

WP 3 Urban Development

REPORT 2

Energy efficiency in integrated urban development

Perspectives

July 2011

Author: Ministerium für Infrastruktur und Landwirtschaft des Landes Brandenburg, MIL (Ministry for Infrastructure and Agriculture of the Federal State of Brandenburg)

Compiled by the Urb.Energy working group which consists of the following companies:

Ernst Basler + Partner GmbH

B.B.S.M. Brandenburgische Beratungsgesellschaft für

Stadterneuerung und Modernisierung mbH

UrbanPlus, Droste&Partner



Part-financed by the European Union
(European Regional Development Fund
and European Neighbourhood and
Partnership Instrument)

This publication was compiled with the support of the European Union. The Ministry for Infrastructure and Agriculture of the Federal State of Brandenburg (Ministerium für Infrastruktur und Landwirtschaft des Landes Brandenburg, MIL) bears sole responsibility for the content of this publication which does not reflect the views of the European Union.

Ernst **Basler + Partner**



B.B.S.M.

Brandenburgische
Beratungsgesellschaft für
Stadterneuerung und
Modernisierung mbH

urban^{plus}
Droste&Partner

Author:

**Ministerium für Infrastruktur und Landwirtschaft des
Landes Brandenburg (MIL)**

Referat 22: Bautechnik, Energie, Bau- und Stadtkultur

Peter Busch

Henning-von-Tresckow-Straße 2-8

D-14467 Potsdam

Telephone: +49 331 8668200

E-mail: Peter.Busch@mil.brandenburg.de

www.mil.brandenburg.de

www.urbenergy.eu

Compiled by the Urb.Energy working group which consists of the following companies:

Ernst Basler + Partner GmbH

Stephan Kathke, Kathrin Senner, Tobias Schmeja

Tuchmacherstraße 47

D-14482 Potsdam

Telephone: +49 331 747590

E-mail: info@ebp.de

**B.B.S.M. Brandenburgische Beratungsgesellschaft für
Stadterneuerung und Modernisierung mbH**

Wolfgang Wünts, Rainer Blank

Behlertstraße 3a Haus B

D-14467 Potsdam

Telephone: +49 331 289970

E-mail: mail@bbsm-brandenburg.de

UrbanPlus, Droste&Partner

Thomas Knorr-Siedow

Nöldnerstraße 31

D-10317 Berlin

Telephone: +49 30 3221154

E-mail: Droste@urban-plus.eu

TABLE OF CONTENTS

1	Introduction and preliminary comments	1
1.1	Reason for and objective of the report.....	1
1.2	Structure of the report.....	1
2	The exchange of knowledge and experience in the Urb.Energy project	3
2.1	Transfer from a quantitative perspective.....	3
2.2	European energy policy as the basis for the Urb.Energy project	5
2.2.1	European energy policy	5
2.2.2	The Urb.Energy approach	6
2.3	Transfer from a qualitative perspective	7
2.4	Interim conclusion.....	12
3	Insights from current activities and projects in the Federal State of Brandenburg ..	15
3.1	Background situation in the Federal State of Brandenburg	15
3.1.1	Three phases of urban and district development	16
3.1.2	Integrated urban and district development	18
3.1.3	Creating a framework and developing energy policy in the Federal State of Brandenburg	18
3.2	Activities in the Federal State of Brandenburg	21
3.3	Projects carried out in Brandenburg as part of the National Urban Development Policy (NSP)	22
3.3.1	NSP Project Brandenburg Urban Network on Energy Efficiency and Climate Protection (BraNEK)	23
3.3.2	NSP Project Spreewalddreieck Regional Energy Concept.....	24
3.4	Model towns and cities involved in the ExWoSt research programme "Energy-efficient urban renewal in Brandenburg"	28
3.4.1	Guben - Integrated Energy Strategy 2020	29
3.4.2	Lübbenau/Spreewald - Lübbenaubücke / Energy 2021 Master Plan	30
3.4.3	Vetschau/Spreewald - A Community Centre with Energy!	32
3.4.4	Luckenwalde - District Energy Concept for the Nuthe/Burg Quarter.....	33
3.4.5	Prenzlau – 25/27/29 Schwedter Straße.....	34
3.5	Energy in towns and cities - measures aimed at embedding climate and energy policy in integrated urban development.....	35
3.5.1	Recommendations for homogeneous urban districts.....	36
3.5.2	Recommendations for heterogeneous urban districts.....	36
3.5.3	Overarching recommendations for action.....	37
3.6	Recommendations for action and lessons learned from activities and projects in the Federal State of Brandenburg	41
3.6.1	Relevant areas of activity.....	41
3.6.2	Instruments.....	44
3.6.3	Organisation and resources	46
3.6.4	Pilot projects.....	47
4	Recommendations for action for project partners from Brandenburg's perspective.....	49
4.1	Good practice approaches that can help project partners to develop appropriate strategic approaches	50
4.2	Recommendations on measures that should be implemented in the short term.....	54
	Appendices - Project profiles for projects in Brandenburg	55

LIST OF ABBREVIATIONS

BBR	Bundesamt für Bauwesen und Raumordnung (Federal Office for Building and Regional Planning)
BBSR	Bundesinstitut für Bau-, Stadt- und Raumforschung (Federal Institute for Research on Building, Urban Affairs and Spatial Development)
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
BMVBS	Bundesministerium für Verkehr, Bau und Stadtentwicklung (Federal Ministry of Transport, Building and Urban Development)
BMWi	Bundesministerium für Wirtschaft und Technologie (Federal Ministry of Economics and Technology)
BraNEK	Städtekrantz Berlin-Brandenburg / Brandenburger Städte-Netzwerk Energieeffiziente Stadt und Klimaschutz (Berlin-Brandenburg Planning Association / Brandenburg Urban Network on Energy Efficiency and Climate Protection)
BTU	Brandenburgische Technische Universität Cottbus (Brandenburg University of Technology Cottbus)
CEE	Central and Eastern Europe
CO ₂	Carbon dioxide
EEWärmeG	Erneuerbare-Energien-Wärmegesetz (Act on the Promotion of Renewable Energies in the Heat Sector/Renewable Energies Heat Act)
EnEV	Energy Saving Ordinance
ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
ExWoSt	Experimenteller Wohnungs- und Städtebau (Experimental Housing and Urban Development)


INSEK	Integriertes Stadtentwicklungskonzept (Integrated urban development concept)
KfW	Kreditanstalt für Wiederaufbau (Development Loan Corporation, German government-owned development bank)
MIL	Ministerium für Infrastruktur und Landwirtschaft des Landes Brandenburg (Ministry for Infrastructure and Agriculture of the Federal State of Brandenburg)
MIR	Ministerium für Infrastruktur und Raumordnung des Landes Brandenburg (Ministry for Infrastructure and Regional Planning of the Federal State of Brandenburg, since November 2009: MIL)
NSP	Nationale Stadtentwicklungspolitik (National Urban Development Policy)

1 INTRODUCTION AND PRELIMINARY COMMENTS

1.1 Reason for and objective of the report

This report, "Energy efficiency in integrated urban development – Perspectives", is the second report to be published by the Ministry for Infrastructure and Agriculture (MIL) as part of the Urb.Energy INTERREG project.

The aim of the report is to present the knowledge gained on integrated urban development in the German Federal State of Brandenburg and to derive from this knowledge concrete recommendations for action and strategic approaches for energy-efficient and climate-friendly urban development. These recommendations and approaches build on the findings of Report 1 "**Energy efficiency in integrated urban development – Interim assessment**" and, in particular, the experience gained in two of the MIL's project areas – the Brandenburg projects carried out in the context of the **National Urban Development Policy (NSP)** and the ExWoSt research field **Modellvorhaben zur energetischen Stadterneuerung (Pilot Projects on energy-related urban renewal)** – and on the recommendations of the report "**Energie in der Stadt**" ("**Energy in the City**"). A particularly significant role is accorded in this report to the international comparative perspective, which is a central element of the Urb.Energy project. Strategy and action recommendations are deduced from the findings and their transferability for the Urb.Energy project partners in the Baltic region is identified.



The objective of Report 1 **Energy efficiency in integrated urban development – Interim assessment** is both to present the experiences gained with the strategies and procedures of integrated urban development and to present and evaluate specific projects for increasing energy efficiency in the context of integrated urban and district development in the Federal State of Brandenburg. These projects are assessed on the basis of a selected catalogue of criteria that take into account the three Urb.Energy Work Packages on the topics of: "Integrated Urban Development" (WP3), "Technical Solutions" (WP4) and "Financing Opportunities" (WP5).

1.2 Structure of the report

The preliminary comments of Chapter 1 establish the connection with Report 1 and, in particular, explain the orientation of Report 2.

Chapter 2 considers the mutual transfer of knowledge and experience in the Urb.Energy project against the background of European energy and climate policy, and the experiences,

successes and difficulties encountered by the project partners and highlights their strategic approaches to energy-efficient urban and district development.

Chapter 3 examines the background situation, activities and projects in the Federal State of Brandenburg. The Federal State of Brandenburg's two central project areas on the topic of energy efficiency and climate protection in the context of integrated urban development are examined here and the insights gained are presented. The Brandenburg NSP (National Urban Development Policy) and ExWoSt (Experimental Housing and Urban Development) projects, which were already presented in Report 1, are evaluated in terms of their current status and the insights gained into these areas in the meantime. Recommendations from the report "Energy in the City" are then presented. This report was compiled under the auspices of Urb.Energy in 2010 and was commissioned by the MIL (Ministry for Infrastructure and Agriculture of the Federal State of Brandenburg). The insights from the activities and projects carried out in the Federal State of Brandenburg are summarised and edited.

Finally, Chapter 4 presents some key action recommendations for the Central and Eastern European (CEE) project partners of Urb.Energy.

The Appendix includes condensed presentations of ten exemplary Brandenburg Projects in the form of project profiles.

2 THE EXCHANGE OF KNOWLEDGE AND EXPERIENCE IN THE URB.ENERGY PROJECT

Together with the CEE and Baltic states, the Federal State of Brandenburg has been committed to the exchange of knowledge and experience on the sustainable development of the housing and settlements built using industrialised construction systems since the 1990s. Whereas the early years were dominated by neighbourly cooperation with Poland and the exchange of information about technological models for the sustainable refurbishment of buildings (SurEuro NAS, 5th EU Framework Programme for Research and various bilateral cooperation projects with Polish towns and cities), the focus in the Urb.Energy INTERREG project shifted to the exchange of information and knowledge on energy efficiency in integrated urban and district development and the experience gained in Brandenburg in recent years has been able to make a significant contribution to this.

2.1 Transfer from a quantitative perspective

Approximately 85 million people live in residential settlements in the European Union which were constructed after the Second World War and prior to 1990 using standardised industrialised construction methods. Of these, approximately 11 million residential units housing approximately 34 million inhabitants are located in the large housing estates of the former East Block states (outside the former USSR), which joined the EU in 2004. A further approx. 600,000 (Latvia), 435,000 (Estonia) and 750,000 (Lithuania) residential units constructed using prefabricated and other industrialised construction methods may be added to these 11 million units for these accession countries; therefore it may be assumed that a total of almost 13 million such residences exist in the eastern region of the EU. It is estimated that a further approx. 1.9 million industrially constructed post-War residences may also be found in Belarus, the only Urb.Energy project partner state outside the EU.

Measures for increasing energy efficiency have been carried out in many West European countries for around three decades and the pace of their implementation has accelerated over the past two decades. Considerable housing stock in the northern EU Member States, in particular, have now undergone extensive energy-efficiency upgrading. Hence, the adoption of a perspective that goes beyond the level of individual buildings and extends to the sustainable development of neighbourhoods, renewable energy sources and intelligent distribution structures is gaining in significance. Alternative solutions, such as the use of low-threshold measures and stand-alone solutions, which are tailored to local energy supply conditions as well as innovative financing processes and energy partnerships reduce unilateral dependencies and increase the flexibility for action. In contrast, comparable projects have only been carried out to a limited extent in the eastern EU accession countries and, in particular, in the Baltic states that previously belonged to the USSR; considerably less than 10 % of the post-war building stock in these countries have been refurbished. Parallels with the experience gained in the area of integrated urban and district development projects in the European Union from the 1990s, e.g. with the 'New Deal for the Communities' in Great Britain, the 'Politique de la Ville' in France and the 'Soziale Stadt' in association with the 'Stadtumbau' programme in Germany, can only be found to a very limited extent in the new eastern accession countries.

Overall, the challenges posed by the necessary increase in the energy-technology efficiency of cities and housing stock represent a strategic and financial problem on a pan-European scale that can scarcely be expected to be overcome at national level alone. Based on the assumption of a financial requirement of (only) EUR 5,000 per residential unit in the neighbourhoods with buildings constructed using industrialised methods and on the total number of such residences in the eastern EU and in Belarus alone, a total of EUR 75 billion would be required, which should be used to meet the requirements of energy efficiency and climate protection. As investments that are borne independently by the market, this sum would not include any further measures for optimised heat production and energy distribution and does not take into account schools, other infrastructure buildings or the older residential building stock, which have been long neglected and whose energy efficiency may be assessed as similarly deficient.

In view of the scale of the investments required, it is clear why the conveying of positive experience is not the sole focus of interest in Brandenburg when it comes to the transfer of knowledge about energy-efficient cities and integrated urban and district development concepts. It is far more a question of joint active participation in the implementation of the European Union's energy efficiency targets which are intended to contribute to mitigating the effects of climate change and exploiting the potential that may be associated with all aspects of such a policy. Ecological objectives are not the exclusive focus of interest here. If the efforts to increase energy efficiency in Europe in the area of urban development, housing stock and the production of goods and services were to fail, within a foreseeable period of time, the economic and social consequences of the energy price increases that may be expected as a result and the more severe effects on the climate would become a problem with a pan-European dimension, which would also have impacts on the quality and stability of life in Brandenburg.

Moreover, the unavoidable investment requirement for improved energy efficiency in Europe's cities is also associated with significant opportunities for socio-economic development. Firstly, the competencies developed in the fields of energy and environmental protection over the past two decades in Brandenburg present comprehensive export potential for goods and services. Secondly, with the increase in energy efficiency, considerable labour market potential is being activated in the CEE states themselves which contributes to the development of prosperity and welfare in these countries. The energy upgrading of buildings and infrastructure creates an employment-relevant market, which provides opportunities for increases in income and incentives for the training and qualification of employees. As a result, developments can be introduced on the basis of energy and climate policy that help to halt the emigration of qualified workers from the eastern partner countries, which, having been exacerbated by the economic crisis since 2008, has become an important factor in the demographic and socio-economic problems that prevail there.

2.2 European energy policy as the basis for the Urb.Energy project

2.2.1 European energy policy

From an early stage, the European Union undertook to reduce its emissions of greenhouse gases by 8 % as compared with 1990 levels by 2012 in the context of **international agreements** (United Nations Framework Convention on Climate Change, Kyoto Protocol 1997). European climate protection policy is embedded in the EU's Sustainable Development Strategy. The third dimension of "environment" was added to the Lisbon Strategy in Gothenburg as far back as 2001; this strategy, with its focus on economic and social policy, had been adopted a year earlier in 2000. One of the seven central challenges identified in the Lisbon strategy is "**Climate change and clean energy**". The EU defines its environmental policy priorities in the environmental action programmes. The current programme, which started in 2002 and will run until 2012, focuses primarily on climate change and climate protection through the reduction of greenhouse gas emissions as a central challenge that will be pursued more intensively in the follow-up programmes.

The EU has highlighted the special role of cities since 1996, at the latest, with projects for "**Sustainable Cities**" and, more generally, the highlighting of European cities as the social and economic power centres of development in 2007. Urban regions generate high proportions of Gross National Product (GNP). They are the most important producers of knowledge and innovation and over 80 % of EU citizens live in them (i.e. cities and municipalities with 10,000 or more inhabitants). The fact that around 75 % of European greenhouse gas emissions are also generated in cities is a fact that is linked with their developmental role. Hence, cities play a key role in the implementation of the EU's climate and energy-saving strategies. Thus, in the **Leipzig Charter** on Sustainable European Cities of 2007, the ministers of the EU Member States with responsibility for urban development supported the European strategy on sustainable development and highlight the importance of a sustainable integrated urban development policy in this context. One of three action strategies regarded as particularly important in this context is the modernisation of infrastructure networks and increase in energy efficiency.

In order to attain the objective agreed at European level of limiting the global temperature increase to a maximum of 2° C, the European Council identified the need for an integrated climate and energy policy concept at EU level. Based on this, together with the promotion of environmental sustainability and the combating of climate change, **increasing security of supply, safeguarding the competitiveness** of European economies and the **availability of affordable energy** were defined as objectives for European energy policy. In 2007, the European Council agreed on the 20-20-20 goal, which is intended to assist in the achievement of the two-degree target by:

- reducing greenhouse gas emissions by 20 % (or 30 % in the event of the emergence of a corresponding international agreement), – an increase to 25-30 % is currently under discussion;
- increasing the proportion of renewables used to 20 %; and
- increasing energy efficiency by 20 % (saving 20 % of primary energy).

With its integrated energy and climate package, the European Commission produced a comprehensive package of measures on energy and climate policy in 2008. The purpose of

this package was to ensure that the EU would achieve its climate targets by 2020. The package, which was definitively adopted in 2009, comprises six directives. These relate, inter alia, to an increase in the proportion of renewable energy sources used in electricity generation, in the heating and cooling of buildings and in the transport sector to a total of at least 20 % by 2020. Germany committed to achieving an 18 % reduction in greenhouse gas emissions by 2020 and to developing a national action plan to this end.

In 2008, the European Commission also published the 2008 Energy Efficiency Package, which was followed, inter alia, by the proposal for the updated **Directive on the Energy Performance of Buildings** (Directive 2010/31/EU), which was published in June 2010 and must be implemented for the most part by the Member States by 2012/2013. With the ten-year Europe 2020 economic programme, the European Union substantiated its objectives in 2010 and published the Resource Efficient Europe initiative, which is intended to contribute to the decoupling of economic growth and the consumption of natural resources through the promotion of renewables, the modernisation of the transport sector and the promotion of energy efficiency.

The European Commission will pursue the following five key aspects up to 2020:

1. Make Europe energy efficient.
2. Create an integrated Europe-wide energy market.
3. Increase consumer autonomy and achieve the highest possible level of security and hazard control.
4. Develop Europe's leading position in the area of energy technologies and innovation.
5. Strengthen the external dimension of the EU energy market.

It is intended to promote innovative integrated energy solutions at municipal level. This measure will be initiated in 2011 as one of four large European projects under the heading of "Intelligent Cities" and will combine the best of existing approaches. In addition, it is aimed to achieve 20 % energy savings through more efficient energy use – the main focus here is on the buildings and transport sector (acceleration of refurbishment measures, energy labelling of buildings, environmentally-friendly urban mobility). The EU presented a corresponding **Energy Efficiency Plan** in March 2011 which, however, will only be substantiated through the adoption of concrete regulatory measures at a later stage. In addition to the buildings sector and industry, the plan highlights the role of the public services as a role model and consumer with considerable market power. A progress report planned for 2013 is intended to examine whether the EU will achieve its overall objective by 2020. If this is not the case, the Commission will propose legally binding targets for energy efficiency at European level.

2.2.2 The Urb.Energy approach

The Urb.Energy project is devoted to the topics under discussion and aims to promote sustainable energy-related urban development strategies in residential areas in the Baltic Sea region. It combines the integrated urban development approach with the energy-efficient refurbishment of buildings, the renewal of energy supply infrastructure, the upgrading of the residential environment and the identification of innovative financial instruments. In doing this, Urb.Energy is able to build on the results of the BSR Interreg III B Project

"BEEN – Netzwerk für Energieeffizienz im Gebäudebestand des Ostseeraumes" ("BEEN – Baltic Energy Efficiency Network for the Building Stock").

Existing approaches being adopted in the relevant countries are being analysed and transferable integrated urban development strategies presented in the context of three work packages (urban development, energy and financial instruments). The focus of the "Urban Development" work package – of which Reports 1 and 2 are a part – is on the application of integrated urban development approaches with a view to increasing the energy efficiency of urban districts. Particular emphasis is placed on the action areas of **energy-efficient building refurbishment** and **modernisation of energy supply infrastructure**, the **upgrading of the residential environment**, the **improvement of social and economic infrastructure** and the **participation of property owners and residents**. This work package combines the evaluation of urban planning development processes and the partial implementation of integrated development concepts in the target areas with the exchange of experience between the actors and knowledge transfer. Practical guidelines and transferable approaches are also being developed in this context.

2.3 Transfer from a qualitative perspective

The INTERREG project Urb.Energy involved a conscious paradigm shift for the Federal State of Brandenburg in comparison with previous cross-border projects. Whereas previous cooperative undertakings usually concentrated on the energy upgrading of individual pilot projects, Urb.Energy adopts such projects and integrates them into general strategies for districts and, in the case of smaller cities in particular, the entire city in question.

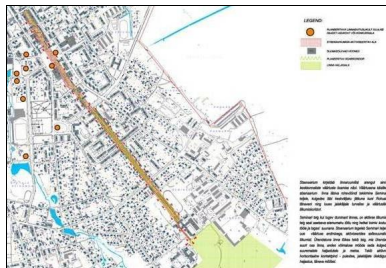
The Urb.Energy workshops, a tour of the Urb.Energy project partners in the CEE states and Belarus and technical discussions carried out there with municipal actor groups and national bodies revealed that the measures initiated by the EU to increase energy efficiency and for the benefit of climate protection at municipal level are actually inspiring the participating actors to act increasingly on an interdepartmental basis and develop integrated concepts. The Urb.Energy projects clearly demonstrate to the actors that the efficiency targets agreed in the EU can only be achieved by taking into account the systematic links between buildings, energy-technology infrastructure and settlement structures and the associated social and economic conditions – demographic trends, economic and income development, the behaviour of users and finance modes are particularly important in this context. Moreover, a precondition for successful management leading to greater energy efficiency is that all of the relevant actor groups and end users are incorporated into the process at an early stage and on an ongoing basis. This transition from the previous processes, which were segmented and related to individual cases, to integrated overall concepts, which was triggered by the policies for increasing energy efficiency, is a complicated process and not without contradictions nor immune to resistance.

The demand for change is high and is viewed by the Urb.Energy partners as a challenge involving the replacement of a planning culture that was predominantly characterised by sectoral planning and centralistic traditions with **actor and network-oriented strategies**, which incorporate and strategically implement local potential. The case-study-oriented **potential and deficit analyses** (SWOT) methodology and an **integrated action concept** for the entire city and the exemplary districts analysed developed from this – accom-

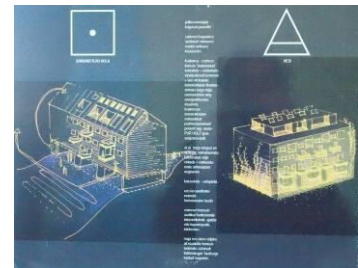
panied by the **international exchange of experience and knowledge** between the project partners – proved to be a suitable strategy for the Urb.Energy project.

Urb.Energy includes a total of 20 project partners and associated organisations which focus on the exemplary neighbourhoods. All of the neighbourhoods of the CEE states display elements of integrated development planning with a view to the promotion of greater energy efficiency in practice. The local Urb.Energy projects see themselves on different levels as key projects for local development.

Rakvere (EST) is a rural regional centre in northern Estonia with approximately 16,000 inhabitants. Its population has been in decline for several years. The energy upgrading of a ribbon-like neighbourhood, "Seminar Street", is used as a model for the redevelopment of the entire urban structure and to link this area with the historical old town centre through the city centre, which arose after the War, and to develop a shared vision for the city as a whole. In the neighbourhood itself, which consists largely of standardised residential blocks, in addition to the problems associated with the limited economic potential of the often elderly residential owners, the fact that only a change of image and architectural impressions combined with energy upgrading will maintain the attractiveness of the neighbourhood in the future residential property market is also problematic. The necessary conviction and participation process is being pursued in an exemplary manner in that the city is promoting the involvement of the property owners with the help of external expertise and a convincingly conveyed energy audit.



© UrbanPlus



Status: development of spatial, social and communication concept, energy audit, structural alternatives and open space concept.

With the public KREDEX bank, Estonia is the only one of the eastern EU Member States with a revolving financial instrument – comparable to the German KfW – which is integrated into the Urb.Energy project. Through its exemplary public relations work, which generates visibility in the public arena, the press and on television, KREDEX offers financial services for investments in energy saving and refurbishment by residents throughout the country, which, however, due to the current economic crisis, can only be successfully marketed with the help of a subsidy element.

Riga Jugla (LAT) is a large peripheral housing estate built between the 1960s and 1980s and incorporating some housing agglomerations from the post-transition period. The estate

is located in a popular close-to-nature location 10 km from the city centre. By reducing energy consumption and implementing measures to enhance the residential environment, the city council aims to prevent the impending devaluation of the housing stock and to establish the area as a future-oriented green neighbourhood as the change in the resident population, expected for demographic reasons, unfolds. Riga has an excellent set of instruments for integrated development and planning at its disposal which, however, needs to establish a counterpart at neighbourhood level. As the energy upgrading of public buildings progresses, promotion strategies are required that reflect the economic capacities of residential property owners and can be made accessible to them. In the context of the current economic crisis, the focus is on low-cost living which, paradoxically, can only be ensured in the long term through costly investments in energy-saving measures. At neighbourhood level, it is planned to overcome the segmentation of interests and to develop a high level of technical and media competency for integrated development through the establishment of a redevelopment agency with the involvement of the city.



© UrbanPlus



Status: establishment of a redevelopment agency, refurbishment of public infrastructure buildings, energy audit, development of a strategy for residential blocks, concept for the qualification of public space; development of finance strategies.

Jelgava (LAT), a city with almost 64,000 inhabitants and a shrinking population uses the planning for the energy-efficient reconstruction of residential buildings to develop a vision for enhancing the attractiveness of the city centre, whose approximately 20,000 inhabitants represent one third of the total population. The limited economic capacity of the residents and partly segmented activities on the part of the public actor group make it difficult to implement this objective. Particular problems are posed by the hitherto insufficient promotions offered by the state and private entities, which would be necessary to guarantee costs that could be borne by the residential property owners, and the, in part, problematic agreements between the municipal and state levels and the energy suppliers. The insufficient funding – in part, the lack of credit-worthiness of individual property owners and inadequate subsidy components – make user participation difficult. Jelgava is making a particular effort in the area of the technological upgrading of old heat supply networks. The administration lacks planning and consultancy capacities due to the savings measures implemented at national and municipal levels in response to the economic crisis. Following the implementation of pilot projects, the Jelgava project will have to progress from the technical audit and planning stage to a social routine for its implementation.

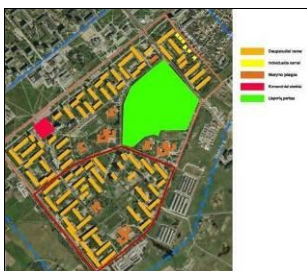


© UrbanPlus



Status: technological upgrading of the old heating supply networks, development of implementation strategy for the integrated urban development concept through pilot projects.

Šiauliai (LIT) is a city in northern Lithuania with a population of 130,000. The Lieporiai/Miglovaros neighbourhoods have a large collection of different residential block types which originate from the pre-1990 period. Up to now, only a small proportion of the buildings have undergone energy upgrading, and the majority of the buildings, as with the heating conduction system, which has not been fully upgraded, and the technology used in older combined heat and power plants generate major energy losses and costs for residents. Despite significant economic problems in reproducing successful pilot projects with a broad impact, by providing integrated neighbourhood development concepts, the city aims to create the preconditions necessary to ensure that deficits can be remedied in areas where better overall economic perspectives and suitable promotional programmes exist. In spite of all the efforts, however, gaining understanding among residential property owners, the city planning actors, who are aiming to achieve integration, and the monopolistic energy suppliers and national policy, in particular, for the fact that long-term energy efficiency is also a precondition of social and economic sustainability in the neighbourhoods is viewed as a difficult undertaking.



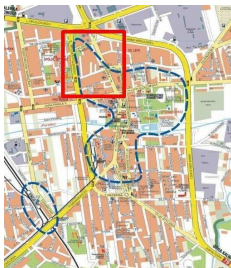
© UrbanPlus



Status: provision of integrated neighbourhood development concepts; energy audits and pilot projects provide the opportunity for the development of plausible strategies for increasing efficiency.

Piaseczno (PL), a city with 40,000 inhabitants, benefits from its proximity to the metropolis of Warsaw and has been experiencing an economic boom and population growth since 1990. The case study area is dominated by residential blocks from the 1960s to 1980s, which are at risk from social polarisation. The established population is ageing. Whereas those who have recently moved to the neighbourhood are often merely seeking cheap

accommodation, settlements inhabited by prosperous residents are emerging in the surrounding areas. Building on comprehensive energy audits, concepts arise in which the aim of energy efficiency and measures to enhance the residential environment (open spaces, waste management, social control) should develop a synergy that will contribute to the comprehensive upgrading of the neighbourhood. One challenge faced by the administration and professional experts is to achieve the active involvement of the citizens and local political arena in the measures undertaken as part of the integrated urban development concept approach. The integrated approach is viewed by the external consultants as a precondition for the prevention of social exclusion and a lifestyle-oriented development that takes the elderly, in particular, into account.



© UrbanPlus



Status: energy audits are implemented and concepts created on the basis of their findings; a strategy for selected sub-neighbourhoods is being developed on the basis of individual pilot projects.

Lida in the **Grodno** region (**BEL**) is a regional city in western Belarus with approximately 40,000 inhabitants which, as a non-EU project partner, has adopted the objectives and methodology of the Urb.Energy project. Its only case study, Lida/Grodno, is part of a planned economy and central state system. While the city recorded comprehensive state investments in the public arena in 2010, environmental and energy efficiency investments in the residential building stock and in energy generation have only been made in a few experimental cases up to now. Due to the strong central state influence, local self-organisation is limited and, despite a privatisation rate of 85 %, the influence of residents on the development of residential blocks, which are also centrally managed, is minimal. The support of the Urb.Energy partners is viewed as a means of accessing a locally dominated district development strategy.



© UrbanPlus



Status: externally supported pilot projects, development of an energy concept for the entire city without the direct possibility of implementation.

2.4 Interim conclusion

For the comparison and transmission of experience, it is particularly important that, despite the different process experiences in the post-1990 development of the cities, many structural parallels may be observed.

- The majority of the Urb.Energy project's partner cities are medium-sized cities and, with the exception of Piaseczno and the Brandenburg cities examined, are mostly located in thinly populated regions characterised by population decline.
- The populations in the majority of the cities are declining both as a result of ageing and migration.
- As is the case in Brandenburg, these small and medium-sized cities assume an exemplary role as infrastructural anchors and leading structures for the common good, in particular in peripheral areas.

Comparisons can also be made with the urban-technical and settlement-structural conditions. Not only do the standardised residential blocks built using industrial construction methods assume a significant position in the Brandenburg cities and in the CEE states, the basic urban design structures of the settlements constructed after the Second World War are also largely similar. Based on over 40 years of a comparable system development, it is possible to find planning culture parallels in the background situation and in the management of change that can result in mutual learning from the experience of the other partners in the shared discourse, for example about the relationship between the urban administration and civil society.

In contrast, clear differences exist in the nature of institution building, i.e. the tools used in the promotion of development and housing policy, since 1990. Whereas in Germany the federal authorities and the federal states became involved in the provision of comprehensive support for the development of a social housing market and the formation of strong municipal structures, the development in the CEE states in the first 15 years after the political change, at least, was characterised by the extensive withdrawal from housing policy and funding. The extensive individual privatisation of housing to tenants with the hesitant introduction of reliable regulations on common property – the building shell, building services, site and relationship with the neighbourhood – and their management led to the atomisation of interests in many cases. Along with the difficult income situation and the effects of the international financial crisis, which were more acute in the CEE states – with reductions in income of up to 30 % – these developments prevent concerted action which is necessary to increase energy efficiency.

Technological conditions and the implementation of measures

Although historical buildings are dispersed throughout almost all of the neighbourhoods, the existing housing and settlement stocks are largely characterised by industrialised construction methods. Experimental solutions for the energy upgrading of residential buildings can now be found in all of the neighbourhoods examined by the project. Their effective implementation on a mass scale in accordance with the EU's climate guidelines is not primarily

hindered by technical limits, but fails due to the inadequacy of the available funding and previous financing structures, which are incompatible with the material situation of the majority of residents. Under these conditions, which have been further exacerbated by the current economic crisis in the CEE states, questioning the aspired energy standards from a socio-economic perspective is considered necessary in the target areas. Measures that gradually lead to appropriate energy savings, and hence do not put too much of a strain on the public institutions that provide the finance and users, are generally deemed preferable to state-of-the-art solutions. Hence, it makes sense to carry out plausibility checks so that locally adapted strategies can be identified. The subjection of measures to a plausibility check should prompt the consideration of marginal utility factors which, in turn, give rise to the optimisation of the energy-saving and value-conservation of settlement structures, which takes into account the relevant social, housing management, technical and economic data and hence enables the avoidance of unsuccessful investments. Such considerations have not previously been incorporated into the integrated neighbourhood development concepts.

Innovation transfer

Whereas the transfer of technological knowledge at building level does not pose any problems, the transfer of innovations in the area of energy generation and intelligent distribution networks is deficient. Under the influence of centralistic production structures, the alternative forms of energy generation that have been tested in Brandenburg in recent years have received little attention in the CEE states. Wind energy, small flexible energy generation plants, geothermal energy and intelligent networks have seldom been tested there up to now and the potential they offer is viewed as low. This prompts the risk of incorrect investments in traditional large-scale industrial standard solutions while hybrid solutions using many different technologies are already being adopted in other locations. A more intensive exchange of information about cutting-edge energy generation and distribution technologies is considered desirable so as to ensure energy efficiency and the economic sustainability of climate strategies and economic growth.

Finance

In many instances, the energy-saving measures adopted under the conditions of existing credit and funding programmes do not reflect the actual financial capacity of the residents. Hence, the latter are almost forced to reject participation in measures to increase energy efficiency even if they agree with the objectives in principle. In general, a subsidy component is viewed as necessary – to the extent, at least, that the cost incurred by users in increasing energy is already balanced out by the savings made in the short term. However, the introduction of subsidies on the required scale exceeds the current capacity of the available public resources. Revolving funding models are generally viewed as promising even if they can only generate a very limited market response under the current crisis conditions. The resources provided up to now by the states and the European Union scarcely meet the demand and the co-financing possibilities available to the users. The provision of subsidies to the main population groups is viewed as necessary in all target areas even if it takes the form of an income-dependent component of a general financing model.

Market behaviour, value development and energy efficiency

Because its sale is not viewed as an option, housing that has become the property of former tenants as a result of privatisation is often viewed exclusively from the perspective of its current utility value and not in terms of its economic market value. Residents also frequently consider the long-term increase in value through the improvement of energy efficiency exclusively from the perspective of the resulting short-term loss of liquidity; a perspective that goes beyond individual concerns is lacking. In view of the fact that an increase in transactions involving the housing stock will arise of necessity in a society characterised by ageing property owners, in the view of the project partners, the opportunity arises for the development of alternatives to individual ownership, for example owner cooperatives. These would facilitate joint strategic management – including energy upgrading – and represent a strong actor group vis-à-vis the municipalities and subsidising bodies.

Building culture and quality as a precondition for sustainable district development

Consideration of the expected demographic developments, the lack of available living space (approximately 25-40 m²) in comparison with western European countries and the increase in the number of households in view of individualisation of living conditions would support the expectation of continuing precariousness in relation to the housing market. The already identifiable regional differences in the demand for housing will become even more acute. Whereas unoccupied housing is expected to arise in some areas, the demand for living space will exceed availability in others, at least in the lower price segments of the market, as are typical of the case study areas. In some places, a decline in value can lead to settlements that were previously occupied by the average population becoming increasingly accepted and sought by problematic social groups. In the context of an accelerated increase in prosperity and mobility as the economic crisis wanes, this trend towards social segregation is at risk of intensification. Hence, from a long-term perspective, an approach that concentrates exclusively on energy efficiency and refurbishment without checking the plausibility of achieving an increase in the attractiveness of the architecture, infrastructure and public space in the individual areas under consideration would appear to be problematic.

Governance and institutions

In general, municipal administrations that are committed to increasing energy efficiency can be found in all of the target areas. However, they are faced with weak user and owner institutions and, in many cases, centralist structures of centralised-state management and energy-sector structures which are opposed to integrated action strategies. Cooperative actor alliances and networks are lacking in the neighbourhoods, cities and regions. The transfer of the experience of city cooperations and the qualification of property ownership associations for the partnership-based negotiation of strategies are also seen as a challenge, as is the development of local (redevelopment) agencies for the implementation of energy strategies with the participation of the municipalities, which can act as strong partners for the property owners and the energy sector and can competently steer the implementation of measures – with the involvement of all of the relevant parties. It is important to note that this will require the strengthening of municipal competencies and the provision of corresponding personnel and external consultancy resources.

3 INSIGHTS FROM CURRENT ACTIVITIES AND PROJECTS IN THE FEDERAL STATE OF BRANDENBURG

The activities and projects presented below should be considered against the background of Urb.Energy's task in the context of European energy policy (cf. Chapter 1.2) and the specific socio-economic and legal conditions that prevailed in the Federal State of Brandenburg (cf. Chapter 3.1) over the process of transformation of the past 20 years. These conditions arise in varying forms in the project partner countries (cf. Chapter 2.3). Attention is drawn here to the heterogeneous property ownership structures – which are characterised by a high proportion of individual property owners – a low level of awareness, the establishment of integrated approaches and development concepts at overall city and district level as well as differentiated actor structures and a limited culture of participation by the relevant actor groups, in particular residents and owners. Chapter 3 presents an extract in summarised form from the insights illustrated here gained from the Brandenburg projects for the city actors involved and for the Federal State of Brandenburg. The insights gained for the project partners are then presented in Chapter 4 in the form of recommendations for action – these are applicable irrespective of population development in the CEE states, which is not characterised by decline in all cases.

3.1 Background situation in the Federal State of Brandenburg

The post-1989 transformation process in the eastern regions of Germany led to fundamental social and economic changes in the Federal State of Brandenburg which are clearly reflected in the areas of urban development and housing. The state and the municipalities faced a large number of tasks simultaneously after 1990. The neglected older inner-city building stock had to be upgraded rapidly, the residential areas built using industrialised construction methods had to be adapted to the demands of a changing society and new buildings needed to be erected to meet quantitative demands and satisfy the new quality requirements.



© B.B.S.M.



© B.B.S.M.



© B.B.S.M.

At the same time, the outdated infrastructure had to be modernised so that it could meet the social needs of modern cities and offer a basis for the economy. The most important conditions for urban development and housing included the economic-spatial consequences of the transition from a planned to a social market economy and the demographic transformation, which was reflected in the ageing of society and in a clear decline in the population particularly in the peripheral areas of the federal state.

The importance of ecology and climate protection has changed significantly over the course of the past two decades. Whereas energy efficiency was initially more a consequence of the

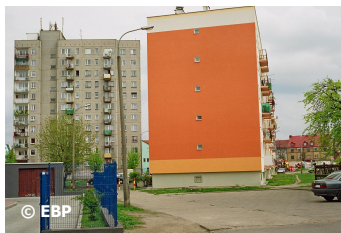
measures necessary to curb energy costs, in recent years it has shifted to the focus of integrated regional development based on climate protection, which may only become possible on the necessary scale through the progress achieved in the upgrading of buildings and promotion of urban development in the past two decades.

Other conditions also play a significant role in the development of the cities and housing in Brandenburg, particularly in terms of the comparison with the new EU Member States in Central and Eastern Europe. Firstly, the transformation was boosted by the options available for state promotion and private investment opportunities in a country that is wealthy in comparison with the other CEE states. In addition, it was possible to buffer the consequences of the transformation, and all of the associated problems, through the adoption of the laws and economic system of the Federal Republic of Germany, the transfer of information and experience bolstered by the shared linguistic area and the comprehensive social transfer. The early decisions about the structure of the housing sector were also highly significant. Whereas in many cases in the CEE states responsibility for development was withdrawn from users due to the rapid individual privatisation of housing, in Brandenburg the formation of municipal and, later also, private housing companies and the retention of comprehensive cooperative stock, rapidly established an effective housing sector with corresponding management structures which was able to become an effective partner for politics and residents.

3.1.1 Three phases of urban and district development

Viewed retrospectively, the processes of the past 20 years can be classified in three phases.

- In the housing sector, the early post-1990 years were characterised by the restitution of older housing stock and the transfer of industrialised housing to municipal housing companies.

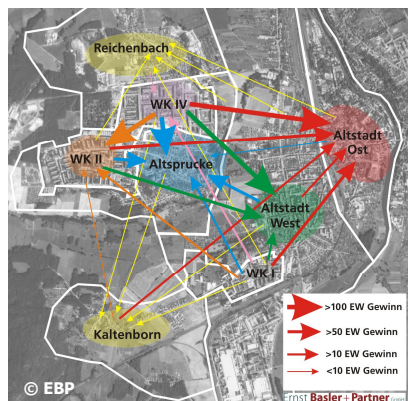


An important precondition of this was the formation of plots as a prerequisite for suitable sustainable management and allocation between private and public areas. After around 1993, privatisation to institutional investors arose on a comparatively small scale, while, despite the subsidies offered by the state and the existence of established residential property law, the offer

of privatisations to tenants met with very limited interest. The vast majority of the housing stock built in the industrialised construction style remained rented properties. High tax write-offs for refurbishment and modernisation and comprehensive promotional programs for the upgrading of buildings and infrastructure made it possible, inter alia, for the initial steps in the energy upgrading process to be completed. These first steps involved the modernisation of heating systems and reduction of heat transfer along with the consumption-based billing of water and heat use. Up to the year 2000, the Brandenburg cities were in the throes of a clear transition phase. Urban development and planning were largely sectoral and reactive in nature. The vast modernisation and refurbishment bottleneck that had built up over the years in the building and infrastructure stock would be remedied with the aim of developing "Lebenswerter Städte" ("cities worth living in") so that the constitutional task of providing equivalent living conditions throughout the Federal Republic of Germany could be fulfilled. A response had to be provided to the intensive pressure for investment in infrastructure, various housing stock and the

construction of new buildings, in particular, and little or no scope existed for interdepartmental and integrated urban development strategies.

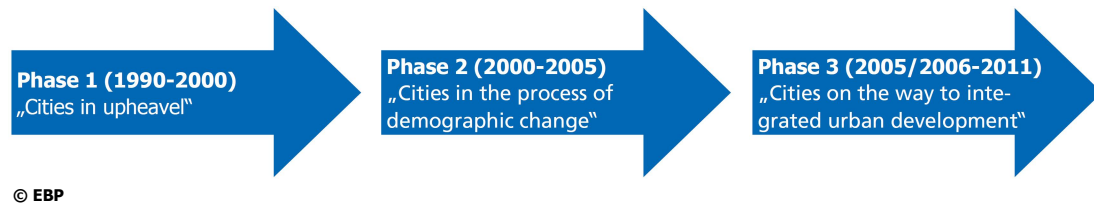
- Following the completion of the extensive refurbishment of building stock and the comprehensive construction of both apartment buildings and detached houses, the period from 2000 to 2005 in the urban development planning of the Brandenburg cities was characterised by the reaction to the rapid demographic change (reaction to the fast decline in population in large swathes of the region and the long-term forecast of negative population development due to the ageing of the population). The strategy shift from the focus on buildings to the consideration of neighbourhoods and districts was linked with the swift reduction in the vast stock of unoccupied properties through demolition and the simultaneous upgrading of the remaining stocks and corresponding adaptation of the infrastructure. Within the urban redevelopment process, a high level of awareness emerged for the fact that this process involved numerous areas of urban development simultaneously. Hence, integrated approaches and the early involvement of actor groups and stakeholders were deliberately adopted. The experience gained from the Stadtumbau-Ost project (redevelopment of the east of the city) was later incorporated into the Stadtumbau-West programme (redevelopment of the west of the city), a joint project of the German government and federal states. During this phase, the actors at local level in the Federal State of Brandenburg began to develop an awareness of the scarcity of conventional energy resources, increasing energy costs, dependency on global developments and a greater level of environmental responsibility.
- Due to the growing complexity of the tasks involved, urban development since 2005 has been increasingly understood as an interdepartmental cross-sectional task and hence as



a "Dachpolitik" ("umbrella policy"). With the Leipzig Charter (2007), integrated urban development as a principle for the sustainable development of European cities became a central concern throughout Europe. In the Federal State of Brandenburg, the instrument of integrated urban development concepts (INSEK) became established as a basis for all sectoral planning, for larger projects and for the promotion of urban development using public funding. Brandenburg's promotional programmes were and are more strongly based

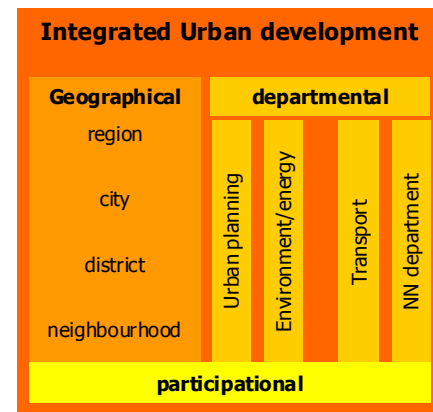
on the consideration of energy efficiency in urban development and housing, and the integration of special programmes for the promotion of energy efficiency arises at federal level (KfW). Climate protection concerns are currently increasingly being incorporated into sustainable integrated urban development. The launch of the federal research project "ExWoSt – Energetische Stadterneuerung" ("Experimental Housing and Urban Development – Energetic urban renewal") signals the extensive need for research and action linking the topic of energy efficiency with the challenges of urban redevelopment and urban renewal. Based on the Leipzig Charter, the federal authorities have, beyond the realignment of the urban development promotion programme, initiated a National Urban Development Policy (Nationale Stadtentwicklungspolitik, NSP) in Germany and

climate protection is becoming an important focus for action in the context of sustainable urban development strategies.



3.1.2 Integrated urban and district development

An integrated approach to urban development has now become established at all planning levels in the state of Brandenburg and, in particular, in the cities. Climate change and the associated challenges, in particular, of increasing energy efficiency and the use of renewables are recognised more and more as central to regional and urban development. In addition, a number of the Brandenburg cities are already focusing on these tasks in the context of the aforementioned federal initiatives and projects. The development of integrated municipal and regional energy and climate protection strategies are increasingly gaining in significance in the context of urban development. The Federal State of Brandenburg is currently (2010/2011) launching a promotional programme (REN*plus*) in support of this development.



In summary, in terms of the promotion of energy-efficient development in the Federal State of Brandenburg, it is possible to observe a shift from a property-related strategy during the first decade after German unification to the targeted support of a sustainable urban and district development that is aware of the prevailing economic, social and ecological conditions and makes intensive use of energy-technology innovations.

3.1.3 Creating a framework and developing energy policy in the Federal State of Brandenburg

In addition to the energy policy framework provided by the EU, presented in Chapter 2.2, the Federal State of Brandenburg's energy policy is also accompanied by the framework provided by the German state.

Energy policy framework at national level

Under the Kyoto Protocol, the Federal Republic of Germany committed to reducing its emissions by 21 % by 2012 (compared with 1990 levels). The National Climate Protection Programme serves in the implementation of this commitment and covers the most important measures in sectors that are not involved in the European or international emissions trading. In accordance with the Climate Protection Initiative, the proceeds from the emissions trading are invested in measures to reduce emissions and are distributed between measures to be

undertaken at home and abroad, e.g. the funding programme for municipalities, social and cultural facilities.

Based on the 29 measures of the Meseberg Programme, the Federal German government passed the Integrated Energy and Climate Programme (Integrierte Energie- und Klimaprogramm, IEKP) in 2007. This programme applies the European decisions on an integrated European climate and energy policy and the associated European objectives at national level and implements them through a concrete programme of measures. The stated aim of the programme is to

- reduce greenhouse gas emissions by 40 % below the 1990 level,
- increase the share of electricity generation accounted for by renewables to at least 25-30 %,
- increase the share of heat generation accounted for by renewables to at least 14 %,
- increase the share of electricity production accounted for by the cogeneration of heat and power to 25 %

by 2020.

With the IEKP, the federal government initiated 14 laws and ordinances and seven additional measures, for example the amendment of the EEG (Renewable Energy Sources Act), the EEWärmeG (Renewable Energies Heat Act), the amendment of the Energy Saving Ordinance – EnEV and the continuation of the CO₂ building refurbishment programme. As part of the sustainability strategy, it is also aimed to double energy productivity as compared with 1990 levels – a measure that would necessitate an increase in energy efficiency across the entire energy chain.

The roadmap, Energy Policy 2020, an integrated energy policy concept that looks further into the future, was published in 2009. It is clear from this policy that Germany sees the establishment of an integrated urban development policy as an important component of climate protection.

In late 2010, the federal government presented an energy concept for an environmentally friendly, reliable and affordable energy supply developed jointly by the Federal Ministry of Economics and Technology (BMWi) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). This concept formulates guidelines for future energy supply up to the year 2050 and describes the path to be taken into the age of renewable energies. This further supports the existing objectives of the federal government on a long-term basis until 2050. The focus here is on a gradual reduction of greenhouse gas emissions until 2050 by between 80 % and 95 %. The share of gross final energy consumption accounted for by renewables should be 60 % by 2050 and the share of gross electricity consumption accounted for by electricity generated from renewable energy sources should be 80 %. Primary energy consumption should fall by 50 % by 2050 as compared with 2008 levels and electricity consumption should be reduced by 25 %. The rate of energy refurbishment for buildings should be doubled from the current annual level of less than 1 % to 2 % of the total building stock. In the area of transport, final energy consumption is to be reduced by around 10 % by 2020 and by around 40 % by 2050, as compared with 2005 levels. The energy concept defines measures in nine areas of activity, for the implementation of the objectives. These concern, for example, action requirements in relation to

- the "key question of energy efficiency" in private households, in the public sphere and in the municipalities (e. g. climate and energy funds, supplementing the national climate protection initiative),
- "energy upgrading of buildings and energy-efficient building", which are viewed as the most important measure for the reduction in fossil fuel consumption (almost 40 % of final energy consumption is accounted for by this sector) and are proclaimed as the long-term objective of a practically climate-neutral building stock (e.g. the amendment of the EnEV in 2012, "Energy-efficient retrofits for urban buildings" funding programme)
- the "Herausforderung Mobilität" ("Mobility Challenge") (e. g. six million electric vehicles by 2030, orientation towards zero emissions vehicles, incorporation of air traffic into emissions trading, shifting of freight transport from road to rail) and
- the "acceptance and transparency" of energy policy in the public arena.

Energy policy of the Federal State of Brandenburg

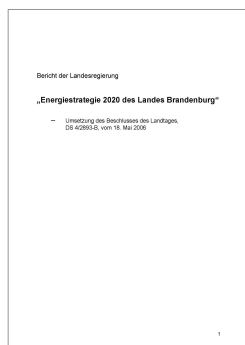
The Federal State of Brandenburg presented the challenges of climate protection and energy as far back as 1996 with its energy concept. In 2002, the federal state government passed the energy policy action framework of the Federal State of Brandenburg until 2010 with its "Energiesstrategie 2010" ("Energy Strategy 2010"). An action concept was developed for the implementation of the strategy. The further development of the energy strategy from the year 2002 was enshrined in the resolution of the Brandenburg state parliament of 18 May 2006 "Zukunft sichern – Brandenburg als Energieland ausbauen" ("Securing the Future – Developing Brandenburg as an Energy State").

National and international energy and climate policy objectives are currently supported in the Federal State of Brandenburg by the "Energiesstrategie 2020" ("Energy Strategy 2020"), which was passed by cabinet in 2008, and the "Maßnahmenkatalog zum Klimaschutz und zur Anpassung an die Folgen des Klimawandels" ("Catalogue of Measures for Climate Protection and Adaptation to the Consequences of Climate Change"); additional objectives are also being formulated in some areas. The "Energiesstrategie 2020" defines the Federal State of Brandenburg's energy policy and energy sector guidelines. The focus here is on the provision of a secure and economically viable energy supply in the long term and the reduction of CO₂ emissions. Here, Brandenburg is

pursuing the triple objective of security of supply, competitiveness and environmental and climate compatibility. The quantitative strategic aims of the energy strategy up to 2020 are

- reduction in final energy consumption by 13 % (as compared with 2004, i.e. an average of 1 % per year);
- increase in the proportion of primary energy consumption accounted for by renewables to 20 % (in particular solar energy, biomass and wind power); and
- 40 % reduction in CO₂ emissions by 2020, as compared with 1990 levels, and a further 35 % by 2030 (to be achieved through greater energy efficiency, carbon capture and storage (CCS) with brown coal conversion).

In order to achieve its energy policy objectives, the state of Brandenburg sees a need for measures that go beyond the efforts of the EU and German federal authorities and is focusing the necessary strengths and potentials in the action concept for the energy strategy.



For the implementation of the energy strategy, Brandenburg is banking, in particular, on communication with all actor groups, on the provision of information and consultation, the creation of incentives, networking and the exchange of experience. Responsibility for the coordination of the strategy lies with the "Energy Strategy 2020" inter-ministerial working group. This group incorporates the affected policy fields on an interdepartmental basis as well as the promotion of urban development and residential space and integrated urban development.

With its resolution of 25.03.2010, the Brandenburg state parliament stipulated that reports be presented on the implementation of the Energy Strategy 2020 and also requested further-reaching concrete measures (e. g. continuation of the energy strategy – developed on the basis of proposals from the "Energie in der Stadt" ("Energy in the City") report – and agreements on climate protection objectives with the housing sector associations). Brandenburg's "Energy Strategy 2020" is currently being updated.

3.2 Activities in the Federal State of Brandenburg

The linking of urban development, energy and climate policy in the Federal State of Brandenburg is not only reflected in the parliamentary resolutions and reports, it is also clearly demonstrated by the concrete activities and projects that have already been carried out, are currently being implemented or are at a very advanced planning stage. The experience gained in the Federal State of Brandenburg through the pilot projects of the National Urban Development Policy (NSP), the federal authorities' pilot projects in the research field of energetic urban renewal in the ExWoSt (Experimental Housing and Social Development) programme and in Brandenburg's own report "Energie in der Stadt" ("Energy in the City") is particularly rich.

With the **National Urban Development Policy**, the federal German government supports the development of cities and regions through pilot projects which are usually classified in the federal constitution as the responsibility of the federal states and municipalities. The



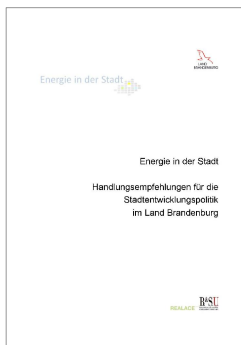
federal government's policy aims to strengthen and secure the economic competitiveness of Germany, its cities and its regions. At the same time, the cities and municipalities should develop in a sustainable way, i.e. they should enable social equality, secure the natural basis for life and be economically successful. The National Urban Development Policy creates platforms for lively debate, raises the topics concerning current urban-social and urban-design trends and adopts exemplary action and solution approaches, particularly involving local and regional civil-society actor groups, and targets innovative ideas and exemplary solutions that are designed on a partnership basis. In addition to civil society, social city, economic development, architectural culture and regionalisation, climate protection and energy is one of the six urban development action fields of the NSP. The Federal State of Brandenburg is involved with the BraNEK (Brandenburg Urban Network on Energy Efficiency and Climate Protection) and "Regionales Energiekonzept Spreewalddreieck" ("Spreewalddreieck Regional Energy Concept") projects.

The aim of the **ExWoSt research field "Energetische Stadterneuerung" ("Energetic urban renewal")** is to design urban development processes and measures, to be imple-

mented in the context of the programme “Stadtumbau Ost”, more efficiently in energy terms and more sustainably. To this end, various concepts, approaches and projects are tested in pilot projects and implemented on a pilot basis. In addition to insights on climate protection, renewable energies and energy saving, corresponding responses in relation to the further development of urban design and housing issues in the context of urban renewal are expected to be obtained from the experience gained in the pilot projects. In early October 2007, the Ministry for Infrastructure and Agriculture of the Federal State of Brandenburg (MIL, formerly MIR) required that the Brandenburg cities participate in the “Modellvorhaben zur energetischen Stadterneuerung in Städten der Bundesländer Brandenburg und Sachsen-Anhalt” (“Pilot project for the energetic urban renewal of the cities of the federal states of Brandenburg and Saxony-Anhalt”). Vetschau/Spreewald is represented as the eighth model city along with the cities of Cottbus, Finsterwalde, Guben, Luckenwalde, Lübbenau/Spreewald, Prenzlau and Spremberg.



The report **Energie in der Stadt** (“Energy in the City”) was compiled in 2010 on the request of the MIL against the background of the energy strategy of the Federal State of Brandenburg (cf. Chapter 3.1.3). Its purpose was to convey the current status of energy and climate policy debate and identify the relevant technical and legal challenges. The aim of the report was to develop action recommendations based on this information for an urban development policy that would be more strongly based on the energy and climate policy objectives of the Federal State of Brandenburg and, therefore, the aims of the German federal authorities and the EU. The report was also intended to sharpen the MIL’s departmental policy in this area and to contribute to the establishment of a cross-sectional approach that would not only reach the other departments but also feed into the debate at the federal policy level.



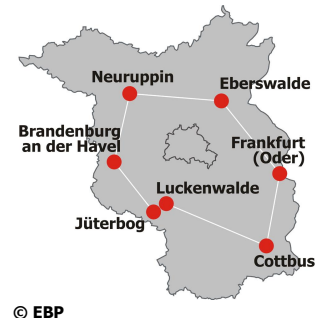
Chapters 3.3 to 3.5 below present the insights gained from the activities and projects against the background of the situation in the Federal State of Brandenburg. Additional information on the Brandenburg projects is included in the Appendix – this is referred to in the relevant places. Chapter 3.6 summarises the insights and presents them in a structured way and Chapter 4 focuses on the situation in Central and Eastern Europe.

3.3 Projects carried out in Brandenburg as part of the National Urban Development Policy (NSP)

Two projects being implemented in the Federal State of Brandenburg are being funded using NSP resources in the context of the area of action “Building the city of tomorrow – combating climate change and assuming global responsibility”: the **Brandenburg Urban Network on Energy Efficiency and Climate Protection (Brandenburger Städte-Netzwerk Energieeffiziente Stadt und Klimaschutz, BraNEK)** and the **Spreewalddreieck Regional Energy Concept (Regionale Energiekonzept Spreewalddreieck)**.

3.3.1 NSP Project Brandenburg Urban Network on Energy Efficiency and Climate Protection (BraNEK)

Based on the existing network structures of the inter-municipal working group **Berlin-Brandenburg Planning Association (Städtekrantz Berlin-Brandenburg)**, in the Brandenburg Urban Network on Energy Efficiency and Climate Protection (BraNEK), the municipal administrations are equipping themselves for the challenges of climate protection and energy efficiency (cf. Appendix 1). Existing municipal experience and expertise are being collated and developed, the most important "action possibilities" for municipal action are being identified, a



methodological framework for local strategies developed, enduring communications structures being established between and within the cities, local activities being supported and exemplary approaches developed in the context of pilot projects.

The project work in the network was initiated with the start of the project in April 2010 and ends in December 2011. The project is designed as a workshop process. It is "sustained" by a community exchange of experience and discussion process and refers directly to current developments.



The following central insights arising from this NSP project can be summarised at this point:

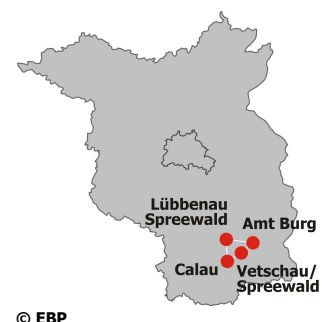
- the provision of personnel support in the area of climate and energy in the urban administrations plays a crucial role in the municipalities (clear responsibilities and scope for action);
- the **networking of the actors** is a fundamental component; this would appear to necessitate: a) an interdepartmental working group within the administration; b) an independent expert committee at municipal level; c) external networking in the urban networks at regional, federal state and central state level;
- climate protection objectives and measures must be guaranteed politically to facilitate an objective and implementation-oriented, efficient and binding examination of specific local action requirements;
- the municipalities need the systematic and interdepartmental surveying of existing projects and measures in the area of climate and energy as a basis for awareness-raising and promotion of communication within the municipalities; this basis represents an important pool of information and ideas for other states for the generation of new measures and projects;

- the municipalities need robust data so that they can derive information about action requirements and effects of measures;
- the **incorporation** of the topic into the **Integrated Urban Development Concepts (INSEK)**, which are binding on Brandenburg as a condition of obtaining state funding, is necessary and dovetailing with climate protection concepts;
- **integrated climate protection concepts** should be developed which provide additional substantive support to the strategic action approaches by providing a functional concept;
- the municipalities need the support of the federal and federal state authorities (so that these too can achieve their climate protection objectives): increase "external" action pressure at the municipal level; create incentives for voluntary action; clearly prepare the wide-ranging activities and promotion possibilities at federal and federal state level (both of which have numerous ministries) (transparency and clarity and even stronger interdepartmental coordination and pooling of programmes and activities are viewed as important support).

The shared work and exchange carried out in a network represent a gain for all of those involved. The successive and constantly increasing awareness of the range of possible action approaches and the transfer of expertise in relation to the planning and implementation of concrete – and also small-scale – measures and projects are important results of the network activity. The network activity alone contributes to the more efficient and effective deployment of the limited human and financial resources. Against this background, this approach is to be recommended in particular for other "starter" cities as awareness-raising and the examination of the topics of climate protection and energy efficiency is initiated in this way within the municipal administrations and an ongoing and efficient exchange of experience is developed between the municipalities with the federal state and state and with other national initiatives and bodies from research and business. The continuity of this established network structure should be supported by the federal state.

3.3.2 NSP Project Spreewalddreieck Regional Energy Concept

The participating municipalities of Calau, Lübbenau/Spreewald, Vetschau/Spreewald and Amt Burg (Spreewald) will activate the ecological, economic and social potential of a regional energy policy that is locally embedded in the different municipalities through active engagement (cf. Appendix 2). The focus of attention here is on the reduction of energy consumption, the reduction in CO₂ pollution of the atmosphere, increasing the efficiency of the energy distribution system and the intensified use of renewable energies. A **comprehensive general concept for the region** is being developed with the project that can become the basis for a joint energy strategy and from which future individual projects can be derived in a particularly qualified way.



The project is in the phase of development and coordination of a model for energy policy on a regional scale. Work is being carried out on the identification of key projects at the same time. An inventory was carried out at the beginning of the project.

Sixteen guided interviews with key individuals from the fields of energy consumption, energy production and energy supply were carried out and recorded. In addition to the interviews, the input of further concrete data was agreed. The predominant part of the data is already available and forms the basis for the substantive work in the thematic working groups.

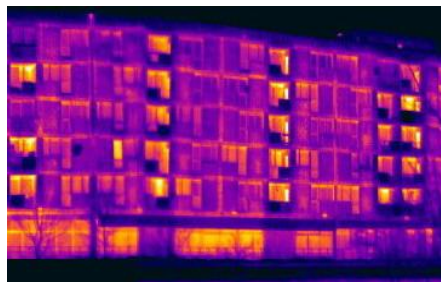
The initial basis for the development and coordination of a guideline for energy policy on a regional scale was established at the discussion with the key individuals in the context of the first, second and third round tables.

With the round table, a **communications platform** was created that facilitates the discussion between important participants from the administration, politics, science, regional energy suppliers, energy generators and energy consumers on strategies and content and serves the purpose of coordination. The substantive work is carried out primarily in the three working groups of energy suppliers, energy consumers and energy generators, whose findings were collated in the context of a round table on an integrated general concept.

A new way of resolving the complex challenges of climate protection on a regional scale is adopted in this way. Thanks to the intensified cooperation between the neighbouring municipalities and the exchange of interests and problems with key regional actors, an important impulse is given in the direction of regional development strategies beyond the urban level.



© B.B.S.M.



© B.B.S.M.



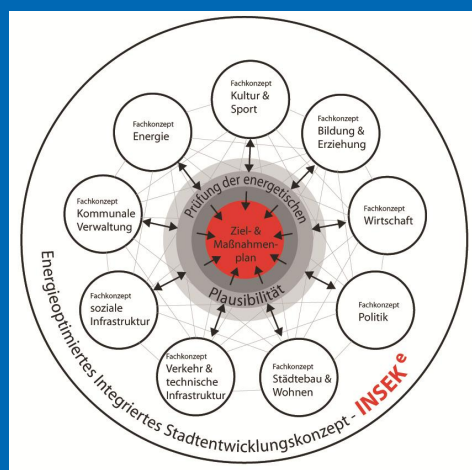
© LUGV Brandenburg

For the implementation of the energy policy objectives, and taking into account the defined guidelines (securing of the basic requirements for living and economic activity, social compatibility, environmental protection and regional participation), the following main fields of action arise for the Spreewalddreieck region:

- increasing energy efficiency in the building stock;
- expansion of sustainable energy generation from wind power, solar power, biomass and geothermal energy and the development of the cogeneration of heat and power;
- efficient management of the energy system (distribution and storage);
- information and participation in public relations work, influencing of user behaviour;
- development of inter-municipal structures.

As part of preparing the energy upgrading of buildings, it has been standard practice since the introduction of energy certificates, at the latest, to roughly estimate energy consumption and reasonable energy construction measures, and then develop the concrete refurbishment plans on the basis of informed analyses (e.g. energy requirement certificates, rough energy diagnoses). This approach, which ensures that energy aspects are given suitable consideration in planning processes, has proven successful. The Spreewalddreieck regional energy concept goes a step further and has adopted the objective of analysing the existing struc-

ture at district or neighbourhood level and in this way develop guidelines for the planning of buildings. An estimated calculation of the useful energy requirement of neighbourhoods or supply areas was carried out as part of the inventory of the housing stock with the help of an **energy plausibility check**. The plausibility check enables the verification of the energy efficiency of the supply systems. In addition, crucial factors for the energy balance of a neighbourhood or supply area are identified (settlement structure type, building density, settlement area size, building typology and building upgrade status). The plausibility check was developed as an instrument in the context of the ExWoSt research field “Energetic urban renewal” (see Chapter 3.4).



The **plausibility check** is a process for verifying current and potential future energy supply systems for their energy-related plausibility. It shows the influence of settlement structure type, building density, settlement area size, building typology and building upgrade status on the energy balance of a neighbourhood or supply area. The process is divided into two stages: a general and a detailed check.

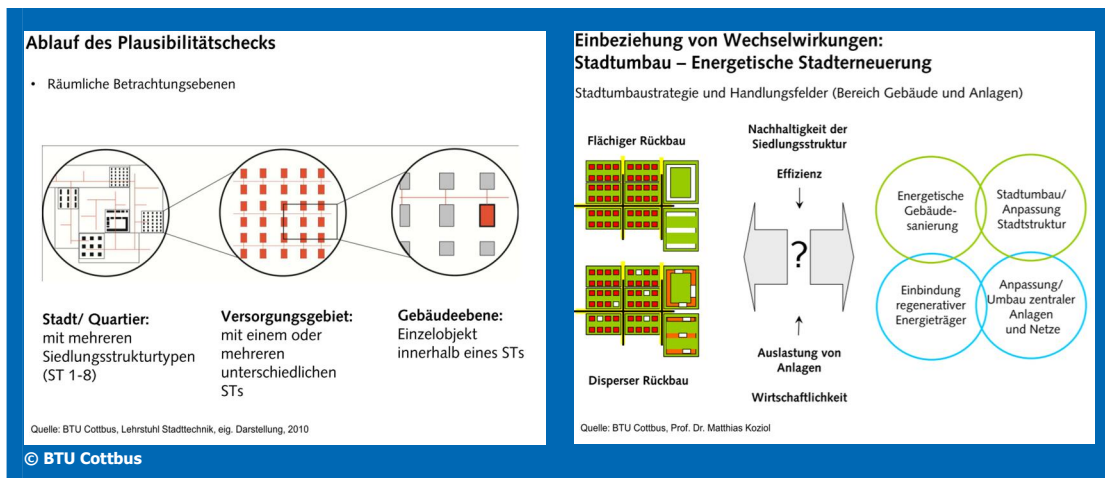
The general check provides an overview of suitable energy supply systems in different settlement structures with different building

types and upgrade statuses. It indicates the typical energy requirements of buildings in characteristic settlement structures and acts as a basis for the comparison of estimates for the energy consumption of settlement areas in individual neighbourhoods. The general check also indicates which energy supply system is worthwhile for which level of energy requirement in a particular settlement type with the associated building types at different levels of upgrading.

The detailed check provides a basis for the concrete energy-related consideration of a neighbourhood or supply area. It is a tool for the estimated calculation of the useful energy requirement of neighbourhoods/supply areas before and after appropriate refurbishment measures in the building stock. In addition, the energy efficiency of the supply systems can also be verified using the detailed check. Interactions that arise either in the modification or retention of the existing supply system are taken into account in the overall calculation.

The basis of the plausibility check is the definition of “energy-relevant settlement types of local settlement structures” and a “German building typology”. The system underlying the energy plausibility check can be applied to other federal states and situations, however the settlement and building typologies must be adapted to the relevant structures and climatic conditions.

The plausibility check process and the interactions with urban design and energetic urban renewal are depicted below.



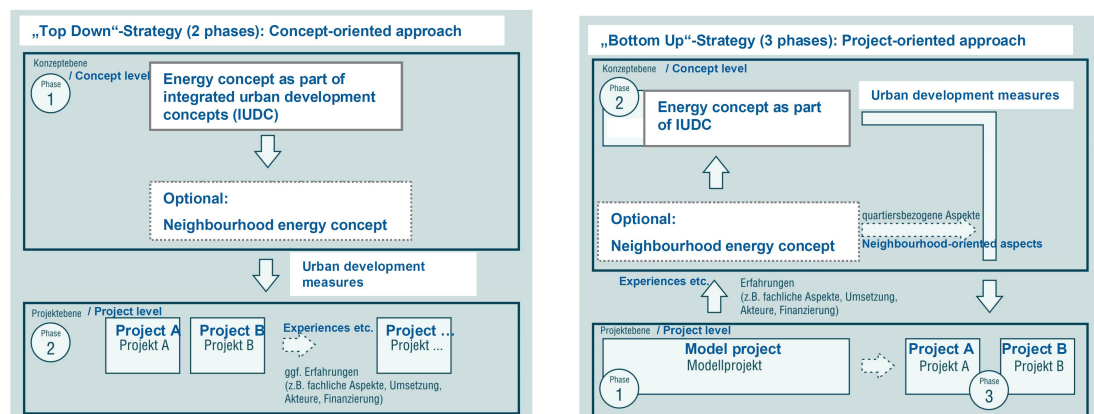
The project aims to produce transferable solutions for the areas of climate protection and global responsibility and for regionalisation. In addition, potentials in the areas of activation of regional economic cycles and participation are identified. Based on the experience gained in the implementation of the project, recommendations are derived for the establishment of sustainable cooperations in other cities and regions. The following central insights can currently be identified:

- effective climate protection requires more than the **initiative and participation** of individuals; the ideas and visions and, ultimately also, concrete projects and changes in behaviour across the board are required at local level to meet the challenges of climate change;
- local **climate change alliances** are needed, in which the promotion of renewable energies and increase in energy efficiency are worked towards jointly with, inter alia, the energy consumers, generators and suppliers with a view to reducing CO₂ emissions;
- in the municipalities, politics and administration fulfil **model functions**, convince and win over partners for the implementation of climate and environmental policy objectives;
- actors are brought together through **participation processes**, for example the establishment of working groups; these structures are essential for the continuation of projects when funding lapses;
- environmental protection and climate protection are easier to communicate when it can be shown that measures are also **economically** rewarding for the participants;
- innovative climate protection projects are usually associated with extensive **cooperation and management processes**; expert-technical concepts and cooperation processes must be linked in a tailor-made fashion;
- the **energy plausibility check** is a way of checking current and potential future energy supply systems and provides information about the estimated useful energy requirement of neighbourhoods or supply areas and following the implementation of upgrading measures in the building stock.

3.4 Model towns and cities involved in the ExWoSt research programme “Energy-efficient urban renewal in Brandenburg”

At the beginning of October 2007, the Ministry for Infrastructure and Agriculture of the Federal State of Brandenburg (MIL, formerly MIR) invited towns and cities in Brandenburg to participate in a “pilot programme for energy-efficient urban renewal in towns and cities in the Federal States of Brandenburg and Saxony-Anhalt”. The deadline for applications was 22 October 2007. The municipalities in Brandenburg that had been chosen were announced on 27 November 2007. In addition to the cities of Cottbus, Finsterwalde, Guben, Luckenwalde, Lübbenau/Spreewald, Prenzlau and Spremberg, Vetschau/Spreewald was also selected as the eighth model town.

This section outlines some of these projects, which could be adopted as models for the next few years as a result of the experience gained at municipal level. Both **top-down** (concept-oriented) and **bottom-up** (project-oriented) approaches have been used. In contrast to municipal integrated energy and climate protection concepts, the main focus here (with the exception of the projects in Guben and Lübbenau/Spreewald) is on bottom-up approaches, i.e. the concrete implementation of pilot projects. Based on their experiences with the energy-efficient rehabilitation of individual buildings, the participating towns and cities from the Federal State of Brandenburg aim to develop, step by step, overarching objectives and solutions that can be applied at district and neighbourhood level.



© BMVBS/BTU Cottbus

A plausibility check instrument has also been developed within the framework of the ExWoSt research programme for energy-efficient urban renewal. This was used for the first time in the NSP project “Spreewalddreieck Regional Energy Concept” (see chapter 3.3.2).

3.4.1 Guben – Integrated Energy Strategy 2020

The energy strategy was developed in response to population decline in the town, which affected the housing complexes supplied by district heating systems in particular (see appendix 3). High heat losses within the **grids** have resulted in increased service and maintenance costs for the local population, and the rising price of fossil fuels has had a detrimental effect on competition in the town, both economically and socially.



The energy strategy is using a **top-down approach** to tackle these changes and restructure the power supply system while taking urban redevelopment into account. The town is creating the conditions for secure, economical and sustainable energy supply and making an active contribution, by taking a focused approach, to the Federal State of Brandenburg's energy and climate protection objectives. The objectives include increased energy efficiency, the use of renewable energy sources and a reduction in CO₂ emissions, but also ensuring that the area remains an attractive residential and business location, preserving a minimum population density and client density in the supply area. The initial focus, however, is on separating district heating from the gas supply network and on building up decentralised local heating systems.

On the basis of the analysis and the objectives, three strategies were examined and evaluated in cooperation with the key stakeholders. Concrete measures for implementing the preferred strategy ("Decentralised heating supply and the compact city") were put forward. Building on this energy strategy, a **focused action plan** was developed in 2010 and has been continuously updated. Some of these measures include:

- **forming a steering group** consisting of representatives from the municipal government, energy providers and housing associations, as well as developing an implementation strategy and setting priorities (e.g. on building management systems in public buildings, the energy-efficient renovation of property owned by the municipal government and the housing associations, the installation of heating technology and the use of renewable energy in the building sector);
- appointing an **energy and climate management officer**;
- setting up an **energy fund**;
- **raising awareness** and mobilising the public (e.g. organising "energy days" in schools, holding competitions in schools and nurseries, issuing publications and arranging public events);
- **developing local heating systems** for different types of housing (analysing the requirements and options available; creating organisational models and operator models), and
- constructing and operating agricultural **biogas plants** (including drafting operator and financing models, selecting appropriate locations, etc.)

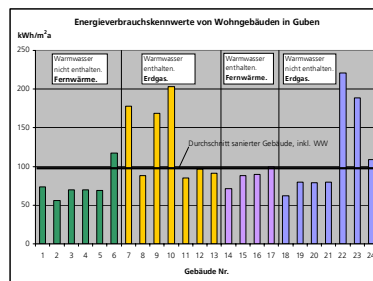
The local heating provider is currently examining **four different types of heating system** and **how to adapt the network** to support them.

The success factors that have been key in bringing about general acceptance of the energy strategy are the multidisciplinary nature of the project and, above all, the direct involvement

of the mayor and the participation at an early stage of the most important stakeholders with regard to the implementation of potential measures.



© EBP



© EBP



© EBP

Guben's Integrated Energy Strategy 2020 shows that it is only possible to produce a widely accepted solution and implement it successfully if **an integrated approach is taken in the development of energy or climate protection concepts and urban development concepts**. The only way to identify any challenges and potential within the town or city as a whole and to appropriately set priorities and sustainable strategies for action is by interlinking integrated urban development and urban renewal ideas with the energy strategy. The energy strategy forms the basis for decision-making. All the stakeholders who are affected by the changes **must not be left behind during the process**. In addition to the development of an action plan, the implementation of flagship projects also plays an important role. The funding needed to achieve this must be made available.

On the basis of the energy strategy, Guben has succeeded in making the transition from drafting the strategy to a continuous process that focuses on implementing the measures. The current funding programmes provided by the German Federal Government and the Federal State of Brandenburg have adopted this approach and require that greater attention is given to developing implementation-oriented measures at the stage when the concept is being prepared.

The aim now is for other municipalities to follow this example and produce similar strategies and concepts. From the outset, they should focus in particular on specific local challenges and problems. Against the backdrop of population changes and urban renewal, it is clear that sustainable energy provision and heating systems and also adapting the network infrastructure play a central role. Specifically **involving the relevant stakeholders at an early stage is essential to support transparency, acceptance and the implementation of concrete measures**.

3.4.2 Lübbenau/Spreewald – Lübbenaubücke / Energy 2021 Master Plan

The objectives of the Lübbenaubücke project are to refurbish housing units in line with requirements, design urban redevelopment measures (particularly demolition and dismantling) compatible with the town and its inhabitants, upgrade the residential environment, improve the infrastructure and strengthen the local economy (see appendix 4).

Within the field of energy and climate protection, Lübbenau is working at three different levels simultaneously. At **town level** it is drawing up a **municipal energy concept** – the Energy 2021 master plan (step 1). In the Neustadt South West **district** there are plans to carry out detailed energy efficiency studies (step 2). And at **building level** a feasibility study is being conducted for the pilot project “House for Children and Senior Citizens” (step 3). Both **top-down** and **bottom-up approaches** are consequently being used.



© EBP

The Energy 2021 master plan is currently being drawn up. A draft of this **municipal energy concept** was completed at the end of 2010 and a consultation process with the project stakeholders is now underway. The concept includes an analysis of structures and potential, energy-efficient guiding principles and a definition of the long-term objectives. At the same time, detailed energy efficiency studies are being carried out in the Neustadt South West district and construction has started on the “House for Children and Senior Citizens” project.

The Lübbenaubücke project has established a model for **local cooperation** which succeeds in promoting continuous collaboration between the project sponsors and also supports the close involvement of the population and local businesses at an early stage. With the development of its municipal energy concept, Lübbenau/Spreewald has become one of the first towns in Brandenburg to include the issue of municipal climate protection in its integrated urban development programme on a significant scale, namely at municipal, district and building level.



© Lübbenaubücke



© Lübbenaubücke



© B.B.S.M.

The Energy 2021 master plan is a perfect example of how important it is to **integrate energy efficiency into the urban development process**. More and more towns will have to face this question in the future due to prevailing conditions such as higher fossil fuels prices, etc. Further networks are being created with other municipalities and stakeholders, such as higher education institutions, in order to exchange important information and developments, as well as new experiences and expertise. The close involvement of relevant members of the public and the focus on including all named stakeholders are also key steps in the implementation of the Energy 2021 master plan in Lübbenau/Spreewald. Using a range of different methods and instruments, it is possible to visualise energy efficiency objectives three-dimensionally and realise projects with the involvement of many people. An open and stable communication structure and solutions that are designed to suit a wide variety of users can contribute to conveying and achieving overarching climate protection objectives.

3.4.3 Vetschau/Spreewald – A Community Centre with Energy!

Within the context of an ExWoSt pilot project, the former secondary school is being converted into a community centre with a nursery, senior citizens' club, music school and multi-functional civic hall (**bottom-up approach**) (see appendix 5). These facilities were previously housed in several different locations, some of which were outside the town centre. The energy-efficient renovation of the listed brick building (dating from 1896/97) and the adjoining courtyard wing (built in 1934) includes installing an **innovative heating system that uses geothermal energy as well as fitting internal insulation that complies with regulations on historical buildings**.



© EBP

Building work began in spring 2010. It should be completed in summer 2011.

The concept for using the building was initially agreed within the framework of a **feasibility study**. Following an invitation-only **competition to realise the plans**, which attracted many innovative approaches, proposals were developed for the structural implementation of the design (which included an energy concept). The architecture firm which won the competition was commissioned to plan the project. Based on the initial blueprints, an application was made for funding from the Programme to Support the Energy-Efficient Regeneration of Social Infrastructure in Municipalities (Investment Pact – ESI). The plans then steadily took shape. Firstly, several **workshops** were held with the future users of the building to reach an agreement on the structural measures for the building and the grounds. Secondly, test drilling was carried out and a suitable concept for a **geothermal heating plant** was developed based on these results.

The project demonstrates that it is also possible to achieve high levels of energy efficiency in listed buildings. The high costs of the project are mainly due to the renovation work and only partly a result of the energy-efficiency measures. As a multi-functional building, this project is making an important contribution towards strengthening the town centre and encouraging social integration. One of the important requirements for achieving a high level of quality in the project was the extensive involvement of external experts at an early stage within the context of the feasibility study, the competition to realise the project and the series of workshops.



© B.B.S.M.



© B.B.S.M.



© B.B.S.M.

The project is a positive example of how a municipality can reduce running costs and engage in climate protection by carrying out energy-efficient renovations to important property. The concept for using the building, which is an innovative opportunity for the commu-

nity, and linking the renovations in with the urban redevelopment process are **new ways of realising integrated urban development**. This initiative to reuse vacant buildings in the town centre that are important for urban planning by relocating public infrastructure is an approach that can also be transferred to other areas. In addition, it shows how **holding a competition** can have a positive effect on the technical quality and public acceptance of a project.

3.4.4 Luckenwalde – District Energy Concept for the Nuthe/Burg Quarter

The focus of this ExWoSt project is on conducting energy efficiency studies in the Nuthe/Burg **district**, which consists of prefabricated buildings (see appendix 6). The main features of the district are renovated and still-to-be renovated blocks of flats, a shopping centre and a nursery. The aim of the project is to determine the main areas where action is needed to implement energy-efficient renewal. The studies take a **bottom-up approach**, concentrating on balancing and visualising the district's energy requirements and local energy provision (the energy flow). Build-



© EBP

ing on the results of this analysis, the aim is then to develop a variety of different solutions and set priorities for the implementation of energy efficiency measures which can also be used in other **urban districts**. **Individual projects** will demonstrate which options can be used in the renovation of typical local buildings and will also provide an opportunity to gain experience in implementing ambitious energy-efficient renovation solutions.

The concept focuses on the following areas of energy-efficient urban renewal:

- carrying out energy-efficient renovations to the district's nursery and partially converting the building into a district centre that can be used by people of all ages;
- dismantling housing that is no longer needed;
- carrying out energy-efficient renovations to residential buildings in the district and adapting them to demographic changes;
- improving the residential environment (rainwater infiltration systems, building cycle paths, etc.);
- balancing and visualising the district of Nuthe/Burg's energy requirements and local energy provision (the energy flow);
- setting priorities for the implementation of energy efficiency measures.

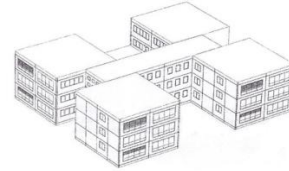
In addition to the renovation work, the district's transport network is also being restructured. Luckenwalde is currently concentrating on the project to renovate the "Burg" nursery. Planning permission was granted in 2010 and construction is expected to begin in 2011. The wide-ranging energy efficiency measures will greatly reduce the day-to-day running costs and this will lead to savings in the long term. The project involves several innovative ideas, including the application of a low-energy design to an existing nursery and the funding concept.



© B.B.S.M.



© B.B.S.M.



© Institut für Gebäude + Energie + Licht – Planung

The project is a good example of how the overall energy balance of an urban district can be improved. In addition to the primary objective (energy-efficient renovation), the nursery project shows how energy consumption can be further reduced **at comparatively little additional financial cost** while at the same time upgrading the external appearance of the building and creating new options for using it. However, transferability is unlikely due to the high costs and the difficulties experienced in funding the “Burg” nursery project. By visualising the energy efficiency objectives three-dimensionally, it is possible to communicate the overarching climate protection objectives. Presenting complex relationships in a simple way and visualising goals and progress play a central role in achieving this.

3.4.5 Prenzlau – 25/27/29 Schwedter Straße

The three 19th-century residential buildings (which include an individual listed building) are on one of the main roads leading into Prenzlau city centre. The properties are owned by the municipal housing association and are currently completely empty, but since they are an important part of Prenzlau’s cityscape, they are now to be renovated. The plan is to redevelop the buildings in an economically sustainable way to provide suitable accommodation for people of all ages and at the same time to undertake **energy-efficient renovations that comply with regulations concerning listed buildings** (see appendix 7). The project is part of the city’s energy supply concept, which involves the city of Prenzlau, housing associations and public utility companies as well as energy producers, plant operators and other business partners. It is taking a **bottom-up approach**.



© EBP

Building work is scheduled to begin in 2011. It should be completed in 2013.

A **competition** was held in 2009 on the back of a **feasibility study** on renovating the building, which was conducted in 2008. Five consortia of architects and planners developed alternative proposals for a redevelopment process that included an innovative energy concept. Two of these bids were reviewed in the next stage of the process and then re-evaluated by the jury. The winning consortium tasked with all further planning then finalised its proposal, focusing in particular on optimising its cost-effectiveness. In 2010, funding applications were submitted to the investment bank of the Federal State of Brandenburg and these were approved in July 2011. Almost EUR 2,500 will be invested for each square metre of living space.

The project highlights the potential to conserve considerable amounts of energy in listed buildings. In particular, by connecting the building to the district heating network, which uses some renewable energy sources, it is possible to heat the building in a climate-friendly

way. One of the main success factors is the remarkable involvement of the local authority in organising the project and in making funding available for renovation.



© B.B.S.M.



© B.B.S.M.



© B.B.S.M.

The structural solutions developed in this project can also be used for the energy-efficient renovation of other 19th-century structures and similarly old buildings in other cities. This topic is especially important given the need for action to be taken to upgrade city centre residential buildings. Some of the pioneering strategies used in the project include connecting the buildings to the district heating network and at the same time **integrating renewable sources of energy into the Prenzlau public utility company's district heating concept**, which involves the seasonal storage of surplus heat energy. Combining these measures leads to a significant reduction in the buildings' primary energy factor and also provides a perfect way to decrease CO₂ emissions in spite of the fact that heritage conservation regulations prevent any action being taken in certain areas to increase building envelope insulation. Prenzlau's experiences in the future will be of interest to other municipalities where restructuring the district heating system is also on the agenda.

3.5 Energy in towns and cities – measures aimed at embedding climate and energy policy in integrated urban development

In 2010, a report was prepared on behalf of MIL that aimed to examine current discussions on energy and climate policy and to identify any potential technical and legal challenges. The objective of the report was to use this knowledge basis to produce recommendations for action to be taken to develop an urban development policy that was more focused on the energy and climate policy goals of the Federal State of Brandenburg and thus on the goals of the German Federal Government and the EU. The aim of the report was also to sharpen the focus of MIL's policy in this area and to contribute to developing a cross-cutting approach at district level that not only influenced other departments, but also found its way into policy discussion at national level.

The report followed a process that in the end enabled it to provide specific solutions for the Federal State of Brandenburg. Two closely connected technical components form the substantive basis of the report:

- "Local energy and climate protection policy approaches and strategies in urban districts with **homogeneous building, stakeholder and user structures (large housing developments)**"

- “Local energy and climate protection policy approaches and strategies in urban districts with compartmentalised, **heterogeneous building, stakeholder and user structures (city centre areas with old buildings)**”

Three workshops and an event for various associations were held to support the process to draw up the report. The main findings from the report and the workshops were then combined to form the recommendations for action. The report differentiates between **recommendations at urban district level**, which are further **divided into homogeneous and heterogeneous districts**, and **overarching recommendations**.

3.5.1 Recommendations for homogeneous urban districts

Buildings located in homogeneous districts (large housing developments) in Brandenburg's towns and cities have mostly already been refurbished and therefore have good levels of energy efficiency. There is further potential to make savings by implementing **low-cost measures** such as adjusting the heating characteristics of the house connection substations or carrying out hydraulic balancing. In addition, the following is recommended:

- **Optimise the district heating networks**

In order to optimise the district heating networks in large housing developments, the advice is to assess the potential of the following options within each district's energy efficiency concept:

- replacing fossil fuels with renewable sources of energy (e.g. biomass, biogas), which will reduce CO₂ emissions and influence regional added value as expected;
- increasing efficiency, in particular by using cogeneration systems;
- minimising heat loss (by rehabilitating or reducing the supply network);
- optimising the networks and the cogeneration facilities while at the same time reducing the buildings' heating requirements.

- **Evaluate the efficiency of the heat supply network**

This involves considering ways to compensate for anticipated underuse of the existing heat supply networks. Some of the options for counteracting this inefficiency include expanding the network or connecting areas with heterogeneous structures to the system. If the existing supply system is no longer cost-efficient, a standalone system should also be considered.

- **Use renewable sources of energy**

Any public utility companies and energy providers that have already exploited the full potential of cogeneration within their district heating networks should consider switching from using fossil fuels to integrating decentralised solutions (e.g. solar thermal energy, biomass cogeneration plants, etc.) into the existing network. A solar atlas should be produced that illustrates the potential of using roof areas in homogeneous districts for solar power generation systems.

3.5.2 Recommendations for heterogeneous urban districts

In heterogeneous districts (areas with old buildings), the structure of ownership and the energy profiles of the buildings are very diverse. The following specific action is recommended:

- **Establish a set of criteria for centralised or decentralised heating networks which can form the basis of district energy efficiency concepts**

The starting point for energy efficiency concepts developed by municipalities for heterogeneous districts should be a set of criteria that allows individual municipalities to decide whether to opt for a centralised or a decentralised heating network. The report provides a few initial suggestions on this issue. Decentralised systems are an advantage if heat requirements are expected to sink in the future (as a result of energy-efficient renovation and falling population figures), if there are large distribution distances between energy clusters (EC), and/or if it is not possible to further expand the central network for technical or economic reasons.

Centralised networks, on the other hand, are the preferred choice if they will be efficient in the long term and the network structure can be expanded without having to make any major changes, if heat provision is energy efficient and economically competitive (e.g. the network uses waste heat from power plants), and/or if energy can be supplied at competitive rates.

- **Use “add-on measures” as a substitute for energy efficiency measures that cannot be implemented in listed/architecturally significant buildings**

If it is not possible to implement energy efficiency measures in listed/architecturally significant buildings, compensation measures (add-ons) can be used instead. These include switching to using renewable sources of energy (e.g. solar thermal energy, photovoltaics, geothermal energy, etc.) or energy-efficient solutions (e.g. industrial waste heat, cogeneration plant clusters, etc.) as individual or communal local heating solutions.

- **Form energy clusters at district level**

Particularly in heterogeneous areas, it is only at district level that it is possible to identify where there is potential and therefore to reveal the broad spectrum of opportunities for energy-efficient urban development. By forming and classifying related urban clusters, it is possible to develop concrete recommendations for action without having to examine each house individually, which can be costly. The district and municipal concepts can then be mutually adapted.

3.5.3 Overarching recommendations for action

In relation to overarching recommendations for action, the report highlights three thematic areas in which action is required state-wide. In particular, these concern **drafting and updating municipal energy concepts** and **developing energy-efficient district concepts** as well as agreeing climate protection objectives with local housing associations and distributing relevant information about energy efficiency and renewable energy sources. Action also needs to be taken to promote innovative technologies, support pilot and demonstration projects and maintain quality assurance in construction. There is also a need to embed energy policy in the urban development framework on a long-term basis, to establish an effective monitoring system and to create internal administrative structures to optimise municipal work on energy issues. The recommendations for action are as follows:

- **Develop integrated municipal energy and climate protection concepts**

The report concludes that the development of municipal energy and climate protection concepts is an important recommendation that should be implemented in the short

term. These municipal concepts help to prepare the technical foundations at city level, can link in with IUDCs and are key for achieving energy efficiency objectives, since there is considerable potential to realise climate protection in municipalities by increasing energy efficiency and using renewable sources of energy.

The main components of energy and climate protection concepts are analysing the status quo (i.e. ascertaining and balancing energy consumption and CO₂ emissions), evaluating potential and developing concrete action plans. Within the context of these concepts, the aim is to produce and formally set out targets at municipal level. These should include declarations on reducing final energy consumption and decreasing CO₂ emissions by increasing energy efficiency and expanding the use of renewable energy. Additional goals could focus on the future energy supply infrastructure or the municipality's role in setting a good example. A plan for managing the implementation of climate protection measures should also be prepared.

- **Develop district energy efficiency concepts**

In order to increase the focus on climate protection and energy conservation within the framework of district measures, particularly within the context of urban redevelopment, one of the most important recommendations that should be implemented in the short term is establishing a direct link between the provision of funding and the presentation of district energy efficiency concepts. The approach enhances municipal energy and climate protection concepts and is implementation-oriented.

The concepts should balance energy consumption and CO₂ emissions in each district and, for example, provide a heat or CO₂ atlas. In addition, they should include details about conservation potential and targets at district level. The report recommends grouping buildings according to age and energy characteristics, which enables districts to draw general conclusions about energy requirements and renovation solutions. In individual heterogeneous districts, municipalities should also examine the possibility of creating "energy clusters" (EC), which emphasise similarities (in relation to utilities provision, socio-spatial organisation and urban development) within connected district structures. By creating energy clusters, it is possible to develop concrete recommendations for action without having to examine each building individually, which can be costly.

- **Support pilot and demonstration projects relating to energy efficiency and renewable energy**

The report considers promoting pilot and demonstration projects a suitable way to explore the potential for municipalities in Brandenburg. Once projects have been evaluated, support can be given to roll out suitable concepts on a larger scale.

- **Introduce a quality management system (European Energy Award®)**

Communication between stakeholders in municipalities is of vital importance for developing integrated approaches and concepts. The report recommends turning to tried-and-tested quality management systems to facilitate a move towards more systematic communication. The quality management system "Energienstadt" ('Energy city') was developed in Switzerland in the 1990s and later implemented in Germany and other countries in the form of the "European Energy Award®" (eea). Based on an analysis of the municipality's current energy-related activities in six areas, an energy team made up of representatives from the relevant authorities, utility companies and other municipal stakeholders develops an energy policy work programme. The results of these measures are

examined and evaluated by external eea advisors during the process and may be recognised with a European Energy Award[®]. The municipalities are committed to carrying this process forward and re-evaluating the measures and their achievements every two years. The score given to the participating town following the auditing process is an indication of the success of the municipality's energy-related activities and how they compare to other communities. A regional office is normally set up to implement the measures.

An impact analysis conducted in Switzerland found that the "Energienstadt" programme (the "European Energy Award" in other countries) had achieved the second highest savings of all the programmes.

- **Implement low-cost measures within the building sector**

Between 1990 and 2010, the main strategy of the housing associations in Brandenburg for existing buildings was to undertake sweeping energy-efficient renovations. Around 55 % of the housing associations' property has been fully renovated and roughly 25 % has been partially refurbished. Average energy consumption for space and water heating in properties owned by municipal and cooperative housing associations has fallen from approximately 219 kWh/m²/year in 1990 to around 128 kWh/m²/year in 2009. This is an energy saving of about 42 %. However, sweeping renovations such as this require high levels of investment – generally between 700 and 1,000 EUR/m².

Given the already high standard of renovation, declining population figures in many parts of Brandenburg and the now limited scope to provide financing as a result of large debts, local actors have started to focus more on using low-cost measures to increase the efficiency of building services.

Above all, there is considerable potential to increase the efficiency of building systems. Often this can be achieved with smaller investments without having to carry out structural changes. Measures implemented within the framework of the Brandenburg pilot and demonstration project ALFA[®] (Allianz für Anlageneffizienz – 'Alliance for efficient investment') required investment of between EUR 0.55/m² and EUR 3.66/m² and resulted in energy savings of 4.25 – 10.25 %. These measures included adjusting system parameters to meet a target state/hydraulic balancing, improving control systems (efficient pumps, changing thermostatic valves) and laying the technical foundations for energy-optimised management (optimising the connected load, intelligent control cabinet technology, etc.). A study carried out in the homogeneous district of Cottbus-Ströbitz, for example, calculated that the potential energy saving that could be made by altering the heating curve in existing buildings would be between EUR 0.15/m² and EUR 0.18/m². Compared to sweeping energy-efficient renovation, the cost-benefit ratio of low-cost measures is significantly higher. For around one hundredth of the cost, it is possible to make savings that correspond to roughly a tenth of the savings potential of more comprehensive measures. However, extensive technical expertise is needed to implement low-cost measures in order to ensure that suitable efficiency measures are competently identified for each individual case and that expert support is provided during the implementation process.

- **Provide training to companies that implement structural engineering and building services**

The reason for this measure is that building contractors often lack the necessary exper-

tise to set up building services in a way that enables them to function optimally or to install components and building materials using an approach that makes it possible to actually achieve the estimated energy consumption figures. Given the rapid increase in requirements, new training modules are needed that document, for example, common flaws and highlight their impact on energy needs.

- **Conclude climate protection agreements with the housing industry**

Climate protection agreements with housing associations play an important role in municipal climate protection policy. Similar agreements in the past have shown just how efficient a joint, coordinated approach can be. In order to achieve sustainable results, it is essential to set ambitious targets, establish transparent structures and develop a systematic monitoring process. The climate protection agreements help to raise awareness and provide good publicity for any success that has already been achieved and also for any new measures or courses of action. This is in the interests of both the housing industry and municipal policy.

- **Appoint municipal energy managers**

The report recommends establishing/appointing municipal energy managers, who aim to support towns and cities in developing a) energy concepts, b) quality management, monitoring and control systems and c) energy portfolio management. For smaller towns, where appointing an energy manager is simply too expensive, there is a possibility of assigning one manager to cover several municipalities, for example within the framework of a partnership arrangement, a municipal consortium or a special network of cities for climate protection/energy.

The energy policy of the 2014-2020 operational programme

Energy policy measures should be strategically integrated into the European Regional Development Fund (ERDF) operational programme for the 2014-2020 funding period. The European Commission is planning to make greater use of its resources to support measures and projects that aim to fulfil the EU's priority objectives, such as the climate and energy package.

With this in mind, increased attention should be paid to energy efficiency, climate protection and renewable energy, but also to climate change and adaption strategies, and concrete approaches for achieving the energy policy objectives need to be outlined.

One of the key areas is promoting pilot and demonstration projects, which are used to examine the economic viability and practicality of various measures and to then help roll out the implementation of suitable technologies and instruments. In addition, an integrated climate protection approach needs to be established at local level and this includes **developing municipal energy concepts** and introducing **municipal energy management systems**.

The EU will increase its focus on monitoring and controlling the implementation of energy policy objectives through funded projects to ensure above all that the projects, concepts and management systems that already use quality controls and certification are suitable.

3.6 Recommendations for action and lessons learned from activities and projects in the Federal State of Brandenburg

The recommendations for action and lessons learned from activities and projects in Brandenburg that are described in chapters 3.2 to 3.5 of this report will now be summarised for the municipalities in Brandenburg and the state as a whole. They will then be edited for the benefit of the project partners in chapter 4. They refer to the **municipal level** in particular.

The main conclusion that can be drawn from all the activities and projects in Brandenburg in recent years is that it is essential to interlink all sectoral approaches and involve all stakeholders at an early stage and to maintain this link. This applies to activities at city, district and also building level, focusing in particular on districts. With regard to the stakeholders and strategic direction, the main focus is on municipal policy sovereignty, housing management and energy supply. In addition, a wide range of instruments is available, from the analytical and conceptual level to multiple small-scale investment measures to advisory services.

Alongside this range of instruments, after many years of implementing projects in municipalities it is now possible to draw on an ever increasing number of good practice projects. However, given that each situation has its own specific conditions, challenges and problems, it is essential to always concentrate on providing an individualised approach, making use of or further developing the necessary instruments and appropriate good practice methods as required. In many cases, municipalities do not need to address new areas of urban development activity, but rather existing areas that have been given a new impetus for development as a result of the challenges posed by climate protection and energy efficiency. The most important stakeholders in towns and cities, in addition to the municipal administration and urban policy-makers, include the citizens, businesses, representatives of the housing market, energy providers and transportation companies. Energy supply is also particularly relevant at regional level, especially for the expansion of renewables and the related issue of power grids. The lessons learned and recommendations outlined below refer in particular to the expertise and the projects that form the basis of this report.

3.6.1 Relevant areas of activity

Within the field of **urban and settlement structure**, municipalities should focus on and implement existing development approaches based on the principles of sustainability. For urban structure, this includes, in particular, integrated, energy efficiency-oriented urban and transportation development planning as well as settlement structures that are as compact as possible and focus on inner urban development, multi-use options, short distances and minimising the extent of coverage by impervious surfaces (following the “compact city” planning model). As far as redevelopment projects are concerned, the development planning process should actively control energy and heating requirements as well as the compact design of the buildings and should also ensure the optimum use of renewable energy sources (especially solar energy). In this context, attention must also be paid to urban structure requirements for adapting to the consequences of climate change (e.g. avoiding heat islands, creating ventilation corridors, and protecting against flooding).

In order to support energy-efficient urban structures, it is also recommended to carry out a tested rough balancing check and assessment at district or service area level on planned energy efficiency measures in buildings and supply systems, similar to the tests performed within the framework of the **energy plausibility check**.

Public buildings are exceptionally important for energy efficiency and climate protection. This is due, on the one hand, to their considerable potential to increase savings and efficiency, and, on the other, to their role in setting a good example for citizens, businesses and other urban development stakeholders. This gives municipal administrations an opportunity to have a direct influence. In addition to the many legal conditions that must in any case be taken into consideration for new buildings and renovations, the following recommendations also apply to public buildings:

- ▶ initiate energy management for public buildings (e.g. administrative buildings, schools and nurseries) at municipal or inter-municipal/regional level to make the most of savings potential and identify potential to increase efficiency; energy performance contracting;
- ▶ implement technical and structural measures in the renovation of buildings, facilities and heating systems to increase energy efficiency;
- ▶ support negotiated agreements to meet energy standards for new buildings and/or renovations;
- ▶ use renewable energy sources to provide municipal buildings with energy;
- ▶ develop and implement pilot and demonstration projects;
- ▶ develop organisational measures and incentive systems to influence users' behaviour (e.g. the 50:50 incentive system in schools to encourage staff and pupils to conserve energy; energy-efficiency campaigns aimed at employees working for the local administration);
- ▶ organise a public marketing campaign about the measures to raise awareness and share experiences and success stories.

There is also considerable potential to conserve energy and increase efficiency in both **private and institutional residential buildings**. The main recommendations in this area of activity, which is key for municipalities, are:

- ▶ at an early stage, conduct a basic analysis (that is as comprehensive as possible) of the existing energy-efficiency situation and savings potential in buildings, e.g. in the form of energy performance certificates, basic energy checks, etc.;
- ▶ introduce energy performance contracting to make the most of savings potential;
- ▶ increase energy efficiency in buildings by carrying out initial energy-efficient renovations. If a building has already undergone extensive modernisation, gradually exploit the rest of its optimisation potential. If a building has been partially modernised, implement further measures during the next stage/cycle of renovation;
- ▶ implement **low-cost measures**, for example conserving energy and reducing utility costs by installing heating and hot water systems in such a way that they achieve optimum performance, implementing smaller technical measures, installing individual room controls in residential buildings, providing information

about consumption (e.g. smart meters), and also encouraging housing associations and other property managers/community associations to provide advice to tenants on energy conservation in the home in order to optimise consumers' behaviour;

- ▶ use renewable energy sources located inside or on the building (photovoltaics, solar thermal and geothermal energy); use renewables to provide power;
- ▶ provide municipal advisory services to the public, housing associations and property owners;
- ▶ conclude agreements on climate protection and energy efficiency with the housing industry and property owners.

Within the field of **power generation and supply**, there are significant opportunities to conserve energy and increase efficiency and there is also great potential to take action in the area of **renewable energy**. Municipalities should be able to make the most of these opportunities by having a direct influence on (local) energy providers. There is also a regional or inter-municipal element to this area of action and municipalities should therefore seek to conclude meaningful cooperation agreements, for example with neighbouring communities and the city region.

In particular, municipalities should work towards developing and utilising renewable sources of energy and sustainable, low-emission technologies for generating power (e.g. natural gas, cogeneration) as well as exploring decentralised energy supply options. The choice between local heating and district heating will depend on the urban, district and building structure. A municipal or regional register of different surfaces can show municipalities which rooftops are suitable for solar installations, which areas are unsuitable for solar farms, etc. Coordination at regional level is particularly important if plans involve the extensive use of renewable energy sources (solar farms) or if installations might be disruptive (wind power, biogas). The expansion of renewables should also be strengthened and initiated by support from investment companies such as community funds and public parks or bio-energy villages. In order to adhere to the principles of sustainable municipal procurement, and to set a good example, municipalities should focus on climate protection when choosing ways to provide electricity and heat for their own property.

The recommendations for action in relation to **mobility** are, to a certain extent, closely connected to those for urban and settlement structure. Municipalities should take account of existing sustainable development approaches (compact cities, multi-use) and their main objective should be to prevent the use of motorised private transport (in particular cars) as much as possible. In addition, municipalities should aim to promote a shift towards environmentally friendly, low-emission forms of transport. The main focus here is on expanding and incentivising "soft mobility". This includes non-motorised private transport (walking and cycling) as well as public transport (with attractive bus and rail systems), which takes the form of an integrated transport system and links in with regional and long-distance transport services. The bus system should take advantage of new low-emission technologies (e.g. buses powered by natural gas). It is also important to establish favourable conditions for the development of electro-mobility in both this area and the motorised private transport sector. By converting the city's vehicle fleet, municipalities can take a leading role and stimulate a ripple effect. Alongside the many options that can be used to incentivise environmentally-

friendly mobility, municipalities can also turn to more restrictive measures, for example focused traffic management, traffic calming and parking management. Municipalities can also influence the technical design of traffic routes and systems. This includes restructuring street lighting practices (e.g. dismantling street lamps that are no longer needed, “half-night” lighting, LED lamps) and also using energy-saving, low-maintenance LED technology in traffic lights and using photovoltaics to generate power to operate a variety of systems.

Public relations and advisory services are important areas of action that help to raise awareness and make information available. In addition to information on and involvement in planning and concepts, this also includes details on concrete measures and opportunities as well as targeted effects. In order to emphasise its role in setting a good example, the municipal administration should actively provide the public with information about its own activities and measures in particular (renovation of buildings, mobility, environmentally-friendly procurement, using renewables, etc.). Schools and nurseries are key stakeholders and multipliers with a particular interest in the measures, and their involvement should therefore be actively supported (e.g. school-specific proposals, an educational trail on energy experiences, an energy award). It is also vital to encourage other stakeholders to take an interest in the implementation of climate and environmental policy objectives (e.g. local companies, associations, social facilities, and the local population). In the long term, a public relations strategy should be developed (within the context of the energy and climate protection concept, for example). The local population, businesses and representatives of the housing market should be given information about energy-efficient construction/renovation (advice on and examples of different funding options and “accessible” projects/examples or targeted information activities, e.g. thermography). Municipal/inter-municipal or regional energy managers play a major role.

3.6.2 Instruments

Prioritising the issue within municipal policy, especially by adopting a municipal policy decision, is essential and is the first step municipalities should take. Based on experience, this is also a logical point at which to initiate a structured discussion using a municipal concept (top-down approach).

Integrated Urban Development Concepts (IUDC) are one of the core elements of integrated urban development policy and are underpinned in Germany by the Leipzig Charter. IUDCs have already been established in many areas and are the only instrument that enable actors to integrate the cross-sectoral topic of “climate and energy” into the relevant areas of action within the field of urban development at strategic level. They broaden the field of urban development by introducing the issues of energy efficiency, reducing energy requirements and using renewable energy sources.

The development of **energy and climate protection concepts** as separate technical models, on the other hand, serves to greatly bolster strategic approaches. They are normally applied to urban zones, however it can be useful to expand them to cover urban regions or rural areas as well since these areas are strongly linked to energy generation (renewables) and also provide a market for public utility companies. The concepts should be interlinked with IUDCs at both ends, taking the IUDC frameworks, objectives and strategy into account on the one hand and also making a specific contribution to the IUDC and its development on the other (producing key proposals). They must be aware of climate protection objectives

and strategies at EU, national and state level and break these down so that they can be applied at municipal level. The aim is to enable strategies to be implemented sustainably in a way that fits with the city's development as a whole and also to ensure that urban development measures bear the region's climate protection and energy efficiency requirements in mind. In addition, they should provide feedback for regional energy concepts (particularly on data, but also on objectives). However, the focus must be on developing specific measures. Energy and climate protection concepts should always be designed to suit the circumstances in each individual town or city and should have the potential to be carried forward in the future. Below are recommendations for the main aspects of energy and climate protection concepts.

- ▶ the **fundamental principles** are: achieving an energy and CO₂ balance, assessing potential in different scenarios, setting qualitative and concrete quantitative municipal goals, developing specific measures (also taking cost effectiveness and funding options into account), developing a concept for controlling (monitoring/evaluating) the implementation of climate protection measures and goal attainment, drawing up a public relations concept;
- ▶ a multidisciplinary, systematic **record of existing projects and measures** relating to the thematic area of "climate and energy" also forms the basis of the concepts; this is also used to raise awareness/promote inter-municipal communication and provides a pool of information and ideas that other towns and cities can draw on to help them develop new measures and projects;
- ▶ the relevant **areas of action** for the concepts are: power generation and supply, urban development, buildings (public, private housing stock), mobility, public relations; looking at the issue of adapting to the consequences of climate change is optional, areas of action that are a priority for municipalities (e.g. district heating systems) should be examined more closely;
- ▶ one of the most important issues is developing **policies that back** climate protection objectives and measures as a means to support efforts to address local situations where action is needed in a goal and implementation-oriented, efficient and committed way;
- ▶ **Public relations / raising awareness / communication** are a key component of climate protection/energy efficiency activities; in many cases, they help to motivate stakeholders that are not yet involved in municipal planning processes; public relations work should be initiated before/at the same time as concepts are being developed (a systematic process requiring a certain amount of time to achieve concrete, tangible results) and this will also increase the local population's awareness of the administration and its policies; the implementation of initial climate protection measures should be seen as a "pragmatic approach" rather than an alternative route in order to make this issue "accessible" at an early stage, thus stimulating interest in the topic → focus on **acceptance**, support and initiative;
- ▶ the introduction of a **quality management system that focuses on activities and measures** (e.g. European Energy Award) can also provide useful support. It aims to build systematic communication between stakeholders within the

framework of the development of integrated climate protection approaches and concepts and also aims to support and evaluate the process.

Since the district is the most important level within the urban setting in relation to housing stock, **district concepts** should be drawn up within the framework of integrated urban development and urban renewal processes. The plans must be based on the IUDC or urban redevelopment strategy and the municipal energy and climate protection concept – this encourages a greater focus on implementation. If appropriate, this will also establish a link with the regional energy or climate protection concept (including theories, breaking objectives down so they can be implemented at district level, strategic statements). District concepts can also form the basis of pilot and demonstration projects. In areas with heterogeneous old buildings, it can be useful to form “energy clusters” (EC). It is then possible to develop concrete recommendations for action for districts with similar characteristics in relation to utilities provision, socio-spatial organisation and urban development without having to examine each building individually, which can be costly. Individual large homogeneous housing developments can be turned into “model energy-efficient districts” and provide good examples of consolidation. A set of criteria (that is still to be drawn up) should make it easier to decide whether to opt for a centralised or decentralised heating network when drafting energy-efficiency district concepts, especially in districts with old buildings.

Energy plausibility checks can be used to assess existing or planned energy measures in buildings and supply systems at district level in particular.

In addition, **competitions** are an appropriate way to increase awareness and motivate local stakeholders. This includes participation in national or regional competitions, e.g. between municipalities on efficiency or conservation projects that have an external impact and contribute to external image-building, and also the implementation of competitions within municipalities (e.g. between schools, on investment projects) that have an internal impact and contribute to internal image-building.

3.6.3 Organisation and resources

The increasing significance of this issue and the importance attached to it in municipal policy mean that municipalities must have robust internal and administrative systems. If, despite priority being given to this issue, this is not the case, then urban policy risks losing credibility.

Energy/climate protection managers play a key role in supporting this new area of action (climate and energy) in local administrations by clearly setting out the responsibilities and scope of action. Any additional capacities are determined by the size of the town or city. It is highly recommended to establish this role within the municipality’s core administrative structure, either as a separate department or within a department that takes a cross-sectoral approach (e.g. urban development). It is crucial to create an adequate job profile to maintain expertise and also to develop and publicise the topic within the administration and the town or city. Alternatively, or rather in addition, appropriate expertise could also be drawn from local energy agencies or public utility companies.

In many cases, **external experts** are also needed. On the one hand, this means making use of objective know-how for integrated processes and communication; on the other, it

means using specialised knowledge for problem-oriented research (e.g. energy-efficient renovation of buildings, heating networks).

Cooperation and communication are key elements in the development of the topic. The following is recommended:

- ▶ establish a multidisciplinary working group within the administration, which focuses in particular on developing the concept and implementation (especially within the departments responsible for urban development, the environment and economic promotion);
- ▶ set up an independent specialist advisory council at municipal level that includes interested parties and stakeholders, and spans a local network;
- ▶ if appropriate, participate in external city networks at regional, state and national level (to exchange experiences and raise awareness);
- ▶ conclude local climate protection cooperation agreements and agreements on objectives with local representatives from the housing market, public utility companies and local contractors. The aim is to agree specific CO₂ reduction and energy conservation measures in order to exploit any further potential to reduce CO₂ emissions.

Financial resources are required to initiate and implement measures. They motivate municipalities to engage with the issue, and also serve as an “advance payment” for helping to decrease public finance expenditure in the future. Acquiring a range of good sources of funding at state, national and EU level is essential and it should be noted that a high level of funding is often needed. The municipality’s own contribution must also be guaranteed. In addition or, if appropriate, alternatively, municipalities should examine the possibility of receiving sponsorship from local businesses.

3.6.4 Pilot projects

The development of pilot projects plays a key role in demonstrating the importance of this topic in municipal policy. Municipalities must have sufficient capacity to initiate and implement pilot projects. Such projects should cover all the different areas of action, but address specific local situations and problems. They can be developed before or at the same time as local energy and climate protection concepts, but they should be a key outcome of these concepts and existing projects should be gradually integrated into a city-wide strategy. In this way, they can also be used as models, since developing individual projects (bottom-up approach) at the same time as city-wide strategies is another potential approach that other municipalities could adopt to tackle the challenges posed by climate protection and energy efficiency. There is scope for both small-budget and large-scale projects. They help to raise awareness and encourage acceptance and also provide an opportunity to gain and transfer knowledge within the town or city (positively affecting the administration, the population and business sectors). They can also have a considerable external impact at state, national and EU level.

Sharing the knowledge gained in recent years in Brandenburg is strongly recommended. One of the most important points is the development of appropriate organisational structures within and also among municipalities. The focus is on integrating the cross-sectoral areas of action of “climate and energy” into the overall urban development planning process

and to promote coordination and integration with all the different areas of urban development (e.g. buildings and settlement structure, transport, business, environment, etc.) since these sectors are closely connected and can create synergies.

4 RECOMMENDATIONS FOR ACTION FOR PROJECT PARTNERS FROM BRANDENBURG'S PERSPECTIVE

The Federal State of Brandenburg can look back on a wide range of experiences over the past two decades. On the one hand, these reflect the state's journey from reactive urban planning to sustainable, integrated urban development, and on the other hand, they gradually take into account the challenges posed to towns and cities by climate change, especially the need to increase energy efficiency. Project partners can actively draw on the experiences gained from the numerous approaches developed based on the lessons learned in Brandenburg. In this way, they can take good practices on board and also avoid mistakes. However, this does not mean that other municipalities have to adopt models and recommendations exactly as they are. Given the differentiated conditions (see chapter 2.3), it is clear that the aim is more to sound out strategic approaches together and then adapt them to local situations. The focus is on strengthening **bottom-up approaches** within the local context while at the same time emphasising the importance of competence-based **top-down strategies**, developing **cooperative structures**, adopting **energy plausibility checks** and also making the most of **low-cost measures** (such as training, system analysis and the step-by-step optimisation of technical measures).

Although the experiences in Brandenburg, which is committed to implementing environmentally-friendly and innovative energy strategies, can provide others with inspiration, it is difficult to make direct recommendations for project partners in view of the context outlined in chapter 3.1 because:

- although both sides experienced a political/economic turning point, in East Germany this was linked to the opportunities provided by extensive transfer payments;
- despite their structural similarities, the project partners' requirements are shaped by their different situations;
- the situation concerning tenancy and property law is fundamentally different and this can result in an insufficient balance within the cooperative structures between the state, local policy and administration, property owners and their property managers and energy providers, which often have a monopoly (another missing element is that, for the most part, housing associations do not have strong relationships with the public administration – either as partners or rivals – and property owners are also not strongly represented at local level by their own autonomous bodies, e.g. cooperative approaches; municipal associations in the regions are largely undeveloped);
- property owners tend to operate in isolation and this, combined with the current income situation and the weak regulation of residential property, makes it difficult to stimulate collective action;
- a low level of institutionalisation – comparatively weak municipal and local government institutions, a lack of property development – hampers the development of confident networks (which generally only emerge in clear and transparent situations) and also creates financing problems (lack of opportunities to secure funding, especially considering the expected dynamisation of the housing market as a result of demographic change).

Brandenburg has found that reliable institutions are a prerequisite for the development of cooperative strategic action. Project partners should therefore consider in which sectors,

over and above energy and environmental policy, it might be useful to strengthen urban and environmental policy institutions. This relates in particular to the importance of having a reliable legal and regulatory framework (planning, property, regulation of tenancy and residential property rights) and robust, independent stakeholder structures (municipal constitution, regional development, housing, residential property and tenants' associations, chambers of professional associations, district representation).

4.1 Good practice approaches that can help project partners to develop appropriate strategic approaches

Below are some suggestions based on the lessons learned in Brandenburg that offer partners ideas for their own projects.

Instruments

- **Integrated concepts represent governance approaches**

In recent years, integrated concepts have evolved from rough templates into dynamic strategic concepts for municipalities and local stakeholders that are supported by a culture of cooperative action. Provided that Integrated Urban Development Concepts (IUDC) also contain agreements on how they will be implemented, they provide an opportunity to change planning culture, which makes it possible to establish a balance between bottom-up (focusing on local initiatives) and top-down strategies (implementing national and EU commitments as well as professional standards). Based on the experiences of the municipalities in Brandenburg, IUDCs should be developed in combination with funding strategies to become a standard instrument for managing development.

→ Examples: Guben (p. 29), Lübbenau (p. 30), Luckenwalde (p. 33)

- **Network structures as a general model for action**

When it comes to achieving a balance between different stakeholders, hierarchical organisational forms have proved less suitable than open network structures, which enable stakeholders with different backgrounds to come together at a level of action that focuses on issues and tasks. These networks are effective on a horizontal level (bringing together various local stakeholders), but there is also the option of integrating a vertical component (regional and national cooperation partnerships, ministries). Networks are the ideal instrument for managing and sharing knowledge in order to provide a basis for decision-making.

→ Examples: BraNEK (p. 23), Spreewalddreieck Regional Energy Concept (p. 24)

- **Promote round tables**

Round tables help to establish a fairly regular dialogue between the various stakeholders and those who are "affected" and make it possible to build trust and develop routines for solid discussions. To be effective, the person chairing the session must be well-informed and the participants must agree to contribute. Support for this can be provided by an important figure in the local hierarchy – e.g. the mayor – and, if appropriate, a contract. They are a means of bringing municipalities and stakeholders together (e.g. this can also include the housing industry and energy providers; during implementation, members of the public and property owners can be involved).

→ Examples: Spreewalddreieck Regional Energy Concept (p. 24), Lübbenaubücke (p. 30)

- **Integrated energy/climate protection concepts**

In many cases, integrated energy/climate protection concepts have become part of the process to move integrated urban development forward in Brandenburg. They can provide inspiration to implement individual measures and small-scale energy/standalone solutions.

→ p. 44; example: Guben (p. 29)

- **District energy concepts**

District approaches enhance municipal urban development, energy and climate protection concepts and focus much more on implementation. Different strategies need to be adopted for homogeneous and heterogeneous districts. In areas with old buildings, district energy concepts make it easier to decide between centralised and decentralised heating systems – a relevant set of criteria can also provide a basis to help municipalities make this decision.

→ Examples: Luckenwalde (p. 33), Lübbenau (p. 30)

→ Set of criteria p. 36

- **Energy plausibility checks**

This process was only recently developed as a response to limited resources and the danger that measures might produce socially and economically untenable results with little ecological relevance. The aim is to assess the plausibility of investing in energy efficiency measures in buildings and districts. In light of demographic change and districts' uncertain socioeconomic prospects, plausibility checks are becoming increasingly important. The detailed plausibility analysis, supported by external and independent experts (e.g. municipal energy managers), should provide a basis for financing and decision-making.

→ p. 26f; example: Spreewalddreieck Regional Energy Concept (p. 24)

- **Municipal energy management**

The introduction of municipal energy management systems aims to reduce energy consumption in public buildings and also within the municipality itself. In addition to identifying potential to conserve energy and increase efficiency (e.g. through energy performance contracting), this approach can also focus on the possibility of generating power locally/regionally in decentralised plants using renewable energy sources. Distribution networks should also be examined in this context. Innovative approaches are often developed to tackle specific problems.

→ p. 40

- **Quality management**

Introducing compulsory, modern quality management systems (e.g. European Energy Award®) as a prerequisite for receiving funding ensures that results are continuously evaluated and increases the prospect of being able to adapt to any changes. These systems show what stage has been reached in the project implementation process, which developments are a success and where there are failings.

→ p. 38

Building measures

- Complex renovation measures

Implementing complex renovation measures in order to achieve a standard of excellence is only worthwhile if long-term use (networks, infrastructure) and demand (buildings, socio-cultural infrastructure) can be guaranteed.

- Agreements with property owners and property managers

Based on the lessons learned in Brandenburg, it seems sensible to emphasise the rationale (from a real estate perspective) behind investing in energy efficiency at building and neighbourhood level, particularly when discussing measures with property managers. The economic consequences of the measures should be made clear and the concept should take the potential of property owners and tenants into account in this respect, making them aware of the effect on their income. Financing should be planned on a long-term basis and, in the same way, the consequences of the measures should be made clear in binding agreements.

→ Conclude climate protection agreements with the housing industry (p. 40)

- Differentiated methods of generating and distributing power

Undifferentiated master plans for getting cities and districts into good, energy-efficient shape have not been ideal solutions due to technical issues and a lack of acceptance. Differentiated strategies for generating, supplying and utilising power, on the other hand, have contributed to solutions that are economically viable and easy to explain. If concepts are differentiated, then it is easier to implement strategies that involve different forms of energy working side-by-side and standalone systems. This approach also makes it possible to incorporate solutions for any new requirements and to use new technical innovations.

- Low-cost measures

In many cases, it seems sensible to tie investment to an analysis of marginal utility, which would make it possible to react to the pace of change in the environment. Low-cost measures often lead to an effective increase in efficiency, but adding even more investment on top of this will only increase efficiency slightly. This investment has largely no impact on the economic and social consequences and financially it endangers the extent to which measures can be implemented in a district. Measures financed by property owners tend to follow a step-by-step process with different levels of intensity and this is a convincing alternative to "ready-made master plans".

- Using renewable sources of energy

There is also potential to increase efficiency in existing plant networks by implementing new technology and using renewable sources of energy as extensively as possible (wind power, hydropower, geothermal energy and bio-energy). Since the opportunity afforded by new technology often comes along unexpectedly, its implementation depends on the flexibility of local and regional energy concepts. An international exchange on energy-efficient innovation (which should also discuss smart grids) is urgently needed in order to give project partners the best opportunity to increase efficiency. The expansion of renewables can also be strengthened and initiated by support from investment companies such as community funds and public parks or bio-energy villages.

Organisation & training

- **Municipalities as energy-efficiency centres**

Strengthening municipalities and municipal networks as a requirement for the implementation of energy concepts has become one of the key features of a development approach that focuses on the principle of subsidiarity (as outlined in the German Constitution). In accordance with this approach, municipalities need to have appropriate resources and capacities and must become stakeholders. The appointment of energy and climate protection managers and municipal energy management officers plays a key role in this context.

The opportunity for municipalities to involve experts in particular fields in specific tasks or, if they are overtaxed, to commission agencies to provide support, is especially important. Using external sources for support in generic municipal tasks on a temporary basis increases the flexibility of municipal activities and also helps to improve the quality of municipal activities by establishing stable advisory relationships.

For this to be achieved, tasks and procedures must be clearly structured within Integrated Urban Development Concepts.

Further training on strategies and concepts that have been adopted should be made available to staff and should be supported by relevant networks.

- **Knowledge management and pilot projects**

The Experimental Housing and Urban Development programme (ExWoSt), which has been running for decades in the Federal Republic of Germany and has been successfully implemented at national, state and municipal level, is now a key component in the generation and dissemination of knowledge, as evidenced by the projects presented in this report. It is a flexible instrument that has been implemented in cooperative projects and projects focusing on network relationships and over the decades it has addressed virulent problems relating to housing and urban development in different social, economic and technical areas and has helped to make exemplary solutions available across Germany. The programme has tackled the renovation of buildings and districts, and is increasingly looking into improving demographic background knowledge and energy efficiency. Controlled experiments are proving to be a good basis for sustainable, integrated reasoning.

These "learning relationships" can be developed at both national and regional level and provide a way to encourage acceptance of new topics and the necessary capacity to develop them.

- **Information & training**

Although technical knowledge is circulated very quickly, it appears that modern administrative process can only be shared by using intensive forms of knowledge dissemination and cooperation "on the case". In this respect, networks (as learning forums) and temporary staff exchange programmes – which, unfortunately, are not yet part of the Urb.Energy project or the research strategies developed within the framework of the EU's INTERREG programme – would be good opportunities to provide training for local projects and share knowledge.

Financing

- **Revolving funds**

Revolving funds have been used in Brandenburg and Estonia and also at municipal level in individual partner cities and are a cost-effective way to finance measures. They are also sensitive to uncertain budgetary developments. They should be developed experimentally using European funding for the topic area and implemented in a controlled, but flexible way.

- **Means-tested grants**

With regard to the financial situation and demographic composition of the project area (an age structure involving a large number of young and old people and an increasing number of young households just starting out), all funding for the clients who fall within the scope of the pilot project must also include an income-oriented component for providing grants. This component should be integrated into the financing mechanism to ensure its acceptance and implementation.

- **Combination of financing instruments**

It is also recommended to combine the different funding options (revolving funds and means-tested grants). Together, they can help to develop the capacity of both the municipalities and other stakeholders to take action.

4.2 Recommendations on measures that should be implemented in the short term

The lessons learned in the Federal State of Brandenburg show that solutions seeking to attain a standard of excellence, although desirable, cannot be implemented on a large scale, especially when finances are limited. Step-by-step approaches, on the other hand, which form an integrated part of a comprehensive strategy, enable actors to achieve large savings in relation to energy consumption, reduce harmful emissions and sustainably increase the quality of districts and housing at little cost.

APPENDICES - PROJECT PROFILES FOR PROJECTS IN BRANDENBURG

APPENDIX 1 - PROJECT PROFILE "BRANDENBURG URBAN NETWORK ON ENERGY EFFICIENCY AND CLIMATE PROTECTION (BRANEK)"

The 'Städtekrantz' urban network in Berlin-Brandenburg Brandenburg Urban Network on Energy Efficiency and Climate Protection (BraNEK)

Pilot project as part of the National Urban Development Policy of the Federal Ministry for Transport, Construction and Urban Development (BMVBS)/ Federal Institute for Construction, Urban and Land-Use Research (BBSR)



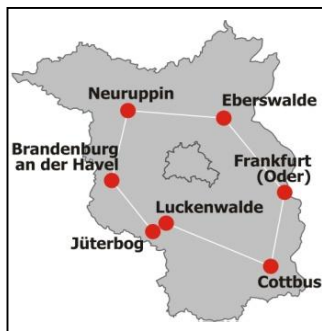
© Ernst Basler + Partner GmbH

Summary

Building upon the network structures of the intercommunity consortium "Städtekrantz Berlin-Brandenburg" (the Berlin-Brandenburg urban network) that has been in existence since 1995, the Brandenburg energy-efficient city programme for climate-change prevention (BraNEK) aims to equip municipal authorities for the challenges of climate-change prevention and energy efficiency. The objective is to collate and process existing community experience and expertise and to identify the most important opportunities for concerted action. A joint general approach has been developed to local strategies based on the long-term communication structures between and within the cities. Thus local activities are supported by interaction across the region around Berlin and a reference base for individual pilot projects could be established as a learning basis.

Location

The seven cities of the BraNEK network form a ring of secondary towns around Berlin in Brandenburg between 50 and 120 km from Berlin.



© Ernst Basler + Partner GmbH

Key data/indicators at municipal, regional and/or district level:

The cities of the network vary widely in their structure, with populations ranging between appr. 12,000 and up to 100,000 inhabitants. They play a major role as local and regional centres and have a significant function in development issues in the region itself.

Realisation/period of implementation

April 2010 to fourth quarter 2011

Status

The network project work commenced with the project launch in April 2010.

Participants/partners in the project

The project has the support of the seven member cities of the intercommunity consortium "Städtekrantz Berlin-Brandenburg". These are the Brandenburg on the river Havel, Cottbus, Eberswalde, Frankfurt (Oder), Jüterbog, Luckenwalde and Neuruppin. The key participants and also the beneficiaries of the project are the municipal administrations, in particular in the sphere of urban development. The network has agreed on informal cooperation with the Climate Change Research Platform of the Potsdam-Institut for Climate Impact Research (PIK), the Brandenburg Energy Technology Initiative (ETI) and the Spreewald-Triangle Regional Energy Concept Project.

Participation/implementation process

The project was designed as a workshop process and relies on experience and knowledge transfer and a discussion process, building directly on current energy and climate developments. Since the kick-off in April 2010, eight workshops will be held by December 2011. In parallel with the workshops, an internet presence has been launched on the Städtekrantz Berlin-Brandenburg website and five thematic newsletters were published.



© Ernst Basler + Partner GmbH

städtekrantz
BERLIN-BRANDENBURG



The 'Städtekrantz' urban network in Berlin-Brandenburg Brandenburg Urban Network on Energy Efficiency and Climate Protection (BraNEK)

Pilot project as part of the National Urban Development Policy of the Federal Ministry for Transport, Construction and Urban Development (BMVBS)/ Federal Institute for Construction, Urban and Land-Use Research (BBSR)



© Ernst Basler + Partner AG

Integrated approach

The BraNEK project is based on an integrated approach, involving all specialist departments of the municipal authorities and external experts. As a first step, a baseline survey in the cities was carried out, involving other local participants (including public utility companies). Various approaches have been identified for urban networks and have been initiated to inter-link the multidisciplinary issues of "climate-change prevention" with integrated city development that have led to considerably synergetic effects.

Technical solutions

The purpose of the project is, among other things, to create a basic conceptional and procedural framework for local climate-change prevention strategies. In the context of the development of such strategies, which are not directly part of the project, solutions have emerged which also involve technical implementations and innovations.

Funding/support

The project, with a budget of approximately EUR 200,000, was promoted as part of the "National Urban Development Policy" of the BMVBS/BBSR (German ministry for transport, regional and urban affairs). The member cities contribute both human resources and financial investment by means of membership fees to the "Städtekrantz Berlin-Brandenburg" intercommunity consortium.

Success factors and innovations

The project is innovative, in particular because of its nature as a cross regional and cross-actor network. It has proved an experiment in pioneering a new kind of approach in this sector. Highlighting the success factors in the community initiative is an essential part of this project. The involvement of other participants is also exemplary. The chosen approach has shown the benefits from concerted action. The planned methodological results have helped enable cities to work out specific urban strategies.

Challenges and shortcomings

The relative lack of human and financial resources available to the municipal authorities have presented a significant challenges to the cities. Also the generation of awareness amongst the community, city authorities and local participants need to be constantly addressed concerning the challenges of climate change.

Transferability of solutions

In particular the innovative networking aspect of the project is a model approach for local community governments. Where financial and human resources are restricted, networking and exchanges of experience provide an effective opportunity to undertake new tasks, joint approaches and also to work out joint positions on issues – e.g. contrasting routine assumptions. To bring together the many people involved in environmentally-responsible cities, integrated approaches, in particular at city and district level, can best be pursued in monitored and mediated networks of communication.



© Regionalbüro Barnim

APPENDIX 2 - PROJECT PROFILE "SPREEWALDDREIECK REGIONAL ENERGY CONCEPT"

Spreewalddreieck Regional Energy Concept

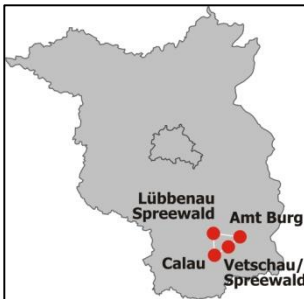
A pilot project introduced under the federal “National Urban Development Policy” initiative



© Stadt Vetschau/S.

Summary

The municipalities involved in the project of the ‘Spreewald Reginal Triangle’ aim to tap into the ecological, economic and social potential of an energy policy established at local level. The focus is on reducing energy consumption, decreasing CO₂ output into the atmosphere, increasing the efficiency of energy distribution systems and encouraging a greater use of renewable energies. This project, which was initiated under the “National Urban Development Policy” (NSP) under the auspices of the federal government, aims to develop a comprehensive overall plan for the region which can be used as a basis for a joint energy strategy and also for producing well-planned individual projects for an energy efficient future.



© Ernst Basler + Partner GmbH

Location

The towns of Vetschau/Spreewald, Lübbenau/Spreewald and Calau as well as the Amt Burg-Spreewald (the collective municipality of Burg) are in the touristic hotspot of the Spreewald region of Brandenburg, approximately 90 km southeast of Berlin.

Key data/indicators at municipal, regional and/or district level:

The region covers an area of 538 km² and is home to around 44,500 people (December 2009). Both Vetschau and Lübbenau have been centres of energy production for over a century. In the past, the towns were defined by brown coal mining and two large power stations nearby; however, since March 2007, both towns have become part of the “Innovative Energy Region Lausitz-Spreewald”, which aims to develop sustainable energy policy.

Realisation/period of implementation

December 2009 – November 2011

Status

A joint strategy and conceptional framework has been developed with the regional participants and individual projects have been developed and are under collective survey.

Participants/partners in the project

The project was initiated by Vetschau and Lübbenau which together with Calau and Amt Burg make up the Spreewald-Triangle region. In addition to these municipalities, the initiative also involves energy providers, the agriculture and forestry sectors, the Spreewald Biosphere Reserve administration, businesses and housing associations.

Participation/implementation process

A communication platform in the form of a round table has been established to support coordination and decision-making. This enables all important actors from the administrative, political and academic spheres as well as regional energy providers, energy producers and energy consumers to enter a permanent discourse over strategies and project issues. The three working groups were initiated: energy consumers, energy producers and distributors. They are carrying out the substantive work and their findings are brought together during round table sessions that have led to an integrated overall concept.



© B.B.S.M. mbH



© Stadt Vetschau/S.

Spreewalddreieck Regional Energy Concept

A pilot project introduced under the federal “National Urban Development Policy” initiative

Integrated approach

Interlinking various otherwise sectoral issues, such as energy conservation, energy production and power supply, and also encouraging cooperation between a broad spectrum of participants has led to a considerable synergy effect. Priority is giving to the “learning process”, which promotes discussion between key participants. The municipalities see themselves as the initiators and facilitators of a broad dialogue of the regional society and actors, however they are also prepared to develop their own contributions. In addition, the project has explored, on a pilot basis, an inter-municipal scope of action and has motivated other towns to develop strategies for sustainable and energy-efficient town structures.



© LUA Brandenburg

Technical solutions

With the expertise of the Brandenburg University of Technology (BTU) Cottbus, the project has evaluated the technical and economic feasibility of individual measures for increasing energy efficiency and also drawn up proposals for a further development of an innovative and intelligent power supply and distribution system for the municipalities and the region.

Funding/support

The project's gross budget is EUR 88,000, not including pilot measures. As a recognised pilot project within the the research programme “National Strategy Plan for an Integrated Urban Development Policy – Pilot Projects Initiated Under the National Urban Development Policy”, the initiative was given a grant of EUR 37,500 by the Federal Government. The municipalities participating in the project are providing the remaining funds.



© Stadt Lübbenau/S.

Success factors and innovations

The project has explored new ways to solve the complex challenges posed by climate change mitigation on a regional scale. Both increased cooperation between neighbouring municipalities and providing a means for exchange with key regional actors have been an important impetus towards developing regional development strategies that extend beyond the municipal level.

Challenges and shortcomings

The greatest challenge has been to overcome conflicts of objectives, particularly in the technical and economic fields. A key issue has been maintaining a steady energy supply and price stability, while at the same time increasing the proportion of renewable energies. Input from a large number of small renewable energy sources leads to a high volatility in the grid makes and it necessary to reconstruct or upgrade the supply network, focussing on ‘intelligent network architecture’. Another point of conflict concerns the public acceptance of the essential network upgrade. The fear of price rises due to the turn towards a more efficient energy network has read to a reluctance amongst the residents towards the construction of further power lines.



© Stadt Vetschau/S.

Transferability of solutions

Above all, the initiative has developed transferable approaches for “climate change mitigation and global responsibility” and “regionalisation”. In addition, the project has shown a potential in “activating regional economic cycles” and “local participation” across politicians, energy related actors and research. Recommendations for establishing a sustainable model of collaboration have been produced that have proved to be attractive for other towns and regions, based on the lessons learned from implementing the project.

Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner

APPENDIX 3 - PROJECT PROFILE "CITY OF GUBEN - INTEGRATED ENERGY STRATEGY 2020"

City of Guben – Integrated Energy Strategy 2020

Reorganisation of energy supplies with regenerative energy sources in urban renewal



© Ernst Basler + Partner AG

Summary

By means of its Integrated Energy Strategy, the city wishes to create the conditions for safe, economical and sustainable energy supply and make an active contribution, by taking a focused approach, to the energy and climate-change prevention objectives of the Land of Brandenburg. The objectives include increased energy efficiency, the use of renewable energy sources, the reduction of CO₂ emissions, but also ensuring that the area remains an attractive residential and business location, preserving a minimum residential or client density in the supply area. The initial focus however is on separating district heating from the gas supply network and on building up decentralised local heating 'island' solutions. A medium to long-term priority is cooperation with the neighbouring Polish city of Gubin.



© Ernst Basler + Partner GmbH

Location

The city of Guben is in the east of the Land of Brandenburg, on the border with Poland.

Key data/indicators at municipal, regional and/or district level:

Since 1990, the city of Guben has lost about 40% of its population and at the end of 2009 had approximately 19,000 inhabitants. Two thirds of the available housing are precast rented apartments which have for the most part been renovated and provide relatively good thermal insulation. Developments in the sphere of heat distribution have been even more drastic with a 75% reduction in heat loss. Recently, the thermal power station and the fine distribution of heat have been modernised, but not the transit lines. These are still oversized and lead to 30% heat losses in transit to the end consumer.

Realisation/period of implementation

Since May 2009

Status

After completion of the energy strategy, in 2010 an action plan was developed, building on the recommendations of the energy strategy.

Participants/partners in the project

Right from the start, an interdisciplinary project group has managed the initiative, consisting of representatives from various areas of municipal government, local housing companies and industrial enterprise, local and regional power suppliers and city councillors.

Participation/implementation process

At an early stage, the major participants in the city joined together in advisory groups to jointly develop the energy strategy and to work out the recommended measures for the various spheres of activity. They also provide information by means of awareness campaigns. Due to the process-oriented nature of the energy strategy, it has to be regularly evaluated and reviewed. For this, a monitoring and controlling system has been established as one of the priority measures.



© Ernst Basler + Partner GmbH



City of Guben – Integrated Energy Strategy 2020

Reorganisation of energy supplies with regenerative energy sources in urban renewal

Integrated approach

The integrated energy strategy is closely related to the integrated urban development and urban renewal (IUDC) concept. Because technical infrastructure and urban development are closely intertwined, the project has several interrelated objectives. Heat must be supplied economically, and the supply structure must ensure affordable energy prices for the consumer as well as environmental benefits achieved by the use of regenerative energies and through increasing energy efficiency. To ensure integrated local action, advisory groups with an interdisciplinary membership have been deployed.

Grundsatz	Kriterien
Wirtschaftliche und sichere Energieversorgung gewährleisten	Investitionskosten Energiekosten Verlässliche Energieversorgung Lokale Wertschöpfung
Gesellschaftsverträgliche Energieversorgung garantieren	Abwanderung Arbeitsplätze Soziale Spannungen
Umweltverträgliche Energieversorgung sicherstellen	Erhöhung Energieeffizienz Anteil der Erneuerbaren Energien Umweltbelastung (v.a. Wasser, Luft) Stadt- und Landschaftsbild
Maßnahmen - Mix gemeinsam mit Akteuren umsetzen	Akteure aus Politik, Wirtschaft und Gesellschaft Mehrere Handlungsebenen Ausmaß der lokalen Verankerung
Pionierrolle der Stadt Guben stärken	Leuchtturmprojekt Medienwirksame Projekte Image der Stadtregion Guben

© Ernst Basler + Partner GmbH



© Ernst Basler + Partner AG



© Lerke

Technical solutions

Some of the aims of the energy strategy are implemented with target margins which were developed building upon the energy strategy of the Land Brandenburg. In addition, various strategic approaches are being taken towards the renewal of energy supplies. Research in detail suggested that implementing a variety of concepts side by side and in 'island networks' leads to a maximum of energy savings at lowest investment cost.

Funding/support

The entire cost of the concepts amounts to EUR 100,000, funded 50% by the city's own resources and 50% with funding from the Stadtumbau Ost (Urban Renewal East) programme. Guben is a model city in the ExWoSt (Experimental Housing and Urban Development) research sector "Energetic Urban Renewal" and to this extent benefits from exchanges of experiences among the parties involved.

Success factors and innovations

Essential success factors in the acceptance of the energy strategy, in addition to the multidisciplinary nature of the project, have been in particular the direct involvement of the mayor and commitment at an early stage of the most important participants in view of the implementation of potential measures. The general background situation in 2008 also favoured the plans: increasing energy prices as a consequence of world market development and as a result of the high level of dependence on third parties. One innovation is the close link between the strategic approach and the requirements of urban development resulting in the creation of a heat supply structure that is as flexible in response as possible to future uncertainties, in particular as regards the demographic situation.

Challenges and shortcomings

The greatest challenges have been the implementation of the energy strategy and the measures. Still, both city and power suppliers lack the necessary resources to rapidly implement an extensive bundle of measures. This not only affects investment projects, but in particular also non-investment measures such as the important sectors of "organisation and coordination" as well as "public relations".

Transferability of solutions

The project highlights the close interrelationship of technical infrastructure and urban planning and the interactions associated with this. Linking into the urban regeneration process is a vital precondition for the development of long-term sustainable solutions in the context of urban renewal.

Early involvement of a wide range of participants has proved highly important to the implementation of subsequent action and was essential for the project to receive widespread acceptance from the start.

Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner

APPENDIX 4 - PROJECT PROFILE "LÜBBENAU/SPREEWALD - LÜBBENAUBRÜCKE / ENERGY 2021 MASTER PLAN"

Lübbenau/Spreewald – Lübbenaubücke / Energy 2021 Master Plan

Strategies for urban energy regeneration



© Stadt Lübbenau/S.

Summary

The objectives of the Lübbenaubücke project have been the refurbishment of housing in line with residents' requirements, the development of urban regeneration measures (particularly partial demolition of surplus housing) to make the urban structure compatible with the town's demands. Also upgrading of the residential environment, improvements to the infrastructure and strengthening of the local economy were on the agenda. In the context of the ExWoSt pilot project "Urban Energy Regeneration", the Lübbenau/Spreewald local authority has developed a comprehensive municipal energy concept – "Energy 2021 Master Plan".



© Ernst Basler + Partner GmbH

Location

Lübbenau/Spreewald is in the region of Brandenburg, about 90 km south east of Berlin.

Key data/indicators at municipal, regional and/or district level:

The population of Lübbenau/Spreewald was about 17,000 at the end of 2009. It has lost around 11% of its inhabitants since 2001. The town used to be prosperous due to the extraction of lignite and operation of a power station, but after the collapse of these industries it had to deal with the increased emigration by its predominantly young population. The old town has grown considerably in importance due to the significant rise in tourism since 1990. With its castle and harbour its image is now that of a touristic jewel typical of the Spreewald.



© Stadt Lübbenau/S.

Realisation/period of implementation

Lübbenaubücke as a communicative planning concept started in 1999, Energy 2021 master plan: Feb. 2009 – Dec. 2010

Status

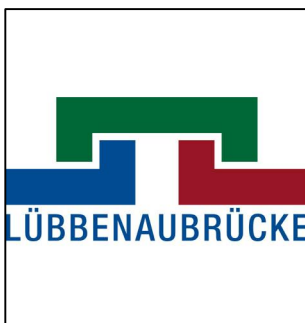
The Energy 2021 master plan has been published at the end of 2010 as a draft for continuous reviewing according to the changing demand. At the same time detailed energy studies have been undertaken for the Neustadt South West district and the individual project "House for children and senior citizens".

Participants/partners in the project

The Lübbenaubücke approach mobilises a large number of participants from the local population, industry, science and public institutions from the region of Brandenburg, the district of Oberspreewald-Lausitz and the town of Lübbenau/Spreewald.

Participation/implementation process

A central focus of the Lübbenaubücke urban development and housing management project is on cooperation and communication between all the participants and the promotion of citizen involvement. Since 1999 many individual urban development projects were completed boosting the residents identification with the town. As far as refurbishment and modernisation of the housing stock is concerned, great emphasis is placed on energy efficiency and the use of innovative technologies.



Lübbenau/Spreewald – Lübbenaubücke / Energy 2021 Master Plan

Strategies for urban energy regeneration

Integrated approach

At the forefront of the project is a comprehensive planning approach which is directed towards all-round strengthening of the Lübbenau location. The direct involvement of the top decision makers ensures a high flexibility, reliability and accountability in the urban redevelopment process. The town of Lübbenau/Spreewald views the municipal energy concept, with the development of an energy model with medium and long term targets, as an important building block for future urban development.

Technical solutions

Energy considerations such as thermal insulation of the building shell, installation of modern heating systems, and in some cases the use of new technologies such as solar heat, have had high priority for some time in the refurbishment of existing buildings. An outstanding energy efficient refurbishment project is the 2005 pilot "Barrier-free refurbishment to low-energy home standards". It was possible to reduce the primary energy requirement by some 70% by means of full thermal insulation combined with installation of a ventilation system with heat recovery and heat storage. The objectives of the municipal energy concept are to integrate renewable energies and efficiency raising measures in energy production as well as in distribution into the urban development processes and existing supply structures. It provides the framework for the implementation of future regeneration projects under optimum energy conditions.



© Stadt Lübbenau/S.



© Stadt Lübbenau/S.



© Stadt Lübbenau/S.

Funding/support

The Lübbenaubücke cooperation project was initially funded under the Federal programme "Socially Integrative City" and later under the "Eastern Urban Reconstruction" programme. Federal Government, the region of Brandenburg and the municipality each provided one third of the funds required. The projects for energy efficient refurbishment of housing stocks were mainly funded by a combination of social housing grants from the region of Brandenburg and the Federal investment bank's (KfW) renewable energies programmes, based on the concept of revolving funds.

Success factors and innovations

The Lübbenaubücke project has enabled a model of local cooperation to be established which successfully achieves continuous collaboration between the project sponsors and also the early and close involvement of the population and local businesses. With the development of a municipal energy concept, Lübbenau/Spreewald becomes one of the first towns in Brandenburg to include municipal climate protection in its Integrated Urban Development on a significant scale, namely at municipal, neighbourhood and building level.

Challenges and shortcomings

The challenges for the future will be prioritising the inclusion of energy considerations in all urban regeneration activities for the town as a whole, the implementation of ecologically optimised and economically realistic plans for CO₂ reduction and reducing local energy consumption.

Transferability of solutions

The town of Lübbenau/Spreewald is a perfect example of how important it is to include energy matters in the urban development process. More and more towns will have to face this question due to higher fossil fuels prices etc. At the regional level the town is working with the three municipalities of Calau, Vetschau/Spreewald and the district of Burg (Spreewald), under a National Urban Development Policy (NSP) pilot project, on the production of a "Spreewalddreieck Regional Energy Concept".

Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
 Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner

APPENDIX 5 - PROJECT PROFILE "VETSCHAU/SPREEWALD - A COMMUNITY CENTRE WITH ENERGY!"

Vetschau/Spreewald – A Community Centre with Energy!

The energy-efficient renovation and conversion of a heritage protected school house



© B.B.S.M. mbH



© Stadt Vetschau/S.



© Stadt Vetschau/S.



© Stadt Vetschau/S.

Summary

Within the context of a pilot project of the Experimental Housing and Urban Development programme (ExWoSt), the former secondary school was converted into a community centre including a nursery, senior citizens' club, music school and a multi-functional civic hall. The energy-efficient renovation of the heritage protected brick building (dating from 1896/97) and the adjoining courtyard wing (built in 1934) includes installing a heating system that uses geothermal energy as well as fitting internal insulation that complies with regulations on historical buildings.

Location

The town of Vetschau/Spreewald is situated on the edge of the Spreewald region, approximately 90 km southeast of Berlin.

Key data/indicators at municipal, regional and/or district level:

Around 8,800 people live in Vetschau/Spreewald (July 2010), however the town has been severely affected by outward migration and the demographic changes in the region. The town centre includes the historic old town, with the community centre at its edge, as well as two large industrial housing districts, which have already been the focus of comprehensive urban redevelopment measures. The social infrastructure in the town centre includes primary and secondary schools, two nurseries and a library. These are also used by the people living in adjacent village districts.

Realisation/period of implementation

Building began early in 2010 and was completed in summer 2011.

Status

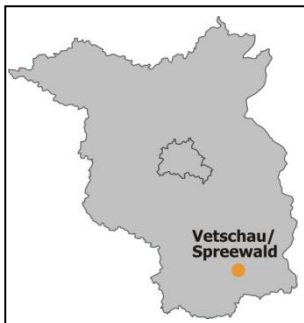
Nearing completion.

Participants/partners in the project

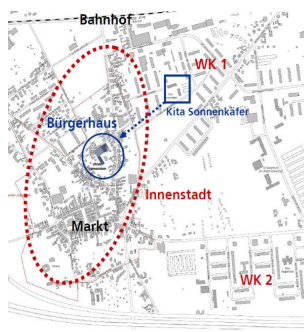
The town of Vetschau/Spreewald (owner of the building and responsible for the facility) in cooperation with the Sonnenkäfer Nursery, the senior citizens' club and the Oberspreewald-Lausitz District Music School.

Participation/implementation process

The concept for using the building was developed within the framework of a feasibility study. Given the complexity of the task with regards to the architectural, conservation and energy-efficiency objectives, the decision was taken to hold a competition. Following a restricted competition to realise the plans, which attracted many innovative approaches, proposals were developed for the implementation of the design (which included an energy concept). The architecture firm which won the competition was commissioned to plan the project. Based on the initial blueprints, an application was made for funding from the Programme to Support the Energy-Efficient Regeneration of Social Infrastructure in Municipalities (Investment Pact – ESI), which is part of the German response to the global financial crisis. Several workshops were held with the future users of the building to reach agreement on structural measures and plot use. In addition, test drilling for geothermal energy was carried out and a suitable energy concept based on these results was developed.



© Ernst Basler + Partner GmbH



© B.B.S.M. mbH



© B.B.S.M. mbH

Vetschau/Spreewald – A Community Centre with Energy!

The energy-efficient renovation and conversion of a heritage protected school house

Integrated approach

The community centre is a key measure of the Integrated Urban Development Concept targeted on rehabilitation of the old town and regenerating the urban structure. In addition, the project is linked to the pilot project "Spreewalddreieck Regional Energy Concept", which was initiated under the National Urban Development Policy (NSP). It integrates a number of different uses for the building and promotes dialogue between generations. This public facility also helps to strengthen the function of the old town and thus brings about a process of revitalisation.

By supporting the energy-efficient renovation of the building, Vetschau/Spreewald is making an excellent contribution to climate change mitigation and putting the town's motto into practice: A town with energy.



© B.B.S.M. mbH



© B.B.S.M. mbH



© Stadt Vetschau/S.

Technical solutions

The heating system uses a geothermal facility with a heat pump. The peak load requirements are covered by a condensing gas boiler. Under floor heating provides the ground floor with heat energy and overhead heating supplies the upper floors. A heat recovery ventilation system provides an additional way to help conserve energy. Internal insulation is installed in areas connected to the clinker brick facade and external insulation is used in all other parts of the building.

These measures will reduce the building's energy requirements by over 50%. However, a concrete evaluation of results will only be possible after the first period has been successfully completed to the standards of the energy pass to be issued.

Funding/support

The total cost of the project (excluding landscaping) is approximately EUR 1.8 million. The majority of this cost was covered by grants from the Investment Pact ESI and the urban redevelopment sub-programme RSI. Municipalities would not be able to realise this structural renovation without considerable funding.

Success factors and innovations

The project demonstrates that it is possible to achieve high levels of energy efficiency in heritage protected buildings. The high cost is mainly due to the renovation work and only to a relatively small part a result of the energy-efficiency measures. As a multi-functional building, it is making an important contribution towards strengthening the town centre and encouraging social integration.

Challenges and shortcomings

The main challenge is aligning issues such as heritage conservation and fire protection with the energy-efficiency goals, functional requirements and financial resources. Above all, this highlights the limits of the energy-efficient upgrading that can be achieved at a reasonable technical and financial expense.

Transferability of solutions

The project is a positive example of how municipalities can reduce running costs and engage in climate change mitigation by carrying out energy-efficient renovations to its properties. The concept for using the building and linking the renovations in with the urban redevelopment process are new ways of realising integrated urban development. This initiative to reuse vacant buildings in the town centre that are important for urban identity by making the most of public infrastructure offers is an approach that can also be transferred to other areas. In addition, it shows how holding a competition can have a positive effect on the technical quality and public acceptance of a project.

Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner

APPENDIX 6 - PROJECT PROFILE "LUCKENWALDE - DISTRICT ENERGY CONCEPT FOR THE NUTHE/BURG QUARTER"

Luckenwalde – District energy concept for the Nuthe/Burg quarter

Model refurbishment options for typical buildings



© fotos-aus-der-luft.de

Summary

In the ExWoSt pilot project, the energy study of the Nuthe/Burg district was used to find out the areas where action is needed on energy renewal and how a partial conversion can lead to an opening for the use of the neighbourhood. The study focused on balance and visualisation of the district's energy needs and coverage (energy flow). Building on the analysis, alternatives and priorities for implementation of energy measures were developed, which are also transferable to other urban districts. Individual projects were indicating model refurbishment options for typical buildings and neighbourhoods. It was a priority goal to produce experience for the realisation of ambitious energy remediation projects.



© Ernst Basler + Partner GmbH

Location

The town of Luckenwalde is in the Land of Brandenburg, about 60 km to the south of Berlin.

Key data/indicators at municipal, regional and/or district level:

The town of Luckenwalde had a population of about 21,000 at the end of 2007. Its population had fallen by about 20% since the end of 1990. Luckenwalde has a compact medieval centre with peripheral estates with industrially produced housing blocks. Surrounding the old town are late 19th century areas and smaller districts of prefabricated concrete construction, particularly in the north east and north west. About 1/3 of the housing stock and many public buildings are connected to the district heating system.



© Stadt Luckenwalde

Realisation/period of implementation

Starting in 2008, the "Burg" day nursery refurbishment will be finished in the fourth quarter of 2011

Status

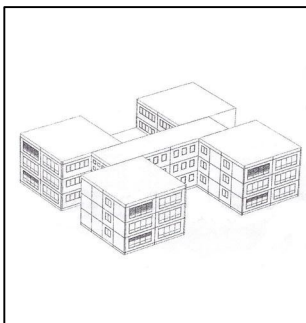
Luckenwalde is currently concentrating on the "Burg" day nursery project as an example to be integrated into the energy concept for the neighbourhood. Due to the increased demand for low-cost housing, the neighbourhood concept is currently under scrutiny and lower cost improvements to the prefabricated concrete apartment buildings in the district are being implemented. In addition to the refurbishment, the local road transport network is also being restructured. This in particular includes traffic calming measures around the day nursery.

Participants/partners in the project

The refurbishment of the day nursery is being implemented in collaboration with the town of Luckenwalde, the municipal utilities company, the operator of the facility, Volkssolidarität LVB e.V., Fläming-Elster Regional Association and external research consultants.

Participation/implementation process

The "Burg" former day nursery is being refurbished to energy efficiency standards and converted to a cross-generational district centre under the umbrella of the ExWoSt project. The primary objective of the refurbishment is to save energy through insulation and the use of efficient heating technologies, the use of renewable energy in generation and ecological building materials.



© B.B.S.M. mbH

Luckenwalde – District energy concept for the Nuthe/Burg quarter

Model refurbishment options for typical buildings

Integrated approach

The main focus of the day nursery refurbishment was on developing an integrated solution. Apart from the primary objective of energy efficient refurbishment, the particular intention is to demonstrate how energy consumption can be even further reduced at low financial cost, while at the same time upgrading the external appearance and creating new options for the use of the building. As part of the total redesign, a school playground and a community centre for the elderly will be established, alongside the existing use by the day nursery. Thus the building will be made ready for a long term use, despite falling birth rates. The project is part of the regional energy concept and is integrated in the "Brandenburg Community Climate Protection Network (BraNEK)" pilot project under the National Urban Development Policy, in which the town is involved.



© B.B.S.M. mbH

Technical solutions

Energy efficient refurbishment of the day nursery was achieved by the use of complex systems for insulation of walls, roofs and basements and by replacement of the windows. Particular importance is placed on the use of ecological building materials and insulation of the building joints. Heat is supplied from a new system which incorporates automatic ventilation with heat recovery and the use of solar power for hot water supply. The measures described will achieve an energy gain of around 60%. Through energy conservation and the use of solar power, CO₂ emissions are being reduced by 70% compared with the previous levels. The results will be scientifically monitored and become the basis for future benchmarks.



© B.B.S.M. mbH

Funding/support

The day nursery refurbishment project is financed by a combination of funds from the Investment Pact for Energy Improvements in the Municipalities (ESI programme) and the Land of Brandenburg urban development grant. The energy relevant measures are supported by an 85% grant (Federal/Land) under the ESI programme. The local authority provides the remaining 15% as its own contribution. The town receives additional funding for the other project costs in the form of a 90% subsidy (Federal/Land) from the RSI part of the Federal/Land programme "Urban Regeneration East" and contributes 10% itself.

Success factors and innovations

An energy concept has been developed for the neighbourhood. It includes refurbished or still un-refurbished apartment blocks (prefabricated concrete construction), a shopping mall and a day nursery. The range of energy measures associated with the refurbishment of the day nursery will produce a significant reduction in running costs, leading to savings long term. Innovative features are the use of low energy construction in an existing day nursery and the funding concept.



© Stadt Luckenwalde

Challenges and shortcomings

One of the greatest challenges was funding the project. The refurbishment of the prefabricated concrete apartment blocks is under reconsideration in order to secure an affordable housing stocks for the lower income population. The originally planned full-scale refurbishment would have resulted in unsustainable rent increases.

Transferability of solutions

The project demonstrates model improvements in the overall energy balance of an urban district. For the model-project, a direct transferability is unlikely due to the high costs and the difficulty of funding the project. In Contrast, the reconsideration of high-end rehabilitation will become more common.

Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner

APPENDIX 7 - PROJECT PROFILE "PRENZLAU - RENOVATION OF THE RESIDENTIAL BUILDINGS 25, 27 AND 29 SCHWEDTER STRASSE"

Prenzlau – Renovation of the Residential Buildings 25, 27 and 29 Schwedter Straße

Energy-efficient renovation and redevelopment of old, heritage protected buildings



© B.B.S.M. mbH



© B.B.S.M. mbH



© Keller Mayer Wittig

Summary

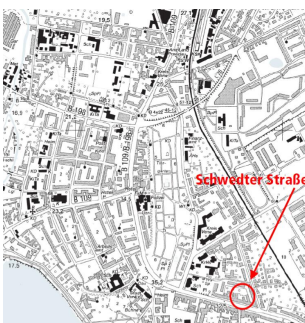
The three 19th century residential buildings (which include an individually listed heritage building) are on one of the main roads leading into Prenzlau town centre. The properties are owned by the municipal housing association and were completely empty at the start of the project. As they were an important part of Prenzlau's townscape, they were to be renovated. Within the context of an Experimental Housing and Urban Development (ExWoSt) pilot project to promote urban regeneration, the plan was to redevelop the buildings in an economically sustainable way to provide accommodation suitable for cross-generation housing and at the same time to implement an energy-efficient renovation that complies with the regulations for listed historical buildings. The project is part of the city's overall energy supply concept, which involves the city of Prenzlau, local housing associations and public utility companies as well as energy producers, plant operators and other business partners.



© Ernst Basler + Partner GmbH

Location

The city of Prenzlau is in the Land of Brandenburg's Uckermark region, approximately 90 km north of Berlin.



© B.B.S.M. mbH

Key data/indicators at municipal, regional and/or district level:

Prenzlau has roughly 20,200 inhabitants (July 2010). A decrease is expected to continue as a consequence of demographic change. The town suffered extensive damage during the war and as a result the structure of the city centre is characterised largely by industrial apartment blocks. Schwedter Straße is one of the city's few remaining areas with old buildings. As the district capital and a medium-sized centre, Prenzlau has assumed an important role in supplying public services, both at local and regional level. These include a complete range of different schools, a hospital, facilities for senior citizens, youth clubs and museums.

Realisation/period of implementation

Building has started early in 2011 and will be completed in 2012.

Status

Under construction.

Participants/partners in the project

Wohnbau GmbH (municipal housing company), the city of Prenzlau, Stadtwerke Prenzlau GmbH (municipal utilities company).

Participation/implementation process

On the basis of a feasibility study into renovating the building from 2008, a competition was held in 2009. Five planning cooperatives developed alternative proposals for the redevelopment that included an energy concept. Two of these bids were revised in the next stage and then re-evaluated by the jury. The winning cooperative finalised the design, focusing in particular on optimising its cost-effectiveness.



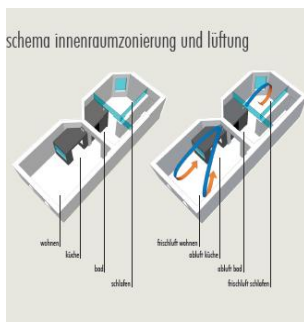
© B.B.S.M. mbH

Prenzlau – Renovation of the Residential Buildings 25, 27 and 29 Schwedter Straße

Energy-efficient renovation and redevelopment of old, heritage protected buildings

Integrated approach

The energy-efficient renovation of old buildings to provide accommodation suitable for all generations is a key focus of Prenzlau's Integrated Urban Development Concept and strategy. By creating new apartments to meet local demand within an old building, the project is making a contribution to stabilising the city centre. Linking the project in with the city's energy supply concept, which involves the city, housing associations and public utility companies as well as energy producers, plant operators and other business partners, also contributes to sustainable urban development.



© Keller Mayer Wittig

Technical solutions

The heating system is connected into the district heating network. Part of the network's supply already comes from renewable energies. The aim was to further increase the efficiency of this system by using geothermal energy. Any excess heat produced in the summer months will be stored in an aquifer and fed back into the network during the winter.

Within the building itself, a heat recovery ventilation system helps to save energy. In order to adhere to heritage protection regulations, internal insulation is installed behind the stucco facade facing the street. External insulation is used for the courtyard facades.

Funding/support

The estimated total cost is around EUR 4.4 million. Sources of funding include a loan from Brandenburg's social housing fund (GenerationsgerechtModInstR/age adapted housing) and grants from the Urban Redevelopment Programme and the EU Lifts Directive. It would not have been feasible to rely on private financing alone to realise the project due to the high building costs and the limited opportunity to use rental income for refinancing due to a regionally low income level.



© B.B.S.M. mbH

Success factors and innovations

The project highlights the potential to conserve considerable amounts of energy in heritage protected buildings. In particular, connecting the building to the district heating network, which partially uses renewable energy sources, makes it possible to heat the building in an environmentally-friendly way.

One of the main success factors is the remarkable involvement of the local authority in organising the project and in making funding available for renovation.



© B.B.S.M. mbH

Challenges and shortcomings

The main challenge with this project was harmonising the various targets (building costs, rentability, functionality, heritage conservation and saving energy). One particular difficulty was adapting the original floor plan, which was designed to suit the tastes of the haute bourgeoisie to current demand and opportunities in Prenzlau. Small, accessible apartments were created that meet modern living requirements.

The energy concept illustrates the technical limits of the renovation of old buildings and the importance of examining the cost–benefit ratio for energy-efficient renovation.

Transferability of solutions

The solutions developed in this project can also be utilised for the energy-efficient renovation of other 19th century structures and historical. This is especially important given the need for action to be taken to upgrade vacant city centre residential buildings. Integrating the city-wide energy concept with seasonal heat storage is a pioneering strategy for consideration by other municipalities restructuring their neighbourhood heating networks.

Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner

APPENDIX 8 - PROJECT PROFILE "SPREMBERG - GARTENSTRASSE EDUCATION AND LEISURE CENTRE"

Spremberg – Gartenstrasse Education and Leisure Centre

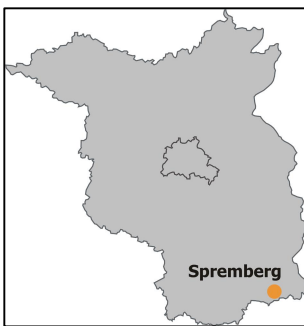
Energy upgrading of a former vocational education complex



© Stadt Spremberg

Summary

The town of Spremberg has converted a former vocational education complex near the town centre into an education and leisure centre with an integrated primary school and a neighbourhood club house. The complex was built using a standardised design of precast panels and consists of two buildings and a gymnasium. This is an "Urban Energy Regeneration" pilot project under the "Experimental Housing and Urban Development" (ExWoSt) research programme of the Federal Ministry of Transport, Building and Urban Development (BMVBS). The results are incorporated in the production of a comprehensive urban energy concept for Spremberg.



© Ernst Basler + Partner GmbH

Location

The town of Spremberg in the Land of Brandenburg lies on the border with Saxony, about 140 km south east of Berlin.

Key data/indicators at municipal, regional and/or district level:

The population of Spremberg was about 24,800 at the end of 2009. Population levels are declining. The town lost around 8.5% of its inhabitants between 2001 and 2009. It has a historic centre with little adjoining ribbon development. The standard of refurbishment in the town centre is high. Around the periphery there are a number of residential areas built of precast panels, most of which are connected to the district heating system. There is full natural gas coverage.

Realisation/period of implementation

2008 – 2011

Status

Construction work on the former boarding/day school building with gymnasium and club house was completed and the former school building has housed a primary school since November 2009. The next task was to update the integrated urban development concept, which had an energy section added in late 2009/early 2010. By the end of 2011 a comprehensive municipal climate protection concept will have been finalised by the local authority and its partners on the basis of the revamped IUDC and the experience of the previous measures implemented on energy efficiency.

Participants/partners in the project

The participants are the housing associations, the local utilities company, local politicians, interested citizens and the municipal authority with their external experts.

Participation/implementation process

On the initiative of the municipal authority, an "Urban Energy Regeneration" working group was set up as a result of a workshop series at the end of 2008. Its members are working on solutions for an energy supply covering the whole town. Along with the political groups and housing associations, the working group also includes the utility companies.



© Stadt Spremberg



© Stadt Spremberg

Spremberg – Gartenstrasse Education and Leisure Centre

Energy upgrading of a former vocational education complex

Integrated approach

The energy factors integrated in the spatially oriented urban development concept of the town of Spremberg form the basis for the development for a comprehensive and integrated energy strategy for the whole town. It provides a basis for more integration of the individual projects on energy conservation, improving energy efficiency and increased use of renewable energies in district and/or town-based considerations. This coherent overall strategy takes changes in demography, the economy and energy into consideration and facilitates sustainable urban development.



© Stadt Spremberg

Technical solutions

The heating of the new school building was secured by connection to the municipal district heating system, which is based on cogeneration of heat and power. A comparison between geothermal and district heating options based on the design requirements in the 2007 Ordinance on Energy Saving (EnEV) indicated a lower primary energy consumption for the district heating option. The main potential for saving energy in the building was through replacing the windows and insulating the basement ceiling.

With regard to the gymnasium and club house, which were also part of the complex, a comparison of options was carried out on the use of renewable energies such as solar power combined with different heat pump technologies. The result showed that the most sustainable package of measures for the gymnasium was the use of an air/water heat pump combined with a solar heating for the hot water supply. The running costs, under evaluation for the first heating period, will have been reduced by more than EUR 40,000.



© Stadt Spremberg

Funding/support

The refurbishment received about EUR 2.5 million of aid from Federal Government and the region of Brandenburg, with an allocation of EUR 327,000 for the school building, EUR 360,000 for the club house, about one million Euros for the gymnasium and EUR 780,000 for the greenery and open space.

Success factors and innovations

The success of the project was assured by very dedicated actors on the municipal side focussing on a socially inclusive and communicative management. Thanks to the energy upgrade, savings in running costs have been achieved which are helping towards maintenance of the facilities also in a tight municipal budget.

Challenges and shortcomings

The refurbishment of the gymnasium with its barrel roof represented a major construction challenge, particularly in terms of overcoming structural problems.

Transferability of solutions

The opportunities and limitations associated with measures and concepts for urban energy regeneration were analysed and documented for the pilot project. The results of these evaluations is available and can be utilised for other locations in the future.

The methodology of planning and collaboratively implementing improvements in energy efficiency of the buildings are transferable to other projects. The high standards applied to this research project cannot be achieved without subsidies from other than municipal sources.



© Stadt Spremberg

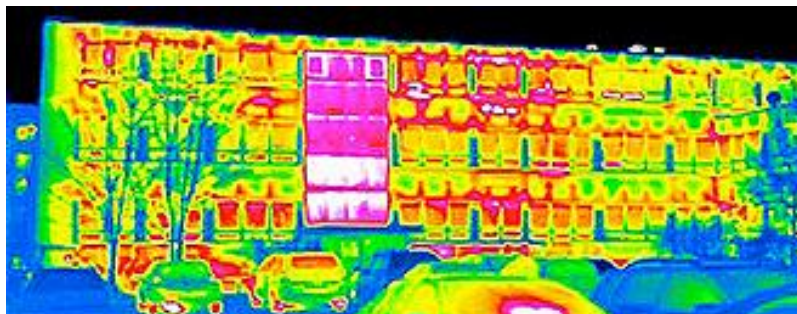
APPENDIX 9 - PROJECT PROFILE "COTTBUS - AN ENERGY-EFFICIENT SCHOOL"

Cottbus – An Energy-Efficient School

Renovating a school complex to passive house standard



© www.eneff-schule.de



© www.eneff-schule.de

Summary

The school building, which was constructed in 1974 as a type "Erfurt" building from precast concrete panels with an auditorium and sports hall, has undergone an energy-efficient renovation for its future use by the Max Steenbeck High-School. An outstanding energy concept was developed to meet the passive house standard and it is therefore a model for both energy-efficient renovation in other areas and climate change mitigation at the municipal level. One of the integral components of the project was a monitoring strategy to analyse the achievement of objectives in the long term. the Brandenburg University of Technology (BTU) Cottbus will monitor the building operation intensively starting operation in 2012.

Location

The independent city of Cottbus is in the region of Brandenburg in the Lausitz, approximately 110 km southeast of Berlin.

Key data/indicators at municipal, regional and/or district level:

Cottbus currently has around 101,800 inhabitants (July 2010), however as a result of demographic change, this figure is expected to decrease in the long term. The city's urban structure was shaped by industrial development, particularly during the period of the German Democratic Republic, and housing estates erected at this time. As a regional centre, Cottbus has a diverse range of social infrastructure and other services of general interest. The project location is at the edge of the city centre close to the BTU Cottbus.

Realisation/period of implementation

Building work began in summer 2010 to be completed by the end of 2011.

Status

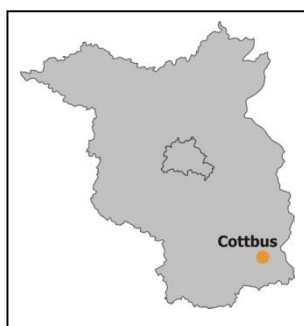
In the final process of construction.

Participants/partners in the project

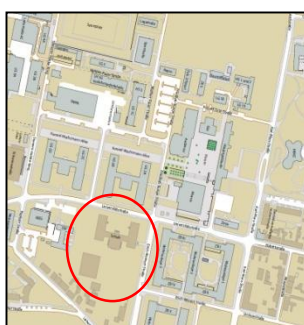
The city of Cottbus, ARGE Steenbeck (collaboration of builders), BTU Cottbus, Federal Ministry of Economics and Technology (BMWi)

Participation/implementation process

The concept for the creation of a school that would meet the passive house standard was developed on the basis of a feasibility study which examined several renovation alternatives with different energy-efficiency standards. A broad-based team of architects, specialist planners and researchers has shaped the implementation of the project. The priority was to ensure that the future user of the building, the Max Steenbeck High-School, was intensively involved in the plans. The pilot project is receiving support from a number of sources, including the BMWi (Federal Economics Ministry) through the funding measure "Energy-Efficiency in Schools (EnEff:Schule)". The project is also a focus of the research accompanying this programme. Another partner is BTU Cottbus, which is responsible for monitoring the project.



© Ernst Basler + Partner GmbH



© BTU Cottbus



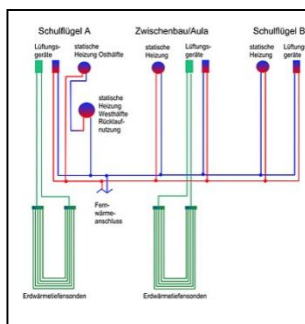
© www.eneff-schule.de

Cottbus – An Energy-Efficient School

Renovating a school complex to passive house standard

Integrated approach

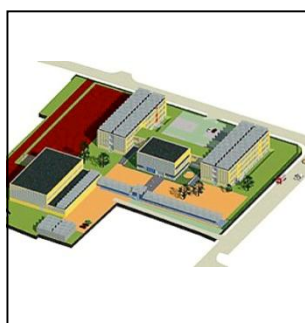
The project is part of an Integrated Urban Development Concept, which was updated early in 2011. It has also been incorporated into the pilot project "Brandenburg City Network for Climate Protection (BraNEK)", which was initiated under the National Urban Development Policy (NSP). Cottbus is participating in this initiative. Energy-efficient renovation and housing technology were part of the curriculum at the school, which specialises in science subjects. Once the project has come to an end, the monitoring technology will still be used because a monitoring post will be established in the experimental laboratory for school pupils (UNEX), which is open to all schools. Experiments can bring energy efficiency in buildings to life and the topic can be integrated into teaching events held at BTU Cottbus or other training institutions. Another component is focusing on accessibility in the building.



© www.eneff-schule.de



© www.eneff-schule.de



© www.eneff-schule.de

Technical solutions

Plans included the installation of high-quality external insulation, optimised window and glazing, external blinds and efficient lighting as well as the use of long-lasting and sustainable energy-efficient building materials. The heating system uses a district heating cogeneration system, highly efficient heating pumps and a controlled ventilation system with heat recovery. Some of the distinctive building components include a geothermal energy transformer to preheat/precool the supply air, special insulating boards (PCM) built into the ceiling of the top floor as well as a geothermal facility for storing excess solar energy near the sports hall. A wind-turbine provides extra electricity. These measures will reduce energy requirements by over 80%.

Funding/support

The total cost is around EUR 11.3 million. The project is partially financed by subsidies (primarily from the European Regional Development Fund (ERDF) for sustainable urban development and the Urban Redevelopment Sub-programme RSI) as well as municipal credit. This ambitious energy concept was made possible by bundling a number of different funding resources.

Success factors and innovations

The project's energy concept is comprised of a number of very diverse components, which involve the use of innovative building materials and technology. One of the special features of the project was that different measures were implemented in each wing of the building. Intensive monitoring will provide a comparative assessment of their effectiveness.

The building's users are closely involved in the project and the school pupils, for example, learn about ways to save energy.

Challenges and shortcomings

The combination of different new technologies was particularly challenging, as in some cases, there was no long-term practical experience with these technologies and in others it proved necessary to develop specific structural solutions. One problem was the structural and financial magnitude of the project, proving a risk Cottbus, which, however could be overcome.

Transferability of solutions

Since the school building is a standard-type of structure that can be found across Brandenburg (and eastern Germany), the results could be easily transferred to other renovation measures. However, it is important to take into account the high financial costs of the partly experimental technical solutions used.

The scientific monitoring process will lead to the long-term results of the energy-efficient renovations to be evaluated and published.

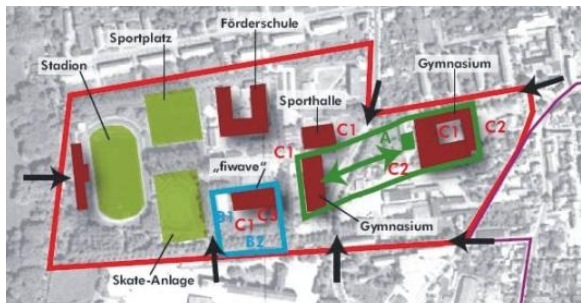
Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner

APPENDIX 10 - PROJECT PROFILE "FINSTERWALDE - SCHOOL AND SPORTS CAMPUS"

Finsterwalde – School and sports campus

Urban energy regeneration at the Finsterwalde-West sports and leisure venue



© INSEK Finsterwalde



© Stadt Finsterwalde



© Stadt Finsterwalde

Summary

The town of Finsterwalde has set itself the goal of turning towards sustainable energy supply offerings. In this context has reduced the energy demand of public buildings and switched supplies progressively to renewable energy sources. The school and sports campus project is an ExWoSt pilot project for urban energy regeneration and includes a varied package of measures for energy upgrading of a town centre education and leisure venue with various buildings, some under heritage protection. It serves as a reference project for the further development of the energy friendly neighbourhood.

The core of the project is the refurbishment of the so-called Former "Innere", an assembly hall shared between two high schools which will be amalgamated in this context.

Location

The town of Finsterwalde is in the Lower Lausitz region in Southern Brandenburg, about 100 km south of Berlin.



© Ernst Basler + Partner GmbH

Key data/indicators at municipal, regional and/or district level:

Finsterwalde has a population of about 17,500 (07/2010 data), but is affected by a declining population due to the demographic change in the region and outward migration. Its centre comprises the historic old town, districts with precast concrete panel housing, small-scale residential and industrial areas. As a medium-sized centre, Finsterwalde plays a supply role beyond the local level and has important public infrastructure, e.g. the district hospital, many educational institutions, an indoor swimming pool and several museums.

Realisation/period of implementation

The initial package (e.g. refurbishment of the gymnasium) has already been completed. The energy upgrade of the Sängerstadt high school campus, the largest project module, is due to be completed by 2012 and serves as a focus project for the improved energy efficiency of the overall town.

Status

Partly completed, partly under construction, partly still in in preparation.

Participants/partners in the project

Municipality of Finsterwalde, Stadtwerke Finsterwalde GmbH (city owned utilities company) , district of Elbe-Elster, HACON Engineering Ltd.

Participation/implementation process

The initial project approaches were developed in the context of the Integrated Urban Development Concept. The viability of the alternative energy supply to the school campus was examined in a feasibility study in 2009. The funding for the campus pilot was secured by linking the project closely to the urban redevelopment process of the neighbourhood, so that construction could begin on that package in spring of 2010.



© Stadt Finsterwalde



© Stadt Finsterwalde

Finsterwalde – School and sports campus

Urban energy regeneration at the Finsterwalde-West sports and leisure venue

Integrated approach

The project is a key component of the Finsterwalde's Integrated Urban Development Concept. Rather than just being an energy upgrade for the location consisting of several infrastructure facilities, its main purpose is functional amalgamation: In the context of the school campus pilot, two previously independent high schools are being combined into one high-performance institution. The synergies between schools, sports and other leisure amenities are being expanded. The measures contribute to functional strengthening of the town centre and the sustainable use of precious building stocks.



© Stadt Finsterwalde

Technical solutions

In the context of the energy upgrade to the listed school buildings, various measures were implemented, such as conversion of the heating system and improvements to the thermal insulation.

For the sports and leisure venue, the possibility of installing a local heating island network with cogeneration of heat and power and retrofitting buildings with solar power and photovoltaic systems was implemented. Long term, another school building and the "FiWave" swimming pool will be integrated in the energy concept to create an even more efficient overall structure.



© Stadt Finsterwalde

Funding/support

The costs for the school campus were around EUR 3.1 million and are largely funded through grants from the RSI urban redevelopment sub-programme. For the municipality it would have been impossible to implement the project without the urban development funding.

Success factors and innovations

The project highlights the options by which an existing school with some landmarked buildings can be upgraded to a high energy standard. The project's distinctiveness lies in the implementation of a campus model with many interlocking modules in combination with a neighbourhood energy model inducing the revitalisation of part of the town.



© Stadt Finsterwalde

Challenges and shortcomings

The combination of different energy providers was a major challenge. Previously the energy regeneration had focussed on individual projects such as the sports hall and high school. Its amalgamation has not yet been finally completed due to technical and financial problems. One of the reasons for this is the heterogeneous building stock which is characterised by different types of construction, levels of refurbishment and conditions of ownership, which required a very complex project concept.

Transferability of solutions

The conceptual approach of amalgamating several structures at a location into a functional complex with a shared energy supply system is generally estimated to be transferable. The chances of realisation should be particularly good if the refurbishment standard starts from a lower position and the opportunity exists to create an efficient local supply system.

Published by: Ministry for Infrastructure and Agriculture (MIL) of Brandenburg, Department 22: Construction, Energy, Building Culture and Urban Culture, Henning-von-Tresckow-Straße 2-8, 14467 Potsdam

Edited by ARGE Urb.Energy, which involves the following companies:
Ernst Basler + Partner GmbH / B.B.S.M. mbH / UrbanPlus, Droste&Partner