



Case Study



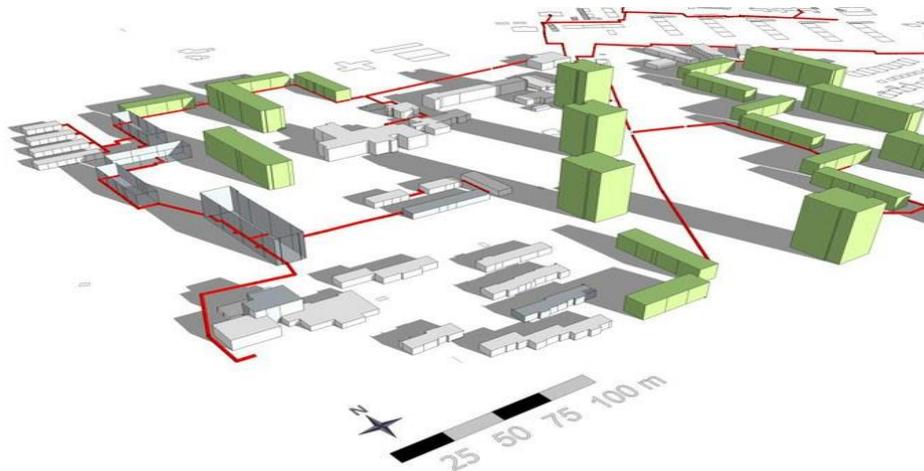
Freiburg, Germany - “Climate Change Action Scenario” until 2030

Freiburg is situated within the temperate oceanic climate zone. It is the warmest city of Germany despite winter cold and rain in summer. Heating degree days are calculated at around 2800. It receives about 1800 hrs/year of sunshine. Freiburg counts 210,000 inhabitants and is one of the fastest growing cities in Germany. Since the 1980s Freiburg and its inhabitants have been concerned with sustainable energy. The initial aim of moving away from nuclear energy towards the use of renewable energy sources (RES), expanded into a comprehensive climate protection approach. The city developed a vision for a sustainable city reliant on an ecologically-oriented energy supply and is today well known for its solar, energy efficiency and public transit programs. The targets of the City are a reduction of CO₂ emissions by 40 % until 2030, compared to 1992, the coverage of 10 % of the electricity consumption in the city by local renewable energies until 2010 and 100 % substitution of electricity supply from nuclear energy until 2010 for electricity consumed in Freiburg.

Concerning the use of local renewable resources in electricity supply the emphasis is on PV panels installed on public, commercial and private buildings, which is due to a long tradition of solar energy use in Freiburg. Another major focus in the supply are cogeneration plants in the periphery which are to be operated with biogas from farming, using new and existing gas supply lines. Most of thermal energy from renewables is provided by local biomass, utilizing biogas in cogeneration plants, fuel wood in major heating plants and wood pellet boilers in individual buildings. A big effort is devoted to solar thermal panels, but due to limited contribution of solar collectors during the heating period the overall contribution to cover the thermal energy demand will remain small. The municipality is using various planning tools: For long-term energy planning, an Excel-based “sce-

nario model” was used, tailored to the existing demand and supply structure in Freiburg of 2005. Using known energy saving potentials for sector specific technical conservation measures and local supply potentials for renewables, and considering long-term municipal development plans, a consistent “climate change action scenario” until 2030 was defined in communication between the municipality, housing companies and local utilities which resulted in realistic combination of measures and time frames and corresponding targets. These targets were confirmed by the City Council. To derive concrete measures and investment plans on neighborhood level, supply alternatives have to be defined and compared. For local district heating projects using cogeneration or biomass, the simulation model “BHKW-Plan” has been used to analyze energy balances and economic results. In case of solar thermal projects, the planning package “T-Sol” is frequently used. The most relevant policies for the implementation of the described measures in the field of regulations are the self-commitment of the municipality for its own public buildings in terms of energy conservation and use of renewable energies as well as the prescription of low-carbon energy standards for new buildings.¹ Important financial incentives are the municipal program for private home owners to support retrofit measures in residential buildings and the installation of a revolving contracting fund for economic energy investments.

3D-Model of the Retrofitting area in Freiburg Weingarten-West



Source: <http://www.ise.fraunhofer.de/de/geschaeftsfelder/systemintegration-und-netze-strom-waerme-gas/themen/smart-energy-cities/projekte/abgeschlossene-projekte/weingarten-2000-2013-modellhafte-stadtquartierssanierung-freiburg-weingarten>

As part of the strategy, a neighborhood project Weingarten West is being implemented with the goal of a 30% reduction of primary energy consumption. This is an energy-oriented refurbishment of a Freiburg city district including the district heating. The passive-house-standard refurbishment is to be demonstrated with the example of a 16-storey high-rise building. One key objective is stronger networking of the parties involved: building society, energy supplier and tenants.

References

International Energy Agency (IEA). 2011. Energy Conservation in Buildings and Community Systems Programme, Annex 51: Energy Efficient Communities - Case Studies and Strategic Guidance for Urban Decision Makers, Subtask A ; Edited by A. Koch, J-C. Kerstin, European Institute for Energy Research – EIFER, Karlsruhe. http://www.annex51.org/media/content/files/casestudies/subtaskA/SubA_report_120405.pdf

¹ These buildings are constructed on estates sold by the municipality (using private contracts).

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Credentials

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