

Recent market assessment and legal framework for BEMS in Greece

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ABSTRACT

During the last two decades, the Building Energy Management Systems (BEMS) showed a systematic development in Greek market. Many factors affect the BEMS' penetration into the Greek market. Among others, the most important are the increment of private building construction activity and the establishment of a relevant legal framework to comply with the respective European one. The aim of this paper is to present the development of BEMS' market in Greece and the legal framework that should comply with the European Directive regarding the energy performance of the buildings. The latter is expected to play an important role in speeding-up the penetration of the BEMS in the Greek market.

1. INTRODUCTION

The BEMS were developed systematically after 1980 in house complexes and service buildings. Because of the high BEMS' cost, the first buildings equipped with these systems were banks, large office buildings and deluxe houses.

Major factors of BEMS' market development are the increment of building construction activity, the sensitization for energy saving issues and environmental protection in Greece and the reconciliation of the relevant national legal framework to the respective European one.

In this article, the current state of the BEMS' market in Greece and the major factors which affect it are initially presented. The most important of them are the building construction activity, the purchase and installation cost of BEMS, the customers' awareness concerning BEMS,

the performance, the reliability and the support of the BEMS after their installation.

The effect of the relevant legal framework to the BEMS' market development in Greece is then investigated. The Greek legal framework, in reconciliation with the respective European one, has recently signalized a new period for the country's energy issues and particularly for the building construction activity. It introduces legal acts and norms to promote the rational use and management of the energy, the incorporation of renewable energy sources in buildings and the improvement of building construction quality, which are placed among the fundamentals of sustainable planning and ecological building construction. At the same time, the citizens' awareness regarding the energy savings and other quality features of the buildings they live or work is maintained (Delvaux, 2003).

Finally, in this article the interaction of the financial, social, legal and cultural conditions, the climate, the local singularities and the available means for achieving healthy living conditions and indoor air quality with simultaneous energy savings is revealed, in order to select and formulate the recommended measures for improving the building energy performance.

2. BEMS' MARKET IN GREECE

2.1 Overview

The building construction activity in Greece had been following a cadent route prior to 1995, when it reached its lowest price. Since 1995, as a result of the decrease of the cost of money, this cadent route turned over. Until today, the

increment of building construction activity has been constant and the trend is that it will be continued unflaggingly during the following years.

The Building Energy Management Systems seem to penetrate dynamically the Greek market. By 1995 BEMS' sales run to 43 M€/year, that is the 3% of the European market.

Assuming an increment proportional to the respective European one, we anticipate that in 2010 the sales of BEMS in Greece will run to 468 M€/year.

2.2 Problems for BEMS' market development

Several factors affect BEMS' market negatively, being, at the same time, fields of corrective actions.

2.2.1 The high cost of BEMS

The cost of BEMS could sum up to the 7-10% of the total cost of a building construction. However, because of the energy savings achieved by the BEMS, the initial capital for the installation is depreciated in a short time.

During the following years, the trend of the BEMS' market price is not expected to be cadent. On the other hand, the value of the systems, in comparison to the initial capital, is expected to increase (EC Atlas Report).

2.2.2 The lack of information and planning services

Researches have shown that the customers' knowledge about the benefits they can obtain from the application of such systems is limited. A crucial factor of the BEMS' promotion is the competence of the person who installs the systems (UK1, 1994).

2.2.3 Risks in efficiency, reliability and inadequate support

The risk of low efficiency or unreliability (breakdown) of BEMS is still high and it is related mainly to the low compatibility between the parts of the system (given that the benefits of those systems have a straightforward relation to their availability and efficiency).

2.3 Native Private Building Construction Activity

A thorough analysis of these data can be found in the recent (2003) report of the Institute of Economy and Constructions, under the title

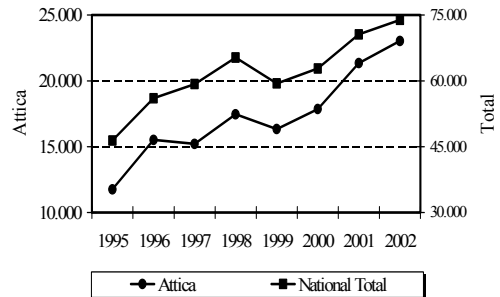


Figure 1: Private Building Construction Activity, in thousands m³. Source: Data process National Statistic Service of Greece - Assessments Institute of Economy and Construction.

"Diachronic Evolution and Recent Trends in Native Private Building Construction Activity" (Fig. 1).

Focusing to the most recent evolutions of the native private building construction activity it is worth to note the following:

In the whole country, the private building construction activity increases with a Mean Annual Rate of Variation (MARV) of 7.55% during the 1999-2002 quadrennium. The regions of South and North Aegean Islands appear to have the highest increment with a MARV of 20.9% and 17.8% respectively and the region of Ionian Islands a 16.6%. During the same period, the regions of West Macedonia appear to have a MARV decrement of -5.3% and the region of Thessaly a -1.2%.

In 2001, the private building construction activity was 12.36% higher (volumetric increase) compared to that of 2000. The highest percentage increments appear at the regions of Central Greece (31%), East Macedonia – Thrace (26.9%) and South Aegean Islands (20.1%). On the contrary, in the same year, two regions showed a decrement compared to that of 2000 (West Macedonia -2.9% and Thessaly -1.4%).

Finally, according to the distribution of the total private building construction activity, it is worth noting that the most important region is that of Attica, since it participates to the total by a 29.35% in average, while the second one is the region of Central Macedonia participating in the total with a 19.8% in average.

3. LEGAL FRAMEWORK FOR BEMS IN GREECE

3.1 EC Directive on the Energy Performance of Buildings (2002/91/EC)

The Directive 2002/91/EC on the energy efficiency of buildings (Official Journal of the European Communities L 1, 4.1.2003, p.65) is adopted, after a lively discussion at all levels and with overwhelming support from Member States and the European Parliament, on 16th December 2002 and entered into force on 4th January 2003. The objective of the Directive is, having regard to the articles 6, 174 and 175(1) of the Treaty established the European Community, to promote the improvements of the energy performance of buildings through implementation of cost effective measures.

The Directive is designed to comply with Kyoto Protocol and to respond to issues raised in the recent debate on the Green Paper on energy supply security. According to the Kyoto Protocol (May 2002) the EC Member States must reduce their greenhouse gas emission by 8% compared to 1990 levels between 2008 and 2012 and the progress towards meeting the target must be made by 2005. The European dependence on external energy sources and the promotion of energy savings in buildings and in transport section were the major points emerged during the debate on the Green paper on Energy Supply [November 2000 – COM (2000) 769 final of 29th November 2000] (Bowie and Jahn, 2003).

The Directive follows earlier measures which were adopted before the Kyoto Agreement and before the uncertainties recently raised in connection with the energy security in the Union. Council Directive 93/76/EEC (13 September 1993) in order to limit carbon dioxide emissions by improving energy efficiency (SAVE) [Official Journal of the European Communities L 237, 22.9.1993, p. 28], required Member States to develop, implement and report on programs in the field of energy efficiency in the building sector. However, the Commission, proposing this new Directive in 2001, felt a need to provide for a complementary legal instrument at a Community level, including more concrete action with a view to achieving the great unrealized potential for energy savings and for reducing the large differences between Member

States' results in this sector (Jager-Waldau and Ossenbrink, 2003).

In order to emphasize the significance of the energy efficiency of buildings, the energy consumption in EC buildings is briefly presented. In 2001 there were about 178 million buildings within the 25 member states of the European Union, accounting for more than 40% of the final energy consumption. Of this, around 2/3 was consumed within homes and 1/3 within commercial buildings. The energy for heating/cooling and hot water represents around 70% of domestic energy consumption and 50% of commercial energy consumption. While the energy demand for industry has been relatively stable, the residential and tertiary sector, the major part of which is buildings, has the trend to increase its energy consumption and also its carbon dioxide emissions.

The aim of the Directive is to 'promote the improvement of the energy performance of buildings within the European Community, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness' (Dahlsveen, 2004). This is to be achieved through the following main actions:

- The creation of a general methodology following a framework provided by the Directive that can be used to calculate the energy performance of buildings. To find the most effective measures for each individual building a multidisciplinary evaluation is needed an energy audit (energy, environmental and economy evaluations and calculations). Member States apply the methodology at national or regional level.
- The application of minimum requirements, as measured by the methodology above, to all new residential and tertiary (generally public and commercial) buildings and to the major refurbishment of existing buildings with floor areas greater than 1,000 m².
- The introduction of an Energy Performance Certificate (EPC) to be available whenever a building is constructed rented out or sold.
- Regular inspection and assessment of boilers, heating systems and air conditioning installations (Elmorth, 2003).

It is noted that the article 4 par. 3 of the Directive institutes a wide exceptional clause. The

Directive, apart from others, also excludes the residential buildings, which are intended to be used less than four months of the year. This exception is noteworthy because in Greece the number of country houses is significant, especially at the seafrosts of the Central Greece and at the islands.

The Directive must be translated in to national law by January 4th 2006. However the implementation of certain parts of the Directive by national governments can be delayed if there is a lack of suitably qualified independent experts. If this proves to be the case then Member States will be given an extra period of three years to fully apply the provisions (Dahlsveen, 2004).

3.2 Application issues of the Directive 2002/91/EC in the Greek legislation

The Directive 2002/91/EC augmented the actions, the standards and the methods, already provided by the Directive SAVE 93/76/EEC in order "to limit carbon dioxide emissions by improving energy efficiency" which was the first European approach of the energy performance of buildings.

The Greek legislation complied with the Directive SAVE issuing Joint Ministerial Decision (JMD) 21475/4707/19.08.1998 [Government Gazette (GG) B' 880] for the "limitation of the carbon dioxide emissions provided with the setting of measures and requirements for the improvement of energy performance of buildings". With this JMD, the measures for the energy savings and the use of renewables in new and existing buildings, of all uses and categories and in residential blocks as well, were set in order to limit the carbon dioxide emissions.

For the implementation and application of the above JMD the requirements of the energy performance were set in the framework of a new Regulation scheme, the *Regulation of Rational Use of Energy and Energy Efficiency* (KOXEE). This plan was to replace the current Regulation of Heat Insulation, [Presidential Decree (PD) 1-6/4-7-1979]. The aim of KOXEE was to establish the required procedures, methods and mechanisms of the application, which would constitute the base for the implementation of the energy certification, calibration of the buildings and the issuance of the *Energy Performance Certificate* (EPC). It is worth noting, that at the

same time a scheme PD regarding the motivations for the energy savings in buildings was also compiled. However, as both cases weren't definitively acknowledged and established, they still today remain in a form of "schemes".

The KOXEE should be applied for the issue of the building construction permit. In the building construction planning the introduction of an Energy Performance Certificate (EPC) for the building is obligatory and it has to be available whenever a building is constructed, rented out or sold. The country is subdivided into four climate zones for the calculation of the energy performance of buildings. All the existed buildings of the country are temporarily categorized based on energy and environmental performance, taking into account the date of the building construction.

In fact, the above scheme of KOXEE was modified and improved several times during the period 2002-2004 and its legal elaboration has been completed.

Meanwhile, in 2002, the Directive 2002/91/EC mentioned above was issued and the Member States must comply with this Directive by January 2006.

Until now, the Greek legislation, regardless of the fact that the plan of KOXEE is already completed and meets the requests of the Directive, it still hasn't issued any compliance administrative act.

3.3 Critical consideration of the existed Greek legal framework

The provisions of the current JMD 21475/4707/1998 and of the KOXEE plan, as it was modified and improved, present many similarities and they are consistent with the targets and directions of the new Directive of the Community 2002/91.

In particular, in the framework of JMD for the improvement of the energy performance, the buildings' climatic and local conditions, as well as indoor climate environment and cost-effectiveness are taken in to account. Yet, these measures should not contradict any other essential requirements of the buildings such as accessibility, safety and their intended use.

Besides, in the KOXEE plan, the energy performance of the buildings has been calculated on the basis of a methodology relative to that of the Directive 2002/91, which may be differenti-

ated at a national or regional level. In fact, apart from the thermal insulation, it also includes other factors that play an increasingly important role such as incorporation of renewable energy sources and generally the design of the building.

Of course, the above do not justify the compliance delay to the Directive 2002/91. They just demonstrate that the essential issues have already been taken into consideration by the Greek legislator, but the part of the official acceptance and their publication in Government Gazette remains and these procedures should be accelerated.

Apart from the typical compliance, the simultaneous establishment of measures, mainly financial motivations incorporated in the tax policy framework, which will facilitate the implementation of the existed legal framework for the energy performance of the buildings and make it more attractive, is required.

4. CONCLUSIONS

It is concluded that the BEMS' market is a significant one and in the future it is anticipated to present remarkable sale volumes, mainly due to the growth of building construction activity, the ongoing concern for energy saving and environmental protection, the relevant motivations and the reduction of rates of interest.

An important adverse factor that affects the development of the BEMS' market negatively is the fact that no special attention has been given to the customers' awareness and to the installation of the BEMS by experienced and properly skilled staff.

Since BEMS constitute an attractive asset for the market, in the field of law, the immediate compliance of the Greek legal framework to the relevant European one is required. This will be achieved not only by the speeding-up of the legal acceptance of the Regulation of Rational Use of Energy and Energy Efficiency (KOXEE), but also by the simultaneous establishment of measures, mainly financial motivations incorporated in the tax policy framework. These measures will facilitate the implementation of the existed legal framework for the energy performance of the buildings and they will eventually make it more attractive.

The outcome of the above will be the final definition of the legal requirements for the in-

corporation of BEMS in the building construction sector, which, in turn, will result in the establishment of the legal assurance conditions and the safety of transactions.

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