



This Energy Factsheet is part of a series developed by Powerful Thinking with our partners. To see the full series online go to: www.powerful-thinking.org.uk/resources/fact-sheets

MEASURING GENERATOR LOADS RESOURCE PACK



Photo credit: Firefly Clean Energy

About this Factsheet

The purpose of this factsheet is to help you, a member of staff or a volunteer measure and record the power consumption of your event so that the data can be used to make future efficiency savings. In many cases the power provider will/should do this for you, but if for any reason they are not contracted to provide this information, are unable to do so or you do not have onsite technical support, here's the know-how to get the job done yourself.

We recommend that you delegate this task to a dedicated member of your team who will not become otherwise distracted by managing, building or dismantling your event.

Useful Background Information:

Generators are sized by the "kVA" – an electrical term for power. The following table gives the maximum current per phase for a generator of given kVA.

Generator Size (kVA)	Current per Phase (Amps)
15	21
30	42
40	56
60	83
80	112
100	140
160	222
200	280

The term "phase" is another electrical term; the generator in effect has three separate outputs so for example a 100 kVA generator above could supply a total current of 420 A (140 A x 3). Note that loads on each phase are kept as equal as possible .

In order to use the generator efficiently the load (i.e. the electrical demand from equipment plugged into it) needs to be matched well with the capacity. A generator is most efficient at 75% of its capacity. So using our 100 kVA example, it could efficiently supply a load of 100 A per phase. This will give best fuel usage but also allow for occasional peaks in current demand.

However, current measurements on a generator are instantaneous – a snapshot of the current supplied when we happen to look at the meter on the front panel; our car speedometer only shows the instantaneous speed we happen to be travelling at when we glance down at it. In order to show the cumulative energy produced we need to view it as energy produced over time. This is measured in kWh (kilowatt hours).

What to measure and why:

You'll need to take the following readings from as many of the generators onsite as has been agreed – preferably all or most of them. You will find the readings in the generator control panel, and can enter them into the data sheet provided with this factsheet.

- Time
- Currents on phases L1, L2 & L3
- kWh
- Fuel level – at beginning and end of event, with a note of any refills.

Most modern generators have a control panel that can show the kWh the machine produces. However, the figure shown will be from the day the generator left the factory – akin to the odometer on a car. So we need to find and record the kWh at the beginning of the event otherwise the subsequent readings will have no reference.

In terms of actually finding the correct numbers on the generator control panel, talk to the electricians and explain what you are doing. Ask them to show you how to find the current and kWh readings – there are several different manufacturers and all the panels are slightly different. Ask them to show you what you really **MUST NOT** touch or press! Some machines can be remotely interrogated and the suppliers may be able to just give you the results or direct you to the site where they are recorded.

When to measure:

Ideally readings every hour would be gathered. If this is not feasible, try taking readings at regular times each day but under different conditions; perhaps morning, afternoon and night. It depends what the generator is supplying i.e. a kitchen will use no current at night but may be at maximum demand at 8am. At noon a shower block may be idle but heavily used at 9pm. Voila! Hand the data to the person responsible for analysis.

Use **this template** to record data.

Further guidance:

If you wish to measure all types of total power consumption to use in a carbon emissions audit, such as with the **Julie's Bicycle Creative IG Tool**, please refer to **Factsheet #21 – Advanced Power Monitoring Resource Pack: Measuring Power & Recording Template**.

If you wish to learn more about how energy works and technical terms as part of this exercise, please refer to **Factsheet #11 – How Energy Actually Works and Essential Terminology**.