

Rolf Disch

Solar Architecture



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With the global problem of climate change becoming an imminent threat and fossil fuels running out to the point of complete exhaustion, the future not only of architecture, but of civilisation lies in sustainable and solar design.

Ever since the early 1970es, Rolf Disch has shown a strong commitment to environmental issues. Starting with individual family homes and communal projects, it was the movement against nuclear power plants which made him think of alternatives. Today, he is famous for his concept of plus-energy houses that produce more energy than they consume. Disch is a visionary pragmatist. The vision is to make solar energy the engine of society. For the pragmatic achievement of this aim, the architect and his office have come up with innovative and affordable solutions. Solutions that can be adapted world-wide.

Let us introduce you to three of Disch's major projects – three milestones in solar architecture: The Heliotrope is an experimental and immensely energy efficient building that turns with the course of the sun. With the Solar Settlement (Solarsiedlung), Disch managed to design a complete housing estate at a unique sustainability standard: affordable solar architecture for everyone. With the Sun Ship (Sonnenschiff), he transfers the technologies of producing and saving energy to the larger scale of a five storey commercial and office building.



Solar architecture is not about fashion - it is about survival.

Lord Norman Foster

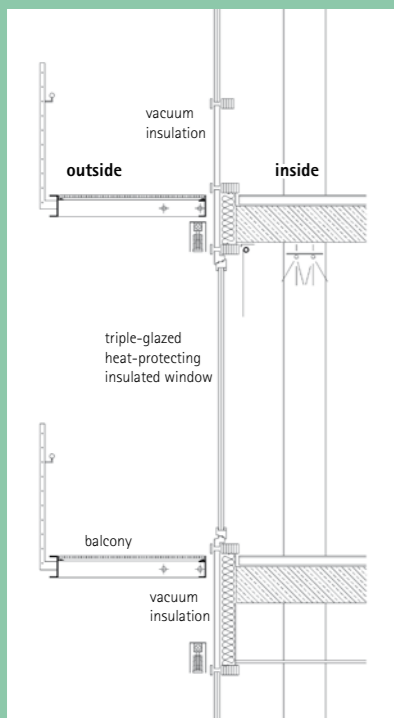


Every building a solar power station! To arrive at a positive energy balance, a house must make the best possible – passive and active – use of the only variant of energy that is delivered for free everyday and everywhere: the energy of the sun.

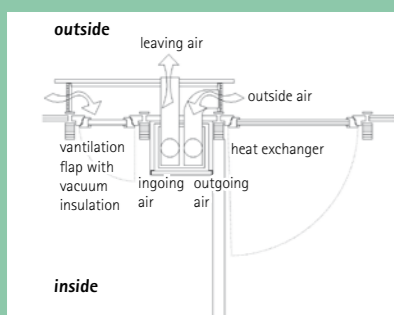
The south-facing roofs of plus-energy houses are paved in photovoltaic tile, they consist of pv panels, while the southern front is made almost completely of triple-glazed, vacuum insulated windows. The canopy form of the roof guards off the sun rays in summer and allows them to get in deep into the rooms in winter, while inward infrared reflecting windows keep the warmth inside.

This effect is increased by insulation technology and a ventilation system with heat exchange. The inside climate is regulated by means of the activation of the building masses as a thermal accumulator, together with the use of Phase Changing Material (PCM) which changes from solid to liquid at exactly the temperature you want inside. Additional heat is thus absorbed in the PCM coated walls. In the cooling process during the night, the reverse process sets the energy free again when you need it.

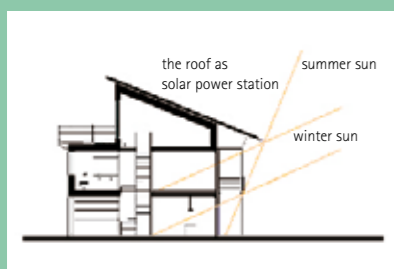
Producing a maximum of solar energy with your own roof, and reducing energy consumption to a minimum, this combination makes Rolf Disch's houses net energy producers.



longitudinal section of the façade



cross section of the ventilation system



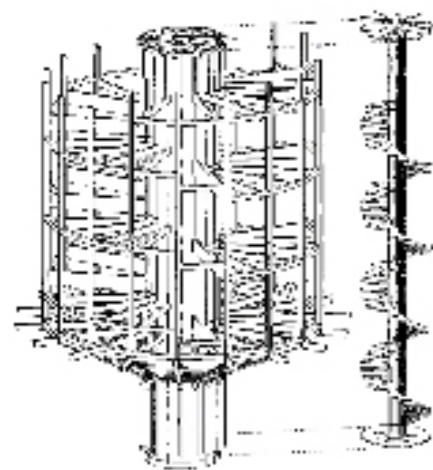
the roof as solar power station



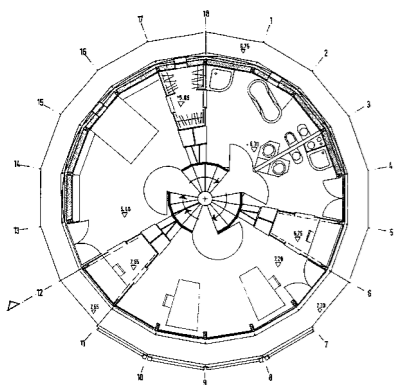
With his plus-energy houses, Rolf Disch blazes the trail for a new solar age.

Hermann Scheer, Member of Parliament, Winner of the Alternative Nobel Prize

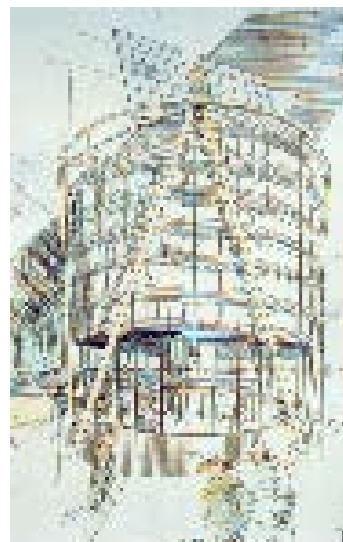




Heliotrope Construction



Groundplan



Heliotrope Hotel

In Freiburg, in the sunny south-west of Germany, at the foot of the Black Forest, Rolf Disch has built his private residence, the Heliotrope. At the edge of a vineyard slope, the visitor will all of a sudden face a spectacular, futuristic building. It is indeed a building for the future, a unique and striking structure, a pioneering work for a new solar age.

Heliotropic plants have leaves or flowers that follow the sun's rays in its course, and this is exactly what the house does: The cylindrical, three storey corpus spins round a column on a pedestal, either facing the sun with its triple-glazed front and collecting its warmth in winter, or blocking it off by turning its insulated rear in summer.

The "solar sail" on the roof is a huge photovoltaic construction that rotates independently. It produces more than five times the electric power needed by its inhabitants. In addition, hot water comes from solar-thermal tubes which snake around the house and which also serve as balcony railings. On top of that, the house is equipped with a geo-thermal heat exchanger.

The Freiburg prototype of 1994 can be adapted to many purposes and sizes. It has, for example, been built as an exquisite company show room, and a large Heliotrope hotel has also been planned by Disch and his team.



Heliotrope is, in a sense, a temple - a place for the worship of both ancient sunlight and groundbreaking design.

Azure, May 2007





Ten years later, in 2004, the futuristic and vanguard design of the Heliotrope had been both refined and adapted to something more familiar, but in no way less advanced: The Solar Settlement is, in a sense, a mere residential housing estate. Yet, it is the first housing estate world-wide to achieve, every single house, a positive energy balance.

Five rows of 50 two to three storey terraced houses (plus nine penthouses on the roof of the Sun Ship) add up to 7,850 square metres of living space. Each house has the typical large, dark blue photovoltaic roof, balcony and garden. The principal building material is wood – from regional forests, and non-contaminated by chemicals. The Berlin artist Erich Wiesner has contributed the colour concept to the outward design: Each unit has been painted according to the wishes of the owners who could choose from a range of bright primary blues and reds, aqua greens and earthy yellows. There are no cars allowed on the 11,000 square metres of residential premises, but there is parking space outside and a well organized car sharing system.

The Solar Settlement provides bright, healthy and environment-friendly plus-energy homes for 60 families at a reasonable price. These 60 families will remain independent from rising costs of gas and oil: They earn money by selling their photovoltaic surplus instead.



Disch is doubtlessly the most renowned solar pioneer in Germany.

DIE ZEIT, December 1994





The Sun Ship screens off the Solar Settlement from the main street in the west. Five storeys high, it extends over a length of 125 metres. The colourful covers of the ventilation elements add a playful touch to the massive, yet elegant vertical and horizontal structuring. The overall dynamic idea is that of a huge ship – on its way into a solar future. The Sun Ship takes care of a number of functions for a catchment area of some 25,000 people. There are (ecological) supermarkets and a café-bar on street level, and offices of diverse sizes above, with 5,500 square metres of commercial and business space altogether. On the top of the building, plus-energy penthouses are situated in a beautiful roof garden landscape, with a splendid view over the Black Forest and the Rhine valley, and, again, with their characteristic photovoltaic panel roofs sloping southwards.

Solar architecture has comparatively rarely been used in multifunctional commercial buildings. The Sun Ship proves that strict sustainability standards and fully regenerative energy supply work perfectly well for a spacious and compact concrete, steel and glass construction. Rolf Disch has managed to prove that function and form, ecology and economy can be happily together in buildings to serve almost any purpose. Sun Ship and Solar Settlement, partially financed by a series of successful Solar Real Estate Funds, prove that there can be a double profit: for the investors and the environment.



Close to Hermann Hertzberger, Auer & Weber, and Otto Steidle in its style and concept, Disch's architecture is avantgarde in ecological terms. It is not ideology, but reasonable realism at a reasonable price.

Falk Jäger, Baumeister, 12 / 2006

