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

ENERGY AND SUSTAINABILITY FOR THE RECOVERY OF THE VILLAGES ALPINE: THE CASE OF CAMPOFEI IN VALLE GRANA

by Giorgia Calzia
Tutor: Daniele Regis
Co-tutor: Roberto Olivero

The thesis project aims is upgrading the energy efficiency of a small alpine village, called Campofei, located in Valle Grana, in the municipality of Castelmagno.
The town, situated 1,489 meters above sea level, is in a state of deterioration with early recovery construction by the client.
The work the work relates particularly to the issue of sustainability, an issue that now echoes in many contexts, but unfortunately with little basis in reality everyday.
The thesis can be defined in a "utopian" because they are all concentrated sources (solar, water, wind and biomass) from which we can produce clean energy, always keeping in mind the architectural aspect.

Editing of the redevelopment of the township

Was done this work permitted by the intrinsic characteristics of the same: in the lower part (Campofei low) of late medieval, you can meet compact buildings to counter the strong winds, what precisely identifies the possibility of using the energy of the wind. At the top of 7-800 instead, you can find large barns and buildings in Long Sleeve with southern exposure, as in the past then you use solar energy. Another energy is by water, which was already used in the past by the old mill site near the Valliera rio (river near the hamlet) where today the remains of the building are represented only by the wheel.
Another usable energy is biomass as the country is overgrown by a forest of beech trees.
Another important factor for the existence of the place is the presence of a special microclimate, which makes possible the cultivation of medicinal herbs.
For all these features, the township has the ability to take advantage of all four energies, thus making it independent of the township Campofei, assuming a suitable energy storage system, so that it can be reused by the locals.
This system makes possible the detachment from the network and an independence from both the thermal point of view that electric, trying to pursue in the philosophy of the project, excluding use of batteries of accumulation of chemical type, choosing instead of a pumping system of water.
The sizing of energy works was done in the most unfavorable conditions, with the simultaneous presence of all the inhabitants of the village who exercise energy, so make sure of the independence of the country.
For each energy field was done a detailed analysis, allowing you to provide material to verify the correct implementation of the intervention.
The types used in the project have been identified in order to fully respect the historic character of the place without inserting elements that not altered appearance.

As regards the energy from the sun has been carried out the design of the photovoltaic panels

Editing with photovoltaic panels in the township

and bioclimatic greenhouses

with regard to biomass has been designed the insertion of thermo-burning stoves and boilers, for the role of water is proceeded to the inclusion of the micro-turbine and the related construction works. The design is the inclusion of wind turbines and the last phase of the redevelopment of the township about the sizing of the storage system.

The thesis is divided indicating the different actions, according to energy, in each chapter you will find the descriptive part of the type of plant, project, part of the legislation and incentives.

For further information, e-mail:
Giorgia Calzia: giorgiacalzia@gmail.com