

PERFORMANCE ASSESSMENT OF RESIDENTIAL BUILDINGS IN HUMID CLIMATE IN ALGERIA, USING LIFE CYCLE ANALYSIS METHOD.

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▶ RESEARCH INFORMATION

ABSTRACT:

Actually, Algeria faces a challenge to control energy. Moreover, national energy consumption has progressed, especially in the residential sector which represents 34.2% of final energy use. Energy efficiency is an appropriate response to this problem; the evidence is that residential buildings present a real threat to the environment through their high energy consumption. It becomes imperative that the design of housing projects in the future be oriented towards new strategies mainly aimed to reducing the impact on the environment and improving energy efficiency, the development and implementation of sustainability strategies and energy efficiency aspects in residential buildings, especially in humid climate, that are necessary in order to control energy consumption in the residential sector.

KEYWORDS

energy consumption, residential sector, energy efficiency, sustainability strategies, humid climate, and energy performance evaluation.

INTRODUCTION / CONTEXT

In Algeria for instance, the global energy consumption has been increasing fast during the last decades; the households sector represents more than the third of that global energy that we can see in (figure1) which shows the fast growing speed of residential energy consumption. In addition, a large program to provide new residential has been introduced. This program is based on the very limited information and guidance despite the lack of provision to monitor, appraise or evaluate these buildings concerning environmental aspects and energy efficiency. Yet adequate standards, and requirements related to environmental aspects and energy use for the design of residential buildings is considered essential to avoid the type of problem which occurs in existing Algerian residential buildings provided.

QUESTION / GOAL

the main aims of this study are

- I. Explore and evaluate the life cycle analysis method buildings in other countries, and explore the simulation tools for assessment of environmental impact and energy use in residential buildings.
- II. To develop a research framework in order to improve future design performance of residential buildings in humid zone in Algeria in order to reduce the environmental impact and to improve the energy efficiency.

The question that outlined this research :

- How can the contributing parameters and variables of the buildings be managed in order to improve sustainability and energy use systems within residential buildings in humid zone in Algeria and how to identify and quantify the contributing parameters and variables?

HYPOTHESIS

The purpose of this study is to test empirically:

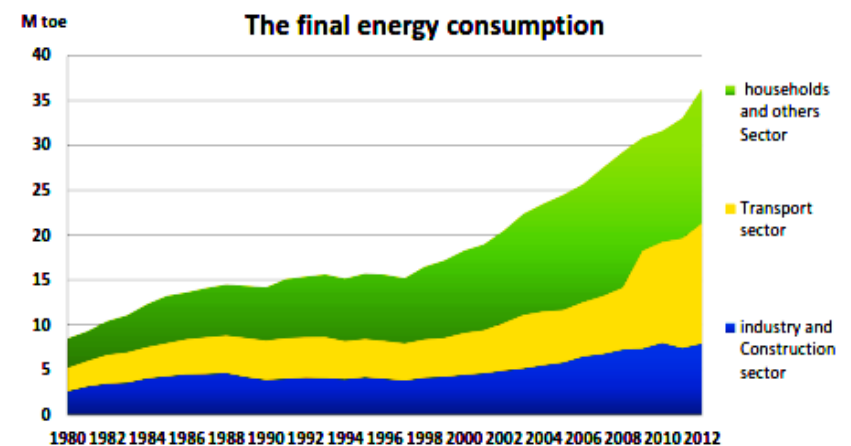
1. The application of the design method, within residential buildings in humid zone in Algeria.
2. If these design requirements are provided, to meet the satisfaction and the requirements of users.

ADVANCEMENT STATE OF RESEARCH/ METHODOLOGY

Literature review and research method

In recent years, an increasing amount of literature on optimizing energy efficiency in residential buildings has been published. In these studies, different kinds of quantitative model have been developed and examined to find a solution for this optimization problem. Researchers therefore investigated different fields of application such as the building envelope insulation thickness, window characteristics, HVAC systems, etc., utilizing specific constraints and parameters. These methods mostly focus on developing an approach for designing the most economically profitable residential building by, for example, minimizing life cycle costs (LCC).

Yet, the Algerian governing and regulation body of sustainable environment does not consider the so-called life cycle assessment (LCA) approaches, which sets the goal to quantify the environmental impact of a product along its entire life cycle. The application of the environmental evaluation on existing and new residential buildings is not mandatory, and it is rarely considered during the design stage. So we have chosen to use LCA to evaluate the energy performance and environmental impact of a residential building located in a humid zone by selecting Bejaia an Algerian coastal town represented in (figure2).



▶ Fig. 1: Final energy consumption by sector (1980-2012) (MEM, 1980 to 2012).



▶ Fig. 2: Case Study: Coastal City Bejaia Algeria (<https://airalgerie.dz/planifier-votre-voyage/nos-destinations/bejaia/>)

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