Planned integration into a landscape still to be designed

NATURE IS WHERE IT ALL STARTS

building in harmony with nature, for the future

CONTENT

Contact
Architekturbüro Rödel
Architektur I Urbanismus

Dr phil. Harry Rödel
Ph.D., MA.Arch (Hon), MA.ArtHist (Hon),
MA.Carpenter, GradDipH.EDU, UrbDev
Reg.Member: UNESCO, BBK, VKKS, SIA

Altismattstrasse 6 | 4562 Biberist | Switzerland
+41 79 8511 028 | info@tua.earth | www.tua.earth

Bank account details
Postfinance: IBAN CH9109000000319520485

INTRODUCTION

Dear Ladies and Gentleman,

My name is Dr. Harry Rödel; I studied Architecture (SIA) and Urban Studies; as well as undertaking my Master in Construction and furniture Joiner. For 25 years, I have mainly been working with the building materials wood and clay, and alongside other materials, these make up the components of my teaching at various universities. As co-founder of an Environment Rating System (5 Green Star Rating Tool www. Nzgbc. org.nz/greenstar and www.gbca.org.au); the environment and sustainability are close to my heart.

With this project, my wife and I have planned to build a house, that is for the most part, is built out of natural materials. Our goal is to collect measurements and data from the diverse building materials, as these are not yet documented in clay buildings. We would like to go one step further with our building project, and alongside wood and clay, we would like to work with Electro-smog and Grey Energy. During the building-works, mistakes will happen, or building materials will not interact with each other as planned; these instances must be named and documented so that other professionals in the construction industry can incorporate this data into their projects.

We are using all our recourses for a conscious environment, though as the scientific researcher myself, I am aware that all prototypes and measurement methods are processed and financed over several years. For this reason, we would be delighted when you would support us as a sponsor. One of our goals is to advertise this project through various print and television media, so that this project can have as big an impact as possible, and you as a sponsor can profit from it too.

BACKGROUND OF THE RESEARCH PROJECT

As an architect, urbanist, carpenter coming from disaster management, I am very concerned with the philosophy and the effect of water. With the realization of a „Lehmholzhaus (Clay-Wood-House)“ we want to create a real use for society. It´s not enough for us to focus on a healthy environment for the next generations, we want to be active as well. **The concept is based on the focal points ecology, health, design, material, performance and wildlife.**

Building permit and energy certificate are available. This mud house shall be built to explore constantly newest, but also financially feasible possibilities. It should be understood as a model house, which gives other developers the possibility to learn how to build in harmony with the environment. To get real readings under load, the research object is inhabited all year round. **The idea is to create a possibility for experiments and measurements for you**. These measurements can endure over a short or long period (e.g., 2,3, or 5 years).

The basic idea is **the maintaining of the ecosystem** through a sustainable environmental protection. The environmentally friendly construction has several advantages: the two predominant materials clay and wood are also completely returnable to the natural cycle after the end of their use. Wood can be sufficiently available through sustainable afforestation. Thanks to the environmentally friendly materials and construction ability, this project has the ability to continue storing bound CO_2, instead of emitting further CO_2.

This will also be reflected positively in the grey energy balance. With this construction technique more than 40 tons of CO_2 can be reduced, which is the average dioxide emissions of a mid-range vehicle over 20 years at 10,000 km of annual mileage.

BUILDING HEALTHY AND SUSTAINABLE FROM THE BEGINNING

Planning phase

A building biology property analysis is showing various fields of action right from the beginning, which are then taken into account by the design. Furthermore, **building biologists and health experts** are already actively involved in the planning phase. Thanks to the holistic approach, measures can already be taken which counteract environmental factors such as electrical and magnetic alternating fields, electromagnetic waves and geological disturbances.

Buildings materials

- Steel girders and trials - the demagnetization of steel girders is eliminated by the use of wood. The required reinforcing iron is replaced by **basalt reinforcements.**

- Clay, wood and sheep‘s wool – the 45-centimetre-thick outer walls consist almost entirely of natural materials. This leads to a huge reduction of the annual energy consumption. In addition, the use of chemical protection agents in natural materials is eliminated.

- **100% PU foam free** – PU foams, mineral fiber insulation, PVC or laminate flooring, for example, are commonly used in the installation of windows and doors. The hardening process releases large amounts of isocyanates (esters) classified as having a „suspected carcinogenic effect“. Our health-conscious alternative is based on the use of „low-emission“ products such as loam, wood and wool.

- Thermal protection as a priority – double insulation guarantees one year-round **temperature basic value of 18 °C**. In addition, chemical-free **built-in triple-glazed wood-aluminium windows** ensure optimal thermal insulation.

- Disposal without waste - almost all materials used can be returned to the natural cycle.

- **Efficient climate protection** – the use of clay and wood offers long-term CO_2 reduction. From generation to disposal, wood has a climate-friendly CO_2 balance due to CO_2 storage, while for a brick wall with comparable properties, a high CO_2-Ausstoss accrues.

BUILDINGS MATERIALS

	Ziegel	Poren-beton	Kalksand-stein	Beton	Holz- & Holz-baustoffe	Lehm	Glas	Metalle
Natürliche Rohstoffe	+	+	+	–	+	+	+	+
Primärerenergieinhalt	–	–	–	–	+	+	–	–
Transportweg	+	+	+	+	+	+	–	–
CO_2-Ausstoss	–	–	–	–	+	+	–	–
Recyclingfähigkeit	–	+	+	–	+	+	+	+
Druckfestigkeit & Tragfestigkeit	+	+	+	+	+	–	–	+
Verarbeitung	+	+	–	–	+	+	–	–
Raumklima	+	+	+	+	+	+	–	–
Wärmedämmung	+	+	–	–	+	+	–	–
Schallschutz	+	–	+	+	–	+	–	–
Brandschutz	+	+	+	+	–	+	+	–
Feuchteschutz	+	–	+	+	–	+	–	–

Tabelle[1]

Grassing

Consistent roof greening promotes decentralized, ecological rainwater management. The delayed discharge relieves the disposal, provides an evaporation reserve and thus the return to the natural water cycle. It will be in a heavy rainfall of 27 l / m2 a discharge to the sewerage of 0.3 l / m2, compared to 27 l / m2 levy on the sealed ground. This promotes plants and a food supply for the animal world. At the same time, the green roof works against excessive warming in the surrounding area. The rainwater is cleaned and collected in tanks. The construction method with a total roof greening should further support native plants and serve as the food base for the resettling animals. The gable design with niches, doubling and false ceilings should offer an offer for native birds, bats and insects. This creates a protected resettlement (home) for many species.

- **Identification of health-damaging environmental factors already in the planning phase**
- **Health promotion thanks to consistently tested and certified use of natural materials**
- **Reduction of end-of-year consumption and long-term CO_2 reduction**
- **Contribution to the preservation of species protection**

1 Pfoh, Sandro, Franziska Grimm, and Patricia Schneider. „Leitfaden 01 Ökologische Kenndaten - Baustoffe Und Bauteile.“ In Projektplattform Energie des Bayerischen Bauindustrieverbandes e.V.,. München: deZentrum für Nachhaltiges Bauen, Technischen Universität München, 2016, S. 16.

2 Bemessungsgrundlage nach FLL: 300l (s x ha) in 15 min. = 27 l/m2 bei 2% Dachgefälle.

A 100%
HEALTHY HOME

Through the optimally complementary components of the architecture, hydro- and permaculture, water, sun and wind, an innovative home and ventilation technology has been developed that optimally utilizes all natural energy resources. This leads to low energy consumption and has proven CO_2-neutral. The intelligent and hygienic demand ventilation controls the room air and the room climate. The room air control measurement is part of the unique health concept. It may be assumed that there is a balanced indoor humidity of up to 50 % throughout the year. The moisture-compensating construction with radiant heat through the floor or wall heating underlines the activity of the construction. Diffusion-open walls provide the best possible protection against cold and heat and, with their moisture-regulating construction, create a pleasant feel-good climate in the rooms.

Electrosmog protection through the use of shielded cable guides, mains decouplers and wall construction, the harmful electro smog is contained. Constant measurements are intended to identify problem areas in order to find solutions.

Furthermore, the use of **solar thermal** energy and locally **produced wood-chip district heating should create a nuclear power-free zone**.

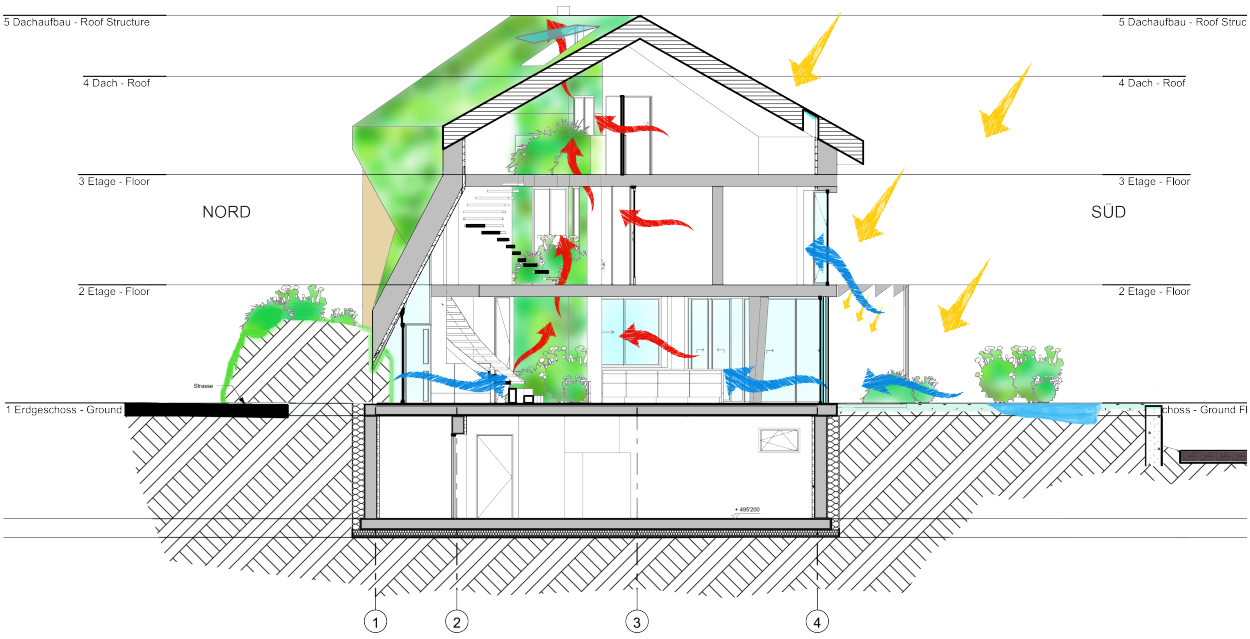
20 % of the world‘s population suffer from allergies and their symptoms, such as house dust, pollen, mites, milk protein, grasses, which are characterized by the itchy nose, rashes, red eyes or even dyspnea. Pollutants and chemicals in building substances promote allergies. This not only applies to building materials but also to auxiliaries such as adhesives, glues, waxes, oils, paints and glazes. **Pollutant reduction is the alpha and omega for an allergy-free living.** Even by a naturally constant humidity of up to 50 %, the symptoms can be reduced.

The summer and winter images show the heat and fresh air movements as well as the use of summer energy.

- **GLow energy consumption and proven CO2-neutral**
- **Balanced room humidity - Room to breathe deeply**
- **Allergy-free living thanks to natural materials and fair construction**
- **High-value security for home and environment due to resource-saving energy-efficient and sustainable environmental protection**

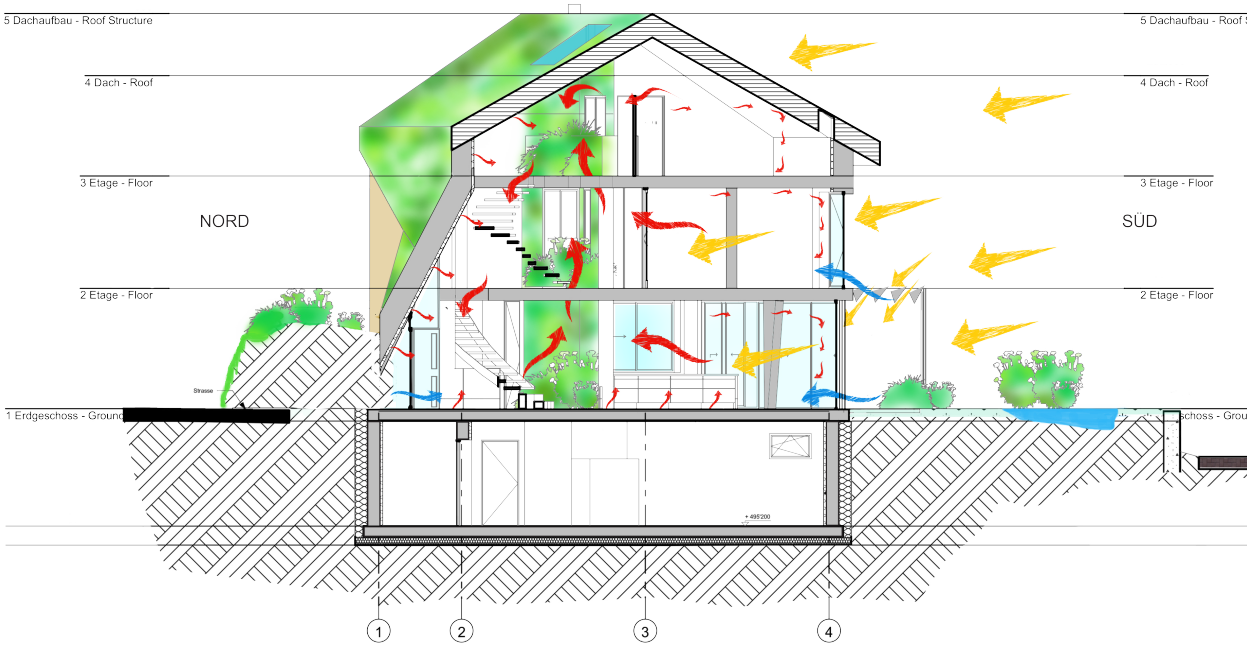
3 WHO. Management of Noncommunicable Diseases Department. Chronic Respiratory Diseases and Arthritis. „Prevention of Allergy and Allergic Asthma.“ Geneva: World Health Organization, 2003.
– Evans, Chris. „One in Two People Now Suffer with Allergies.“ Telegraph Media Group.

SUMMER



Ventilation / cooling and heat storage in the loam walls and floors

WINTER



Recirculation, heat discharges from clay storage walls and floors with direct benefits of deep and direct solar directing

Measurements

A permanent long-term controlling should provide long-term results:

- **The moisture content of building materials** – the processed natural materials are measured from time to time to gain further insights into their behaviour.

- **Heating and primary energy demand** – the measurements should show if it is possible with the construction method to achieve or even further reduce the heating demand EFH ≤ 70 kWh per m² of living space.

- **Effectively pollutant tested** – only pollutant tested and transparent to the end user products and product origin. Before using a building biology emission assessment, these materials were examined by in-house test chamber measurements.

- **Electrical alternating current potential** – free measurement of low-frequency, alternating electric fields (V / m), caused by an alternating voltage on lines (overhead lines of the distribution grid, high-voltage lines, roof overhead lines, etc.).

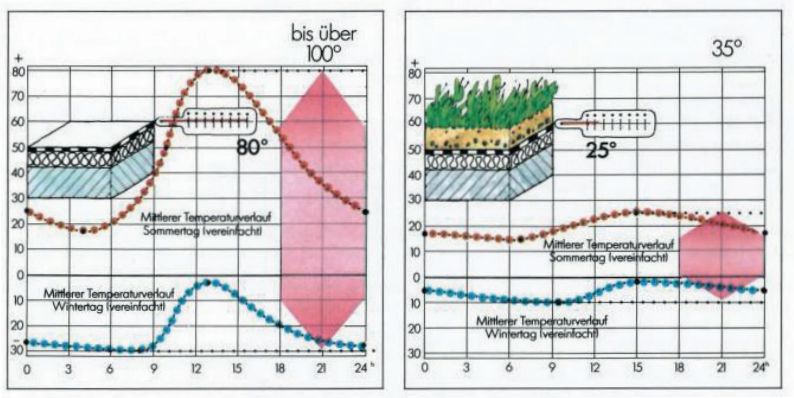
- **Alternating magnetic fields** – Measurement of low-frequency alternating magnetic fields (nT), caused by current-carrying electrical lines and by long-term recordings (local power supply, overhead lines, power lines, transformer stations, railways, etc.).

- **Electromagnetic waves** (radio frequency) – service-specific measurement of high-frequency, electromagnetic radiation by means of spectrum analysis (µW / m²) caused by transmitters (mobile telephones, cordless telephones, wireless networks, broadcasting, radar)

- **Geological disturbances** – measurement of magnetic field (nT) resp Radiation (IPS) of the Earth and its conspicuous disturbances (%) - (local disturbance zones such as geological faults, water activities)

- **Radon soil gas measurement** – Radon soil gas measurement at two measuring points using a special measuring lance down to a meter depth. The soil gas is fed into a measuring chamber in which an electronic radon monitor precisely determines the content of radon (kBq / m³). All measurements are made according to the „Standard of Building Biology Measurement Techniques“ (SBM 2015).

- **Temperature and Precipitation Measure-ment** – Measurements are made on the green roofs to determine temperature history and precipitation, and to compare with values from the immediate environment



Abbild [5]

Maximale Temperaturschwankungen auf Flachdächern, Differenzen beim Kiesdach bis 70 K im Jahresverlauf.

4 Loga, Tobias. „Die EnEv und das Niedrigenergiehaus. Beispielberechnungen für ein Einfamilienhaus.“ edited by INSTITUT WOHNEN UND UMWELT GmbH. Darmstadt, 2002.

5 Teichmann, Lisa. „Human-Bioklimatische Auswirkungen Von Urbanen Dachbegrünungen.“ Technischen Universität Berlin.

FOR FUTURE QUALITY OF LIFE – 100% ORGANIC AND HEALTHY

1. The extended solar house

The energy required for heating and hot water is covered in this construction way more than half of solar energy by solar systems. You generate electricity with a photovoltaic system - the surplus is saved by special battery technologies. Both measures should cover up to 80% of your energy needs. The thick clay walls and floors serve as energy storage. The remaining heat is generated, for example, by the wood chip district heating plant in the village.

2. The air conditioning

Through the architecture in symbiosis with the surrounding area a naturally functioning air conditioning system is to be built. The house is connected to a green atrium across all levels and spaces. In cooperation with the pond in front of the house and the sunlight (large windows), an ascending air conditioning system was designed. All rooms have the possibility of cross ventilation with the atrium.

3. The self-sufficiency with water

The water supply will become one of the greatest challenges for humanity in the future. As a result, we are examining in the research project to what extent it will be possible in the future to supply itself with water. The green roofs should be used to generate drinking water from rainwater. At the same time, we are thinking about how we want to regulate the disposal of service water in the future. Anyone can think in one dimension - we think multi-dimensionally and consistently networked!

4. The Grey-Energy - before and after the construction phase

One of the tasks is the preparation and extrapolation of the Grey-Energy from the building materials, during their production, transport and disposal. For this purpose, the life of div. Materials are included.

5. Future Idea - Power-to-Gas Technology (not yet planned)

The basic idea is to convert excess electricity into methane gas using a chemical process (water electrolysis). We have a gigantic natural gas infrastructure so it would be easy to store the synthetic gas there. The excess electricity would therefore be cached underground in the form of gas and, if necessary, reused in one‘s own four walls.

Every day we come a little closer to our vision - the dream of self-sufficient life. Our contribution to this: We work on the self-sufficient Clay-Wood-House, which not only makes you independent of the costs of energy providers but should also be financially feasible during construction. The development of

6 https://www.energie-experten.org/
http://www.ib-rauch.de/okbau/stoffwert/bssuche.html
http://www.oekobaudat.de/
http://www.oekobaudat.de/datenbank/browser-oekobaudat/daten/db1/100.1/End%20of%20Life/Generisch.html#bereich1

technical components and the ability to store energy is one of the steps into the future. Our further development of the mud house supplies electricity and heat. Different ways of complete independence should be tested in practice.

The results are available to the community for further development. It‘s natural that not everything works 100% right away. Even after 30 years of clay and timber construction in planning and practice, new ways have to be found again and again in emerging challenges. The purpose of this research project is also to discuss emerging shortcomings, so that they can be avoided in the future, thereby creating added value for society and science.

WORK WITH US!

We would like to invite you to share your ideas for this research project. It goes without saying that you install your devices for measurements anywhere and we also include this in the planning. The same applies to materials, procedures and financings that are to be tested. By agreement, the inhabitants can be used before moving in and then later as subjects. What we offer: We give all participants full access to all readings - no matter how they turn out (this is part of an honest science).

We will also create a website with the project and name companies and sponsors involved in the project. Furthermore, we will make every effort to ensure that this research project is also discussed in other media, TV, trade journals, etc. Since it is a mud house, we would also like to invite some school classes and students of architecture, civil engineers, building physicists, agricultural and environmental educators in due course.

Now a note on our own behalf: It goes without saying that we provide the research project for your ideas free of charge. However, research projects are always costly. Despite our invested capital and used man-power on-site, many measurements or sub-projects cannot be realized without the help of sponsors. So, if you want to build a crowdfunding platform or directly support the research project - be it with a smaller or larger amount - we are very happy and thank you very much

Dr. phil. Harry Rödel

NATURE BUILDS!