

CLIMATE CHANGE

HEIDELBERG Germany

Heidelberg is one of Germany's leaders in climate protection. A remarkable number of measures have been implemented on a communal scale in the field of energy and transport, and a wide range of instruments involved in the process.

THE CITY

Heidelberg consists of 14 districts representing a total of 140 000 inhabitants. Founded just over 800 years ago, it was the seat of the Palatine Electors and became famous for its university, the oldest in Germany, which was founded in 1386. Even today, the town – one of the showplaces of German romanticism – remains essentially a university and residential town, but is also on the point of becoming a major economic growth centre and a veritable hub for the Rhine-Neckar region.

In 1997, Heidelberg was awarded the prize as "Federal capital for the protection of nature and the environment" as well as the "European Sustainable Cities Award".



CONTEXT

Heidelberg is one of those German towns with extremely demanding local energy and environmental regulations. Since the early 1990s, the town has implemented a policy for energy saving, the development of renewable energies and sustainable development. In December 1992, the Town Council committed itself to an environmental protection and energy-saving programme which was presented to residents. The Town's programme is reassessed every two years to be adapted to new energy and socio-political conditions. Application of the catalogue of fixed priorities in its climate protection programme and implementation of various projects in the field of energy control will help meet the objective of reducing CO₂ emissions by 20% by 2005 compared with 1987 levels – an objective defined within the context of a declaration made by the Heidelberg Town Council. In all, these measures should lead to savings of 200 000 t/year of CO₂ (households, trade and industry) and 25 000 t/year of CO₂ in the transport sector.

Heidelberg is discussing a development which will allow it to retain its character while remaining a socially responsible town in the future, take care of the environment and be economically efficient. In spring 1997, the Town Council passed the "Heidelberg 2010 urban development plan", which defines the main themes of town policy in the form of a Local Agenda. Heidelberg has also been selected as a model-town by the "Towns of the Future" research programme run by the Federal Ministry of Transport, Construction and Housing, which tests future strategies for sustainable urban development as part of an experimental housing construction and urban development project.

THE HEIDELBERG EXPERIENCE

When drawing up its energy control and climate protection programme in 1992, Heidelberg decided to concentrate on the following:

- > the growth of potential energy-saving through technical improvement of energy efficiency and consumer awareness, to develop new habits;
- > combined production of heat and electricity;
- > the recovery of waste heat and overproduction of electricity in trade and industry;
- > the use of locally available energy potential and renewable energy sources.



The instruments used

Heidelberg Town Hall used basic data produced by Stadtwerke Heidelberg AG (town energy distribution company) in association with energy distribution, as well as information on communal energy management to draw up its **energy budget** –defined and updated regularly by Heidelberg's IFEU design office. Surveys had to be performed to obtain information on heating oil sales. The data was corrected for seasonal variation so that the information on heating does not vary according to climate, which may have been, for example –warmer or colder in 1999 than the average for 1961 - 1990. The data provided by the Federal Meteorological Office allowed them to disregard the effect of atmospheric temperature. The Town Planning and Statistics Office and the Regional Statistics and Economic Studies Office also provided a great deal of data (census of the workplace as well as buildings and housing).

The results of the 1987 population census as well as the various measurements and surveys within the context of the Urban travel plan were also used as a basis for calculating energy consumption in the transport field. TEMIS software was then used to work out the cost of **emissions** linked to energy consumption.

According to the sectors concerned, different methods were used to estimate **energy-saving potential**. The "*typology of Heidelberg buildings*" was established for private households and various energy ratios were defined for the communal heritage. Considered as secondary in this context, the trade and industry sector was only subjected to an empirical analysis. The potential for renewable energy was identified partly for specific sites (for example for hydraulic energy and the biomass) and partly on the basis of existing roof area (solar energy).

Once the analysis of consumption and potential saving was complete, the Town gradually drew up more detailed **action catalogues** for the energy and transport sectors. These measures were then discussed with local operators at many debates and discussions. The actions selected for the energy sector chosen either for a major economic return, i.e. an interesting cost-efficiency ratio, or for their strong overall potential for CO₂ reduction. The work done produced a list of nearly 100 concrete actions. Each of these measures includes a brief description of the action in question, a list of the people involved, the potential CO₂ saved, the priority of each action and its cost.



Since 1993, these actions have been gradually implemented according to priority. The aspects used as a basis for weighting the various options were as follows:

1. ecological compatibility (for example, primary energy consumption and emissions);
2. social compatibility;
 - jobs;
 - acceptance by inhabitants;
 - correct and equitable distribution of costs;

3. procurement safety;
4. profitability (energy costs for the consumer and future evolution of these costs);
5. compatibility in a town context (for example, with the development of town planning);
6. the prospects linked to their adaptability and durability;
7. the chances of political implementation.

Operators involved

Within the municipal administration, the **Office of environmental protection, energy management and health promotion** coordinates all these activities. It is supported in its work by Stadtwerke Heidelberg AG, Heidelberg's public transport company (Heidelberger Strassen- und Bergbahn AG, HSB), the Local Agency for environment protection and energy advisor (Klimaschutz- und Energieberatungsagentur, KliBA) and the town's inhabitants.

The Local Agency for environment protection and energy advisor – better known as the "KliBA" – was founded in March 1997, with a membership of ten towns and villages, as well as Heidelberg savings bank (Sparkasse Heidelberg). The KliBA acts as a consultant for questions of energy saving and the use of renewable energies, particularly for rehabilitating old buildings or designing new ones.

Energy round table in Heidelberg

This institution was set up with the aim of bringing together residents, non-government organizations, local experts, associations and businesses to provide them with a forum for identifying and implementing energy management projects based on local cooperation. This Round table is particularly concerned with energy optimization when rehabilitating old buildings. It has been used as a communications forum for the various operators involved in the old building sector, facilitating the definition of joint projects. For example, it took the initiative in drawing up the "*typology of Heidelberg's buildings*" and then introduced the system of *energy diagnosis* ("Heidelberger Wärmepass") to promote a detailed energy audit for building and economic potential. This Round table was dissolved once KliBA was set up.

Later work and action programmes

Two operations have been selected below to illustrate the variety of instruments used by Heidelberg Town Hall since drawing up its energy programme.

Energy diagnosis ("Heidelberger Wärmepass")

At the end of 2000, KliBA had made a total of more than 200 energy diagnoses. Evaluation of these jobs revealed that three-quarters of the buildings analyzed consumed more than 150 kWh/(m²a) and therefore had remarkable energy-saving potential. Since then, it is not surprising to note that in 73% of cases, KliBA had to recommend improving the heat insulation in these buildings. A survey also showed the extent to which performing an initial survey and energy diagnosis had been decisive. In 25% of cases, the energy diagnosis encouraged owners of buildings to take immediate steps and in 53% of cases to plan later action.



Town planning and development master plan

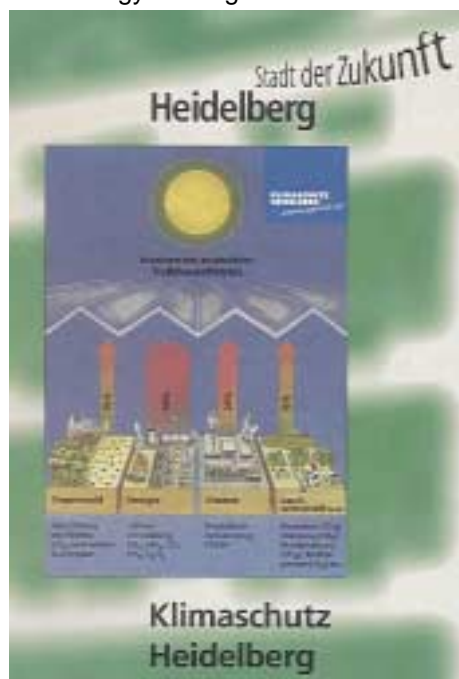
Private law contracts require anyone purchasing land belonging to the Heidelberg local authority to optimize heat insulation and adjustment and heating techniques and to use passive solar energy and waste heat in water and air – based on long-term economic and ecological regulations. The energy ratios for heating (including hot water) must not exceed the values fixed for the urban heritage, this being 50 kWh/m²a for multi-family buildings and 65 kWh/m²a for single-family homes, and must generally remain about 30% below the thresholds set by the German Order on heat protection for 2001.

EVALUATION AND OUTLOOK

The Town council has assigned the town administration to publish regular "CO₂ Reports" and "Energy reports", i.e. carrying out a kind of implementation review of the energy management and climate protection programme. These reports describe the operations which have been started, are in progress or completed during the period under consideration, while distinguishing clearly between the energy and transport sectors. The catalogue of actions is permanently completed with new projects. The first report of this type was published in 1993 and others followed in 1995, 1997 and 2000. The methodology used is the same as was used for the energy programme drawn up in 1992.

The review report for 2000 included a report on CO₂ emissions up to 1999 in the energy sector for the Heidelberg region (disregarding the transport sector) and communal buildings. According to a study by the Climate Alliance, Heidelberg is certainly implementing many more actions for climate protection than other towns, but the report is still somewhat disappointing. This shows that there is still a long way to go before the joint objective stipulating a 20% reduction in CO₂ emissions by 2005 (reference year: 1987) can be met. Taking all sectors into consideration, emissions have, in fact, increased by 6% compared with 1987. This increase has been particularly steep in the trade and industry sector (24% increase), while the increase in domestic emissions is barely +1% compared with 1987. The increase in electricity consumption in all sectors is particularly noticeable. On the other hand, CO₂ emissions from communal buildings have fallen: the efficiency of energy management in this sector is, indeed, reflected in a reduction of emissions by more than 30% since 1993.

In spite of this rather disappointing result, Heidelberg continues to play the role of precursor in climate protection in Germany. Its energy and transport policy is marked by the large number of measures implemented. After a long and difficult initial phase, this policy has now moved into a dynamic phase, which proves that it is widely supported by everyone involved, both in industry and public enterprise, with the transformation of the Stadtwerke Heidelberg companies and their development from energy distribution into a real energy service supplier. In the meantime, implementation of these measures has also been extended to neighbouring towns.



FOR FURTHER INFORMATION

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