

Case Studies

Energy Efficiency Measures In Live Performance Venues Across Australia

This document provides a collection of energy efficiency measures in live performance venues across Australia. The purpose of this case study collection is to share success stories and prompt venue managers to consider implementing similar energy efficiency measures in the various areas of their venue.

Greener Live Performances
through energy efficiency



Energy Efficiency In Performance Spaces

Stage Lighting

Perth Concert Hall, Western Australia

Perth Concert Hall, owned by the City of Perth and managed by AEG Ogden Pty Ltd, is renowned as one of the finest music acoustics in the southern hemisphere.

Perth Concert Hall has recently replaced four of their ten 20 year old Fresnel lamps. The 2,000w tungsten Halogen lamps have been replaced by 120w RGBAW (Red, Green, Blue, Amber, White) fittings with a colour temperature of 5,600°K (measurement in Degrees Kelvin - 5,600°K is equivalent to sunlight at noon).

The savings on energy consumption are enormous considering the difference in wattage (2000w vs 120w) and Perth Concert Hall reported on a range of benefits that came with this retrofit including savings on gels for the colour scrollers of the old Fresnel fittings and man-hours to replace gel strings and service the Fresnels. Further benefits are the beam angle and the colour saturation and variation (CRI) of the RGBAW LED fittings. Perth Concert Hall has replaced four units so far and is looking at purchasing another six in the future.

You can find more information on stage lighting in our *Energy Efficient Lighting Design resources*.

Sound - Rechargeable Batteries For Microphones

Malthouse Theatre, Victoria



Malthouse Theatre is the resident theatre company of The Coopers Malthouse building in Southbank, part of the Melbourne Arts Precinct and produces and presents Australian contemporary theatre.

Malthouse Theatre is using rechargeable batteries for their microphones. The initial outlay for the rechargeable batteries was approximately \$500 and they last for around 18 months. Before switching to rechargeable batteries, Malthouse spent around \$500 to \$600 on disposable batteries per season and threw their disposable batteries out after every show. Changing to rechargeable batteries entails additional electricity costs to recharge batteries; however, these are minimal compared to the money spent on disposables before and especially, the environmental impact of the battery waste.

Since using rechargeable batteries, Malthouse Theatre has reduced their recycled batteries from approximately 50-60kg to 20kg a year. On average, Malthouse Theatre went through around 3,780 disposable batteries a year¹, which means that one recyclable battery replaces an average of 210 throwaways. Malthouse Theatre has not experienced any technical glitches and the process for recharging has been seamlessly integrated into the daily routine for back of house staff. While they currently still offer non-recyclable batteries as an option for outside hirers (some producers/production managers are not confident about the reliability of rechargeable batteries), they are trying to lead by example and encourage people to give it a try.

¹ This includes batteries used for other equipment and batteries people bring from home; nevertheless, it gives an indication of how dramatically their battery consumption has been reduced.

Auditorium Lighting

Mackay Entertainment & Convention Centre (MECC), Queensland



Mackay Entertainment & Convention Centre (MECC), a business unit of Mackay Regional Council, provides diverse theatrical entertainment and event facilities and services to the communities of Mackay and is one of the leading theatres and function centres in region.

MECC replaced 110 lights of their 1090 seat theatre auditorium from 75w bulbs to 16w (1100 lumen) LED lights. This meant a reduction from 8,250w to 1,760w for 110 lights. All LED lights are linked to only one general power outlet (GPO) and are dimmable between 0 and 100% by responding to a DMX signal which is converted to a PWM signal driving the LED lights.

Through the refit, MECC is saving around a \$1,000 on their energy bill. The LED lights require significantly less maintenance saving time and labour cost and emit considerably less heat reducing the cost of air conditioning.

Melbourne Recital Centre, Victoria

Melbourne Recital Centre is a venue for ensemble music in Melbourne, programming and presenting in excess of 450 concerts and events each year across a variety of musical genres including classical, jazz, popular, cabaret and world music. Melbourne Recital Centre is running their LED house lighting at 90% wattage across the three modes (concert, day, night). The difference in light level is hardly noticeable to patrons and saves on the life of the globe as well as on energy cost.

Managing Air Conditioning

Frankston Arts Centre, Victoria



The Frankston Arts Centre is a business unit of the Frankston City Council comprising a theatre, galleries, a creative arts hub and a function centre.

Frankston Arts Centre has recently upgraded their Building Management System (BMS). With their previous system, the HVAC system could not be adequately controlled for individual areas around the venue and its control was limited to a simple on/ off functionality.

Now, the Frankston Arts Centre can flexibly schedule the HVAC system from a web-based interface for different areas of the venue suited to their event bookings schedule. The system also allows them to configure holidays and temporary exceptions for HVAC operations with a start and end date. With the increased control, excessive HVAC usage could be reduced by an average of around three hours a day.

Frankston Arts Centre is in the process of integrating their event management system with their BMS, which will enable the BMS to automatically program the HVAC according to the event schedule without the need for manual control.

For more information on Building Management Systems, refer to our *Building Management System Information Kit*.

Energy Efficiency In Public Areas

Foyer Lighting

Mackay Entertainment & Convention Centre (MECC), Queensland

Mackay Entertainment & Convention Centre (MECC) replaced 131 lights in their Foyer with LED lights changing from 120w bulbs to 12w. Before the retrofit the foyer required a total of 14,320w which has now been reduced to 1,637w. Whereas the 131 old lights cost \$7,700 in just electricity bills yearly, the new, brighter, less heat producing and less service intensive LED lights cost only \$880 a year. This meant a cost reduction of 89%.

	Old PAR 38 120w	New CREE LR6 12w
Energy usage & cost per lamp per year	299.52kWh a year \$77.88 *	29.952 kWh a year \$7.78 *
Maintenance Cost	Bulbs & Labour \$45	No Maintenance 5 year warranty
Overall cost per lamp per year	\$122.80	\$7.78

*Based on 8hrs/day, 6 days/week

These figures do not take into account the saving on air-conditioning as the new LR6 generate 95% less heat. Through this retrofit the MECC produces an estimated 50,000 tonnes less in carbon emissions.

More information on energy efficiency measure for public area lighting can be found in the *Improving Lighting Efficiency in Public Areas of Live Performance Venues Fact Sheet*.

HVAC Upgrade

Malthouse Theatre, Victoria

Malthouse Theatre has recently replaced their A/C unit. This retrofit has reduced the theatre's environmental impacts as the old system was running on a refrigerant called R22, a major contributor to greenhouse gas emissions. The system is designed to be much more energy efficient than the 20 year old model and allows for greater control through zoning and timers across the venue. The system also makes efficient use of return air and the materials of the new system lead to better air quality. Looking at it holistically, maintenance and repair costs have been greatly reduced as have Workplace Health and Safety concerns, since access for the new unit is in a safer position. While Malthouse Theatre cannot quantify the energy usage of the unit itself, overall reductions in their energy bill since unit replacement have proven that the retrofit increased the energy efficiency of the venue significantly.

More information on upgrading HVAC systems is available in our *Retrofitting HVAC Systems Design Guide*.

Monitoring And Managing The Energy Consumption Of Your Venue

Submetering

Brisbane Powerhouse, Queensland



Brisbane Powerhouse is a contemporary multi-arts, dining and conference venue.

Brisbane Powerhouse has installed sub-metering in their venue comprising a total of 11 meters. These meters monitor the usage of individual lighting, sound and mechanical services for their two theatres and one public stage as well as the chiller plants for the air-conditioning. The sub-metering system reports back to their Building Management System (BMS) allowing Brisbane Powerhouse to track their energy usage more accurately and to adapt procedures accordingly.

More information on monitoring and managing energy consumption is available in our *Building Management System Information Kit*.