POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Architecture (Environment and Land)
Honors theses

Energy Conservation and renewable sources of energy: from theory to practice – Public premisis energy re-qualification in Alba

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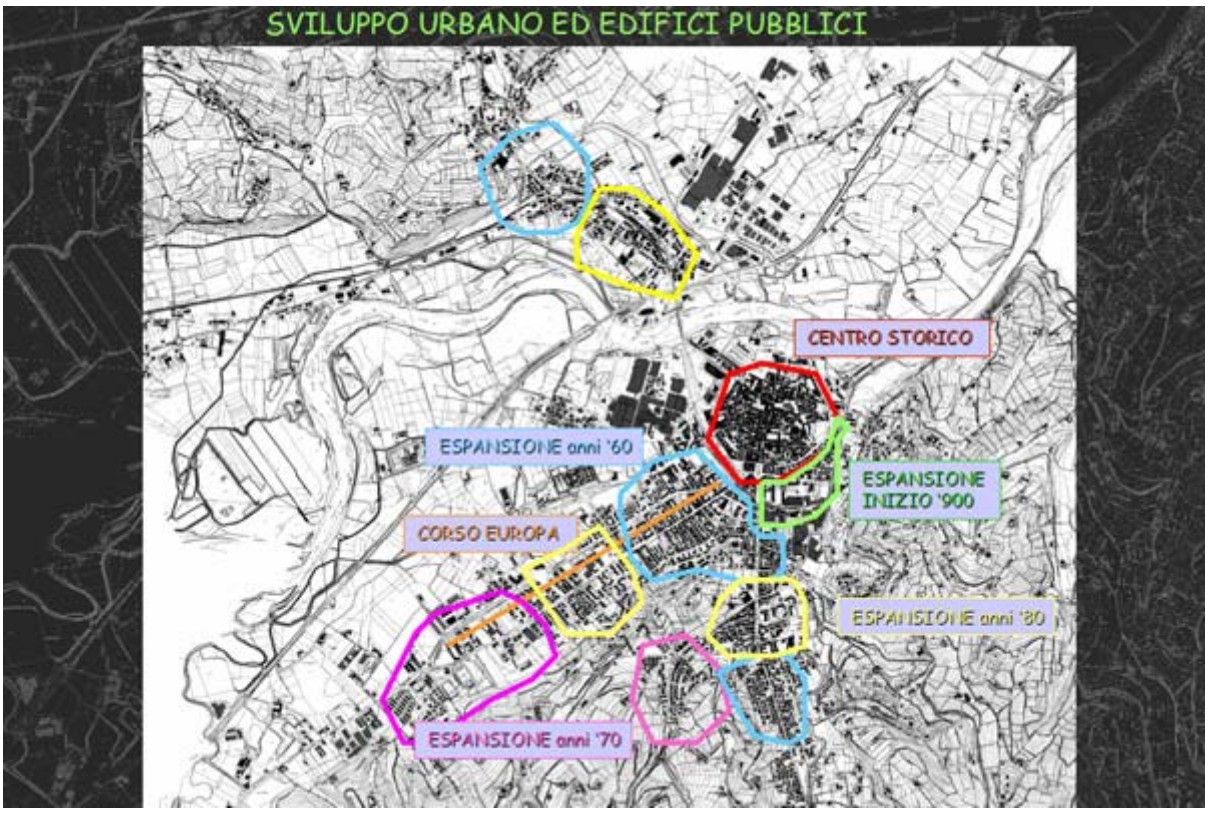
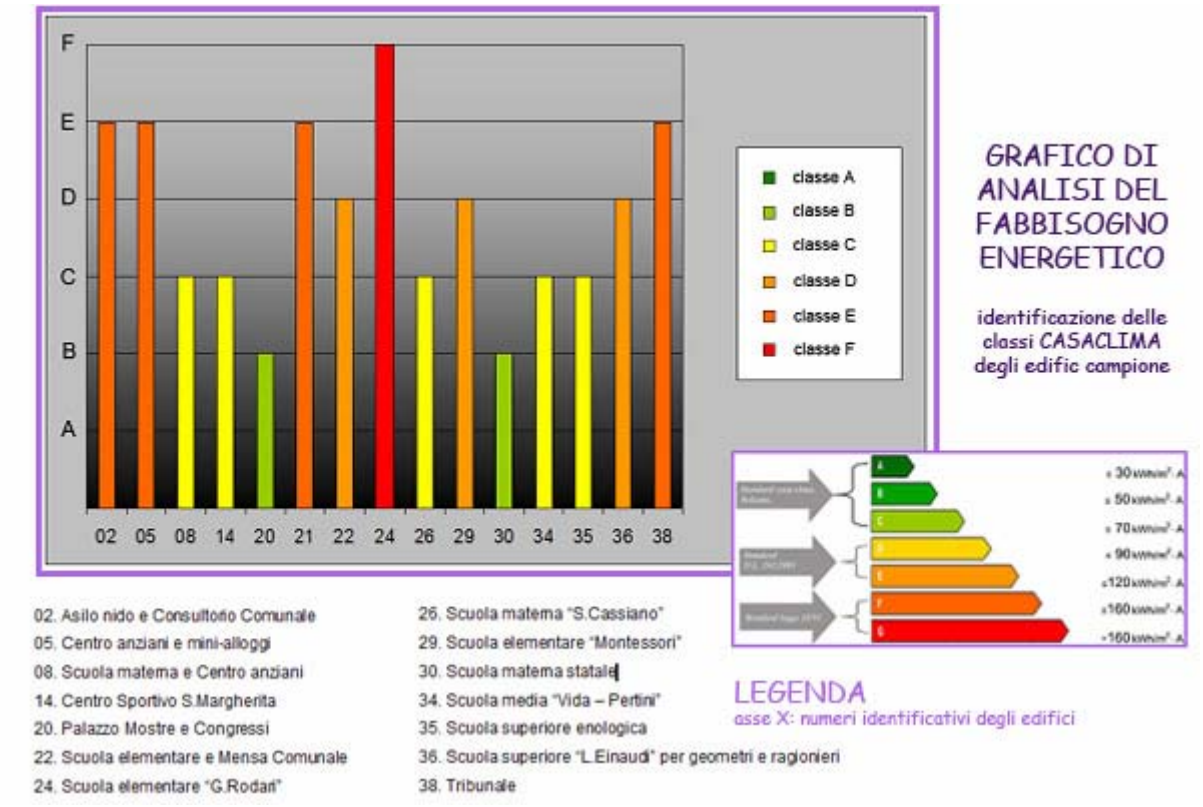
It is often argued about bio-climatic project principles and often it is “theorized” what the project is supposed to accomplish: all of these are really good statement but it is necessary to proof such good concepts can be actually transformed in a real project, able to stand up to an existing context and able to fit in well into an established territorial reality with important historical roots. In order to demonstrate these concepts the town of Alba has been examined, as an interesting example due to the imminent introduction of the new Local Urban Planning Regulation (P.R.G.), which takes into account environmental concepts, providing incentives for the implementation of technological systems able to exploit renewable energy.
The dissertation is divided into three parts: in PART I the bio-climatic theoretical principles on which the project has been based, are being analysed, with particular reference to the implementation of such resources on existing buildings; the Italian and European environmental regulations are also defined in this section.

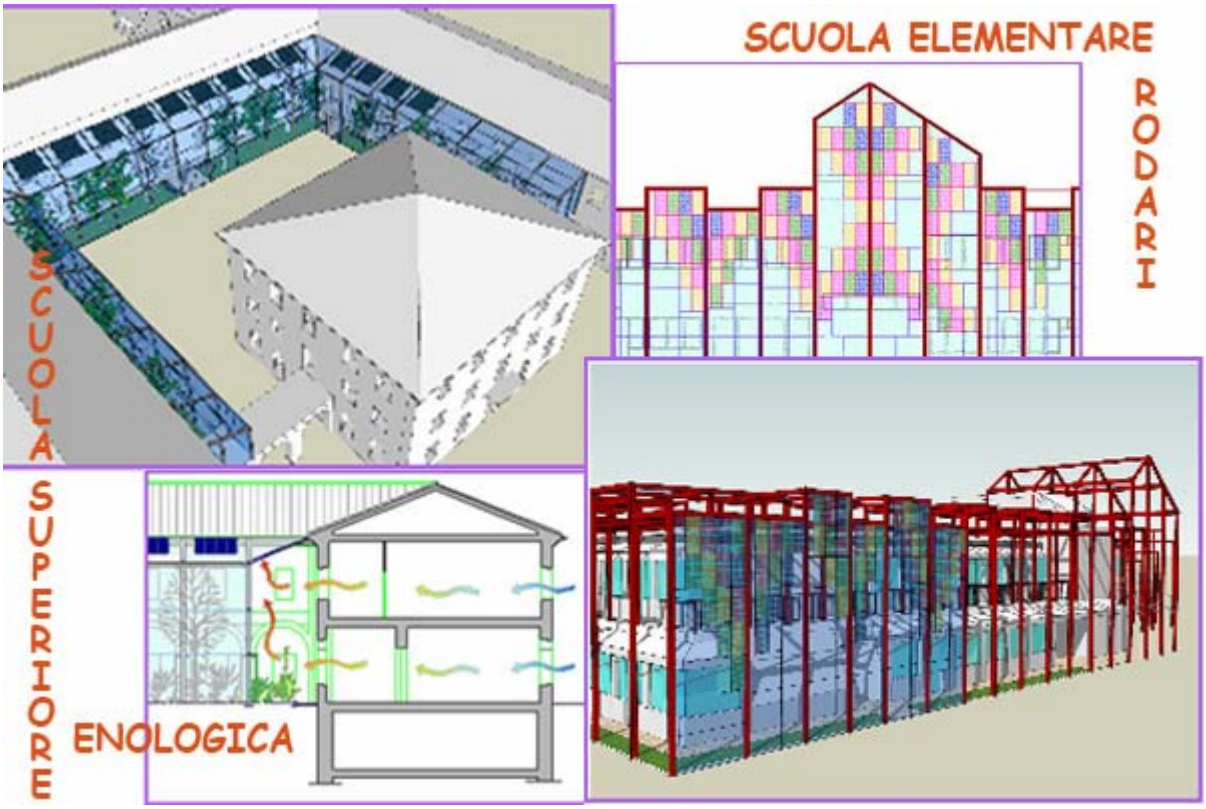


In PART II public buildings are being analysed in more detail, with particular reference to the town of Alba: a brief historical evolution about the public buildings' patrimony is followed by an accurate buildings' cataloguing using records able to describe their main characteristics.
Among these buildings, a significant specimen has been chosen on which has been implemented an energy requirements analysis between both the summer and the winter periods, employing experimental data programming tools supplied by the speaker.



From such analysis results, in PART III, it is possible to identify the two main study-cases which showed the worst problems: during the summer time the building in most need of an air cooling and recycling system appears to be the Oenological High School, whilst during the winter time the building showing to be in greater need of energy for heating and hot water supply appears to be the Primary School "G.Rodari". For both such subject cases have been performed detailed energetic analysis and the main presumed sources of such problems have been identified. Through such study, two project proposals have been submitted which both suggest the same element that is the greenhouse, which can be employed with different aims and functionalities. With the new project data available, a new energetic analysis has been performed and, from the results, it can be observed that the building's conditions have been greatly improved without impact on its use nor on its base purpose.

For the Oenological High School, the project proposal suggests the introduction of a greenhouse placed along the building's external profile, positioned inside the School's courtyard: it will be connected with the building's internal main corridor by simply removing the door frames and it will operate as an air extraction vent flue. This function will be further helped by the installation of some solar-air panels placed upon the roof.



For the Primary School "G.Rodari" the project proposal always suggests the use of the greenhouse element, this time though, with the different function of providing heat accumulation, as the main structure problem is the heat dispersion and the winter time energy requirements. The designed element operates as insulating layer, as filter between the inside and outside and allows to considerably reduce heat dispersion. In order to efficiently provide a cover to the Greenhouse, not only windows but also glass-to-glass photovoltaic panels which allow through colour and forms schemes, the supply of a significant share of the electrical requirements.

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