

ANALYSIS OF URBAN SCALE ENERGY CERTIFICATION SYSTEMS FOR EFFICIENT COMMUNITIES

* *María Belén Sosa, Erica Norma Correa, María Alicia Cantón*
¹*INAHE - CONICET, Ruiz Leal Avenue, Mendoza, Argentina*

*Corresponding author e-mail: msosa@mendoza-conicet.gob.ar

ABSTRACT

Cities have not been planned considering the energy they demand. The environmental crisis has led to center the attention in the energy conservation at building scale. But, the energy efficiency of the city does not depend on the sum of bioclimatic buildings. Being the planning of the urban form necessary to combine the performance of the buildings with the environment. In this frame, the urban certification systems incorporate the valuation of energy efficiency. This work analyzes four systems (BREEAM, LEED®, Green Star, and CASBEE), detects from the set that which in its categories emphasizes the relationship between urban form and energy consumption; and applies it to a set of cases in the study area. Analysis shows that LEED® places greater importance on urban form planning. However, when evaluating the performance between LEED® and the case studies, it is detected that the urban form-energy consumption relationship is not congruent between the certification requirements and the consumption obtained.

Keywords: Urban form, Urban scale certification, Energy efficiency

INTRODUCTION

Cities worldwide will demand 40% more energy resources by 2030 [1]. This projection is preoccupying, since in general terms cities have not been planned considering the energy they consume, or how the increasing cost or scarcity of this resource can affect development [2]. The energy efficiency on building scale is a topic commonly approached by the scientific community with several studies and application cases. However, this trend does not have been reflecting at the urban scale at the same magnitude. In this sense, working on the intermediate scale of the city, neighborhoods or communities, surpasses the analysis of buildings as units and of the city as a whole. This study scale can be a great advantage for sustainability, since it has been shown that actions at the local level tend to generate large-scale repercussions [3, 4].

That is why considering the energy component associated to the urban form is important during the design and planning stages in order to generate energy efficient urbanization's [5]. This consideration is very important to guarantee good standards in the urban form-energy consumption relationship. Previous studies in the Metropolitan Area of Mendoza, Argentina (AMM) show that there are strong correlations between variables of the urban form and the associated energy consumption. There were found optimal design combinations to reduce energy consumption by up to 37% between different alternatives [6]. These results shows that the form of the built environment can increase or decrease the effects of strategies associated with reducing energy consumption and the sustainability of a model urban.

In recent years, new tools have been developed and implemented from different perspectives to certify, under parameters of social, economic and environmental sustainability, the design of new neighborhoods and communities. These systems seek to improve the built environment through developments that value and respect the natural environment, that contribute to improving the quality life of citizens, and reduce the consumption of fossil resources. This is how certification systems, by targeting actions at the local level, can play an important role since having these tools allows urban planners to have a set of measures and parameters from which to implement actions to improve their development. The present work was developed based on three main objectives: (i) analyze the categories considered by the most widely used and implemented urban scale certification systems; (ii) detect the system that considers the urban form-energy consumption relationship within the categories; and (iii) apply this system to a group of cases in the study area (AMM) and verify if the certification system is consistent with the results previously obtained from the urban form-energy consumption relationship.

METHODOLOGY

First, we identified and selected urban scale certification systems. At international level, there are several certification systems that have developed and adapted their version for urban scale: "BREEAM" Communities (United Kingdom), "LEED®" Neighborhood Development (United States), Green Star Communities (Australia), "CASBEE" Urban Development (Japan), "DGNB" Urban Districts (Germany), "HQETM" (France), Pearl Community Rating System (United Arab Emirates). Within this group the most widely used worldwide were analyzed. This condition was determined by counting the number of certifications granted to date for each system in its urban-scale version, taking as a cut-off line those systems with more than ten certifications granted.