



**Legislative Assembly for the Australian Capital Territory**

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**Towards an environmentally sustainable  
Assembly building in the  
Australian Capital Territory**

**Paper to be presented by Tom Duncan, Clerk of the  
Legislative Assembly for the Australian Capital Territory**

## **Introduction**

The ACT Legislative Assembly Secretariat has, for a number of years, been involved in implementing measures to improve the environmentally sustainability of its operations, particularly in relation to the management of its major asset, the Assembly building itself. A major step forward for the Secretariat in the management of the Assembly building came with the commissioning of a series of environmental audits at the end of 2007. A consulting engineering firm was contracted to audit the Assembly building's performance in terms of waste management, energy consumption and water consumption. The report on the audit findings was handed down to the Secretariat midway through 2008 and concluded that while the Assembly performed well in some areas, it also had only average performance in other areas and recommended the implementation of a range of initiatives to reduce the impact of the Assembly's operations on the environment. In this paper I will outline some of the findings of the report and the measures that the Secretariat has undertaken to better manage environmental sustainability across the organisation.

## **The audits**

While the Assembly Secretariat has always attempted to reflect environmental considerations in its policy decisions and the management of its infrastructure and facilities, it wasn't until last year that an holistic approach to environmental management across the organisation was developed. In December 2007, following a procurement process, the Secretariat engaged a consulting engineering firm to audit the environmental performance of the Assembly building. The firm was tasked with reviewing the arrangements in place for, and the environmental outcomes associated with, the Assembly's waste management, water consumption and energy consumption (both gas and electricity).<sup>1</sup>

In establishing the specification for the consultancy, the Secretariat developed a detailed set of requirements about the information that it sought, and the areas where recommendations for improvement should be considered by the consultant. Attachment A contains a summary of these key areas. The Secretariat also requested that any recommendation for capital or recurrent investment include an approximate cost and payback period, and outline the efficiencies gained in terms of financial savings and the environmental footprint reduction (i.e. reduction in CO2 emissions).

Over a period of six months, the engineering firm undertook data collection, collation and analysis in the following areas:

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<sup>1</sup> The audits did not, however, include an evaluation of the car fleet managed on behalf of non-executive MLAs by the Secretariat.

- evaluation of the site including inventory of water appliances and electrical appliances, lighting and plant;
- collation of seasonal gas and electricity consumption patterns based on historical billing data;
- collation of seasonal water usage based on historical billing data;
- audits of office spaces to determine the number of appliances left powered-on after hours;
- installation of additional water sub-metering on water appliances;
- a series of waste audits examining compliance with the existing waste management arrangements; and
- the application of the National Australian Built Environment Rating System (NABERS) tool in relation to energy, water and waste.

One of the difficulties associated with evaluating the performance of the Assembly through the audit process was that the building venue is markedly different to other, more traditional, office buildings. For instance, there are a large number of spaces such as meeting rooms, committee rooms, reception and exhibition rooms, and the Assembly chamber. These spaces do not accommodate building occupants and consequently there is a lower ratio of people to floor space when compared with other buildings. Similarly, with a kitchenette in each member's office and special kitchen facilities in the Speaker's hospitality room, member's lounge and the reception room, there are energy and water demands not typically present in traditional office buildings. Working closely with Secretariat staff, the consultant attempted to take these issues into account in applying the NABERS tool.<sup>2</sup>

### **The findings and recommendations**

The report produced by the consultant used the NABERS rating software to assess the performance of the Assembly building on a spectrum of performance (one star to five stars, with five stars representing the highest level of performance) indicated that the Assembly received the following ratings under NABERS:

- 4 stars for energy use representing 'strong performance';
- 3 stars for water usage representing 'average' performance; and
- 3 stars for waste management representing 'average' performance.

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<sup>2</sup> The NABERS tool is a performance based rating system for existing buildings, rating a building, 'on the basis of its measured operational impacts on the environment, and provides a simple indication of how well... [an organisation is] managing these environmental impacts compared with... [its] peers and neighbours'. The NABERS tool also incorporates the Australian Building Greenhouse Rating (ABGR). [www.nabers.com.au](http://www.nabers.com.au)

The report made a number of observations about why the Assembly building received the performance ratings it did and handed down recommendations directed towards improving the Secretariat's approach to environmental management, leading to reduced waste going to landfill, and reduced water and energy consumption.

One of the main recommendations of the report was that the Secretariat develop a more systematic approach to its management of sustainability issues through the development of an environmental management system providing for improved recording and monitoring of key performance areas to track the organisation's progress. Other findings are outlined below.

### Energy

Findings and recommendations made with respect to energy consumption are outlined below.

- Notwithstanding the strong performance of the Assembly building on the energy consumption front, the consultant found that there was still the capacity to reduce consumption by 25-30%.
- The consultant found that there was a large number of building occupants leaving desktop PCs switched on for extended periods when not in use (80-90%), especially overnight. A recommendation about introducing a software solution to overcome this problem was put forward.
- The consultant found that electric hot water heating utilised at the Assembly building was not a greenhouse-gas friendly method for water heating. A recommendation was made about introducing a more efficient water heating system.
- A range of light fittings were identified as being highly energy consumptive and a recommendation was made to replace these lights with lower wattage lighting. The consultant estimated, for example, that by replacing around 50 150 watt metal halide light fittings with 20 watt fittings, the Assembly could save in the order of 33,700 kWh (kilo Watt hours) of energy per annum, equating to a reduction of 32 tonnes of CO<sub>2</sub> or \$4,200 per annum.
- The consultant found that the existing large chiller utilised at the Assembly venue was inefficient and at the end of its operating life. It was recommended that a replacement be considered and that modern, efficient, chillers would consume around 67% of the power as that consumed by the existing chiller.

### Water

Findings and recommendations made with respect to water consumption are outlined below.

- The consultant found that the Assembly did have water efficient equipment and management practices but that there was high consumption observed on site.
- The consultant noted that the Assembly building did not have rainwater collection and recommended that a large capacity collection system be installed.

- The consultant recommended investigating the excessive water consumption and introducing improved monitoring of water appliances.

### Waste

Findings and recommendations made with respect to waste management are outlined below.

- The consultant found that the Assembly already employed extensive strategies to reduce the amount of waste going to landfill with 81% of the waste stream be recycled or composted.
- However, the consultant found that of the remaining 19% going to landfill only 14% of needed to go to landfill. This equates to only about 2.5% of the Assembly waste stream that should be going to landfill.
- One approach to reduce the amount of waste going to landfill recommended by the consultant was the removal of landfill waste bins under building occupants' desks;
- The consultant recommended ongoing measurement of the waste streams; and
- The consultant recommended an ongoing education and awareness program around waste issues.

### **The Secretariat's initiatives**

After examining the conclusions and recommendations of the consultant's report, the Secretariat evaluated how it could best respond to the findings. Perhaps the most important recommendation that the Secretariat implemented was the establishment of an environmental sustainability committee made up of managers and staff from across the organisation. The committee's role has been to:

- develop an action plan based on a cost/benefit analysis of the findings in the consultant's report, assigning responsibilities for implementing actions to areas within the Secretariat and setting deadlines for completing particular actions;
- monitor the implementation of the action plan;
- propose new environmental management initiatives; and
- act as 'environmental champions' across the organisation, undertaking awareness raising and education.

The committee is comprised of eight staff from across each of the Secretariat's five sections, is chaired by the Clerk and meets approximately every two months.

In addition to the development of the environmental sustainable committee, the Secretariat also embarked on developing improved performance measurement tools, allowing the organisation to better monitor and report on energy and water consumption patterns and compliance with the Assembly waste management systems. To this end the Secretariat now has a simple spreadsheet based system in place to record a range of information (included in Attachment B).

The collection and interrogation of this data will allow the Secretariat to better evaluate its overall environmental performance and to make adjustments to its operational responses where there particular issues are identified.

Other initiatives that have been or are being pursued by the Secretariat and outlined below.

#### Water initiatives

- Internal water fountains converted to garden beds
- Replacement of shower heads with more efficient low flow heads
- Replacement of cisterns and 9ltr/12ltr dual flush cisterns with 5ltr/7ltr dual flush cisterns
- Urinals changed to 7 litre flush
- Replacement of movement sensors in toilets to activate flushing systems on urinals
- Investigation of the costs and benefits of installing rainwater tanks to provide water for internal gardens and the cooling tower (the Secretariat has decided not to proceed with this initiative at this point in time)
- Installation of sub-metering on the water cooling tower to better measure water consumption of this appliance

#### Energy

- Introduction of low wattage lighting across the building (6 and 10 watt bulbs (replacing 150w and 50w))
- Progressive introduction of smart lighting to areas of the building (CBUS system – motion detection, lux sensitive lighting)
- All members' offices have movement activated lighting (some also have lux sensitive lighting)
- Movement sensitive lighting installed in all toilets
- Deactivation of one of the Assembly's two domestic water heaters following analysis of consumption patterns which showed that only one water heater would meet the requirements of the building
- Installation of a more efficient chiller is scheduled in 2009-10 (expected to result in a 30 percentage reduction in energy consumption compared to the existing chiller)
- Development of improved monitoring and recording processes for energy consumption;

- Installation of new BMS (Building Management System) including Smart Scheduler for improving climate control efficiencies
- Reducing heating temperature 'set points' of climate control settings by 0.5 of a degree Celsius
- Investigation of the costs and benefits of the installation of solar panels
- Investigation of enhanced power management settings on desktop PCs across the building
- Investigation of the installation of external shading on building windows to reduce prevent building heat transfer
- Application of window film

### Waste

- Introduction of a waste stream to capture compostable waste which is provided to a local worm farm
- Removing landfill bins from under people's desks and replacing with a mixed used co-mingled and paper recycling bin (this has already resulted in a 30% reduction (pro rata) in the amount of waste going to landfill since it was introduced in May 2009)
- Toner and printer cartridge recycling
- Introducing ongoing monitoring of volumes of waste processed through the different waste streams as a performance measurement tool
- Introduction of awareness and education program through *Assembly Matters* newsletter, regular emails, and provision of information about recycling rates to encourage compliance with the waste streams
- Introduction of signage throughout the Assembly building explaining the sorts of waste that should go into the different waste streams

### **Challenges/discussion**

There can be a number of challenges associated with implementing environmental management programs across parliamentary buildings. In the case of the Assembly one challenge is that with 17 different members and their staff, there are a variety of different perceptions around the need, or otherwise, to reduce the Assembly's environmental footprint. In most work environments – both in the public and private sectors – decisions about pursuing particular environmental practices can be formulated and implemented as a matter of policy across the entire organisation. In a parliament, given the spectrum of views on the environmental management, achieving compliance with systems (e.g. waste management system) that have been put in place can be more difficult.

Another challenge for the Assembly in the area of environmental manage is the age of the building. When the Assembly building was developed in the 1950s, environmental considerations were not incorporated into the design and building processes. Given this, there are certain inefficiencies inherent in the building that will never be able to be overcome. I would imagine this is an even greater issue for parliaments that were constructed 100 or 150 years ago.

Finally, given that so much of the Assembly's activities (such as the length and timing of sittings in the chamber and of committees) are in the hands of the Assembly itself, there are some in-built constraints as to what the Secretariat can achieve in terms of reducing power and energy consumption and waste generation.

## **Conclusion**

The Secretariat will continue to monitor its performance on the environmental management front to see that the Assembly building is reducing its environmental footprint in terms of reduced energy and water consumption, decreased waste generation, increased recycling rates and reduced waste going to landfill. In its report, the consultancy firm estimated that if the Secretariat implemented all the recommendations contained in the report that it could achieve significant efficiencies across all these areas. In terms of energy use, it was estimated that the Secretariat could save up to 289,844 kWh of electricity per year (the Assembly typically uses about 1,050,000 kWh of electricity per year, so in the event that the Secretariat is able to reduce consumption by this amount it would represent a 27 % reduction (or a reduction of 404 tonnes of CO<sub>2</sub> emissions). In terms of water, it was estimated that there could be savings of between 1,500 and 4,000 kL per annum from a 2006 high of approximately 8000kL, representing a 18.75 % – 50% reduction in consumption. In terms of waste management, it is estimated that the waste going to landfill could be reduced from 19% to about 2.5% of total waste generated.

Although these estimated efficiencies are predicated on a number of assumptions, some of which are considerably optimistic about the efficiencies that can be brought to bear, the Secretariat will be well-placed to review how it is tracking, to identify initiatives that are working effectively and those that are not, and to make adjustments to the environmental management program that cater to changing operating conditions.

**Attachment A: Secretariat's requirements for the consultant engineering firm**

<b>ENERGY AUDIT</b>
<b>Site Evaluation</b>
Evaluate current metering and determine metering requirements for audit
<b>Data Collection</b>
Revision of past audits and reporting
Historical billing and recorded data
Develop energy device and appliance inventory
Inventory of existing devices and strategies for energy conservation
Survey building construction/materials
Determine device/building use patterns
<b>Tariff Evaluation</b>
Current tariff structure
Comparison: alternative tariff structures
<b>Data Analysis and Reporting</b>
Determine energy profiles from collected data based on appliances, use and building hours of occupation
<b>Benchmarking and Comparison</b>
Gather available data on similar buildings for comparison
Determine relevant relative performance
<b>Evaluation and Process for Improvement</b>
Determine opportunities for conservation through capital investment
Determine opportunities for conservation through management
Determine opportunities for conservation through user practices
Evaluate opportunities for conservation and recommend future actions

<b>WATER AUDIT</b>
<b>Site Evaluation</b>
Evaluate current metering and determine metering requirements for audit
<b>Data Collection</b>
Revision of past audits and reporting
Historical billing and recorded data
Develop water device and appliance inventory
Inventory of existing devices and strategies for energy conservation
Determine consumption patterns
<b>Data Analysis and Reporting</b>
Determine water use profiles from collected data
<b>Benchmarking and Comparison</b>
Determine targets with consultation
Gather available data on similar buildings for comparison
Determine relevant relative performance
<b>Evaluation and Process for Improvement</b>
Determine opportunities for conservation through capital investment
Determine opportunities for conservation through management
Determine opportunities for conservation through user practices
Evaluate opportunities for conservation and recommend future actions
<b>WASTE AUDIT</b>
<b>Site Evaluation</b>
Evaluate current methods of tracking waste disposal and determine monitoring requirements
<b>Data Collection</b>
Revision of past audits and reporting
Previously recorded data
Develop waste source inventory and paths
Inventory of existing devices and strategies for waste management
Monitor waste to determine constituents

<b>Data Analysis and Reporting</b>
Determine waste profiles from collected data
<b>Benchmarking and Comparison</b>
Determine targets with consultation
Gather available data on similar buildings for comparison
Determine relevant relative performance
<b>Evaluation and Process for Improvement</b>
Determine opportunities for conservation through capital investment
Determine opportunities for conservation through management
Determine opportunities for conservation through user practices
Evaluate opportunities for conservation and recommend future actions

## Attachment B: Information recorded on the Secretariat's sustainability monitoring tool

### Waste

- Reflex paper quantity ( number of reams)
- Reflex paper cost (\$)
- Paper recycling cost (\$)
- Mixed recycling cost (\$)
- Organic recycling cost (\$)
- Landfill cost (\$)
- Volume of cardboard recycled (m3)
- Volume of secure paper recycled (m3)
- Volume of non-secure paper recycled (m3)
- Total volume paper recycled (m3)
- Total volume paper and cardboard recycled (m3)
- Volume of mixed recyclables (m3)
- Volume of organic waste recycled (m3)
- Volume of landfill produced (m3)

### Energy

- Gas consumed (MJ)
- Gas related emissions (Tonnes)
- Gas consumption and supply charges inc GST(\$)
- Electricity consumed (KWh)
- Electricity related emissions (Tonnes)
- Total electricity charges inc GST(\$)
- Green Power purchased (%)
- Total kms travelled (KMS)
- Fleet related emissions (Kgs)
- Fleet related emissions (Tonnes)
- Average fuel consumption per vehicle (Litres per 100 kms)
- Total fuel costs inc GST (\$)
- Total carbon emissions (Kgs)

### Water

- Total water consumed (KL)
- Total current charges (\$)