Case study

Fuel Consumption Ready Reckoner For Outdoor Events

Greener Live Performances

through energy efficiency

Understanding the fuel consumption of different sized power generators running at various loadings will help you to plan the most energy efficient event.

To help in this task we've created the following table which details the litres of fuel consumed per hour, along with the greenhouse gas emissions created.

Use the table to inform your choice of the most efficient number and sizing of generators; given your event setting, site layout and production requirements.

Genset Size kVA	25% ltr/hr	kg GHG/hr	50% ltr/hr	kg GHG/hr	75% ltr/hr	kg GHG/h	100% ltr/hr	kg GHG/hr
20	1.82	6.60	2.73	9.89	3.94	14.29	4.85	17.59
30	3.94	14.29	5.45	19.79	7.27	26.38	8.78	31.88
40	4.85	17.59	6.97	25.28	9.69	35.18	12.11	43.97
60	5.45	19.79	8.78	31.88	11.51	41.77	14.54	52.77
75	7.27	26.38	10.30	37.38	13.93	50.57	18.47	67.06
100	7.87	28.58	12.42	45.07	17.56	63.76	22.41	81.35
125	9.39	34.08	15.14	54.96	21.50	78.05	27.56	100.03
135	9.99	36.28	16.35	59.36	23.02	83.55	29.68	107.73
150	10.90	39.57	17.87	64.86	25.44	92.34	33.01	119.82
175	12.42	45.07	20.59	74.75	29.37	106.63	38.46	139.61
200	14.23	51.67	23.32	84.64	33.31	120.92	43.61	158.30
230	16.05	58.26	26.65	96.74	37.85	137.41	50.27	182.48
250	17.26	62.66	28.77	104.43	41.19	149.50	54.51	197.87
300	20.59	74.75	34.22	124.22	48.76	176.98	65.11	236.35
350	23.92	86.84	39.67	144.01	56.63	205.57	76.01	275.92
400	26.95	97.84	45.12	163.79	64.50	234.15	86.61	314.39
500	33.31	120.92	56.02	203.37	79.95	290.21	108.11	392.44
600	39.97	145.11	66.62	241.84	95.39	346.27	129.61	470.49
750	49.36	179.18	82.98	301.20	119.01	432.02	161.71	587.02

** Using average consumption data from various generator suppliers Based on 50hz Prime Rated. Figures will vary between manufacturer. A tolerance of +/- 6% is recommended for estimation purposes.*

coateshire

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Scenario: 3 x 100kVA generators at 75% loading versus 1 x 300kVA at 75% loading.

By using one 300kVA generator as opposed to 3 x 100kVA generators, you will save 4 litres of fuel per hour and 14kg GHGs. Over a 24 hour period that saves almost 100 litres of fuel and 340 kg GHGs.

However if you were able to completely power down one of the 100kVA generators and only run it for eight hours (eg stage performance times), having 2 x 100kVA at 75% running for 24 hours and 1 x 100kVA running for 8 hours, then the total fuel used is 544 litres. Using one 300 kVA generator in this case, would have a demand of 66% for 16 hours and 75% for 8 hours, using a total of 879 litres of fuel.

Therefore in the scenario whereby you could feasibly power down one generator completely, having the three separate generators, would save a total of 334 litres of fuel and 1215kg of GHGs.

Energy Efficient Event:

Plan your production requirements and generator placement to run the minimal number of generators with optimal load, over the shortest period.

Optimal load we suggest is approximately 80% loaded

Balancing the Risk of Power Outs with Energy Efficiency

Planning for the most energy efficient event must not be to the exclusion of managing the risk of power-outs through undersupply of power generators.

The table in this guide provides fuel consumption and GHG figures for certain generator sizes and power loadings. This information will be helpful for you to balance the issues of risk of power outs with that of unnecessary fuel consumption and greenhouse gas emissions.

Accurately estimating likely power demand across your event site is key to planning the most efficient generator number, sizes, location and power distribution. By knowing this, you'll then be able to make informed decisions that will ensure no power cuts and that the highest level of fuel efficiency and management is possible.

Remember this:

- Optimal loading a single generator is the most fuel-efficient option in non-critical (non-performance) times.
- Adding a second generator 'in parallel' uses fuel wisely as it is manages risk (of a power out) while still providing additional power on demand.
- Running two generators with a light load is neither wise equipment management, nor fuel-efficient.
- 'Power-down' generators when they are not necessary. Running them under-loaded (e.g. at less than 30% loading) for extended periods damages the machine.

Example: 'Paralleling' Generators

If you are likely to experience peak loads during performance times (for example due to big lighting effects), and there is a risk that other unpredictable demand could occur and cause a power-out (for example accidentally firing all lighting, or a huge simultaneous demand from stallholders), the solution is to place two generators in 'parallel'.

In this case there would be one primary generator running at 90% loading for most of the day.

The second generator would be placed 'in parallel' on standby, ready to offer more power supply upon demand during critical periods.

This is the most fuel-efficient option whilst balancing risk and providing head-room for short-term critical demand.

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