

IEE PassREg

PASSIVE HOUSE REGIONS WITH RENEWABLE ENERGIES

Task 2.1.1: Describe the critical factors of existing success models in front runner regions

The Success Model of Hanover

Prepared by EnEffect

THE SUCCESS MODEL OF HANOVER

CASE STUDY

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THE SUCCESS MODEL OF HANOVER

CASE STUDY

1

ENERGY AND BUILDING POLICIES

As early as in the mid-1980'es the Hanover City Council took a decision for rational energy use and energy conservation and for broad introduction of renewable energy sources on the territory of the city. The Municipality and Stadtwerke Hannover Energy Utility worked out jointly a comprehensive energy strategy. In the early 1990'es the City Council achieved a **political consensus** for establishment of sustainable development as a major priority of Hanover Municipality. In implementation of the goals laid down in Agenda 21, approved at the World Summit in Rio de Janeiro, the City Council has decided to reduce by 2005 its CO₂ emissions by 25% as compared to the 1990 levels.

In order to achieve this ambitious target the City Council worked out and started to implement a number of mutually complementary **policy instruments**, including the following: Local Agenda 21, Hannover Ten Plus, Integrated Resource Planning, Hannover CO₂ Audit. The effective use of these instruments made it necessary to enforce an appropriate legal and regulatory framework, introducing three specific standards for all the new buildings constructed on plots municipal property: Low Energy House (LEH), Low Energy House Plus (LEH-plus) and Passive House (PH). In addition, ecological standards were introduced as well in the construction of all buildings in which the municipality had some influence.

For the purposes of successful realization of a whole series of programmes and pilot projects, through which the policy of sustainable development of Hanover was implemented, apart from the establishment of Stadtwerke Hannover, several new institutions were created, namely: Energy and Climate Protection Section (1994), Climate Protection Fund "proKlima" (1998), Climate Protection Agency Hannover (region) – CPAH (2001) and Climate Alliance Hannover (2007).

Political consensus

During the past two decades the coalition of social democrats and the Green has retained lasting and stable majority in the Hanover City Council. It has effectively mobilized the support of the other political parties represented in the Council for achievement of a full political consensus on issues related to the sustainable development of the municipality. Consensus has been reached also about broad application of low-energy standards in the construction of new buildings and renovation of existing buildings on municipal plots.

An additional prerequisite for attainment of the political consensus on the application of the new low-energy standards was the strong support by the Stadtwerke Hannover Energy Utility, which is 3/4 municipal property and was the major donor to the Climate Protection Fund "proKlima"

Long-term integrated climate / energy / development policy

Source:

Integrated Energy and Climate Protection Policy-Hannover (DE) – (hannover_566_en.pdf)

The success of the Hanover policies related to climate protection, energy efficiency and sustainable development is rooted in the long-term consistent integrated efforts of a multitude of local stakeholders. The City Council, the energy utility Stadtwerke Hannover AG, the specialized municipal institutions, representatives of the business community, NGOs and interested citizens united their efforts for achievement of the goals laid down in Local Agenda 21 - *reduction of CO₂ emissions through curtailing of energy consumption and expansion of the use of renewable energy sources*. On the basis of the achieved political consensus concerning the implementation of Local Agenda 21, long-term policy instruments and the regulatory framework for their application have been persistently and systematically worked out. A system of institutional structures was built in the municipality for application of the selected policies. As a result of all that a multitude of projects for sustainable development and energy efficiency were implemented on the area of Hanover, including projects complying with the requirements of the "Passive House" Standard. Despite the serious problems caused by the liberalization of the energy market and the impact of the financial and economic crisis these efforts have stood the test of time and have led to results, which are visible not only in Hanover and Germany, but in the entire Europe.

Milestones of climate protection process in Hanover

Stand: 24.08.2012

Common Sources (German):

<http://www.klimaschutz-hannover.de/>

Demus, M. Policy Analyse am Beispiel der Klimaschutzpolitik der Landeshauptstadt

Hannover. Examensarbeit (1999)

http://books.google.de/books?id=ElbFRyq9g24C&printsec=frontcover&hl=de&source=qbs_qe_summary_r&cad=0#v=onepage&q&f=false

Common Sources (English):

http://www.hannover.de/de/umwelt_bauen/umwelt/Hannover_on_the_way_to_Sustainability/index.html

Events and policy decisions with significant influence on the climate protection process in Hannover

- 1972** **Foundation of 1st nationwide Environment Protection Centre**
(Umweltschutz-Zentrum) in Hannover by local initiative “Bürgerinitiative Umweltschutz (BUI)”
- Sources:**
- <http://www.biu-hannover.de/>
- 1986** **Decision of the City Council: Local Pull-out of nuclear energy**
- Forcing Hannover’s utility (Stadtwerke Hannover) to denounce a supply contract with PreussenElektra
- Background of political decisions was a local initiative with citizen boycott of electricity bills
- Sources:**
- Demus, M. Policy Analyse am Beispiel der Klimaschutzpolitik der Landeshauptstadt Hannover. Examensarbeit (1999)*
- http://books.google.de/books?id=ElbFRyq9g24C&printsec=frontcover&hl=de&source=qbs_qe_summary_r&cad=0#v=onepage&q&f=false
- 1988** **Development of an innovative energy concept for City Hannover and Stadtwerke Hannover**
- 1st municipal energy concept (primary focus on efficiency of recourses, not climate protection)
- 10 professional publications with focus on potentials of efficiency on buildings
- 1-year process of work – City of Hannover and Stadtwerke Hannover
- 1992** **Decision of the City Council: 25 % CO₂-reduction until 2005 on level 1990**

- 1994** **Decision of the City Council: Contracting for local CHP feed-in compensation by Stadtwerke Hannover**
- 1994** **Foundation of the Climate Protection Unit City of Hanover**
headed by Hans Mönninghoff (Head of the Directorate of Environmental Affairs)
- 1994** **Energy concept district planning Kronsberg by City of Hannover and Stadtwerke Hannover**
http://www.hannover.de/data/download/umwelt_bauen/s/mokro32-53.pdf
- 1995** **Decision of the City Council: Local Participation in Agenda 21**
Local realisation of the main outcome document of Rio Summit 1992
Establishment of a Local Agenda-21 office City of Hannover
Signing of the charter of Aalborg
Source:
<http://www.agenda21.de/>
- 1996** **First Climate Protection Programme City of Hanover and Stadtwerke Hannover**
- 1997-2001** **KUKA Kronsberg Environmental Liaison Agency**
Source :
http://www.hannover.de/data/download/umwelt_bauen/s/mokro27-31.pdf
- 1998-2001** **Establishment of Kronsberg-settlement Lummerlund / Local participation in EU-Project CEPHEUS**
- 1998** **Foundation of the climate protection fund proKlima**
under substantial involvement of Stadtwerke Hannover (CEO Dr. E. Deppe) und City of Hannover (H. Mönninghoff, Head of the Directorate of Environmental Affairs)
Source:
http://www.proklima-hannover.de/downloads/proKlima/partnership_contract_proKlima_as_a_model.pdf

- 1998** Beginning of electricity market liberalization in Germany
- 2001** Foundation of the Climate Protection Agency Region Hannover
- Source:**
<http://www.klimaschutzagentur.de/>
- 2004** Extension of Partnership-contracting proKlima-fund
- 2007** Evaluation report of CO2-reduction-goals (1990-2005)
- First success in CO2-reduction, but main target value 25% was missed. New need for action was formulated.
- 2007** „Passive House Resolution” of the City Council
- Document: “Ecological Standards for Building Construction in Municipality’s sphere of Influence”
- Source:**
http://www.hannover.de/data/download/lhh/umw_bau/Ecological_standards_for_buildings.pdf
- 2007** Foundation und Kick-off Climate-Alliance 2020
- Source:**
<http://www.hannover.de/klimaschutzallianz/english/index.html>
- 2008** Climate Protection Plan City of Hanover
- 2008** Decision of the City Council: 40 % CO2-reduction until 2020 on level 1990
- Source:**
http://www.hannover.de/de/buerger/pres_med/RH_pm-2011/RH_pm-2011-12/pm480.html
- 2011** Decision of the Region Council: 40 % CO2-reduction until 2020 on level 1990
- Climate Protection Programme “Climate package 2020”:
- 05.2012** Project „Masterplan 100% for Climate Protection“ by Region Hannover and City of Hannover
- Main targets until 2050 on level 1990: CO2-reduction over 95% reduction of energy consumption over 50%
- Source:**

http://www.hannover.de/de/umwelt_bauen/umwelt/masterplan/index.html

<http://www.kommunaler-klimaschutz.de/f%C3%B6rderprogramme/bmu-f%C3%B6rderprogramm/masterplan-100-klimaschutz>

06.2012 Decision of the City Council: Target Value „Masterplans 100% for Climate Protection“

Source:

<https://e-government.hannover-stadt.de/lhhsimwebre.nsf/SIMFrameset?OpenFrameSet&Frame=NotesView&Src=https://e-government.hannover-stadt.de/lhhsimwebre.nsf/0/166CF567C60BD4F8C1257A06000E1F88?OpenDocument&AutoFramed>

Beginning of Passive House Process Hanover

1989 “Zero-energy house” in Dörpe near Hannover

Private Initiative of a zero energy house by local club „Ecological Future Workshop for Minimum-energy and Zero-energy Houses e.V“

Club members are later involved in the PH-process.

Sources:

http://passipedia.passiv.de/passipedia_en/basics/the_passive_house_-_historical_review

Hinz, E. et al: Messdatenerfassung und Auswertung beim ökologischen Nullenergiehaus Dörpe, Institut Wohnen und Umwelt, Darmstadt, 1994

as of mid 90s Establishment of Hannover district Kronsberg

ecological beacon project at EXPO 2000

Low Energy House with limited heat demand 55 kWh/(m²a)

Quality assurance and qualification of architects, planners, companies, construction worker were given by extra founded “Kronsberg-Umwelt-Kommunikationsagentur GmbH (KUKA)”

Sources:

http://www.hannover.de/de/umwelt_bauen/bauen/bauen_lhh/oekobauen/oemobakr/modkrons/kroliter/rotebuch.html

http://www.hannover.de/data/download/umwelt_bauen/v/vorwaerts_nach_weiter.pdf

http://www.hannover.de/data/download/umwelt_bauen/m/kronseng.pdf

Passive house settlement “Lummerlund”

Innovative sub-project at district H-Kronsberg under substantial involvement of Stadtwerke Hannover (*Manfred Görg, Department energy politics and extra tasks*)

Note: At this time local developers and builders were not convinced to build the project, therefore Stadtwerke Hannover introduced the developer and builder Rasch&Partner. The company was charged by City of Hanover to develop and build the settlement. Rasch&Partner had already experience with a passive house settlement in Wiesbaden, Germany.

The project “Lummerlund” participated as of 1997 at EU-Project CEPHEUS. Measurements and Evaluation was taken by Passive House Institute Darmstadt.

Sources:

http://erg.ucd.ie/pep/pdf/Climate_Neutral_Passive_House.pdf

<http://www.cepheus.de/>

http://passipedia.passiv.de/passipedia_en/operation/operation_and_experience/measurement_results/energy_use_measurement_results

2007

„Passive House Resolution” of the City Council

Document: “Ecological Standards for Building Construction in Municipality’s sphere of Influence”

Source:

http://www.hannover.de/data/download/lhh/umw_bau/Ecological_standards_for_buildings.pdf

2010

Development of zero:e park Hannover-Wettbergen

First European settlement with passive houses and zero emission standard (over 300 single houses)

Sources:

Kirscht, E. The zero:e park: Active with Passive Houses. In: 15th Intern. Passive House Conference Innsbruck 2011.

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www.zero-e-park.de

http://www.hannover.de/de/umwelt_bauen/bauen/bauen_lhh/oekobauen/zerosiedlung.html

Policy instruments

In 1992 the Hanover City Council approved a decision to reduce by 2005 the CO₂ emissions by 25% as compared to the 1990 level and in 2008 it decided to achieve by 2020 a reduction by 40%. The attainment of these political goals imposes application of specifically developed policy instruments, which can be divided into three major groups. The first group comprises a range of medium-term and long-term programmes and action plans. The second group comprises the integrated approaches applied in planning and management of the measures for climate protection and energy efficiency improvement. The third group comprises the specifically built systems for monitoring of the results from the implemented measures.

The Millennium goals and Local Agenda 21

Sources:

Agenda 21 and the Millennium goals (Agenda_21_and_the_millennium_goals.pdf)

The Local Agenda 21 – for our Children’s Future (Agenda_21.pdf)

As an immediate response to the eight goals of the Millennium, incorporated in Agenda 21 approved in 1992 in Rio de Janeiro, Hanover has undertaken 14 concrete steps, which represent the local contribution of the municipality to the implementation of these global goals.

In mid-1990’s the Hanover City Council approved, with the participation of a broad circle of partners, including the local businesses, its own Local Agenda 21), which provides the necessary programming base for climate protection and reduction of energy consumption through construction of low-energy and passive buildings. This comprehensive programme contains a total of 40 chapters, grouped in four sections, which formulate in detail the following: (i) the socio-economic requirements; (ii) preservation and management of development resources; (iii) functions of the main stakeholders; and (iv) required funding for implementation of the programme.

Hannover Ten Plus

Source:

Hannover plus Zehn – Working for a Young and Innovative City, 2005-2015 (Hannover__10.pdf)

In 2004 the Hanover City Council approved a 10-year programme (2005-2015) aimed at development of the city as a place for innovations with broad participation of the citizens in that development. In the ten points of the programme a special emphasis is laid on education, research and culture, whereat the main focus is on children, the family and integration in the community. A separate point is devoted to climate protection and protection of the natural environment, which comprises a series of projects for construction and development of the open and green spaces in the city.

Integrated planning process

Sources:

Hannover-Kronsberg, Assessments (imagine_sem2007_hannover_kronsberg_mgeorg.pdf)

Integrated Energy and Climate Protection Policy-Hannover (DE) (hannover_566_en.pdf)

In the course of more than two decades the Hanover City Council has been applying an integrated approach to the general planning and management of the activities in the municipality, including climate protection and reduction of energy consumption. This approach unites in the first place the efforts of all stakeholders, where at in the case of Stadtwerke Hannover AG an optimal balance between the interests of the energy supplier and the respective consumers has always been sought. In the second place, this approach seeks always intentionally an integrated and hence maximally efficient use of all resources (material, financial and human). In the third place, this approach uses a rich range of policy instruments and a broad spectrum of projects, in which all the stakeholder groups are actively involved – from the big companies operating on the area of the municipality to the individual citizens. EXPO 2000 played an important role for the development and successful application of that approach, since it took place on the territory of Hanover and integrated the efforts at all levels – global, national, regional and local.

The Hanover City Council regards urban planning as a key element of the integrated approach in the administration of the city and seeks persistently the required balance between the three main elements of the city: the urban structure, its social and cultural contents and the environment. Under this type of balance a complex mutual linkage of all the three elements is indispensable. The social mix achieves its practical realization in the urban structure. Optimization of energy production and consumption imposes the need of maximally effective utilization of urban spaces, while the high living standard is unthinkable without the respective social, transport and engineering infrastructure.

Integrated Resource Planning

Sources:

Ecological Standards for Building Construction within the Municipality's Sphere of Influence

(Ecological_Standards_for_Building.pdf)

Agenda 21 – Status report (Hannover_Agenda_21_Activities_Report.pdf)

The Hanover authorities apply diligently an integrated approach in the planning of local resources. This approach affirms energy saved as the cleanest and the cheapest energy resource, which minimizes the need of energy production and supply. On the other hand, expansion of the use of the practically inexhaustible renewable energy sources curtails additionally the need of conventional energies and reduces CO₂ emissions.

The municipal authorities in Hanover are particularly persistent in the application of the integrated approach in the planning and management of land resources as well. Irrespective of who possesses the ownership rights on it, land is a resource, which serves many generations and each of them is obliged to protect it from pollution, excessive build-up and undermining of its ecological and landscaping properties. To this end the municipality applies strict standards, that minimize the negative environmental effect, including gradual reduction of the build-up coefficient. Irrespective of the high requirements of the currently enforced standards, they are open to development with a view to future changes in the citizens' requirements and the anticipated higher criteria for land and soil protection. Important instruments to that effect are keeping of an up-to-date land registry and application of appropriate indicators for monitoring and assessment of land resources.

Integrating environment and development in decision-making

Sources:

Ecological Standards for Building Construction within the Municipality's Sphere of Influence

(Ecological_Standards_for_Building.pdf)

Agenda 21 – Status report (Hannover_Agenda_21_Activities_Report.pdf)

CO₂ audit 1990-2005 (bilanzengl.pdf)

In the Municipality of Hanover environmental protection and sustainable development have always been in the focus of every economic and political decision. This has imposed the need in the process of formulation of the respective policies to denounce the clerical approach of the past and to seek involvement of all the stakeholder groups. Abiding steadily to this approach the Hanover Municipality has worked out and begins to apply three major instruments: periodical environmental audit by the municipal administration; drafting of a specialized report on the state of the environment in the municipality (every three years) and working out of environmental assessment of the areas, which are the object of urban planning.

The achievement of Hanover's ambitious target to reduce by 2020 its CO₂ emissions by 40% as compared to the 1990 level requires application of a highly accurate system for monitoring of these emissions during the entire programming period. The most important

instrument of this monitoring is the periodical audit of CO₂ emissions, which takes differentiated account of the different harmful emissions from the energy sector and those from transport. Beside the total reduction of CO₂ emissions on the area of Hanover, direct effects of this audit are also reduced energy consumption for space heating, broad penetration of the *renewable energy sources* and increased number of decentralized plants for *combined* heat and power generation (co-generation)

Legal framework

The application of the new political approaches and instruments as described above requires also creation of a new legal framework, which may guarantee achievement of the high targets for reduction of energy consumption and hence reduction of harmful emissions. To this end the Hanover Municipality has introduced three local energy standards for new buildings:

- Since 1995 - Low Energy House (LEH) - “Kronsberg-Standard”: Space Heat Demand max. 55 kWh/(m²a)¹
- Low Energy House Plus (LEH-plus) max. Heat losses thermal envelope 30% under law standard²
- Passive House (PH)

These standards are applied for (a) all new municipal buildings (both residential and public) and (b) for all new residential buildings constructed on municipal plots. In the second case the application of these standards is ensured through the contract for purchase of municipal land or through the building permit. Taking due account of the good results achieved in the pilot projects, implemented in connection with EXPO 2000, a number of investors, including retail chains and banks, have decided voluntarily to apply the new standards. The municipal administration, on its part, approved its own Action Plan, which comprises 30 measures oriented towards renovation of all the public municipal buildings and of the street lighting in the city in accordance with the new standards, as well as mandatory application of the new standards in all public procurement orders of the municipality.

Low Energy House (LEH)

Source:

Hannover-Kronsberg – Assessments (imagine_sem2007_hannover_kronsberg_mgeorg.pdf)

¹ http://www.hannover.de/data/download/umwelt_bauen/s/mokro32-53.pdf

² http://www.hannover.de/data/download/lhh/umw_bau/Ecological_standards_for_buildings.pdf

In connection with EXPO 2000 at the end of the 1990's started the construction of a new housing estate in the Kronsberg neighborhood (Hanover). It was there that the Low Energy House (LEH) Standard, known also as the "Kronsberg Standard", began to be applied for a first time. This new standard³ achieves reduction of thermal energy consumption for space heating by 25% as compared to the Heat Insulation Regulation (WsVO 1995⁴) norms in force at that time. The Low Energy House Standard has established itself as the most massively applied low-energy standard for that part of Hanover. Simultaneously, in one of the quarters of the Kronsberg Housing Estate several buildings were built under the Passive House (PH) Standard. Investors, who apply that standard, are motivated by the municipal authority through different incentives, including with financial support from proKlima.

Low Energy House Plus (LEH-plus)

Source:

Hannover-Kronsberg - Assessments (imagine_sem2007_hannover_kronsberg_mgeorg.pdf)

As a logical follow-up of the initially applied in Kronsberg new Low Energy House (LEH) Standard, which ensures reduction of heat losses by hardly 25% as compared to the Heat Insulation Regulation (WsVO 1995) in force till that point of time, the Hanover Municipality introduced later the new Low Energy House-Plus (LEH-Plus) Standard. The latter provides for reduction of space heating costs by nearly 40%. Under the LEH-Plus Standard still remains the need of additional heating, which is provided most efficiently by the municipal district heating network. For this reason, wherever there are no objective barriers, connection to that network is mandatory. This standard defines the mandatory minimum of requirements for all new buildings in Hanover, which are constructed on municipal plots. The municipality, on its part, is obliged to provide the necessary consultations to entrepreneurs, who apply the new standard

Passive House (PH)

Source:

Ecological Building in Hannover: The Passive House – a house for the future (EcologicalBuildinginhannover.pdf)

For full renouncement of the need of external heat supply to the buildings Hanover Municipality has introduced the latest local standard - Passive House (PH)- which is also called "Healthy Comfort House". Under it heat losses are approx. 80% (on basis ENEC 2009) lower as compared to the standards in force in the country. In such buildings

³ „German Directive for heat protection (legal force 1995 - 2002)“

⁴ Wärmeschutzverordnung 1995

installation of a ventilation plant with heat recovery, which replaces entirely the additional heat supply, is mandatory. This is far less than what may be achieved under the Low Energy House Plus (LEH-Plus) Standard, but as yet it cannot be avoided, especially when the ventilation system is switched on. Because of the higher initial capital investments this standard is as yet not mandatory for application on the area of Hanover, but the municipality encourages entrepreneurs to apply it in the event of purchase of municipal land and assignment of public procurement orders. The application of this standard is also supported financially by proKlima.

Ecological standards for building construction

Source:

*Ecological Standards for Building Construction within the Municipality's Sphere of Influence
(Ecological_Standards_for_Building.pdf)*

Parallel with the application of the three low-energy standards for buildings of new construction (LEH, LEH-plus and PH), Hanover Municipality has introduced also a series of ecological requirements, applied in the event of construction of buildings municipal property or in the event of build-up of municipal plots sold to building contractors. These requirements comprise the urban development plans (build-up density, solar orientation, engineering infrastructure), as well as the application of the above listed standards in the construction of new buildings. The selection of any of these standards is subject to negotiations between the municipality and the contractors prior to signing of the respective contract for sale of municipal land or prior to the issue of the respective building permit. Parallel with it, connection of the new buildings to the environmentally most efficient district heating system is ensured. In the majority of cases that is the system of Stadtwerke Hannover AG, which uses a significant number of small co-generation plants and renewable energy sources. These ecological requirements are applied in the construction of residential buildings, as well as of commercial sites and facilities.

Policy institutions

The application of the policies for climate protection and energy efficiency improvement and the updating of the regulatory framework impose the necessity of setting in place and development of adequate institutional structures. Specialized units are created within the municipal administration and efforts are made for building their capacity. Public-private partnerships are set up, in which a balance among the interests of the different participants is sought. Networks are built by stakeholders having different status and public positions, which ensure horizontal binding and coordination of actions. In this way all interested parties unite their efforts and resources and orient them jointly towards achievement of the desired goals

(For more information about the institutions please refer to Section 3: Key Stakeholders Involved)

2

ECONOMY AND FINANCING

Climate protection and energy efficiency improvement, including the use of RES and construction of low-energy buildings, are relatively new but rapidly developing economic fields. They attract the attention of ever growing number of investors and ever more significant financial resources, which, parallel with the economic growth, creates also new jobs in the region. Taking account of it, as early as at the end of the 1990'es Hanover Municipality and Stadtwerke Hannover AG created the unique financial instruments proKlima. It became the main initiator and motor of the practical realization of Local Agenda 21 and the ensuing multitude of energy efficiency projects in the Hanover region. Some time later, following the example of Graz (Austria), Hanover Municipality created the public-private partnership Ecoprofit, which provides consultancy and financial support to small and medium-sized enterprises in their efforts to curtail their production costs through reduction of waste and harmful emissions. In 2003 Hanover Municipality initiated the "ImpulsProgramme Passive House" Programme, through which it had been providing support for the creation, advance and development of small and medium-sized enterprises operating in the field of energy efficiency and more particularly passive houses. Along with proKlima, financial support for the construction of low-energy buildings on the area of Hanover is provided also by the KfW Bank (Kreditanstalt für Wiederaufbau)⁵, Bundesamt für BAFA (Bundesamt für Wirtschaft und Ausfuhrkontrolle⁶) and the Hanover Region.

Practice has demonstrated that promotion of sustainable development and energy efficiency contributes to the general social and economic development of the region by creating new jobs and improving the competitiveness of the local enterprises in the Hanover Region.

Climate Protection Fund "proKlima"

⁵ <http://www.kfw.de/kfw/en/index.jsp>

⁶ <http://www.bafa.de/bafa/en/index.html>

Source:

Case study: The “proKlima” partnership contract as a model for cooperative climate protection on community level (Case study proKlima.pdf)

The proKlima Fund operates on the basis of public-private partnership, in which the municipality and Stadtwerke Hannover AG play a key role together with 5 more neighbour municipalities. The proKlima Fund provides annually Euro 5 million, thus supporting the energy renovation of buildings, introduction of the Passive House Standard, as well as the introduction of energy efficient technologies and renewable energy. Alone in the period 1998-2003 the Fund has supported 9,000 projects and initiatives, as of 2012 there are 20,500 measures subsidised and over 49 M Euros allocated. Every Euro financial support, allocated by proKlima, helps mobilize Euro 12.7 in investments, which is the most convincing evidence of the high effectiveness of this instrument. *(See more in the Set of Solutions)*

Ecoprofit partnership

Source:

Case study: Ecoprofit – a local public-private partnership program for sustainable development

In order to mitigate CO₂ emissions and achieve more efficient energy use Hanover Municipality established close operating collaboration with the business community and more specifically with the small and medium-sized enterprises (SMEs) in the region. To this end it built a local public-private partnership for sustainable development Ecoprofit. It is based on a tripartite co-operation between the municipality, SMEs and experts and is oriented towards raising the knowledge and preparedness of the enterprises for curtailing their energy consumption and reduction of the volume of solid waste produced by the production processes. Along from the general environmental effect and reduction of CO₂ emissions this leads to minimizing of the production costs of the enterprises and improvement of their competitiveness. In the framework of this partnership a series of *workshops* was conducted. Under the “learning by doing” method the participants acquire elementary knowledge about the reduction as well as the full liquidation of harmful emissions and production waste. In this way, with the financial support of Ecoprofit a contribution is made to the economic strengthening of SMEs in the region. *(See more in the Set of Solutions).*

Hannoverimpuls

Source:

www.hannoverimpuls.com

In 2003 the local public-private partnership *Hannoverimpuls* was initiated for promotion of and support for creation, development and restructuring of SMEs in six key economic sectors in the region of Hanover, among which also the energy sector (*Energy Solutions*). In the framework of that sector is implemented also the *ImpulsProgram Passive House*, oriented towards assistance for SMEs, which apply the *Passive House (PH)* standard in the construction of new buildings in the Hanover region.

Financial support for passive houses – subsidy programs

Sources:

Ecological building in Hannover (EcologicalBuildinginHannover.pdf)

2008 Environment Report (Environment report 2008_englisch.pdf)

Construction of passive buildings with the use of renewable energy sources often requires additional initial investments, which discourage some investors. For overcoming of that barrier Hanover Municipality applies combined schemes for financial support, in which along with the proKlima-enercity-Fund are involved other institutions as well. These are, for instance, the KfW (Kreditanstalt für Wiederaufbau), BAFA (Bundesamt für Wirtschaft und Ausfuhrkontrolle) and the Hanover Region. For families with children below 16 years of age, for instance, a special scheme for financial support is applied, which leads to reduction of the price in the event of purchase of municipal land by 10% to 40% depending on the number of children.

3

KEY STAKEHOLDERS INVOLVED

In order to achieve its strategic goal – to reduce by 2020 its CO₂ emissions by 40% through construction of low-energy buildings with broad use of renewable energy sources – the Hanover Region involves actively all the stakeholders and takes effectively advantage of their potential. The participation of Stadtwerke Hannover AG (enercity), which is the major energy producer and supplier on the area of the region, is of key significance. In partnership with it the municipality created also the main instrument for implementation of its policy in the field of climate and energy efficiency – the Environmental Protection Fund proKlima. A system of institutions and public-private partnerships, which unites and coordinates the efforts of the individual participants, has been developed. The chief coordinator in this system is CPAH (Climate Protection Agency Hannover region), while the programming objectives and tasks are formulated and implemented in the framework of

the Climate Alliance Hannover 2020. Kronsberg has established itself as the centre of the process, in which KUKA (Kronsberg Environmental Liaison Agency) performs its relations with the broad public and ensures its direct involvement in the implementation of the climate protection measures. Specific attention is paid to the involvement of the businesses and local industries through public private partnerships, branch initiatives and supporting consultations.

Stadtwerke Hanover Energy Utility (enercity)

Stadtwerke Hannover AG (enercity) is the major energy supplier for the Hanover Region. It has a leading position in the supply of heat and electricity to the municipality. Since the major part of the enterprise is municipal property (75%), it plays a key role in the efforts of the municipality to reduce energy consumption by optimizing heat and power production and supply and by promoting the introduction of energy generation from RES and construction of low-energy buildings. The company is also the biggest donor to proKlima.

Climate Protection Fund “proKlima”

The Climate Protection Fund “proKlima”, set up in 1998, is the outcome of the perfect collaboration and interaction between the Hanover Municipality and Stadtwerke Hannover AG. This unique policy instrument plays a key role in the practical implementation of a series of projects (mainly in Kronsberg) by providing financial support for the design and construction of low-energy buildings and for overcoming of certain inevitable market barriers.

(See more in Part 2. ECONOMY AND FINANCING and in Solutions – Working package 4)

Energy and Climate Protection Section

Since the early 1990'es Hanover Municipality has been orienting its efforts towards improvement of its own administrative capacity. To this end in 1994 it set up a specialized unit for practical implementation of the new political priority – climate protection and energy efficiency improvement. The unit is part of the Environmental Protection Division and is called Energy and Climate Protection Section. It encourages the changes in the end energy users' behaviour, provides consultations on the application of the local energy standards in buildings, participates in local energy planning and in auditing of the level of CO₂ emissions, supports the introduction of RES.

Climate Protection Agency Hannover Region (CPAH)

Source:

Local climate-action-program and passive house standard

(WP2_20120507_Local_Climate_concepts_Region_Hannover_U_Scherer.pdf)

The rapid increase and territorial expansion of the activities for climate protection and energy efficiency improvement in Hanover at the start of the new Millennium imposed the setting up in 2001 of the Climate Protection Agency Hannover (region) - CPAH, whose objective is to cover the entire region and to take up the new challenges, related to energy conservation and broader use of renewable energy sources. CPAH plays an important role in multiplying the experience of Hanover and in promoting Passive Houses and renewables. It organizes several campaigns⁷ a year and local Passiv House Days.

CPAH is focused on the region, but also works in proklima area. CPAH and ProKlima cooperate on the base of a mutual agreement. ProKlima supports the agency with expert knowledge, printed materials and subsidies (when performed in "proklima-fund area), while CPAH organizes campaigns and events, serving as a "communication network agency". Jointly they organize common events, like solar festival, CHP-Campaigns, common newsletter, etc.⁸.

Presently the Agency has established itself as a leading not-for-profit organization in the region, which coordinates the implementation of the Climate Protection Action Plans – CAP. Involved in them under different forms are all stakeholders, among which are the municipality of the city of Hanover (the capital of the region), the Hanover Region, as well as two energy suppliers, 6 other companies and the supporting public.

Climate Alliance Hannover 2020

Source:

A Strong Alliance for Climate Protection (broshuereengl.pdf)

In 2007 Hanover Municipality decided to reduce its CO₂ emissions by 40%. In connection with that the same year the Climate Alliance Hannover 2020, was founded. Its objective is to unite the efforts of some 80 public institutions and private companies for implementation of this strategic task. The partners are representatives of industry and the

⁷ An example is the campaign "Start well advice", which aims at timelimited street by street energy consulting to reach out for energy savings with modernization of old buildings.

⁸ For more information see: <http://www.klimaschutz-hannover.de/KlimaInfos-gemeinsam.1898.0.html> and http://www.klimaschutz-hannover.de/e_coBizz_Energieeffizienz_fu.1876.0.html

services sector in Hanover, of the municipal administration, the energy and other utilities, etc. The Hannover City Council and Stadtwerke Hannover AG city energy utility again united their powers and became the major drivers of the new association, which on 12 September 2008 launched the ambitious Climate Protection Action Programme for the period 2008-2020. According to that programme by 2020 the CO₂ emissions in the Hanover region will diminish by 40% as compared to their 1990 level, which means that the region will emit every year 1.8 million tons greenhouse gases less. The implementation of the programme is performed in the framework of the three main networks, which are the pillars of the Climate Alliance Hannover 2020 - Energy Efficiency Network, Partnership for Climate Protection and Opinion Leaders' Network. *(see more 3. KEY STAKEHOLDERS INVOLVED)*

Kronsberg Environmental Liaison Agency (KUKA)

Source:

Sustainable urban development – the ecologically exemplary new settlement of Hannover- Kronsberg (Hannover_Kronsberg_engl_builder_6_06.pdf)

http://www.hannover.de/data/download/umwelt_bauen/s/mokro27-31.pdf

The local authorities in Hanover recognize the significance of the broad involvement of the citizens and of the public support for climate protection and energy efficiency improvement in the newly constructed housing estate in Kronsberg. For this reason they initiated the founding of the local agency KUKA (Kronsberg Environmental Liaison Agency) (1998 -2001). It informed the housing estate residents and involved them directly in public control on the implementation of the project and achievement of its environmental objectives. Step by step the Agency contributed to realization of a change in the residents' behaviour in the course of the regular operation of the sites by making them more committed to the objectives related to mitigation of climate change.

KUKA provided and initiated information and qualification for architects, planners, construction workers and housing companies. Also qualify assurance was supported.

Strengthening the role of business and industry

Source:

Agenda 21 – Status report (Hannover_Agenda_21_Activities_Report.pdf)

Using the fruits of the perfect and rich-in-results collaboration with Stadtwerke Hannover AG Hanover Municipality makes targeted efforts for involvement and direct participation of businesses and in particular of the local industry in the practical implementation of the measures for reduction of CO₂ emissions and for improvement of energy efficiency.

Depending on the concrete circumstances it applies different approaches for enhancement of the role of the business community. For instance, a public-private partnership for development of the retail network of the city has been initiated in connection with the construction of the Seelhorster Garten housing estate. To this end a special concept was developed. For the purposes of providing adequate support and consultancy advice to the local companies the local authority maintains direct and operating contacts with many of them.

4

PLANNING AND DESIGN CAPACITY

The local authorities in Hanover are aware that in order to succeed to reduce by 2020 the CO₂ emissions by 40% (as compared to the 1990 level) all the stakeholders should acquire adequate knowledge and skills. The city administration had to build its own adequate capacity for formulation of the most appropriate policies and working out of programmes and plans for their implementation. To this end an appropriate organization was set in place and acquired knowledge and experience in how to coordinate and control and evaluate the results from their implementation. The realization of a number of programmes and projects for reduction of CO₂ emissions through energy efficiency improvement has required adequate training of the designer and construction companies, as well as of the producers and suppliers of the necessary equipment and energy. The building of this capacity passes through professional orientation and direction of young people towards renewable energy sources and low-energy buildings in the course of their elementary vocational training and the follow-up upgrading of their skills. The building of the necessary capacity has made it necessary to ensure topical information and professional consultations to all the stakeholders. In this direction had been oriented also the efforts for building of local, national and international networks for transfer of environmentally-sound and energy efficient technologies.

Capacity building in the city administration

Source:

Local Agenda 21 – Status report (Hannover_Agenda_21_Activities_Report.pdf)

In order to realize the urgent measures for climate protection through reduction of energy consumption and the use of renewable energy sources the city administration of Hanover was reformed. As a result of it the municipal services and professional consultations were brought closer to their users and permanent monitoring was ensured of their needs and behaviour. Measures were undertaken for development of the officers in the city

administration. Special attention was paid to enhancement of their leadership capacities, while the level of remuneration was tied up to the achieved results.

Education and training

Source:

Local Agenda 21 – Status Report (Hannover_Agenda_21_Activities_Report.pdf)

In addition to the general awareness level of the stakeholders, the implementation of the programmes related to climate protection and energy efficiency in Hanover requires specific approach to each of them. To this end a system of centres for specialized information and consultations for the different stakeholder groups (households, investors and builders) was built in the municipality. Through the specially built national network for professional orientation the municipality attracts young people to the training opportunities and orients them towards construction of low-energy buildings and renewable energy sources. A series of courses and professional handbooks ensure specialized qualification of those employed in the sector.

Environmentally-sound technology transfer

Source:

Local Agenda 21 – Status Report (Hannover_Agenda_21_Activities_Report.pdf)

Hanover Municipality takes active part in the permanent exchange of environmentally-sound technologies. There is explicit interest in technologies related to reduction of CO₂ emissions, curtailing of energy consumption and even full liquidation of waste production. In this connection the municipality participates in regional, national and international networks for innovative services and technology transfer. Moreover, the local authorities aim at enhancing the role of trade unions and workers in the sustainable development of the region and in particular in the construction of low-energy buildings and renovation of the existing buildings in compliance with the new energy standards. Regular local forums and exhibitions⁹ in the context of efficient buildings construction and renovation contribute to these efforts.

5

CONSTRUCTION AND TECHNOLOGIES

⁹ Such as, e.g. *Energie-Spartage* (see more at <http://www.heckmannmbh.de>)

In order to achieve its goals concerning climate protection and energy efficiency Hanover Municipality specified construction and new building technologies as a major priority of its policy. The new housing estate in Kronsberg, built in connection with EXPO 2000, had a significant contribution to the establishment of that priority. One year before the opening of the exhibition started the implementation of the Passive House Programme for new construction and of the 'Energiepass' Programme for upgrading of existing buildings. This development established Kronsberg as a model of sustainable urban development. On its area the two new standards - Low Energy Houses („Kronsberg Standard“) and Passive house (PH) - were applied simultaneously for a first time. Beside residential buildings, under the new energy efficient and nature-friendly methods are being built also child care facilities, schools and sports facilities. The energy supply in Kronsberg is performed through broad use of renewable energy sources. Nature-friendly building materials are used in construction and energy efficient appliances for furnishing of the households. On the basis of the positive results achieved in Kronsberg the city authorities decided to construct the new housing estates "ZERO: E-park In der Rehre" and Kronsberg-Nord, in which the Passive House (PH) Standard was applied. After a detailed analysis of what has been achieved, since 2007 Hanover Municipality has been introducing new ecological standards in the construction of all the new buildings, which are under municipal influence. Beside the energy performance of the buildings, these standards affect also the soil and rainwater.

Programmes and Models

Energy Efficiency Programmes

Source:

Integrated Energy and Climate Protection Policy-Hannover (DE) (hannover_566_en.pdf)

All the projects for low-energy building construction in Hanover Municipality are based on concrete target programmes and policy decisions. After the launching of the Passive House Program for new buildings (1999) and the 'Energiepass' Programme for existing buildings (2003), two new programmes were initiated – "Factor 10-Programme" for energy efficient renovation of existing buildings and "ImpulsProgramme Passive House" Programme for promotion of and support for SMEs, which start or reorient their activity towards construction of passive buildings. On the basis of these two programmes the municipality has decided to introduce full application of the Passive House Standard in the design and construction of the new housing estates "ZERO: E-park In der Rehre" and Kronsberg-Nord.

Hannover-Kronsberg - a model for sustainable urban development

Source:

Kronsberg, Hannover: Component of a Factor 10 Strategy (Kronsberg_components.pdf)

Two favorable factors are usually put forward for the establishment of Kronsberg as a model of sustainable urban development. One of them is undoubtedly the fact that Hanover was the venue of EXPO 2000. The second one is the fact that 80% of the area of the housing estate is municipal property. These two factors, along with the strong support from Stadtwerke Hanover AG and the newly created Climate Protection Fund proKlima, enabled the municipality to apply on a large scale the new standards for low-energy buildings. In addition, the energy supply to the housing estate has been optimized through the construction of a new hydro-power plant, two new wind power plants, considerable amount of photovoltaic capacities, as well as a system of decentralized co-generators. Parallel with the efforts for optimization of energy supply and consumption, innovative solutions are being implemented for evacuation of rainwater, for protection of the properties of the soil and for processing and utilization of solid urban waste. The results in Kronsberg have become an example worth replication not only in the framework of Hanover Municipality, but also all over Germany and beyond its frontiers.

Energy efficient construction

Source:

Passive House Study Tour, 06 May 2012, Hannover, Germany (Kronsberg_components.pdf)

The penetration of the low-energy standards in construction, including the Passive House (PH) Standard, on the area of Hanover took place gradually and in a planned manner through a series of pilot and demonstration projects for residential and public buildings. After the construction of the first 32 terraced houses in Kronsberg to the PH Standard, 330 new individual residential buildings were constructed in “E-park in der Rehre“ to the same standard. The Daycare Center in Wiesengrunde and the Primary school in der Steinbreite are pilot projects for public buildings designed and constructed entirely to the Passive House (PH) Standard.

Terraced houses Sticksfeld

In Sticksfeld (Kronsberg), also called “Lummerlund” settlement, are being constructed the first houses, in which the Passive House (PH) is applied in its entirety, as a result of which the need of traditional space heating by means of radiators has become absolutely redundant. It is replaced by a new type of ventilation-based heating system. The reduced need of external heat supply is ensured by means of a wind generator

ZERO: E-park in der Rehre

On the basis of the results achieved during the construction of the first passive houses in Kronsberg, a new step on a much bigger scale was made in “ZERO: E-park in der Rehre”, involving full application of the Passive House (PH Standard. It is manifested not only in the larger number of residential buildings, but also in the almost zero CO₂ emissions, related to the external heat supply. This is achieved thanks to the harnessing of the most powerful renewable energy source – solar energy. (See more in *Beacon Projects*)

Daycare Center Große Pranke – Hanover-Marienwerder

This is a pilot project for one of the most common types of public buildings – daycare centers – implemented entirely to the Passive House (PH) Standard, Daycare Center Große Pranke¹⁰ was the first Passive House Daycare Center build by city of Hanover in 2007 by decision of council of City of Hannover in 2005. In addition to the applied highly efficient heat insulations and triple glazing of windows, considerable attention has been paid to the solar orientation of the building for the purposes of passive use of solar gains.

As a consistent further development of the PH standard with experience of the first projects the Daycare Center Im Wiesengrunde (owner is municipal housing cooperation GBH www.ghb-hannover.de) is one of the newest realized examples. An adequately arranged inner yard improves additionally the energy efficiency of the building and enriches its functional opportunities. (See more in *Beacon Projects*)

Primary school In der Steinbreite

This school is also a pilot project implemented to the Passive house (PH) Standard. It is the first Passive House School Project in Hannover. It was build upon the financial model Public Private Partnership (PPP). Here also are used highly efficient heat insulation and triple glazing and the traditional space heating system is replaced by a special ventilation-based heating system. The heat supply for the entire building is provided by two gas-fired boilers. When the school is not in session the school forum and the gym may be used by external visitors as well, mainly the residents of the neighborhood. (See also in *Beacon Projects*)

Energy efficient technologies

Source:

Ecological Building in Hannover (EcologicalBuildinginHannover.pdf)

¹⁰ Bär, Stefan. New building of two day nurseries in Hannover in the Passiv House standard. In: Proceedings 10th Int. Passive House Conference Hannover, 2006
http://www.despanqarchitekten.com/html/first_click_options/playing_passivhaus.htmlhttp://www.baunetzwissen.de/objektartikel/Tageslicht-Kindertagesstaette-in-Hannover_777358.html

Parallel with the new construction technologies and technical equipment applied in the buildings constructed to the Passive House (PH) standard, reduction of CO₂ emissions is sought also through the use of renewable energy sources, nature-friendly building materials and highly efficient household appliances.

New technologies for renewable energy

In close interaction with Stadtwerke Hannover AG Hanover Municipality has been making systematic and consecutive efforts for reduction of the share of carbon energy sources in the energy mix of the region and for their replacement by renewable energy sources – water, solar energy and wind. For the purposes of achieving this goal the local authorities seek partnerships with private investors as well.

Environmentally friendly building materials

Different types of materials are used in the construction of buildings – for the construction itself, for interior decoration and for maintenance during regular operation. The municipality encourages the use of environmentally-friendly and healthy materials, which cause no damages to inhabitants and the environment. Preference is given to materials, whose manufacture is environmentally-sound and sparing as regards natural resources, and which till the end of the building life cycle would leave a minimal ecological footprint. Also encouraged is the use of materials, whose second hand application is possible, like wood for instance. Special attention is paid to the impact of building materials on occupants' health. In order to comply with all these requirements the municipality requires that the attitude towards the building materials shall be defined as early as in the process of planning and design.

Energy saving household appliances

Household appliances have a significant contribution to the joint efforts for reduction of CO₂ emissions and for energy efficiency improvement. The Municipality of Hanover provides incentives for renouncement of the use of electric water heaters and centralized DHW supply. It encourages the use of low-energy household appliances and luminaries, as well as of aerators for minimizing DHW consumption.

New legal framework

Ecological standards for buildings

Source:

*Ecological Standards for Building Construction within the Municipality's Sphere of Influence
(Ecological_Standards_for_Building.pdf)*

Since the low-energy standards Low Energy House-Plus (LEH-plus) and Passive House (PH) have proven their effectiveness in a series of pilot projects, launched for a first time in Kronsberg, in 2007 Hanover Municipality decided to start massive application of these standards in all buildings, which are municipal property, and in all buildings constructed on municipal plots. In the second case the application of these standards by other investors is regulated in the contract for sale of municipal land to a private investor or in the building permit. The new standards regulate not only the efficient energy use, but also the utilization of rainwater and soil protection.

(See more in Part 1: ENERGY AND BUILDING OILICIES / Legal framework / Ecological standards for building construction)

6

VISIBILITY AND PUBLIC SUPPORT

Source:

Local Agenda 21 – Status Report (Hannover_Agenda_21_Activities_Report.pdf)

The local authorities in Hanover recognize the fact that implementation of the goals of their ecological and energy policy is unthinkable without active public support and without involvement of all the stakeholder groups of the community. As early as in mid-1990'es they attracted a broad circle of stakeholders in the design of Local Agenda 21 and provoked public dialogue on climate protection issues. The implementation of Local Agenda 21 requires building of permanently functioning networks, in the framework of which the citizens are directly involved in the sustainable development of the region. In the framework of these networks have emerged numerous initiatives, aimed at bringing about a change in consumers' behaviour and in this way helping to reduce the consumption of energy and other natural resources, to minimize solid urban waste and permit its more effective processing and utilization. The implementation of this task passes through broad public awareness and commitment, appropriate training, consultations and advice to all the stakeholders. The local community is provided with useful information about the state of the natural environment in the region and about the key solutions, initiatives and strategic focal points of the local authority's actions for climate protection. A variety of measures have been worked out for enhancement of the role and participation of women and children in the sustainable development of the city and the surrounding area.

Local Agenda 21 - from city-wide dialogue to concrete action

Local Agenda 21 offers a perfect opportunity for involvement of the broad public in attainment of the goals of the municipal policy with respect to climate and energy efficiency. In practical terms this creates conditions for application of the “bottom-up” approach, in which all the stakeholder groups of the community, including women, youth and immigrants, get involved in the public dialogue. In the framework of the so-called Agenda Forum representatives of these groups meet for exchanging information and experience. The specialized unit Agenda Bureau, which is part of the “Environmental Protection” Department of the city administration, provides the organization and coordination of this forum.

New institutions to mobilize social support

For coordination of the large number of stakeholders in the sustainable development of the city Hanover Municipality has created the Environmental Communications Network. Topical information and advice are provided to all the stakeholders on the specifically set up ‘Environmental Hot Line’. The Planning Ombudsman institution was also set up for the purposes of providing support to the different initiatives and projects in the municipality. It takes advantage of the so-called City Forum, in the framework of which any issues related to urban planning may be discussed in a broad public format.

Public behavior initiatives in Hanover

As a result of the involvement of more than 40 organizations in the implementation of Local Agenda 21 a large number of initiatives, aimed at bringing change in public behaviour, have been realized. They have undoubtedly contributed to the achievement of actual results in mitigation of CO₂ emissions through reduction of energy consumption, as well as through water savings and curtailing of solid urban waste production through its adequate processing and utilization.

Promoting public awareness

Promoting public awareness of and commitment to climate protection is a key prerequisite to energy efficiency improvement and broad use of renewable energy sources. In order to meet that condition local authorities seek for diverse ways and formats – from change in the behaviour patterns of children in childcare facilities and schools to providing “door to door” advice and consultations. An important contribution to that effect is the broad incorporation of the environmental and climate protection issues in the school curricula.

Information for decision making

In order to ensure wider public support for the sustainable development of the city and the region the local authorities have been working out strategic focuses, aimed at identification of specific opportunities for urban development in the future - “Social city”, “Young city” and “City of gardens”. A separate strategic focus is oriented towards “Initiatives for employment”.

Involvement of children and youth

The role and the place of children and young people in sustainable development have a significant place in Local Agenda 21. For that reason in the Local Agenda 21 of Hanover have been incorporated a number of projects for active involvement of children in activities for minimizing solid urban waste and creation of environmentally-sound environment in childcare facilities. Measures have been envisaged for supporting young people facing social hardships, as well as for provision of housing to young people, so that they would be able to embark by themselves on their path of life.

Involvement of women

Women and their role in sustainable and equitable development are assigned a specific place in Local Agenda 21. Emphases are laid on equality between the sexes in the field of employment and education, on the combat against male violence against women and on the measures for supporting women, who wish to start their own business. The “Equal Opportunities” Department in the city administration is charged with the responsibility to coordinate these measures and tasks.

Environmental information

The local authorities in Hanover are striving to offer all the citizens topical information about the environment and climate change, as well as about the programmes and projects for reduction of GHG emissions. The most reliable source of such information is the regional Internet portal. Since 2008 the city administration has been periodically conducting studies of the citizens’ satisfaction with the work of the various departments of the city administration and of their access to information.

7

QUALITY ASSURANCE

Good-quality, timely and comprehensive implementation of the large number of energy efficiency programmes, plans and projects in Hanover imposes the need of setting in place a system for monitoring of the achieved results. This system comprises the following:

- Periodical audits of CO₂ emissions produced by the energy sector and transport;
- Periodical reports (every three years) about the state of the environment on the area of the municipality, which trace selected sustainable development indicators;
- A system for environmental management Eco audit, oriented towards improvement of environmental protection and minimizing of the related costs;
- Quality assessment of the energy efficiency of new and renovated buildings.

The results from the operation of the elements of that system serve as the basis for correction of the operating programmes and plans and are the starting point for development of new programming documents. The assessments concerning the achieved level of energy efficiency of buildings are used as a unique tool for repair of omissions and for approximation to the monitored indicators.

CO₂ audit 1990-2005

Source:

CO₂ audit 1990-2005, Emissions from energy generation and transport (bilanzengl.pdf)

The chief instrument of the system for monitoring of the achieved results is the periodical audit of CO₂ emissions, which takes account of the differentiated influence of the energy sector and transport. The first comprehensive audit of CO₂ emissions in Hanover was conducted for the period 1990-2005 r. It established that the predetermined target for reduction of CO₂ emissions by 25% till 2005 had not been achieved. That imposed the need of review of all programmes and plans in order to clarify the reasons for the failure to meet the targets. As a result of it in 2008 the Climate Alliance Hannover 2020 approved a still more ambitious programme for reduction of GHG emissions by 40% till 2020. This is a convincing evidence for the strategic importance of that specific-in-its-nature audit

Hannover Environment Report

Source:

2008 Environment Report (Environment report 2008_englisch.pdf)

Two years after the first audit of CO₂ emissions in Hanover (2006) the Hannover Environment Report (2008), due every three years, was also published. According to the law passed in 2006 this report was made public and subjected to broad public review, which involved an even larger number of new groups of the local population in implementation of the measures for protection of the environment and the climate. As a consequence of the increased public activeness during the same year the City Council approved also the so-called 'Ecological standards for building in areas within the local authority sphere of influence'. This report depicted the reserves for achieving the more ambitious targets for reduction of CO₂ emissions and motivated the Climate Alliance Hannover 2020 to approve (that same year) the programme for reduction of CO₂ emissions by 40% till 2020.

Environmental sustainability indicators for the city of Hannover

Source:

2008 Environment Report (Environment report 2008_englisch.pdf)

After two years of efforts and consultations with other cities in Germany and Europe in 2000 Hanover Municipality approved a series of indicators for assessment of the sustainable development on its territory. The first practical test of these indicators was realized in the Hannover Environment Report 2002. The report demonstrated that these indicators were an excellent tool for permanent monitoring of all the sensitive and vital elements of the environment and were a practical device for measuring the level of the achieved results in its protection and in the sustainable development of its elements. The application of these indicators at the national and supra-national level makes possible to compare and compete with other cities on an equal footing as partners

Hannover Eco audit

Source:

2008 Environment Report (Environment report 2008_englisch.pdf)

On the grounds of EU Regulation No. 761/2001 (Eco-audit, EMAS) и International ISO 14001 standard, Hanover Municipality introduced the system for environmental management Eco audit. The major objective of this system is two-sided:

- i) Improvement of environmental protection; and
- ii) Cost saving;

The achievement of this two-sided objective is a normal result in the event of savings of water, energy and heat energy for space heating. The biggest savings are achieved, however, in the case of improved waste management and optimization of fuel costs. On the territory of the

Municipality of Hanover 33 Eco audit systems are applied in a decentralized manner. The officers of the city administration acquire special training to that effect, which in certain cases requires external certification.

Energy efficiency assurance

Source:

Ecological Building in Hannover (EcologicalBuildinginHannover.pdf)

Every new or renovated building on the territory of the Municipality of Hanover may be evaluated from the point of view of the achieved indicators for energy efficiency. The specifically set up for that purpose Quality Assurance Bureau gives, in addition to the comprehensive expert assessment, also concrete recommendations and instructions in the cases of failure to achieve the design-based indicators. In the event of application of the Low Energy House Plus (LEH-Plus) and Passive house (PH) standards this evaluation might be conducted with financial support from proKlima.

8

MARKET FORMATION / PENETRATION

Since the end of the past century and the beginning of the new Millennium the energy market in Germany has been liberalized. Today it is a key factor in the efforts for reduction of CO₂ emissions. Therefore the programmes, plans and projects, aimed at climate protection, energy efficiency and RES on the territory of Hanover Municipality, are currently implemented under the conditions of a free market. For that reason the city administration in Hanover has been developing and implementing a series of measures for support and development of the market for construction of low-energy buildings, including of passive houses. Parallel with these measures of the administration, the public-private partnerships created on the area of the municipality also contribute to the development of the market for low-energy buildings. They disseminate know-how and good practices in the field of energy efficiency, provide financial support for introduction of innovative low-energy technologies and contribute to upgrading of the knowledge and experience of small and medium-sized enterprises and for development and strengthening of their competitiveness through minimizing of their production costs, including their energy costs.

Contribution of city administration

Source:

A Strong Alliance for Climate Protection (broshuereengl.pdf)

In the course of more than two decades the local authorities in Hanover have actively promoted the development of the market for low-energy buildings. Implementation of the medium- and long-term programmes worked out by them they develop adequate legal framework and introduce a number of instruments for encouraging the application of the low-energy standards in new construction, as well as in renovation of existing buildings. Construction of low-energy buildings is imposed by the new spatial development plans of the territory of the municipality. A specially set up department grants expert assessments of the level of achieved energy efficiency in new and renovated buildings. This, on one hand, helps achieve the high energy efficiency standards, and, on the other hand, it ensures equal starting positions for all the companies operating on the market for low-energy buildings.

Contribution of public-private partnership

Sources:

Case study: The "proKlima" partnership contract as a model for cooperative climate protection on community level (Case study proKlima.pdf)

A Strong Alliance for Climate Protection (broshuereengl.pdf)

For the development of the market of low-energy buildings on the territory of Hanover Municipality contribute also a number of public-private partnerships . The contribution of the Climate Protection Fund proKlima is the most substantial. Apart from the financial incentives for application of the low-energy standards, the Fund conducts also broad market campaigns for promotion of the passive house. The Climate Alliance Hannover 2020, on its part, also conducts an active market campaign for reduction of energy consumption in the construction and renovation of industrial and commercial buildings. Ecoprofit has a specific contribution to the development of the market for low-energy buildings as well. It supports SMEs to improve their management capacity aimed at reduction of energy and raw materials consumption and in this way minimizing of their production costs and enhancement of their competitiveness.

9

SOME LESSONS LEARNED

Source:

*Manfred Georg. Hannover-Kronsberg, Assesments
([imagine_sem2007_hannover_kronsberg_mgeorg.pdf](#))*

The below listed summaries and lessons learned have been formulated on the basis of Manfred Georg's¹¹ report "Hannover-Kronsberg, Assessments", delivered at the IMAGINE Workshop, conducted in 2007 in Saline Royal, France¹².

Success factors for development policy

As a result of the many years of democratic traditions in the administration of Hanover Municipality several major prerequisites for the success of the city's policy in the field of climate, energy efficiency and RES have been created:

- Political consensus has been achieved to shift sustainable development to the top of the agenda as a major priority of the local authority
- A complex approach is been applied, in which citizens' requirements are placed in the focus of attention
- An integrated planning process is introduced
- The "bottom-up" approach is applied in decision-making and implementation of the approved decisions
- Arrangements concerning municipal land are realized with a view to the long-term public interests

Success factors for energy policy

The aspects of decisive importance for the accelerated penetration of the low-energy standards on the territory of Hanover are as follows:

- Persistent political support for all the pilot and demonstration projects, related to the Passive House
- Financial support on the part of the financing institutions in Germany and the EU

¹¹ To provide brief information about Manfred Georg and his position in Hanover

¹² To state the link to the website of the initiative

- Application of energy efficient technologies
- Building a system of public-private partnerships
- Effective institutional support by the city administration
- Strong commitment and direct involvement of Stadtwerke Hannover AG.

Problems and failures

The observations have depicted the following more significant disparities between the expectations and the actual results;

(a) End-users had hoped that their space heating bills would diminish proportionally to the reduction of energy consumption. The conflict between consumers and the district heating utility was triggered by the high values of the fixed components in heat energy prices and by the considerable losses during heat transportation, which had turned to be disproportionately high as compared to the strong reduction of heat requirements. These failures are linked with inadequate awareness-raising activity among consumers.

(b) All in all, electricity savings have turned out to be smaller than expected. The conclusion is that the planned saving may be achieved in a more long-term horizon. Until that time it is necessary to provide significant incentives and consultancy support to end-users.

(c) A number of residents have strongly objected to the installation of ventilation systems without heat recovery. Their dissatisfaction had gradually grown into resistance against all types of ventilation systems, which had created many problems to the housing cooperative.

(d) Reported as failures are the results from the use of solar energy for space heating under the "Solar City" Programme. This is also a consequence of the initial overestimation of the expected results.

Driving forces for low energy standards' penetration

The Hanover case reveals that the factors of decisive importance for the introduction of the low-energy standards in the construction of new buildings and renovation of existing ones are as follows:

(a) The strong support and direct involvement of the energy supplier in the city *Stadtwerke Hannover AG* played a decisive role for the broad introduction of renewable energy sources on the territory of the municipality, for the construction of a large number of co-generation plants and for improvement of the efficiency of the district heating systems.

(b) With its founding and activities the *Climate Protection Fund proKlima* turned into a main driving motor of all projects related to the Passive House Standard. While the experience involving Stadtwerke Hannover AG might turn out not to be applicable everywhere, the public-private partnership in proKlima is applicable at other locations in Germany and beyond its boundaries.

(c) The success model of Hanover contains interesting initiatives and different modalities of *financial support* for climate protection and energy efficiency improvement, which might be replicated at the local level, provided there is sufficient market freedom. This market freedom requires the respective national legal framework, ensuring a higher degree of decentralization and “municipalization”.

Obstacles

The introduction of the standards for low-energy buildings had stumbled on the following major barriers:

(a) Generally speaking, the subject of low-energy buildings (in particular Passive Houses) is not readily accepted by architects and urban planners. This situation is somewhat overcome through the creation and activities of specific working groups, through KUKA and through close cooperation. Undoubtedly, dissemination of appropriate information about success models, as well as specialized training, will be suitable instruments for overcoming of that barrier.

(b) All in all the standards for low-energy buildings (LEH) and Passive Houses (PH) are not well known to the majority of the designers and builders. This barrier may be overcome through appropriate skills upgrading for each of these two groups, as well as through energy audits of already constructed low-energy buildings (LEH). Investors and construction companies outside the region, particularly in the case of passive houses, might be invited to perform the building works.

(c) The initial introduction of the “Kronsberg Standard” was met by strong opposition and strikes on the part of the construction companies. In order to overcome that pressure the city authorities offered additional subsidies for buildings of social designation and permitted up to 10% deviation from the standard.

Key recommendations for other cities

The climate change challenges and the end of the cheap oil and natural gas era require ambitious goals concerning the energy future of European cities:

(i) To create “climate-neutral” schemes for new buildings and settlements

- (ii) To achieve 80-90% reduction of CO₂ emissions (“Factor 10”) as compared with the historically established building practice

Nowadays society possesses the required tools for achievement of these goals in a cost-effective and socially acceptable way. In order to achieve these goals it is necessary to:

- (iii) Study the specific local and regional conditions and resources and formulate specific strategies (“Road maps”) and quantitative targets and timeframes.
- (iv) Make available to the citizens adequate technologies for sustainable energy future, instead of studying what they should be doing in their everyday life in order to save energy.
- (v) Convince people that energy efficient technologies and RES make life more comfortable, more secure, healthier and cheaper; these “side effects” are of key importance for attracting the interest of the majority of the citizens – in this way they would be able to do something for their children’s future.
- (vi) Demonstrate with the design projects for passive houses (“lighthouse projects¹³”) that the climate-neutral buildings are not an idea of what might be realized in the future, but rather a “must” of the present: it is possible to create “islands of sustainability” today and to illustrate the numerous advantages they can offer.
- (vii) The European Union and the Member States should formulate landmarks and incentives for the cities related to working out of local and regional schemes, development of “light house projects“ (???) and support for their replication at the local and regional level.
- (viii) The cities should create local or regional energy or climate protection agencies and funds similar to proKlima.

¹³ The term “Lighthouse projects” is used in the sense of “exemplary” / “beacon” projects

INSTEAD OF CONCLUSION

Hanover 2012 - Starting Point Regarding Passive House

By proKlima

The passive house standard has a long tradition in Hannover: In 1998 the passive house estate Lummerlund was built in the Kronsberg district¹⁴ and for the first time exclusively postheating of the fresh air necessary was used; only the bathrooms have small radiators. At the same time climate neutrality related to the utilization phase of the 32 terraced houses was demonstrated: The CO₂ emissions caused by the annual energy consumption for space heating, hot water and electricity demand was covered by sustainable energy sources. A 1,278 € share was included in the sales price of each house. This financial share equals 2.6 kW and an electricity production of 36 kWh/(m²a) to compensate the small annual CO₂ emissions of the passive house estate. *proKlima* was involved in the process by supporting the EU-project CEPHEUS.

With the “ecological standards for building construction within the municipality’s sphere of influence” decided by the City Council of Hannover in September 2007 climate protection priorities in master plans were set to lay the structural foundations for small heat requirement and use of solar energy.

The standard is part of the “climate-alliance-hanover-2020”¹⁵ which aims CO₂-reduction by 40% until year 2020 compared to the level of 1990. A very new local project “Masterplan 100%”, performed by City of Hanover and Region Hanover, started in May 2012. The project is founded by Federal Ministry for the Environment. The aim is to reach out for CO₂-reduktion of 95% until 2050 on level 1990.

An prominent example of energy-optimized master planning is the new building area zero:e park¹⁶ in Hannover-Wettbergen, a nearly zero emission district with planning of more than 330 Passive House units.¹⁷ To compensate the small CO₂ emissions a new hydroelectric power plant (Döhrener Wolle) is to serve.

Beyond that buyers of real properties of the City of Hannover assume the duty to build a low energy building. Buyers who will erect passive houses are preferred.

Clients in Hannover are offered a big variety of information:

¹⁴ http://www.hannover.de/de/umwelt_bauen/bauen/bauen_lhh/oe kobauen/oemobakr/modkrone/index.html

¹⁵ <http://www.hannover.de/klimaschutzallianz/english/index.html>

¹⁶ <http://www.zero-e-park.de/>

¹⁷ Kirscht, E. *The zero:e park: Active with Passive Houses*. In: *Proceedings 15th Int. Passive House Conference Innsbruck 2011*. Passive House Institut, Darmstadt, 2011.

- Each year in November the days of the open passive house take place. Inhabitants and planners invite the public to visit their houses.
- Lectures about the passive house standard and buildings services are held regularly.
- The department of climate protection of the City of Hannover and proKlima offer independent consultancy regarding passive houses.
- Lists of qualified passive house companies are published.
- The Climate Protection Agency Region Hanover runs several campaigns to support high efficient building modernization by offering energy counselling. proKlima supports the campaigns technically and financially.

proKlima supports building operations (residential and non-residential), newly built in passive house standard and modernization with passive house components, under the precondition that an independent quality assurance is carried out. The quality insurance comprises both plausibility checks of the planning (PHPP, minimizing of thermal bridges, airtight junctions, concept of ventilation and heating) and onsite checks with airtightness testing and setting the balance of the ventilation system. Due to the increasing demand it is important that enough architects, engineers and skilled workers with specific passive house knowledge are available. The local company target offers a broad variety of training courses.

The City of Hannover erects new buildings consistently according to the passive house standard. In the next years 14 new buildings with approximately 37,000 m² are under construction, e.g. numerous nurseries. The passive house standard is already the common standard for public buildings in Hannover, for residential new buildings the market share is 10 to 15 %. The new funding program for non-residential buildings has the target to motivate investors of commercial properties.

While the new building activity is only approximately 250 units a year in Hannover, investments are growing for modernization of the existing 50,000 buildings erected before 1978. Within the 'old building' program proKlima makes about 1.5 million € available each year for the energy-related modernization of residential and association buildings. The program has been consistently focused on establishing passive house technology since 2008. Building owners receive funding to implement high-efficiency insulation standards in outer walls, the topmost ceiling, and the roof; to install passive house windows; and to install comfort ventilation systems with heat recovery. Furthermore consulting, planning and construction supervision services provided by 'energy pilots' are subsidized. These are planners who have experience with modernization and have either already dealt with passive house components or received the Passive House Planner Certificate from the Passive House Institute in Darmstadt. They work together with the building owner to

develop a modernization concept that harmonizes various measures and includes and combines all possible funding options.