

Urban Development and Technical Infrastructure

New Challenges to Professional Training of Urban Planners and Developers

To reach the targets on climate protection, several challenges have to be resolved. The main players are municipalities which create and implement energy and climate concepts. This requires co-operation between representatives of the municipalities, utilities, associations and housing industry. But often, urban planners and developers do not have the necessary knowledge in the field of energy. Therefore, the aim of the EU project »Urban Planners with Renewable Energy Skills« is to increasingly integrate energy issues into the training and education of urban planners.

Germany has set up ambitious goals regarding climate protection. By the year 2050, all greenhouse gas emissions are to be reduced by 80% to 95%, with reference to the previous year. Germany would then accomplish its contribution to the defined »2-degree target«, i.e. to keep the average global warming from increasing more than 2 °C, compared to its level before industrialisation. Politicians have defined a lot of scenarios on many levels and introduced various measures to achieve this goal. Beside energy saving, most of them focus on increased energy performance.

But how and by whom can these objectives mainly be realised? Who are the key players and do they have the required knowledge?

The main focus should lie on the space heating market (incl. hot-water generation), which is responsible for about 35% of the final energy consumption in Germany [1]. Around 80% of the total heat consumption in Germany is used in metropolitan regions or towns of smaller size [2].

To realise this ambitious goals on a local and regional level, an approach that connects with municipalities, their administrations and enterprises is needed. General standard solutions are not optimal, and they are difficult to realise in the pluralistic structure of Germany, with its differences in regional development and its different energetic infrastructural systems. Individual adaptation is the key to success. In addition, it has become clearer and clearer that, for an overall energetic optimisation of a town, district to district has to be considered from the outset, in order to get the right approach to increase

overall performance [3]. But which focuses are required, and what will be the new challenges for city planning?

As the example of the strategy for country development in Saxony 2020 shows, innovative energy concepts play an important role in the plans for country development. To ensure quality of life in the future, in spite of the consequences of demographic changes, it includes definitions of the decisive fields of activity, and objectives. Using Saxony as an example, they can be summarised as follows:

- brownfield development takes precedence over Greenfield development – strengthening city centres,
- living in the city centre for young and old,
- support for economy and retail target groups in inner-city areas,
- monument protection to strengthen identity and image,
- principle of central locations,
- innovative energy concepts have priority [4].

Municipalities also emphasize on objectives to reach the »2-degree target«. They develop the required basis through concepts of environment protection, energy and climate protection, and prepare the implementation for different sectors. They are an integral component of a complex concept of urban development.

Nevertheless, energetic urban planners and developers are facing new challenges, like those in energy management. Integrated urban development concepts (so-called Inseks) build a network considering all important areas. This is a characteristic of the new, future-oriented and innovative town planning. Already today they represent the informa-

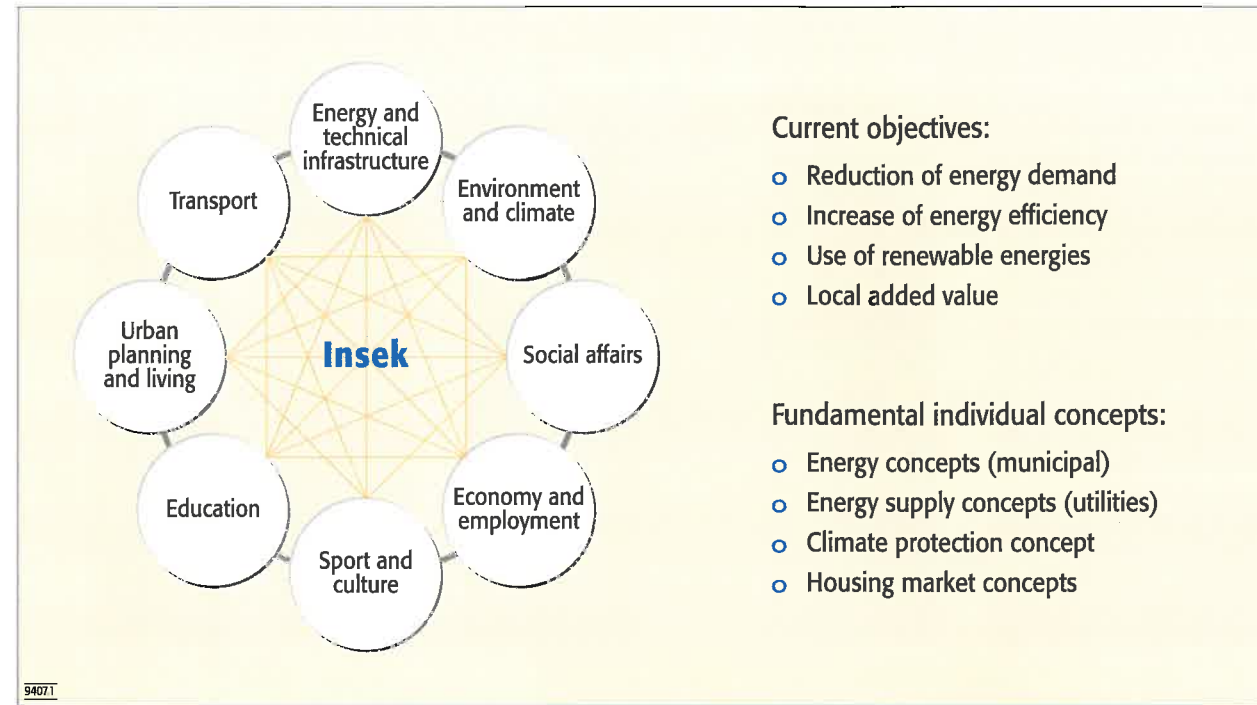


Figure 1. Integrated urban development concepts

Source: AGFW based on BTU/AGFW, BMVBS [3]

tion basis in a lot of municipalities. Although the planning of urban development is a planning level that is not yet formalised, every municipality has to develop a concept with long-term planning goals before they set up a surface use plan – and also before changing or continuing such a plan. Another design level that is not to be underestimated is represented by the energetic plausibility check. The experience from the project Urban Redevelopment »East« (»Stadtumbau Ost«) clearly shows the advantages of this method – in those cases where it was applied.

In contrast to traditional urban development concepts, integrated urban development concepts include a large part of the areas that are relevant for urban development

(figure 1). For the development of such an integrated concept, it is indispensable to match the different areas and to integrate other relevant players.

Municipal concepts of energy and climate protection

When creating municipal concepts of energy and climate protection, the analysis of the actual condition in the areas of heat, power and traffic is a definition basis for objectives and the development of scenarios. These are required to prepare an overall concept based on single area strategies (figure 2).

The actual situation is mainly indicated by the CO₂ equivalent per inhabitant and year in tonnes (table 1). In approx. 900 municipalities alone, (part) concepts have been supported with the BMU municipal guideline

since 2008. In a number of cities, like Herten and Leipzig, experience has been collected over a long time period (table 2).

Urban planners, urban developers and environment offices play a key role regarding preparation and realisation. As experience in the first decade shows, the private sector develops only a limited dynamic activity in the enhancement of the efficiency of buildings. Among others, this is due to the (social) demographic development.

Representatives of the city administration are important players for realisation, as well as energy suppliers, politic parties, associations and the housing industry. It is important to consider that the different interests of all players have to be coordinated. Therefore it is important for the municipalities to participate in an early stage and thus allow a balance of interests.



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	CO ₂ -equivalent t/a/inhabitant	Defined objectives t CO ₂ -equivalent/a/inhabitant
Leipzig	5.75 (2008)	-10% every 5 years, long-term reduction of 2,5 t/a/inhabitant CO ₂ -equivalent
Chemnitz	7.5 (2011)	5,4 t/a/inhabitant CO ₂ -equivalent by 2030
Herten	8.6 (2009)	-91,000 t by 2020 (basis 2006)
Dresden	9.8 (2010)	-10% every 5 years (basis 2010)
Frankfurt (Main)	12.8 (2005)	-10% every 5 years
Average Germany	10.0 (2007)	40% by 2020 (basis 1990)

Table 1. CO₂-equivalent of selected German cities

Source: [6...13]

Project partners

- University Aalto (Finland)
- AGFW (Germany)
- Technical University of Munich (Germany)
- University of Augsburg (Germany)
- Building Research Establishment Ltd. (Great Britain)
- Sabaté associats – Arquitectura i Sostenibilitat (Spain)
- University of Debrecen (Hungary)

Results of the project UP-RES

- Information from about 200 best-practice examples from different EU countries, selection of 30 case studies,
- short seminars on matters of renewable energies with 760 participants,
- 270 regional and municipal planners and architects will participate in the long courses; a minimum of 120 participants will be certified;
- planning instruments will be developed for those seminar participants,
- the prepared seminar documents will be provided to 200 planning schools and institutes in the EC in ten languages.

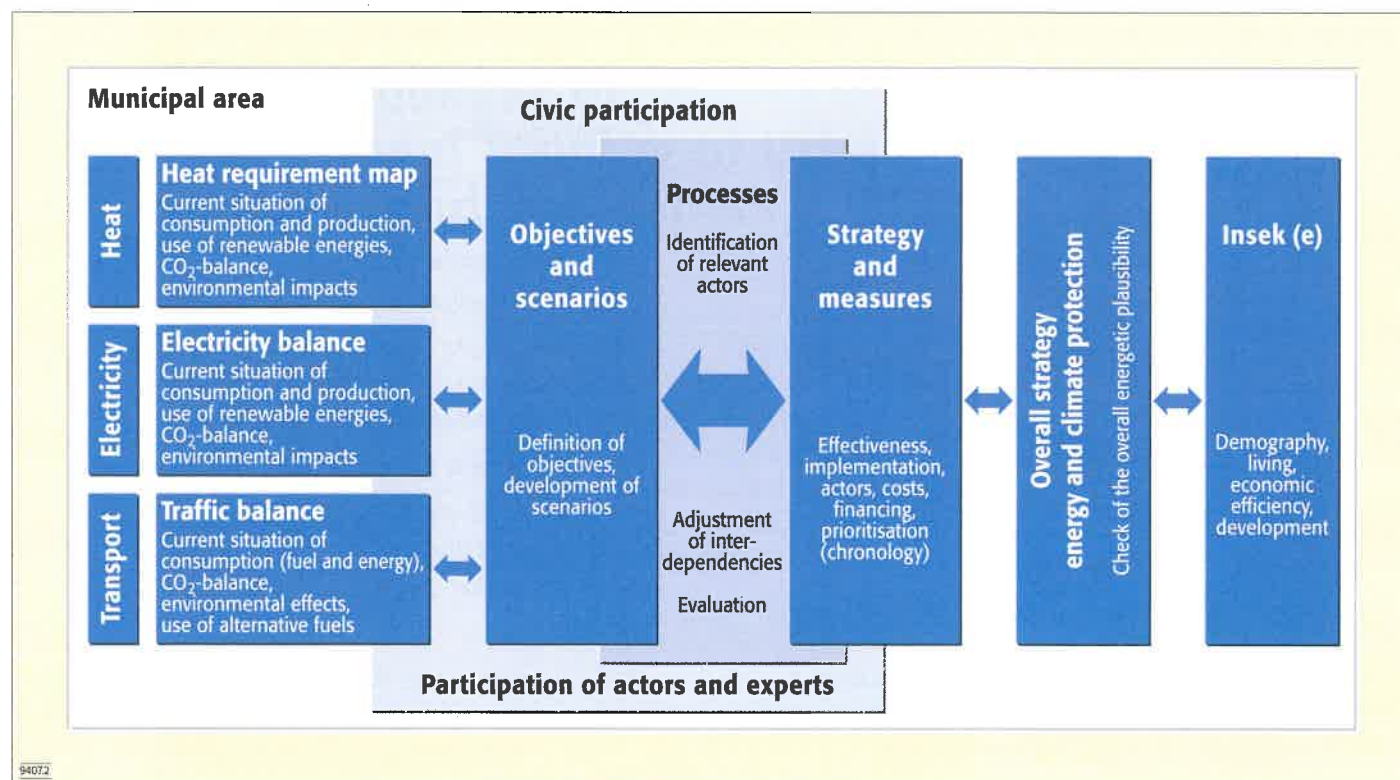


Figure 2. Creation of municipal concepts of energy and climate protection Source: AGFW based on Eneff Seko (IER/AGFW/BTU) [5]

However, the straight coordination of urban planning with local or regional energy suppliers is not or hardly conducted in most cases. The reason for this frequent lack of communication is the sporadic treatment of the »energy« subject in the past training of urban planners. Therefore, it is very important that both sides use the same language and know the key parameters of their partners, e.g. the time schedule of the planning method.

However, this also increases expectations to the player's skills. Today, urban planners/developers have to be experts in a lot of areas. Besides having knowledge in the areas of demographics, segregation

and integration, accessibility for handicapped, retail business, urban redevelopment, development of inner-city areas, urban quarters, and traffic, it has become more and more necessary to consider also energetic topics and plannings, in particular focusing on renewable energies. They also play the role of the mediator and moderator in the dialogue, and not to forget the guiding role for external consultants.

EC project UP-RES

In the energetic part, the EC project »Urban Planners with Renewable Energy Skills (UP-RES)« – September 2010 to February 2013 – follows

this approach. This project targets on strengthening the consciousness of energy and the usage of renewables in space planning. This focuses on an increased integration of energy topics in the training of urban planners. Here, it is very important to support the cooperation with municipal offices, free planners and municipal utilities.

The UP-RES project concentrates on overcoming and eliminating non-technical barriers that prevent renewables from penetrating the market. Urban and space planning represent a special focus, as energy has got the lowest consideration there so far. For some countries, there are already planning guidelines to increase energy performance and apply renewable energies, but planners in local authorities often do not have sufficient time and knowledge put these into practice. Within the context of this project, structures and training requirements are analysed, and methods are developed. Further, short and long courses in the domains of urban and regional planning are developed and implemented, in the five partner countries Finland, Germany, UK, Hungary and Spain.

Results from short courses and surveys

- Mismatch in the interpretation of the ultimate authority for decisions in energetic matters,
- mismatch in the internal concept of collaboration – within a town and with the municipal utility,
- compulsory requirement of matched processes,
- disagreement on technical and economic content,
- lack of trust between players, even when recognising a lack of detailed knowledge, and in spite of growing tasks and fields of activities,
- requirement of simple and clear processes,
- big question: But how? Who will realise it?

Concept	Fields of activity	Goals
The Herten climate control system 2020	<ul style="list-style-type: none"> • Climate-protecting energy supply • Climate-protecting mobility • Climate protection in existing buildings • Climate protection in new buildings • Communication and collaboration 	Decrease of CO ₂ emissions in the town of Herten by approx. 91,000 t by 2020 (basis 2006)
Integrated concept of energy and climate protection for the town of Leipzig	<ul style="list-style-type: none"> • Climate protection in urban development and land-use planning • Organisation of energy supply, dependant on environment compatibility • Climate protection in the traffic sector • Energy saving in buildings • Public relations work • Compensation of climate-affecting emissions 	Decrease of CO ₂ -emissions by 10% every 5 years; halving the per capita emission by 2030 (basis 1990); long-term decrease of emissions to 2,5 t of CO ₂ -equivalent per capita per year
The energy and climate approach for the town of Frankfurt 2008	<ul style="list-style-type: none"> • Power saving campaign: households • Restructuring initiative: residential buildings • Energy performance in non-residential buildings • Approach: clubs and churches • Public properties (focusing on municipality and university) • Sustainable energy supply • Climate protection pact Frankfurt 	Reduction of emissions in the city by 10% every 5 years
Climate protection concept 2007 – 2012 for Hamburg	<ul style="list-style-type: none"> • Hamburg's strategic power grid participation • Expansion and restructuring of district heat supply • Development of the renewable energy sector at the location by the Hamburg cluster of renewable energies • Energetic improvement of existing buildings • Promotion of a sustainable mobility behaviour in all traffic areas • Increased performance of industrial enterprises 	Reduction of CO ₂ -emissions by 40% until 2020 and by 80% until 2050 (basis 1990)

Table 2. Integrated urban development concepts

Source: [6;7;8;12]

The short courses serve as an introduction element and information database for the long courses. These contain tools and application support, workshops, seminars and field trips, as well as a final certification. Due to the big differences between countries, the training concept has to be adapted to all participating countries. In addition to this training concept, 30 best-practice examples will be selected and used in the training.

The best-practice examples, training concepts and the developed tools are published and communicated in ten languages, to promote the application of renewable energies in urban and regional planning. In this way, urban and regional planning can create better conditions for an increased use of renewable energies in Europe.

Results of the EU-RES project

In Germany, a total of six short courses were held (in Dresden, Frankfurt, Munich, Hamburg, Chemnitz and Berlin)

and long courses started successfully in June 2012. Co-operation partners for the short courses were the Saxon Ministry of Interior, the Technical University of Munich (TUM), the Association of Municipal Companies (VKU), the Technical University of Hamburg-Harburg (TUHH), the Hafen-City University of Hamburg and the German Institute of Urban Affairs (Difu). With more than 200 urban planners, it was possible to convey the emphasis of the training and the present approaches to enhance professional development and cooperation.

The discussions during the short courses and the survey results from more than 200 urban planners and supply enterprises, lead to the result that processes between municipalities and supply enterprises require more coordination in general. Nevertheless, there seems to be a strong discrepancy in the assessment of the ultimate authority for decisions in energetic topics, between municipalities and utilities. Further, it became clear that municipalities and also utilities assign a big significance to renewables regarding the future.

Modular structure of the advanced vocational training

- Module 1: Basic information and introduction into the system of a town – technical infrastructure
- Module 2: Basic conditions and data – energy, and energy efficiency
- Module 3: Physical/technical background/forms of energy/energy sources/buildings
- Module 4: Definitions of RES and possibilities/limits in practice
- Module 5: Basic economic principles
- Module 6: Concept preparation
- Module 7: Legislative framework of the realisation of energy/climate goals in politics and urban planning
- Module 8: Implementation measures – Best and worst practice with examples

In addition, it was determined that in former trainings of urban planners, the energy topic played a merely minimal role, and that it is therefore very important to improve this. In collaboration with the Hafen-City University, the first connectivities are implemented in the training of urban planners since 2008.

The experience from previous seminars and the survey results were incorporated into the advanced vocational training, which AGFW offers since June 2012 in collaboration with the German Institute of Urban Affairs (Difu). The high demand and great interest in such training is also confirmed by the recognition through the North-Rhine Westphalia chamber of architects, the Hessian chamber of architects and urban planners, the Schleswig-Holstein chamber of architects and engineers, and the Saxony chamber of architects.

Goals of the training

The goal of this training is to convey knowledge on the interfaces between urban planning/development and energy efficient infrastructures, to explain the interconnections and enable participants to design and implement their own concept of energy and climate protection. The training is targeted on specialised staff in the domains of urban planning/development and environment, and construction offices. Further, the offer addresses off-site planners, architects and responsible persons in utilities. Participants from utilities will get the opportunity to better understand the interconnection with municipal urban planning. They will be able to participate more efficiently in those plannings.

This training allows for the thought of connectivity between municipal planning and the suppliers. A basis of discussion is created through the knowledge conveyed to each side, on the work of each other's domain: Now a »common language« can be spoken. This also enables urban planners and utilities to collaborate in an optimal way, with matched processes, as part of energetic urban development. Only through this enhanced communication and collaboration, future challenges to urban planning and energy supply may be mastered in an innovative way.

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