



POLITECNICO
DI TORINO

Honors thesis

COURSE OF DEGREE IN SUSTAINABILITY DESIGN

Abstract

MANAGEMENT OF DESIGN PROJECT BY BIM: FROM ENERGY ANALYSIS TO LEED AUTOMATION

The case study used for the analysis of the issues described at the beginning of the thesis is a building developed on a preliminary basis and is part of the new area adjacent to Schievano Street in the north-east of Milan.

This case study takes part in the creation of a new Masterplan developed by CMR Project with the headquarters of the Bank BNP Paribas Real Estate as protagonist.

The goal was to study the building compared to the constraints and information provided by customers and find an efficient solution that maintained the initial concept of the structure improving the performance.

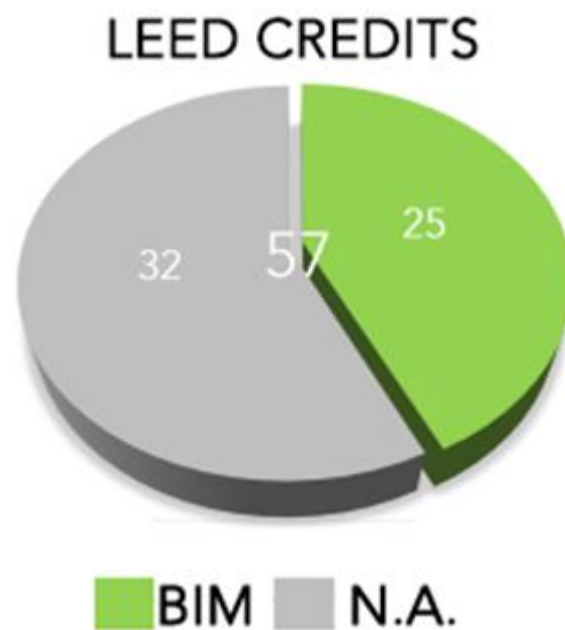
Using BIM it was built a single virtual model from which it was possible to obtain all documentation relating to the project, to manage the time phases of construction and to check real-time costs. Through the creation of the building model it is possible to manage the entire building process from the earliest stages of the feasibility study to the preliminary definitive and executive design and finally the construction and subsequent management of the work.

This new methodology allowed to verify possible inconsistencies, to make preliminary assessments of different solutions and design scenarios and to simplify coordination with other professionals.

It can be said that using BIM, traditional patterns of design changes, moving early on the most complex and structured work, going later to relieve the final work.

This way it is possible to avoid mistakes, superficiality, lack of dialogue between the different actors of the building process, temporal and spatial discontinuity in the chain of realization that can become problems in the construction phase, or even in operation, with increasing costs to correct, adjust, readjust parts of the system.

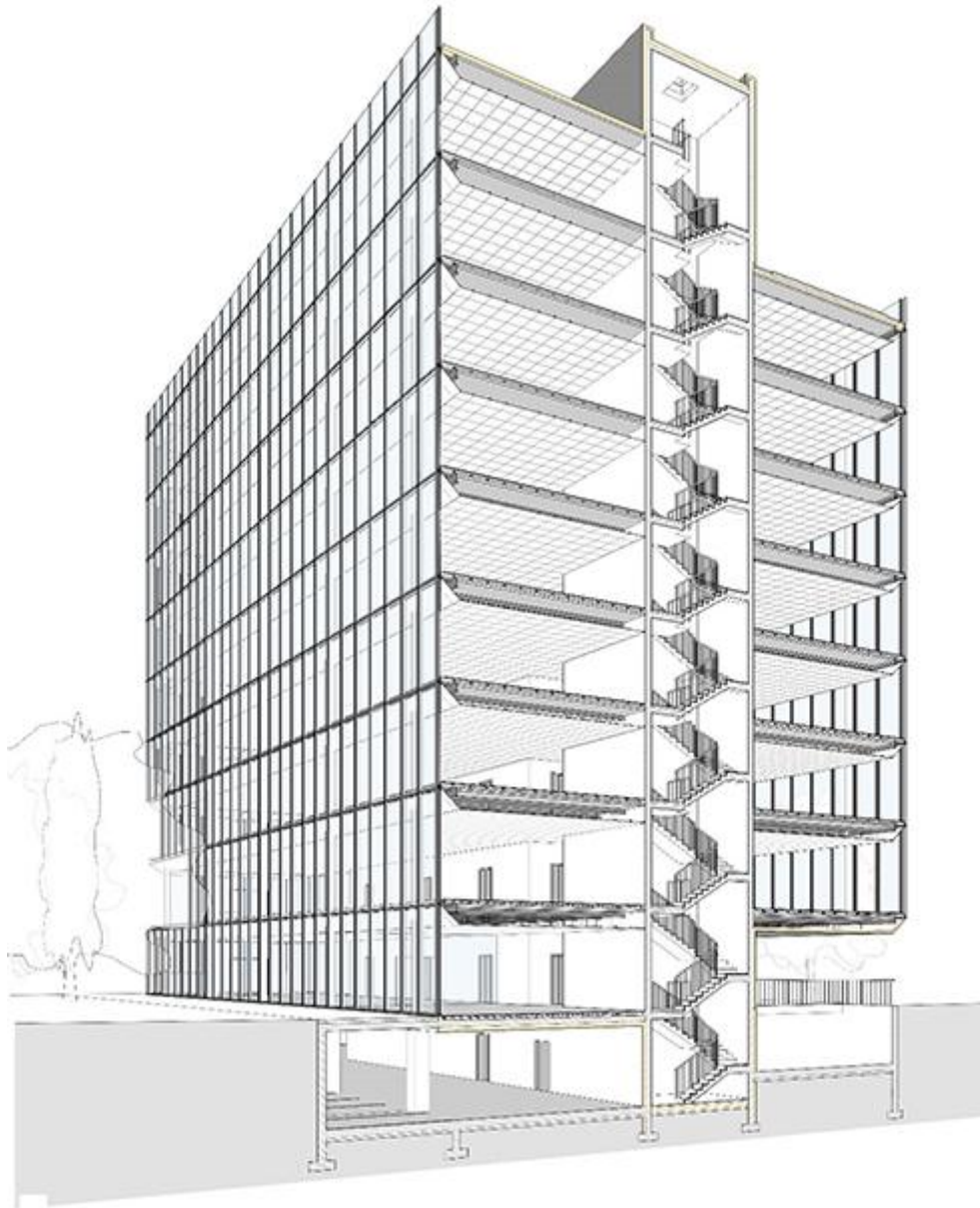
BIM potentiality is not limited to favor only the economic part of the construction industry but, if fully exploited, as demonstrated through the automation of LEED credits, it can be extremely useful in order to achieve proper and sustainable planning.



The introduction of LEED protocol allows to achieve economic benefits, to reduce environmental impact and to resource consumption, but nowadays, especially in Italy, this certification has not yet been disclosed as it should.

The idea of automating a complex, expensive and in particular not so fast certification process is born from the intention to carry out many activities required by the protocol in conjunction with the usual activities of the design.

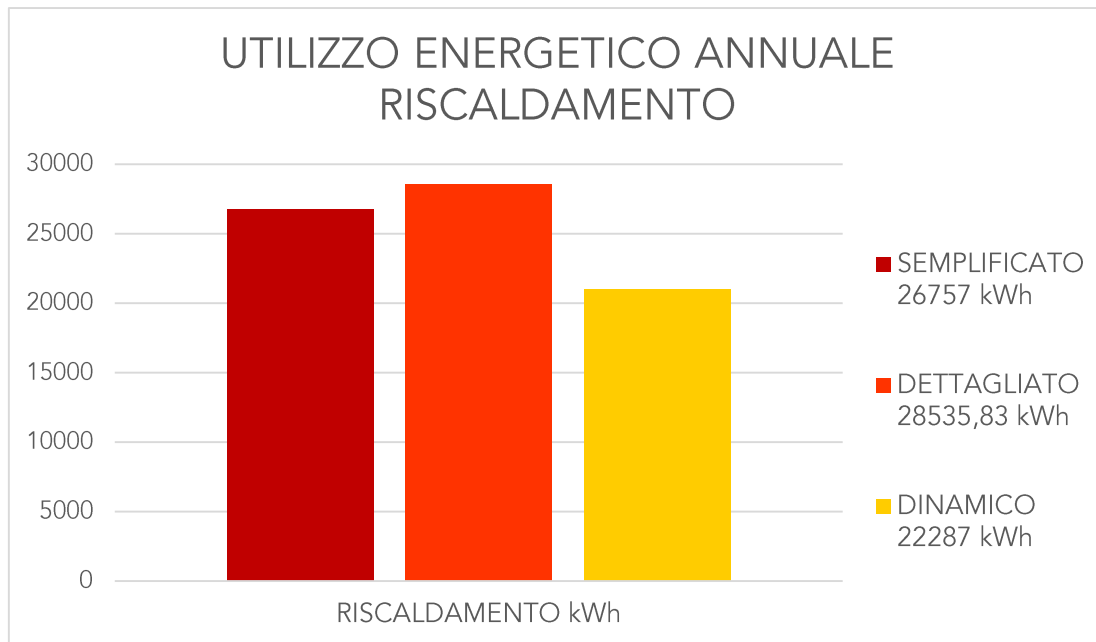
The opportunity to show an initial concept made using the guidelines dictated by the automated credit can be successful in order to alert the customer to the certification and the benefits obtained.



In addition, the need to define methods for energy certification that minimize burden on users in order to promote the energy certification, is one of the main goals at work but also at the national regulatory energy efficiency in buildings. In this context, the role of Building Information Modeling and the computer codes to evaluate the energy efficiency of buildings, which, at the same time, must be simple and reliable, are strategic.

The purpose of this thesis was to carry out the entire design process by combining the architectural part of the building energy analysis. The analyzes have been useful to compare the results obtained through calculation methods that allow to examine the building both with a simplified scheme and with a dynamic one by adopting easy or complex procedures.

The final comparison made it possible to determine the pros and cons of each simulation, evaluating particularly the effects for the various phases of design and complexity of work. On completion of the work, with the knowledge that you have used only a small part of the potential of BIM, it emerges as this methodology may be the solution to many problems related to the design and high environmental impact that the construction sector generates a level world.



At the end of the whole work, It emerges as this BIM methodology, even if used only in a minimum part, may be the solution to many problems related to the design and high environmental impact that the construction sector generates worldwide.

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