



Solar energy, low exergy, zero emission building concept

COST CA23117 CIRCUL'ARTs 2nd Station
Museu Carlos Machado, Ponte Delgada, Azores, 15-18 April 2026

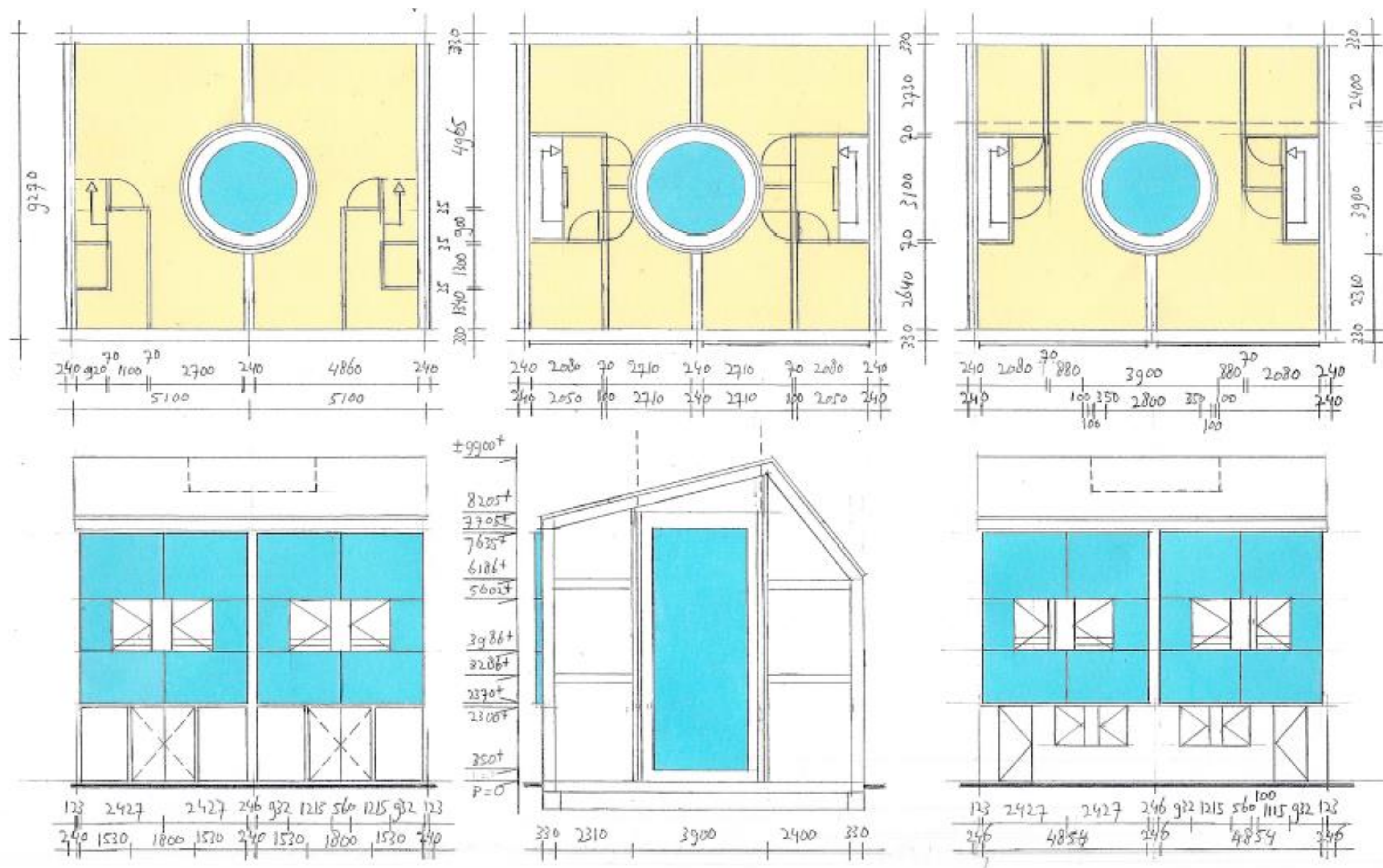


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Seasonal solar heat storage
Local learn to deliver process
Infrared radiating cooling collector
Redox flow electricity storage
Carbon credits blockchain wallet
AR/VR/XR AI-avatar support



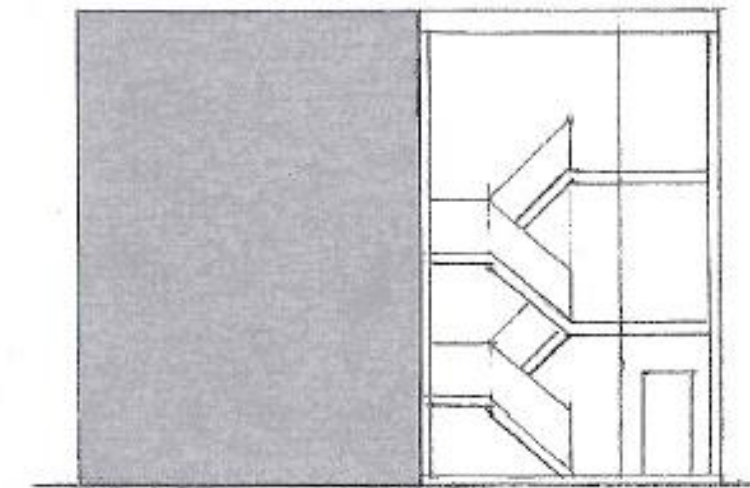
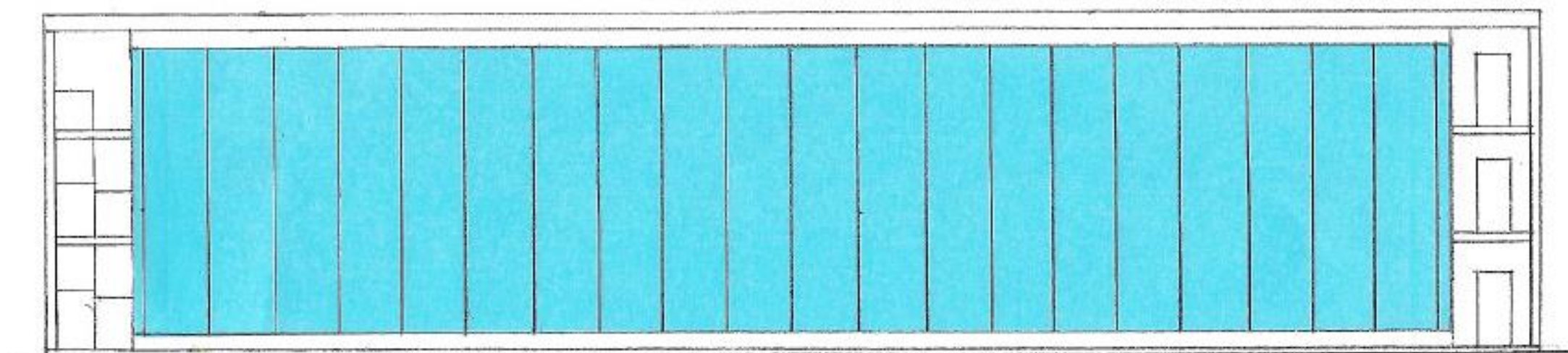
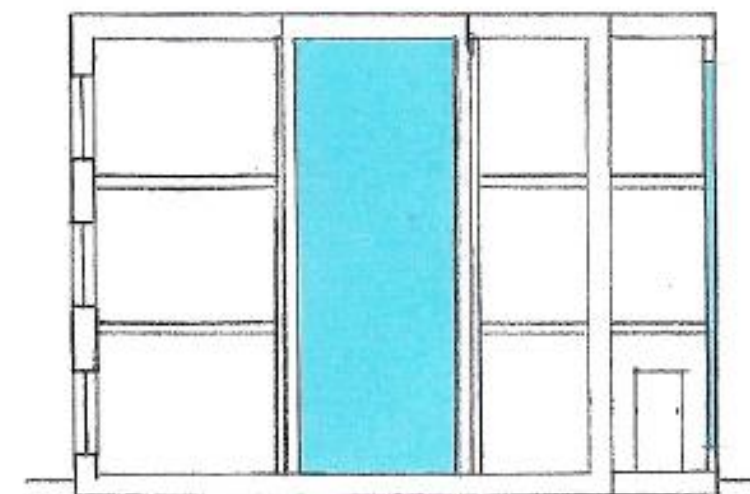
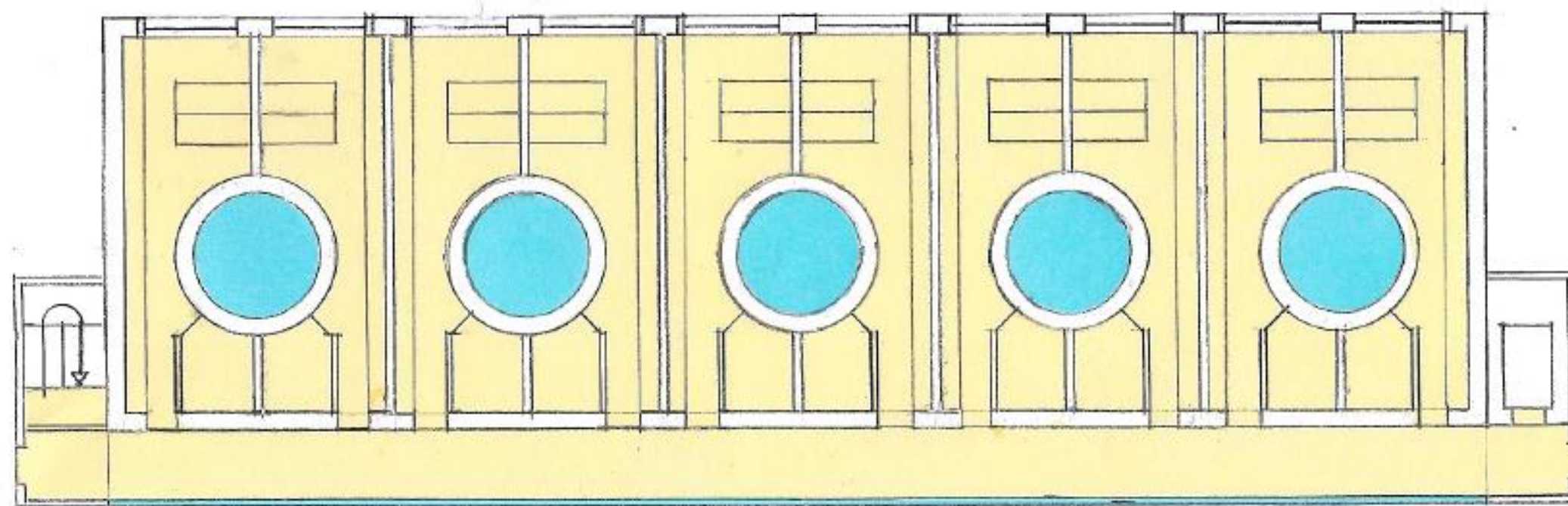
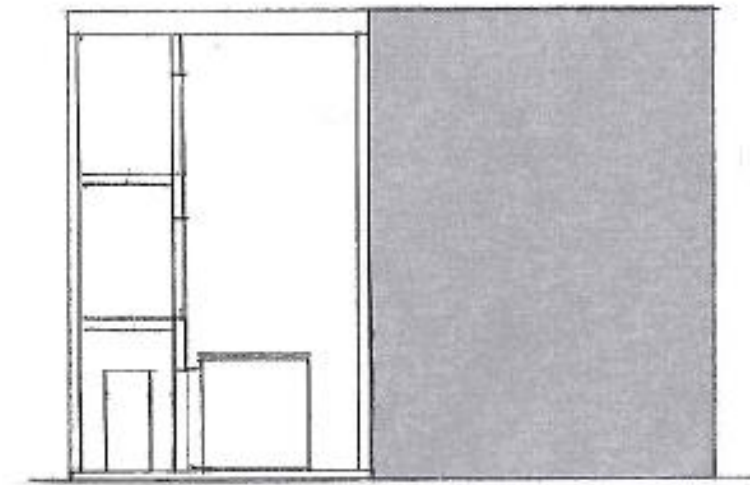
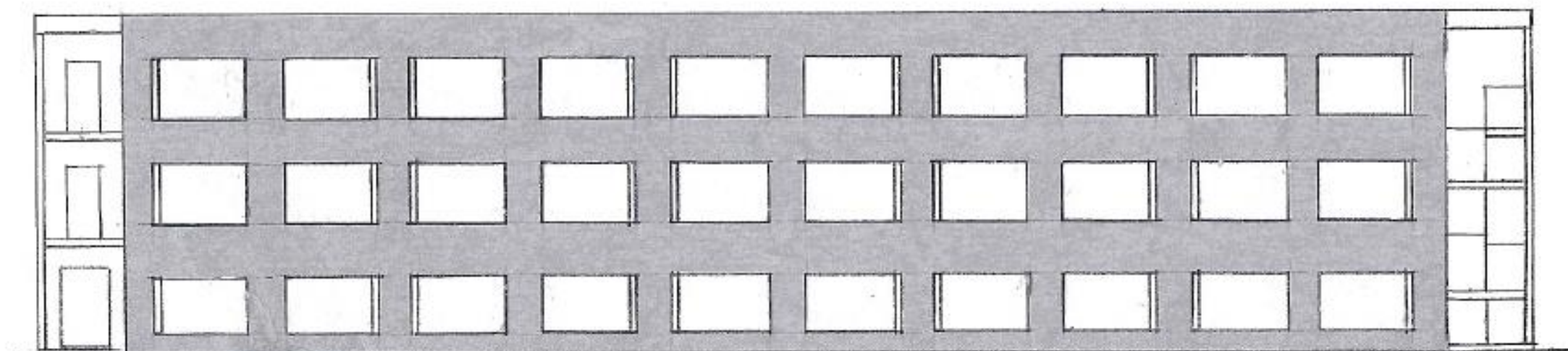
Solar energy, low exergy, zero emission

A solar energy, low exergy, and zero emission building concept, with an integrated seasonal solar heat storage system, without energy losses, supplies indoor heating and hot tap water. The building concept is suitable for free-standing, connected, or high-rise, residential and utility buildings, in all climate zones.



solar heat storage

solar heat storage &
thermal collector





Seasonal solar heat storage

The building concept is characterized as a seasonal solar heat storage system, with the smallest exergy loss (low-exergy), and without any energy loss. In this case, exergy (applicability or quality of energy) stands for the temperatures which are used in the solar heating system, which are as close as possible to the demand temperatures (20 °C indoor and 45 °C shower).



Local learn to deliver process

The project conditions are a southern facade for the solar collector, a water column in the core of the building, and a team being able to deliver the local design, construction and installation, and willing to participate in a local learn to deliver process. Solar collector and storage cylinder suppliers, to deliver the installation elements, are available.



Infrared radiating cooling collector

The global floor area doubling in the coming decades, built on warmer continents, where indoor cooling is required, will impact global carbon emissions. A low-exergy infrared cooling collector avoids carbon emissions, by using space temperature instead of electricity. The collector cools water below air temperature, by means of an infrared radiator, surrounded by an infrared transparent insulator.



Redox flow electricity storage

To multiply the functionality of the seasonal solar heat storage and its required investments, the integration of a redox flow battery can be considered. Redox flow batteries perform better at higher electrolyte temperatures, requiring both membranes and electrolytes, able to operate at a 50-90 °C annual temperature curve for example.



Carbon credits blockchain wallet

Zero emission buildings need investments in solar heating and seasonal storage, which can be co-financed by carbon credits. A blockchain carbon credits wallet for individuals is a small scale solution to facilitate this, house by house. The wallet may be used as a reliable carrier for alternative values as well, such as Sustainable Development Goal (SDG) values.



AR/VR/XR AI-avatar support

The building concept knowledge development, and its dissemination and implementation, will be supported by a virtual reality showing the design, by an augmented reality addressing its characteristics, and by an artificial intelligent multi-language avatar that both guides around and responds questions. Citizens and communities may be involved by an interactive map, to address potential locations.



Contact Details

For more information and for interest to participate please contact:

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