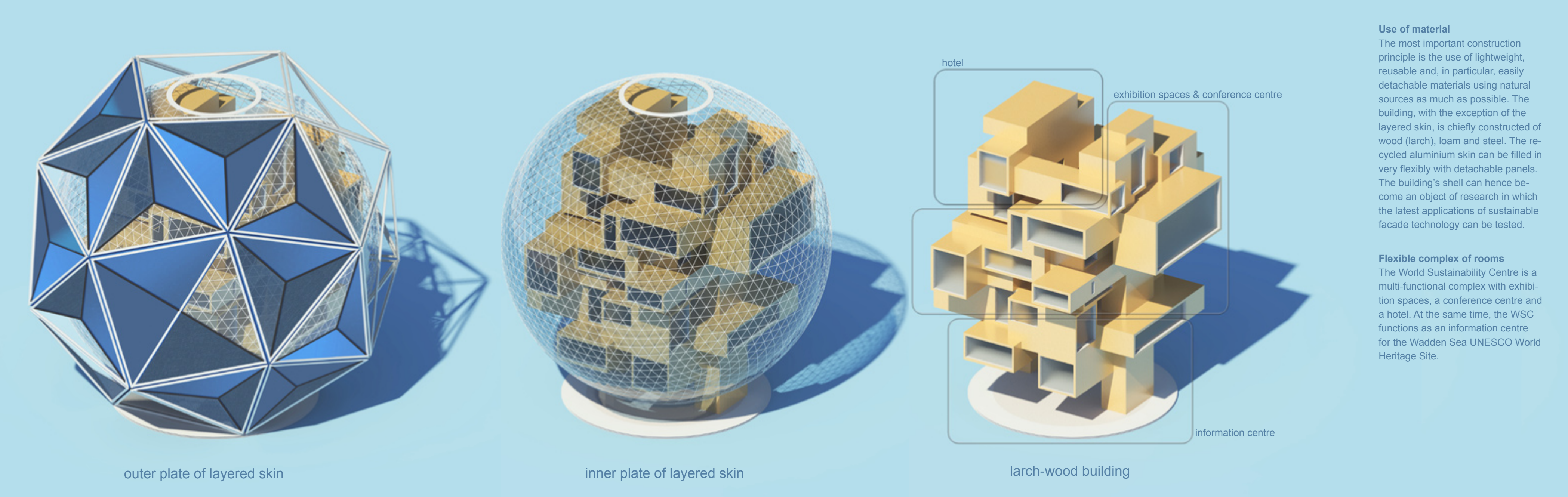
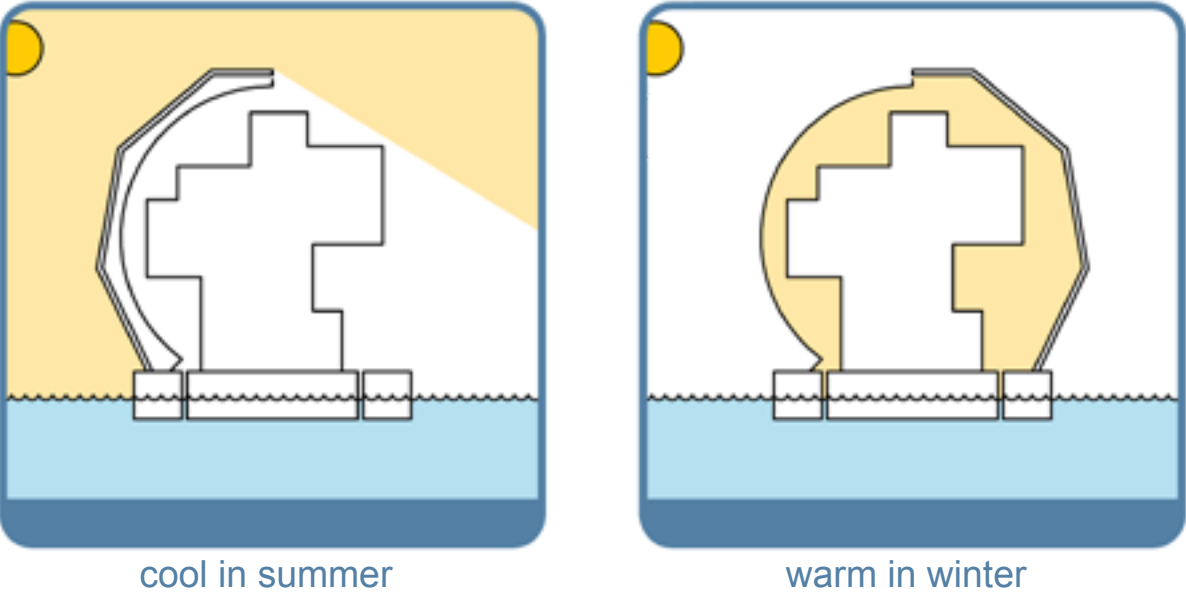


s-cube super sustainable transforming snub-cube

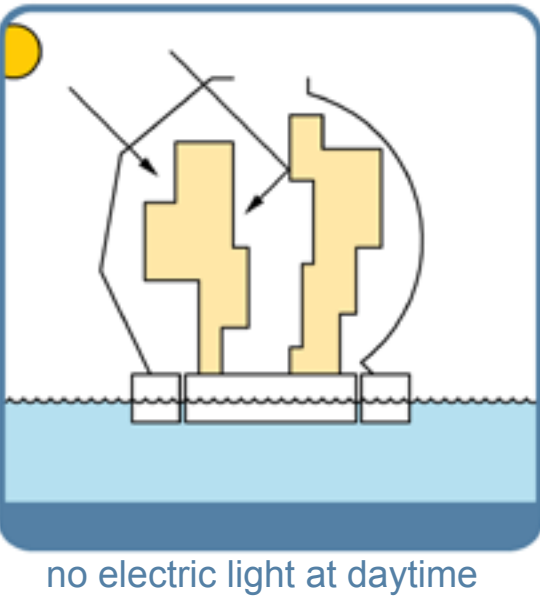
building & programme



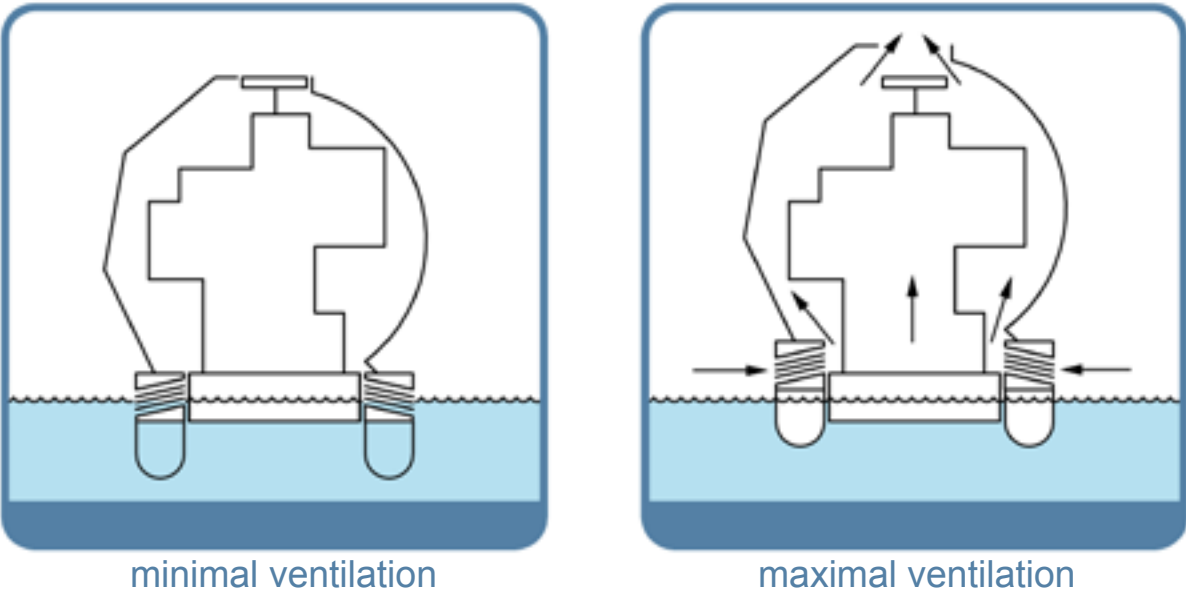
layered skin



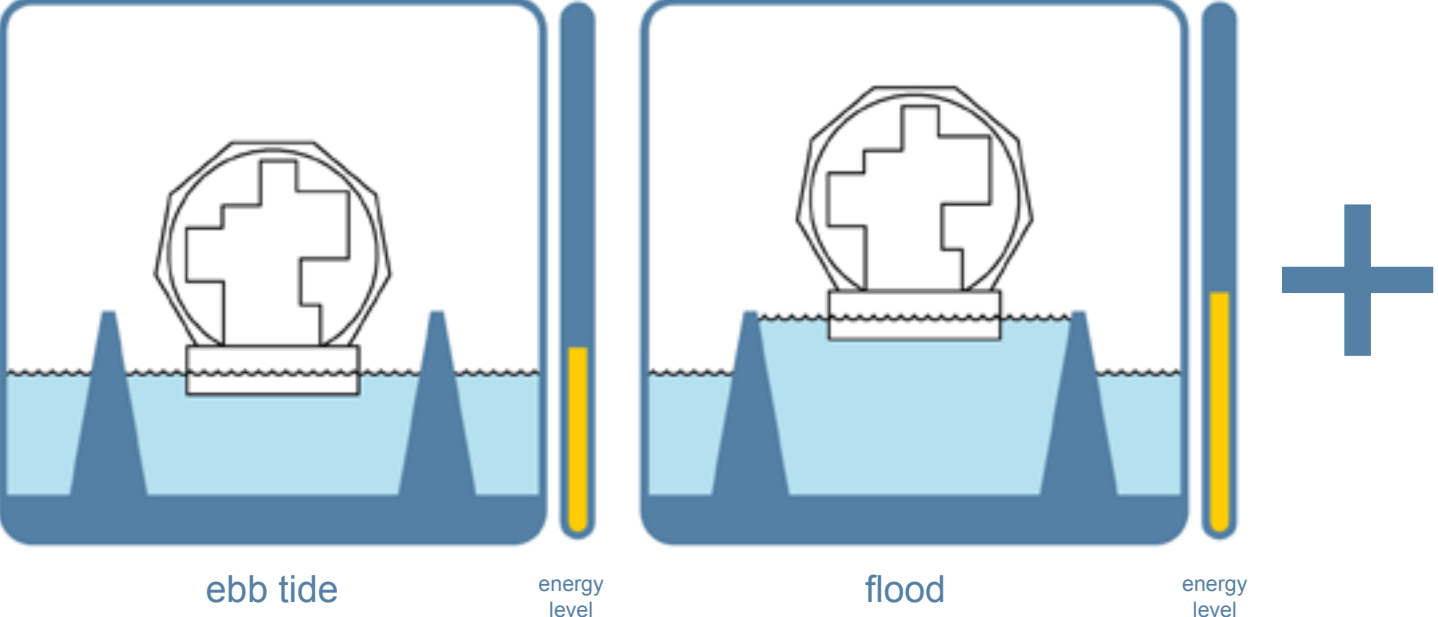
limitation of consumption



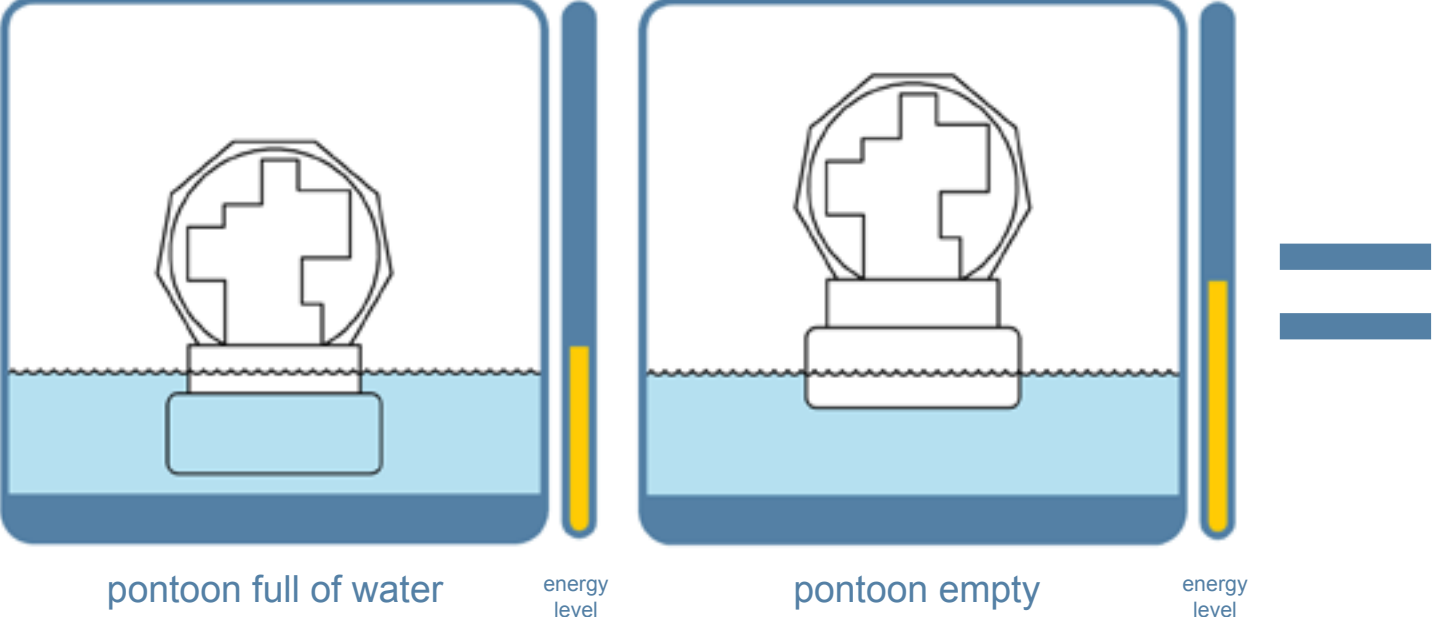
flexible natural ventilation



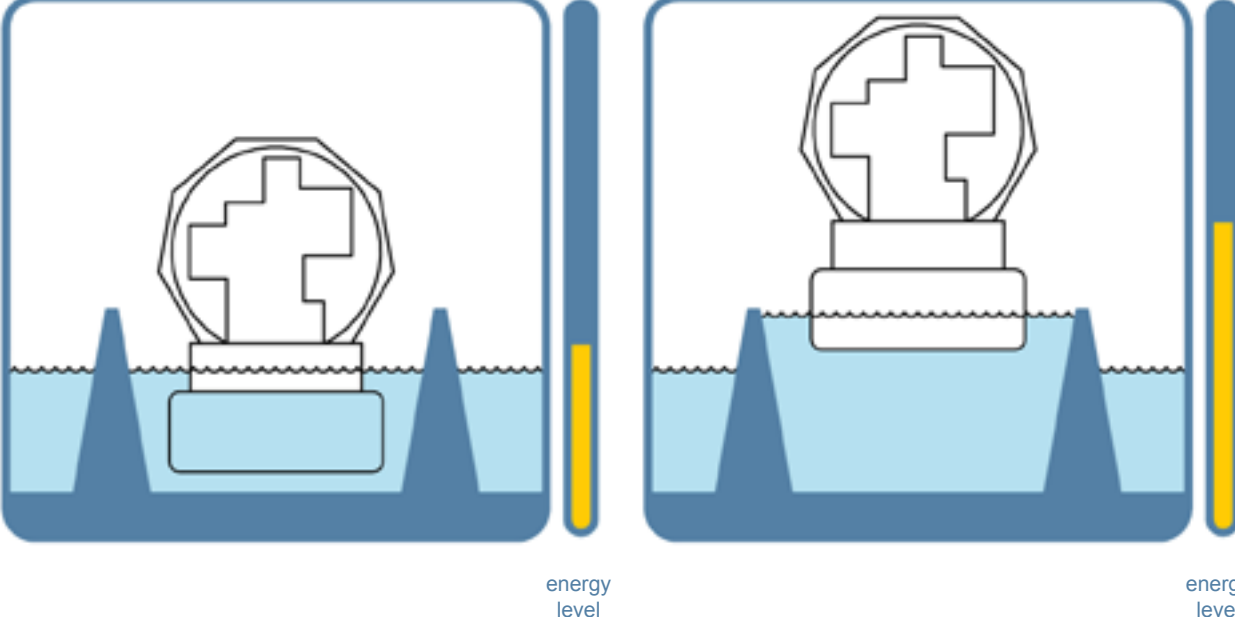
water energy - generation



water energy - storage



building indicates energy level



self-sufficient building

An independently functioning complex of rooms, with all types of facilities around it, consumes a relatively large amount of energy and water. Seeing as the production possibilities are limited, limiting energy and water requirements is an important basic principle. In order to realise a self-sufficient building, the remaining energy and water requirements have to be produced in or around the building itself. The production of energy and water fluctuates over time, which means that storage systems are needed to be able to store energy and water temporarily, so as to compensate for the differences between supply and demand.

Limiting demand
Limiting demand is S-cube's most important principle. There is no need to produce energy and water that is not going to be used. Limiting the demand for energy is realised by means of an ingenious second skin around the building, which functions as a summer and winter coat.

Layered skin
A building has a ambiguous relationship with the sun. In the winter the sun only shines briefly and all the energy is needed to heat the building. In the summer this same energy causes inconvenience by warming up the building too much. The layered skin of the WSC works in the winter as a winter coat, providing good insulation, and allowing a lot of sunlight to permeate. In the summer, the skin works as an airy summer coat with a non-transparent side facing the sun. The area between the layered skin and the actual building is useful to people for large parts of the year.

The summer and winter coat effect is realised through constructing the layered skin consisting of two plates. One of the plates is largely closed (non-transparent) and is covered with PV cells and water pipes for storing collected heat. The other plate is largely transparent. The two plate components are able to rotate around the building and slide behind each other, thus making it possible, depending on weather conditions, to take maximal advantage of the demand for warmth and coldness. The two plates are made of a large number of areas that can be filled in in various ways, such as PV cells, closed insulating sections with pipes for conducting water, glass (with or without PV cells), vacuum insulation panels, and suchlike. The plates are sealed by air cushions.

The demand for warmth and coolness in a well-insulated building is maximally achieved through the layered skin. In order to minimise energy consumption, the indoor climate is controlled by means of Phase Changing Materials

(PCMs) in the walls and floors of the building, which provide a lightweight building with heat-buffering properties.

Controlling the indoor climate in the summer climate is achieved, as mentioned, by screening off the sun with the closed parts of the plates and by ventilation. In order to be able to realise sufficient ventilation, the skin around the building can also move vertically. Pumping empty the pontoons under the two plates causes the plates to rise, thereby creating wide ventilation openings just above the water level and around the entire building. In addition, the vertical movement creates an opening at the top, above the central atrium. This makes it possible to create (if needed) a considerable air current through the building from bottom to top. If ventilation is not desired or necessary, the building can be closed off again by filling the pontoons.

Consumption
S-cube is supplied with sufficient daylight during the day, in part because of the central atrium; the lighting cannot be turned on. Users are thus forced to look for a place with sufficient daylight, rather than adapt the conditions. In spaces without daylight, the light is controlled with timer switches.

Energy generation and storage
Besides generating energy with the PV cells on the plates of the layered skin, the large basin around and under the building is used to generate extra tidal energy. At high tide the basin fills up, after which the flow is halted. At low tide the water flows out again via generators.

On sunny days and/or at low tide more energy than the building uses is generated. This energy is partly stored in the ground (long-term) and partly as kinetic energy in a water battery (short-term). This battery consists of an extra pontoon under the floating building. When the pontoon is full of water the battery is dead. By using superfluous energy to pump the pontoon empty, energy is stored. This energy is released when the valves are opened and the water flows into the pontoon via the generators.

Consciousness-raising
S-cube thus itself participates in the production and storage of energy. In addition, the building is an indicator of the energy stored. When the building lies high in the water then both the battery (pontoon) and the basin are filled. The more this energy is consumed, the lower the building gradually sinks into the water again. The degree to which the battery is still full is thus visible for all its users.



S-cube