



Power Sources on Location



About this fact sheet

Media Greenhouse and Powerful Thinking have produced this factsheet to provide the screen arts with information and inspiration about how to make positive choices about their on-location power. Media Greenhouse is the home of environmental sustainability for the screen arts.

Changing Practices

The power used both in the studio and on location contributes significantly to your production's overall carbon footprint. Reducing this by switching to a lower impact fuel provider or smaller generator will improve your environmental sustainability, can lower your fuel, kit and delivery costs and increase the power efficiency you are getting from your generators. Ways you can achieve this are outlined in this document.

Size your generator correctly

Research by Powerful Thinking in 2012 found that oversizing generators in the outdoor events industry is commonplace, and that outdoor productions could often save 10-30% of fuel costs.

One of the variables which has the most significant impact on the efficiency of your generator and costs is whether the load capacity is sized correctly for the task. This can be difficult to judge, especially when allowing for back up and secondary back up capacities. However, re-thinking this could make all the difference. A conventional diesel generator should be run at least 60 - 75% of maximum rated load to avoid long term damage. Approach your power design from a different perspective by coming at it with more detailed information of how much power your equipment is truly likely to draw.

The most important thing you can do to reduce your fuel consumption is to produce the most detailed power specification that you can in advance. Use data from monitoring use on previous shows if it is available to establish if generator sizes can be reduced for repeat or similar uses. The key problem in the industry is over specification of power needs in advance, everyone (understandably) plays it very safe when estimating power usage, and each person involved will add little more. It is important to ask your crew to specify what they are likely to draw on each piece of equipment, rather than the general requirements e.g. 125Amp, which will result in massive over-sizing of the generators (meaning a lot of fuel burnt for no reason).

Alternative Power Supplies

Table: Carbon associated with power types

TYPE POWER	CARBON
Mains electricity	0.54 Kg per kWh
WVO biodiesel	Zero rated
Solar (and wind)	Zero rated
Hydrogen fuel cell	Zero rated
Methanol fuel cell	0.9 Kg per litre
Diesel	2.63 Kg per litre

Biodiesel fuelled generators

It is important to make sure that your biodiesel comes from waste vegetable oil. Burning waste vegetable oil (WVO) is an environmentally beneficial use of a waste product. Virgin oils, where crops are grown intentionally for use as biodiesel, are not considered environmentally beneficial. Edible crops can be diverted away from feeding people and livestock, destruction of habitats may be taking place and there are often socio-economic or ethical issues surrounding the acquisition and management of the arable land they are grown on.

Using WVO biodiesel in your generators is a good way of improving environmental performance without significant changes to the way you operate. WVO biodiesel can be used in the same way as regular diesel so doesn't require the shift change in attitude which some alternative power sources might. When biodiesel was first introduced, there were problems with the quality which did affect the health of generators and may have given operators a bad view of biodiesel. However we have come a long way since then and nowadays there are thousands of generators running on 100% WVO biodiesel with very few problems reported. A mix can also sometimes be used in generators with no adaptations made to the generator.

Online Case Study: <http://mediagreenhouse.co.uk/case-studies/countryfile>

Solar power

There are a numerous brands and models of generator available on the markets which use solar panels to charge and power them, so there are various ways of meeting power needs according to the needs of your production.

Photovoltaic (PV) panels, are well suited to the UK as they get their energy from light, not sun, so can still generate electricity when it is overcast (although direct sunlight produces the best results). All that is needed is an array of solar panels. These are generally very quick and easy to put up, take down and transport. They should be positioned facing south and not covered by shade.

Solar generators can be excellent because they are completely free to run and don't require any fuel to be transported. They do generally produce less power than a conventional diesel generator and power cannot be guaranteed due to the effect of the weather. However, there are ways to plan for peak power loads, even in the worst weather conditions and the benefit of a solar generator is its capacity to store power for later use. In some ways this is even more efficient because it encourages you to manage your power demands to suit your needs rather than, with a diesel generator, burning fuel constantly regardless of demand.

Online Case Study: <http://mediagreenhouse.co.uk/case-studies/great-bear-stake-out>



Fuel cells

Hydrogen

The hydrogen fuel cell works by converting hydrogen into energy, the by-products are water and heat so it is a very clean technology. The hydrogen 'fuel' can be sourced as the by-product of chemical processes or from the gasses arising from anaerobic digestion (composting facilities). Research is also underway into sourcing hydrogen as a by-product of the energy generated from solar technology and wind turbines, making this a very sustainable 'fuel' source. Hydrogen is the most common fuel, but hydrocarbons such as natural gas and alcohols like methanol are sometimes used.

Unlike a solar or hybrid generator, a fuel cell does not have a battery to store power, however as long as they are supplied with oxygen and fuel they can produce continual electricity. Fuel cells are smaller and lighter than conventional diesel generators making them ideal for productions on the move. They run silently and are ideally suited to locations with restricted space or filming which requires a level of stealth.

Methanol

Methanol fuel cells are comparatively expensive and inefficient compared to the hydrogen fuel cell however there is still a lot of research and development underway. The reason that the methanol fuel cell is so much dearer is that it crucially contains platinum. The great benefits of using methanol are that they are very lightweight, silent and the methanol liquid fuel is much easier to store than the compressed hydrogen.

Currently the methanol fuel cell is best suited to smaller demands, they generally range from 25W to 850W with 12 or 24V outputs, however this could be stepped up with an inverter to produce 110 or 220V. The cell would work well supplementing another power source or would be perfect for filming in small, remote or restricted spaces. They do require fuel top ups, although not nearly as regularly as a diesel generator would, meaning savings on travel and labour too. The methanol fuel cell can achieve up to 52 days runtime from one fuel cartridge.

Pedal power

Pedal power (or other kinetic movements) is a very interesting and exciting new technology. For obvious reasons this would not be suitable as a power source for the vast majority of productions. However it could provide a great opportunity if used at launch events or premiers to promote the green credentials of a production, engage the audience and provide enough free energy to power the screening or performance.

Online case study: <http://mediagreenhouse.co.uk/case-studies/big-cycle-cinema>