energy contracting**. In the case of heat contracting, an energy service provider and the customer conclude a heat supply contract for a specific time frame (typically 10–15 years). The contractor (energy service provider) plans, finances, installs and operates the heating system and the customer only pays for the energy purchased over the agreed contract period. Thus, the customer has a reduced investment risk and increased advantages, such as greater security in supply and, in most cases, lower energy costs.

Furthermore, the government could provide financial incentives such as **feed-in tariffs** to guarantee prices for electricity fed into the grid for the entire lifetime of the equipment used, usually 20 years. The revenues from feed-in tariffs, combined with energy cost savings from the use of self-produced electricity, enable renewable energy projects to be refinanced or even generate a positive cash flow in a short period of time.

Thus, there are several potential financing methods for the development of an EID. The concept supports a combination of different methods aimed at distributing

▲ *Study visit Tampere EID (Härmälä), Finland.*

the financial burden among all participating stakeholders. In addition, the development of feasibility studies is central to the successful application of the concept. When properly implemented, the stakeholders will have a concrete plan for their expenses, knowledge of their future savings (e.g. lower energy demand from end-users) and higher profits (e.g. higher profitability due to more efficient systems with less energy loss in distribution).

Time Frame

The final module within the EID concept refers to the time frames for the definition, planning and implementation of the EID. The following questions can support the definition of a suitable time frame for the duration of the EID: *What phases are necessary for completing the EID's purpose and what are their durations? Are there time constraints associated with the EID? What is the overall duration of the project – from the decision to establish the EID to its completion?*

Understanding the complete process necessary in establishing an EID is crucial for defining its duration. However, knowing how much time is necessary to complete a project may be inconsistent with constraints from other variables – especially funding.

The timing of the EID is dependent on the individual conditions and overall objectives. For example, when the measures of the EID are primarily financed by a funding programme, it is important to consider the scheduling of the implementation and the total duration in years of the project. In the case of funding provided by the development bank Kreditanstalt für Wiederaufbau (Credit Institute for Reconstruction) which offers the "Energetische Stadtsanierung" (Urban Energy Redevelopment) programme, there is a requirement to develop energy district concepts within one year. Three years are scheduled for the subsequent implementation. However, within the AREA 21 project, experience recommends a longer project time frame. The preparation time and the implementation of the measures, in particular, are more time consuming than expected. From experience, the implementation phase, but also all the other processes, could be supported and facilitated by employing an EID coordinator.

Conclusion

The goal of this Energy Improvement District (EID) Concept document is to introduce a framework for the implementation of the EID model within the BSR. The authors have presented the various existing applications of the improvement district idea, appropriating them as a base for formulating the EID concept. The EID approach was then defined as a forward-thinking instrument to drive energy efficiency and innovation at the district level. EIDs are innovative energy efficient model areas which bring together public and private stakeholders who jointly plan and implement tailored energy solutions. Furthermore, the concept is supported by three pillars: (1) a holistic system perspective, (2) the integrated approach to strategic energy planning and implementation and (3) the cooperative planning, decision-making and implementation of energy improvement measures. These pillars support a legitimate and inclusive process with high potential for synergetic cross-sectoral solutions.

The concept was tested in seven pilot districts in different territories throughout the BSR which were then used in the construction of a transferrable modular approach in order to replicate the model in other locations. The modular approach breaks down the concept into five main features that need to be defined according to local conditions following a flexible framework prepared as part of the EID concept. The features are: (1) initiation, (2) area identification and delimitation, (3) organization and cooperative formats, (4) financing and incentives and (5) time frame. Therefore, since the district's framework conditions determine the approach, the process can be depicted as a modular construct in which the features are adjusted according to the prevailing conditions. The final section of this report examines these features in detail, discussing how they can be appropriated in various contexts so that the EID can be successfully implemented in other areas.

The development of the EID concept is a response to the hypothesis that district energy planning is a relevant arena for the implementation of energy efficient measures and the consequent curbing of carbon emissions. Furthermore, it theorizes the potential of synergies with goals in the socio-economic scope. Addressing the energy topic in parallel with other local issues is perceived as an opportunity to bring in various resources and produce innovative and multi-purpose solutions. Moreover, the development of good practices at the district level may lead to a spread of the model, thus increasing its impact. In addition to shedding light on the various challenges inherent to the process, the implementation of the case studies confirmed its potential. In summary, the complexity of the model presents various challenges. These are reported and explained in the jointly published Guidance for Cooperative Energy Planning document. An appropriate EID application has great potential to address local issues related to the topic of energy, and the widespread implementation of the concept is likely to have a significant impact in curbing carbon emissions.

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Process Model for Cooperation in Energy Improvement Districts

A Step-by-Step Outline for Planning and Implementation of EIDs

Executive Summary

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This document addresses the implementation of the Energy Improvement District (EID) project using the perspectives and experiences from the pilot case studies within AREA 21. It divides the process into three phases: (1) the planning phase, (2) the implementation phase and (3) the execution phase.

The planning phase comprises four steps and refers to the preparation for the implementation of the EID. First, the area of the EID is defined according to the context and the interests of the collaborating stakeholders. The area of choice is then validated by the participating organizations. Once the collaborators agree on a defined EID, they can identify potential sources of funding and select which individuals representing each organization will actively participate in the development of the EID.

Once the planning is concluded, the implementation phase follows. This phase refers to the specific analysis and decisions relating to the EID. The analysis should provide a better understanding of and vision for the area, in addition to identifying all the relevant stakeholders that should be involved in the process. Following the initial analysis, the relevant stakeholders engage in a series of workshops to plan and organize the objectives and measures of the EID. Finally, at the end of this process, the goals, strategies and action plan of the EID should be defined.

Finally, the execution phase can start. This phase comprises all the necessary steps for realizing the initiatives defined during the implementation phase. It starts by integrating the EID concept into the city's development planning. After this, the necessary resources are collected and the action plan can be executed. Each of these phases are explained in detail with actionable guidelines, providing a detailed overview of the EID as a cooperative process. The core aspect of this

publication is its practical application, since its role is a step-by-step guide on how a group of stakeholders should proceed to successfully implement an EID. It condenses and organizes the findings of the AREA 21 partners' collaboration experience.

The main outputs jointly published in this book are:

1. Guidance for Cooperative Energy Planning at the District Level, also referred to as the Guidance for Cooperative Energy Planning.
2. Energy Improvement District (EID) Concept, also referred to as the EID Concept.
3. Process Model for Cooperation in Energy Improvement Districts, also referred to as the Process Model (this document).

Acronyms

BSR: Baltic Sea Region
EID: Energy Improvement District

Introduction

This document is one of three main outputs from the AREA 21 project: "Guidance for Cooperative Energy Planning at the District Level" (also referred to as the Guidance for Cooperative Energy Planning), "Energy Improvement District (EID) Concept" (also referred to as the EID Concept) and "Process Model for Cooperation in Energy Improvement Districts" (also referred to as the Process Model). These are jointly published and interlinked. The first output explains the initial steps in the determination of the EID, including the challenges and potential of cooperative energy planning, and guides cities and regions through the initial phase of the EID development process. The second output elaborates on the EID concept, offering a framework for understanding and establishing the parameters for cooperative energy planning and the measures to achieve its goals. This final output addresses the processes that enable EID implementation and cooperation within EIDs. All three documents offer insights that are transferrable to many cities and regions. Together, they can be used as a holistic guide in helping to understand and follow the process from the starting point, via the set-up of a context-specific concept and strategy, to the implementation of the EID in practice.

Description and Aim

The process model for cooperation is designed to be used by BSR cities and regions to implement the EID concept in their specific context. The model will supplement the EID strategy development process and has a targeted focus

▲ *EID Helsingborg; Sweden, Energy efficient hospital area – thinking economy, environment and society together.*

on the identification of concrete energy efficiency measures and means for the implementation of the EID concept. The model will guide BSR cities and regions in establishing and promoting local cooperation formats and processes between local and regional authorities and energy utilities, and will support the targeted involvement of property owners as the main actors in the implementation of energy efficiency measures. In particular, it will support cities and regions in integrating different cooperation formats in their specific local context for the joint identification and subsequent implementation of energy efficiency solutions.

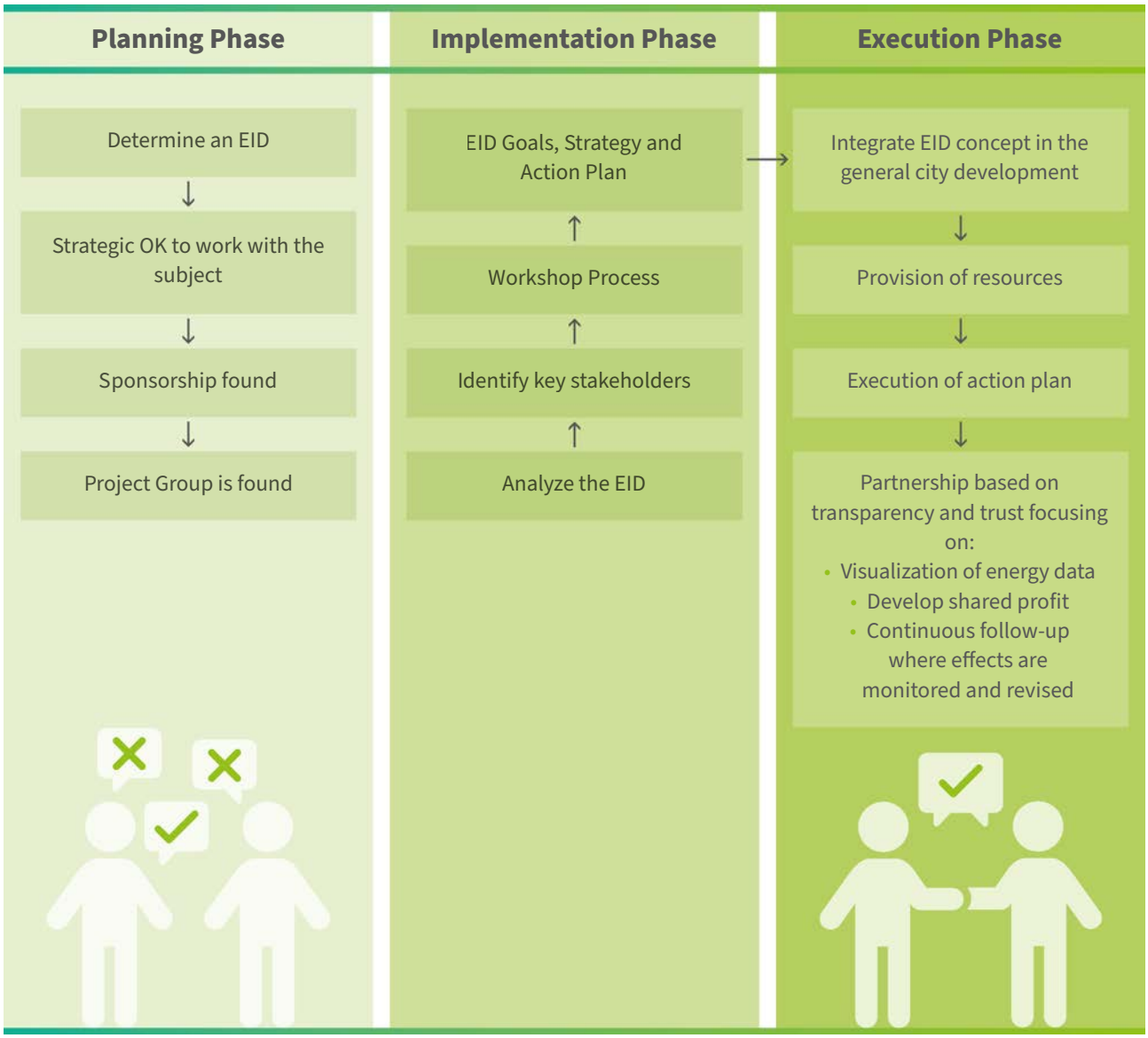
Furthermore, the model incorporates a catalogue of examples of means and measures for the implementation of the EID concept. This will provide incentives for all BSR cities and regions for the planning of new energy efficiency solutions and for the identification of possible means and funding models for the implementation of these solutions.

The process model for cooperative energy efficiency implementation at the district level can be used directly by public local and regional authorities with responsibility in the energy field to initiate local cooperation processes with energy utilities and property owners and to integrate new cooperation formats and tools in local decision-making processes. In addition, the model will provide energy experts in the public authorities, energy agencies and utilities with guidelines for the identification and implementation of energy efficiency measures. The catalogue of examples of means and measures will support BSR cities and regions in the development of action plans for the implementation of the EID concept in their own local context. In particular, it will guide them in identifying context-specific energy efficiency solutions and possible ways to achieve these in practice. In the longer term, this will contribute to a decrease in current CO2 emission levels in existing built-up areas and to achieving the cities' and regions' energy and climate commitments.

Process Model

This Process Model document contributes to the guidelines for and concept of an EID by focusing on the practical aspects of the implementation process of a project. It shows the phases of EID implementation, from its planning to its execution. Figure 6 shows an overview of these phases. The planning phase refers to the preparation for implementing the EID, incorporating steps such as delimiting the EID area, establishing the collaboration and identifying the sources of finance. The implementation phase follows the conclusion of the planning phase. Implementation involves an analysis of the status quo, identifying and exchanging with the relevant stakeholders and decision-making regarding the goals and measures. This is followed by the final execution phase. This phase includes the steps necessary to achieve the initiatives defined in the implementation phase, e.g. gathering resources, executing plans, etc.

▼ ***Figure 6**: Phases of the process model.*



Each of these three phases is broken down and explained in greater detail below.

Planning Phase

Determine the EID

A needs analysis is conducted to determine an area with a high potential for cooperative energy efficient work. An Energy Improvement District (EID) can be characterized by an existing urban area, predominantly comprised of housing with the presence of public buildings, and which could also be combined with commercial and business use. For example, the area could be determined by including some of the following criteria: housing areas with a preference for multi-family buildings, the presence of cooperatives and associations with a reduced number of separate owners, the existence of public buildings or the accessibility to data from the area, including energy demand and consumption (current and future availability), age and refurbishment of buildings, etc.
Furthermore, the EID can also be determined based on the strong interest and commitment of stakeholders in the area and include the following:

- Public authorities responsible for energy planning, urban and sustainable planning and other related fields (i.e. experts, government officers and policy makers).
- Cooperatives, associations or owners (willing participants in the strategic and decision-making process to reduce energy consumption through measures applied to the property or to permanent/fixed property appliances and providing access to energy usage data).
- Energy utilities (to develop their services to fit the future energy systems and thereby secure future profits).

The selection of districts with existing or concurrent initiatives of cooperation formats is recommended. These can include business or housing improvement districts, previous research projects on energy or refurbishment-related topics, previous redevelopment projects, etc. Other suggestions include integrating current and/or future redevelopment plans or strategic documents, selecting and identifying the EID through mapping areas having the highest energy losses and/or the highest energy consumption, with distinct identifiable and unifying features, such as similar building typology, spatial configuration of urban structures, common goals, etc.

Strategic OK

Those organizations committed to initiating the cooperative process need to ratify the defined EID to both support and participate in the upcoming work as well as nominate an EID coordinator. This EID coordinator assumes ongoing responsibility, is a key resource in the upcoming work and serves as the driving force as well as the “spider in the web” in the future EID work.

Find Sponsorship

Enabling a local cooperation process in an EID requires sponsorship. The EID coordinator is responsible for presenting a project charter on behalf of the strategic group of the organizations who have signed the letter of intent. Funds

for sponsorship for the upcoming project and the work of the project leader can have either an international or national source, for example EU programmes, or could simply result from the involved organizations equally sharing the project costs. Other legal organizational formats in the process are also possible. These depend on the ideas of the stakeholders (e.g. bottom-up approaches may lead to cooperatives that are funded by members which share the upfront costs but also the return on investment after amortization).
No additional sponsorship should be needed for additional general organizational participation in the project, since the respective employers will preferably fund this working time. Each participating organization simply invests their own time which is already financed through the daily work.

Formation of Project Group

After receiving funding, the EID coordinator forms a project group. The project group should consist of members from each organization that has identified a benefit in working together towards their common energy and climate goals. Preferably, this group consists of diverse stakeholders – from citizens or representative associations to private and public actors – in order to achieve a broad base of ownership and ensure the active support of all parties.

Implementation Phase

Analysis of the EID

The project group or team should start by describing the status quo of the determined EID. During the analysis, a vision is preferably developed for the EID area which will be used to explain the future scenario of the EID to stakeholders and in other external communication. Below are some examples of the visions that were developed for different EIDs in the AREA 21 project:

- Energy-smart hospital for improved healthcare and reduced carbon footprint (EID Helsingborg).
- “Polytechnic is a high-quality green habitat” (EID St. Petersburg).
- Improvement of the living conditions of inhabitants as a result of the improvement of the energy efficiency of buildings and an increase in energy production from renewable sources (EID Lublin).
- Conscious citizens will live in buildings refurbished to meet 21st century requirements and needs (EID Tartu).
- Residential energy use in Härmälä will be carbon-neutral by 2030. The cost-effective potential for energy efficiency, demand response and renewable production will be realized in residential building stock through collaborations between local stakeholders (EID Tampere).

Identify Key Stakeholders

The project group or team should begin by identifying the key stakeholders for the EID. This is an iterative process which is preferably performed multiple times in different contexts to identify all relevant stakeholders. The result of this is a stakeholder map which illustrates the stakeholders involved in a decreasing order of influence and interest.

Below is a list of some of the stakeholders involved in the AREA 21 projects:

- Departments of real estate,
- Building maintenance,
- Procurement department,
- Energy utility business department,
- Energy utility development department,
- Local politics,
- University/schools,
- Research centres,
- Financial institutions,
- Local businesses,
- Housing associations,
- End-users (such as homeowners, tenants, students, employees),
- Building/apartment owners.

Workshop Process

Workshops with the identified stakeholders should be planned using, for example, the following document available on the project website: “Guidelines for the Organization, Documentation and Evaluation of Local Workshops in Energy Improvement Districts (EIDs)” (Area 21, 2018). The key aim of the workshops should be to support the stakeholders in their work of cooperative energy planning and to establish a long-lasting cooperation. Pre-meetings with the key stakeholders should preferably take place before beginning the workshop process to introduce them to the EID concept and prepare them for the first workshop. In addition, in-between-meetings during the workshop process should enhance progress. Below is an example of the workshop process, with four workshops taking place in the AREA 21 projects. The time suggested for each workshop is about three to four hours, depending on the availability of the local stakeholders (a set time frame will increase the productivity of the workshop and provide better conditions for achieving the desired results).

Workshop 1

Identify the needs, interests and concerns of the stakeholders in order to establish the common EID goals using the guideline described above together with the stakeholder analysis. The outcome of the workshop should result in the formulation of the final goals for the EID after input from the stakeholders.
Below are thematic examples of goals which were developed for different EIDs in the AREA 21 projects:

▲ *EID Lublin (Wieniawa District), Poland.*

Citizen Awareness/End-User Behaviour

- The involvement of 25% of students and university staff in the implementation of energy-saving measures.

Energy Usage

- Reduction of total energy usage by 20% by 2027 compared to 2008.
- Reduction of specific energy usage from 235 kWh/m^2/year (2008) to 177 kWh/m^2/year by 2030.
- 20% reduction in the total costs for heating and electricity.
- 3% reduction in energy costs and an improvement of the quality of the urban and internal environment.
- 25% reduction in carbon emissions from residential buildings through improved energy efficiency (from 2020 to 2030).
- Increase energy intensity in operations by increasing the amount of renewable energy and improving energy efficiency in the methods used, as well as implementing new methods to harvest unused energy potential.

Building Envelope and Building Owners

- Entire building stock renovated by 2025.
- All housing companies in EID have presented a renovation strategy.

Renewable Energy Production

- Increase in the production of energy from renewable sources by 50% by 2030 (compared to 2020).
- Increase in the use of renewable energy by 10% by 2025 (compared to 2015).
- Energy use includes only 10% of fossil fuel energy in district heating production by 2025 (compared to 25% in 2010).

Energy Performance and Optimization

- Increase reliability of energy supply in IED to 99% (2030) from 92% (2020).
- Reduce EID heat peak demand by 20% in 5 years.
- Reduce EID electricity peak demand by 1 MW in 5 years.

Technical Energy Installation and Equipment

- Put energy requirements in all future procurements.
- All ventilation is VAV (variable air volume)–controlled.

Workshop 2

Develop a strategy for achieving and implementing the common goals of the EID. The purpose of this strategy is to steer the development of a cooperative energy planning process within the EID by establishing a common understanding of the main goals and objectives for the energy efficient improvement of the area between local stakeholders. The strategy should illustrate a clear path from the present state (i.e. the present conditions in the EID) to a shared vision for its future development. The strategy should include the common goals to be pursued and achieved in the EID over a clearly defined period of time. The strategy should provide answers to where the process in the EID is going and how the local stakeholders will work together to achieve the common goals.

The EID strategy should be developed in cooperation with the local stakeholders during the first two workshops. In the first workshop, the key stakeholders should have an active role in developing the vision and goals of the EID, and in the second workshop they should be involved in outlining the EID strategy. The involvement of the stakeholders from the very beginning of the process will secure their support for the EID in the long term. The strategy should be representative of the unique characteristics of the EID and should be based on a detailed analysis and in-depth understanding of the local framework conditions of the EID.

Workshop 3

The EID goals need to be broken down into the specific actions required for goal fulfilment. Therefore, an action plan for the EID should be determined where responsibility for the actions are also allocated. Competences and the necessary resources should be identified to develop this action plan. The actions should represent the way forward by envisaging the current situation in comparison to the desired future state, in other words it should represent the roadmap and concrete activities required to achieve the goals and specific objectives of the EID. Involving a broad spectrum of knowledge when performing the roadmap analysis is recommended to minimize the risk of overlooking important aspects in the path towards the goal. The outcome of the workshop should be an action plan for the EID strategy including allocations and funding.

Below are thematic examples of strategies and actions which have been developed for different EIDs in the AREA 21 project:

Citizen Awareness/End-User Behaviour

- Educate building managers in energy issues.
- Promote the use of energy consumption visualization tools.
- Pilot incentive measures for energy savings in student housing.
- Survey students and staff about their awareness of energy-saving issues.
- Moderate discussions to educate the student society on energy saving.
- Piloting the students case championship on EID issues.

- Provide training on smart devices to managers and citizens.
- Set up energy efficiency campaigns.
- Conduct an educational and information campaign on raising ecological awareness in residents in the field of improving the quality of air in the city.
- Conduct an educational and information campaign promoting the habits of saving heat and electricity.
- Conduct educational activities among employees in the rational use of energy.
- Community festivals.
- Organize a series of meetings with seniors titled “Ecology on a micro scale”.
- Organize an educational and ecological project titled “Heat Lessons”, addressed to pupils at a primary education level (a series of classes).
- Set up meetings between the energy strategists and the healthcare departments to further develop specific key performance indexes for each department.
- Visualize possible progress in energy efficiency work to engage staff to continue working with this matter.
- Visualize energy usage.
- Activate citizens and increase their awareness in urban energy usage.
- Involve healthcare operations staff in energy efficiency work.
- Increase cooperation between hospital area stakeholders.
- Limit energy consumption through energy-saving behaviour in residents.

Energy Usage

- Develop open database energy efficiency services for building owners.
- Visualize data on energy consumption in pilot buildings and disseminate this data to end-users.
- Offer new energy contracts based on fuel sources that economically reward energy efficient solutions.
- Put requirements for the optimization of building management in future procurements.

Building Envelope

- Arrange renovation workshops.
- Arrange competitions on urban development and award building renovation prizes.
- Install double-glazed windows.
- Renovate (or deep renovate) all buildings.
- Thermo-modernize buildings and promote energy efficient construction.
- Encourage housing companies to conduct energy efficiency measures.

Renewable Energy Production

- Install solar panels on the roof.
- Promote green electricity contracts.
- Establish incentives for 100% renewable heating.**Energy**

Performance and Optimization

- Conduct planned energy audits on the hospital buildings and implement the findings.
- Develop an operating model to encourage and support owners of electrically heated buildings to implement energy efficiency actions.
- Select a pilot building and create a database on energy consumption for the building.
- Provide smart controls to dwellings.
- Map where the use of disposable products is more suitable than multi-use products.
- Provide real-time energy data, i.e. measure energy per second.
- Promote use of demand response services.

Technical Energy Installation and Equipment

- Put requirements for the optimization of building management in future procurements.
- Renovate transit heating networks and control units.
- Install new metering devices in district heating.
- Upgrade the street lighting system.
- Install 10 block automated heat points in buildings.
- Eliminate coal-fired boilers in buildings (e.g. under the UN environment programme on low emission development)
- Modernize the exterior lighting of the main building facade.
- Modernize the lighting in communal facilities (public buildings, parks, squares, etc.).
- Modernize lighting together with street renovations.
- Put energy requirements in future procurements.
- Reconstruction project of three automated heat points in a dormitory.
- Project for the replacement of building utilities in a dormitory.

Workshop 4

In the fourth workshop, invite local decision-makers and politicians. Introduce and present the EID concept together with the positive experiences as well as the barriers encountered. Apart from introducing the EID concept, the purpose of this workshop is to discuss the current political barriers which were experienced at the local, regional and national level, and which challenged the implementation of the EID concept. Hence, the potential for future policy change at a local level is identified and can hopefully help change policy and legislative matters which could obstruct the progress of the EID implementation.

Execution Phase

Integrate the EID Concept into the General Development of the City

During the fourth workshop, the EID concept and its opportunities and possible barriers are presented and discussed together with local and regional politicians and decision-makers. These decision-makers will hopefully embrace the concept as an efficient method to accelerate the city's development with respect to its climate

goals and use it as a general standardized concept for future energy efficient work. It is of great importance that the EID concept is then integrated into the overall city development plan to ensure new project plans have access to the methods to start the process and build on existing and holistic planning structures.

Provision of Resources

As a result of integrating the EID concept into the city's development plans, resources can be allocated to projects set up as EIDs. This is vital both for the initiation of the process as well for its future implementation. Furthermore, it is also greatly important for an EID that is already implemented and is about to execute their developed action plan to receive enough resources. Regardless of how successful the implementation and elaboration phase has been in the cooperation process, it is only when the expected goals are starting to be fulfilled that real accomplishments are made and the partnership is boosted.

Execution of Action Plan

The workshop process of the EID concept generates collaboratively-developed visions, goals, strategies and action plans for the area. These different outputs build on each other to become useful tools towards continued energy efficiency in the EID. The action plan should have structured activities, allocated responsibilities and a clearly defined time frame for its successful execution. To ensure the further progress of the action plan, its activities should be well monitored and continuously followed up. The activities should preferably be performed iteratively, where both the knowledge and skills of the organizations involved increases over the process. As a result of this, potential barriers will be discovered and the advancement can easily be communicated to the sponsors and project participants. This, in return, will benefit the established cooperation. The proposed EID coordinator could manage the complete process and facilitate the successful implementation of the EID.

There are some points which require specific focus during the implementation of the action plan. The energy data of the EID area needs to be open and usable in the cooperation process in order for it to be analysed and visualized for the end-users. This is key to being able to achieve behavioural changes and, in the end, reduce energy usage in the area. It is also important to develop a shared profit based on the results of executing the action plan. In this way, the EID cooperation will be a partnership based on transparency and trust where all stakeholder organizations gain profit.

References

Area 21. (2018). *Guidelines for Organization, Documentation and Evaluation of Local Workshops in Energy Improvement Districts (EIDs)*. Retrieved May 4, 2020, from https://area21-project.eu/wp-content/uploads/AREA-21-Guidelines-for-Organization-Documentation-and-Evaluation-of-Local-Workshops.pdf

Stakeholder Type (G1)	Specification & Examples		Function/Role(1)
Energy Planners & Other Planners	Public	e.g. energy experts, spatial and environmental planners, transport planners, etc. from local public authorities	• Improve quality of the infrastructure. • Align with government requirements. • Consider the integration of different planning domains. • Improve quality of life of citizens and promote sustainable development. • Establish contacts with policy makers ("contact point"). • Assure moderation and mediation during workshops.
	Private	e.g. consultancy companies working in the field of energy planning (conducting feasibility studies, supporting elaboration of climate plans, etc.)	• Improve quality of the infrastructure. • Improve quality of life of citizens and promote sustainable development. • Assure moderation and mediation during workshops. • Give expert advice (know-how).
Legislators, Regulators	Public	e.g. regional and local public authorities (state chancellery, specialized committees, etc.)	• Provide regulation requirements and control. • Function on behalf of the public interest. • Improve quality of life of citizens and promote sustainable development.

Motivation(2)	Threats/Risks(3)	Strategy(4)
• Gain knowledge of citizens' needs. • Satisfy citizens' needs and expectations. • Preparation of good strategic documents in a participatory process based on a solid information database. • Make their work easier. • Convince stakeholders of the benefits. • Offer business opportunities.	• Political will be influenced by re-election and finance.	
	• Lack of knowledge about other sectors (i.e. sectoral thinking): each expert focuses on their own field.	• Education of the people in charge/ experts. • Provide higher-level master plans, e.g. city climate or energy plan.
	• Conflicts between sectoral approaches, prioritization between different approaches.	• Mediation – levelling different stakeholder interests.
• Gain recognition. • Gain knowledge. • Assure budget security. • Assure company income and revenue. • Secure career. • Preparation of good strategic documents in a participative process based on a solid information database. • Convince stakeholders of the benefits.	• Interest in participation may be lost if insufficient resources to maintain involvement (e.g. contract-based work).	• Involve at a stage in the process where small interventions are required, usually in initial stages where interventions on a large scale are discussed.
	• If project becomes less concrete, they might lose interest.	• Provide higher-level master plans, e.g. city climate or energy plan. • Specify the expected results at an early stage in the process.
	• Lack of knowledge and system overview.	• Education of the people in charge/ experts.
• Provide legal incentives. • Interest in re-election. • Be best in national benchmarking. • Share experiences and ideas. • Gain opportunity to network. • Help to reduce emissions. • Direct legislation/regulation, e.g. mitigating regulation measures for renewable energies to increase local energy production from renewable energies to a percentage that meets expectations. • Be a winner in the competition of the regions/have a forerunner function in their country and abroad.	• Give more recognition to more powerfully positioned stakeholders.	• Mediation – levelling different stakeholder interests.
	• No interest in changing current business models or regulations.	• Show new attractive business models and their benefits.
	• Difficult to go from plans to action (it is often a long process requiring agreement and coordination between different parties).	• Visualize the process, goals etc.
	• The focus is on the installation of renewable energy systems, e.g. solar panels, and not on energy efficiency.	
	• Decision-makers do not always consider expert advice.	
	• Too many different plans and no cooperation (counterproductive).	• Engage in the process at a very early stage. • Establish synergies between existing and new documents and plans.
	• Change in political steering groups may result in deviating focus/ priorities (= less involvement).	• Adopt laws and set long-term, binding targets to ensure that priorities do not shift when there is a policy change.

Stakeholder Type (G1)	Specification & Examples		Function/Role(1)
Legislators, Regulators	Private	e.g. contractors or energy companies providing legal or enforcement services for energy	• Give expert advice (know-how).
NGOs & Citizens' Associations	Public	e.g. district offices	• Circulate information. • Raise awareness. • Offer contact point (management of project activities). • Influence the opinions of citizens. • Share experiences (e.g. about citizen participation).
	Private	e.g. voluntary neighbourhood associations, NGOs	• Ensure social equity. • Share information and experiences (e.g. about citizen participation). • Influence the opinions of citizens. • Support in the participation process.

Motivation(2)	Threats/Risks(3)	Strategy(4)
• Lead in national benchmarking. • Share experiences and ideas. • Offer solutions. • Help reduce emissions. • Return on investment. • Assure budget security.	• Seek to cut costs to be more competitive in the market.	• Use their bargaining power to negotiate with local authorities to allow activities.
• Receive additional financing. • Offer ready-to-use concepts to support citizens. • Offer interesting content and happenings.	• Limited in commitments depending on budgets and political will, so this might be used as an excuse for inaction.	• Use their role as mediator to find common ground between opposing values (e.g. public and private stakeholders).
• Work for the public interest and democratic processes, advocate climate protection ideals. • Promote their activities and organization. • Business development. • Gain new members, cooperation partners and sponsors or form new alliances. • Find new external financing sources for their activities, actions and projects.	• Interest in participation may be lost if a discussion is too concrete and does not meet their objectives. • Private sector interests may not align with their organizational values (i.e. no will to assist others). • Independence.	• Calls for proposals and programmes to finance the activities of NGOs. • Create opportunities to network.

Stakeholder Type (G2)	Specification & Examples		Function/Role(1)
Property Owners	Public	e.g. housing companies, housing cooperatives, public authorities (owners of school buildings, hospitals, etc.)	• Advocate the interests of the organization members. • Ensure their building stock is in a good condition.
	Private	e.g. housing companies, housing cooperatives, households, commercial offices	• Advocate the interests of the organization members. • Ensure their building stock is in a good condition.

Motivation(2)	Threats/Risks(3)	Strategy(4)
• Improve the quality of life of tenants by optimizing the condition of buildings and their surroundings. • Save costs as a result of, e.g., renovation measures. • Ensure stable rents for tenants. • Reduce fees for tenants (especially “fixed” fees). • Free resources for other purposes and functions. • Additional note: motivation to participate in the EID process varies from country to county.	• Limited commitment as an excuse for no action.	• Use bargaining position to negotiate with local authorities.
	• Property owners often use tariffs instead of meters.	• Introduce new requirements/ regulations (e.g. building refurbishment is to be linked to the installation of meters).
	• Property owners may act as a gatekeeper with potential to block decisions.	
		• Promote a combination of different funding sources (i.e. private and public).
• Assure economic feasibility of renovation actions. • Improve the quality of life of tenants by optimizing the condition of buildings and their surroundings. • Make a profit. • Increase the value of the property. • Save costs as a result of, e.g., renovation measures. • Ensure stable rents for tenants. • Reduce fees for tenants (especially “fixed” fees). • Free resources for other purposes and functions.	• Dependent on their experience, knowledge and their will to participate.	
	• Do not perceive themselves as target groups in cooperative energy planning processes (“it is not worth the effort”).	
	• The market value of properties differs from city to city (growing vs. shrinking cities, vacant houses vs. high house demand) the logic of action differs.	
	• Lack of cooperation in capitalist countries in cases where there are many small private owners (e.g. different single-family houses), there may be less interest in a joint investment.	
	• Owners often use tariffs instead of meters (thus getting more money).	• Introduce new requirements/ regulations (e.g. building refurbishment is to be linked to the installation of meters).
	• Heterogeneous ownership structure, many “small” owners.	• Different customer/tenant segments (by service provider). • Select a few participants as advocates amongst other property owners.
	• May not trust public authorities. • May be disinterested in measures and have no desire to take on responsibility. • Could lose interest due to lengthy formal procedures.	• Presence of a mediator (or establishment of contact point/ appointment of a contact person).

Stakeholder Type (G2)	Specification & Examples		Function/Role(1)
Tenants	Private	e.g. residents and building end-users (commercial offices, etc.)	• Support in the development of an EID strategy as well as an action plan (e.g. by providing data and information). • Implement energy efficiency measures in own apartments.

Motivation(2)	Threats/Risks(3)	Strategy(4)
• Be curious: acquire information about, e.g., own energy consumption, the possibilities of new ICT technologies. • Gain the opportunity to participate in decisions concerning the quality of their living environment. • Gain sense of ownership. • Reduced expenses as a result of the implementation of efficiency measures in their flat/building. • Increased security. • Environmental consciousness/ awareness of the consequences of climate change: engaged to take action against it. • Desire for better living conditions (indoor climate) that lead to better health. • Cut energy costs.	• Loss of interest due to lengthy formal procedures. • Disinterested in measures and responsibility. • Participants are new to collaborative processes.	• Make contributions feel appreciated and transparently addressed to show progress of actions. • Use social media for information campaigns and involvement. • Presence of a mediator (or establish contact point/person).
	• Might not trust public authorities and/or property owners.	• Presence of a mediator or establish contact point.
	• Do not perceive themselves as target groups in cooperative energy planning processes (“it is not worth the effort”).	• Visualize process, goals, benefits etc.
	• No motivation to do anything.	• Make contributions feel appreciated and transparently addressed to show progress of action.
	• Psychological rebound effect: energy savings and energy cost reductions can stimulate the renewed consumption of energy.	
	• Unconscious energy consumption habits or lack of awareness about climate issues.	• Use “bad/good parents” examples (“don’t act like me” or “act like me”).
	• Fear of losing privacy (i.e. data protection).	
	• Energy-saving measures, such as insulating the building envelope can negatively impact indoor climate conditions.	

Stakeholder Type (G2)	Specification & Examples		Function/Role(1)
Investors	Public	e.g. housing companies, housing cooperatives, public authorities, banks and public financial institutions	• Assure investment.
	Private	e.g. private companies, private housing companies, private banks	• Assure investment.

Motivation(2)	Threats/Risks(3)	Strategy(4)
• Improve the quality of life of tenants by optimizing the condition of buildings and their surroundings. • Gain a better image. • Increase the property value.	• Limited in their commitment and might tend to use this as an excuse for any kind of action.	
	• If the prices in the real estate market decrease, this has a negative impact on the EID process.	• Structural change to “real” market
		• Use their role as mediator to find common ground between opposing values (e.g. public and private stakeholders).
	• Divergent goals and ideas: investors vs. administrative regulations, e.g. laws, master plans.	
		• A long-term strategy could provide planning and budget security.
		• Banks should offer opportunities for “green” renovation; this will generate future profits (“green loans”).
• Opportunity for publicity. • Return on investment.	• Interest in participation may be lost if the project goes beyond their boundaries of influence.	• A long-term strategy could provide planning and budget security.
	• Lack of cooperation with city planners/architects; conflicts of master plans and investor goals.	
		• Provide almost 0% loans for eco-investments.

Stakeholder Type (G3)	Specification & Examples		Function/Role(1)
Energy Suppliers	Public	e.g. public energy supply companies	• Insights on energy supply requirements and operations aligned with government decisions. • Adapt regulations (e.g. renewable energy or CO2 emissions requirements). • Enable change towards a sustainable society. • Offer contracting models. • Develop models for an energy self-sufficient neighbourhood.
	Private	e.g. private energy supply companies	• Insights into energy supply and competitive service supply. • Enable change towards a sustainable society. • Offer contracting models. • Develop models for an energy self-sufficient neighbourhood.
Energy Network Operators (energy transmission & distribution)	Public	e.g. public energy network operators	• Insights into energy network management and maintenance and operations aligned with government decisions. • Guarantee reliability to customers (supply of energy at any time). • Reduce (power) grid breakdowns. • Ensure a stable grid and energy balance.

Motivation(2)	Threats/Risks(3)	Strategy(4)
• Incentives for knowledge on how to improve service and practice (gather knowledge about clients' wishes). • Ensure positive public opinion. • Generate a "greener" (more environmentally friendly) energy production mix/greater use of renewable energy technologies. • Generate new knowledge, innovations and solutions as well as effective returns. • Generate profit.	• Small companies: if the process requires too much effort, they might feel overwhelmed and withdraw.	• Transparency: clearly show the time frame, concrete measures, etc. • Involve them at an early stage in the process.
	• Nationwide companies: no interest in local (district) projects.	• Provide a database of surveys, reports and data.
	• Fear of losing business opportunities.	
	• The more energy supplied, the more profit (no motivation to support the saving of energy by end-users).	• Competition: best service provider.
		• Promote cooperation between energy suppliers and customers, e.g. by using new ICT tools.
• Search for new business models; return on investment. • Assure budget security. • Incentives for knowledge on how to improve service and practice (gather knowledge about clients' wishes). • Have a (spotlight) lighthouse project to support or promote the own "green energy" policy/ campaign. • Acquire new clients. • Develop future-oriented, sustainable and long-term services and businesses (secure profit).	• Small companies: if the process requires too much effort, they might feel overwhelmed and withdraw.	• Transparency: clearly show the time frame, concrete measures, etc. • Involve them at an early stage in the process.
	• Nationwide companies: no interest in local (district) projects.	• Provide a database of surveys, reports and data.
	• Fear of losing business opportunities.	
	• The more energy supplied, the more profit (no motivation to support the saving of energy by end-users).	• Competition: best service provider.
		• Promote cooperation between energy suppliers and customers, e.g. by using new ICT tools.
• Provision of good services. • Gain know-how. • Reduce bottlenecks and outages due to reduced energy demand and new solutions (higher network security). • Reduce/limit network losses (higher profit). • Brand company as green (green image can lead to more profit). • Bind new customers. • Benefit from new technologies, systems, etc., such as smart metering, online systems for monitoring.	• Limited in commitments depending on budgets and political will, so this might be used as an excuse for inaction. • Legislation can hamper new businesses and services.	• Negotiate with local authorities to allow activities.
	• No interest in changing current business models for clients.	
	• Monopolism.	
		• Risk management.

Stakeholder Type (G3)	Specification & Examples		Function/Role(1)
Energy Network Operators (energy transmission & distribution)	Private	e.g. private energy network operators	• Insights into energy network management and maintenance. • Guarantee reliability to customers (supply of energy at any time). • Reduce (power) grid breakdowns. • Ensure a stable grid and energy balance.
Technology Delivery	Public	e.g. public research institutes	• Circulate information. • Technical, scientific and academic support.
	Private	e.g. private companies delivering new technologies, entrepreneurs, think tanks, start-ups	• Deliver innovations (creative and efficient application of technologies). • Technical support.

Motivation(2)	Threats/Risks(3)	Strategy(4)
• Gain recognition/popularity. • Provision of good services. • Gain know-how. • Reduce bottlenecks and outages due to reduced energy demand and new solutions (higher network security). • Reduce/limit network losses (higher profit). • Brand company as green (green image can lead to more profit). • Bind new customers. • Benefit from new technologies, systems, etc., such as smart metering, online systems for monitoring.	• Small companies: if the process requires too much effort, they might feel overwhelmed and withdraw.	• Transparency: clearly show the time frame, concrete measures, etc. • Presence of financial incentives. • Involve them at an early stage of the process.
	• Seek to cut costs to be more competitive in the market and may discourage a change in current business model. • The more energy supplied, the more profit (no motivation to save energy by end-users).	• Educate about the measures that need to be undertaken to deal with climate change. • Presence of financial incentives.
• Provide a platform for projects in which new innovations can be tested and gather knowledge. • Cooperation possibilities in projects. • Proof of concept.	• If too much focus is placed on research, there may be a disconnect with practice.	• Agree on regular outputs. • Use customers' needs as a starting point (better connection between research and practice).
	• Fear of excessive costs, limited financial resources.	• Provide financial incentives.
• Be the first/pioneer to develop and test new technologies. • Possible sales market for new technical products. • Incentives for developing new and innovative services/products/solutions. • Increase the quality of services (customers value the company more when the company provides new technologies). • Pilot possibilities, test new technologies. • Income, revenue.	• Small companies: if the process requires too much effort, they might feel overwhelmed and withdraw.	• Long-term strategy, planning and budget security.
	• Risk of using models or solutions "making the current situation worse".	
	• Focus on selling products, not on climate benefits.	

Imprint

AREA 21, Baltic Smart City Areas for the 21st Century

Elaboration and Coordination
HafenCity University Hamburg, lead partner

Design and Layout
Lynn Grevenitz, www.kulturkonsulat.com

Credits for images
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AREA 21 is part-financed by the European Union (European Regional Development Fund and European Neighbourhood Instrument) as part of the Interreg Baltic Sea Region Programme 2014–2020, Priority 2 “Natural resources”, Specific objective 2.3 “Energy efficiency”.

ISBN 978-3-947972-18-0 (print version)
ISBN 978-3-947972-19-7 (online version)

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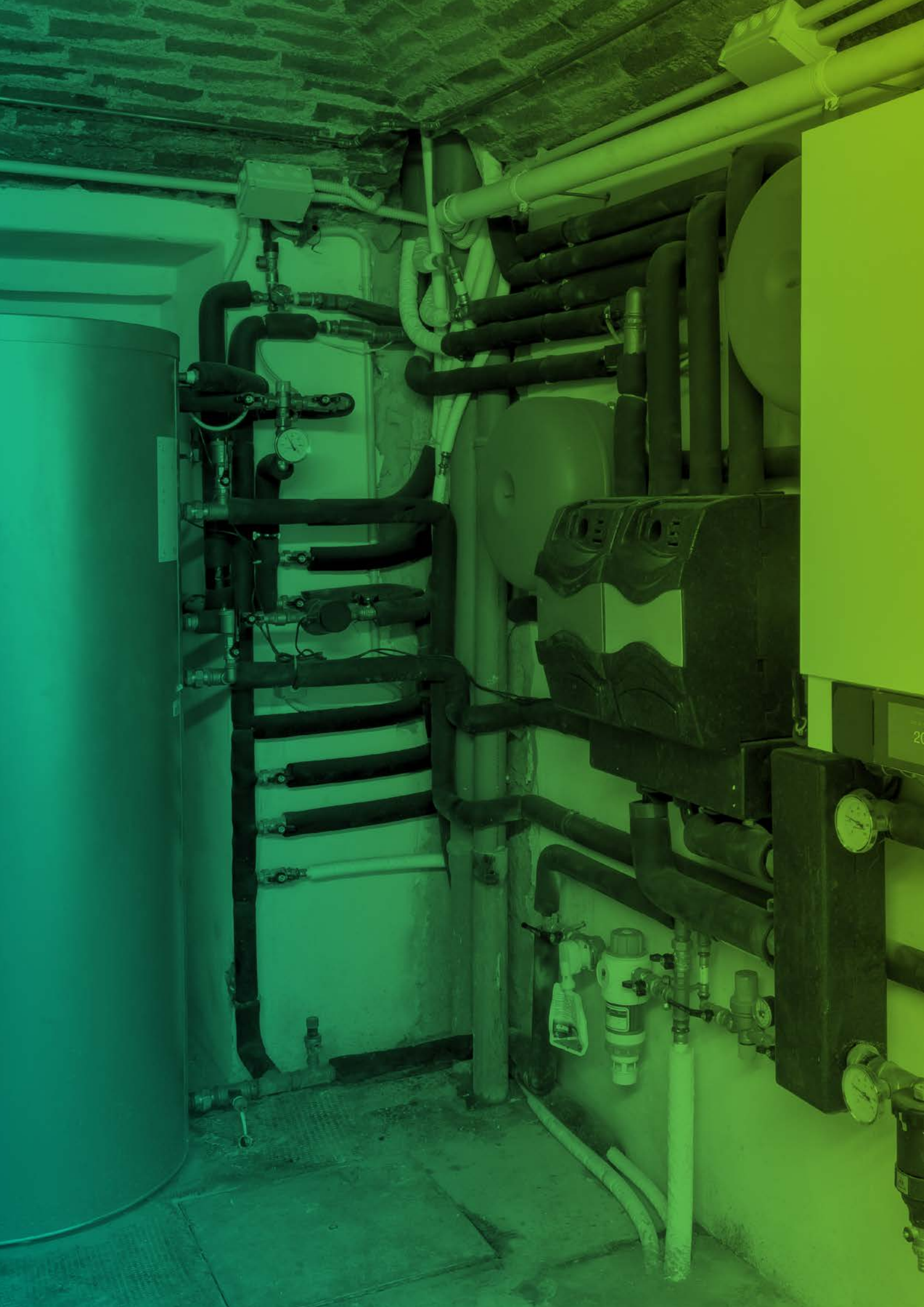
Summer 2020

www.area21-project.eu



Project Summary

AREA 21 addresses the need for energy efficiency by fostering cooperation practices for strategic planning at the district level. The project proposes the development of innovative tailor-made solutions, appropriating the perspectives of a diverse group of stakeholders to address local issues in synergy with energy efficiency matters. The collaborative character of this approach contributes to the legitimacy of the process and when associated with the search for synergies, it results in context-appropriate and multi-faceted initiatives. As a result, AREA 21 expands and strengthens cooperation networks, supporting the implementation of innovation for sustainable development with a focus on energy efficiency.

AREA 21

Interreg Baltic Sea Region

EUROPEAN UNION

EUROPEAN REGIONAL DEVELOPMENT FUND

print version
ISBN 978-3-947972-18-0

online version
ISBN 978-3-947972-19-7