



HAFENCITY AS ECOLOGICALLY SUSTAINABLE CITY

The HafenCity "Brownfield" Development



Located in direct proximity of Binnenalster lake, town hall and main railway station, HafenCity will be a natural expansion of the city centre towards the south. (Photo: Fotofrizz)

HafenCity has the opportunity to become a shining example of sustainability: It is a redevelopment area (internationally termed "brownfield site") with a finely tuned mix of uses, a high building density and excellent transport links courtesy of the U4 underground line. This sustainability is economic, social and cultural, but above all, ecological.

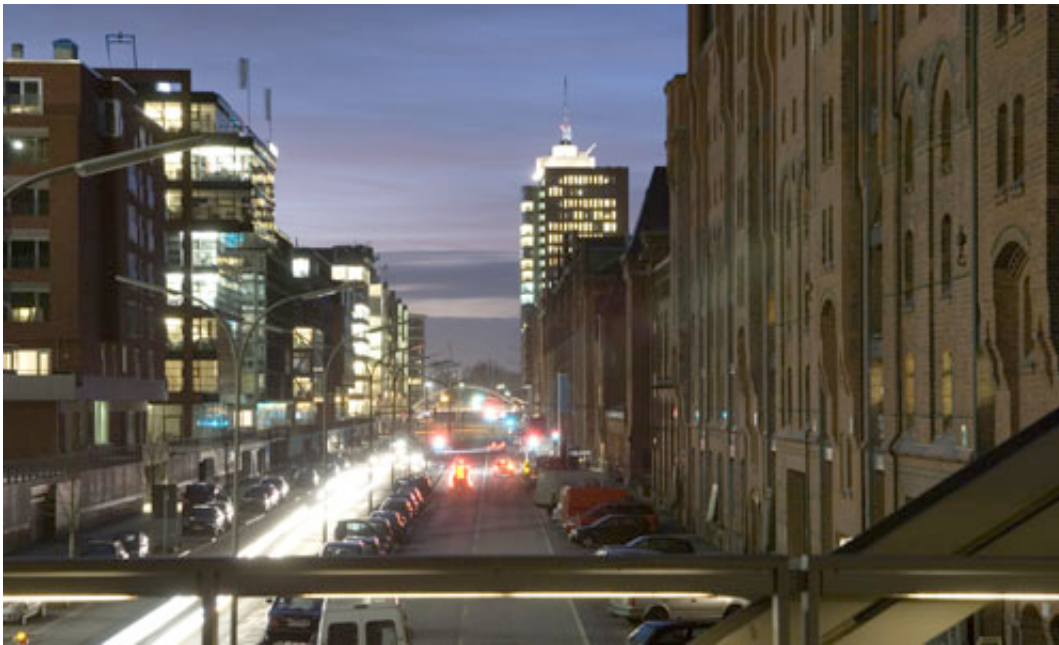
The HafenCity "Brownfield" Development

HafenCity is a model example of ecologically sustainable city development through the reuse of former industrial sites and the development of a sustainable city structure with high quality and intensive use of land.

The HafenCity development is fundamentally ecologically sustainable because it is made up from the redevelopment of former industrial sites rather than – as was the case for large scale projects up until the 1980s – from expansion outwards (greenfield development). In the 1990s, predominately derelict, former dockland sites were redeveloped for inner city uses. That immediately improved the ecological quality of the sites. HafenCity will include many open spaces offering quality leisure and relaxation opportunities (promenades, squares and parks covering an area of approximately 22 hectares), significantly reducing the extent of land surface sealing, despite the intense volume of built-up areas.

Urban Layout and Transport System

HafenCity Hamburg, a 21st Century city, is laid out in such a way that the building density and the openness over the water areas create a modern urban synthesis. Its architectural design model differentiates HafenCity from the traditional 19th century urban style while a similarly high density is achieved with a smaller, more compact but less all-consuming block structure. This allows for an urban continuity right onto the waterfront and the inclusion of large open spaces.



HafenCity and Speicherstadt: dramatic architectural dialogue resulting from a time difference of 120 years. (Photo: ELBE&FLUT)

HafenCity will be a fully integrated part of the city centre: the new U4 underground railway line, along with the existing connections to the north and west on lines U1 and U3, will give HafenCity, and its estimated 40,000 daily commuters, a local public transport infrastructure comparable with any other city centre. The land surface space required will be smaller than expected, thanks to the decision to build an underground line. This will not only improve the quality of the existing ground space, but also avoid any consequent noise pollution issues.

The proportion of private motor vehicles to total traffic should be significantly reduced with the inception of the "2025 Traffic Model": the high density of construction, the high standard of the footpaths and cycle ways (either already completed or planned), and the increased efficiency of the public transport system (underground railway).

From an ecological point of view, it is particularly desirable if a large proportion of daily journeys can be taken using so-called "local mobility" (on foot / by bicycle). A comprehensive network of cycle ways and footpaths criss-crosses HafenCity. Compared to a late 19th / early 20th Century city quarter, like Elmsbüttel, HafenCity blocks are smaller and there are significantly more footpaths and cycle ways in relation to the length of the road network (9:5 instead of 6:5). The choices available to pedestrians of using attractive pathways in and around HafenCity are numerous and therefore the incentive to find more energy-efficient routes into HafenCity or between HafenCity, Speicherstadt and the City Centre have led to a number of new households in HafenCity getting rid of their second car.

Selection of technologies and the local supply of heating energy

Particularly because of the centralised residential areas, the high-quality public transport access to HafenCity and the mix of usage, the number of private car journeys taken by HafenCity households is expected to decrease. Journeys to work will become ever more energy-efficient.

Full ecological sustainability for short journeys in HafenCity, as well as an efficient range of transport options, can only be achieved and maintained if all possible city-centre requirements for pedestrians, or at the very least for cyclists, are fulfilled. In addition, this will require the completion of the U4 underground line and a comprehensive care and leisure infrastructure within Überseequartier.

Within the retail sector, the energy efficiency of HafenCity will be greatly improved by the decision not to build an indoor shopping mall. This increased efficiency will be concentrated primarily in Überseequartier, which includes approximately 55,000m² of retail gross floor space (not sales floor space) There, the efficiency of floor space (useable floor space / gross floor space) for individual retailers will be approximately 80%, as opposed to an indoor shopping mall, where it will be approximately 55-65%. The additional energy needs of the reduction in floor space efficiency would be considerable. The elimination of a mall from HafenCity's masterplan has meant that the open rather than indoor shopping area will increase overall efficiencies (heating, air conditioning and electrical power savings) over the life expectancy of the buildings (80 – 100 years) while offering the same sales-floor space.

Heating Energy Supply

Local heating energy supply systems increase eco-efficiency. As early as 2002, in line with a Pan-European call for tenders in accordance with VOL and EU supply coordination directives, HafenCity Hamburg GmbH (previously GHS – Hamburg Port Area Development Corporation) initiated a utility price competition. It had also specified a maximum emissions level for CO₂ of 200 kg per MWh in new domestic heating systems when completed buildings are handed over to the customer.



Solarthermic constructions on top of a building. (Photo: ELBE&FLUT)

The basic objective for the heating energy supply in a technologically open process is to achieve a mix of district heating and heat generated by decentralised heating plants within HafenCity (cogeneration units, fuel cells, and 1,800 m² of solar panels on residential buildings to provide hot water). The maximum permissible CO₂ level for the heat supply of western HafenCity is in line with internationally agreed climate control targets and will be reviewed annually by industry expert audits. The ultimate goal will be to achieve a level of 175 kg/MWh.

This selection of technologies and the local supply of heating energy will deliver a reduction of approximately 27% over a building-by-building approach using natural gas. The reductions in emissions are greater still in comparison to burning other fossil fuels (oil or coal).

As part of the centralised heat supply in western HafenCity, a high temperature fuel cell unit has been built as a pilot plant, supplying approximately 200 homes and offices with heating and power. These new technologies have not only led to substantially lower emissions, but have simultaneously increased efficiencies. In the future it will be compulsory for at least 30% of the residential hot water supply to come from renewable sources. Solar panels will be fitted on the roofs of residential buildings.

Sustainable Construction

The issue of ecological construction has been high on the agenda for HafenCity Hamburg since 2004. Having set ecological targets since their inception, the buildings in HafenCity will be acknowledged as environmentally significant and award winning. Investors can certify the sustainability of their buildings using recognised measures and use this as a marketing tool. The indicators cover building insulation, air conditioning/heating/ventilation, hot water provision and lighting, as well as energy management and automation covering the building. Introducing these environmental markers has provided HafenCity Hamburg GmbH with a wealth of site-specific information which should help give it the edge over the competition.

Noise Protection

Hamburg's city centre and port area converge at HafenCity. Protective measures are required to ensure that night time noise from manufacturing and container handling in the harbour area won't disturb future residents of HafenCity. In particular, noise imissions from the industrial sectors neighbouring HafenCity must not be allowed to increase. This is stipulated by a port planning regulation.



A modern window construction. (Photo: ELBE&FLUT)

Specific noise protection assurances were set out in the HafenCity's building plans, specifying a maximum night time level of 30 dB(A) inside bedrooms, even with the windows slightly open. Special sound-proofed windows have been developed for this purpose.

Within the specified boundaries, developers have got plenty of scope in their choice of noise-reducing installations. The fitting dual skin façades will not be mandatory. This integrated approach will ensure good relations between residential use and port operations.

Conclusion

Despite achieving sustainability in the construction requirements for HafenCity and allowing for improvements through specific legal and technical measures, the definitive sustainable potential of HafenCity hasn't yet been fulfilled. A heat supply for eastern HafenCity with even lower CO₂ emissions is currently being carried out; a minimum of KfW-60 should become a building standard, and ecological sustainability will be encouraged further in the planning of buildings.

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