

AN ASSESSMENT OF ATTITUDES OF ENVIRONMENTALLY SUSTAINABLE OPTIONS (ESOS) AVAILABLE TO OCCUPANTS OF OFFICE SPACE IN SYDNEY HIGH-RISE BUILDINGS

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ABSTRACT

More than half of building energy consumption in the industrialised world is used for cooling, heating and lighting. In Australia, 86 per cent of total commercial building energy use is in these three areas. The purpose of this paper is to investigate, examine and assess how tenants attitudes impact on various factors of energy efficiency in high-rise commercial buildings. A structured questionnaire was sent to sixty randomly selected Organisations occupying office space in high-rise commercial buildings in Sydney Central Business District Area. This questionnaire was augmented with formal interviews. Twenty-five responses were received and of these, twenty were analysed. The results obtained indicated the strengths of the identified factors. The results obtained from the survey show that tenants restrain the acceptance of environmental issues and implementation of ESOs in high-rise commercial buildings in Sydney, Australia by demonstrating a confusing array of conflicting options, attitudes and obligations in respect to the environmental impacts of the buildings they occupy. The paper concludes with various recommendations to assist commercial building tenants that will also serve as lessons to be learnt for developing countries.

INTRODUCTION

Developed and less developed countries, are increasingly becoming concerned about environmental issues. Particular concern is being given to the consequences of greenhouse gas emissions, the reduction of both renewable and non-renewable resources, waste disposal methods and threats to bio-diversity

The focus of this research is on industries that are major users of natural resources and major emitters of substances that cause environmental harm and the performance of commercial buildings, which use environmental resources at the construction, operation, refurbishment and demolition phases of their life cycle.

Thus, the environmental performance of buildings contributes to the environmental performance of the economy and society (Australian Productivity Commission, 1999).

Companies are one of the dominant social institutions of society. Tenants of commercial buildings, in the broader context, are examined because their roles as companies are changing in respect to environmental issues. Explaining the changing roles of companies, Stigson (1999) comments that in many parts of the world Governments are retreating from their earlier broader role in society and private sector is being asked to fill the gap. Companies are also facing expectations from local communities, employees and individuals to actively be involved and produce results in areas that were previously the undisputed province of government (Stigson,1999). Companies as tenants of commercial buildings in developed and less developed countries can influence the type of buildings

that are built through their demands as consumers. Through their demand, companies can steer developers towards sustainable development that includes Environmentally Sustainable Options (ESOs). Also, companies can adopt ESOs as tenants of commercial buildings at the retrofit stage, that is, with the present supply of existing commercial buildings.

The National Greenhouse Strategy (1998) recognises that energy savings in commercial buildings are one of the major ways to reduce CO₂ and various greenhouse emissions and that global warming is an issue of global scope.

The issue of energy savings and its recognitions should be an important aspect in commercial buildings approval in less developed countries for the purpose of reducing CO₂ and sustaining the environment.

Therefore, the construction industry, in both developed and less developed countries, contributes significantly to local and global deterioration of the environment. It is now faced with some key environmental issues as identified by the Chartered Institute of Building in the UK: destruction of the ozone layer; the greenhouse effect; and the loss of tropical rainforest (Bright and Lown, 1991).

Prasad (1994) explains the need for sustainable development as the risk that humanity faces should it be unlucky in the 'lottery' of climate change is gigantic.

The need for accepting environmental issues and the implementation of ESOs in commercial buildings is therefore imperative in order to avoid such a prospect. However, in order to achieve the full benefits of improved energy efficiency technologies in the high-rise commercial building sector world wide, a better understanding of the consumer decision-making process is required.

This study therefore extends recent work in Australia: Low (1998) by revealing the technology available to tenants of commercial buildings to reduce consumption at the retrofit stage, Greene (1991) further exposing tenants as main players in the decision making process when considering ESOs.

AIM AND OBJECTIVES

The aim of this research paper is to investigate, examine and assess how tenants attitudes impact on various factors of energy efficiency in high-rise commercial buildings. Specifically, the objectives are:

- (1) To examine the present state of availability for ESOs accessible to tenants of commercial buildings.
- (2) To analyse the constraints on the acceptance of environmental issues and implementation of ESOs by commercial building tenants.
- (3) To assess the tenants attitudes on the impact of various factors of energy efficiency in high-rise commercial buildings.
- (4) Using objectives i-iii to make a number of recommendations for the better acceptance and implementation of ESOs in Sydney high-rise commercial buildings that will serve a lesson for less developed countries.

RESEARCH METHODS

An interview with the Sustainable Energy Development Authority (SEDA) was secured. Mr. Verbeek of SEDA also gave further insight into current tenant behaviour in relation to ESOs in high-rise commercial buildings and energy efficiency issues. Research was carried out into the present state of availability of ESO technology and practices designed to encourage the acknowledgment of environmental issues and the better uptake of ESOs.

A structured questionnaire, augmented with formal interviews of sixty randomly selected organisations occupying office space in high-rise commercial buildings in Sydney Central Business

District (CBD) Area. Twenty-five responses were received and of these, twenty were analysed. The reason for analysing twenty was that five questionnaires were incomplete.

DATA ANALYSIS

Table 1 below shows that 55% of the tenants agree that life cycle analysis is not important to tenants of commercial high-rise buildings. There was strong agreement to the statement. The comments from respondents are “We should all be concerned about Legionella?” While 80% agree that tenants do not specify the inclusion of ESOs in the buildings/offices they occupy. In regards to tenants’ awareness of rating schemes 55% of tenants disagreed that their firm was aware of rating schemes such as SEDA’s “Building Greenhouse Rating Scheme”. Only 10% strongly agreed to be aware. The majority of tenants (90%) agreed that corporate images and marketability are enhanced when a company is seen as an energy conscious organisation. None of the respondents strongly disagreed while only 10% disagreed.

Table 1: Number of responses to energy efficiency of high-rise commercial buildings survey

Survey Questions on	Number of Responses (N=20)			
	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Importance given to Life Cycle Analysis by Tenants	5	6	7	2
2. Tenants' Demand for ESOs	6	10	3	1
3. Tenants' Awareness of Rating Schemes	2	7	10	1
4. Corporate Image Improvement	6	12	2	0
5. Incentives and Requirements for ESOs	4	10	6	0
6. Level of Tenants' implementation of ESOs	0	7	9	4
7. Tenants' Motivation to demand for energy efficient premises	8	10	1	1
8. Tenants' Participation at design stage	11	8	1	0
9. Tenants' Consideration for energy efficiency	0	4	12	4
10. Tenants Priorities	6	11	1	2
11. Tenants and Real Estate Agents	6	9	3	2
12. Communication	5	11	3	1
13. Availability of Information as to the performance of occupied premises	6	11	2	1
14. Availability of information of ESOs' performance benchmarks	5	14	0	1
15. Government Assistance	7	11	2	0
16. Environmental Management Plans	1	8	11	0
17. Education	4	14	2	0
18. Occupation history	14	4	1	1

However, the majority of tenants (70%) agreed that tenants have little incentive or requirement to consider ESOs implementation on their premises. None of the respondents strongly disagreed with this statement. As one can see from the above table, 65% of the tenants disagreed with the statement that their organisation implements the use of ESOs in order to improve energy efficiency and reduce energy costs. None strongly agreed with this statement. Notwithstanding the survey has found that the vast majority of tenants (90%) agree that tenants create demand for commercial buildings so therefore they should demand energy efficient offices/buildings thus changing the way buildings are built. Only one (5%) tenants strongly disagreed with this statement. Furthermore, the majority of tenants (95%) agreed that tenants do not get involved in the decision-making processes at the design stages of building. None of the tenants strongly disagreed with this statement and only (5%) disagreed.

The answers to the energy efficiency questionnaire reveal that the majority of tenants (80%) disagreed with the statement that energy efficiency was a high priority for their organisation when searching for suitable premises. Comments from respondents indicated that energy efficiency was considered. In regards to rental costs, 85% agreed that rental costs were a factor that influenced their organisation's decision to occupy the premises.

The majority of tenants (95%) agreed that location was a factor that influenced their organisation's decision to occupy the premises. Location in fact was rated higher than the rental costs associated with the premises. However, 55% of the respondents disagreed with the statement that energy costs had influenced their organisation's decision to occupy the premises. Only 5% stated that energy costs had been a factor that influenced their decision. Energy costs in fact were found to be rated lowest on the tenants' scale of deciding factors.

On the issue of tenant's and real estate agents' commitments to energy efficiency; one can see from the above table that 75% of the respondents agreed that energy efficiency of the building/offices was not an issue considered when the real estate agent was approached about the premises by their organisation. Only two respondents (10%) strongly disagreed with this statement. Furthermore, the vast majority of tenants (80%) agreed that there was no communication between the building owner and their firms regarding the energy efficiency of the premises. The results of the survey also reveal that 85% of the tenants agreed that there was a lack of information available to tenants as to the building's performance and operation. Notwithstanding, the survey also shows that 95% of the respondents agreed that there is a lack of information available to tenants on performance benchmarks for confident adoption of ESOs, while 90% agreed that financial incentives to tenants from the Government would improve the better uptake of ESOs resulting in more energy efficient buildings. 55% of the tenants disagreed that there are cost saving financial incentives to their organisations to have an Environmental Management Plan in place, with an energy manager being appointed and energy audits being carried out regularly.

The question(s) on energy efficiency education show that 90% of the respondents agreed that the education of tenants regarding energy efficient commercial building would result in the building of more buildings through tenants demand. 90% of the tenants had less than 10 years occupation history of their premises with 70% having less than 5 years. Only a small percentage of tenants 5% had more than 15 years occupation history in the same premises.

DISCUSSION OF THE DATA ANALYSIS

Importance given to life cycle analysis by tenants

1. Is Life Cycle Analysis important to tenants of commercial high-rise buildings?

Life Cycle Analysis (LCA), the method for estimating the total costs and benefits of energy efficiency associated with an asset over its useful life, was not regarded as being important to tenants. This tool, which is designed to ensure that decision makers account for all the costs of a decision rather than considering only the purchase price of an item was not well understood by tenants despite its evident benefits. The impression was that LCA was extraneous to tenants' everyday operation of their businesses and something that was to be left to others, mainly the owner of the building.

Tenants' demand for ESOs

2. Do tenants specify the inclusion of Environmentally Sustainable Options (ESOs) in the buildings/offices they occupy?

The vast majority of tenants do not specify the inclusion of ESOs in the buildings/offices they occupy. This was the case namely because the main motivator for adopting ESOs was regarded as being savings in operation costs but, if there are no major and definite savings to the tenant, then any schemes are unlikely to be adopted. Other reasoning included the greater 'risk' associated with unknown technology and the very low priority some respondents gave environmental issues.

Tenants' awareness of rating schemes

3. Are tenants aware of rating schemes available such as the NSW Sustainable Energy Development Authority (SEDA) "Building Greenhouse Rating Scheme"?

Tenants are not aware of rating schemes available to them such as SEDA's "Building Greenhouse Rating Scheme". Reaction from tenants ranged from pure surprise and interest to complete indifference. From the tenants that were aware of these schemes, verbal comments included

opinions that ratings schemes were found to be confusing and not sufficient as an incentive for the uptake of ESOs. The authors believe there is a need to re-design rating schemes in order to make them uniform and easily understood by tenants and the public at large. Also, it would be ideal if rating schemes were issued at no charge to tenants and only based on merit, that is, based on the genuine performance on the premises occupied.

Corporate image

4. Are corporate images and marketability enhanced when a company is seen as an energy conscious organisation?

Corporate images and marketability are enhanced when a company is seen as an energy conscious organisation. There was wide recognition (90% of respondents) that a company's image is projected through the building occupied. Tenant views on this issue are nevertheless in conflict with Item 09 of the Survey where energy efficiency was found not a priority and Item 06 on the implementation of ESOs.

Incentives and requirements

5. Do tenants have little incentive or requirement to consider ESOs implementation into their premises?

It was found that tenants have little incentive or requirement to consider ESO implementation into their premises, as they see no advantage in doing so. The majority mentioned that they were only driven by early bottom line returns. It was also mentioned that shorter leases meant any introduced ESOs would only be beneficial to the next tenants. The full benefits are then only appreciated if tenants enter into longer-term leases.

Level of tenants' implementation of ESOs

6. Do tenants implement the use of ESOs in order to improve energy efficiency and reduce energy costs?

Tenants do not implement the use of ESOs in order to improve energy efficiency and reduce energy costs. Discussions with tenants highlighted the fact that ESOs would be implemented, not for the greater benefit of the community but, only if there were considerable and early bottom line benefits in doing so. The prevailing attitude among tenants was that energy costs are relatively low and negligible when compared to rental costs therefore these do not command attention.

Verbal discussions revealed that some tenants regarded the implementation of ESOs as being disruptive to their day-to-day activities in an existing building and that if ESOs had not been included in the design phase then there would be little likelihood for their inclusion post-design.

Other firms regarded ESOs and energy efficiency as involving a loss of convenience with respect to the purchase, installation or use of energy efficient devices.

Other verbal comments included tenants regarding themselves, as doing all that was possible to be energy efficient. The authors regard these tenants as being unlikely to adopt further energy efficient innovations until their attitude alter.

Tenants' motivation to demand for energy efficient premises

7. If tenants create demand for commercial buildings, do they demand energy efficient offices/buildings thus changing the way buildings are built?

Tenants regard themselves as having the power to influence the way buildings are built through their demand. There was confirmation from the majority of tenants that they have and should have a part to play in the decision-making processes that determine how a commercial building is built. Responses from these statements come into conflict with other responses such as Statement 09 where energy efficiency was found not to be a priority for tenants when searching for suitable premises. From discussions with tenants it were generally felt that energy efficiency issues in high-rise commercial buildings were the concern of other professionals.

Tenants' participation at design stage

8. Do tenants get involved in decision-making processes at the design stages of buildings?

An overwhelming 95% of tenants were found not to get involved in the decision-making processes at the design stage of buildings. Discussion with tenants pointed to the fact that this was left to the owner of the building only and that tenants, unless their firms are of notable size and influence such as major corporations, do not have the power to influence the decision making processes at the design stage of the building they occupy. The authors see this as a major flaw, because different stakeholders have different interests in a building and often energy efficiency and ESO implementation suffer as a result.

The authors believe that with specified tenant requirements, correct design and documentation, and close consultation between all stakeholders, the benefits of ESOs can be optimised.

Tenants' consideration for energy efficiency

9. Is energy a high priority for tenants' organisations when searching for suitable premises?

Despite acknowledging the fact that tenants can influence the way buildings are built, they did not regard energy efficiency as being a high priority when searching for suitable premises. Some tenants argued that energy efficiency issues did not concern them at all and they were too preoccupied with the everyday toils of running their businesses to be troubled with such matters. This response reinforces the Author's view that the appropriate perceptions and practices from tenants are essential for the recognition of environmental issues and the implementation of ESOs.

Tenants' priorities

10. Which factors influence tenants' decision to occupy premises?

Location was found to be high on tenants' lists of influencing factors when searching for premises to occupy, followed by rental costs. In clear contrast to energy costs associated with potential premises which did not rate as having any influence at all by the majority. Clearly, tenants' awareness and motivation do influence the type of premises being built for occupation. If there is no demand for premises that display lower energy running costs, then the suppliers of high-rise commercial buildings will not display appreciation of energy efficiency issues and ESOs.

Tenants and real estate agents

11. Is the energy efficiency of building/offices an issue when Real Estate Agents are approached about premises by tenants' organisations?

Most tenants argued that often they are not sufficiently aware of energy efficiency issues to distinguish between energy efficient and non-energy efficient premises. Other comments included the fact that when tenants were presented with newly constructed premises, they automatically assumed it to be 'state-of-the-art' and therefore energy efficient. The Author believes that newer technologies are more difficult to market and tenants may be apprehensive of technologies that they have not already been exposed to. Education about energy efficiency issues and ESO technology will consequently alter tenants' perceptions and practices.

Communication

12. Is there communication between the building owner and tenants regarding the energy efficiency of the premises?

An overwhelming 80% of tenants replied that there was no communication between the building owner and their firms regarding the energy efficiency of the premises they occupied. Because there are split incentives for owners and occupiers of commercial buildings to implement ESOs, there needs to be communication between two parties as to possible alternative lease arrangements. For example, tenants who include ESO technology in their premises might come to some agreement to be reimbursed in part for that expenditure or for the future savings when the lease expires. The

added benefits of ESO inclusion will not then be solely for the building owner. Thus communication between these two parties is essential in the adoption of ESOs in high-rise commercial buildings. Unfortunately, the majority of tenants argued that communication between two parties is possible only for larger organisations.

Availability of information as to the performance of occupied premises

13. Is there a lack of information available to tenants as to the building's performance and operation?

The majority of tenants (85%) replied that there was a lack of information available to them as to their building's performance and operation. Further, the majority of leases are gross leases, where electricity costs are included in the total rental figure.

In this case there is less incentive for the adoption of ESOs because it is a more difficult task to analyse and alter energy consumption and costs. The Author believes that a lease arrangement between the owner and the tenants, where the energy costs and other operating cost are separate, will result in a stronger incentive for the tenant to monitor these costs and adjust their behavior accordingly.

Availability of information of ESOs' performance benchmarks

14. Is there a lack of information available to tenants on performance benchmarks for confident adoption of ESOs?

Alarming, almost (95%) of tenants replied that there is a lack of information available to them on performance benchmarks for confident adoption of ESOs. In order for a firm to consider the adoption of an ESO, that firm needs to obtain information on the ESOs key attributes such as quality and price, direct up front costs of the ESO and costs of implementing it, estimated costs of maintaining it or repairing it. During the brief discussions with tenants, the Author learned that some tenants had made positive steps towards obtaining information about potential ESO technology but abandoned their efforts when information proved difficult to find.

Government assistance

15. Do financial incentives to tenants from the Government improve the better uptake of ESOs resulting in more energy efficient buildings?

The majority (90%) of tenants believed that Government assistance to tenants would encourage the adoption of ESOs. Suggestions from tenants included subsidies for the adoption of ESO equipment, training, audits for the services of outside consultants. Further proving that tenants will implement ESOs and accept environmental issues if their bottom-lines are affected.

Environmental management plans

16. Are there cost saving financial incentives for tenants to have an Environmental Management Plan in place, with an Energy Manager being appointed and Energy Audits being carried out regularly?

The majority of tenants (55%) believe there are no cost saving financial incentives for their organisations to have an Environmental Management Plan in place with an Energy Manager being appointed and energy Audits being carried out regularly. It is only through the establishment of an Environmental Management Plan that the need for ESOs become apparent. Tenants argued that the running costs of their premises were a small fraction of their rental costs and therefore there was no need for them to adopt an Environmental Management Plan. During the course of a brief discussion with a tenant, the Author learned with disbelief that, for occupational health and safety reasons, the decision maker of the organisation had taped-over all the localised light switches to prevent accidental light switching off with the possibility of a work related injury.

The authors believe that the appointment of an Environmental Manager or a consultant experienced in energy efficiency issues is paramount for the adoption of ESOs. Personal communication is much

more likely to influence tenants' awareness and perhaps even the consideration and adoption of ESOs.

Education

17. Does the education of tenants about energy efficiency issues result in more energy efficient commercial buildings being built through tenant demand?

The education of tenants into energy efficiency issues will result in more energy efficient commercial buildings being built through tenant demand. Only 10% of tenants disagreed with this statement. One particular firm pointed to the fact that both energy consumers, being the tenants, and the energy suppliers lack information and knowledge about experience with energy efficiency.

Occupation History

18. Are tenants' perceptions of energy efficiency and ESOs affected by the extent of tenants' occupation history?

The majority (70%) of firms surveyed had been occupying their premises for less than five years. This factor perhaps could also explain the reason for tenants' behaviour towards energy efficiency issues and the adoption of ESOs in their premises.

The authors believe that the tenant who adopts ESOs will need longer lease terms in order to benefit from the adoption of ESOs. Shorter lease terms will only mean that the next tenant will benefit from the inclusion of the introduced ESO.

Only 5% of tenants had occupied their current premises for longer than 15 years and invariably it would be these tenants who benefited from adopting ESOs and being energy conscious.

SUMMARY AND LESSONS TO BE LEARNT FOR DEVELOPING COUNTRIES FROM THE RESEARCH RECOMMENDATIONS BASED ON FINDINGS

This research paper, which included the Survey of high-rise commercial building tenants, has brought to light a number of key issues affecting tenants that undermine the acceptance and implementation of ESOs and environmental issues.

Tenants show conflicting attitudes, motivation and levels of awareness in respect to the environmental impacts of the premises they occupy. The fundamental flaws shown by tenants restrict the acceptance and uptake of ESOs in high-rise commercial buildings in Australia will serve as lessons to be learnt for developing countries. Recommendations based on research findings can be outlined to assist tenants in the recognition of environmental issues and the acceptance and implementation of ESOs. This in turn will see more energy efficient high-rise commercial buildings being built through tenant demand.

Recommendation 1

Tenants need to recruit the services of professionals experienced in LCA when considering potential commercial premises. These professionals would ideally point out the true, long-term operating costs of premises and inform them about ESOs. Tenants should automatically disregard potential premises using this information.

Recommendation 2

Firstly, the establishment of education programs at the technical, tertiary and professional level will improve the understanding of environmental issues. The decision makers of organisations should attend education programs that, ideally, should present the bottom-line advantages of ESOs. Secondly, to achieve better implementations, a database of presently accessible ESOs should be established and benchmarked by a reputable authority with best practice processes being identified.

Recommendation 3

To gain widespread acceptance a simple and consistent composite star rating needs to be established and made available at no cost to tenants. The public at large will ideally easily understand the composite star rating which will easily be recognisable on a large scale with the use of a uniform logo.

Recommendation 4

The direction of tenants towards energy efficient premises and the adoption of ESOs can be achieved with incentives such as a review of the taxation system where, for example, accelerated depreciation and other concessions for ESOs could be introduced. The survey shows that the majority of tenants would be prepared to adopt ESOs in their premises if there were financial incentives from the Government to do so. The authors believe that there needs to be some sacrifice from both parties.

Also, tenants should choose to sign longer leases in order to verify the long-term profits created by opting for energy efficient commercial buildings and/or for adopting ESOs in their fit outs. The survey in this research shows that 70% of tenants have occupied their premises for less than five years while only 5% have occupied the same address for longer than 15 years. Invariably it is only the latter tenants who will see long-term bottom-line benefits from being an environmentally conscious organisation.

Recommendation 5

There needs to be a commitment from tenants to demand energy efficient premises at the very point when the real estate agents are approached. A commitment from real estate agents is also very valuable, with agents honestly describing the qualities of a potential property and rating them accordingly. Further, legislation would ensure that real estate agents present tenants with the complete and true qualities of a property without deliberately discarding any negative environmental impacts.

A trend for energy efficient buildings could thus become the custom, with a focused effort from tenants and real estate agents. This would influence building owners and developers to design and build environmentally friendly commercial buildings.

Recommendation 6

The mandatory appointment of a qualified and trained Energy/Environmental Manager in every organisation will comply with the legislation requiring such a person when an organisation seeks premises to occupy.

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