

Implementation of Energy Strategies in Communities (Annex 63) Volume 3: Application of Strategic Measures

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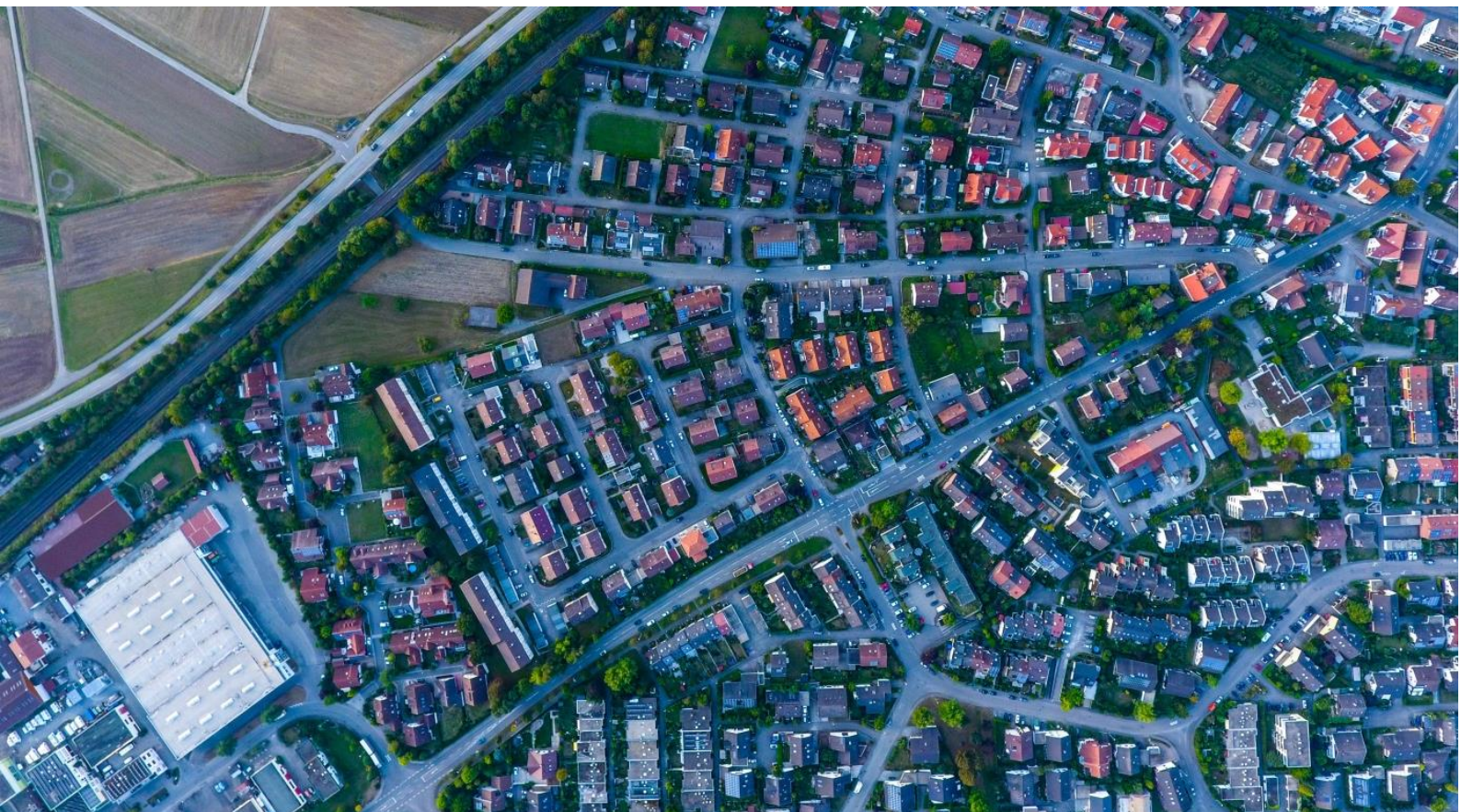
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International Energy Agency

Implementation of Energy Strategies in Communities (Annex 63)

Volume 3: Application of Strategic Measures

Energy in Buildings and Communities Programme
March 2018



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Preface

THE INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) was established in 1974 within the framework of the Organisation for Economic Co-operation and Development (OECD) to implement an international energy programme. A basic aim of the IEA is to foster international co-operation among the 29 IEA participating countries and to increase energy security through energy research, development and demonstration in the fields of technologies for energy efficiency and renewable energy sources.

THE IEA ENERGY IN BUILDINGS AND COMMUNITIES PROGRAMME

The IEA co-ordinates international energy research and development (R&D) activities through a comprehensive portfolio of Technology Collaboration Programmes. The mission of the IEA Energy in Buildings and Communities (IEA EBC) Programme is to develop and facilitate the integration of technologies and processes for energy efficiency and conservation into healthy, low emission, and sustainable buildings and communities, through innovation and research. (Until March 2013, the IEA EBC Programme was known as the IEA Energy Conservation in Buildings and Community Systems Programme, ECBCS.)

The R&D strategies of the IEA EBC Programme are derived from research drivers, national programmes within IEA countries, and the IEA Future Buildings Forum Think Tank Workshops. These R&D strategies aim to exploit technological opportunities to save energy in the buildings sector, and to remove technical obstacles to market penetration of new energy efficient technologies. The R&D strategies apply to residential, commercial, office buildings and community systems, and will impact the building industry in five areas of focus for R&D activities:

- Integrated planning and building design
- Building energy systems
- Building envelope
- Community scale methods
- Real building energy use

THE EXECUTIVE COMMITTEE

Overall control of the IEA EBC Programme is maintained by an Executive Committee, which not only monitors existing projects, but also identifies new strategic areas in which collaborative efforts may be beneficial. As the Programme is based on a contract with the IEA, the projects are legally established as Annexes to the IEA EBC Implementing Agreement. At the present time, the following projects have been initiated by the IEA

EBC Executive Committee, with completed projects identified by (*) and joint projects with the IEA Solar Heating and Cooling Technology Collaboration Programme by (☀):

- Annex 1: Load Energy Determination of Buildings (*)
- Annex 2: Ekistics and Advanced Community Energy Systems (*)
- Annex 3: Energy Conservation in Residential Buildings (*)
- Annex 4: Glasgow Commercial Building Monitoring (*)
- Annex 5: Air Infiltration and Ventilation Centre
- Annex 6: Energy Systems and Design of Communities (*)
- Annex 7: Local Government Energy Planning (*)
- Annex 8: Inhabitants Behaviour with Regard to Ventilation (*)
- Annex 9: Minimum Ventilation Rates (*)
- Annex 10: Building HVAC System Simulation (*)
- Annex 11: Energy Auditing (*)
- Annex 12: Windows and Fenestration (*)
- Annex 13: Energy Management in Hospitals (*)
- Annex 14: Condensation and Energy (*)
- Annex 15: Energy Efficiency in Schools (*)
- Annex 16: BEMS 1- User Interfaces and System Integration (*)
- Annex 17: BEMS 2- Evaluation and Emulation Techniques (*)
- Annex 18: Demand Controlled Ventilation Systems (*)
- Annex 19: Low Slope Roof Systems (*)
- Annex 20: Air Flow Patterns within Buildings (*)
- Annex 21: Thermal Modelling (*)
- Annex 22: Energy Efficient Communities (*)
- Annex 23: Multi Zone Air Flow Modelling (COMIS) (*)
- Annex 24: Heat, Air and Moisture Transfer in Envelopes (*)
- Annex 25: Real time HVAC Simulation (*)
- Annex 26: Energy Efficient Ventilation of Large Enclosures (*)
- Annex 27: Evaluation and Demonstration of Domestic Ventilation Systems (*)
- Annex 28: Low Energy Cooling Systems (*)
- Annex 29: ☀ Daylight in Buildings (*)
- Annex 30: Bringing Simulation to Application (*)
- Annex 31: Energy-Related Environmental Impact of Buildings (*)
- Annex 32: Integral Building Envelope Performance Assessment (*)
- Annex 33: Advanced Local Energy Planning (*)
- Annex 34: Computer-Aided Evaluation of HVAC System Performance (*)
- Annex 35: Design of Energy Efficient Hybrid Ventilation (HYBVENT) (*)
- Annex 36: Retrofitting of Educational Buildings (*)
- Annex 37: Low Exergy Systems for Heating and Cooling of Buildings (LowEx) (*)
- Annex 38: ☀ Solar Sustainable Housing (*)
- Annex 39: High Performance Insulation Systems (*)

- Annex 40: Building Commissioning to Improve Energy Performance (*)
- Annex 41: Whole Building Heat, Air and Moisture Response (MOIST-ENG) (*)
- Annex 42: The Simulation of Building-Integrated Fuel Cell and Other Cogeneration Systems (FC+COGEN-SIM) (*)
- Annex 43: ☀ Testing and Validation of Building Energy Simulation Tools (*)
- Annex 44: Integrating Environmentally Responsive Elements in Buildings (*)
- Annex 45: Energy Efficient Electric Lighting for Buildings (*)
- Annex 46: Holistic Assessment Tool-kit on Energy Efficient Retrofit Measures for Government Buildings (EnERGo) (*)
- Annex 47: Cost-Effective Commissioning for Existing and Low Energy Buildings (*)
- Annex 48: Heat Pumping and Reversible Air Conditioning (*)
- Annex 49: Low Exergy Systems for High Performance Buildings and Communities (*)
- Annex 50: Prefabricated Systems for Low Energy Renovation of Residential Buildings (*)
- Annex 51: Energy Efficient Communities (*)
- Annex 52: ☀ Towards Net Zero Energy Solar Buildings (*)
- Annex 53: Total Energy Use in Buildings: Analysis and Evaluation Methods (*)
- Annex 54: Integration of Micro-Generation and Related Energy Technologies in Buildings (*)
- Annex 55: Reliability of Energy Efficient Building Retrofitting - Probability Assessment of Performance and Cost (RAP-RETRO) (*)
- Annex 56: Cost Effective Energy and CO₂ Emissions Optimization in Building Renovation (*)
- Annex 57: Evaluation of Embodied Energy and CO₂ Equivalent Emissions for Building Construction (*)
- Annex 58: Reliable Building Energy Performance Characterisation Based on Full Scale Dynamic Measurements (*)
- Annex 59: High Temperature Cooling and Low Temperature Heating in Buildings (*)
- Annex 60: New Generation Computational Tools for Building and Community Energy Systems (*)
- Annex 61: Business and Technical Concepts for Deep Energy Retrofit of Public Buildings (*)
- Annex 62: Ventilative Cooling
- Annex 63: Implementation of Energy Strategies in Communities
- Annex 64: LowEx Communities - Optimised Performance of Energy Supply Systems with Exergy Principles
- Annex 65: Long-Term Performance of Super-Insulating Materials in Building Components and Systems
- Annex 66: Definition and Simulation of Occupant Behavior in Buildings
- Annex 67: Energy Flexible Buildings
- Annex 68: Indoor Air Quality Design and Control in Low Energy Residential Buildings

- Annex 69: Strategy and Practice of Adaptive Thermal Comfort in Low Energy Buildings
- Annex 70: Energy Epidemiology: Analysis of Real Building Energy Use at Scale
- Annex 71: Building Energy Performance Assessment Based on In-situ Measurements
- Annex 72: Assessing Life Cycle Related Environmental Impacts Caused by Buildings
- Annex 73: Towards Net Zero Energy Public Communities
- Annex 74: Competition and Living Lab Platform
- Annex 75: Cost-effective Building Renovation at District Level Combining Energy Efficiency and Renewables
- Annex 76: ☀ Deep Renovation of Historic Buildings Towards Lowest Possible Energy Demand and CO₂ Emissions
- Annex 77: ☀ Integrated Solutions for Daylight and Electric Lighting

Working Group - Energy Efficiency in Educational Buildings (*)

Working Group - Indicators of Energy Efficiency in Cold Climate Buildings (*)

Working Group - Annex 36 Extension: The Energy Concept Adviser (*)

Working Group - HVAC Energy Calculation Methodologies for Non-residential Buildings

Project Overview

BACKGROUND

Energy Efficient Communities (IEA-EBC Annex 51) suggested that successful urban energy planning is only possible, if energy planning is integrated in the entire urban planning process. However, research in both Annex 51 and Annex 63 has found that in many countries consideration of energy issues is missing in urban planning processes. This is of great concern, since, with the growing challenge of climate change, municipalities and energy utilities are charged with implementing both measures that adapt to the present conditions and measures that mitigate against future impacts. Both parties, municipalities and energy utilities, must coordinate their actions and both need a comprehensive set of tools and strategies to manage their resources so as to minimise the generation of greenhouse gases.

The linkage between urban form, energy use and climate change has been recognised for many years yet there still remain significant barriers separating the goals of urban planning and those of efficient energy delivery. In current practices energy related issues are still isolated from virtually all other municipal services; building codes for example often limit their scope to building safety and ignore the impact of energy consumption. By integrating strategies about optimizing supply, delivery and consumption of energy with (municipal or utility) planning protocols both municipalities and utilities can deliver to their constituents a powerful set of strategies with which to address climate change.

A natural connection should exist between urban development and energy development. Historically, the separation of each field's priorities and practices has created an energy efficiency challenge that requires a new and improved set of planning tools and strategies.

CONTENT

IEA-EBC-Annex 63 aims to identify strategies that can unify urban and energy planning communities and allow both parties to engage in the process of change to reach long term targets. The research addresses key barriers that expand the scope of planning and lead to a more comprehensive understanding of the new, urban, low-carbon environment. The outcome of this project is that governments, urban decision makers, utilities and urban planning departments can develop a clearer understanding as to how they integrate energy issues into urban planning processes and what actions they must undertake and when, in order to be successful.

PARTICIPATING COUNTRIES

Following countries (represented by 19 organisations) have been participating in Annex 63: Austria, Canada, Denmark, France, Germany, Ireland, Japan, the Netherlands, Norway, Switzerland and the United States of America.

INVOLVED CITIES

Following cities were involved in Annex 63: Salzburg, Vienna (Austria), Burlington, Guelph, London (Ontario), Toronto (Canada), Egedal, Middelfart, Roskilde, Skive (Denmark), Lille, Strasbourg (France), Aachen, Ludwigsburg, Karlsruhe (Germany), Kitakyushu, Yokohama (Japan), Maastricht (the Netherlands), Oslo, Bergen (Norway), Basel (Switzerland), Minneapolis (USA). Also Graz (Austria), Ottawa, Pickering (Canada), Ballerup, Lyngby (Denmark), Bottrop (Germany), Amsterdam, Parkstad (the Netherlands) and Zürich (Switzerland) supported the project team with information and case studies.

METHODOLOGY

To better understand the composition of suitable energy strategies, the research program adopted the following approach:

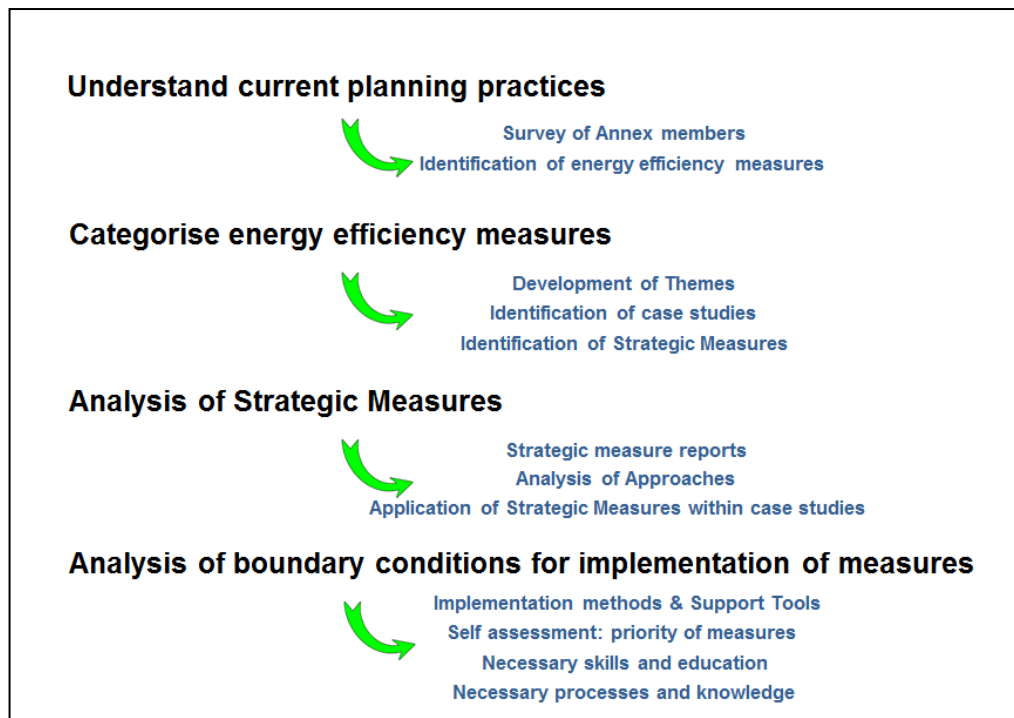


Figure A: Research Methodology (NRCan, 2017)

OUTPUTS

The results of Annex 63 (Implementation of Energy Strategies in Communities) are documented in six Volumes (sequenced according to the development progress). For orientation, the name and content of each Volume is described in the following overview:

Volume 0 – Documentation of workshops and involvement of cities: This report describes the information exchange and dissemination activities undertaken within this research. The information exchange activities were essential to get and understand all relevant information for answering the research question and to contribute to practical appropriability. In total 143 information exchange activities with 2,394 people were carried out.

Volume 1 – Inventory of measures: This report describes the existing national political framework conditions, energy and land-use planning processes, strategies for energy planning and existing national measures in the field of urban and energy planning. In this research, the term measure refers to any action, program, policy or other activity that can demonstrate or influence a change in process. Amongst other background information, 22 planning processes and 89 measures from 11 countries are described in detail in this report.

Volume 2 – Development of strategic measures: This report describes the further development of the analysed measures from Volume 1 into strategic measures. As with the term measure, a strategic measure refers to an essential measure in concept that can be used to develop individual implementation strategies on a local level for part or the whole life cycle of a project (from the first vision to monitoring of the implemented solution). The developed strategic measures deal with the following topics:

- Setting Vision and Targets
- Developing Renewable Energy Strategies
- Making Full use of Legal Frameworks
- Designing an Urban Competition Processes
- Making use of Tools Supporting the Decision Making Process
- Implementing Monitoring of Energy Consumption and GHG Emission practices
- Enhancing Stakeholder Engagement & Involvement
- Including Socio Economic Criteria
- Implementing Effective and Efficient Organisational Processes

The report includes both a summary of each strategic measure supported by nine appendices, each a detailed description of each strategic measure.

Volume 3 – Application of strategic measures: This report describes, for different scales (city, district and project level) and for 29 conceptualised case studies, how implementation champions can apply the strategic measures from Volume 2. Implementation champions are hereby understood as stakeholders in the city who take the initiative to lead and facilitate implementation processes.

Volume 4 – Stakeholder support materials: This report describes, in more detail, within the framework of Annex 63 elaborated stakeholder support materials and their application. The materials deal with the following topics:

- Municipality Self-Assessment tool
- Capacity building and skills
- Workshop format and procedures
- Informational slides for presentations
- Education materials

Volume 5 – Recommendations: This report contains central recommendations for different target groups (e.g. policy makers, researchers, planners), for implementation and for further investigation. Justifications and examples in the field of urban and energy planning are central elements of this report.

HOW TO READ

Depending of the interest of the reader whether the focus might be on the application of results or on the methodology of producing the results, figure B shows the sequence of how best to use the Volumes.

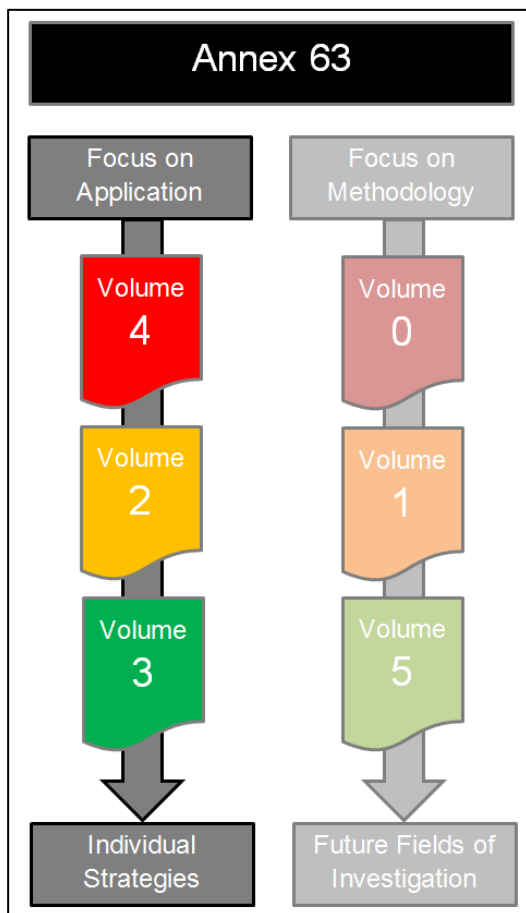


Figure B: How readers should apply the produced documents (SIR, 2017)

If the focus of the reader lies on the application of the elaborated results, the Volume 4 should be read first. The appendix of Volume 4 contains a municipality self-assessment tool that allows the reader to identify the strengths and weaknesses within the current municipal structure. Volume 4 also contains additional working materials (e.g. necessary capacities and skills, suitable workshop formats, informational slides for presentations and education materials) that support the implementation of strategic measures. Recommendations for the successful implementation of specific strategic measures can be found in appendix of Volume 2, leading to the application of different strategic measures as outlined in Volume 3. In this way, the reader gains from the three reports all relevant information for the development of individual implementation strategies.

If the reader is interested on methodological aspects of Annex 63, Volume 0 should be read first. Volume 0 contains the central information regarding the information exchange activities and input from the variety of annex stakeholders (cities, local stakeholder groups, project team, national and international networks, IEA Technology Collaboration Programmes). Principal output of this consultation process is also described in detail in Volume 1 (local framework conditions in 11 countries and 22 cities). Finally, all relevant recommendations for different target groups are summarised in Volume 5. Again, the

reader gets in the three reports all the relevant information for further fields of investigation.

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1. Introduction

Implementing energy strategies in local communities represents a governance challenge that requires both systematic and strategic measures to champion mobilization of stakeholders. In this report, the experiences of implementation champions from cities in 11 countries have been collected. This report builds on the Strategic Measures identified in Volume 1: Inventory of Measures and analysed in Volume 2: Development of Strategic Measures by outlining how these measures are applied in specific implementation processes in communities in the represented cities.

1.1. Output from Volume 1: Inventory of Measures and Volume 2: Development of Strategic Measures

In Volume 1: Inventory of Measures and Volume 2: Development of Strategic Measures, a number of Strategic Measures have been identified as the result of an inventory of measures developed in each of the participating countries. A Strategic Measure is understood as a core concept that can be used to develop individual implementation strategies on a local level.

The developed Strategic Measures form the basis of the case study analysis in this report – Volume 3 – and deal with the following topics:

- **Set Vision and Targets:** Creating a workable community vision, translating national or regional reduction targets into localised goals and targets, techniques for generating stakeholder commitment for targets.
- **Develop Renewable Energy Strategies:** Development of overall renewable energy goals and targets, available technologies and their impact on urban development, stakeholder input, strategy development.
- **Make Full Use of Legal Frameworks:** Elaboration of guiding questions that can be used as basis for making full use of existing legal frameworks for implementation of energy strategies on site as example regulatory frameworks for energy planning, urban planning and contracts.
- **Design of Urban Competition Processes:** Competition types and success factors for the integration of sustainable criteria into competition processes.
- **Make Use of Tools Supporting the Decision Making Process:** Scope of decision support, community modelling tools, non-computer options and approaches.
- **Implement Monitoring of Energy Consumption and GHG Emissions:** Methods and tools to include energy efficiency and GHG monitoring into urban planning and urban development procedures; assessment of smart metering solutions in residential and commercial/industrial buildings, questions of protection of personal data versus transparency of energy consumption, strategic monitoring on municipal level/community level ex ante and ex post.

- **Stakeholder Engagement & Involvement:** Types and purpose of stakeholder engagement, techniques for identifying stakeholders, optimal timing and involvement of participants, input and expectation of discussions.
- **Include Socio Economic Criteria:** Decision making criteria, types of financial models, monetising socio-benefits, sources of information.
- **Implement Effective and Efficient Organizational Processes:** Success factors and framework conditions of the analysis of international “best practices”, organisation forms for a cross-sectoral process, linkage of the external stakeholders to the public administration, the importance of a monitoring process and an exchange of knowhow, bottom up and top down approaches.

These Strategic Measures are represented throughout the planning process, depending on the points of entry, as illustrated in figure 1.1. In Volume 3 it will be illustrated how these measures are applied in connection with each other and throughout the studied planning processes. It will also be illustrated how the measures are connected to the situation at hand in a specific implementation process.

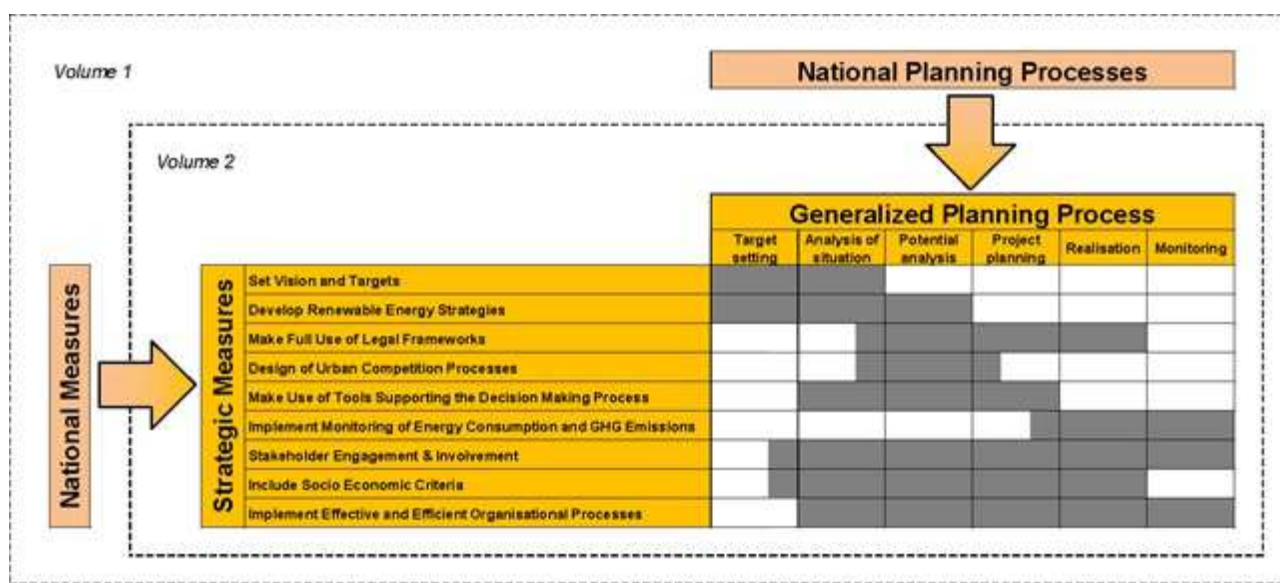


Figure 1.1: Interplay between reports (SIR, 2017).

The efforts of proactive implementation champions will also be described and analyzed in terms of how the Strategic Measures are applied as part of the efforts to successfully implement energy strategies in local communities. Application is identified through the 23 case studies that were collected from local development projects in cities in Austria, Canada, Denmark, France, Germany, Ireland, Japan, the Netherlands, Norway, Switzerland and the United States of America.

1.2 Learning from implementation champions

During the work of the IEA EBC Annex 63, the participants have collected a total of 89 measures that are used in their own countries in urban and energy planning processes leading to the 9 Strategic Measures, described above.

Volume 3 demonstrates the degree and character of championing performed in selected case studies in order to implement energy strategies in local development projects. Particular focus is placed on case studies exhibiting a best practice approach, where proactive stakeholders – termed as implementation champions – actively and strategically address implementation challenges by overcoming resistance and exploit co-benefits. These implementation champions are seen as stakeholders, who take the initiative to lead and facilitate implementation of energy strategies at various scales and through different project types within the urban context. Implementation champions take many forms – both within and outside of the municipal government – and often act through networks and across disciplines. In the case studies, implementation champions include Mayors, urban planners, developers and others. The performance of implementation champions provides significant guidance in bringing plans into action.

Implementation of energy strategies is ultimately about realizing formulated energy targets in the format of physical constructions in local communities in the city. This represents a progression from something abstract (the formulation of a target in words) to something tangible (the physical construction) as outlined in figure 1.2. Each of these represents an implementation moment, where construction, of course, represents the ultimate implementation moment, leading to a materialization of the desired transformation formulated in the targets. Although there is a progression towards construction (illustrated by the grey arrows in figure 1.2), the case studies indicate that the implementation process towards construction is often iterative in character, as implementation champions move between the different moments (illustrated by the blue lines in figure 1.2).

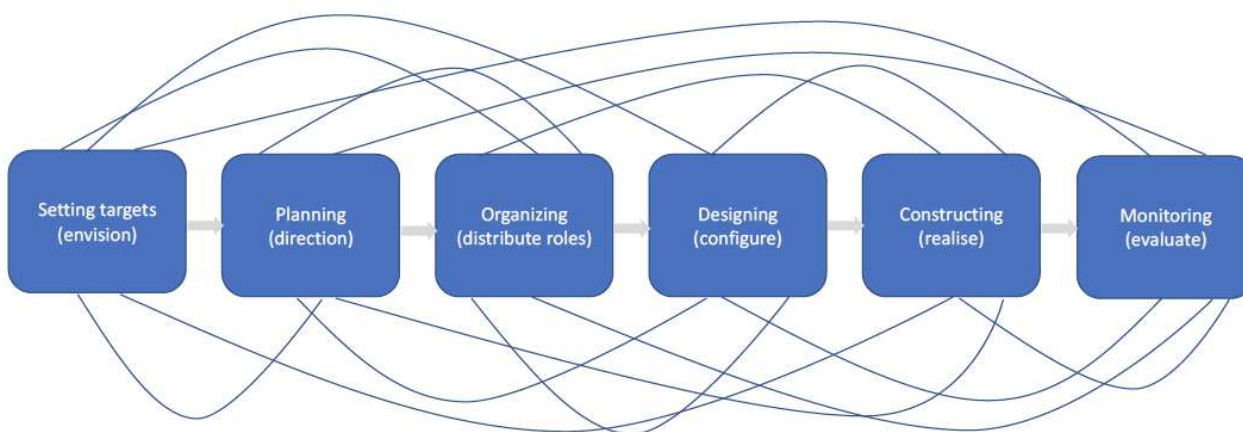


Figure 1.2: Implementation moments leading from target to action (DTU & AAU, 2017).

A key challenge in implementation processes is to ensure progress from target to construction. Implementation champions face the challenge of addressing the implementation gap that prevails in many development processes, and which represents a core motivational barrier and the focus of the work undertaken in Annex 63. Especially at the level of cities and local communities, local

practitioners struggle to be able to bring national targets concerning energy strategies to realisation. This struggle exhibits an implementation gap between national policy and local practice. Although many nations have committed to energy and climate strategies based on specific expert scenarios of future national development, the struggling implementation performed in practice happens in projects at a local level (Sperling et al., 2011). In some instances, national support in the form of frameworks and support for local authority is lacking. In other instances, city administrations are lacking tools and knowledge and have difficulty addressing the non-technical challenges, arising from the complexity of communities (Petersen, 2013). This struggle partly explains the nonattainment of national energy-efficiency targets, which jeopardizes the overall success of the desired energy transition (Henger et al., 2016).

The performance of implementation champions in the case studies in this report demonstrates that implementation of energy strategies at the local scale does not represent a simple technology transfer. As the case studies will illustrate, implementation champions combine a number of Strategic Measures during the implementation process to be able to mobilize the necessary stakeholders to integrate innovative energy solutions into construction projects. To enable uptake of innovative energy technologies, both strategic considerations and hard work is necessary, due to the complexity of interests and the interplay between public and private stakeholders (Shove, 1998), as the initiative progresses towards design and construction.

This illustrates how implementation champions are dependent on the support of other stakeholders. Change is only possible if energy strategies are aligned with stakeholder interests. Such alignments are not always straightforward to develop, because developers, citizens, businesses and others in the local community often have their own targets and aims that need not be coincident with those related to the desired energy strategies. Seen in this way, an energy implementation champion is often involved in developing a new management order.

The case studies allow insight into the championing work performed in order to establish the necessary alignment between energy strategies and community development. As the case studies, will illustrate, the championing work is not approached in a uniform way through a rigid sequence of steps. Rather, implementation champions seem to have a 'way of knowing' how to adjust the process to the situation at hand, as they orchestrate the Strategic Measures in response to the alignment with the community and targets. Such a tailored approach is supported by arguments that a rigid approach in strategy merely leads to the continuation of existing practices, whilst an approach that is more sensitively tailored to specific, local conditions leads to possible transformation in existing practices (Bryson et al., 2009). In that sense, the case studies allow us to learn about the need for implementation champions to make 'smart' decisions in terms of knowing which Strategic Measures to apply and combine in a given situation in order to support alignment.

The aim of Volume 3 is to demonstrate how Strategic Measures are combined by implementation champions in order align energy strategies with community development in selected case studies among the participating countries.

1.3 Structure of the report

The report first outlines the framework that has been developed on basis of the analysis of the selected case studies. This section introduces three scales that reflect an ordering of the case studies in terms of where implementations are anchored. It also elaborates on the four forms of knowledge prevailing in the interplay between communities and energy strategies (described in figure 2.1); and how these are linked to Strategic Measures. Finally, it underlines the complex and iterative nature of championing work. Following this section, the methodology is outlined.

Then, the report provides a description of the case studies. These descriptions are ordered according to the three scales that implementation champions operate in: the city scale, the district scale and the project scale. For each scale, a short introduction is given in order to further characterize the commonalities of the cases within this scale. After this introduction, each case description is shortly summarized. For each scale, two case studies are unfolded in a more detailed and analytical way in order to exhibit the interplay between the Strategic Measures more deeply. These in-depth case studies have been written in cooperation between the partners of the country of the case study and the authors of this report. The other case studies are presented in a short and summarizing format that provides an overview of the implementation processes. These case studies have mainly been described by the partners of the country of the case study and merely edited by the authors of this report.

An analysis of the case studies is given, following the case descriptions. This analysis highlights the where, who, what and how of the case studies. This provides a deconstruction of what the characteristics of championing are with starting point in these four analytical perspectives. The analysis provides the foundation of recommendations.

Finally, the report is summarized by an overview of recommendations and links to Volume 4: Stakeholder support materials.

2. Framework

The case studies collected in Annex 63 put emphasis on uncovering characteristics related to effective implementation techniques of implementation champions. This provides insight into the characteristics of implementation champions and how they facilitate a progression from targets to constructions. This section provides a more general overview of how the case studies have been ordered and interpreted. A more detailed case analysis is found in section 5.

2.1 Three scales of implementation

The case studies differ greatly in terms of how the implementation process is approached. Some implementation projects are organized in small projects, merely focusing on one specific building, while others have a broader and more strategic perspective on developing either a district or the entire city. Common to these development projects is the physical development of a specified focus area and a procedure on how it is organized. Implementation is thus enacted through a variety of urban development situations, depending on how the development is scoped and framed by the implementation champion. It might address for example the master planning of a new district, restoration of an existing building, development of a strategic plan for the city or an urban laboratory in a specific area.

In order to emphasise the characteristics of these different processes, the case studies are divided into three geographical scales – ranging from the city as a whole, to the district and to the specific local building project. This separates the different characters of the planning processes, and hence implementation processes. As an example, the implementation process in the case study of Minneapolis (US) places an emphasis on stakeholder engagement through boards with professional representatives and hearings, while the implementation process in the case study of Stadtwerk Lehen in Salzburg (AT) emphasises more direct dialogue with architects and developers on how a new building can be configured. This indicates important contextual differences between the organization of the two cases, where different types of planning procedures are at play. According to table 2.1, Minneapolis would represent a case study within the ‘city scale’, where Strategic Measures are anchored in a broader strategic planning procedure, compared to Stadtwerk Lehen, representing a case study within the ‘project scale, characterized by a planning procedure that is more focused on the building plans. Due to these differences in planning procedures, the professional communities, in the form of e.g. municipal planners, architects and developers, and the representatives of the local communities, in the form of e.g. NGOs and citizens, differ.

In that way, the scales represent different situations of implementation, providing different windows of opportunity to tie the implementation of energy strategies to ongoing development processes. For example, in Bottrop, the ‘Initiativkreis Ruhr’ – a regional development scheme – became an opportunity to formulate targets and gain economic support for energy strategies. These situations are also important to distinguish, because their characteristics influence the alignment between energy strategy and local community. This ‘external’ development in Bottrop became an ‘internalized’ part of the Bottrop implementation process and supported the engagement of local

<i>Geographical scale</i>	Planning Procedure	Professional community	Local community
<i>City scale</i>	Strategic plans. Formal hearings or voluntary cooperation.	Planners. Involvement of experts and representatives. Cooperation with boards.	Mainly active NGOs and interest groups. Local representatives through hearings and formal meetings.
<i>District scale</i>	Master planning. Detailed plans. Competition. Formal approval. Informal cooperation.	Planners, architects, developers and consultants. Direct cooperation on plans.	Local representatives and interested stakeholders through meetings and hearings. Local citizens and industries/ businesses.
<i>Project scale</i>	Building plans and blueprints. Formal approval. Informal cooperation.	Planners, developer, architect and consultant. Direct and close dialogue.	Neighborhood dialogue and involvement. Direct dialogue with end-users or indirect representation of local needs.

Table 2.1: Overview of characteristics for the three scales (DTU & AAU, 2017).

industries in setting up urban laboratories within Bottrop. It would have made little sense in this chosen trajectory not to focus on local industries, since this was a crucial part of the regional initiative. In that way, the implementation situation provided both a window of opportunity and a trajectory in terms of defining the local community addressed; including which stakeholders to involve.

These situations also reflect the fact that a focus area is needed. This is where champions assemble their forces to enact energy strategies, underlining the fact that no city or champion has the resources to work on all the facets of energy development at once. Through the choice of this 'entry point' to the implementation, the direction of the process is established along with the planning procedure and the professional and local communities involved. By directing their forces towards a specific focus area, implementation champions address the issue of progressing from targets to design and construction.

These three geographical scales are used in this report as a way to structure the case studies within Annex 63, enabling similar situations to be compared. The distinction between these three scales has not been easy, since several case studies would fit into several of the scales. The case of Bottrop exhibits this well, because it concerns the strategic efforts for the entire city at the outset, but channels into urban laboratories at the end. A pragmatic approach has been taken here in terms of including the case studies in the scale that best describes its overall characteristics. The case of Bottrop was therefore placed in the geographical scale of the city where it exhibited especially interesting implementation dynamics. Some might also question why this scale of the entire city has been included in a report with focus on local communities. The reason is that these strategic processes are (or become) linked to community-oriented efforts and in that way, the

report provides a more comprehensive picture of the range of strategies that can be applied by implementation champions, when implementing energy strategies in local communities. Other studies provide similar indications of how multi-level governance characterizes the work undertaken by cities, when governing climate change (see e.g. Bulkeley 2010 or Schreurs 2008).

2.2 Linking urban and energy targets

Implementation projects, like those described in this report, are seldom driven solely by energy targets, as Harman, Taylor and Lane (2015) point out. As a result, implementation may be blocked by conflicting objectives, values or divergent tactics related to the character of the urban development project to which they are linked. These in turn, provide deviant temporal and spatial scales for operation of public administration (e.g. Cajot et al. 2015). The efficiency of an implementation process is seen to be dependent on its ability to deliver change among the stakeholders responsible for aspects such as the planning, investment, technical integration or use of the innovative technology. If the involved stakeholders are not inclined towards this change, then it will seldom take place (unless legal force is applied).

An important part of championing is thus to nurture energy strategies through urban targets that are meaningful for the ordinary community stakeholder. Such an exchange between energy targets and meaningful urban targets can help to motivate stakeholders to change their ways of taking decisions, constructing or adopting lesser known technologies. In Stadtwerk Lehen, in Salzburg (AT), for example, the district was troubled with social issues of image and unity. This social aspect was acknowledged in the technical configuration which included designing a buffer tank for the heating system as a local landmark. By nurturing energy strategies and linking these to local interests, the implementation champions in this case gained a good support for the changes in the building structure. Nurturing is necessary, because change – from one way of doing things to another – often creates resistance in the form of bottlenecks since change involves risk and other concerns. An important part of nurturing is to be attentive to needs and to provide reason, aimed at minimising risk perceptions or highlighting the benefits. In this perspective, alignment between energy and urban targets involves the production of reasoning to allow adoption of new energy solutions in both city administration and community development through ‘marshalling evidence and giving reasons’ (Forrester, 1999:141).

To perform this nurturing and reasoning requires knowledge and understanding how the professional and local communities involved, work. It is not enough to simply identify a potential urban development situation to engage in, it is also necessary to be able to understand the interests and conditions in play and to challenge – even manipulate them – to bring about a new equilibrium in terms of energy development. In Stenløse South, in Egedal (DK), for example, the local energy requirements were based on very careful considerations, balancing legal concerns with the level of energy performance that prospective developers would accept at the development site. In that way, the planners mobilized the developers to construct houses with an energy performance beyond the prevailing Building Regulation at that time. Implementation depends on the establishment of a true and meaningful synergy between different stakeholder interests.

The required knowledge, however, originates from very different arenas, both in relation to professional communities and local communities. Architects and engineers do not talk in the same

language, and neither do citizens and developers. As a result, a silo effect prevails between professionals and local communities. Stakeholders in each arena focus on their own area of expertise with limited attention to those adjoining. The silo effect inhibits the exchange of knowledge between these arenas due to competing interests or lack of engagement in each other's projects. The case studies exhibit a breakdown of these siloes, since an interchange of knowledge takes place. In Erlenmatt-West in Basel (CH), for example, application of the labelling scheme of the 2000-watt society enabled ongoing dialogue between politicians, urban planners and the developer about the configuration of the new district. Such interchange can take many forms: for example, the Mayor in Bottrop worked formerly as an urban planner, and as a result, he could more easily support the linkage between the general political interests regarding city development and the urban planning specialists. Other forms of formal or informal processes of dialogue were exhibited in several of the cases and provided a fundamental part of the effectiveness of implementation processes.

Technical knowledge is often self-generated during the implementation of energy strategies, since formulation of energy targets and configuration of energy solutions require technical competences and overview. However, the case studies show that other forms of knowledge are also included as part of the championing process. In one example, implementation of technical solutions is challenged by non-technical factors, such as: non-acceptance of novel technologies, resistance to energy innovations by traditional energy suppliers, incumbent industries or local residents, who perceive these innovations as unwelcome. The case of Stenløse South, in Egedal (DK), illustrates this well, since a lot of conditions from developers and end-users had to be considered and addressed in the sales material for the building lots in the development district. Hence, socio-economic benefits are at least as important to consider as finding adequate energy technology solutions.

As illustrated in figure 2.1, four different categories of knowledge are explored in the cases: knowledge about the physical context, the technical context, the socio-economic context and the administrative-legal context. Each of these forms of knowledge represents dimensions of the communities involved in urban interventions and are derived from the specific circumstances of implementation processes. The physical context concerns the spatial element and the administrative-legal context, the more organizational elements. In practice, the community considered by the implementation champions includes both professional communities and local communities, as the planning process is integrated with processes such as policy making, construction and daily routines in the neighbourhood.

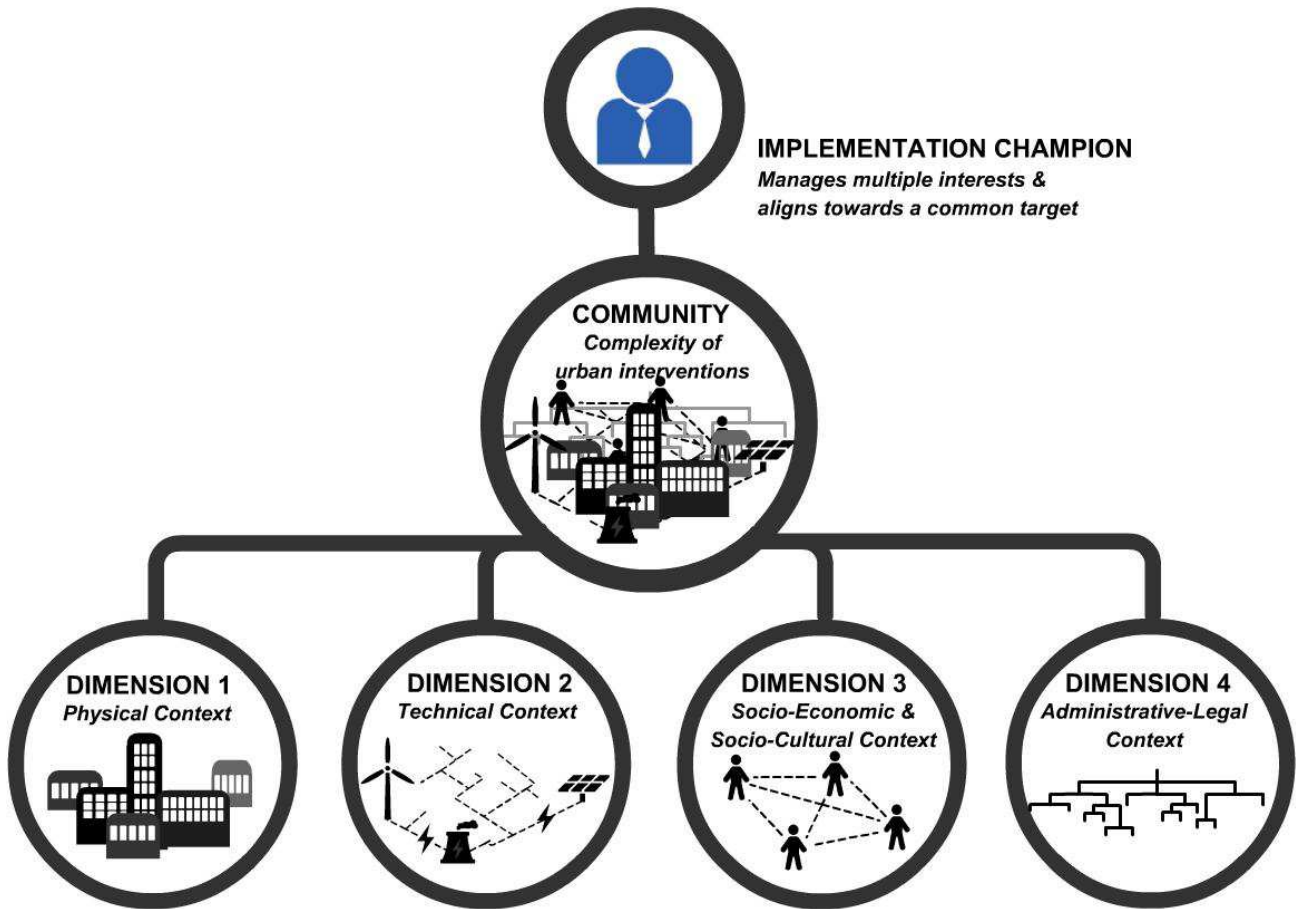


Figure 2.1: Illustration of the four dimensions involved in Community development (DTU & AAU, 2017).

The flow and exchange of different forms of knowledge represent a crucial part of the alignment process undertaken by implementation champions. These forms of knowledge are applied as part of the championing process, as a basis of nurturing meaningful and reasonable configurations through a solid sense of grounding – in terms of understanding the conditions at hand. As Rydin (2010:71-72) notes, a key issue is to understand what role knowledge plays within networks around urban development and whether the knowledge is in the right form to actually deliver change. In that sense, it is not unimportant as to how visions and targets, for example, are framed and in terms of what they represent in view of the four dimensions.

2.3 Application of Strategic Measures

The knowledge discussed above is transferred in the implementation process through the Strategic Measures identified in Volume 1: Inventory of Measures and Volume 2: Development of Strategic Measures. The Strategic Measures can be seen as mobilizing actions that are used to negotiate and reason with certain stakeholders throughout the implementation process. Different Strategic Measures are used in different situations and contexts, as the cases will illustrate. In that sense, implementation champions ‘pick’ and ‘assemble’ different Strategic Measures. Whether a mobilizing action is effective or not depends largely on the ability of the champions to match and mould the measures with the four knowledge contexts in figure 2.1. In Stenløse South, in Egedal (DK), for example, legal regulation represented an effective measure due to the local conditions at

play, but in Stadtwerk Lehen, in Salzburg (AT), stakeholder engagement proved to be an effective measure.

The Strategic Measures are linked in different ways to the four dimensions on figure 2.1, depending on their character and the bottlenecks and co-benefits addressed:

- **Set Vision and Targets** helps to provide a common direction in the process. This target setting often takes its starting point in technical scenarios although the integration into construction processes and acceptance of users is also considered along with socio-economic factors (dimensions 2 and 3). Depending on the situation, target setting can also include physical and spatial considerations such as the size of a building or an area or administrative-legal factors that consider the procedure to reach the targets (dimensions 1 and 4).
- **Develop Renewable Energy Strategies** provides an overarching direction towards energy focus. This has a strong orientation towards the technical context (dimension 2), but it should also include the others (dimension 1,3 and 4), depending on the framing of the strategy.
- **Make Full Use of Legal Frameworks** provides the possibility of providing regulatory pressure. This has its starting point in the administrative-legal context (dimension 4), but it could also relate to the physical and technical contexts (dimensions 1 and 2), depending on the focus of the framework.
- **Design of Urban Competition Processes** provides a way of framing urban development processes in the planning phase. This also has its starting point in the administrative-legal context (dimension 4), but relates strongly to the physical and technical contexts (dimensions 1 and 2). Often, this measure would consider the socio-economic context as a result of social competition requirements (dimension 3).
- **Make Use of Tools Supporting The Decision Making Process** helps to outline the situation and provide documentation. These tools can consider all four dimensions (1-4), depending on the character of the decision process and the documentation needed.
- **Implement Monitoring of Energy Consumption and GHG Emissions** helps to document progress in order to allow for learning. This is typically oriented towards the technical or socio-economic contexts (dimensions 2 and 3). The organisation of this measure may be based in the administrative-legal context (dimension 4).
- **Stakeholder Engagement & Involvement** allows exchange of knowledge between stakeholders. This exchange typically works across all four dimensions.
- **Include Socio Economic Criteria** allows innovative project configurations that break with the idea of simple technology transfer. This has its starting point in the socio-economic context (dimension 3), but it would typically also relate to the technical and administrative-legal contexts (dimensions 2 and 4).

- **Implement Effective and Efficient Organizational Processes** supports the structuring of the facilitation and management process. This has its starting point in the administrative-legal context (dimension 4), but it involves issues concerning the physical, technical and socio-economic contexts (dimensions 1, 2 and 4).

As indicated in the above, the combination of Strategic Measures involves the considerations of how the four dimensions are championed, integrated and prioritized in the decision-making process. The Strategic Measures can be seen as levers that enable consideration of the different forms of knowledge in the implementation process. Although some measures have their starting point in one specific form of knowledge – e.g. aimed at organizing the management of the process – these measures are linked to the other forms of knowledge, depending on the intention of bringing the measure into action. This strategic work is performed at the overarching arena of city administration or in community development. This strategic work also involves a meta-level of strategic and managerial forms of knowledge in addition to the four dimensions, as discussed below.

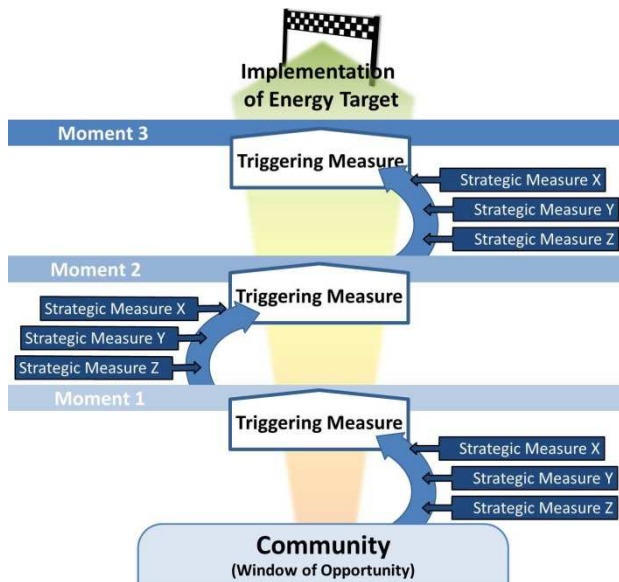
2.4 Championing

Implementation of energy targets can be categorized as a ‘wicked problem’, to which definitive and objective answers do not exist (Rittel and Webber 1973). To such kinds of problems, a rigid, responsive and sequential approach to planning (and hence implementation) is seldom effective (Bryson et al. 2009). In order to achieve desirable outcomes, a careful tailoring of concepts, procedures and tools to whatever situation is at hand is necessary, according to Albrechts (2004). There are strong indications that these more transformative forms of governance are dispersing and gaining anchorage in processes of implementation (see e.g. Rydin 2010), similar to many of the case studies. This revisits rational arguments built on the concept of the city as a well-ordered system and acknowledging the complexity of cities by engaging in more iterative processes. A key challenge, however, still prevails, since knowing how best to champion an implementation process represents a challenge.

As this report focuses on the work of implementation champions, the act of championing represents a core issue to understand. Championing is seen as a strategic component aimed at building on and exploiting the knowledge from communities through integration in the facilitation and management of the implementation process itself. The act of championing can be illustrated, as a trajectory, shown in figure 2.2, leading from a specific implementation situation towards implementation of an energy target. The trajectory should not be viewed as something fixed and planned beforehand. On the contrary, many of the case studies, exhibit that this trajectory is developed ‘on the fly’, through adjustments and flexibility in the process in the sense that energy targets are continuously readjusted along the way, as a result of iterations of especially the Strategic Measure of ‘Set visions and targets’ and ‘Stakeholder Engagement & Involvement’.

This indicates a fluid and dynamic interpretation of an implementation process, introducing the dimensions of time and space in indicating how different measures interact over time. An example of this is in Stadtwerk Lehen, in Salzburg (AT), where the local government first specified energy targets for an area, providing direction. These targets were then developed further, both through

social work in the neighbourhood that inspired to ways to specify the targets and through dialogue about the configuration of the buildings and the energy system. In that way, implementation champions channelled the targets, initially formulated through policy-making, into more specified configurations for the community's own setting.



1) Initial implementation champion:

A champion takes a specific initiative to act. The anchorage and orientation of this champion determines the local context, including given preconditions and drivers.

2) Implementation moment:

The champion adheres implementation actions to on-going planning procedures. These actions are oriented towards addressing specific implementation moments.

3) Combination of Strategic Measures:

Implementation actions are supported through a combination of Strategic Measures that support the achievement of the implementation moment.

4) Implementation of Energy Target:

The direction of the implementation process in terms of the goal. The direction shifts, depending on obstacles and potentials along the way.

Figure 2.2: Championing illustrated as an implementation trajectory (DTU & AAU 2017).

Such an iterative approach to implementation represents a break with the idea of implementation as a rational and straightforward process. Seen in a historical perspective, rational approaches to governance have been widespread. In examples where a simple technology transfer is applied to implementation, technical experts typically support city administrators in setting the targets for development, and the following configuration of solutions is then carried out together with technical specialists, and often isolated from the local communities affected by the initiative. This way of administrating the city represents, what is termed as a rational and technology-centred approach (Rydin, 2010). In such an approach, stakeholders from the private sector are given a more passive role and merely asked to approve the targets and solutions set by specialists. In this practice, a perception prevails that the city follows a certain 'order', where each stakeholder performs the intended role in a rational way. In real life, however, the intended roles and their alleged order are not in agreement with actual performances from stakeholders.

The case studies illustrate that the Strategic Measures cannot stand alone. Effective application of Strategic Measures relies on the ability to choose a combination of measures that are able to establish the necessary momentum for change within the local community involved. Each Strategic Measure needs to be moulded into a form that makes sense and engages the stakeholders that need to make the necessary changes. This relies on knowing the context and having the ability to adopt the measures to this context.

3. Methodology

This report is primarily based on the knowledge that partners in the Annex 63 have brought to the project and to the discussions within common meetings. Through this collaborative dialogue, observations and analysis of the case studies have led to common reflections about which parameters and dynamics that are in play in the implementation of energy strategies in local communities. In this section, we briefly outline the methodology behind the data collection and the learning curve of the Annex 63 meetings.

The data collection in Annex 63 for Volume 3 has been based on collection of case studies from participating partners. The partners represent different institutions from Austria, Canada, Denmark, France, Germany, Ireland, Japan, the Netherlands, Norway, Switzerland and the United States of America.

The selection of case studies is partly random, partly systematic. The partners and the participating cities were given on the basis of the application of Annex 63, and do as such not represent a 'typical' systematic selection of case studies. However, there has been a close dialogue at Annex 63 meetings about the selection of case studies within the boundaries of participating or relevant cities in the project. A maximum variation strategy, according to Flyvbjerg (1991) has been applied to the selection of cases from the participating cities. The common characteristic has been that the case studies had to represent a national frontrunner in terms of championing for implementation of energy strategies with emphasis on different forms of local communities. We have succeeded in ensuring cases that are early in their implementation process, cases that have been extremely ambitious, and cases that have challenged mainstream processes. The number of case studies has been continuously expanded during the work period on the basis of discussions about what types of cases that were relevant or missing.

The intention with the case studies is to provide a qualitative insight into specific implementation processes with focus on depth and richness in terms of unfolding how Strategic Measures have been applied and combined. The systematic approach supports a common form of analysis, reflected by the application of our model to the Strategic Measures. This analytical tool provided a systematic analysis of implementation processes in each case. As a result, the main conclusions to draw from the work in this Volume 3 concern the interplay between Strategic Measures that characterize each of the cases.

The case studies have been developed on the basis of two templates (appendix) that describe the implementation process in more detail but on the basis of different parameters. The first template functioned as a screening tool to provide an overview of the case studies. The second template contained greater detail and functioned as a part of the coding process, since partners were asked to more specifically describe the Strategic Measures involved. Each partner has been responsible to collect the necessary data to complete the more detailed template. This means that the collection methodology may vary from dialogue, interviews to surveys of written material about the case. In each case, the city involved has been asked to revise and comment the description of their process as a way to validate the data. The templates that have been used have been developed on basis of discussions in the Annex. In some of the cases, it has been necessary to

further supplement the descriptions by contacting the contact person of the case study and asking for supplementary questions.

All of the case descriptions have been coded with focus on where the implementation is anchored, who implementation champions are and what Strategic Measures that have been applied. In addition, an analysis of how the Strategic Measures are combined in relation to windows of opportunity, bottlenecks, strategies and knowledge has also been carried out. Through this coding it has been possible to see how implementation champions approach Strategic Measures different at different scales of the city and describe some of the implementation dynamics in more detail.

The conceptualisation within the Annex 63 framework has occurred on the basis of iterations between the analytical work and discussions at Annex 63 meetings. During initial meetings and analyses, focus has been on understanding what kind of implementation processes is carried out and what kind of implementation challenges are addressed and how. This has led to the identification of the Strategic Measures and to the recognition of how these are played out at different scales in the city (for more information about this working process, please see Volume 0). The Strategic Measures and the model of their interplay was developed as the result on the work carried out in Volume 1: Inventory of Measures and Volume 2: Development of Strategic Measures, identifying important elements from planning processes in each country, and analyses of the cases, illustrating application of these measures in practice.

4. Case studies

The case studies are divided into the three scales of the city, as earlier described. In each of the sections, the scale is first more thoroughly introduced and then follows the description of case studies. As mentioned previously, two case studies are described in more detail (2 pages) to provide greater insight into the implementation dynamics. The remaining case studies are presented in a short format (1 page).

4.1 Application of Strategic Measures at the city scale

The city scale represents one of the three community scales in planning, where implementation of energy strategies is addressed. At this scale, implementation efforts are anchored at the broader strategic context, covering the city in its entirety. It often implies a strong political or administrative focus, where energy visions and targets are formulated more broadly in form of strategic statements. These approaches often trickle down, either to implementation projects at the district or project scale, or result in initiatives that target dispersed forms of communities more broadly in the city; e.g. addressing energy renovations in buildings in general. In that sense, there can be a strong linkage between this City scale and the District and Project Scale over time.

City Scale	District Scale	Project Scale
Targets in form of broad strategic statements	Targets in form of setting up planning framework	Targets in form of specific configurations at site
Development-oriented	Planning-oriented	Action-oriented
Strategic representatives	Local representatives	Professional stakeholders
Outlining	Framing	Configuring
Decision and Information	Analysis and Regulation	Execution and Monitoring

Table 4-1: The City Scale compared to District and Project Scales (DTU & AAU, 2017).

The two in-depth case studies, Minneapolis (USA) and Bottrop (Germany) illustrate the characteristics in table 4-1. In both case studies, a great deal of championing is performed at the political and administrative level in terms of gathering and organizing different representatives within and outside of the city administration to support implementation of energy strategies. On one hand, the case studies illustrate a great deal of implementation work aiming at formulating initial targets and adjusting these through stakeholder engagement. On the other hand, the cases illustrate a strong emphasis on the organizational work performed in order to outline the direction and ensure support of the action plan within the organization. In both cases, efforts were also made to mobilize and involve important stakeholders, such as NGOs and green industries.

Case Study 1.01:

Minneapolis, USA

Implementation moment

Implementing energy targets in the form of setting up an organisational framework and identifying target groups in the city.

Main achievements

Organizational readjustments and formation of boards that ensure commitment to energy targets and the action plan set to reach these.

Aims/targets in relation to scale

Focus on environmental justice and urban equity from a policy-oriented perspective with emphasis on re-organization.

Key Strategic Measures

A combination of involving and committing key stakeholders, setting common targets and enact feedback loops and monitoring.

Minneapolis characteristics

- Emphasis on establishing political endorsement and strong leadership.
- Innovative city with focus on urban growth.
- Equity challenges in urban development and focus on env. justice.
- Strong NGO sector.
- Cooperation with energy utilities.

Impact and success factors

In Minneapolis, a strong platform for implementing energy strategies has been forged at the administrative scale of urban development. Actions are taken at the administrative level to establish boards to support progress and coordination of energy strategy initiatives. Tools have also been developed to monitor and support progress. As a result, a strong commitment to the developed action plan has been established. Important success factors have been the strong urge to address environmental justice and equity. Another factor is the strong culture of stakeholder involvement that prevails in the city administration.

Stakeholders involved

The central administration of Minneapolis and the politicians have played a key role in the implementation process. They have recognized the need to develop common targets and put action behind agreements. Other important stakeholders have been industrial partners, utility companies and citizen groups that actively engage themselves in the process. The established boards represent different urban stakeholders, and provide important input to the socio-economic adjustment of energy targets.

Strategic measures

Minneapolis has worked carefully with energy target setting. The commitment to setting targets is driven by a strong sense of environmental justice. Information tools, like a greenhouse gas inventory, have been used in order to ensure technical considerations. Stakeholders have also been involved in setting targets. As a result, the targets have been developed on the basis of a good merge of technical insight and socio-economic interests in the city.

The targets have, then, been converted into action plans that have again been converted into organizational adjustments aimed at ensuring institutionalization of the targets by establishing boards and strengthening administrative departments. This illustrates that management of the

Main lessons

- 1) Targets should be set in conjuncture between public concerns and energy aims.
- 2) Targets need to become institutionalized in the organisation.
- 3) Appoint collaborative organisational units that have implementation of energy targets as a direct responsibility.
- 4) Information tools and monitoring ensure ongoing evaluation and push implementation forward.

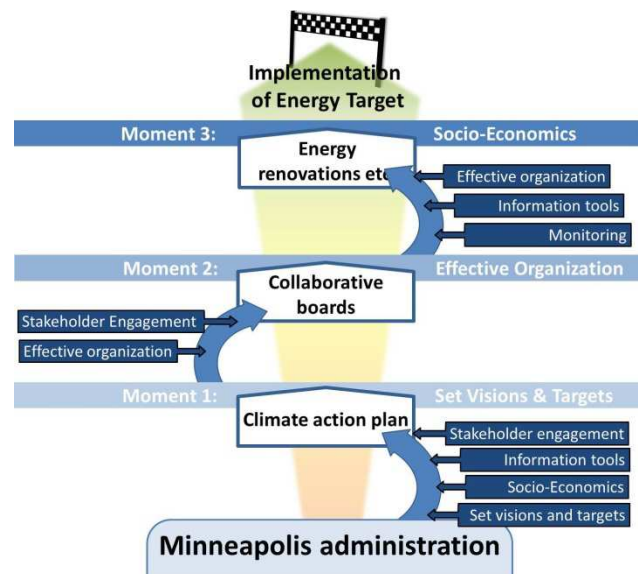


Top: Cooperative approach (source).
Bottom: The Xcel Energy Center (source).

efficiency of the organization has been crucial to support the implementation of the targets.

The organization boards and strengthening administrative departments. This illustrates that management of the efficiency of the organization has been crucial to support the implementation of the targets. The organizational efficiency is also ensured through the measure of monitoring, which feed-in data to feedback loops and evaluations. This allows for continuous adaptation of the implementation process. Information tools are also used in this regard to benchmark and evaluate initiatives.

These organizational adjustments have also led to the establishment of collaborative boards, where relevant representatives from outside the administration have been enrolled. This illustrates a strong collaborative approach, which ensures that the implementation of the action plan is led by a collaborative voice, which reflects different points of interest in the process. The implementation process has led to specific initiatives addressing e.g. energy renovations and dialogue with energy utilities.



Process Diagram Minneapolis (DTU & AAU, 2017)

Case Study 1.02:

InnovationCity Ruhr, Bottrop, Germany

Implementation moment

Implementing energy targets in the form of organizing an innovative pilot project.

Main achievements

Organizational reorganizations and launch of more than 300 demonstration projects.

Aim/target in relation to scale

50% reduction of greenhouse gas emission within project area from 2010 to 2020. The pilot region has around 70,000 inhabitants.

Key Strategic Measures

Targets through a visionary masterplan, green industrial clusters with public-private partnerships and central coordination unit.

Bottrop characteristics

- Initiative mayor and good leadership.
- Innovative city with focus on urban growth.
- Situated in a strong industrial region.
- Regional innovation initiative.
- Living laboratory approach.

Impact and success factors

A pilot area of Bottrop will be transformed into an energy efficient district until 2020. The focus of the master plan for Bottrop's redevelopment is on energy efficiency and renewable energies in both commercial and residential areas. More than 300 different projects have been realized, addressing: living, working, energy, mobility, and urban planning. The refurbishment rate within the city of Bottrop is around 3 % p.a. compared to a refurbishment rate of around 1 % p.a. at the national level. 38 % CO₂ reduction are estimated for 2020.

Stakeholders involved As a network of 70 leading companies, the Initiativkreis Ruhr has been a main driver of the initialization and realization of the Innovation City pilot project. A central unit, the Innovation City Management GmbH (ICM), has been founded to coordinate the transition process. Furthermore, the city of Bottrop integrated the local industry and commerce into the process with roundtable meetings. The local population has been integrated via public events, such as summer festivals, to strengthen identification with the project and the city. Moreover, free energy consulting service led to stronger participation and supported public investments into refurbishment and modernization.

Strategic measures

In Bottrop, a pilot project has contributed to the target setting, as it has provided a potential for developing the city in an innovative way. The current mayor of Bottrop has been a driving force behind the creation of this potential, as he has been a leading person in the InnovationCity Ruhr project. An important element of creating this potential has been to engage in collaborative work aimed at organizing a solid network within the project. The mayor has purposely worked on developing a wide social network, supportive for the Innovation City process.

Main lessons

- 1) Targets for urban redevelopment include a shared objective to achieve significant levels of carbon reduction.
- 2) Involvement of leading energy specialist situated in the local community, hereby expanding the technical possibilities for innovation.
- 3) Achieving financial support through national funding scheme in order to raise commitment and degree of innovation.
- 4) Organization of a Smart Energy Town Committee that ensure coordination across the network. Ensuring consensus about the solutions already in the design phase of the project through dialogue.

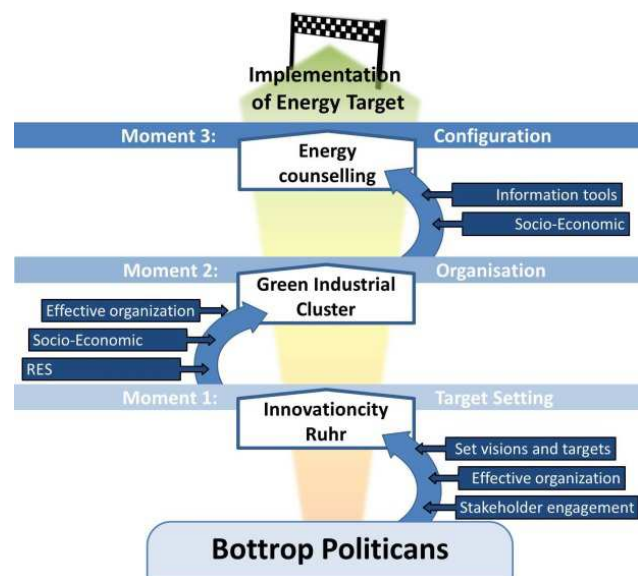


Top: Energy efficient district (KlimaExpo.NRW). Bottom: Future house (KlimaExpo.NRW).

On the basis of stakeholder engagement, a green industrial cluster has been developed. In that way, visions of strengthening industrial development and urban transformation went hand-in-hand in the further development of the targets.

An effective organisation of the planning process has been provided. Administrative and managerial actions have been carried out, including the Innovation City Management GmbH, which manage the overall project. Financial models have also been put into place that support outward activities, like free energy counselling for building owners. The administrative actions also include application of measures such as information tools as a way to monitor and evaluate progress.

During the implementation process, the character of collaboration has shifted from broad representations and agreements towards more specific collaborations in relation to urban laboratories at the district and project scales.



Process Diagram Bottrop (DTU & AAU, 2017)

Case Study 1.03:

ProjectZero, Sønderborg, Denmark

Implementation moment

Implementing energy targets through a public-private partnership.

Main achievements

600 homes have been renovated on the homeowners' costs and 100 new jobs in the energy business have been created. The local craftsmen have an additional 13.5 million € turnover.

Aim/target in relation to scale

The target for Sønderborg is to emit zero GHG emissions in the municipality from 2029 and on.

Key Strategic Measures

Visions and targets set in close cooperation with a broad array of stakeholders. New business models have also been developed.



Top: Refurshing private homes (ProjectZero, 2015). Bottom: Collaboration with a local scout group (ProjectZero, 2015).

Impact and success factors

A holistic energy strategy was developed in cooperation between the municipality, local businesses, financial and research institutes. Important success factors have been subsidies for free energy advisory and education of craftsmen, leading to an increased local added value and the attainment of energy targets. The goal is that homeowners and local craftsmen should in the long run pursue energy efficiency increase and creation of local green jobs via a self-sustained process.

Stakeholders involved

ProjectZERO is formed as a private company with the task of catalyzing development. The idea of the public-private partnership came from a local business think tank of technology companies in the area. The project is the “hinge” between the municipality, the local technological companies and the citizens. Important stakeholders are energy utilities, local energy technology companies, local craftsmen, the private homeowners, housing companies and educations.

Strategic Measures

The ProjectZERO company represents an important champion. An important strategic measure in the process has been to develop targets in alignment with local companies and that empower citizens. The target also has a technological basis with focus on energy efficiency coupled with electricity and heating systems, based on a mix of renewable energies, etc.

Another important measure is that of socio-economic impact and business models. Emphasis is put on making it attractive to energy renovate private homes. This represents a new business model that has been developed. The organization as a public-private partnership represents a measure that has supported development of new business models. In addition, measures like information tools and monitoring are also applied as support.

Case Study 1.04:

DACH Cooperation, Karlsruhe, Germany

Implementation moment

Implementing energy targets through knowledge exchange.

Main achievements

Opportunity for an extensive exchange among the three cities of Karlsruhe (DE), Salzburg (AU) and Winterthur (CH). Formulation 9 concrete energy efficiency project proposals.

Aim/target in relation to scale

Networking and exchange of experiences to enhance learning and synergy effects for the DACH cities to speed up the energy efficiency improvement.

Key Strategic Measures

Organization/Processes, Criteria for competitions, Inclusion of socio-economic impact and financial models.



Top: Opening meeting of DACH Project in Karlsruhe, Sept. 2013. Bottom: Below: Visit of the "Energy Hill" in Karlsruhe, Feb. 2014.

Impact and success factors

Exchange during the first phase of the project have created a trusting framework, in which diverse stakeholders from municipalities and from the economy met to draft ideas for more efficient energy solutions.

Success factors have been: the holistic approach, the support from the city administrations as well as the opportunity that some stakeholders could talk to their counterpart of the other cities for experience exchange.

Stakeholders involved

The three cities have been behind the idea to create a synergy effect through exchanges. The projects being developed and reflected on were for the benefit of these cities. These cities have gathered stakeholders from the energy, industrial, financial, construction, training and research areas in order to work together towards their climate protection and energy efficiency targets.

In Karlsruhe, one stakeholder is the energy utility Stadtwerke Karlsruhe GmbH, distinguishing itself as a provider of climate friendly electricity, gas and heating. KEK (Karlsruher Energie- und Klimaschutzagentur) is another involved municipal entity.

Leadership and facilitation

The most effective trigger is the intrinsic motivation of individuals. Through the organisation of DACH it has been possible for individuals to express their needs and meet other people with similar motivation. People from all areas are represented. It is the group itself that offers a platform of exchange and discussion and generation of new ideas.

Sharing common values facilitates the cooperation and gives the basis for actions. The fact that the stakeholders themselves are decision makers makes it easier to implement measures residents since it covers a wide range of topics such as parenting support, elderly people, town management and landscape.

Case Study 1.05:

Guelph, Ontario, Canada

Implementation moment

Implementing targets through organisation of a strategic energy plan.

Main achievements

Development of a cross-sectoral organisation to oversee the implementation of the community energy plan.

Aim/target in relation to scale

Multi-sector activities are better governed by an independent body with the authority to cross sector boundaries.

Key Strategic Measures

Creation of a energy utility / council body with a clear mandate.

Impact and success factors

The development of a community energy plan that included among its activities a district energy network created the need for independent governance to oversee the inter-sectoral projects. Neither municipality nor local electricity provider had a mandate for community energy planning or implementation. A separate holdings company created at arm's length from the city administration with a mandate for implementing the plan. Under the holding company were supporting organisations that addressed specific activities within the plan. For example, one organisation addressed the district energy initiative, another addressed telecommunications, another transportation, etc.

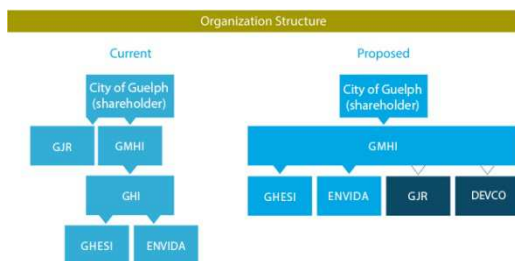
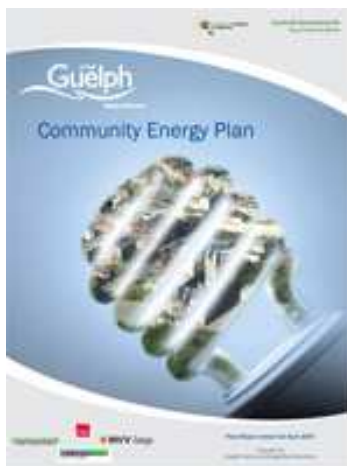
Stakeholders involved

The municipal holdings company was chaired by City Hall (Mayor) and through its membership; associated stakeholders could provide input to and receive direction for the implementation of the plan. Members included energy suppliers (natural gas, electricity, oil), public utility (water, waste), community groups, transportation and health and welfare organisations as well as the sustainability and green energy sector.

Leadership and facilitation

The champion for this initiative was a sustainability conscious and popular Mayor. Her role was instrumental in the development of a city wide plan with reduction targets exceeding those of the province and a series of retrofit initiatives as well as a district energy initiative.

She initiated the investigation as to the legitimacy of the arm's length organisational approach within provincial legislation and established the holdings company as a operational entity. Engagement with the local electricity and other stakeholders enabled the initiation of the district energy network.



Top: City of Guelph Community Energy Plan (source). Bottom: Governance Structure (source).

Case Study 1.07:

Aachen, Germany

Main achievements

The rate and quality of energy efficient refurbishment of residential housing is higher than requested by National regulations.

Aim/target in relation to scale

The aim is to deliver affordable, honest/neutral and easy to find information and advice about energy efficient refurbishment to house owners in all residential neighbourhoods with old buildings.

Key Strategic Measures

The city council developed a special regulation, called „Aachen standard“, better than the National one. This regulation is combined with local funding and the implementation of an energy advisory agency, called „altbau plus“ (old building plus) as an honest non-profit broker.

Impact and success factors

The implementation of the “Aachen standard” combined with local funding and an independent energy advisory agency “altbau plus” led to a significant higher number of energy efficient refurbishment of residential houses.

Success factors are the neutrality of the energy advisory agency as a non-profit institution (house owners trust them more), and the good cooperation with local enterprise network “effeffac” (companies that offer certified works and services in energy efficiency refurbishment). Another success factor is the excellent cooperation with the local energy supplier, owned by the city, and with the local housing company, also owned by the city.

Stakeholders involved

The stakeholders are the city council with the position of a coordination manager for all energy strategies and climate protection measures in Aachen, altbau plus as agency, effeffac network of enterprises dealing with energy efficient refurbishment, agency for consumer protection with special advise programmes for poor house owners and residents, the energy supplier, the housing company and various district councils as supporters of direct activities like information meetings and exhibitions.

Strategic Measures

The case study Aachen refers to the following strategic measures: vision and target setting is done on city level whereas implementation is delivered on district and project level.

The local legal framework Aachen standard sets the frame and the efficient organisation of the urban energy planning process by the responsible city officer details this framework into real activities. The energy agency altbau plus develops the information tools and organises stakeholder engagement. The cooperation of altbau plus with effeffac network has a local economic impact and serves as an innovative business model.



Top: Renovation of an old building by private owners in Aachen (source). Bottom: Office of the network altbau plus offering free consulting (source).

Case Study 1.08:

Luzern, Switzerland

Implementation moment

Implementing energy targets through a cooperation between eight municipalities with focus on linking heat suppliers and building owners.

Main achievements

17 objects (buildings, complexes and urban areas) identified for the use of heat and power from waste, industrial cogeneration and renewable sources.

Aim/target in relation to scale

Reduce the region's carbon footprint, by generating 150'000 MWh/a from renewable sources, waste and industry, as a substitute for oil.

Key Strategic Measures

Link up local heat and renewable energy suppliers with local consumers; and support municipalities to facilitate energy performance contracting agreements with utilities.

Impact and success factors

The LuzernPlus region, committed with reducing carbon emissions through oil substitution, facilitates contracting agreements between local heat suppliers, namely waste and industries, and end users (buildings). In a first step, LuzernPlus has assessed the overall potential, estimated at 150.000 MWh/a, ready to be absorbed by 17 objects (currently identified) in eight municipalities. By strengthening the capacity of municipal governments to assess potentials and link up local heat suppliers with building owners and energy performance contractors, LuzernPlus has laid the ground for significant investments in clean technology and the promotion of waste and industrial heat, as a substitute for 15 million litres of oil per year.

Stakeholders involved

LuzernPlus is an association of eight municipalities around the city of Lucern. Based on the canton's regulatory guidelines, LuzernPlus has strengthened the capacity of municipal governments to promote waste and industrial heat as a substitute for oil. This has been achieved through the joint involvement of local heat suppliers (renewable sources, and heat from waste and industrial cogeneration), end consumers (buildings, neighbourhoods, etc.), and energy performance contractors (utilities).

Strategic Measures

The strategy consists in strengthening the role of municipal governments as "model consumers," regulators and facilitators (of contracting agreements). Also, all municipalities engaged in the Project are invited to join the Energy Cities association and certification process. By joining, municipalities subscribe to a holistic approach to sustainable energy management in all relevant areas, such as urban planning, buildings, transports, electricity generation/ distribution, waste and waste water management, local governance, and cooperation – far beyond the scope of the Contracting Project.

Case Study 1.09:

Strasbourg Metropolitan Region, France

Implementation moment

Implementing energy targets through a strategic platform aimed at supporting knowledge exchanges in the energy transition.

Main achievements

The joint regional urban planning agency is coordinating a process and exchange platform to support the local energy transition. Their focus lies on public policies and responsibilities in planning process.

Aim/target in relation to scale

Fostering interdisciplinary approaches and exchanges and sharing knowledge. Exchange on appropriate urban and regional scale on implementation.

Key Strategic Measures

Regional development goals also beyond traditional urban planning disciplines (e.g. economic development, innovation) and transversal exchange platform along the disciplines

Impact and success factors

Since 2014, the urban and development agency of Strasbourg called ADEUS (Agence de Développement et d'Urbanisme de Strasbourg) started a "platform" to help the local energy transition. This Platform is a "place", where those involved in planning can exchange, mutualise and capitalise information over a long time horizon. The process is mainly addressing the following questions: Which levers are useful in public policies and which energy strategies are relevant at the planning level?

Stakeholders involved

ADEUS coordinates experts and professionals on distribution and production of energy, planning and environment, economy, housing and transport sectors, data providers and administration. The platform helped to involve urban planners and administrative in developing energy concepts and introduced concrete issues to energy providers.

The platform process also organises regular steering meetings with all administrations located on their territory. In addition, they proposed meetings with all actors and partners (architect, economical chamber, pole of innovation, harbour, main companies...) to have a global vision of the process and see if particular information is missing. At the end of the project they proposed some strategic measures to implement in the Coherent Regional Planning Scheme (SCoT).

Strategic Measures

Two levels of strategic measures was proposed at SCoT level:

- Rebuild the document taking into account direct energy instrument inside.
- Used the actual document highlighting urban choices, with direct impacts on energy targets.

The second part of the project (on going) aims to propose adapted solutions to implement energy measures in the Local Urban Plan (PLU) at the lowest planning scale of municipalities.

4.2 Application of Strategic Measures at the district scale

The district scale represents another scale in the cities, where implementation champions operate. At this scale, implementation efforts are mainly characterized by being anchored in the context of planning new urban development or re-developing existing urban areas within the city, covering a larger part or district of the city. In these processes, the energy strategy has to somehow be transferred into the requirements and parameters of the masterplan, which is often handled by private actors. As Needham (2000:443) formulates it: “in most cases spatial planning is an intervention in, or an influencing of, the creation and use of the physical environment by others”.

Targets are being formulated as a planning framework that supports the transformation of a given area. This framework is intended to help local representatives, like planning professionals, politicians and stakeholders involved in construction to understand the requirements and conditions for development in relation to energy strategies. This scale is somewhat in-between the city scale and the local project scale. Compared to the city scale, the targets at the district scale typically provide a more holistic perspective on the dynamics related to the entire district. Another difference between the district scale and the project scale is that the former is more oriented towards main-stream interventions and the former towards more experimental interventions (project-oriented).

City Scale	District Scale	Local Project Scale
Targets in form of broad strategic statements	Targets in form of setting up planning framework	Targets in form of specific configurations at site
Development-oriented	Planning-oriented	Action-oriented
Strategic representatives	Local representatives	Professional stakeholders
Outlining	Framing	Configuring
Decision and Information	Analysis and Regulation	Execution and Monitoring

Table 4-2: The District Scale compared to City and Project Scales (DTU & AAU, 2017).

The two in-depth case studies, Erlenmatt-West in Basel (Switzerland) and Stenløse South in Stenløse (Denmark) illustrate the above characteristics. In both cases, important champions are found among planning professionals and developers in relation to working out a masterplan configuration of the district that include viable energy targets. On one hand, the case studies illustrate work aimed at assessing what the values of the plan should be in terms of technical energy targets and socio-economic demands. On the other hand, the case studies illustrate alignment work aimed at balancing stakeholder interests through application of available planning instruments and strategic measures. The case studies illustrate the work performed in the planning of transformation of a new or existing district and how energy considerations become embedded into this work.

Case Study 2.01:

Erlenmatt-West, Basel, Switzerland

Implementation moment

Implementing energy targets by configuring urban development through a certification scheme.

Main achievements

Comprehensive approach to implementation of good energy performance standards, heating and electricity based on renewables and others. Also considering quality of life.

Aims/targets in relation to scale

Development of several new residential blocks as part of bigger development area with special building regulations, including achievement of the 2000-Watt-Site label for 10% of the site.

Key Strategic Measures

Legal regulation framework to commit developers to targets, design of urban development processes through a certification scheme and effective organisation to ensure backup in the operation phase.

Basel Erlenmatt-West characteristics

- Proactive canton and city.
- Progressive developer.
- Acknowledged national certification scheme.
- Former experience with similar projects.

Impact and success factors

A precondition for implementation in Erlenmatt West is the prevalence of the 2000-Watt-Site label. It is a well-developed and acknowledged national certification scheme with focus on energy and GHG. This scheme allows cities in Switzerland to easily set up urban requirements in new development areas. The certified Energiestadt Basel-City required that 10% of the buildings in the site should comply with 2000-Watt-Society scheme in building regulation for special development sites ("Bebauungsplan"). Achievement is controlled by target agreements, due at the date of realisation.

The 2000-Watt-Site certification was initiated by the city of Zurich and is now administrated by the federal SwissEnergy program and certified by the Swiss Association Energiestadt. To develop a 2000-Watt-Site the developer has to mandate an accredited 2000-Watt-site advisor and the site authority must be certified as 'Energiestadt'.

Stakeholders involved

The developer of the area decided, voluntarily, to use the 2000-Watt-site certificate for the whole site in order to prove the achievement of the target agreements. The certificate was also intended as a communication and marketing tool. The developer's motivation has been expectation of a growing market for this kind of projects. This provides a proactive situation, where the developer has engaged in a close cooperation with the city in order to configure appropriate solutions to energy issues, among others, in a comprehensive perspective. This emphasis on sustainable development is supported by the city of Basel, due to its status as 'Energiestadt'.

An important strategic measure has been to exploit the certification scheme of the 2000-Watt-Site to promote energy considerations through urban design criteria. The assessment of the scheme is based on a comprehensive approach that comprises management system, communication and cooperation, supply and disposal, build-

Main lessons

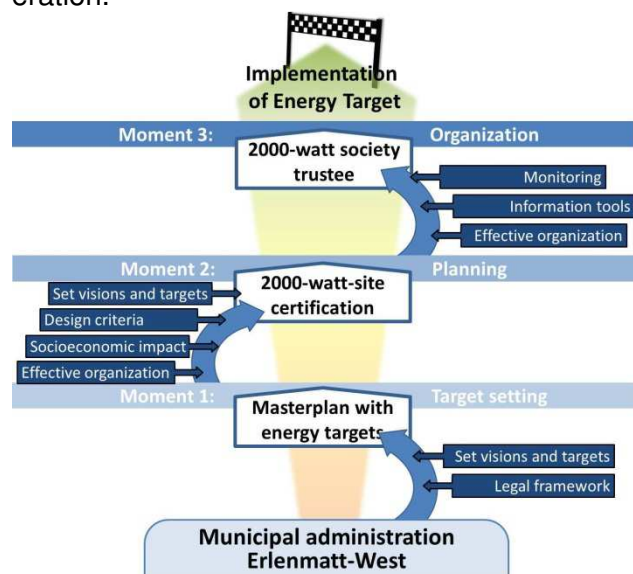
- 1) Holistic targets that take both urban quality and energy strategy into consideration.
- 2) Close cooperation between the city and the developer in identifying holistic solutions. The city contributes with public development in connection to the site to raise urban quality.
- 3) Application of a national certification scheme as a way to commit to and organize the configuration of the chosen solutions in a holistic perspective.
- 4) Both short-term and long-term considerations, including both construction and operation phases.



Illustration of the Basel Erlenmatt-West development site (Source, 2017).

ings and mobility, and covering planning, construction and operation phases. The scheme represents a legal framework that provides a framework for the target setting of project development of a site. The certification has been implemented in the master planning of the site.

The certification fulfilment has involved stakeholder engagement in the sense that the developer and the municipality has closely prioritized the project parameters within the scheme, including e.g. energy, social life, urban quality and mobility. The comprehensive approach in the scheme result in consideration of both environmental and socio-economic factors in the prioritization. Some points are earned by public investments and others by private investments, so cooperation has been key. The certification fulfilment also involves monitoring in order to measure the degree to which the targets are met at the site. In order to ensure that the targets are not lost during this transition, the developer and the city are working to identify a trustee that will handle and carry on the intentions in the certification scheme during operation phase. This illustrates how strategic attention is put on how the project is organized, and who are responsible for maintaining focus on the qualities of the project during operation.



Process diagram of Erlenmatt-West (DTU & AAU, 2017).

Case Study 2.02:

Stenløse South, Stenløse, Denmark

Implementation moment

Implementing energy targets through local energy performance requirements and innovative energy provision.

Main achievements

Shifting heat provision from traditional natural gas system to individual heat pumps and increased energy performance in mainstream single family buildings in spite of initial resistance from building developers.

Aims/targets in relation to scale

Pressure houseowners and building companies to enforce municipal energy requirements in new districts. Mainly addressing mainstream building companies, suppliers and house owners. Emphasis on doable technologies like heat pumps, geothermal heating, solar cells, low energy performance, etc.

Key Strategic Measures

Political and internal discussions (to gain commitment), simple environmental assessment calculations (to set targets), technical scenarios (to equalise socio-economic impacts), legal pressure (to enforce requirements) and organisational support (to facilitate and adjust the process).

Stenløse South characteristics

- Leading energy specialist involved.
- EU-funding from the Concerto programme.
- Ambitious municipality.
- Single family housing primarily.

Impact and success factors

In Stenløse, the platform for implementing energy strategies has been development of a large-scale new dwelling area south of the city. Both politicians and technical staff have seen this development area as a window of opportunity to implement energy strategies. Due to a long period with no urban expansions, this new development area got a lot of special attention from the politicians.

The vision puts emphasis on realizing ambitious energy strategies in a new dwelling area. The more specific targets have been formed as a result of what was feasible and acceptable to politicians and other stakeholders. In the first two project phases the ambitions were mainly to improve the energy performance. In the next phases, the screws were tightened, since it was decided not to provide the traditional natural gas heating system otherwise implemented in this neighbourhood. Instead, the houses had to be heated on the basis of improved energy performance and individual heat pumps.

Stakeholders involved

The development gained considerable political attention. It was launched following a political shift, where politicians from the left and right wing joined forces. The mayor was especially keen on ensuring a strong collaboration in the new city council, resulting in the idea of combining urban growth with an environmental profile. Alongside the political attention, the technical staff also included important champions that understood how to challenge and inspire not only the politicians, but also industrial stakeholders in the process. The project involved a high degree of negotiation and argumentation both internally and with external stakeholders.

Strategic measures

An important strategic measure in Stenløse has been the formulation of realistic visions and targets through a combined Planning and Agenda 21 strategy. This planning document specifically pointed out how the new development area could be exploited as a way to promote energy

Main lessons

- 1) Targets based on realistic and prevailing technical solutions.
- 2) Good understanding of how developers and house owners think allows for viable socio-economic configurations.
- 3) Legislative pressure to commit developers and house owners to comply to local requirements.
- 4) Learning approach with continuous dialogue during planning and case handling of building projects.

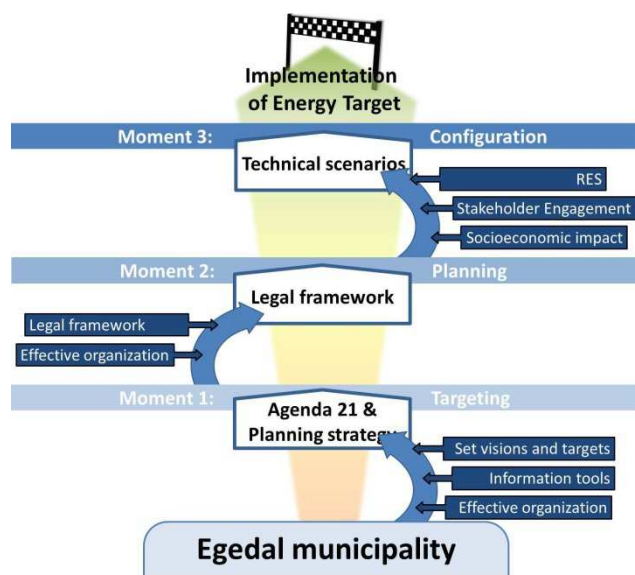


Top: Aerial photo of the district of Stenløse South (AAU, 2017). Bottom: Picture of one of the buildings in the district (AAU, 2017).

efficient housing. The document has been developed with a high degree of political support. The document was based on simple calculations of the environmental costs of expanding the city on the basis on a mandatory environmental assessment report. The aim was merely to equalise these costs. The socio-economic impact was also considered in the sense that the visions and targets were set at realistic levels based on socio-economic considerations.

During the development of the project itself, specific technical scenarios were developed and discussed in terms of meeting the interests of politicians and other stakeholders. The chosen solutions reflect a high degree of knowledge about the building process and stakeholder interests in terms of available technologies, building procedures, economy, risk perceptions and the like. This knowledge was to a lesser amount the result of direct involvement, but rather of former experiences and informal knowledge.

This implementation process also involved legislation as a way to force the house-owners and building companies to comply with requirements. This was especially necessary, because mainstream stakeholders were addressed. The legislation was applied in relation to formulation of local energy performance requirements and similar urban design requirements.



Process diagram of Egedal (DTU & AAU, 2017).

Case Study 2.03:

Gnigl, Salzburg, Austria

Implementation moment

Implementing energy targets through energy criteria in an urban competition.

Main achievements

Three public buildings in need of refurbishment were fused into one building called 'Education campus Gnigl'. The process tackled the topics buildings, energy, mobility and information.

Aim/target in relation to scale

Developing standards for the architectural competition. Economic analysis for the local heat network and energy generation and saving potentials. Developing mobility solutions together with citizen participation.

Key Strategic Measures

Set vision and targets; make use of tools supporting the decision making process; design of urban competition processes; stakeholder engagement & involvement; implement effective and efficient organizational processes.



Top and bottom: Concepts for "Education campus Gnigl" (City of Salzburg and architects Storch, Ehlers & Partner).

Impact and success factors

This development has mostly been valuable for the experiences made. It has shown what resolved ambitious climate targets mean in reality. Unfortunately, not many of the estimated targets will be realised. The buildings will have a quite high building standard, but not become the lighthouse projected it could be. Ideas about district heat and energy solutions were abandoned. A big success is the mobility sector, including a district parking house.

Obstacles are technical matters, legal restrictions and structural. The city needs personal and financial resources and people who are responsible for "Smart City" or "Climate" topics.

Stakeholders involved

Some of the driving champions are the committed employees of the city council, who are involved in the Smart City process and the multidisciplinary project team of researchers and experts.

Some of the opponents have been other employees of the city council (building department), because of lack of time and know-how. The mayor has also pulled in other directions.

Strategic Measures

Excelled leadership: There was a funded research project to develop criteria for the building, the district energy supply and mobility services; leader of the project was the smart city coordinator (city of Salzburg).

Bottlenecks: Political support (mayor); awarding authority (department of the city council); utility company (not very creative); not enough knowledge about the existing building stock etc. (missing data).

Case Study 2.04:

Schlösslesfeld, Ludwigsburg, Germany

Implementation moment

Implementing energy targets through energy refurbishment plans.

Main achievements

Based on the energy strategy for the city of Ludwigsburg from 2009 local energy plans for various districts are developed and implemented.

Aim/target in relation to scale

The city council aims at an integrated strategy for the city development combining sustainability, energy efficiency and urban development.

Key Strategic Measures

For each district, here Schlösslesfeld, an energy related vision was developed and broken down into measures and activities of the municipal administration. Stakeholder engagement is the key.

Impact and success factors

Schlösslesfeld is a traditional residential area with two very active foundations (the public library foundation and the citizens for Schlösslesfeld foundation). The local parish church is also actively involved in the implementation of the energy strategy plan.

The buildings belong to many small housing companies as well as private owners. The responsible administrative officer coordinates actively the participation of all groups in setting up a local energy plan for the old housing stock.

Stakeholders involved

On city level, the department for sustainable development and the division for energy plans within plays a crucial role as proactive champion. Within the energy refurbishment plan, all house owners, flat owners, housing companies and residents of Schlösslesfeld will be involved. The local energy supplier cooperates with city administration and is flexible with decentral energy solutions.

Strategic Measures

This case study refers to the following strategic measures: vision and target setting on city level has already taken place. The urban energy planning process is already very efficient and effectively organised. The stakeholder participation process has started. A good socio-economic impact is expected on local level. Information and monitoring tools are work in progress.

The successful implementation of energy refurbishment plans for community areas is always based on committed actors on local level like the two foundations and the parish church in Schlösslesfeld.



Top: Master Plan for the city of Ludwigsburg
Bottom: Solar panels on a roof in Ludwigsburg, Schlösslesfeld quarter (source)

Case Study 2.05:

Zero Village Bergen, Bergen, Norway

Implementation moment

Implementing targets through organisation of a strategic energy plan.

Main achievements

The project is still awaiting political approval due to objections from the regional governor.

Aim/target in relation to scale

ZVB aims to become the first large scale (800 dwellings) development project in Norway aiming at a totally zero emission set of buildings based on the Zero Emission Building definitions.

Key Strategic Measures

The Renewable energy strategy is a Key Strategic Measure in this project. The starting point for the design and location was a solar energy analysis of potential areas in the Bergen city region. Stakeholder involvement and Urban design processes have also been influential.



Top and bottom: Snöhetta illustration of ZVB (Snöhetta Architects and SINTEF ICT)

Impact and success factors

The project is still awaiting political approval. Snöhetta Architects and SINTEF ICT has developed a 'sound shadow tool' to calculate how the buildings can protect the urban area behind buildings from sound waves the nearby airport.

Stakeholders involved

A key champion is the private developer ByBo (champion). Other stakeholders are: NTNU, SINTEF ICT, Snöhetta Architects, and Christian Michelsen Research. The municipality has been central in including the site into the local municipal plan after partial political approval. Regional objectives concern the planned site's proximity to the Bergen Airport as well as distance to public transport hub. The objection has led to a prolonged design process.

Strategic Measures

ByBo AS has run the design process of the zero emission building (ZEB) based idea. They have presented a very visionary and pioneering project to the municipality. Together with NTNU they have been central in finding a site with the highest solar energy potential and in bringing in and engaging other stakeholders in this project. Christian Michelsen Research provide insight into thermal storage capacities; hence, Renewable Energy Strategies have been a very strategic measure. Urban development processes have been central in the design phase. Snöhetta has been central in the adaptation of the design to requirements for sound blockade due to the close proximity to a planned airstrip at the Bergen Airport.

Case Study 2.06:

Furuset Forbildeprosjekt, Oslo, Norway

Implementation moment

Implementing targets through regulation and close collaboration.

Main achievements

Only small parts of the plan have been implemented. App. 2.000 housing units are planned and app. 3.000 work places. 50% greenhouse gas emissions within 2020 is to be reached through water-borne energy supply, environmentally friendly materials, energy efficient buildings and public transport.

Aim/target in relation to scale

The Furuset project aims to develop a climate-friendly and attractive neighbourhood. It incorporates sub-goals like: creation of attractive urban spaces, strengthening of green infrastructure with blue-green connections, a broad and varied supply of residential units and a well-functioning traffic hub.

Key Strategic Measures

Stakeholder Engagement is seen as key and represents a strong characteristic of in the public partnership projects between municipality of Oslo and Futurebuilt pioneers.

Impact and success factors

The area regulation plan and the action plan were adopted in the City Council in November 2016. This marks the start of the implementation phase.

Even though only small parts of the plan have been implemented, key success factors in the Furuset project seem to be:

The potential that Oslo municipality has to apply property strategy as a tool and to lead the way through green public buildings, citizen participation and public infrastructure to connect otherwise disconnected parts of the area.

Other important factors were the Futurebuilt programme's incentives and coordination assistance and the strong ownership and support within the population at Furuset.

Stakeholders involved

Key stakeholders involve Oslo Municipality, Futurebuilt and Hafslund.

Strategic Measures

The champion in the Furuset project is Oslo municipality, which together with Futurebuilt has coordinated stakeholder engagement locally in Furuset as well as on city level. They have been responsible for large participatory processes within the Furuset area, an urban design competition, and thorough documentation of needs and expectations in the main end-user groups within the area.



Top: Furuset street scale view (source). Bottom: Furuset full scale view (source).

Case Study 2.07:

Nordhavn, Copenhagen, Denmark

Implementation moment

Implementing targets through energy requirements and dialogue stimulation.

Main achievements

High building energy standards (<20kWh/m²a), integrated as active parts in the energy system (district heating, seawater cooling, PV, heat pumps and batteries)

Aim/target in relation to scale

Pressure building companies to enforce municipal energy requirements. Stimulating of actors through early dialogue to go further and emphasis on energy system integration.

Key Strategic Measures

Political backup & renewable energy strategy (to set ambitious targets), legal pressure (to enforce requirements), early stakeholder dialogue (identifying synergies for innovations beyond legal requirements)

Impact and success factors

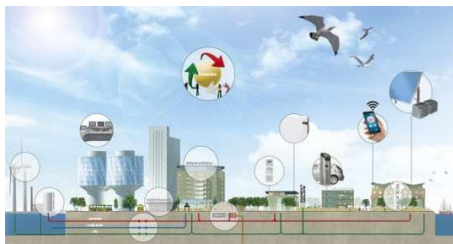
Copenhagen City & Port Development Corporation, a publicly owned, privately driven entity, got the land and buildings transferred to develop these areas in order to finance large infrastructure projects. The land was formerly owned by several governmental entities. In cooperation with city administration, this allowed to include high energy targets and sustainability certifications in local development plans, tendering processes and to establish stakeholder dialogue. Ambitions were back-up by the city administration, municipal politics and energy companies, aligning their targets and working together.

Stakeholders involved

Main stakeholders are: the publicly-owned, privately operating land-owning development company, the municipality, public energy utilities and developers. The municipality set the strategic target to be climate neutral in 2025, which is aligned to the energy utilities agenda in phasing out fossil fuels until then. The development company and the municipality follow through on these targets through common actions at district and project scales: Enforcing energy standards via regulation and convincing private developers through early dialogue. The municipality invited consultants and universities to provide technical knowledge on project level. The development company ensure monitoring of the activities of private developers.

Leadership and facilitation

The city administration brought different stakeholders from public and private sectors together. Strategic targets were by city administration and public utilities and defined a rough framework for the development. Implementation on project level is controlled by the public land developer. These shared responsibilities require a close cooperation, also including involvement of consultancy firms, universities and other non-public stakeholders to provide technical knowledge.



Top: Aerial view on Nordhavn (By&Havn / Ole Malling). Bottom: Scheme on energy system integration (EnergyLab Nordhavn).

Case Study 2.08:

Dundalk 2020, Ireland

Implementation moment

Implementing targets through a coordination of different demonstration projects.

Main achievements

Demonstration projects with 168 retrofitted and new buildings with a combined floor area of 19,630 m². Development of a Community Energy Bureau that evaluates and monitor demonstration projects.

Aim/target in relation to scale

Focus on renewable energy supply; photovoltaics, hydro, biomass and CHP projects. Further development of an auditing tool to calculate greenhouse gas emissions of new and existing developments: the Dundalk Sustainable Energy Zone Emissions Model (DSEZ-EM).

Key Strategic Measures

Drafting of a Community Charter, where all project partners signed up to a shared vision and commitment to delivering the Dundalk 2020 Community. Forging new partnerships across the spectrum of energy users in the development of this community wide energy programme.

Impact and success factors

A Community Energy Monitoring Tool (CEMS) was developed as a platform, giving each user a view of their current energy usage and production and to compare current use with historical usage patterns. The Community Energy management system was combined with the Energy Master Plan Tool (EMP), resulting in € 1 million in energy savings with a corresponding annual saving of 6.000 tonnes of CO₂. Many benefits have been felt, as a result of Dundalk 2020 being a pilot community involved in the HOLISTIC project (funded within Concerto II). This has provided an opportunity to collaborate with other European Concerto cities. It has also resulted in training for professionals and local energy users.

Stakeholders involved

Many stakeholders are actively involved in Dundalk 2020 Steering Group and one or many of the Action Groups. Many other stakeholders have worked closely with SEAI to deliver the Dundalk 2020 targets, such as Ard Easmuinn Residents Association, Glen Dimplex and Kingspan Renewables. The mix of stakeholders involved in the Dundalk 2020 project supports the view that everyone has a part to play in the development of a successful Sustainable Energy Community.

Strategic Measures

The Concerto funding programme set out the monitoring approach. The required reporting regime was deployed across each community. This includes clearly defined work streams, established project deliverables and milestones for each project and each year over the course of the 6 years. Annual contract amendments agreed with the Commission at the end of each period is viewed as critical to the success of the project. The resulting flexibility accommodated substantial effects associated with the financial crisis in Ireland during the course of the project.



Top: Work packages (SEAI)

4.3 Application of Strategic Measures at the Local Project Scale

The project scale represents a third scale in the city, where implementation of energy strategies is addressed. In several cities, the implementation efforts are mainly characterized by being anchored in innovative development projects, covering one or several buildings within a smaller area. This often implies a very tangible approach to integrating energy targets in the specific configuration of a building or infrastructure system.

City Scale	District Scale	Local Project Scale
Targets in form of broad strategic statements	Targets in form of setting up planning Framework	Targets in form of specific configurations at site
Development-oriented	Planning-oriented	Action-oriented
Strategic representatives	Local representatives	Professional stakeholders
Outlining	Framing	Configuring
Decision and Information	Analysis and Regulation	Execution and Monitoring

Table 4-3: The Project Scale compared to City and District Scales (DTU & AAU, 2017).

The community at this scale is characterized by including specific stakeholders that are involved in the local project. Often, these stakeholders act within a framework of decisions about the project influenced by other stakeholders, and now face the task of making different ends meet. This might include urban planners, energy engineers, developers, architects and the like. At this scale, the implementation effort is centred around developing a viable configuration that will meet the professional and legislative requirements and the socio-economic demands of local end-users. In that sense, the efforts are about orchestrating the configuration of specific technologies and the organization of these in terms of stakeholder responsibilities. The orchestrating work at this scale is often characterized by testing and experimenting. The implementation champions face the task of minimizing the risk of innovation in order to push the configurations away from mainstream solutions. Technical experts play a crucial role in terms of appraising new energy solutions that will work in practice.

The two in-depth case studies, Stadtwerk Lehen in Salzburg (Austria) and Minato Ward in Tokyo (Japan), illustrate the above characteristics. In both cases, a great deal of orchestration is performed by champions at the professional and technical level in terms of ensuring dialogue about the configuration of energy solutions in the project together with stakeholders from the building sector or energy utility sector. On one hand, the case studies illustrate a great deal of work aiming at adjusting the configuration of technical solutions so that innovative changes can be carried out. On the other hand, the case studies illustrate the more facilitative work performed in order to limit the risks involved in integration of innovative solutions.

Case Study 3.01:

Stadtwerk Lehen, Salzburg, Austria

Implementation moment

Implementing energy targets through innovative energy solutions.

Main achievements

Implementation of innovative energy solution to gain as much solar energy as possible in a new residence area. Provision of a micro net distribution for the new built area with extension to renovated houses in the neighbourhood. Passive house and low-energy standards.

Aims/targets in relation to scale

Development of a new residential area driven by the City of Salzburg, the local energy supplier, the scientific institutions SIR and Steinbeis in close cooperation with developers, architects, public utility housing enterprises and energy specialists.

Key Strategic Measures

Quality agreement (to commit developers to targets), cross-disciplinary steering group (to organize and coordinate), funding from Concerto (to provide economic support) and cooperative district management and participatory process (to increase social acceptance).

Lehen Utilities characteristics

- Leading energy specialist involved.
- EU-funding from the Concerto programme.
- Ambitious municipality with prior experiences.
- Prior experiences with implementation of energy strategies.

Impact and success factors

A former gas plant area – Stadtwerk Lehen – has become available and decontaminated with a view for urban redevelopment. This area became a central element of the masterplan of the Lehen district with focus increasing the living quality, including a clean energy supply. Both new national and local regulations in the field of energy supply have foreseen a relatively high share of renewable.

Since many years, the City of Salzburg has worked actively on implementation of energy strategies. The city and several of the involved stakeholders have pre-existing knowledge and experiences about how to establish commitment and social acceptance. This is, a result of former experiments with alternative forms of energy supply. The project was launched on the basis of a small group of stakeholders with a vision. The masterplan of the district was elaborated in several workshops and became a central driver.

Stakeholders involved

The development of the new residential area is driven by the City of Salzburg, the local energy supplier, the scientific institutions SIR and Steinbeis in close cooperation with developers, architects, public utility housing enterprises and energy specialists. SIR started to gather this group together and a quality agreement was written down where all ideas was formed to detailed aims. A participatory approach has been applied to ensure social acceptance of future residents.

Strategic measures

A quality agreement was developed as a way to ensure a common vision. The agreement was politically agreed and formed the basis for the Concerto project. The quality agreement was revised after the design phase and the architectural competition. It was written in a more detailed way to show how the aims could be fulfilled through the chosen project.

Main lessons

- 1) Targets have been clarified through a quality agreement.
- 2) Organization of a steering group in order to ensure consensus about the solutions already in the design phase of the project through dialogue.
- 3) Achieving financial support through European funding scheme in order to raise commitment and degree of innovation.
- 4) Involvement of leading energy specialist that has ensured technical knowledge about energy solutions.
- 5) Participatory approach that has supported social acceptance of the technical solutions.

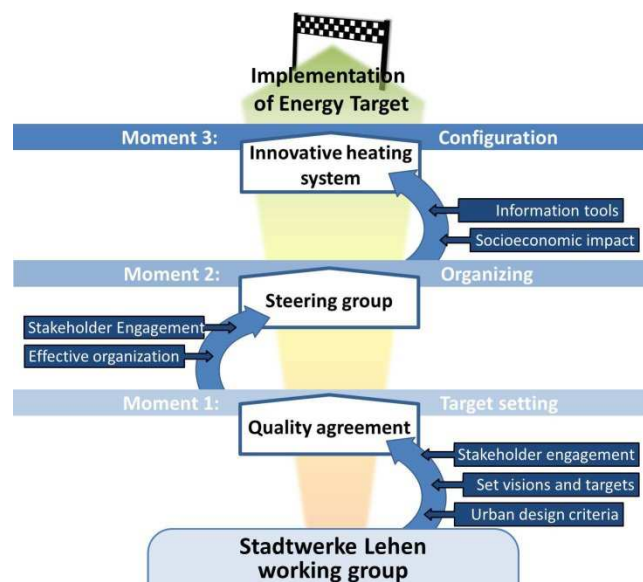


Top: Heat storage tank integrated into the community (SIR). Bottom: Project meeting (SIR)

A steering group was formed, where the leadership was settled in the office of the city council for urban planning. The different project managers of the single projects were coordinated. Cooperation of all projects was focused to fulfil the common goals of the quality agreement. The social quarter management (Info Point) has guaranteed the information and involvement of the neighbours and inhabitants. The steering group has ensured a good flow of information and contributed with effective project management.

Technical insight was ensured in the work with innovative energy solutions through a simulation tool that helped to find the optimal system configuration through scenario analysis. Energy specialists and researchers played an important role in this process.

Implementation was dependent on ensuring a financial scheme. The Concerto funding provided this basis together with funding from the Austrian Ministry for Transport, Innovation and Technology in the program 'Building of Tomorrow'. This allowed resources for doing simulations and monitoring without getting higher costs for the social housing. As a result of this funding, monitoring has formed an important part of the process, allowing for continuous evaluation and adjustment of the process.



Process diagram Stadtwerke Lehen (DTU & AAU, 2017).

Case Study 3.02:

Minato Ward, Tokyo, Japan

Implementation moment

Implementing energy targets through a showcase project.

Main achievements

Implementation of integrated district energy system operated through a smart energy center in a newly developed district. Close cooperation between public and private stakeholders in the district. The project involves a high degree of technical innovation, namely demand-side and supply-side control of buildings, requiring a great deal of coordination across building projects.

Aims/targets in relation to scale

Development of a showcase of 'smart energy network' in a new district driven by a leading national energy specialist and as part as a model project scheme for future smart cities.

Key Strategic Measures

Urban development plan (to set targets), funding for a leading model (to get economic support), showcase for Tokyo Gas (to get technical expertise and support) and setting up a local committee (to organize and coordinate).

Minato Ward Tamachi characteristics:

- Leading energy expert situated in local community
- Increasing emphasis on energy resilience following the Great East Japan Earthquake.
- National funding scheme that support implementation of local energy strategies.
- Part of the Metropolitan area in Tokyo with high urban density.
- Visionary municipality.

Impact and success factors

The project is anchored in the urban redevelopment of the Tamachi Station North East area in Minato Ward, which is featured by several major business and commercial districts such as Roppongi and Toranomon. The municipal government has been most eager for improving public service for the residents, especially for children and families in terms of amenity and security. The municipal government experienced that during the Great East Japan Earthquake the Roppongi Energy Service Co. was able to keep supplying power and heat in the area, while there happened long time grid power shortage in most of Tokyo. The operated cogeneration and DHC systems kept supplying. As a result, the municipal government wish to improve its local branch offices to be more secured and self-reliant against disasters.

Stakeholders involved

Tokyo Gas has played a key role in the project. They have been eager to promote "smart energy network" as a leading energy service business infrastructure in the competitive market in Tokyo Metropolitan area. Tamachi Station North East area redevelopment was a good opportunity to develop a showcase of the concept. Tokyo Gas is one of the major owners of the area and it owned old supply control facilities, maintenance service training center and R&D center. They were much old and ready for being relocated to other places. This was a strong driving force for a successful model of smart energy network.

Strategic measures

The vision of exploiting the redevelopment of the area as a showcase represent one strategic measure. The mayor of Minato Ward encouraged stakeholders to agree with high level targets. Through involvement of Tokyo Gas, the technical knowledge was naturally expanded, since the company is an energy specialist. Critical attention is directed towards prioritizing resources to

Main lessons

- 1) Targets for urban redevelopment include a shared objective to achieve significant levels of carbon reduction.
- 2) Involvement of leading energy specialist situated in the local community, hereby expanding the technical possibilities for innovation.
- 3) Achieving financial support through national funding scheme in order to raise commitment and degree of innovation.
- 4) Organization of a Smart Energy Town Committee that ensure coordination across the network. Ensuring consensus about the solutions already in the design phase of the project through dialogue.



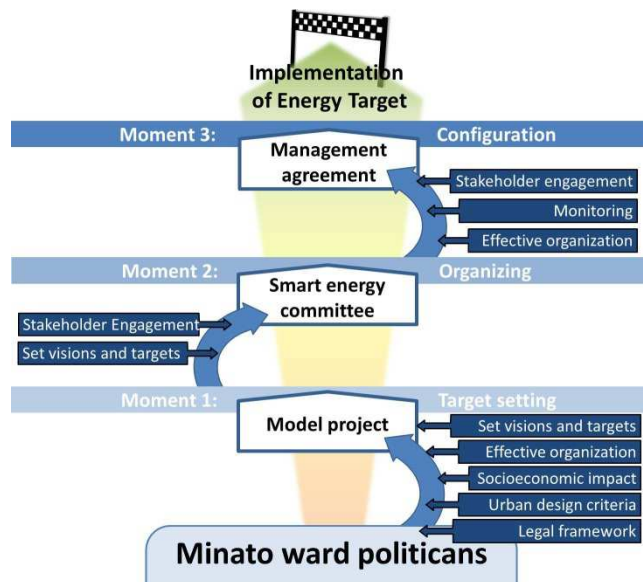
Top: Smart energy network assessment council

Bottom: Minato Ward community

develop innovative solutions that address resilience and disaster management. A great awareness has been put on this in the Business and Living Continuity Planning (BLCP).

A financial scheme was developed as, the project was selected as part of the support program: “Leading model project of low-carbon building and housing” conducted by the Ministry of Land, Infrastructure and Tourism (MLIT). This led to application of the model of PDCA (plan-do-check-act) that encourages demand-side, supply-side and local government to improve processes. The tool ‘CASBEE-UD’ has contributed to the check part such as performance validation, assessment and actual process of PDCA cycle.

Stakeholder engagement has been a central part of the project. The ‘Smart Energy Committee’ (SEC) was established. This committee has ensured knowledge exchange between urban and energy stakeholders. It has been established as a place, where targets for the Smart energy network are set, plans and decisions regarding its establishment and operation are made, and mutual agreement on the management is formed. It involves monthly meetings and intensive debates. A ‘Smart energy network council’ has also been established. This involves third-party experts and scholars having professional knowledge



Process diagram Minato Ward (DTU & AAU, 2017).

Case Study 3.03:

PALET, Parkstad, the Netherlands

Implementation moment

Implementing energy targets through a step-by-step approach.

Main achievements

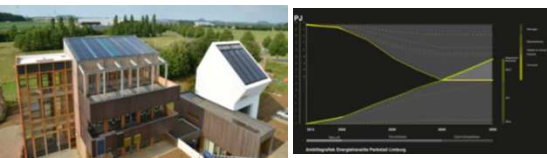
In Parkstad both a bottom-up and a top-down approach are successfully implemented. First, the pilot project "The District of Tomorrow" has been realised together with the South University. Learnings were transferred to a housing company to renovate 153 houses to near zero-energy level. The results of the pilot projects are used to extrapolate the effects on the whole City of Parkstad.

Aim/target in relation to scale

The extrapolation of the pilot projects build the basis for the City Council apply transition management for achieving the long term goal to become a zero-energy city in 2040. The necessary actions, to reach the goal of zero-energy city in 2040, are specified for each of the 8 districts in the City of Parkstad. The individual municipalities organised meetings with stakeholders, to make agreements of their role and contribution to achieve the ambition of the City.

Key Strategic Measures

Vision and target setting, making use of the design of the urban planning process and organising stakeholder engagement.



Left: District of Tomorrow, Right: Energy Transition Roadmap, PALET (ZUYD).

Impact and success factors

The step-by-step approach applied in Parkstad addresses the process towards energy-neutrality on three levels: integral technical research and demonstration on a pilot level, application in a district, and overall planning for the whole city. Often these three levels are not addressed simultaneously, so that there is a lack of knowledge, innovative companies and commitment of decision makers and the public.

This knowledge has been transferred to a housing company in order to renovate 153 houses to a near zero-energy level. Through a step-by-step method a wide support has been created for the transition towards zero-energy in all the villages belonging to the City of Parkstad. Further, companies are enabled to develop and test innovative products, which fulfil the zero-energy standards. It has been the example for a national approach called "De Energiesprong (the Energy Jump)".

Stakeholders involved

Major stakeholders in the process are the South University who introduced the transition approach, and the coordinating board of the Cities of Parkstad who adopted the approach and financially supported the development of PALET (Parkstad Limburg Energy Transition). The municipality proposed the approach to the individual cities and villages of Parkstad, which all agreed on the ambition and the start of the implementation. Only in the implementation phase important stakeholders like representatives of branches and the companies themselves were involved.

Strategic Measures

Normally in Dutch cities the integral long term responsibilities are not clearly addressed. In the City of Parkstad there is a coordinating board of eight smaller cities. The only reason this board is existing is to address the common goals and responsibilities of participating cities (vision and target setting). The key-success-factor has been the braveness of some decision makers (among others directors of the University) and the leading role of the content of the research groups.

Case Study 3.04:

Jono, Kitakyushu, Japan

Implementation moment

Implementing energy targets through guideline requirements.

Main achievements

19ha-wide district, which was old self-defence force base in front of the train station, is redeveloped as “Zero-carbon city block” consists of 350 detached houses, 200 apartment houses, hospital and living convenient facilities.

Aim/target in relation to scale

This area is aimed to be most advanced zero-carbon city block as leading project of the action plan for Eco-Model City.

Key Strategic Measures

Stakeholder cooperation among Kitakyushu city and the other three organizations. They established the “Guideline for urban development in Jono advanced zero-carbon city block” to implement zero-carbon development (besides other sustainability measures).



Top: detached house with PV
Bottom: Overview of the district

Impact and success factors

Zero- or nearly zero- energy and carbon balance is expected at least newly built residential buildings. In detached house, over 100% CO₂ reduction is aspired by introducing high thermal insulation performance, more than 4kW/house PV power generation, HEMS, degradation prevention, aseismic performance, fuel cell and cooperation with community energy management system. In an apartment house, over 70% CO₂ reduction is aspired by similar measures. One of the success factors is leadership of Kitakyushu City in developing guideline and encouraging environmental friendly urban planning. It is also important factor that the guideline is attractive to developers and residents since it covers a wide range of topics such as parenting support, elderly people, town management and land scape.

Stakeholders involved

Ministry of Finance (Land Owner), Fukuoka Prefecture, City of Kitakyushu and Urban Renaissance Agency set up the convention for development plan of the district. The important factor is the leadership of City of Kitakyushu who works on this project as leading project of Eco-model City. After the completion of the project, general incorporated association “Jono Hito Machi Net” will implement town management and most of residents are expected to participate.

Strategic Measures

The City of Kitakyushu is famous for promoting advanced environmental policy in Japan and it was selected as “Eco-Model City” and “Future City” by the Japanese Government. The redevelopment of Jono is a leading project in the “Kitakyushu Eco-Model City Action Plan”. A guideline for zero-carbon urban development describes details of urban development in desired specifications, which was established in the beginning of the planning. Experiences of the smart community demonstration project in Higasida are used for the energy management systems at district scale.

Case Study 3.05:

Minato Mirai 21, Yokohama, Japan

Implementation moment

Implementing energy targets through a smart community demonstration project.

Main achievements

In 186ha bayside business district, “Minato Mirai 2050 Action Plan” was established. CGS with existing DHC pipelines, Area Energy Management System, renewable energy system etc. will be introduced in the district.

Aim/target in relation to scale

Upgrading Low Carbon and BLCP (Business and Living Continuity Planning) performance, which became important factor after the Great East Japan Earthquake.

Key Strategic Measures

Stakeholders’ cooperation among Yokohama City which is selected as Eco-model City and FutureCity, town development association and landowners. Energy management System.

Impact and success factors

By implementing “Minato Mirai 2050 Action Plan”, the energy efficiency of the district and BLCP performance is increased, which is a major challenge in urban districts after the Great East Japan Earthquake. The City of Yokohama gained experience of YSCP (Yokohama Smart City Project), which was one of the four large-scale smart community demonstration projects funded by national government from 2010 to 2015. Eight offices and commercial buildings in the district participated. By using the experience, a district-wide energy management system under cooperation of BEMS and AEMS was implemented.

Stakeholders involved

“The council for Smart Urban Development in Yokohama Minato Mirai 21 District” was organized by the City of Yokohama. The city established the “Minato Mirai 2050 Project Action Plan” according to the report of the council. A general incorporated association “Yokohama Minato Mirai 21 Corporation” signed the “Basic Agreement on Town Development under Minato Mirai 21 district” with the landowners in the district. This organization is responsible for the area management in the district. City of Yokohama, enterprises, citizen universities and Yokohama Minato Mirai 21 Corporation will work together for implementation.

Strategic Measures

The city promotes environmentally responsible urban development as “Eco-Model City” and “Future City”, as selected by the national government. In addition, a basic agreement on town development and success of YSCP are important project drivers. The BLCP performance is a co-benefit and the existence of the District Heating/Cooling System and Utility tunnels enables the district to promote CGS (Co-generation system).



Top: Overview of Minato Mirai 21 district.
Bottom: Utility Tunnel and DHC pipelines

Case Study 3.06:

Zanklhof, Graz, Austria

Implementation moment:

Implementing targets through an upscaling approach.

Main achievements:

235 apartments in the residential area of Zanklhof in Graz-Gösting has been transformed with focus on high energy efficiency, high quality of green spaces and a car-free zone within the area. 26 apartments were implemented in passive house standard and 64 apartments as low-energy-houses.

Aim/target in relation to scale:

New approaches were first tested in small projects, and then upscaled to a bigger scale. A single-family passive house served as role model to provide knowledge about passive houses to 26 apartments, in a time where this construction method was unknown in Graz.

Key Strategic Measures:

Set vision and targets; include socio economic criteria.



Top & bottom: Residential area before & after the transformation (source: project leaflet Zankelhof)

Impact and success factors

Energy efficiency was the overall goal, especially in the 2nd phase of construction. The goal was to reconstruct and modify the old factory brickwork into modern low energy walls. Two of the mainly new built houses were realized in passive house standard. The result corresponds exactly with the goals. Only what is planned from the beginning is possible to be reached accordingly. Many desirable qualities in building standard and green space can only be realized if they have been defined and planned at the very beginning.

Stakeholders involved

Most of innovative impulses are coming from committing open-minded single persons. In this case, it was the architect Dietmar Koch, who is working at "Leitner Baumeister" as project developer and project manager. There were several opponents e.g. the building services engineer, contractors and the owner himself. As usual a lack of knowledge causes a lack of confidence, while conservative approaches and ways of thinking suggest security.

Strategic Measures

The Styrian provincial government provided a funding framing very beneficial for this kind of new approach. But it was difficult to estimate the extra costs, because there was no particular funding model for those quality measures.

Finally the additional expenses have been cushioned very well by the "Eco-points" of province of Styria, which were developed simultaneously. The project was additionally funded by FFG (Austrian association for research funding) for the innovative housing technology and ventilation system.

A very important precondition is good networking within the building sector because it ensures exchange of knowledge and stimulates inventiveness among like-minded planners.

Case Study 3.07:

Stieglgründe, Salzburg, Austria

Implementation moment

Implementing targets through a social housing pioneer project.

Main achievements

"Stieglgründe" is a social housing complex with 128 apartments, built by two non-profit housing associations. The project started with a master plan for urban planning for a larger area. Then they developed innovative concepts for energy supply.

Aim/target in relation to scale

This pioneer project was finished in 2002. Nowadays several aspects have become standard because they have proved to work. The technical planning was supported by a team of sociologists having special information on user behaviour of the tenants and energy saving.

Key Strategic Measures

Develop renewable energy strategies; implement monitoring of energy consumption and GHG emissions; stakeholder engagement & involvement; include socio economic criteria.



Left and right: Impressions from the area (source: SIR)

Impact and success factors

A large thermal solar system (380 m²) is in use combined with two 150 kW biomass (pellets) vessels. Additionally, the houses are equipped with a controlled air ventilation system with heat recovery (one of the first in social housing), providing high living comfort and satisfaction. The social concept behind the technical approach strengthens this effect. It contains a common social meeting point, high quality outdoor areas and green areas and low energy consumption, because of good energy concept and user information

Stakeholders involved

City of Salzburg declared a master plan for the whole area and acted as building authority for the first building sector with 128 social apartments. Two non-profit housing associations were involved as developer and builder of the houses and property management. The architect team comprised architect, construction physics, energy and green area professionals. From the competition and the first design they worked as a team. Salzburg Institute for urban planning and housing (SIR) developed the energy concept and was responsible for monitoring, evaluation and documentation. A social team were responsible for information and participation process.

Strategic Measures

In general, the needed energy for heating and domestic hot water was measured. User behaviour was also monitored with focus on influence of window opening on the heating demand in four apartments. The room temperatures were measured as well as the quality of air inside and outside. The users also got detailed feedback on this monitoring data in order to improve their behaviour.

5. Case studies analysis

The case studies illustrate certain patterns in terms of When implementation processes are being implemented. Who the implementation champions are. What levers these champions apply in order to mobilize the necessary stakeholders. How the champions operate in terms of skills.

This section is based on some of the main patterns that have been observed through the analysis of the case studies. These patterns provide the foundation for the recommendations in the next section, hopefully providing inspiration for other implementation champions as a means to further develop the effectiveness of their implementation processes.

5.1 When

As mentioned in the introduction, implementation of energy strategies is ultimately about realizing formulated energy targets in the format of physical constructions in local communities in the city. This represents a manoeuvre from something abstract (the formulation of a target in words) to something tangible (the physical construction) as outlined in figure 1.2 (implementation moments). This manoeuvre involves a number of different implementation moments as the case studies indicate. In some of the cases, the implementation process has not led to construction yet, as implementation processes are still on-going. Although construction represents the ultimate implementation moment, leading to a materialization of the desired transformation formulated in the targets, other moments support the building up towards this moment. These implementation moments represent important points of anchorage for implementation process in terms of 'when', as will be shown.

Setting visions and targets represents an important moment in implementation processes, as figure 5.1 illustrates. Since all of the studied cases have worked with target setting as part of their implementation efforts, the initial target plays an important role. The case studies indicate that it determines 'when' implementation processes are introduced in on-going planning processes. The initial target is often formulated and anchored in relation to on-going development processes in the city. Generally, the targets in the case studies are driven from an energy or urban perspective, depending on who the implementation champions are, and what their interests are, as will be shown in the next section. The target setting represents a common thread in the implementation process, as the targets are continuously formulated and reformulated by implementation champions during the process. The formulation of 'when' the implementation process is anchored is often a result of iterations in target setting during the implementation process. At an initial stage, the target might be unclear and not targeting a specific local community. As the implementation process proceeds, the target becomes more specific in relation to the chosen community.

Through figure 5.1 it is illustrated how the targets may be found within all of the case studies that have been studied at the three scales, and in the following it is explained how they are further developed as part of the implementation process.



Figure 5.1: Overview of combination of Strategic Measures at the three scales (DTU & AAU, 2017).

In case studies of city scale developments, the targets are anchored in producing an overall strategy for the city, like developing a climate action plan or engaging in a regional development initiative. The targets are not bound to a specific site at the outset, but rather, generalised according to its purpose, when deployed at a more general scale. The community perspective is still present, because an array of specific beneficiaries are still involved, although in a broader sense, when compared to the district and local project scale.

In Minneapolis, the implementation work has emphasised development of a climate action plan, leading to a number of initiatives aimed at mobilizing both internal and external support. The target setting is thus driven by the intent to initiate and structure climate actions across the entire city. The orientation of the targets influence the community's involvement in the implementation process. In the first stages of the process, it is clear that there is no limitation as to community involvement since stakeholders represent very different parts of city development: NGOs, developers and investors, etc. However, as the implementation progresses, more specific forms of local community become engaged. Since the initiative takes its starting point as the entire city, the more detailed configuration of specific actions takes on many different forms with the activities being dispersed across the city. In a similar way, many of the case studies that take their starting point at the city scale end up in the two other geographic scales, namely local and district. As will be discussed later, the case studies described at the district and local project scale could also have been incubated at the city scale, although this is not accounted for in the cases.

In relation to the configuration of targets at the city scale there are some activities that maintain the characteristic of a broader approach. Continuing with the case of Minneapolis, an important activity has been to identify buildings in the city in need of energy refurbishment. Through green accounts,

implementation champions in Minneapolis have been able to identify those buildings and provide counselling to the owners of these buildings in order to improve their energy performance. In these projects, champions have been appointed that support the concept of the refurbishment itself. In cooperation with building owners and appointed craftsmen they address how best to establish the necessary incentive. This example illustrates that the implementation efforts may not always be spatially bound to a specific site or infrastructure. However, this still represents a more thematic approach for local communities: building owners with low energy performance buildings. Similar initiatives are reflected in the cases of Aachen and Sønderborg.

The other case studies at the city scale illustrate similar patterns to that of Minneapolis. In a case study like Bottrop, a major difference is seen in the initial driving force being embedded in interests of urban development, rather than in climate issues. The city of Bottrop is facing the challenge of addressing industrial patterns in the city, as former industrial districts need to be transformed in order to maintain a high urban quality. This challenge represents the primary driving force but soon becomes coupled to the issue of sustainable development and as seen from a socio-economic perspective as a potential for redefining the industrial identity by focusing on developing green clusters through the InnovationCity Ruhr initiative. Through this linkage, private investors and developers are successfully enrolled in the transformation of these industrial districts. This illustrates subtle interchanges and linkages between urban and energy efforts at the strategic level, leading to a variety of local actions.

In a case like that of Guelph in Ontario, energy planning represents the strategic starting point for target setting. In such an infrastructure project, the targets are formulated from the perspective of utilities and the improvement of infrastructure. Strategic energy planning represents an important area of development, where energy targets are formulated and projects are initiated. Both utility companies and municipalities have an interest in innovative solutions in the energy network. In the case of Guelph, one of the initiatives was to implement district energy. Such a change in an energy network requires involvement and dialogue with the stakeholders involved in the maintenance and development of such networks. As a result, the implementation process in Guelph represented more of a political process, involving the Mayor, utility companies and the holding company responsible for the network. The configuration of solutions took place in this strategic dialogue over ways to revise the energy network. Since such changes often involve transformation of existing infrastructure, it necessitates the configuration to take into consideration of how prevailing interests may be taken into account; often resulting in a highly politicized process.

In cases at the district scale, the targets set are characterized by being oriented towards mainstream implementation of energy requirements, compared to targets set at the local project scale. As a result, initiatives consider the district from a more holistic perspective with emphasis placed on the moment of making the plan rather than on the moment of configuration. In most of the development projects, emphasis is put on integrating energy considerations in the configuration of the master-plan of the district. In Basel, the Erlenmatt-West district represents a good example of how development of a new district represents a possibility to integrate energy considerations in the overall planning of that district. In this project, the implementation champion is actually a developer, who wishes to certify the district as a 2000-Watt-Site. As a result, implementation efforts become focused on how to comply to the urban design criteria of the

certification scheme. This involves weighting the different factors of the certification, including those of urban quality and improved energy performance. The other cases at this scale: Stenløse South in Egedal, Furuset in Oslo, Stiegl Gründe and Gnigl in Salzburg and Zankelhof in Graz and Zero Village Bergen in Bergen, all illustrate implementation work aimed primarily at identifying good design criteria for urban development. The moment of organization is involved, exhibiting a strong dialogue with stakeholders to identify viable criteria. The moment of configuration is also involved with emphasis on considering existing building practices and available technologies. A balance between voluntary and required action varies throughout these projects, as will be illustrated in a later section. In some cases, regulative force represents an important tool with which to impose the targets.

In one of the cases, there is also a strong element of energy infrastructure considerations. In the case of Stenløse South in Egedal there is an explicit focus on transforming existing energy infrastructure. In this case, the implementation champions set an urban design criteria that required developers to design low energy performance houses that would not be connected to the prevailing natural gas based heating grid. This represents an example of how proactive energy planning may impose and challenge the building practices in a new urban development area. This also illustrates that targets are anchored to a specific urban development agenda oriented towards a district; that being urban transformation, infrastructure optimisation or more general civic agendas.

In cases at the local project scale, the targets are often formulated in the perspective of exploiting an urban development site as an opportunity to develop innovative energy solutions. An example of this is Stadtwerk Lehen, where a former gas plant has been selected as a site for urban transformation. This project is part of the European Concerto scheme, aimed at demonstrating cost-effective energy optimisations of districts and communities. Through enrolment into this scheme, an important target for the development of Lehen is to turn it into a model city district of sustainable development. This innovative perspective lead to a strong emphasis on the configuration moment in the implementation process. Innovative solutions were implemented in this case, as a result of stakeholder involvement focusing on how to configure the buildings at this specific site. Multiple stakeholder interests were represented in the configuration of the chosen solution: municipal interests, developer interests and technical interests. Through numerous meetings, an innovative configuration was worked out, resulting in the integration of alternative forms of energy supply in this new area. In that way, implementation champions in his or her project have worked more intensely with the configuration moment, which was strongly coupled to the local site in terms of actually configuring the buildings in detail.

The cases from Japan illustrate a strong involvement in this type of development project. The Ministry of Land, Infrastructure and Tourism (MLIT) has provided a financial scheme aimed at supporting 'Leading model projects of low-carbon building and housing'. This has led to several innovative local projects in Japan, including that of Minato Ward in Tokyo. A special driving force in this project was the experience of the municipal government in recognising that they were not able to supply power and heat to their residents for a long time after the Great East Japan Earthquake. As a result, issues of resilience and disaster management were seen as critical. The configuration efforts in this case were oriented towards the interplay between demand-side and supply-side

control of buildings, with a starting point in implementing specific solutions. Due to the very technical nature of this project the utility company, Tokyo Gas, has been deeply involved in the process. Their motivation has been to showcase innovative technologies. This case demonstrates that local projects can also address a broader systemic innovation such as implementing a smart energy network.

The issue of ‘when’ is important to address in implementation processes, because it has an impact on how implementation should be handled. There is a big difference in terms of approach, whether the project concerns new buildings or existing buildings: both the stakeholder interests and the regulative framework differs. Such differences influence how different roles are (or should be) distributed in each implementation process. The challenge – as will be discussed further in the next sections – is to ensure that a bridge is established between the urban- and energy-oriented interests and that the implementation process considers the actual configuration challenges in terms of bottlenecks arising from stakeholder interests and other constraints. The implementation champion, thus, has to be aware of what kind of implementation process he or she is engaging in. Without such an awareness, it might be difficult to establish an effective collaboration between relevant stakeholders, and hence, a viable configuration of what to implement, when to implement, how to implement and by whom. Each context can also identify site specific instruments such as possibilities for regulatory change may exist in relation to new building sites, whereas these are seldom effective in relation to existing buildings.

Another important difference to highlight is that of mainstream projects versus experimental projects. Several of the cases developed under experimental conditions, like Stadtwerk Lehen and Minato Ward, show how private stakeholders are often more strongly inclined to innovative solutions in such projects. Some of these cases even illustrate that the developers take the lead in terms of championing the process. These cases often rely on external funding or more internal incentives in order to establish this willingness to invest in innovative solutions. Cases that have been developed under mainstream conditions, on the other hand, illustrate how a more conservative atmosphere was prevailing. This is for example the case with Stenløse in Egedal, where the configuration of solutions was dependent on the ability to apply legal force and to provide sufficient incentives for the private stakeholders to accept the innovative solutions.

In that way, the anchoring of the implementation process influences the conditions in which the implementation champions must navigate as they channel the targets into more viable configurations. The cases suggest that implementation champions have an ability to apprehend and exploit how energy targets are contextualised in the implementation process.

5.2 Who

Implementation of energy strategies can be a struggle, because it involves strategies that transform prevailing systems and practices. Overcoming resistance and bottlenecks forms part of working effectively with implementation. As a result, effective implementation is dependent on champions who are driving or pushing towards the desired strategies in their daily work. Effective implementation also depends on the ability to engage other stakeholders since each of the

implementation moments rely on different stakeholders that take action in relation to the strategy. In the following examples, different stakeholders take initiative to drive these implementation processes, demonstrating how new types of stakeholders are recruited in the process to become implementation champions themselves, as figure 5.2 shows.

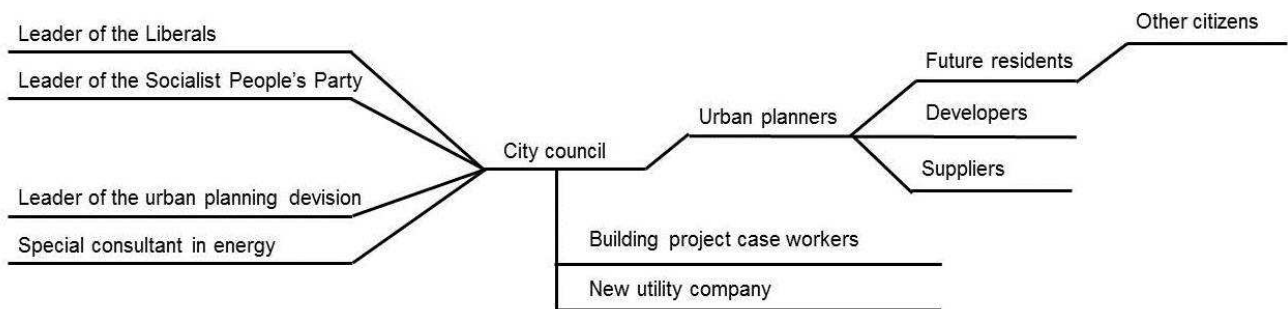


Figure 5.2: Example of an expanding network of implementation champions from the case of Stenløse South in Egedal, Denmark (DTU & AAU, 2017).

The case of Stenløse South in Egedal illustrates a combination of four very typical implementation champion types. In this development process, several initiatives occurred in parallel, leading to a combined implementation of energy strategies.

1. The first type of implementation champion that should be emphasised is **influential politicians**. Influential is applied here in the sense that the politician has an ability to establish a broad commitment to a cause. In the case of Stenløse South, two political leaders from different parties found a constructive synergy by coupling their interests in urban development and sustainable development during preparation for upcoming elections. These politicians established a strong commitment to support urban development projects with a sustainable profile. Through this commitment and engagement of the politicians in a single cause it was easier to gain the commitment of other politicians in city council.

2. The second type of implementation champion to be emphasised is that of **urban planners**. In the case of Stenløse South, the leader of the urban planning division had a sense of urgency towards the idea of working with sustainable development and saw the possibility to connect this work to on-going urban development processes. Being the leader of the urban planning division, she had a great deal of influence in the direction of the work within the department. She also had a lot of experience in terms of handling the political aspects of gaining support for a strategy and she had a good working relationship with the director of the municipality of that time.

3. The third type of implementation champion to emphasise is that of **energy specialists**. In the case of Stenløse South, an energy specialist helped shape this sense of urgency to address energy strategies. He was especially helpful in the process of convincing the politicians as he had hands-on knowledge of what was possible. Through this tacit knowledge, the energy strategy was presented in a more tangible way which politicians could more easily understand and commit to. The energy specialist also played an important role during the configuration moment by having the ability to adopt and adjust the technical configuration to socio-economic needs among developers and users.

4. A fourth type of implementation champion is the **administrative manager**. In the case of Stenløse South, the director of the municipality played a central role in channelling political decisions into organizational restructuring. He ensured that the development project received the appropriate resources and respected the innovative character of the project. This support provided an important incubation space for other implementation champions; providing a protected space for development.

Through the intersection of these four driving forces, the city council was convinced about the development project and passed a strategic plan that aimed specifically at integrating innovative energy solutions in a new development area of the city. The commitment of the city council proved to be fragile when resistance was shown by developers, but the Mayor exhibited strong leadership by withholding the commitment to the original plans in spite of periods of commotion. The city council therefore became a 'second-level' of implementation champions for the energy strategy by passing action plans and providing support for further actions.

Through the support of the city council, the development project team was then broadened, involving a greater number of planners from the urban planning division, involved in drawing up the master plan of the new urban development. Through this planning document, stakeholders from the private sector in the form of future residents, developers and suppliers became enrolled in the project. These stakeholders acted as implementation champions at a 'third-level' by committing to the energy targets through their building projects and putting pressure on each other to comply.

In many of the other cases, these four central types of implementation champions are also illustrated. Both in Bottrop and Guelph implementation was driven by strong Mayors that believed in the cause and had the ability to assembly majority support within city council. As will be described later, these politicians have also had the skills to coordinate efforts with administrative managers so that technical staff became engaged and anchored the visions into specific development projects. In several of the cases in Salzburg, the combination of proactive urban planners and dedicated energy specialists was also critical for the success of the implementation. In several cases, this interplay was established on the basis of research and development projects, like the Concerto programme, where urban planners and energy specialists cooperated about configuring innovative energy solutions in urban development projects. In some of those projects, the network of implementation champions tended to extend itself to include the working groups involved in the project.

In a few of the cases, implementation champions were represented by stakeholders from the private sector. This was the case in Sønderborg, where a think-tank of local industrial stakeholders has been an important driving force, leading to strong perspectives on strengthening the local industry in relation to energy strategies. This engagement has directed the focus of the politicians and technical staff towards this focus area. In other cases, a private investor or developer has taken the lead. This is the case in Erlenmatt-West in Basel, where the developer had proactively applied the 2000-Watt-site certification scheme to address energy strategies. Similarly, in Zero Village Bergen, the private developer was also the one to drive the implementation process. In Zanklhof in Graz, a proactive architect represented an important implementation champion that raised the issue of innovative energy strategies.

These examples illustrate that in many cases, developers, investors and architects from the private sector can also become the initiating champion and raise the level of ambitions while pushing towards improved solutions. Often, this interest is based on the possibility of marketing or positioning themselves as green, as a way to exploit this type of profiling. In these cases, the expansion of the network is towards the municipality, including the politicians and technical staff in order to gain permission for innovative solutions. In several of the Austrian cases, obstacles and resistance was registered in relation to such municipal-internal processes, including resistance from building service engineers and others.

A final type of driving implementation champion is that of academia or universities such as illustrated by the case of Parkstad in the Netherlands. In this case, the South University played an important and active role in terms of driving an experimental development area. Through the engagement of university staff, a strong coalition with the city administration and private stakeholders was developed. This represented a good illustration of a triple-helix approach to development processes, where specialists from universities become active partners in the implementation process.

In conclusion, it seems that implementation champions are aware of engaging people during the implementation process that represent the following roles:

- Politicians that provide and ensure political commitment, so that the direction towards energy strategies in the implementation process is stabilized throughout the project.
- Central administrators in the city who act as coordinators between politicians and administration, so that practical challenges are addressed and obstacles removed through centralized decision-making and top-down pressures.
- Key managers in the city, who focus on allocating resources and determining organizational structure, so that there is a clear division of roles and responsibilities in relation to the energy action-plan.
- Urban planners or architects who translate energy strategies into physical development projects through masterplans, so that the integration between energy and urban issues is embedded in the plan itself.
- Technical experts who have special knowledge about what is technically possible, so that technical dialogue and objective inputs regarding trajectories and scenarios are provided.
- Utilities that are responsible of managing energy provision systems, so that technical integration and development issues are addressed and bottlenecks due to conservatism in these systems are avoided.
- Investors who own a piece of land to be developed, so that these become inclined to take extra risks by doing something 'extra' in relation to energy.
- Developers and construction professionals who are responsible for the construction and renovation project and take a constructive stance in terms of identifying viable energy solutions and are willing to take the risk in relation to innovations.

- Citizens or end-users that can act as either supporters or opponents, so that these can see the benefits of the initiatives and provide support rather than obstructing the process through complaints.
- NGOs that represent common interests, so that these may help to influence the political agenda.

A key lesson from the case studies is that the constellation of implementation champions varies greatly. This indicates that it is no excuse for inaction that there is, for example a lack of political support, since other constellations of implementation support can be formed according to the above. In that sense, good implementation champions are the ones that are able to find or construct a viable constellation of implementation champions on the basis of what is possible at a given moment. Effective implementation seems to occur when an implementation processes spread in ever-widening circles, in terms of engaging more and more implementation champions. However, a delimiting factor is that there needs to be a first-mover in terms of implementation champion. Someone needs to take action on given energy strategies and to follow through in spite of eventual initial resistance.

5.3 What

As already argued, implementation champions appear to possess special ‘abilities’ that allow them to create support and engagement for a specific cause. These abilities are related to the Strategic Measures that have been identified. The Strategic Measures of **‘Set Visions and Targets’** and **‘Stakeholder Engagement & Involvement’** represent overarching categories of measures and are strongly related to each other. A key starting point is to set the targets and then to get other stakeholders to follow these targets. In this regard, ‘Stakeholder Engagement & Involvement’ represents an overarching measure aimed at ensuring that relevant stakeholders support the cause, formulated by the ‘Set Visions and Targets’ measure. In a sense, harnessing new implementation champions in other sectors of the development project. In the following, the key measures are described in relation to the two overarching measures through examples from the case studies organized on the basis of the implementation moments from figure 1.2.

The measure of **‘Develop Renewable Energy Strategies’** represents an important part of the implementation moment of setting the target. In cases like Bottrop, the technical orientation towards renewable energy strategies has represented a crucial element of the target. In this case, the idea of working towards a green industrial cluster has been crucial and represented an important means of getting financial support and gaining the interest of industrial collaborators. In other cases, like in Erlenmatt-West, this measure involves development of technical scenarios in connection to specification of targets in relation to building and energy configurations. Through this process, an alignment in stakeholder interests is carried out through dialogue around such scenarios and configurations.

Another important measure that is connected to the target setting is the measure of **‘Make Use of Tools Supporting the Decision Making Process’**. This measure is supportive of the target setting, because it provides objective input about which target to work towards. In cases, such as Minneapolis and Parkstad, this measure has been applied as a way to identify and document

which focus area to work with. In Minneapolis, green accounts and other information tools were applied as a basis for making decisions about what areas of the cities to prioritize. In Parkstad, an information tool (called Pallet) has been developed that illustrates the Energy Transition Roadmap of the city. Such information tools support decision-making in terms of choosing appropriate targets and provide documentation for engagement of other stakeholders.

In relation to the moment of making plans in the implementation process, one of the measures relate to **'Make Full Use of Legal Framework'**, which represents the traditional way of enforcing urban planning projects. This is seen applied in several of the cases that operate at district and local project level: Stenløse South, Erlenmatt-West, Guelph, Aachen, Minato Ward, Jono and Minatomirai. In these projects the legal framework is used as a way to push building developers to comply with energy strategies. This represents an effective way of ensuring compliance, when this measure is applicable.

Another measure related to this moment of implementation concerns that of **'Design of Urban Competition Processes'**, which is also related mainly to masterplanning of urban development areas. In many of the cases, including Nordhavn, Erlenmatt-West, Bergen and Oslo, this measure has represented a way of getting different stakeholders to provide their inputs on how to reach the proposed targets. Compared to the legal framework, this measure allows more room for stakeholder engagement, since developers and architects often form more actively part of defining the conditions. In that way, stakeholders may feel a greater urge to engage in the project and the developed solutions may be better aligned in terms of their socio-economic conditions, compared to situations, where the legal framework has been set with starting point mainly in municipal requirements.

In relation to the implementation moment of organization, the measure of **'Implement Effective and Efficient Organizational Processes'** is central. This represents managerial efforts made to execute action plans in relation to the organisation of the project, so that the right support and framework is in place to reach the targets. Especially in the case of Minneapolis, there is a clear link between the target setting, which involves development of an action plan, which is then executed through reorganisations. In several of the cases, this measure also includes the aspect of stakeholder engagement, since the organizational initiatives aim at strengthening stakeholder involvement. This is for example the case in Salzburg Lehen, where regular meetings were arranged between the different stakeholders as a way to continuously discuss ways to configure energy solutions. Similar setups are seen in the other cases, where different forms of boards and other ways of organizing stakeholder involvement have been arranged.

In relation to the implementation moment of configuration, the measure of **'Include Socio Economic Criteria'** is often represented in the case studies. This often includes economic schemes ensuring that the risks of e.g. investors or developers can be counteracted. In many of the cases at the local project scale, an important economic factor has been to ensure funding of the project through national or local funding programmes. These cases often tend to have a more innovative character compared to the other scales without similar funding. In other cases, the socio-economic factors have been considered more indirectly as a result of stakeholder engagement and dialog. In e.g. Stenløse South and Salzburg Lehen, there have been strong and

interdisciplinary considerations about the configuration of buildings and energy systems with regards to socio-economic factors. In Stenløse South, one of the considerations was about which type of technologies to work with, depending on how to keep the prices down and lower the risk for developers. In Salzburg Lehen, the social aspect related to social issues of image and unity were addressed and acknowledged in the technical configuration, which included designing a buffer tank for the heating system as a local landmark.

Finally, in relation to the monitoring moment, an important measure often related to this is that of **'Implement Monitoring of Energy Consumption and GHG Emissions'**. Especially in cases that receive funding there is a requirement about providing documentation of the success and impact of the project, which is often achieved through monitoring systems. Monitoring in that way helps to document how effective solutions are based on different parameters. In the case of Parkstadt, the importance of monitoring is especially evident, since this project includes a step-by-step approach, where experiences from one step are fed into the next step. This leads to a transition in the sense of moving innovations from experimental buildings to more mainstream buildings. This is possible, because the monitoring of experiments provide documentation of whether or not the solutions are working. In the other cases, such monitoring efforts may also be present in the form of documentation from previous projects, which are e.g. the case from Salzburg, where different innovative development processes also feed on each other. Monitoring is seen as a way to provide continuous feedback about progress. It allows evaluation and follow up.

In the case studies, we see a good ability among champions to recognize and exploit organisational strengths and characteristics at the given scales in combination with a good understanding of the local community and its stakeholder interests. The measures are combined in a way that fits with the parameters of the project in order to ensure progress and engagement.

5.4 How

Championing of energy strategies in an implementation process involves a specific set of skills in terms of how to engage in processes of change. It obviously involves the willingness to proactively promote innovative solutions that challenge prevailing systems and practices. This represents a precondition. Other skills are involved as well, based on the knowledge that has been gained from the case studies.

The case studies tend to represent chaotic processes with very little linearity in terms of who does what and when. This tendency also applies across the case studies, as it has been difficult to identify very specific linear patterns in the way that implementation processes develop over time. Looking more closely into a number of the case studies has indicated that the studied processes tend to have an iterative character. This means that the processes of implementation are situated, based on the local context and preconditions, and adjusted accordingly as bottlenecks, openings and shifts present themselves. To navigate represents a crucial skill in such complex and iterative processes.

In the former sections, some of these skills have already been indicated. Champions need to have:

- 1) The ability to anchor an implementation process to on-going development projects in order to ensure that a sincere interest among key stakeholders can be established as a fundamental driving force.
- 2) The ability to review and revise energy targets of the implementation process on an ongoing basis depending on the configuration of proposed solutions.
- 3) The ability to engage stakeholders from different sectors relevant to the project, so that the different dimensions (physical, technical, socio-economic and administrative) are considered. This involves expanding the network of implementation champions as the project progresses.
- 4) The ability to challenge resistance and bottlenecks by exploiting strategic measures that help to address these. Similarly, in terms of identifying and exploiting co-benefits and other potentials.

In addition to these skills is the ability to work and navigate within an iterative process. Based on the observations in the case studies in this volume, it was found that the idea of more iterative exchanges in the implementation process are represented. Although it is not explicit in all cases, there is a pattern that looks similar to the plan-do-check-act cycle, which has been described by Deming 2000, Shewart 1931 and 1939). In some projects, like Minato Ward, this cycle is applied very explicitly as a way to continuously improve and develop the development process. Applying the cycle means that working flows are set into place that ensure that the way of operationalizing initial plans are revised over and over again during the implementation period. This revision is done through analyses and reflections about whether the achieved results are satisfying (check) and based on formulating a new action plan (act). This cycle is beneficial, because of the complex character of the iterative implementation processes, where the plans and the doings need to be continuously shifted to how the process unfolds, taking situational shifts and turns into account.

Although implementation processes may look linear in retrospective, as illustrated in figure 5.3. Each step forward involves small iterations of planning-doing-checking-acting, helping to pushing the target setting forward through formulation of new interim targets. These iterations often represent how the implementation champion exploits specific implementation moments or procedures along the way as a way to push towards a new equilibrium. In each step, the target setting becomes more tangible and supports the implementation of the initial vision.

In order to facilitate this kind of process, it is necessary to be able to establish feedback and evaluation loops, both in a formal and an informal way. A formal loop could take the form of monitoring and evaluating efforts, involving standardized procedures and being delimited to certain periods of the project. It could also involve the setting up of formalized boards and procedures, like in the case of Minneapolis, that allows these boards to evaluate progress. An informal loop could take the form of on-going discussions and reflections, like e.g. adjusting the target setting at different points in the project through stakeholder engagement and involvement. This could be informal meetings, workshops and the like, providing insight that changes the way that the implementation champion(s) proceed with the project.

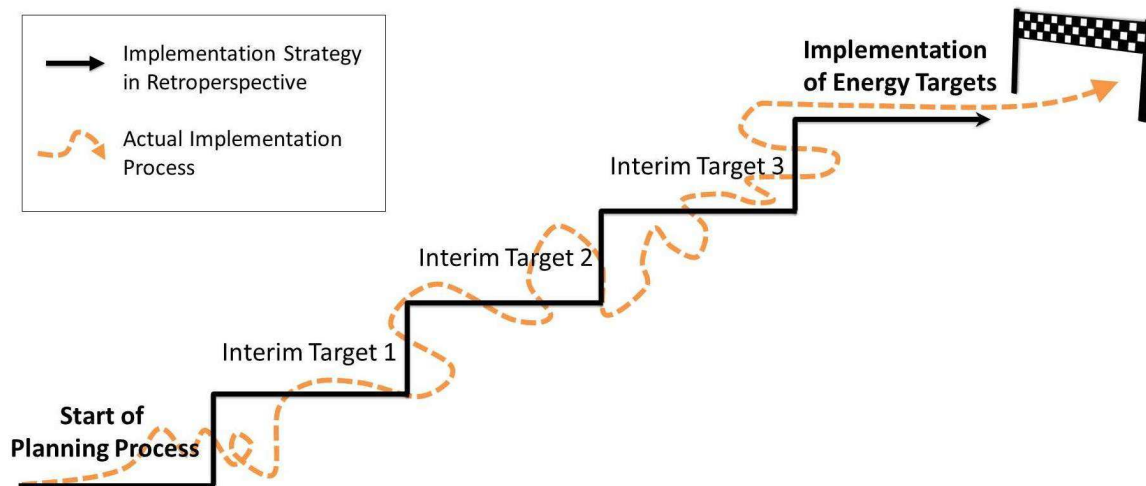


Figure 5.3: Interim Steps necessary for implementation of energy targets. (DTU & AAU, 2017).

Although figure 5.3 illustrates the implementation process as having a start and an ending, the case studies indicate that this is not always clear. Both the start and end often represent yet another interim stage, seen in the perspective of initiatives within the whole of the city. In many development projects, the studied implementation processes represent individual sub-processes with a natural closure. However, these sub-processes are linked to both previous and future projects, and there are also simultaneous projects that set off from each other. In the case of the city of Salzburg it is clear that several projects are developed both simultaneously and over time in the city. Especially case studies at the city scale indicate this linkage between projects, since this often represents the overall attempt to facilitate a coordinated approach with several subprojects, providing this interplay between the city scale, the district scale and the local project scale.

In terms of innovation and transformation, the end-interim-target of the project is interesting to consider. This ‘target’ represents the result of the project and reflects the ability of the champion to have challenged the status quo during the implementation process. In some cases, the end-target will be very close to current status quo, in other cases, it will be radically different. On the basis of the case studies, it is clear that subsidies and financial support help to levitate technical configurations to rather ambitious levels, like in the Japanese cases. While in other cases, where a more mainstream approach has been chosen, like in Egedal, the level of innovation per se is not as high. The challenge, however, with subsidies and financial support, is that the realized innovation may be difficult to transfer to other projects, if mainstream conditions prevail. The case study of Parkstadt provides a good illustration of this kind of ‘transition management’, where the shift from innovative experiences to implementation under mainstream conditions is managed by specifically addressing how to transfer experiences from one project to another.

6. Recommendations

The following recommendations reflect the findings of this volume 3 and function as guidelines for champions involved in implementation of energy strategies in local communities. The recommendations demonstrate how Strategic Measures may support implementation processes.

When

Energy targets seen in isolation are seldom effective driving forces for implementation. Case studies show that many implementation champions exploit prevailing urban development processes as a lever to channel energy targets into more tangible parameters to which involved stakeholders can commit. As a result, anchorage of these targets within a specific local community is critical and involves an ability to understand the community at hand and to be able to address bottlenecks for change and to exploit potentials for change with the starting point in the selected community. This anchorage typically evolves, when recognizing how certain implementation moments (target setting, planning, organizing, designing, constructing and monitoring) support the channelling-in of broad initial visions to tangible configurations embraced by critical stakeholders.

Who

Anyone may be an implementation champion, as illustrated by the case studies. The most important characteristic for these champions is a personal drive – not only for pursuing energy strategies – but also for addressing bottlenecks in the implementation process. The cases also illustrate that implementation champions are not lone wolves, but rather act as a collective, supporting each other with ideas and initiatives. In that sense, initial implementation champions ultimately represent a recruiter of new implementation champions, thereby expanding the network of stakeholders working for implementation of energy strategies. Through this constellation of implementation champions, a supportive network is created that represent different dimensions of the project, including those of urban and energy.

What

Implementation champions actively apply and combine Strategic Measures:

- *Set Visions and Targets:* these play a crucial role as a guiding principle throughout the entire implementation process. In order to work effectively, visions and targets should be formulated in a way that mobilize stakeholders in the process, embracing both technical and socio-economic elements and a solid anchorage in the local community. The visions and targets should also be negotiated and constantly reviewed, so that they channel in from the abstract to the concrete through linkages to on-going development processes and stakeholder engagement.
- *Develop Renewable Energy Strategies:* well thought-out strategic plans provide an important point of departure in the implementation process. These strategies support the formulation of focal points that link technical and socio-economic elements having a specific emphasis on renewable energy.
- *Make full use of Legal Frameworks:* the use of regulation tools represents an effective method by which to enforce energy targets from a top-down perspective. Such tools provide good

momentum for implementation and often includes reflections on how to configure a project in a viable way.

- *Design of Urban Competition Processes*: this represents an important approach – related to urban development – in which energy requirements are specified. This approach enables the engagement of stakeholders - architects, developers, consulting companies and energy experts - to provide their inputs on how to reach proposed targets.
- *Make Use of Tools Supporting the Decision Making Process*: justifying and documenting targets, strategies and focus areas represents an important means of convincing stakeholders about the urgency of action. Different tools, such as energy atlases, green accounts and the like, can provide insight and instill a sense of trust regarding chosen decisions.
- *Implement Monitoring of Energy Consumption and GHG Emissions*: establishment of learning cycles is crucial in order to advance from one stage up to another. Monitoring represents a good way of establishing feedback and evaluation of the implementation process.
- *Stakeholder Engagement & Involvement*: this represents a key focus area in implementation processes since it allows the process of channelling-in visions and targets to reach viable solutions. Through stakeholder engagement and involvement, bottlenecks are addressed and co-benefits are exploited. Engagement and involvement may take many different forms but is often linked to other Strategic Measures as a point of departure for encountering stakeholders. Through these encounters, stakeholders become mobilized in the implementation process, which provides necessary approvals and resources for moving forward.
- *Include Socio Economic Criteria*: this represents an opportunity to overcome resistance to change and enable exploitation of the co-benefits of social issues. Through their incorporation, the often administrative or technical character of implementation is transcribed into more commercial and public interests. This allows ‘smoothing off the rough edges’ in the configuration of an implementation project, so that more stakeholders can see the benefits.
- *Implement Effective and Efficient Organizational Processes*: through its management and structure it is possible to increase the administrative support within an implementation process. This might include a redistribution of roles, reallocation of resources, and establishing feedback procedures, and the like. Such support systems provide an important backbone for implementation processes by providing implementation champions with responsive and proactive administrative support.

How

Implementation champions work in an iterative way and take great care in knowing and learning during the process on how to:

- Anchor the implementation process in on-going urban development projects of sincere interest among key stakeholders so as to ensure a fundamental drive.
- Review and revise the energy targets of the implementation process on an ongoing basis depending on the configuration of proposed solutions.

- Recognize that interim steps in the process are necessary and be strategic about which steps to take and in what order. Link and connect projects across the city.
- Ensure formal and informal feedback and evaluation loops during implementation processes, so as to continuously maintain and strengthen stakeholder engagement and interest.
- Ensure that the different dimensions of local communities, including the physical, technical, socio-economic and administrative are considered. Ensure that these dimensions are included into strategic decisions and configurations.
- Creatively challenge resistance and bottlenecks, e.g. by identifying and exploiting co-benefits and other potentials, also across the different dimensions of local communities.

This volume highlights through case studies that anchoring and engaging local communities in implementation processes is important in order to succeed with implementations.

7. Link to Volume 4: Stakeholder Support Materials

Important lessons for the teaching and development of implementation champions involved in energy strategies within local communities can be derived from the case studies in this Volume 3. The aim of teaching and development of such champions is to strengthen their strategic sense of how to make implementation processes successful, by building on the ideas and experiences of others.

A first step towards developing implementation champions with a capacity for implementation is to have people that act as champions in the first place. An initial focus therefore lies in providing a sound organizational culture that encourages championing and nurtures activities of this sort.

The second step towards building capacity includes identifying which competences are lacking or that must be strengthened:

- *Technical competencies* related to the ability to navigate in the technical jargon related to energy systems, including the ability to identify relevant technical specialists and involve them in the development.
- *Socio-economic competencies* related to understanding construction and planning practices with a special emphasis on risk mitigation to overcome bottlenecks. Social acceptance and economic barriers represent critical components due to the innovative character of the implementation process.
- *Political competencies* in terms of being able to ensure political support. Without such support, there is a risk that the implementation process will be negatively impacted by political resistance.
- *Managerial competencies* in terms of providing the proper prioritization of resources and ensuring institutionalisation of efforts. It is crucial that the right persons in the involved organizations are involved at the right time and in the right way. The implementation process has to be integrated into parallel processes such as budgeting, planning, organization, etc.
- *Planning competencies* in terms of having insight into the planning system and knowing how different planning instruments or planning moments may be used as a lever to advance the implementation process.
- *Local community engagement competencies* in terms of being able to work outside of the office and motivate external stakeholders to engage in the process. This might also involve internal staff in the city from other departments. Having the ability to work hands-on and not only develop strategies on paper. This could include skills in dialogue, workshops and the like.
- *Facilitation competencies* in terms of being able to navigate in this complex process and to keep an overview of both the long-term trajectory and the short-term solutions needed to

ensure commitment to the process. This could include skills in project management, but also dialogue, workshops and the like.

The third step in capacity building involves considering the format of how to develop the proposed skills among implementation champions. Education materials, workshops and the like would benefit from applying a learning-by-doing format, due to the tacit character of knowledge that implementation champions seem to have in the case studies. In a way, championing should be seen as a craftsmanship, and be learned accordingly, through hands-on approaches. As argued previously, implementation champions exhibit hands-on knowledge in terms of knowing when to apply which Strategic Measures and in terms of navigating depending on situational factors. This corresponds to, what Schön (1983) terms as the reflective practitioner, who is aware of their implicit knowledge base and learn from their experience. As a result of these considerations, standardized materials that is mainly presented orally will make it difficult for implementation champions to adopt the tacit skills necessary for effective navigation. Rather, a reflective space needs to be created for these practitioners, so that they are encouraged to 'play' with how they mobilize and navigate in such processes, and hereby developing their reflective necessary to be able to evaluate and re-adjust their efforts.

The material should also take into account that the target group is typically engaged people that probably come with a great deal of experience, so peer reviews and peer feedback might also represent good ways providing new inspiration and learning from each other. An example is the case study from Karlsruhe, where planners from different cities visited each other in order to exchange experiences and ideas about how to implement energy strategies through their work. Through such exchanges, implementation champions may be inspired to try out new ways of engaging with resistance or new ways of anchoring an innovative project idea.

More information regarding suitable workshop formats, capacity building and skills and education materials can be found in Volume 4: Stakeholder Support Materials.

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Appendix A

May 2015/Annex 63

Guide for using the template for screening case studies

Subtask C

This template has been developed to support the screening of case studies across all of the involved countries in Annex 63. The aim of this screening is to provide an overview of relevant case studies from each country. At the meeting in Minneapolis in October 2015, we will discuss which of these case studies to further develop in order to get a good representation of the implementation challenges and potentials that we wish to further study. Each country is expected to fill in the template for 3-6 case studies at least. The lessons from the case studies are intended to be channeled into the partners' supervision of at least one pilot project in each country; carried out in collaboration with pilot cities in the annex.

Example of different correlated activities in subtask C (from Austria):

Pilot city (collaboration): Salzburg

Pilot project (supervision): 'Schallmoos' in Salzburg

Case study 1 (lessons):

'Stadt:Werk:Lehen' in Salzburg

Case study 2 (lessons): Approach in Graz

The case studies can both be chosen among the pilot cities in the annex and from other cities in the country. It is up to each partner to consider what would be most appropriate for their situation. The advantage of picking one or several case studies from the pilot cities is that it would provide a better platform for collaboration with the city and valuable insight into the city. On the other hand, there might be highly valuable case studies outside of the involved cities, which could also be relevant to include in our annex.

The template provides a common framework to report information about the case studies. We agreed on the meeting in Salzburg that the templates should mainly help to communicate what is unique about each of the case studies. The template should be seen as a means to provide a first overview of the case study to be further developed after the Minneapolis meeting.

The author(s) are required to provide:

1. A description of the approach of the chosen case study
 1. Categorization of the innovative points
 2. Implemented systems
 3. Impact and success factors (expected and actual)
 4. Involved stakeholders
 5. Leadership/steering
 6. Monitoring process
2. A more explicit assessment of the approach
 1. Innovative elements and relevance for Annex 63
 2. Enablers and barriers for success
 3. Transferability of the case study

The description of each case study should fill 3-4 A4 pages and be sent to Maj-Britt Quitzau (quitzau@plan.aau.dk), preferably in word and pdf format. The deadline for delivering the filled in templates is September 1st, 2015. The descriptions will be posted on the webpage of our annex.

Country:

Name of the city (name of municipality):

Title of case study:

Author name(s):

Categorization of the innovation in the studied approach (tick off):

- Process
- Monitoring and data
- Stakeholder cooperation, participation and evaluation
- Financial issues and economy
- Legislation
- 'Insight' (viability, things that work, practical knowledge)
- Technology innovation
- Tools, labels and investments
- Methods
- Administration, organization and government

1. Description of the approach

1.1. Implemented solutions

Which solutions have been implemented? Which instruments and tools were used in order to enable the implementation? What are the main results of the implementation?

Insert a figure that illustrates the implemented solutions. Insert a diagram that illustrates the main results.

1.2. Impact and success factors (estimated and actual)

What are the results and impacts of the approach (estimated vs. actual)? Are results being seen yet – if not what are the expected results? What is the value of the process seen in a transformation perspective?

1.3. Involved stakeholders

Who are the stakeholders that have played a major role in the approach (positive/negative)?

Who are the driving champions? Who are the opponents – and why are they opposing this approach?

1.4. Leadership/steering

What kind of leadership is excelled in this approach compared to traditional processes? How were bottlenecks addressed in the process?

1.5. Monitoring process

How are the driving champions measuring success and understanding impacts within the approach? How are evaluations of the approach brought further?

2. Assessment of the approach

2.1. Innovative elements

Why is this approach relevant for Annex 63. What is innovative about this approach? Has it been tried before and if so what was the result – why is this different? What can we learn from this approach?

2.2. Enablers and barriers of success

What factors have been critical for the success of the approach? What political, economic, environmental and social drivers have played a role in the approach (positive/negative)? How were the conditions for the implementation process in terms of resources and time?

2.3. Transferability

What is transferable from this project? Which special conditions are important to be aware of? What characteristics about this municipality are relevant to emphasize? Is it being applied elsewhere?

Info box about the studied approach

Examples (depending on character of approach)

Size of the area

Urban scale of the area

Type of urban development project

Time and status of development

Chronology of the implementation process

Illustrate the chronology of the major decisions and steps in the process

Pictures, Links, etc...

Appendix B

Jens, Vickie and Maj-Britt
Annex 63/Subtask C

Template for identification of 'measures' in cases

The aim of this template is to support the identification of interesting 'measures' that play an important role for implementation of energy strategies in communities.

For those partners that have already delivered a description of case studies, we would ask to identify those 'measures' in the processes of the chosen cases that you see as relevant for the implementation process. You can look at our interpretation of one of your case studies to get an idea of what measures that could be identified (please also provide your comments/sup-plements to this one).

For those partners that have not delivered (enough) case studies yet, we would ask you to think about the clusters of 'measures' that were identified at the meeting in Biel and to select case studies that would exemplify some of those 'measures' that you would see as especially important in your country. Do, however, please remember, that we are interested in understanding how these 'measures' are APPLIED, so we would like you to describe a specific process or project, where the 'measure' has been applied in relation to the perspective of community development (related to implementation of energy strategies). Do please also indicate if other 'measures' have been applied as part of the process in order to get an understanding of how different 'measures' may supplement each other.

Our understanding of 'measures' builds on the clusters developed by subtask A and B (see on the next page). These are used to categorize key issues that provide planners with a platform to enable effective change processes at community level. In relation to our case studies, we wish to understand how measures within these different clusters are handled contextually and strategically in the development processes.

The deadline for delivering an overview of 'measures' for each case study is on August 26th. If you should have any questions about the template, please contact Maj-Britt: quitzau@plan.aau.dk or +45 2627 3863.

Explanation of columns in the table

Below you can find an explanation of what we expect you to write in each of the columns in the table of the template that you have received in relation to your case studies.

<p>Specific measure</p>	<p>A specific element or action in the planning process that have played a significant role to promote implementation of an energy strategy. You should think about something that the municipalities would recognize as part of their planning process (e.g. masterplan, team work...)</p>
<p>Cluster of measures (A/B)</p>	<p>Identify which of the clusters of measures outlined by subtask A and B that the specific measure is related to.</p> <p><u>A: Political support</u> Measures that help to establish a political platform for support for implementing energy strategies. Could include measures such as strong political leadership or lobbying and other strategies to establish the necessary support.</p> <p><u>B: RE Strategy municipality (analysis, mapping, roll-out)</u></p> <p><u>C: Information tool</u> Measures in the form of tools that involve data gathering of different kinds. Help to gather and organize knowledge within the process/project.</p> <p><u>D: Monitoring</u> Measures aimed at evaluating and monitoring a process.</p> <p>E: Inclusion of social-economic impact</p> <p><u>F: Criteria for competitions process / urban design</u></p> <p><u>G: Stakeholder inclusion/approach</u> Measures aimed at involving different stakeholders (both external and internal) in the process/project. E.g. public participation, informal dialogue, cooperative ways of organizing the process...</p> <p><u>H: Enabling legislation</u></p> <p><u>I: Vision and Target setting and commitment</u></p> <p><u>J: Organisation/Process</u></p> <p><u>K: Financial models</u></p>

<p>Entry point Urban Planning</p>	<p>Account for how the measure supports the introduction of energy strategies into urban planning. Think about what the 'professional' intention is with application of this measure. We wish to understand in which working phase we are and what the measure helps to change in this phase in terms of implementing energy strategies.</p>
<p>Entry point Energy Planning</p>	<p>Account for how the measure is related to energy planning. Think about what the 'professional' intention is with application of this measure. We wish to understand in which working phase we are and what the measure helps to change in this phase in terms of implementing energy strategies.</p>
<p>Effectiveness (encourage – enable – enforce)</p>	<p>Indicate whether the measure is one that encourages (providing an open choice), enable (reflecting a bit more of a strategic pressure) or enforce (making it mandatory)</p>
<p>Motivation</p>	<p>Explain the more strategic reasoning behind application of this measure. Do also indicate explanations as to how/why this measure seems to have an effect on the implementation process in the given situation, where it is applied.</p>

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