DEEP GREEN 2030
FULL SPECTRUM SUSTAINABILITY

ENERGY SAVING ASSESSMENT
DATA ANALYISIS CONDUCTED – CARBON FOOTPRINT

Boss Cabins has designed and manufactured an innovative and patented welfare cabin with the intention to minimise the operational carbon footprint of the product along with the running cost of their units.

Carbon Footprint was contracted to assess the annual carbon and cost savings achievable by operating Boss Cabin's new product which is sold under the trade name 'Deep Green'

Boss Cabins' 'Deep Green' hybrid cabin includes solar panels and lithium-ion batteries integrated with a fuel-efficient HVO generator as a backup. The generator is a Boss Cabins-patented design which requires less frequent servicing than a standard generator. Space heating is provided using a separate thermostatically controlled diesel heater. Additional features which improve environmental performance include energy efficient electrical appliances as well as rainwater harvesting and greywater recycling.

This assessment was carried out by comparing the performance of Boss Cabins' 15-person Deep Green canteen and office welfare unit with a standard (non-eco) welfare unit of the same size and configuration.

Carbon Footprint Ltd has reviewed the data provided and the method of calculations for Boss Cabin's welfare cabins. 'Actual' data from Boss Cabin's energy monitoring of production (solar gain) and consumption was provided, although not from the full 12-month 'real-world' field testing which is currently still ongoing. This current assessment therefore employs a modelled approach for a 12-month period to estimate the potential energy savings (and emission reductions) based on extrapolation and assumptions (stated below).

How was the carbon footprint calculated?

The energy savings calculations compared the total run times of the generators for each of the welfare units, with the Deep Green cabin also including a small diesel space heater. The number of running hours required for each working day was used to calculate consumption of diesel in litres. The number of working days per month was then scaled up to a full calendar year.

Key conclusions

Our assessment suggests that on average the Deep Green 15-person welfare cabin will save circa 3,370 litres of fuel p.a. which equates to 8.4t CO_2e/year[1] and a cost saving of £9,572[2] (when HVO is used to fuel the cabins). Deep Green cabins annual operations have 9.3% of the in-use emissions of a Standard cabin, a 90.7% overall reduction[3]. In regard to service visits, the reduction in generator and toilet servicing visits from the embedded technology reduces fuel use and associated CO_2 emissions by 99.4% and 66.67% respectively[3]. As these emissions fall under scope 3 (indirect emissions) they cannot be included on the overall operational emissions reduction figure.

1 *To convert diesel combustion into emissions, the calculation used the 2022 emission factors developed by the Department for Environment, Food and Rural Affairs (DEFRA) and the Department for Business, Environment & Industrial Strategy (BEIS) for reporting emissions.*
2 *At an assumed HVO price of £2.10 per litre*
3 *See tables on following pages for details.*

It is worth noting that using biofuel in the generators would result in the operational emissions being reduced to near zero. While this applies to either welfare cabin, the annual consumption of the Deep Green cabin is significantly lower at 330.6 instead of 3588.8 litres.

Annual results of welfare unit comparison –
TOTAL ENVIRONMENTAL SAVINGS – FUEL SAVED AND REDUCED CO2 EMISSIONS

Item	Standard CO24	Deep Green CO24	Difference	% Difference
Total diesel consumption including heating* (litres/year)	3588.8 litres	330.6 litres	-3228.2 litres	89.95%
Operational CO_2 emissions (tonnes CO_2e/year)	8.94 tonnes (8936 kg)	0.83 tonnes	-8.11 tonnes	-90.72%

Annual results of welfare unit comparison –
TOTAL FINANCIAL SAVINGS – FUEL SAVED AND AVOIDED SERVICE COSTS

Item	Standard CO24	Deep Green CO24	Difference	% Difference
Total operational fuel costs including heating - HVO BIOFUEL at £2.10 per litre	£7536.48	£694.26	-£6842.22	-90.78%
Annual generator service visit costs (£200 per generator service)	£1640	£10	-£1630	-99.4%
Annual generator service visit fuel costs HVO BIOFUEL at £2.10 per litre	£141.50	£0.35	-£141.15	-99.4%
Annual cost of toilet service visits - £25 per visit	£1300	£433.25	-£866.75	-66.67%
Annual toilet service visit fuel costs HVO BIOFUEL at £2.10 per litre	£360.36	£120.10	-£240.26	-66.67%
TOTAL	**£10978.34**	**£1257.96**	**£9720.38**	

Annual results of welfare unit comparison –
ENVIRONNMENTAL & FINANCIAL IMPACT OF CABIN OPERATION (ALL ELECTRICAL OPERATIONS AND HEATING)

Item	Standard CO24	Deep Green CO24	Difference	% Difference
Annual generator run time (hours/year)	1640 hours	104 hours	-1536 hours	-93.67%
Total diesel consumption including heating[1] (litres/year)	3588.8 litres	330.6 litres	-3228.2 litres	89.95%
Operational CO_2 emissions (tonnes CO_2e/year)[2]	8.94 tonnes (8936 kg)	0.83 tonnes	-8.11 tonnes	-89.95%
Total operational fuel costs including heating DIESEL at £1.69 per litre	£6065.07	£558.71	-£5455.66	-89.95%
Total operational fuel costs including heating HVO BIOFUEL at £2.10 per litre	£7536.48	£694.26	-£6842.22	-89.95%

[1] Heat supplied by electric heaters in the standard cabin and by a low-consumption space diesel heaters in the Deep Green cabin.
[2] Based on 2.49kg of CO2 emitted per litre of diesel consumed.

Annual results of welfare unit comparison –
ENVIRONMENTAL& FINANCIAL IMPACT OF VISITS TO SERVICE GENERATOR

Item	Standard CO24	Deep Green CO24	Difference	% Difference
Annual generator run time (hours/year)	1640 hours	104 hours	-1536 hours	n/a
Annual service visits required[1]	8.2 visits/year	0.05 visits/year	-8.15 visits/year	-99.4%
Annual diesel consumption generator service visits[2]	27.06 litres	0.165 litres	-26.9 litres	-99.4%
Annual generator service visit CO_2 emissions (kg CO_2e/year)[3]	67.38 kg	0.41 kg	-66.97 kg	-99.4%
Annual generator service visit costs (£200 per generator service)	£1640	£10	-£1630	-99.4%
Annual generator service visit fuel costs DIESEL at £1.69 litre	£113.87	£0.28	-£113.59	-99.4%
Annual generator service visit fuel costs HVO BIOFUEL at £2.10 per litre	£141.50	£0.35	-£141.15	-99.4%

[1] Every 200 hours of runtime for standard generator, every 2000 hours for Deep Green generator
[2] Based on assumption of 30 miles distance travelled to and from site and 0.11 litres/mile of fuel used (approx. 20mpg) – 3.3 litres per visit
[3] This emission saving from service visit fuel falls under Scope 3 (indirect emissions) and therefore cannot be quantified within the total operational CO2 emission saving.

Annual results of welfare unit comparison –
ENVIRONMENTAL & FINANCIAL IMPACT OF VISITS TO SERVICE TOILETS

Item	Standard CO24	Deep Green CO24	Difference	% Difference
Annual toilet service visits[1]	52 visits/year (weekly)	17.33 visits/year (Every 3 weeks)	-34.67 visits/year	-66.67%
Annual diesel consumption for toilet service visits[2]	171.6 litres	57.19 litres	-114.41 litres	-66.67%
Annual CO_2 emissions (tonnes CO_2e/year) from toilet service visits[3]	427.28 kg	142.4 kg	-284.88 kg	-66.67%
Annual cost of toilet service visits - £25 per visit	£1300	£433.25	-£866.75	-66.67%
Annual toilet service visit fuel costs DIESEL at £1.69 per litre	£290	£96.65	-£193.35	-66.67%
Annual toilet service visit fuel costs HVO BIOFUEL at £2.10 per litre	£360.36	£120.10	-£240.26	-66.67%

[1] Based on the requirement to service every week in a standard cabin; average every 3 weeks in a Deep Green
[2] Based on assumption of 30 miles distance travelled to and from site and 0.11 litres/mile of fuel used (approx. 20mpg) – 3.3 litres per visit
[3] This emission saving from service visit fuel falls under Scope 3 (indirect emissions) and therefore cannot be quantified within the total operational CO2 emission saving.