

Get AMP'd

Energy Efficient Outdoor Events - Temporary Power

There is increasing pressure on all business owners to reduce operating costs and to take responsibility for the environmental impacts of their activities.

Implementing energy efficient events can be a pathway to tackling both. The following fact sheet delves into energy efficiency for outdoor music events using temporary power and guides you to Get AMP'd by following the **Assess, Manage, Perform, Disclose pathway.**

Greener Live Performances
through energy efficiency



Power costs can be a considerable line item in budgets for outdoor music events. With energy prices ever-increasing, energy efficiency is quickly making its way to the top of priority lists for those event producers with an eye on their triple bottom line. Just as there many settings for outdoor music events from city parks and streets, to greenfield sites or sports fields, so too there is more than one way to power events.

Event producers, site managers, production managers, artist liaison, technical production managers, vendor management and anyone that plans for or uses power at events has a role to play in achieving energy efficiency. Are you a **Power Player?**

Outdoor music events commonly use temporary power supply provided by diesel-fuelled generators (gensets). The main priority is to ensure enough power is supplied and there are no mid-show cutouts. Many events may be oversizing the gensets needed and few truly know just how efficient their power planning has turned out to be.

In this fact sheet we introduce you to the **Power Planning Pathway** and the critical steps we've identified – **Assess, Manage, Perform** and **Disclose**. Also read the *Permanent Power Fact Sheet* and the *Energy Efficient Outdoor Events Checklist* to help build an energy efficient event.

What is Energy Efficiency?

Energy efficiency is simply using less energy to achieve the same result. At outdoor events with temporary power, this means the maximum kWh produced for minimum litres of fuel used. This will be achieved through being able to run all your generators at the optimal power load of 70 – 80% of capacity.

Using energy efficient equipment, swapping electric catering equipment for gas powered, right-siting generators, smart power distribution, and powering down generators are examples of energy efficiency initiatives. The information outlined in this fact sheet and the action items in the *Energy Efficiency at Outdoor Events Checklist* will help you achieve an energy efficient event – resulting in fewer, smaller and optimally loaded generators.

An event's energy efficiency profile can be assessed through one or a combination of indicators, depending on the best approach given an event profile. Typical indicators are:

- total kWh
- average kWh per hour
- running hours of generators
- number and size of generators
- fuel consumed
- average generator load
- kWh per event attendee
- dollars spent per kWh of power produced

Why Energy Efficiency?

The benefits and motivating factors behind running an energy efficient event are *budgetary, environmental* and *reputational*.

When using temporary power supply, cost savings can be achieved by being able to hire smaller or fewer gensets, running them for shorter periods and using less fuel. All are billable aspects to genset hire.

Some hire arrangements may have fuel supply bundled as part of the contract. In this case any successes in reducing fuel consumption will be rewarded straight to the hire company's bottom line. Strike a deal whereby fuel is charged separately, or for multi day events, arrange re-fuelling through a separate vendor.

If it is not possible to split the fuel costs from the genset hire, we hope that you will be motivated by what is an equally important positive outcome of energy efficiency efforts – the environmental benefits.

Being energy efficient means using less non-renewable fossil fuel resources and producing fewer greenhouse gas emissions (GHG). Responsible event producers must consider their GHG impacts and by running energy efficient events you will be able to confidently communicate your commitment to GHG reductions and benefit from reputational enhancements.

Power Use at Events

Outdoor music events require power for light and sound on stages, amenities, site offices, dressing rooms, traders, caterers, bars, refrigeration, site lighting, décor, and event activities and entertainment aspects. Power is used at three distinct times:

1. pre-event during site build, production bump in and rehearsals/sound checks
2. during the event
3. post-event bump out

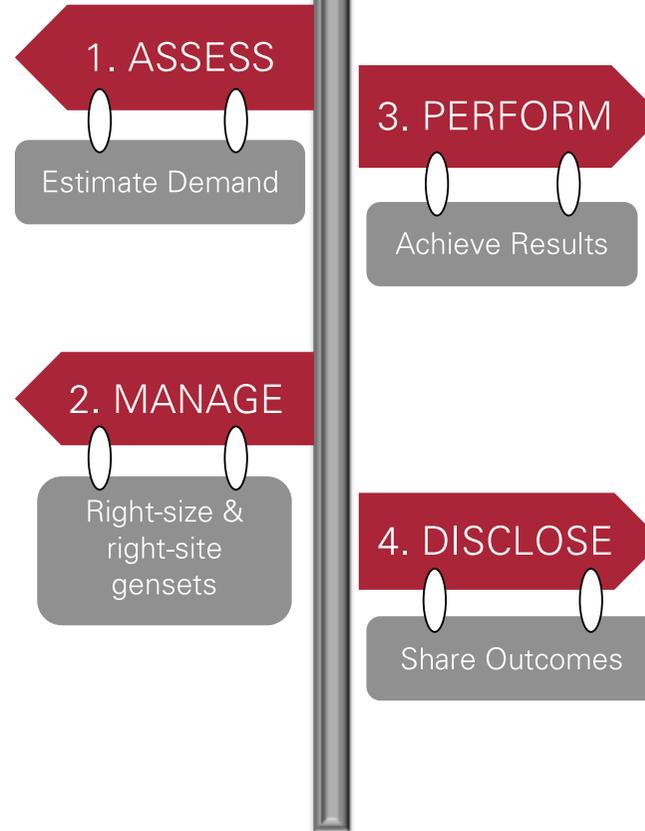
A typical outdoor event's power consumption will be split evenly between;

1. stage requirements
2. bars and traders/caterers
3. amenities/site lighting

There are opportunities to achieve more efficient power use in all three phases of the lifecycle across all three aspects of power demand.

Some events also use permanent power, provided by the site. Events with an eye on renewable energy are seeking biofuel for gensets, or using temporary solar or even pedal power. Innovations in renewable energy supply around the corner for events include hydrogen fuel cells and kinetic energy. Keep an eye on new technologies and offer the event as a way to demonstrate these emerging alternatives.

POWER PLANNING PATHWAY



Get AMP'd

At most outdoor events there's little opportunity to put infrastructure based efficiencies in place on the site. Power provision will often be a case of access to a mains power outlet in the great outdoors! So you'll need to **GET AMP'd** to tackle energy efficiency in the outdoors... Follow our **Power Planning Pathway**:

1. ASSESS – estimate demand
- Accurately forecast energy demand
- Look for efficiency opportunities

2. MANAGE – design in efficiencies
- Design-in energy conservation
- Plan for operational efficiencies
- Right-size and right-site gensets

3. PERFORM – achieve efficiencies
- Engage power users
- Implement initiatives
- Monitor and adjust compliance at the event
- Meter and measure power consumption

4. DISCLOSE – share results
- Analyse results and assess performance
- Feed back performance results to power users, staff, and other stakeholders

What's the Source?

Temporary power at outdoor events most often is supplied by diesel-fuelled power generators (gensets). Diesel is a non-renewable fossil fuel, and greenhouse gas emissions are created for every litre of fuel consumed. Energy efficient use of gensets will therefore mean reduced fuel consumption and reduced GHGs.

Temporary power to outdoor events can also be sourced through renewable fuel sources such as biodiesel. Biodiesel is reported to run less efficiently than mineral diesel – meaning more fuel is consumed for the same amount of power generated. However GHGs are zero as biodiesel is made from 'recent' rather than 'ancient' carbon sources. Check with your genset and fuel supplier for the facts on the efficiency of the chosen biofuel in their equipment.

Temporary power supply from zero GHG sources is popularly supplied through mobile solar power and a more boutique solution is pedal power! If you don't have access to these in your region, look to local solar companies to set up demonstration models, both promoting their business and providing you a zero emissions power solution.

Estimate Energy Demand

Accurately estimating the event's likely power demand in order to right-size and right-site gensets is an important step on the **Power Planning Pathway**.

Identify the major power users including:

- Site lighting
- Amenities
- Traders, caterers, bars
- Site infrastructure (cabins, offices)
- Entertainment providers
- Stage AV/band requirements

Do you know their power?

Gather as much information about the likely equipment needing to be powered, including wattage, voltage, and amps. Know what needs to be running, where and when.

This information can be gathered through application forms, technical specifications requests from performers, and supplier information on proposed equipment to be hired.

Collate information on;

- What equipment requires power
- Likely power draw (amps, watts)
- When and how long power could be required

Technical Specifications

Stallholders: During the application process or when participation is confirmed, stallholders (bars, caterers, food stalls etc) will communicate their technical requirements to the event such as site size, marquee provision, number of tables, car spots, employee passes etc. Request power estimates during this process. Start out by informing them of the event's energy efficiency ambitions and request they look for ways to reduce their energy consumption through equipment choice and operations. Consider letting them know what their power quota is – the maximum they are allowed – and that anything over this they will need to a) justify, and b) pay for.

Artists: If artists, performers and bands are bringing in their own AV or request certain technical provision, require them to detail what the power draw will be. This will turn their thinking towards the energy intensity of their AV design choices and hopefully tune them into planning energy efficient effects.

Suppliers: Lighting, sound, infrastructure and equipment hirers are critical players in achieving an energy efficient event as they are the ones who will be sourcing and supplying the power using equipment. Engage them in seeking out and planning in efficiency.

1. ASSESS

Keeping an eye out for likely power demand peaks is important as these peaks are the indicators for sizing a genset. Peaks commonly occur through special lighting effects on stages, and start up sessions by power hungry equipment such as electric water heating.

Consolidate the information received from all power users and precinct managers and plot requirements by location, demand and timing. Power requirement timing for specific power users is particularly important to determine as the genset size can perhaps be reduced if all the equipment needing power in one location won't be used simultaneously. What you are ultimately aiming to do is to flatten out anticipated peaks in power demand so you don't have to oversize the genset just to provide enough power for that one likely peak.

Over-sized gensets running at well below capacity wasting fuel is also a common issue in the bump-in and bump-out period, where show-day gensets are used to just to charge batteries, the site office and security lights. Overnight loads are also much lower than show time, and configuring power distribution to isolate equipment that needs to run 24 hours a day will mean some gensets can be switched off completely.

Right-sizing gensets

Gensets are sized by the amount of power they can provide – expressed as KVA (kilovolt amps). The power you are drawing is measured in kWh (kilowatt hours).

The aim is to configure genset sizing, siting and distribution to bring them in as close as possible to a 70% - 80% operating load. This is the sweet spot where gensets use the least amount of fuel comparative to power output – achieving **maximum fuel efficiency**. This will also give you buffer for peak loads (e.g. when everything is turned on at once, for lighting peaks, or for equipment that has an elevated demand for power as it is warming up).

To maximise efficiency you need to determine if you can bring that potential peak down, so that you can reduce the total genset size. This can be done by challenging lighting designers to create the same lighting effect at a lower energy demand. If that can't be managed, look at running two gensets with one isolated to high power demand lights or running them in parallel to have the second 'kick in' as required.

Use the Experts

Genset suppliers are there to help you and are experts at working out the right sized equipment for the job. They are motivated to not send out over-sized gensets as running them at low loads is bad for the equipment.

Establishing a good relationship with the genset supplier and choosing one that is interested and engaged in helping you achieve an efficient event is important. Make sure you plan in enough time to gather power demand by users and to work with the genset supplier on efficiency planning. They need as much detail as possible on the likely power profile of your event. Having this information compiled by an informed event/site/production manager working in tandem with an engaged genset supplier will mean you are well on your way to planning out an energy efficient event.

Something else to note is that all of the planning in the world can go out the window if the genset supplier at the last minute provides an oversized genset because that's what they had in the yard. Put processes in place to be assured you receive the gensets that have been planned for and remember to check them live on-site!

Manage Energy Efficiency

Managing for energy efficiency is the next step on the **Power Planning Pathway**.

Successful implementation of energy reduction and efficiency plans is dependent on staff, crew and contractors being involved and actively committed to the event's goals of reducing power demand.

Those making sourcing or equipment hiring decisions and those operating equipment are integral to success. Put a communications plan in place to let power users, production staff, site and lighting designers know about the event's commitment to reducing energy demand and improving energy efficiency.

- Formalise commitment to energy efficiency through establishing an energy management policy and plan.
- Set power reduction objectives.
- Instigate a power-down policy.
- Incentivise reduction performance.
- Contract it into agreements and include in staff/event performance reviews.
- Ensure accurate records of previous event's power demand and reduction initiatives are kept to enable continual improvement.

Site Management:

- Challenge power estimations and work to establish reduction targets.
- Work with production and catering teams to plan a site that will maximise efficiency. This can mean clustering power distribution.
- Work with production and catering teams to identify where potential power downs can occur and establish a system to ensure this is instigated on-site.
- Establish kWh and fuel metering of gensets so you can review and report to production and catering management and power users.

Production/Stage Management:

- Request or require energy efficient lighting to be used on stages and site lighting.
- Work with AV suppliers and designers to create low energy lighting effects.
- Communicate with performers around energy efficiency and engage their participation in designing energy efficient lighting plans.
- Review bump-in, rehearsal and sound check times to streamline as much as possible.
- Liaise with AV technicians to establish if systems can be powered down between sound check and show time without losing settings, so gensets can be switched off.
- Understand if dimmer control and light shut down reduces power demand, rather than the use of mechanical shutters.

Catering/Bar Management:

- If energy intensive catering equipment such as electric bain maries, urns and fryers are proposed, require the use of gas powered equipment instead.
- Review site plans and look for potential for increased power demand for refrigeration due to climatic conditions. Provide shade.
- Incentivise, meter and reward catering and bar outlets that produce energy efficient operations.

Questions...

- Are energy management and power down policies in place?
- Are power quotas in place?
- Have accurate power estimates been received?
- Are site and production management working together to review power estimates and to design-in site layout and operational efficiencies?
- Are engagement and incentive programs in place to encourage energy efficient planning and operating?
- Are AV suppliers actively looking for solutions?

Perform Efficiently

Implementing your plans and performing efficiently is the next step on the **Power Planning Pathway**.

Site and Event Information

Any handbooks, information packs, newsletters or update emails sent out to event participants and likely power users should include information on the event's power conservation and efficiency aims and specific actions each power user can take to play their part.

Campaigns and Rewards

Set up a low-power challenge, pre-promoted to power users, to encourage interest in and successful implementation of efficiency initiatives. This could be one stage team pitched against each other to have the best production value/effect for the lowest power consumption, or the lowest energy using food trader. Feel free to use the term '**Power Player**' in your campaign!

Penalties

Although it may be better to use a carrot rather than a stick, you could embed clauses into agreements whereby if power users use more than their prescribed or required amount of power, they are charged an excess usage fee.

Site Inductions

Power users (i.e. primarily traders, stage crew, site crew), will be inducted when they arrive on-site, as per standard event requirements. Include reminders in that induction about the event's commitment to energy conservation and efficient operations, and what specific actions they are expected to take.

On-site Visits

Go around to major power users and operators (e.g. traders, stage and site crew) and reiterate the energy conservation and efficiency actions that should be undertaken, observe them in action, and correct/encourage correction as required.

Incentivise Genset Suppliers

Offer to pay a bonus if genset power demand comes in on average at 70 – 80%. Enquire if metering and reporting of genset efficiency is possible.

Battery Banking

A clever way to get energy where you need it without just revving up a fossil-fuelled genset is by harvesting untapped power that's being created from your gensets and storing it in batteries to be used to power smaller requirements. Engage genset providers to look at setting up a system that banks power to batteries and uses this stored power, only switching to genset power when required.

Permanent Distribution

If you're running an event with a significant site size over multiple days and using many gensets, consider putting in permanent power distribution. You could also go further and talk to specialists about a 'smart grid' whereby power is distributed from generators when it is needed and includes battery banking.

At-Event Metering

Ensure you have systems in place to measure fuel consumption for each genset. Alongside fuel consumption, you should also meter kWh drawn down (power demand) on gensets to establish efficiency of each.

Also ask any zero emissions power suppliers to provide kWh of power used so you can include this in your overall event energy performance reporting.

Perform Efficiently

Site & Infrastructure

Temporary infrastructure on outdoor sites needs power for such things as amenities, site offices, coolrooms, dressing rooms, medical/first aid, and even air conditioning or heating for temporary indoor spaces. The physical layout of the site has a huge role to play in the potential for efficient use of mobile gensets.

- Plan site layout so that power distribution can be clustered with overnight (24 hr) loads on separate gensets than showtime loads.
- Plan site layout so power is distributed to configure loads to be optimised on gensets at 70 to 80% of load potential, for as long as possible.
- Plan site layout to allow fewer larger gensets if load will be relatively constant throughout the event.
- Plan site layout to use a larger number of smaller gensets if there will be considerable short-term peaks. Bring these gensets online to cover these anticipated peaks.
- Place site cabins and amenities in the shade to reduce need for AC, and hire infrastructure with gas water heating.

Light & Sound

Lighting and visuals use the largest amount of power on stages and opportunities exist to reduce energy demand if performers and lighting designers are willing to consider energy efficient lighting and equipment.

- Streamline rehearsal and sound check times to enable switch off of gensets.
- Plan power-free acoustic performances.
- Use natural site features to optimise acoustics.
- Implement the power down policy.
- Site and program performances so sound bleed does not require over/competing amplification.
- Use low energy stage and site lighting.
- Choose lighting which when dimmed or shut off, means the power demand is reduced, rather than mechanical shutters.
- Don't use stage lights and site lights during the day.
- Site lighting switch on too early or left on during the day is a potential power drainer. Put processes in place to only have site lighting on as of dusk.
- Use LED solar powered lighting towers.

Catering & Bars

Many events have temporary on-site food and beverage and goods, and in many cases these need power. Whether if it is organised by external traders or managed in-house this category of power use needs some thinking and planning.

- Use gas powered catering equipment.
- Ensure refrigeration in catering, bars and dressing rooms is only on when needed.
- Review load in and cool down timing for stock and turn on refrigeration only when required. Power down where you can.
- Ensure refrigeration is in the shade.
- Check that traders are only using the equipment they stated they would bring.
- Audit/monitor equipment use by traders to check they are not leaving equipment on when not necessary and/or are using power-pulling equipment at the prescribed times.

Event Activities

- Review proposed activities that are energy intensive and look for low energy alternatives.

Attendee Communications

If you're really doing great stuff at your event with regards to power conservation and efficiency, promote it to attendees. If there are ways they can interact in energy conservation and efficiency actions, through their participation in the event, get them involved!

You may wish to create initiatives to purposely engage them to think about energy conservation and efficiency both at the event and in their everyday lives.

Events have role to play in contributing to sustainable development, so engaging and inspiring event attendees to conserve energy and use energy more efficiently is a great outcome of your at-event energy efforts. Some ideas to communicate with and engage event attendees include:

Website, Newsletters, Program: Include information about the event's commitment to energy conservation and efficiency in relevant external communications.

On-Site Signage: If there are any innovations that can be viewed, put up explanatory signage.

On-Site Messaging: If you have a relevant location, eco-zone or similar, include messaging about the initiatives you are taking and similar steps attendees could take at home and work.

People Powered: Set up ways that people can power their own entertainment. Pedal power is the obvious option, however clever tinkerers in your community may create other bespoke set-ups. Put the word out to installation artists to cook up amazing ideas.

Power for the People: Attendees will often need power to charge phones and cameras. This can be provided through the people-power above or through solar power set ups.

Renewable Entertainment: Installations, activations or entertainment powered by the sun, wind or other renewable sources, can be devised.

Performance Monitoring

Report the energy consumed by the event, along with overall efficiency, cost savings and greenhouse gas emissions. This reporting can be both for internal management purposes, and used to inform and further inspire power users. You may also choose to take a full disclosure approach and make your results available to public stakeholders and to share your learning with industry colleagues.

Consider separating out your reporting into pre-event (site build, bump in, rehearsal), show days, and post-event (bump out).

Gas used for cooking should also be measured and reported and included in your overall energy consumption and particularly in the event's GHG inventory.

Monitor Compliance: The only way to ensure your efficiency plans are implemented is to keep an eye on what's happening on-site. Factor into your plans someone to go around and check that power users - especially stallholders, bars and caterers - only have plugged in what they have pre-declared they will. Also check for things that have been left on when they shouldn't be, such as lights.

Generator Power: Track the size, location and running hours of generators. Measure fuel consumption for each and if possible measure kWh produced and kWh drawn. Many new generators have this capability in-built. Enquire with your supplier. Knowing kWh and fuel consumption are the critical measures in assessing an event's energy efficiency performance.

What was plugged in and when: It is very important to log what equipment was actually being powered, and from where it was powered. Set up forms to gather this information and log it. Go out and cross check it live, and keep that information for future planning purposes. Take photos, write down specs, log timing and running hours.

What To Measure and Report

Where relevant and possible, measure the following:

- Total generator kVa
- Total running hours
- Total litres fuel (by type)
- Total kWh produced and drawn down per generator
- Total kWh for zero emissions power supply
- Total bottled gas (kg) and mains gas (kWh)

With the gathered data you will be able to assess the energy efficiency of your event. Be careful not to compare your efficiency outcomes to events with different profiles (size, content, attendee number etc).

- Average kWh per hour consumed
- Cost per kWh hour (include fuel, equipment hire and direct personnel)
- kWh per attendee
- Total kWh energy saved due to initiatives
- Total cost saved due to initiatives
- Total GHG avoided due to initiatives
- Total greenhouse gas emissions

Having baseline (previous) data will allow you to report the actual savings/efficiencies achieved – energy efficiency is having the same result for less power. If you don't have baseline data, report on power estimates in a business as usual scenario.

Also report on your management approach – telling the story of your journey, the steps you took, the hurdles you faced and challenges overcome. Report on efficiencies you identified and targets you set. Explain what actions were implemented, successes and failures of plans and future actions for improvement. And don't forget to disclose your performance to stakeholders, especially staff and power users.



This Activity received funding from the Department of Industry as part of the Energy Efficiency Information Grants Program.

The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein.

Greener Live Performances
through energy efficiency

