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Working towards sustainability in existing infrastructure through strategic facilities management

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WORKING TOWARDS SUSTAINABILITY IN EXISTING INFRASTRUCTURE THROUGH STRATEGIC FACILITIES MANAGEMENT

Investing in the efficient operation of buildings is not just good for the environment, but also helps reduce lifecycle-operating costs and improves occupant productivity. 'Factoring environmental sustainability considerations into upgrades and operations is a socially responsible business strategy that leads to financial benefits', argues Greg Alley, former Asset Manager Infrastructure Services, Corrections Victoria.

Buildings have a significant impact on resource use and the environment. In the United States, a study conducted by the U.S. Green Building Council (USGBC)¹ in 2004 estimated that commercial and industrial buildings (i.e. non-residential buildings) are responsible for:

- 30% to 40% of energy consumption
- Adding 30% to 40% of atmospheric emissions
- 60% of all electricity use
- 25% of all water use
- 35% to 40% of the municipal solid waste stream
- 25% to 30% of all timber and construction materials.

Activities that lead to resource consumption and waste generation are responsible for a significant proportion of environmental problems. Addressing the source of these problems is the most effective way of dealing with them. This can be achieved through careful selection of materials, systems and design when planning new construction or facility upgrade projects and by implementing proactive maintenance strategies aimed at having facilities and equipment operating at maximum efficiency.

FACILITIES MANAGEMENT & SUSTAINABILITY

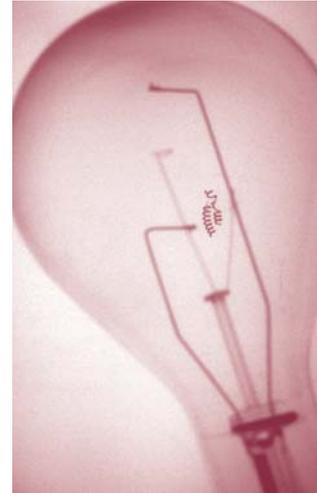
The International Facility Management Association (IFMA) defines Facility Management (FM) as 'a profession that encompasses multiple disciplines to

ensure functionality of the built environment by integrating people, place, process and technology'².

Whilst the benefits of green buildings are becoming increasingly well known, the challenge for facility managers is adopting FM strategies for integrating green principles in building maintenance and operations. It is becoming increasingly incumbent upon facility managers to promote the implementation of sustainability in existing buildings on an ongoing basis, by developing plans aimed at:

- Solving building maintenance problems:
 - reducing inefficient use and unnecessary wastage of building materials and resources; reducing chemical usage and recurring waste production
- Reducing building operating costs:
 - reducing waste disposal costs by managing waste production; reducing running costs and energy consumption; maximising use of recycled materials and water
- Increasing building occupant comfort and productivity:
 - conducting surveys to elicit information regarding occupant perception of level of comfort; developing an objective framework in conjunction with Operations and HR management to measure productivity
- Communicating the benefits and importance of adequate ongoing facility maintenance:
 - communicating the need for good ongoing building Operations & Maintenance (O&M) to decision makers; motivating senior management to make sustainability part of their organisation's culture; and, communicating environmental achievements to customers and the community

Facility managers are aware that investing in the efficient operation of buildings is not just good for the





environment, but also helps reduce asset lifecycle and operating costs. The USBC 2004 study referred to above estimates that:

Green upgrades and operations are financially responsible business strategies that lead to a range of financial benefits, including:

- increasing productivity by as much as 10%
- increasing job satisfaction by as much as 24%
- reducing absenteeism by as much as 45%
- lowering utility costs by as much as 50%; and
- reducing life cycle costs by at least 25%

It should be noted that the results indicated above are derived from overseas studies and that their relevance to the Australian environment is therefore limited. It is also unclear as to how the outcomes were measured and to what degree other factors (e.g. staff management practices, 'sick building syndrome' v identified building hazards, etc.) impacted upon results. Another obvious limitation is the subjectivity surrounding 'soft' measures such as increases in productivity and job satisfaction and to what extent the built environment impacted on these factors. However, measuring the effect of such strategies on utility costs and life cycle costs of assets are much more easily quantifiable and can be readily be adapted to most situations.

A major goal of strategic asset management should be to address sustainability on an ongoing basis, which requires the expertise of facility managers and maintenance personnel and the commitment of financial decision-makers. Issues that fall under the scope of facility management should include:

- Building cleaning and maintenance issues including chemical use
 - selection, storage, usage (reduction/elimination) and disposal of chemical cleaning agents;
- Ongoing indoor air quality monitoring
 - reduce production of Volatile Organic Compounds (known as VOCs, these are organic compounds or fumes released by commonly used indoor products like paints, cleaning agents,

disinfectants, etc. and which can be potentially harmful to occupants)

- Energy efficiency
 - selecting equipment with a high energy-efficiency rating (e.g. Five Star rating appliances) when installing or replacing assets
- Water efficiency
 - recycling waste/water programs
- Recycling programs and facilities
 - recycling consumable items such as paper, plastic, etc.
- Exterior maintenance programs
 - maintaining the physical fabric of facilities to prolong their useful life thereby reducing replacement frequency and costs
- Systems upgrades to meet green building energy performance standards³

This approach to 'greening' existing building maintenance and operations provides an opportunity for facility managers to promote the overall value of strategic facility management. Choosing the right materials, establishing the right safeguards, and practicing proper maintenance are all part of a positive overall building maintenance program. With strategic inputs at all points of the product life cycle, facility managers can support sustainability on an ongoing basis and assist organisations to reap the economic and environmental benefits of such a strategy.

SUSTAINABILITY AND THE BOTTOM LINE

In 2002 the Victorian State Government sponsored an initiative called the Environmental Management Accounting Project, aimed promoting improved management accounting practices that increased profitability whilst achieving better environmental outcomes. The project consisted of a series of case studies sponsored by EPA Victoria, Environment Australia and the Institute of Chartered Accountants in Australia. The studies resulted in a 2003 report developed by Professor Craig Deegan of RMIT University Melbourne, on the impact of 'Environmental Management Accounting' on organisations⁴.

Environment Management Accounting is a system that provides users with information on the environmental performance of an organisation. The report found that in general, management within the organisations that were part of the study had very little knowledge of the environmental costs associated with conducting their operations and that this was largely due to deficiencies in accounting systems:

Organisations often fail to acknowledge and properly measure the cost of waste and this is seen as a major limitation of most accounting systems. Organisations are generally found to ignore the acquisition costs associated with wasted resources, and instead restrict their recognition to waste disposal costs. Again, many opportunities for improving financial and environmental performance are being missed because of a lack of information.

The report also highlights the way that most accounting systems allocate costs related to energy consumption and usage in a manner that does not accurately reflect the actual consumption of those resources.

The key findings of the report were:

- once a determination had been made on what environmental costs should be monitored, it was necessary to apply a method of allocating costs to activities generated by the business;
- certain environmental costs, for example, those arising from use of water, energy and other resource consumption were often hidden in 'overheads' by the existing accounting systems; this resulted in costs being allocated to processes or products in a way that did not reflect their actual usage;
- waste costs of organisations were either not reported or were grossly understated because these costs were often hidden in administrative and general overheads;
- failure to properly account for environment costs meant that opportunities for improving financial performance of the organisations had been lost;
- fairly minor and low cost changes to existing systems of accounting could lead to significant improvements in how the business conducted its operations;

- the inclusion of an additional field into the accounting system to provide non-financial information could also provide benefits in terms of being able to monitor resource consumption; and
- the failure to allocate particular environmental costs, such as electricity and raw material costs, to particular processes had implications when capital budgeting decisions were being undertaken.

The report concluded from the case studies that a team with a mix of skills was needed to be involved in developing an environmental accounting system. This expertise should include financial management, information technology skills (to set up the system), asset management expertise and, a senior management representative who could 'champion' the project. Clearly, there is a role for Facility Managers to contribute to the development of an environmental management accounting system.

STRATEGIC FACILITY MANAGEMENT IN THE VICTORIAN CORRECTIONAL SYSTEM

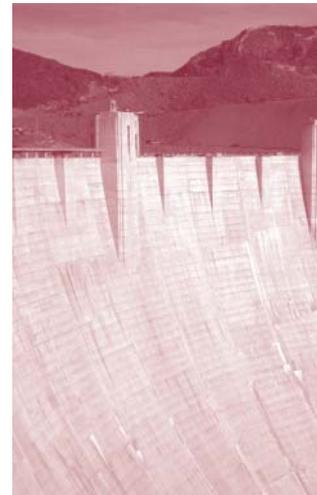
Corrections Victoria, Department of Justice, is responsible for the operations and facilities management of 11 public prison facilities in Victoria, comprising approximately 200,000 m² of physical assets⁵.

Of the public prisons asset stock, 82% is in the 1984 to 2003 effective age bracket, and 15% is pre-1974. Despite its large asset base and the age of the buildings, Corrections Victoria until recently did not have a coordinated facility management plan and relied on prison-specific reactive responses for the upkeep of prison facilities.

A coordinated facility management approach, using innovative technology was piloted at a recent study involving Victoria's two women's correctional facilities – Dame Phyllis Frost Centre (maximum security for 260 prisoners) and

Tarrengower Prison (minimum security for 54 prisoners). This pilot was based on a proactive Facility Management approach that was designed to:

- provide a set of agreed 'minimum' FM standards and benchmarks suitable for the Victorian prisons environment, based on lifecycle repair and replacement assumptions for the difference asset classes in the facilities;





- identify critical essential works to bring the facilities up to the defined standards;
- provide a detailed cost estimate of the proactive lifecycle replacement of asset classes within the correctional facilities, including the building fabric over the next 20 years; and
- assist with the development of a correctional facilities strategic plan to meet the continuing demand growth for prison infrastructure in Victoria.

The basis for the creation of minimum FM standards in the Victorian prisons system arose from a thorough understanding of the many and varied regulations and other statutory documents that specifically impact correctional facilities. These included Government and Departmental Policies and Frameworks which dictate prison specific codes and physical construction requirements, in addition to The Building Code of Australia, the Disability Discrimination Act, various Australian Standards and the regulations which commonly apply to all construction types. As a result, benchmarking of assets could now be reported on with a view to assisting the facility planning and management of both current assets and future infrastructure developments.

Architektonic Pty Ltd, and architectural consulting firm, was engaged by Corrections Victoria to conduct a Facilities Asset Condition Audit of the two target facilities, with a view to generating FM strategies which would take into consideration the long-term objectives of Corrections Victoria. The processes and methodology undertaken in the execution of this project were adopted as a prototype for future implementation across the Victorian prison system.

The innovative utilisation of technology with which the audits were conducted included a 'PDA' (hand-held computer) device used for integrating CAD floor plans and digital photographs with a database that provides a web-based browser-reporting interface. Life Cycle Analysis (LCA) data was integrated within the project for long-term planning and audit outcomes. The data collected from the audit formed the basis for the development and implementation of strategic facilities management initiatives over an extended period of time.

The facilities asset condition audit task was formulated through the input of a wide-ranging group

of industry specialists including architects, facility management consultants, facility planners, engineers, building surveyors, quantity surveyors, graphic designers and computer programmers.

The use of the hand-held PDA device by the consultants achieved a significant saving to the project both in time and cost. The collective objective across all disciplines was to achieve a minimum 95% coverage of all possible asset conditional outcomes in predefined formats. This type of data consistency provided a sound platform for confident translation of data and information for strategic facility management thinking. It also served to eliminate the possibility of multiple translations of the same condition, which then require subsequent downstream reinterpretation.

As part of the audit exercise Life Cycle Costing (LCC) by a Quantity Surveyor was incorporated into the building components under review. LCC is a technique that takes into account all of the costs incurred during the various stages of a building in its operation, or building element during its utilisation. It is the analysis of costs spread over a period of time that corresponds to the economic Life Cycle of the building or building elements. Life Cycles differ from one building type to another and also change with time and technological advances.

The value of the LCC analysis is in that it allows for the weighting of 'trade-offs' in building construction, improvement or operation. The inclusion of LCA provides a tool for balancing the short, medium and long-term economic consequences of decisions. The LCA weighting of both economic and non-economic factors has ramifications in the decision making process for Corrections Victoria. The strategic FM outcomes arising from these decisions helped establish a framework for future direction in design, construction and operation of correctional facilities in Victoria.

Whilst a strategic approach to facilities management is a new way of operating, strategies aimed at addressing sustainability and saving energy within the Department of Justice have been in place for some time now. Examples include:

- reviewing energy usage and developing a database of consumption patterns across the Department;
- conducting walk-through energy audits of the Department's major sites; using the information

from the audits to undertake a range of energy saving works;

- developing and delivering training courses in energy management for relevant personnel;
- communicating related issues to staff via distribution of information and meetings; and
- developing energy guidelines for implementation in the design of new infrastructure projects.

The Victorian Department of Sustainability and Environment (DSE) has developed and published Environmentally Sustainable Design and Construction (ESDC) Principles and Guidelines to integrate environmental sustainability in the design and construction of new capital projects⁷. These guidelines are aimed at encouraging Victorian government departments to incorporate environmentally sustainable principles into the planning of new infrastructure works.

When planning a new building project, it is important to define how the building will function and the main issues it should address⁸. The scope of these plans should include details of energy efficiency requirements and other environmental attributes. It is at this stage that the maximum potential exists for minimising the building's future environmental impact. It is also at this stage that Life Cycle Analysis (LCA) concepts should be utilised to define design, purpose and fit-out.

Asset management plans should include a set of minimum performance standards for the sustainable operation and upgrades of existing buildings. High building performance promotes sustainability, through the efficient operations of plant and equipment. The task for Facility Managers is translating this knowledge into a sound business case for a strategic approach to proactive maintenance that will enable buildings to operate efficiently. It also provides an opportunity for capturing the economic benefits and reduced environmental impacts associated with operating buildings in a sustainable way over time.

Greg Alley: biography

Greg Alley has over 15 years experience in the Victorian public sector across a wide range of portfolios including Health, Welfare, and Corrections. In his current role with Corrections Victoria, he is responsible for **Facility Management** in Victorian public correctional facilities. Greg is currently undertaking a Masters of Public Infrastructure by research at Melbourne University Private. The topic of his research project is *Achieving Environmentally Sustainable Development (ESD) through Public Private Partnerships (PPP)*
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