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Architecture of LOW ENERGY Consumption

Phoenix

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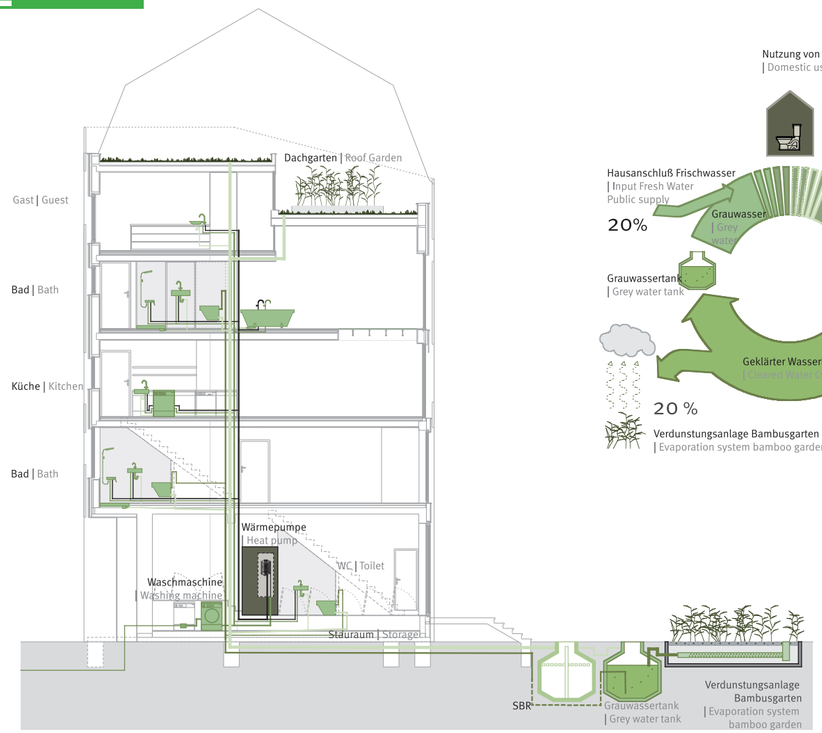
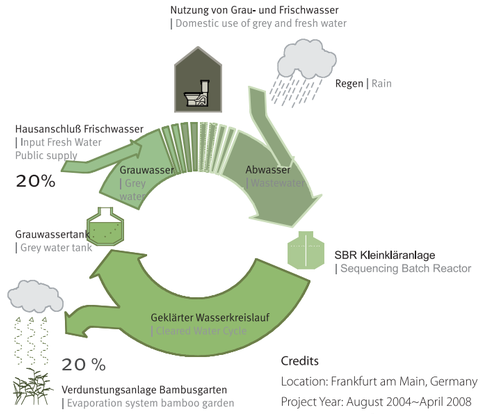
By Ifengspace Shanghai

Phoenix





Credits

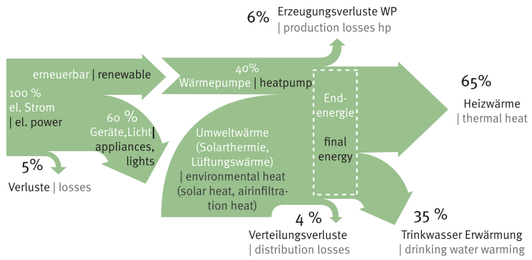
Location: Frankfurt am Main, Germany
Project Year: August 2004~April 2008
Floor Area: 220 m²
Project Type: Residential
DGJ Architects Team: Hans Drexler, Eva Zellmann

Awards

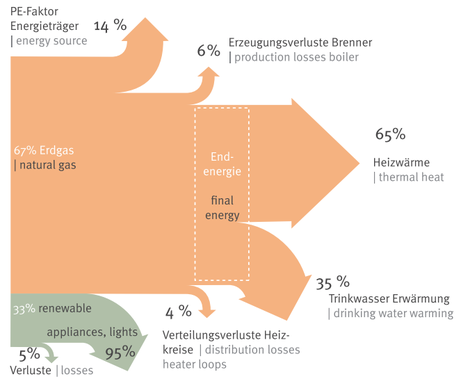
Distinction Exemplary Buildings Land Hessen 2008—Architects' Chamber;
Special Distinction 2008—Ministry of Building Hessen;
Timber Building Award Hessen 2008—Honorable Mention;
Green Building Frankfurt 2009—City of Frankfurt;
National Winner Energy Efficient Buildings Award 2009—German Energy Agency (DENA) and Federal Ministry of Building and Urbanism

Flow of energy

Minihouse



Riedberg house

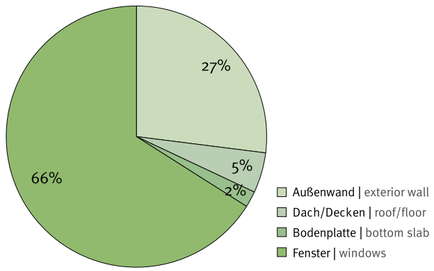


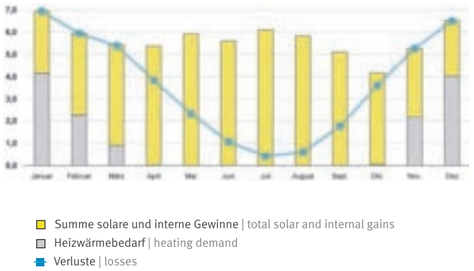
Minihouse

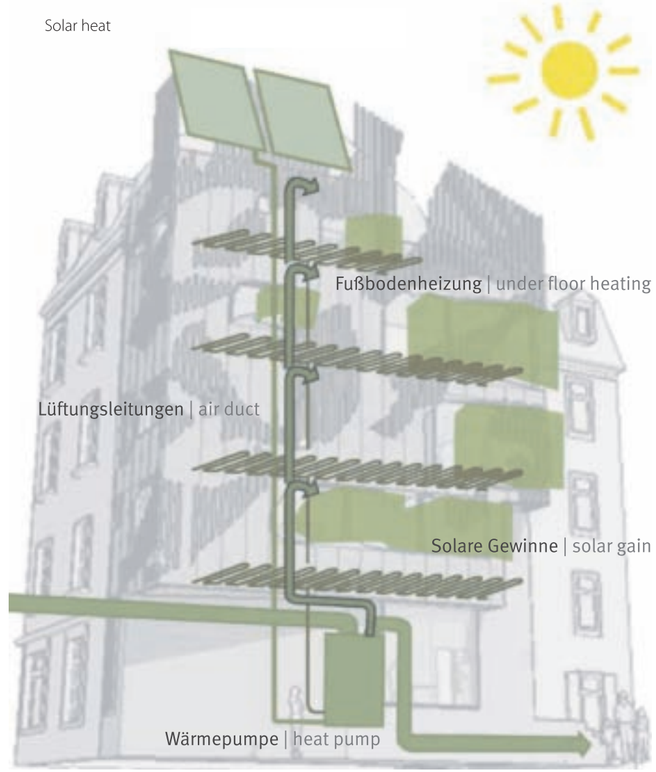
| DGJ Drexler Guinand Jauslin Architects |

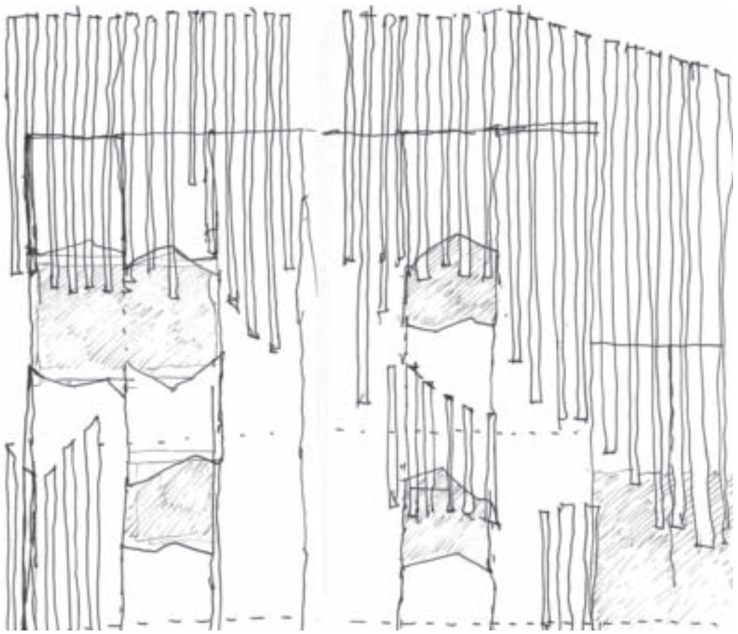
The Minimum Impact House, completed in Frankfurt am Main in 2008, is a sustainable solution for low cost living in city centers—a prototype typology with a minimal footprint on a leftover urban space.
The Minihouse is minimal in two ways. It fits a 150m² house on a 29m² parcel and it has a minimal impact on the environment.
The Minihouse is not a common urban house—many people stop by when they see it for the first time: its timber clad facade cantilevers out over the sidewalk. It seems to be loved more by the public than by architects.
The designer found out that in conventional construction the running uses about 50% of the primary energy, the rest is divided into the modules fabrication and mobility. The total energy use of the prototype is 63% lower than the compared conventional new building under existing rules. The climate-change effect (in kg CO_2 equivalent) could be reduced by 68% per housing unit.
The Minihouse is about responsibility; together with the building process designers fully monitored all energy-use and $C0_2$-output effects of the building, not only concerning construction and operation but also demolition, and the mobility and infrastructure and the land used by its inhabitants.
Because of the small plot, the overall cost of the project was roughly equal to the suburban house with the same floor area. The increased cost for the development and construction of the prototype was compensated for by the reduction of the annual running costs of the house itself. The design of the facade and the integration of highly-efficient technology reduce the energy-consumption to the passive-house level of 15kWh/sqm · yr with a calculated value of 13,9kWh/sqm · yr at the Minihouse.
On such a small spot, the organization of the different functions in the house had to be vertical instead of horizontal, and it appears to be a lot bigger inside than its size suggests from the outside.
The main aspects of technical solutions in design are heat recovery ventilation systems, air-tightness, joint design, avoiding thermal bridges and using reliable insulation and resistance values (u-values). The designers relied on best practice solutions but were especially interested in using CO_2 absorbing materials like wood or other natural fibers to reach a positive effect in the life cycle CO_2 balance. Paradoxically many of these natural and composite products are not suitable for standardized passive house certificates.
Even though it uses traditional techniques and materials, the Minihouse at Walter-Kolb-Strasse in Frankfurt is a built peculiarity. And in being so, it is not transferable. But one can transfer its technical and conceptual strategies, its architecture. Architecture is not a question of building but of thinking.
So, what matters in this project is not only the sustainability of the construction but above all the sustainability of the theoretical approach of its design. The result of a sustainable design is the point of departure to new projects: building changes thinking—as thinking changes building.

WINDOWS | PASSIVE SOLAR GAINS

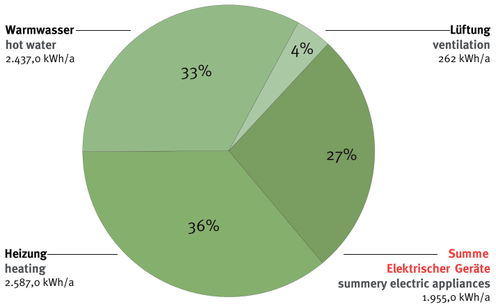


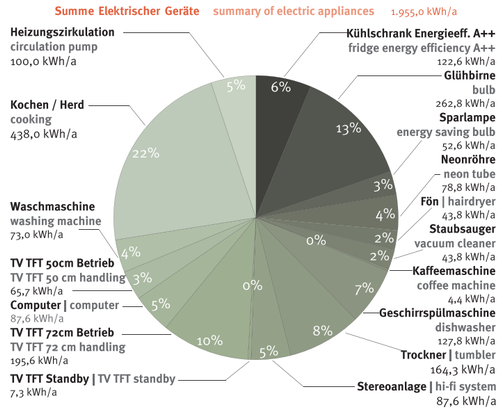






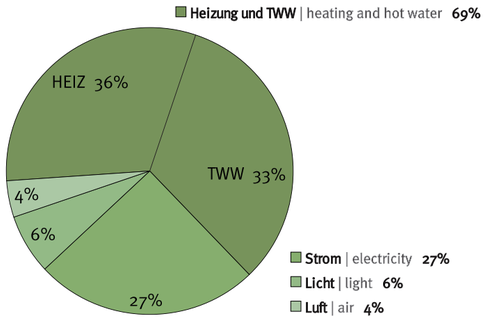
ELECTRIC APPLIANCES



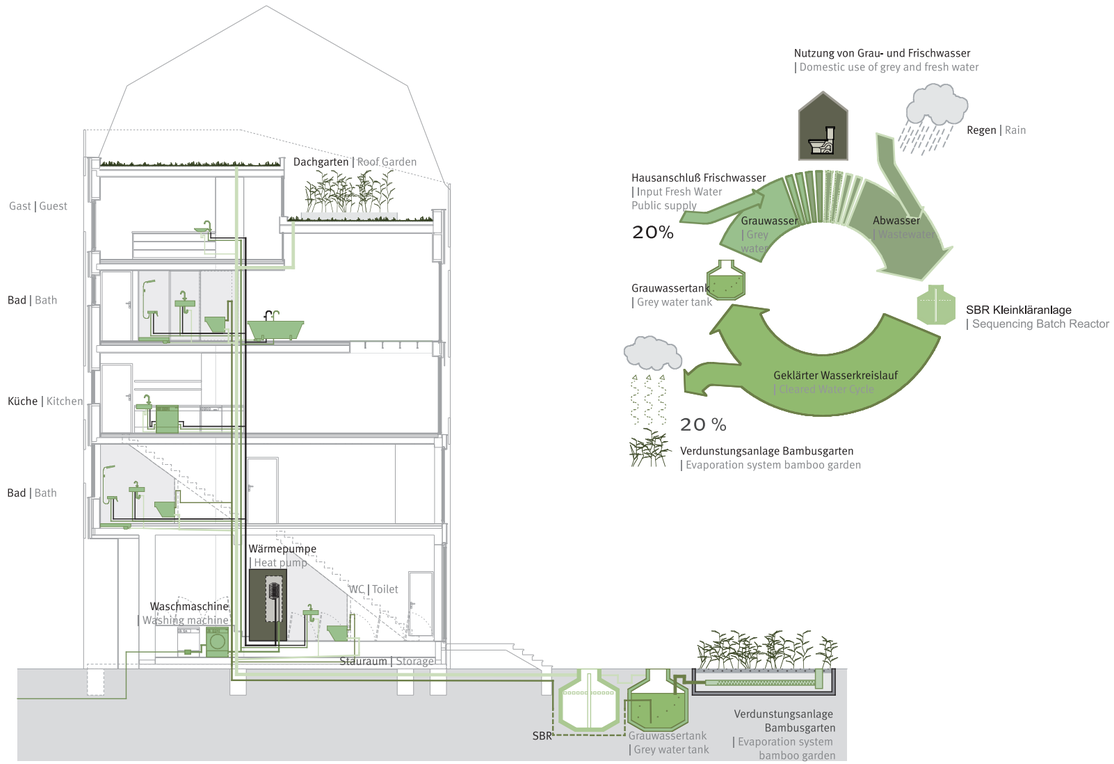


OPERATION

Energiethemen energy topics	Energiebedarf reduzieren reduce energy demand	Energieversorgung optimieren optimize energy supply
Wärme heat	Wärme erhalten gain heat	Wärme effizient gewinnen gain heat efficiently
Kälte cooling energy	Überhitzung vermeiden avoid overheating	Wärme effizient abführen conduct heat efficiently
Strom electricity	Strom effizient nutzen use electricity efficiently	Strom dezentral gewinnen gain electricity locally
Licht light	Tageslicht nutzen use daylight	Kunstlicht optimieren optimize artificial light
Luft Air	Natürlich belüften aerate naturally	Effizient maschinell lüften efficiently machined venting



RESOURCE RECYCLING



During the demolition, construction and operation of buildings, a variety of resources can be recycled, including timber, earth, rainwater, grey water, etc. Resource recycling can avoid excess consumption load and promote energy conservation.