Title

Energy Performance Certification of Existing Tertiary Buildings

Proposers

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Research Programme

The research group FTARCH has been developing since 2003 a research programme in the field of energy certification of existing residential buildings – financially supported by SiTi in contract with the Turin Agenzia Territoriale per la Casa (ATC) – and its PRIN “La certificazione energetica e la verifica ambientale degli edifici. Metodologie di valutazione e simulazione” has been funded by MIUR. The group is now on the point of opening a new research line concerning the existing tertiary buildings: the theme is complex either in theory – up to now there are not validated procedures to determine heating, cooling, equipment and lighting annual energy demand – or practically, since it is quite difficult to split the demand among the different final uses.

The aim of the research activity submitted is to set out a method to collect and examine experimental data and a method to estimate the energy demand. Both methods will be focused on tertiary buildings.

Research framework:

Preliminary study

- setting of final uses (heating, cooling, equipment, lighting)
- bibliographic research on international building’s energy performance procedures and methods
- surveying on energy performance certification for tertiary buildings in Europe (through personal contact and visits also)

Process of data

- collection and examination of actual primary energy consumption for heating and cooling*
- collection and examination of actual power consumption*
- design of forms intended to collect plant characteristics and users customs
- collection of plants characteristics and users customs

Method development

- definition of a space heating and cooling, equipment and lighting energy consumption method based on building and users input
- comparison between method results and actual consumption: sensitivity of the inputs
- definition of artificial neural networks in order to calculate the consumption from some selected inputs
- application of the artificial neural network and results analysis
- definition of an original procedure of tertiary buildings energy performance certification

*The research group FTARCH has already collected the amount of power and primary energy actually consumed in the following tertiary buildings: Istituto di credito San Paolo-IMI, Politecnico di Torino, Palazzo di Giustizia di Torino and approx 150 schools owned by Provincia di Torino.

Project Background

The European Directive 2002/91/EC of the European Parliament and of the Council (December 16th 2002) on the energy performance of buildings provides that an energy performance certification is made
available to the owner or the tenant when buildings are constructed, sold or rented out. The certification contains reference values for consumption and may be accompanied by recommendations for cost-effective improvements of the energy performance. The amount of energy actually consumed includes heating, hot water heating, cooling, ventilation, lighting. Member states are going to set minimum energy performance requirements within 2006. Some of them - Denmark, Netherlands, United Kingdom – have already carried out interesting researches in that field.

Ten years before the European Directive, in Italy Law 10/1991, art. 30, provided that an energy certificate should have been supplied in case of location or sale of a building, but the ex art. 30 Regulation is not yet in force. Furthermore, after the D.Lgs. 112/1998 (known as "Riforma Bassanini") the matter is now entrusted to the Regional Governments.

In order to supply a common energy performance assessment methodology, the Italian Thermotechnical Committee (CTI) has recently issued a new Technical Report (TC) on Energy performance of buildings – Space heating and DHW, but at the moment no activity is in progress for the assessment of energy consumption due to air conditioning, lighting and other electrical uses.

In France, CSTB (Centre Scientifique et Technique du Batiment) in partnership with ADEME (Agence de l’Environnement et de la Maitrise de l’Energie) is carrying out a HQE (Haute qualité environnementale) procedure for tertiary buildings.

References

- M. Filippi, C. Maga, 2004, La certificazione energetica degli edifici nei paesi europei, in corso di pubblicazione sulla rivista “CdA”.