



AKTIVHAUS

BIOSPHERA 3.0 EQUILIBRIUM PROJECT



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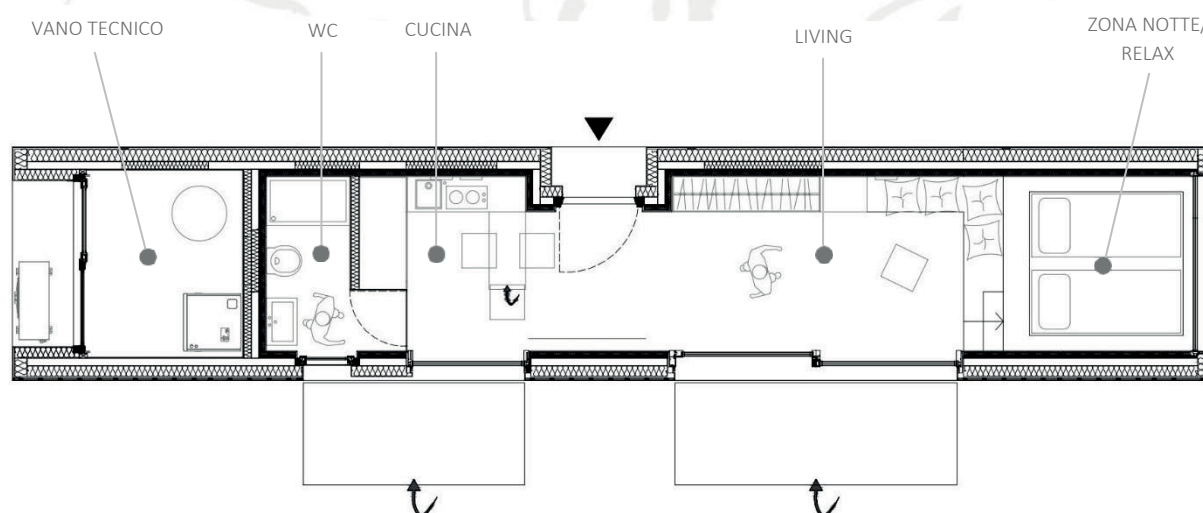


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Biosphera project is an itinerant and self-sustaining housing unit that can be transported by road. It is the unique itinerant housing unit in the World that integrates the Biophilic Design, an architectural design inspired to the biophilia with the aim to create a revitalizing environment in favour of the human health. (Some constructions built on this design are Apple, Google and Facebook's Campus or The Pentagon, USA) The housing unit is totally built with X-LAM wood (the inner net surface is 38 m² like a studio flat);



its main purpose is to evaluate the relationship between human physiology and the isolated casing (called third skin) that protects the housing unit according to the variation of the outdoor weather conditions (from -20 to +40°C).

This project will collect vital signs (skin temperature, heart rate, electrodermal activity) relating them to the unit casing that can reduce normal energy consumptions of 95% thanks to the static iper-insulation.

The third skin also guarantees homogeneous inner temperatures that can vary between 21°C (in the winter period) and 26 °C (in the summer period). Especially, it is able to preserve the proportions of radiative, evaporative cooler and convective exchange that our body detects like well-being/comfort or fulfilment of the human senses (thermal touch, mechanical touch) without the employment of traditional systems.

One of the main Biosphera's purposes is to test, in a preliminary phase, how this advanced casing can generate benefits to the human who is constantly connected to the surrounding environment that in turn is conditioned by the climate and the urban air pollution.

In addition to the physiological response, Biosphera monitors the energetic performances of the casing and the indoor and outdoor environmental quality to establish how many advantages can be produced by



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the ventilation and filtration systems on the respiratory apparatus; the acoustic comfort is reached through waterproofing techniques applied to the air passage (with acoustical bridge) and with iper-insulating glass windows and advanced sound-absorbent/insulating materials. The visual comfort is achieved through the natural and artificial light modulation according to the human activities and the olfactory well-being is guaranteed with the purification/filtration/recycling of the heating air and through the integration of perfumed essences that can stimulate or relax. Sensory apparatus comfort and, consequently, the maximization of electrochemical energy consumptions are the final purpose of the project. The experimentation involves several complementary sectors linked by the goal of making humans more efficient, increasing their concentration and recovery skills and reducing physical/emotional stress.

BIOSPHERA 3.0: A SCIENTIFIC RESEARCH AND ENVIRONMENTAL MONITORING PROJECT

Biosphera 3.0 is a project for the home of the future and for the human well-being. It's a "Zero Energy": aenergetically autonomous home, built according to human needs, adopting the best technologies available and capable of autonomously producing all the energy needed to live there. In order to put out a scientific , technological and environmental monitoring research, Biosphera 3.0 will be subjected for 24 months to the toughest stress tests (with external temperatures ranging from -10 ° C to + 35 ° C); data of more than 20 parameters relating to the building envelope and the human physiology of those who live there will be constantly monitored and collected. The researchers of the Aktivhaus team, of SUPSI, of the University of Turin, of the University of Valle d'Aosta and of the UniRoma2 will therefore check the data concerning the energy performances and the biophysical qualities both inside and outside the housing module , verifying the real well-being reached.

Thanks to the presence of a thermal imaging camera, a noise and vibration analyzer and some probes, it will be possible to collect the follwing physical data:

- the outdoor air temperature and the module external surfaces temperature;
- the indoor air temperature and the module internal surface temperatures;
- the indoor and outdoor quality of air (quantity of fine dust PM2.5 / PM10, concentration of CO2, concentration of CO, presence of ethanol and aldehydes - gas usually present in traditional houses);
- the presence and intensity of electromagnetic fields.
- The energy produced by the photovoltaic system
- The energy consumed by each individual user (heating, cooling, domestic hot water production, lighting, etc.)

Human "sensations" will instead be detected by latest-generation devices that will monitor vital signs (heart rate / heart rate, body temperature) and the emotional and psychophysical state of the users. Thanks to an on-demand connection and the constant transmission of the collected data, it will also be possible to follow the life inside the module directly from the social networks and from the dedicated website, verifying in real time the energy balance of the housing unit and the savings that Biosphera 3.0 technologies are able to guarantee.

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THE ROADSHOW

Biosphera 3.0 is a mobile home: the module will in fact be installed in different locations such as Milan, Locarno, Zurich, Rorshach, Airolo, Bolzano, San Romedio, Como, Mines, Bari, Rome, Florence, Verona, Catania in order to be tested in the most different environmental conditions and to verify the potential that technology offers today in terms of energy savings and well-being. For each tour stop, all the areas are chosen in order to easily allow the Biosphera 3.0 transport and a convenient connection of the module to the water and electricity supply sources, which is necessary to compensate for unforeseen events (safety factor).

The module is supported by 8 manual-moving mechanical pistons: therefore, where in the planned installation area will be placed steel plates (one for each piston) on which the pistons will insist, so as to guarantee an adequate distribution of the load and preserve the flooring below.



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SUSTAINABLE MOBILITY

Biosphera is able to produce energy for 8000 kilowatt hours / year, while to maintain the living standards in maximum comfort requires only 2000 kilowatt hours / year. It's an active building that produces four times more energy than needed. For this reason the remaining part of electricity is used to power an electric car, in order to guarantee an environmental and energetic sustainable mobility.

The electric car will follow the housing module in every stop and it will be securely connected to the electricity grid of the module in order to be recharged.

During the stops, it will be placed on a platform created specifically for the Biosphera event that act as an exhibitor for the vehicle itself.

THE LIVING EXPERIENCE

During the tour Biosphera 3.0 will be inhabited by people, which will be provided of a regulation containing rules about the module use and the right behavior of user, in order to ensure a correct experience respectful of the surrounding environment. The presence of large windows in the living room allows a continuous dialogue with the external environment: guests are therefore required to maintain a decent appearance throughout the day; in the sleeping area instead, since the window is located more than 2 m above the ground, visibility from the outside is precluded, guaranteeing an adequate level of privacy.

In any case, all the windows can be easily obscured in case of need using an external vertical sliding system. Inside the module are just allowed biodegradable, eco-detergent and eco-soap dishes, so that gray water can be conveyed into the municipal collection network (manholes). As for black water, the toilet in the module is chemical: the waste water is then removed manually and delivered to a special operator who will dispose of it.



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