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A value creation tool in the sustainable building field: the LEED certification®

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Abstract This paper seeks to outline the key aspects of sustainability in the built environment by focusing attention on the LEED® certification system as a "universal" instrument to support the implementation, management and evaluation of sustainable buildings.
The first part of the paper describes the rapid spread of the LEED certification in recent years as a direct consequence of the capacity of this instrument rating to adapt to specific types of buildings as well as to different climatic conditions and morphological features of the sites.
The second part presents and analyzes the economic and financial aspects of sustainable buildings. Starting from international experiences in the field of sustainability, the present world then proceeds to describe the current Italian condition, highlighting market perceptions and opportunities for future development.

INTRODUCTION

The concept of sustainable development took shape in the Triple Bottom Line (TBL) approach (Brown, Dillard, Marshall, 2006), economy-environment-society, according to which true sustainability is achieved at the centre of a process that takes account not only of the natural environment but also of economic and social needs. Like every product, the built environment must therefore be placed at the centre of the sustainability pyramid and must be designed to ensure the highest economic value with the lowest consumption of natural resources and with respect for the welfare of individuals. But how can the sustainability of building processes be measured?
Protocols for the environmental certification of buildings began precisely in response to this question. Environmental certificates establish a pattern of performance indicators as a benchmark and provide for the assignment of marks in relation to the achievement of objectives of excellence with respect to a standard performance.
Among the certification protocols that are currently available, LEED® (Leadership in Energy and Environmental Design) is the most widespread at a global level.

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AN INTRODUCTION TO LEED CERTIFICATION

Methods for the design, construction, management and use of buildings have a very huge impact on the future of the environment. Buildings consume a massive amount of energy and water and make a substantial contribution to carbon dioxide emissions that aggravate global warming while consuming 40% of raw materials at a global level (Watson, 2011). USGBC (U.S. Green Building Council) set up the LEED certification system to provide a reference tool for the implementation of efficient buildings that are healthy and sustainable from an economic point of view as well. LEED is a programme for sustainable architecture that is recognized at international level, able to provide operators in this sector with a reference framework to identify and implement project and construction practices in which the level of sustainability of the intervention can be measured in every phase of the construction process, up to the time when the built structure reaches the management and maintenance phases.

Launched in 2000, by now more than 22,000 projects in the world have achieved LEED certification and more than 39,000 other projects have been LEED-registered and are on the way to achieving the certification. Taken together, these projects represent a total of more than 1 billion square metres of LEED space.

There are four levels of LEED certification, called respectively *"Certified", "Silver", "Gold"* and *"Platinum"*, depending on the level of sustainability achieved in the intervention. The system is based on a score that is linked to the achievement of the sustainability objectives obtained in the following specific works categories that cover the whole construction process: Location and Transportation; Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality. The systems for LEED certification are applicable in respect of new buildings and interior spaces with different uses (residential, commercial, health-related facilities, offices, schools, etc.) and for various types of existing buildings as well as for neighborhood developments.

LEED is a "voluntary" programme that provides those who are involved in the transformation of the land (clients, real estate companies, designers, operators in the construction industry) with the necessary tools to determine the consequences on the performance of building structures of measures aimed at the reduction of consumption levels and at increased efficiency in the use of resources while at the same time designing units that are environmentally healthy for the users of these buildings. While it is of fundamental importance to consider the impact that the construction industry has on our planet for the safeguarding of environmental resources, it is also equally important to assess the impact that the quality of buildings has on the people. Human beings in fact spend on average 90% of their time in closed environments: the principles of sustainability such as the use of natural light, air quality in indoor environments, the use of non-toxic materials with a low content of VOC (Volatile Organic Compounds) or with no such content at all, create environments that are more healthy and contribute to the prevention of some diseases that are very widespread. It has been demonstrated that when building redevelopment brings about an improvement in the quality of indoor air, the diffusion of natural light and higher perceptions on the part of users, there is on the one hand a reduction of up to 20% in communicable respiratory diseases and a drop of up to 25% in allergies and asthma syndrome while there is on the other hand a reduction of up to 50% of the effects of psycho-physical discomfort (Fisk, 2000). Medical studies have shown that interventions on health-related aspects of indoor air inside buildings could reduce by more than 65% the incidence of asthma cases among children of school age (Source: U.S. Centers for Disease Control and Prevention, American Journal of Respiratory and Critical Care Medicine).

LEED: A SYSTEM OF INTERNATIONAL CERTIFICATION

U.S. Green Building Council (hereafter referred to as USGBC) is a non-profit organization that is dedicated to the promotion of growth and to a sustainable future by means of efficient construction practices in economic fields and in the energy sector. USGBC was set up in 1993 and since 1996 commenced action on the promotion of the first Protocol of LEED certification through the work of LEED Committees, interdisciplinary working groups consisting of researchers, professionals and representatives of the construction industry. In 1999 USGBC, together with the Green Building Council and representatives of Australia, Canada, Japan, Spain, Russia, the United Arab Emirates and the United Kingdom, launched the World Green Building Council (WGBC), a multinational organization that today includes the Green Building Council of more than 80 countries around the world and promotes and supports their growth as a monitoring organization that can guide the construction market towards the objectives of environmental, social and economic sustainability.

The year 2000 witnessed the launching of the first LEED protocol, applicable to new buildings and renovations. Between 2000 and 2008 the first protocol was backed by other versions of the LEED system to expand and at the same time specialize the offer of certification among different categories of buildings. In particular, systems such as LEED for Commercial Interiors™, LEED for Core & Shell™, LEED for Existing Buildings™, LEED for Schools™ and LEED for Homes™ were introduced. (Figure 1) LEED ratings systems are updated through revisions on a regular development cycle.

There are three basic types of LEED improvements

1. **Implementation and maintenance of the current version of LEED.** This process includes the correction and clarification of credit language as well as fixing more substantive inaccuracies and omissions, which require a more rigorous review and approval process.
2. **Adaptations.** The process for adaptations to existing ratings systems and their credits provides an efficient and streamlined approach for responding to the particular needs, constraints and opportunities of different project types.
3. **Next version.** This is the comprehensive improvement phase of LEED development that occurs through a periodic evaluation and revision process. This phase includes multiple avenues for stakeholder input and final approval by USGBC members.

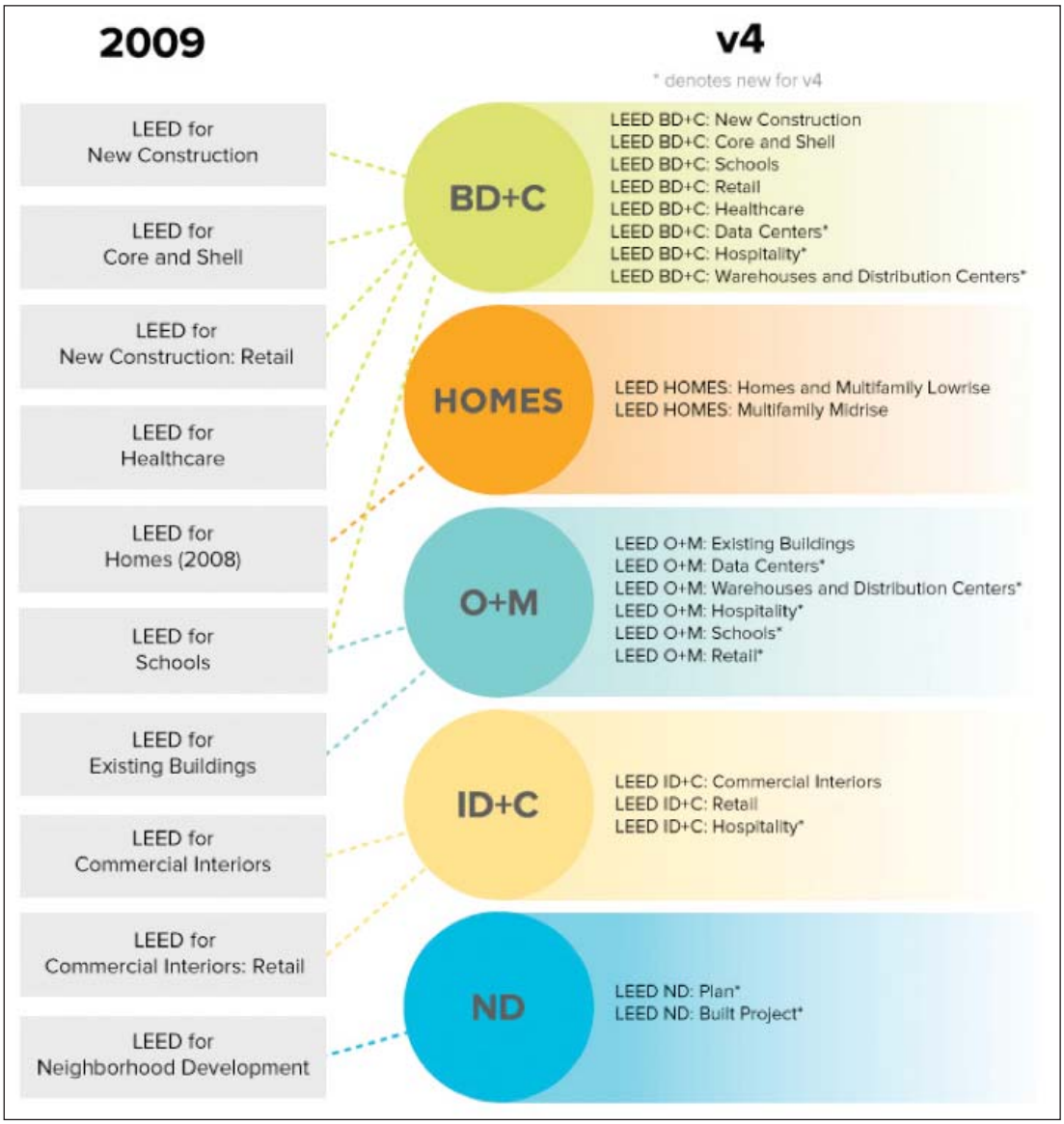
Following the ever increasing popularity of LEED protocols in the United States and in order to ensure their correct application, USGBC instituted a programme of professional accreditation by experts of LEED procedures, the LEED AP®.

USGBC also developed an IT platform – LEED Online – to send certification documents in order to streamline and simplify procedures.

The Green Building Certification Institute (GBCI®) was set up in 2008. This is an independent body that administers LEED certification and the accreditation process and the continuing education of professionals who work in the field of certification and the sustainability of buildings.

The decision by USGBC to separate the management of certification procedures and professional accreditation from research, the promotion of a culture in favour of sustainable construction and the drafting of certification protocols is intended to ensure maximum fairness and effectiveness as well as to implement certification procedures with the utmost technical rigour. In addition, the massive growth in the registration of projects between 2007 and 2008 and the expansion of the protocol outside US territory have rendered necessary the setting up of an agency dedicated to logistical and organizational management.

Figure 1 LEED© certification systems U.S. Green Building Council [copyright U.S. green Building Council]



Throughout its history USGBC has launched new versions of all the protocols, enriching and updating them in relation to the evolution of the market for sustainable construction. The goal of USGBC is to continuously update evaluation guidelines so as to ensure that high quality standards are maintained in line with technological innovations.

Between 2009 and 2011 the offer for certification was enriched by three new protocols: LEED for Neighborhood Development™, LEED for Retail™ and LEED for Healthcare™, while the latest update of the certification protocol LEED v4, which again expands the various types of buildings that can be certified, was officially presented to the public in November 2013. This last version comes at the end of a long process of review and upgrading that led to the emergence of a new concept of sustainable construction. LEED v4 builds on the fundamentals of previous versions while offering a new system that prepares all LEED projects in a portfolio to perform at a higher level. Highlights of LEED v4 include:

Figure 2 The distribution of LEED certified projects in the world [copyright U.S. Green Building Council]

- New market sectors: New market sector adaptations for LEED include data centers, warehouses and distribution centers, hospitality, existing schools, existing retail and mid-rise residential projects.
- Time saving support tools and resources: Simplified LEED credit submittal requirements, descriptive step-by-step reference guide materials with videos and tutorials, and a more intuitive technology platform.
- Building performance management: LEED v4 is focused on outcomes so that building owners have a better understanding of how to manage their buildings to meet full performance potential.
- New impact categories: Climate change, human health, water resources, biodiversity, green economy, community and natural resources.

DISTRIBUTION OF LEED[1] CERTIFICATION

The LEED certification system is now the most widely used around the world with projects in more than 140 countries.

LEED space, certified and registered, (according to the USGBC) exceeds 1 billion square meters Excluding North America, Asia is the continent with the highest percentage of certified and registered projects: China and India are the countries in Asia where the LEED protocol is mostly spread. The Middle East follows, particularly the United Arab Emirates, and South America with Brazil in the lead. Brazil has a Green Building Council that is very active and that promotes the transposition of the protocols according to appropriate regional characteristics.

In Europe, Germany is the country with the largest number of LEED certified and registered projects: 97 certified projects and 268 registered projects. Italy has up to now 64 certified projects and 167 registered projects for a total of 231 LEED projects which are equivalent to a gross area of 3,473,927m². Among the projects in Italy there are 59 which apply the protocol LEED Italia Nuove Costruzioni e Ristrutturazioni promoted by GBC Italia, 13 of which have already received the final certification.

1 USGBC provided all statistics in this section, updated to April 2014.

In Italy LEED has experienced a progressive increase in interest since 2008, the year when Green Building Council Italia was set up. Green Building Council Italia has in fact promoted measures aimed at spreading the LEED method and has also been responsible for the translation and for the adaptation of the certification protocol in the light of the Italian situation, favouring its application in the national territory. Furthermore, GBC Italia has promoted the concept and the drafting of certification protocols based on the LEED method to be applied to particular building types that have special characteristics in our country, such as housing (GBC Home), the urban fabric (GBC Quartieri) and interventions on historic buildings (GBC Historic Buildings).

ELEMENTS OF FLEXIBILITY IN LEED CERTIFICATION

LEED is a rating system that continues to evolve even in its international components. The global coherence of LEED, which in fact constitutes its highest level of leadership, is essential to achieve the objective of accelerating practices for the development of sustainable construction around the world. Spurred by this thinking, USGBC developed global Alternative Compliance Paths (hereafter referred to as ACP), namely options within the LEED credits to make the tool more flexible and consequently more adaptable to projects in different parts of the world. This approach allows the development of ad hoc solutions for every nation while keeping a single protocol structure and a common language among operators. In Italy, for example, by virtue of its membership of LEED International Roundtable, Green Building Council Italia has shown its leadership quality by means of the establishment of a working group on security (*Gruppo di Lavoro per la Sicurezza*) and the development of ACP for the certification of existing buildings. GBC Italia has played a crucial role in bringing greater attention to safety in workplaces within LEED. Furthermore, since Italy is characterized by the presence of numerous historic buildings, the method for the certification of existing buildings must take account of conservation elements that render the role of GBC Italia particularly significant with regard to this aspect even from an international perspective.

SUSTAINABILITY AS A VALUE CREATION TOOL

The importance of sustainability in real estate investment decisions is now widely perceived, particularly in developed markets such as the United States where the LEED was designed.

Scientific literature on this subject recognises the existence of several financial advantages both for the tenant and for the owner (McNamara, 2011; Fuerste, McAllister, 2011).

Sustainable buildings are in fact more attractive to their end-users thanks to the possibility of an increase in worker productivity as a result of an improvement in the environment and working conditions (Delmas, Pekovic, 2013). Besides, companies that use sustainable buildings have positive effects on their reputation and greater ability to attract talents.

The tenant, in fact, is interested in the full cost of use, in other words the sum of the rent and the other operating expenses. The use of more energy-efficient buildings allows savings on the second component (a reduction in operating costs, particularly energy and water savings). As a consequence the tenant can sustain a higher rent with the same expense or at an even lower cost (O'Shaughnessy, Bernstein, Young, Flanagana, Jewell, Russo, 2008).

From the investor's point of view, greater customer satisfaction arising from the combination of better quality in the spaces and greater economic efficiency favours an increase in the occupancy rate (Mc Graw Hill Construction, 2008 e 2009), and high rates of pre-letting in certified buildings (Chappell, Corps, 2009). In addition, there is a reduction of the investment risk due to the greater attractiveness of sustainable buildings, thereby favouring the asset liquidity as a result of the shorter sales time required (Jackson, 2009). In the Italian market this aspect is particularly important in large urban contexts such as Milan and Rome where the demand for these assets from foreign investors is high while the supply is currently low.

Moreover, at a global level, the awareness of the need to link the tax burden to the sustainable standards of the building is growing (Plimmer, McCluskey, 2011). As of today various States (Nevada, Maryland, New Mexico, New York, Oregon) and several other American cities (including Cleveland, Philadelphia, Cincinnati) grant tax benefits linked to the ecological performance of the buildings.
Another aspect that is of fundamental importance is the possibility to obatain a greater supply of bank credit and/or a lower interest rate to finance sustainable buildings. There have already been cases of primary American credit institutions (for instance, Wells Fagiacomorgo & Co. and Bank of America) that have set up specific financing programs linked to real estate portfolios that are LEED certified (UNEP 2010). The recent experience in the United States of a "green bond", in other words, of debt securities that have underlying sustainable real estate portfolios, seems to confirm the strong interest for financial products of this type. They are in fact characterized by a lower yield required by investors as a result of a reduced risk associated with the underlying portfolios (Green Securities LLC, 2013).

THE VALUATION OF SUSTAINABLE PROPERTIES

The high level of transparency of the US real estate market, coupled with the presence of professional operators who register market transactions by taking account of a large number of "characteristics",[2] including the presence of LEED certification, has made it possible to perform several studies with statistical significance.[3] Analyses based on comparisons between groups of "traditional" buildings and groups of certified buildings in limited geographic areas, resulted in higher rents (6% premium) and higher selling prices (16% to 35% premium) for certified buildings (Fuerst, McAllister, 2009 e Eichholtz, Kok, Quigley, 2010). In Italy the absence of accurate and reliable data on market transactions has prevented any possibility of undertaking statistical studies similar to those performed in the United States.
Discounted cash flow ("DCF") models represent an alternative to statistical analysis. DCF models require several assumptions to be made (such as renewal probability and timing, different growth factors, non-recoverable costs, vacancies, capital expenditures, capitalization and discount rates, etc.). Each of these elements is affected not only by the specific market in which the asset is located but also by the sustainable characteristics of the building and by the existence or the absence of a certification. As of today, unfortunately, even with regard to the American market, only little and conflicting data are available to estimate such aspects in the specific field of sustainable buildings. In addition to the scientific works mentioned earlier regarding price and rent premium, several studies have shown reductions in the operating costs of sustainable buildings ranging from 8.5% to 13.6%, increases in the employment rate between 2.5% and 6.4% (Mc Graw Hill Construction 2008 and 2009) and case studies have reported lower vacancy rates and higher percentage of prelease in certified buildings (Chappell, 2009).

SUSTAINABILITY IN ITALY: EVIDENCEFROM A SAMPLE ANALYSIS

As the presence of green certified buildings in Italy is still limited, quantification of premiums and discounts is a very challenging task, and the only way, both for researchers and practitioners, to assess market development is to survey professionals regarding actual and future perceptions. From a study carried out in 2011[4] (Morri, Soffietti, 2013) on a sample of over 2,400 persons, mainly professionals

2 CoStar Database (www.costar.com) is a well known "*provider of real estate information*".

3 The methodology used is called the hedonic pricing method and is a method to estimate the market value of certain goods and services by means of the use of multivariate regressions in order to isolate the contribution that a single characteristic (for example, the presence of LEED certification) gives to the total value of the asset.

4 Done in collaboration with Cushman & Wakefield and with Green Building Council Italia.

and investors operating in the real estate sector, significant information on current perceptions and on possible future developments in the sustainable construction filed emerged. The survey, consisting of a web-based[5] questionnaire that included 22 questions divided in four main fields ("sample data", "certification and sustainability", "costs, risks and premiums" and "taxes, laws and sustainable policies") made it possible for the first time in Italy to obtain a direct feedback from economic operators regarding real estate sustainability. The vast majority of the sample was 35 to 55 years old (75%). Only 12% were younger than 35 and 13% were over 55, an overwhelming majority of the sample (99%) answered that sustainability plays a major role in the construction business. 60% of the respondents tend to identify sustainability mainly with energy saving. Almost 90% of respondents perceiving an increased demand for sustainability seems to indicate that green building in Italy is here to stay and that it has the potential to significantly affect construction jobs, products and buildings.

Approximately 50% of respondents expected extra construction costs in the order of 5-10%; 30% thought that additional costs would be higher than 10%, while 20% expected an expense differential of 5% or less. Similar results came out for positive price differentials that stand at between 5% and 10% for 52% of respondents and more than 10% for 24% of respondents.
The vast majority of respondents (84%) indicated that they believed in a high degree of preference for sustainable buildings by tenants, but 81% thought such preference to be strictly tied to lower operating costs. Only 6% of respondents think that tenants might be willing to pay a "net" higher rent due to the presence of a certification. It should be noted, however, that as much as 79% of the sample feel that sustainable characteristics may reduce the risk of the so-called "*brown discount*", *i.e.* lower rents resulting from the absence of a certification.
In line with the experience of other Western countries (particularly the USA and the United Kingdom), also in Italy it is now possible to observe a preference of large multinational companies, typically more concerned about sustainability, to acquire or lease sustainable properties, preferably with a certification label.
The overall risks linked to investments in sustainable buildings are seen as being in line with those of other real estate investments, while there do not yet seem to exist "preferential credit lines" for financing (70% of the sample do not see any encouragement by the banks in providing credit linked to these properties).
In conclusion it can be said that a significant interest concerning real estate sustainability in Italy exists; there also seem to be a clear perception of its economic and financial advantages as well as an awareness of the incremental costs, which are in line with the findings of other studies (Eichholtz, Kok, Quigley, 2013; Reichardt, Fuerst, Rothke, Zietz, 2012) conducted in the United States and in the United Kingdom. However, only a further increase in the number of sustainable buildings and, consequently, of transactions can contribute to establish a solid basis on which to perform more thorough statistical studies.

CONCLUSIONS

Certification is evolving from a "time" experience (the certification of a new construction or of an existing building which retains its certification forever or for a number of years) to a process that is continuous and permanent: a sort of "**lifelong certification**" based on continuous monitoring of the behaviour of buildings. The process of "**continuous certification**" brings along with it several other aspects, particularly those related to monitoring buildings performance and the collection of data.
With regard to these issues LEED comes as a fundamental platform for project development at an in-

5 The questionnaire was distributed by e-mail and received a total of 270 replies.

ternational level, that is to be pushed forward with the awareness that work in this area is just at the beginning: the eco-certification of buildings represents in fact not only an opportunity from the sustainability point of view but also a valid economic and financial choice.
One of the strengths of the LEED model is represented by the continuous updating of the rating system that is carried out both by USGBC personnel and by countless volunteers and professionals in the construction sector. USGBC is currently trying to remove the barriers and to create compliance paths in order to facilitate the development of sustainable projects on an international scale, regardless of the geographical location and of the type of building.
With regard to the dissemination of the concept of sustainability at a global level, if the United States represent a positive example that has considered greenbuilding at the centre of attention for more than twenty years, Italy is now at an important turning point. The economic crisis has certainly imposed a slowdown on the renewal of the architectural heritage but it has not interrupted its innovative thrust. This is confirmed by the completion in recent years of a growing number of certified buildings and by a significant interest by multinational corporations for innovative and efficient spaces.
As a consequence, it is likely that in the near future we will witness the completion of a significant number of additional sustainable projects and their introduction on the market.

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