

POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Sustainable Architecture
Honors theses

ISLAND OF SAN GIULIANO: REDEVELOPMENT ENERGETIC-ENVIRONMENTAL

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Photo Insert

The island of San Giuliano is located in the lagoon of Grado (GO) and has an area of about 20 hectares, divided between fish farms and land. Is far 6.8 km from Aquileia, a fundamental point of support for the project, because the marina of Aquileia can be used as a pole of interchange to reach the island by lagoon's taxi.

The project is divided into:

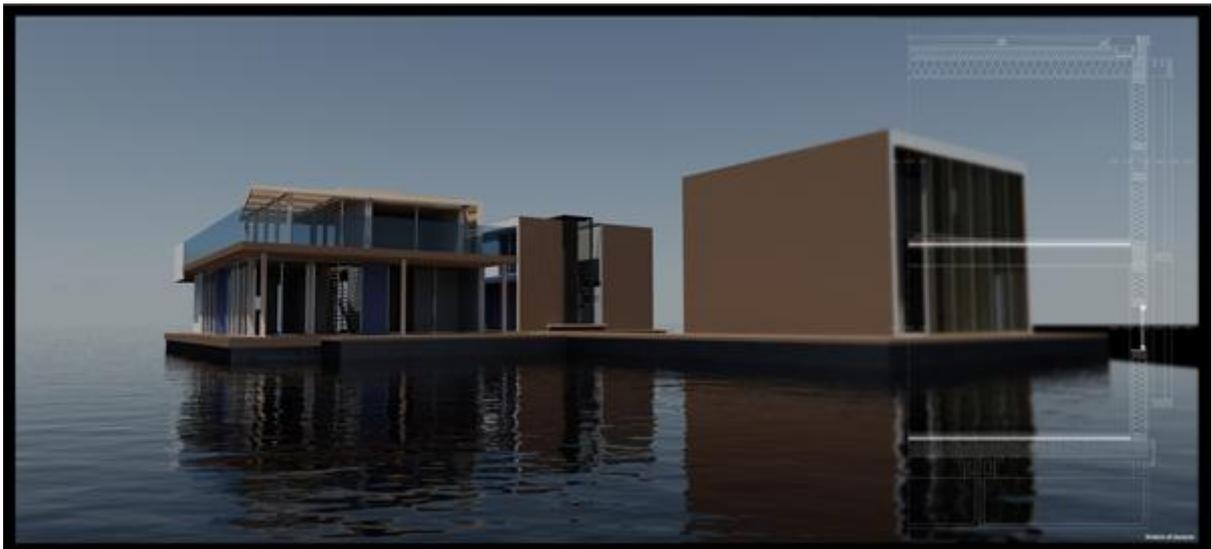
- Accommodation of the island and new constructions
- Marina
- Floating village
- Basin for the production of hydroelectric power

The accommodation on the island is divided into:

- New construction: caretaker's house, storage of agricultural products, basin for the production of renewable energy, pool and caves a bateaux
- Trails in stabilized earth, curved to reduce the action of the wind, and floating wooden piers, supported by poles
- Distribution of plantings and crops: olive grove, vineyard, orchard, lavender cultivation, vegetable garden, and tamarisk trees on the banks
- Accommodation of the docks, which require some actions: dredging to achieve the depth of 5 m , the formation of gaps in the west to allow the entry of boats and prevent the entry of the wave, and the protection of embankments

The marina will accommodate boats from 6 to 30 m, the orientation of the piers is perpendicular to the prevailing wind direction .

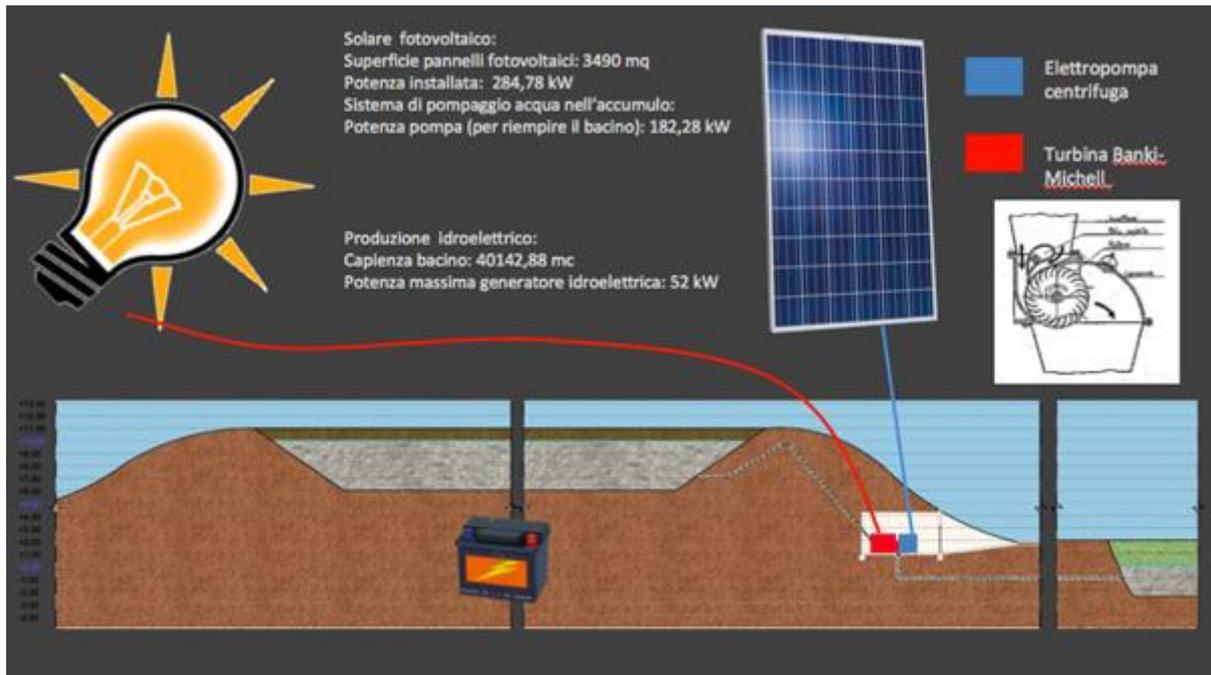
All piers inside the intervention will be equipped with the basic facilities for the correct functioning of both the marina and the floating village (Picture 1), with the exhaust system, drinking water, electricity and heating. It was decided to propose a central heating because at a depth of about 200 meters there is a source of hot water at 45 ° C that we exploit for radiant floor heating which operate at temperatures lower than the groundwater.



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The floating units are designed in standard sizes of 10x6 mt, mt 10x8 and 16x10 mt. The peculiarity and innovation of these is the floating system where you wanted to use a fiberglass hull partitioned into molds of modular dimensions 4x2 m and 2x2 m, where inside a system of thought has been given to balance weights placed in the four corners including tanks that are empty or filled with water to compensate for imbalances due to accidental loads.

Another feature that was meant to deepen were so-called PCM (Phase Changing Materials) used in the case study to improve the surface mass of the walls going to put small balls of wax in the plaster and found an improvement in the phase angle of the wall of several hours.



Section

Great importance is given to the production of electricity from alternative sources, in particular solar panels. This system has many advantages but also a big problem as it is an instable power or not directly controllable by man in production and are not certain or better they suffer large variations in production, according to weather conditions, which must be compensated by the central traditional power.

The problem that arises is the great difference in the reaction times of the two systems in fact, the voltage drop is immediate while the central vary from a few minutes for small plants, to tens hours for the larger ones.

For this reason, a strong voltage drop, not covered by small and fast core, can cause blackouts in the national grid.

To overcome this problem, it should intervene between the source accumulators unstable and the end user.

In the project, the accumulator has been interpreted with a reservoir that, with the excess production of the photovoltaic panels is filled. In the moments when the sources can not provide the necessary energy to the island, the accumulated water is conveyed on a hydroelectric turbine.

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