



Evaluation of CO₂-mitigation of EXPO-neighbourhood Hannover-Kronsberg (1999 - 2001)

Hannover Kronsberg EXPO city district CO₂ emissions audit

The City of Hannover developed the Kronsberg exemplary settlement with the aim of reducing heating energy consumption by around 45% compared to conventional building methods regarding total domestic energy use (heating, hot water, electricity) and thus avoiding 60% (with wind turbine generators 80%) of emissions of climate-altering carbon dioxide (CO₂) gas. The detailed CO₂ audits by ifeu for 1999 - 2001 show that it has been almost possible to achieve these targets in practice.

Framework conditions

The energy concept for the new development at Hannover Kronsberg had three components:

- Low Energy House building methods with quality assurance monitoring and a skilling and qualification programme
- District heating provision from local CHP plants
- An electricity saving programme.

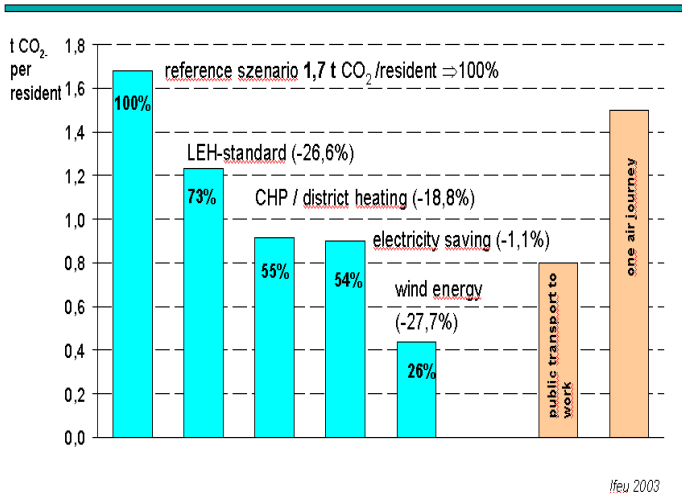
Together they were intended to achieve a 60% reduction in CO₂ emissions. By using regenerative energy sources (wind, solar) and innovative technologies (passive houses, solar-powered district heating, microclimate zones) further CO₂ reductions were striven for.

Low Energy Houses

Residential buildings on Kronsberg were built as Low Energy Houses (LEH) according to specifications laid down by the City of Hannover municipality. As a target value, a maximum heating energy demand of between 50 and 55 kWh/m²a was aimed at.

The entire construction process from initial planning to handover was accompanied by advisory and monitoring measures aimed at guaranteeing optimal energy efficiency and the high standards of craftsmanship required by Low Energy construction.

CO₂ – reductions per resident



ifeu's detailed study over three years of the monthly consumption of all 2,890 apartments with a total accommodation area of 213,000 m² showed that the average thermal energy demand of the buildings was, at 56 kWh/(m²*a) in 2001, around 42% lower than in conventional buildings observing the 1995 building insulation methods. Related to the entire accommodation area of the settlement (space heating, hot water and electricity consumption) this led to reductions in CO₂ emissions of 27%.

District heating provision with decentral CHP plants

All buildings on Kronsberg draw their heating and hot water from gas-powered decentral Combined Heat and Power (CHP) plants via a district heating system. Parallel generation of electricity and heat saves primary energy and a further 19% of CO₂ emissions.

Electricity saving potential still to be exploited

A broadly-based information and motivation campaign was intended to reduce the standard electricity consumption of Kronsberg households from 2,500 kWh/a by 30% to 1,750 kWh/a. Unfortunately savings in 2001 were just 5%. At most 4% of households had taken up the offer of grants towards the purchase of energy-efficient appliances. Thus the electricity saving campaign achieved a small reduction in CO₂ emissions of about 1%!

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Favourable winds

In 2001 three wind turbine generators with a total capacity of 3.6 MW were in operation on Kronsberg hill. If this were credited to the households in the Kronsberg development it would constitute a further 28% (3,100 tonne) reduction in their CO₂ emissions.

CO₂ emissions per resident

The measures described here reduced CO₂ emissions per Kronsberg resident by 74%, from 1.7 to 0.4 tonnes per year – very close to the target savings of 80%.

To put this in proportion: the daily journey to work emits 0.8 tonnes, and a single long-distance flight around 1.5 tonnes of CO₂ per resident and year.

Literature

Zusammenfassung: CO₂- Bilanz 2001 Hannover Kronsberg, März 2003, ifeu Heidelberg;
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