

Sustainable management strategies improve building performance: the case of Italian large building owners

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ABSTRACT

Current market expectations go behind the delivery and management of buildings that are in compliance with health and safety requirements as established by building codes and standards. The sustainable approach to the built environment seeks to reduce the environmental impacts of buildings. The comprehensive connotation of sustainability includes criteria that are ecological, economical, social and cultural.

The European region is highly committed to meet the Kyoto's environmental goals. In 2002, the European Parliament issued a Directive to promote energy efficiency standards in buildings in relation to outdoor conditions. Corporate and institutional facilities management departments have not yet thoroughly adopted sustainable development strategies. Typical obstacles to change in organizations are the need to maintain status quo and minimize the bottom line. To employ sustainable management strategies, facility managers could use industry-tested tools such as benchmarking and life cycle assessment.

This paper describes the significance of the sustainable approach for facility management strategies and the particular role that technologies have in developing data base(s) for more accurate resource allocation. This paper discusses those components that can be successfully integrated within a set cultural framework in terms of improving the owner's bottom line and the owner's image by providing a facility asset that is cost effective, healthier and better for the global environment. The paper makes its points by discussing the case of a facility manager of a large public building complex, operating in Italy.

Despite the difficulties of assessing management practices, their inclusion within building environmental assessment methods is critical from the standpoint of reinforcing the relationship between building design and building operation.

INDEX TERMS

Facilities management; Sustainability; Healthy environments; Benchmarking

INTRODUCTION

Current market expectations go behind the delivery and management of buildings that are in compliance with health and safety requirements as established by building codes and standards. Current practices and new scientific knowledge on health risks associated with environmental hazards, such as mould growth, have shown the magnitude of the interest/risk and introduced new aspects in facility management (FM). Since 11 September 2001, occupants and public's expectations for the ability of the buildings to keep occupants safe and healthy have been raised and because of that also the insurance industry has changed attitude in conducting its business toward the construction industry.

The subject of healthy buildings can be studied and addressed at different stages of building life (i.e. design, pre-construction, construction, commissioning, operation and maintenance). All stages, while sharing common principles, have different applicative aspects that make them unique and call for specific tool development for risk avoidance. Because a large

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segment of the building stock is already existing, working in tools for environmental risk avoidance is of utmost importance.

The term sustainability, as used in research and government policies, includes criteria that are ecological (e.g. resource conservation), economical (e.g. long term conservation and renewal of resources), social (e.g. social capital and intergenerational equity) and cultural (e.g. conservation of cultural diversity). While there is an international agreement on the concepts that define sustainable development this is only the beginning in addressing the need of the different cultural systems. In fact, local strategies must be identified to meet the regional needs.

The promotion of healthy indoor air, energy efficiency and the minimization of environmental impacts are essential to sustainable development. A sustainable approach to the built environment seeks to reduce the environmental impacts of buildings. It includes an overall protection approach to land-use, to the design and construction strategies as well as the type of resources needed during the operation and maintenance phase. This paper focuses on operation and maintenance using as a case study a facility manager in charge of a large public building portfolio.

THE EUROPEAN REGION'S AND THE ITALIAN'S ENVIRONMENTAL AND HEALTH COMMITMENT

Europe is highly committed in promoting the effort as laid down in the Kyoto protocol and WHO targets (*WHO, European Health 21 target 10; Health 13 target 31*). This means to be able to *reduce the demand for energy by 18% by the year 2010, to contribute to meeting the EU's commitments to combat climate change and to improve the security of energy supply*. Advantage should be taken of all opportunities resulting from rational use of energy in buildings and transport systems.

Moreover, operational measures to save energy and improve sustainability simultaneously should contribute to an increased indoor environment quality, considering health, comfort and safety. These efforts should, therefore, be in line with the health targets specified by the WHO Europe:

- *By the year 2015, people in the Region should live in a safer physical environment, with exposure to contaminants hazardous to health at levels not exceeding internationally agreed standard. (European Health 21 target 10)*
- *By the year 2015, people in the Region should have greater opportunities to live in healthy physical and social environments at home, at school, at the workplace and in the local community. (European Health 31 target 13)*

The need for a coherent and integrated approach at all professional levels has been proven to be a necessary condition to meet the target of an eco-friendly, sustainable and minimal energy environment and the ambition of a healthy, comfortable and safe indoor environment. This includes the contribution of building owners and their facilities management departments.

In Europe, 40% of the 930 Mtoe of energy consumed is used in the residential and tertiary sectors. Approximately 20–50% of the consumption is related to heating and cooling purposes, depending on climate and economical development of the different EU countries. This means that increased awareness must be directed towards the problems concerning energy performance of buildings and associated carbon dioxide (CO₂) emissions. In 2002, the European Parliament issued a Directive to promote energy efficiency standards in buildings in relation to outdoor conditions (EU, 2002).

Because Italy has low energy consumption, 140 million Btu per capita, and one of the lowest energy intensity, 6603 Btu per \$1990, compared to other OECD countries, the task of reducing emissions is challenging. However, in spite the fact that Italy first adopted a Clear Air Act in 1966, and good results have been achieved in sulphur dioxide (SO₂) reduction, air pollution remains a serious environmental challenge and CO₂ levels remain very high in larger cities. In fact, in 1998, Italy emitted 120 million metric tons of carbon, 8% higher than 1990 levels. Italy plans to meet its quota of the Kyoto agreement by doubling the country's production of energy from renewable sources by 2010 and by reducing greenhouse gas emissions through energy efficient measures in the transportation sector (EIA, 2003).

THE BUILDING STOCK

The objectives of the European Parliament Directive, mentioned above, are to: promote the improvement of energy performance in buildings within the European Union in relation to outdoor climatic conditions; apply regulations regarding indoor climate; and assure cost efficiency.

Italian statistical literature indicates that the building stock is rapidly aging. The Italian building portfolio equals to 4000 million square meters of which 56% are for residential use, 28% for office and 16% for production. Currently, building renovations count for 60% of building investment of which 43.1% are for renewal and 17.5% for special maintenance. It is envisaged that by 2020 intervention on existing building will account for 80% of the market. This is particularly of relevance when evaluating indoor environmental risks if it is considered the tendency to abandon traditional construction techniques to prefer technological solutions that leads to a higher risk of indoor pollution.

Because of the economic relevance of the building industry (190 000 billion/year plus the equivalent in allied industries), which also sees a considerable employment factor (8% of the total), it is important to reach this sector by directing it towards objectives of sustainable energy and environment as hoped for by the International Community. This scenario underlines the key role played by facility managers in capital retention.

FACILITY MANAGEMENT AND SUSTAINABILITY

For the purpose of this paper, it is assumed that sustainability is viewed as a desirable direction for all building related activities. The focus is on client control of the technology and materials to be used in management of the built environment. FM operates on the premises that the efficiency of any organization is linked to the physical environment in which it operates and that the environment can be improved to increase its efficiency. The past decade has marked a shift from thinking of facilities as a way to house the workforce to thinking about the entire building portfolio of a company in strategic terms. Managers are beginning to think of their buildings as a way to achieve strategic corporate goals and sustainability is becoming a strategic asset.

A growing number of companies understand the benefits of environmental stewardship, realizing that these values are transmitted to employees and customers. There is also a growing body of research that correlates environmental performance to stock portfolio performance. For example, mutual fund managers, for funds that invest only in socially and environmentally responsible companies, are now documenting ratings of companies' environmental performance.

However, corporate and institutional FM departments have not yet thoroughly adopted sustainable development strategies. Sustainable management strategies can both improve the owner's bottom line and the owner's image by providing a facility asset that is cost effective and better for the global environment. FM can provide a disciplined framework for the examination of many of the relationships between decisions and the satisfaction of the end

user of the property, whether in economic or environmental terms. It also provides a framework for the review of user satisfaction as business and other circumstances change.

TOOLS FOR MANAGEMENT OF THE BUILT ENVIRONMENT

Performance measurement is really at the heart of good facilities management practice. Most successful tools for measuring building performance are the time and quality based methods of life cycle costing (LCC) and benchmarking. By using the concept of time to define the real and full cost of any effort, LCC can be used to correct the myth of the high cost of sustainable strategies. Benchmarking also has dual uses for improving facility quality and encouraging sustainable strategies.

The differences with regard to sustainability as compared with other dimensions of the FM problem include primarily: longer term perspective required on what is already a long term asset; wider social, political and economic context over extended time period as part of an evaluation of sustainability; greater number of actors, participants and experts engaged in the dialogue affecting the decision; lack of a framework in which that dialogue can take place and the difficulty of managing the discussion to ensure a proper balance between the competing objectives; absence of feedback mechanisms which can be relevant to informed decision-making; weakness of evaluation tools to select and prioritize criteria for effective decision making (Brandon, 1999).

There are many management systems to secure sustainable buildings. But what is also needed is a formalizing of best practice modes into some coherent framework. In fact, it is believed that the portfolio, organizational and client end user needs would be better served if they were now to be reflected in a formal life quality framework that fitted within a client's business mission plan. In this perspective building performance improvements are viewed as economically valuable if they are considered as potentially conflicting with occupant productivity or other aspects of user satisfaction.

Unfortunately, although LCC and benchmarking are good for any FM strategy, they are tools that are not frequently used correctly or effectively. One of the limitations of LCC is that very few businesses pay all the costs. Investors and developers pay costs early in the life of the building, but tend not to pay the operating costs for the buildings.

THE 'SMALL STEPS' APPROACH TO WEB BASED FACILITY MANAGEMENT

Because of the above profiled Italian environmental policy context, Italian building owners are pressured to act on their portfolio to help the overall government agenda in meeting the Kyoto quota. Large owners, such as municipalities, are moving in that direction by qualifying the energy and health performance of their building portfolio and identifying more effective ways to manage it. Here is the case of the FM division, Sieco, of a large semi-public owner in organizing its services having in mind long term frames. In early 2003, Sieco managed a portfolio, primarily offices, with approximately 12 500 occupants. These buildings are divided into two areas: North and South. Most of their current portfolio was built in the past 40 years and includes a significant number of signature buildings.

Sieco's primary goal was to establish a FM organization in Italy, which could provide global services using standardized systems. To achieve this goal trends and improvements in technology clearly pointed to the Web as an integrated solution for facilities managers. Due to its collaborative nature, eventually the Web will provide the unifying thread across divisions.

Sieco reviewed a number of commercial off-the-shelf vendors to determine the best application that integrated with the partially existing CAD database. A computer aided facilities management and a computerized maintenance management system (CMMS) were adopted. Tasks that are automated in CMMS include: work order processing, accounting functions for labour and material management, central help desk, scheduling and project

management links. The system includes also an e-assessment of the quality of work provided on what was requested.

The overall space to be managed is divided in major authorities, each one led by an executive with a degree of autonomy, which meant a reality with several existing stand-alone work management systems. The main effort was to develop an occupancy database to monitor building performance and inform resource allocation. This meant developing consensus for adopting standard language and consensus on objectives to be achieved as shown in Table 1.

Table 1 Taxonomy of objectives to be achieved

Acquire decision support tools	Improve processes for	Provide e-services
Work management	Work management business	For clients (occupants)
Space asset management	Space planning and allocation	Procurement (in the future)
Project tracking and cost generation	Record keeping	
	Information flow	

In 2000, for pragmatic reasons the system was first applied to the most recent of their building portfolio. The implementation phase is not yet completed for the portfolio. Initial cost and information sharing, like in other cultural contexts, are the major barriers to be overcome in the implementation of the overall system.

CONCLUSION

Having been part of a surveying team for health and energy performance, and having had the opportunity to be in one of the buildings that had performance database and one that has not yet implemented the web system, it must be remarked that:

- Despite the difficulties of assessing management practices, their inclusion within building environmental assessment methods is critical from the standpoint of reinforcing the relationship between building design and building operation.
- Access to sets of consistent historical performance data allow for better correlation between the local operating conditions and the global context in terms of including economical, social and cultural criteria.

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