CASE STUDY

COST SAVING ANALYSIS – HYBRID SOLUTIONS

SUMMARY

Hybrid solutions are ideal to convert traditional technologies into greener solutions, with a significant cost saving and a low environmental impact.

CURRENT FRAMEWORK

Today's energy grid is facing an unprecedented set of challenges, a need to transition away from fossil fuels towards renewable energy sources, spiking demand due to the increased electrification of electric vehicles, homes and consequently infrastructure instability.
Renewable energy sources are estimated to lead the power generation mix, reaching 80—90% in 2050[1].

Global Conferences like Cop26 – The UN Climate Change Conference in Glasgow – has increased the attention and the commitment of countries in common environmental targets.

In some countries, for example in the United Kingdom, reforms concerning red diesel and other rebated fuels entitlement have already been put in place and effective from April 2022 to push the investment in cleaner fuel alternatives and help meet environmental and air quality targets. Companies and people now allowed to supply or use rebated gas oil (red diesel) and rebated biofuels are expected to be affected from this reform: the main purpose of use of the red diesel is the off-road one, for example in the construction industry to power bulldozers and cranes or drills for oil extraction. It represents around 15% of all the diesel used in United Kingdom and produces nearly 14 million tonnes of carbon dioxide a year. With this reform, the tax system will be supported in incentivize users to improve their energy efficiency, with cleaner solutions or simply consuming less fuel, since it is expected an increasing trend in fuel costs, which will have an impact on those sectors such as construction and mining, which will now need to pay the entire duty rate for white diesel, having lost the entitlement to red diesel[2].

In this phase of global transition from diesel to use of alternative fuels sources, energy storage is the common denominator that enables alternative technologies to be used. These systems deliver clean and efficient energy solutions across a wide range of commercial and domestic applications.
The demand for sustainable fuels is projected to triple over the next 20 years. Sustainable fuels, including biofuels such as hydrotreated vegetable oil (HVO), can be an interesting alternative to the red diesel also in terms of costs saving[3].

1. *Source: McKinsey & Company, Executive Summary "Global Energy Perspective 2022" – April 2022*
2. *Source: UK Government, Policy paper "Reform of red diesel and other rebated fuels entitlement", available here: https://www.gov.uk/government/publications/reform-of-red-diesel-entitlements/reform-of-red-diesel-and-other-rebated-fuels-entitlement*
3. *Source: McKinsey & Company, Executive Summary "Global Energy Perspective 2022" – April 2022*

PRAMAC

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TECHNOLOGY

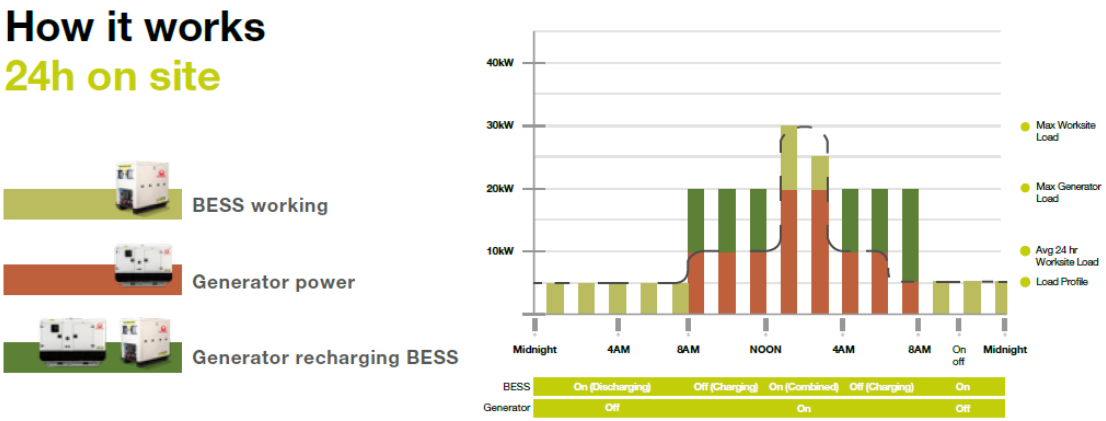
Total investments across energy sectors are expected to grow by more than 4% per annum and are projected to be increasingly skewed towards non-fossil and decarbonization technologies[4].

A hybrid configuration is the perfect solution to convert traditional diesel technology into a greener solution, with low environmental impact, high performances and cost saving.

Hybrid power systems manage the operation of diesel generators, which often operate at a low load. The fuel economy of diesel generators is not convenient when working at low load since more fuel is consumed at 10% load to generate one kilowatt hour of energy, with respect to working at 50% load or above.
With the hybrid system, when power demand is low the generator can be turned off so that the battery itself supplies the power. When the battery runs low or power demand increases, the generator is turned on. With this setting, the generators only runs when strictly necessary and in the most efficient way. The result is less running hours, more efficient consumption of fuel, less emissions, less maintenance and refuelling, resulting in saving money.

Pramac solutions are mobile power banks with different enclosures configurations (canopy, container, trailer mounted) for constructions, events, utilities, remote off-grid for commercial and domestic, EV charging. In hybrid mode, this technology is compatible with any diesel genset. In any demanding application like events and construction sites, where low loads or peaks can be a problem for the generator, the hybrid solution is ideal to improve the overall performances of the site.

In a worksite for example, this system may work also for the peak shaving, reducing power consumption for short time periods to avoid excessive consumptions.



Pramac plays a role of leading actor in the industry by combining performance and reliability, expanding and diversifying its product offer to keep pace with the times and meet the new requirements defined by the governments and the market.

The Off Grid range powered by Pramac is a battery energy storage system that allows the storage of energy from multiple sources: generator, solar or the grid. Energy can be redistributed, at a later time, to a site that needs power. When one of our battery energy storage system is deployed onto the site it is possible to have a clean, green solution that can power the site during those periods of low energy demand, such as overnight or during the weekend. This allows customers to utilize reliable, green, clean energy in almost any application.
In addition to environmental benefits deriving from the use of hybrid solutions, it is possible to have a significant costs optimization for rental customers.

4. Source: McKinsey & Company, Executive Summary "Global Energy Perspective 2022" – April 2022

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RESULTS

With the solutions in hybrid mode, users can reduce fuel consumption around 50% with a reduction of CO_2 from 50% to 94.7% during operations.
In the example below, a cost saving analysis, with a comparison between 3 potential site setups.

- **The first column** - Running the site in the conventional manner, operating a diesel generator fuelled with red diesel running 24/7.
- **The second column** - Running the site utilizing a hybrid power solution (combining the generator with a battery storage system) fuelled by conventional white diesel.
- **The third column** - Running the site as per the existing site setup utilising a hybrid power solution (combining the generator with a battery storage system) fuelled by HVO.

100kVA 50% REDUCTION EXAMPLE

STANDARD DIESEL GENERATOR	DATA	HYBRID POWER SOLUTION	DATA	HYBRID POWER SOLUTION FUELLED BY HVO	DATA
Hire Period (days)	28	Hire Period (days)	28	Hire Period (days)	28
Hire Period (hours)	672	Hire Period (hours)	672	Hire Period (hours)	672
Generator Runtime (hours)	672	Generator Runtime (hours)	336	Generator Runtime (hours)	336
Silent Runtime (hours)	0	Silent Runtime (hours)	336	Silent Runtime (hours)	336
Fuel consumption (litres)	6.921,6	Fuel consumption (litres)	3.460,8	Fuel consumption (litres)	3.460,8
CO2e Output (kg)	21.845	CO2e Output (kg)	10.922	CO2e Output (kg)	1.162
CO2e Reduction (%)	0	CO2e Reduction (%)	50	CO2e Reduction (%)	94,7
Fuel Cost (2 £/l)	£13,843	Fuel Cost (2 £/l)	£6,922	Fuel Cost (2.2 £/l)	£7,614
Hire Cost	£600	Hire Cost	£2,000	Hire Cost	£2,000
Total Cost	**£14,443**	**Total Cost**	**£8,922**	**Total Cost**	**£9,614**

-50% FUEL LITERS

-50% CO_2 EMISSION

-38% TOTAL COST (HYBRID POWER SOLUTION)

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RESULTS

From the cost saving analysis above, the final cost optimization of the Hybrid Power Solution, compared to the standard diesel generator one, is clear, even considered the more than tripled hire cost.

The cost optimization is even much more incisive if a more extended period is considered: for example, in 12 months, the total saving that could be reached is of around £66,252

The hybrid power solutions fuelled by HVO offers as well a positive impact in terms of cost decrement, even with an higher hiring (compared to the Standard Diesel one). However, the higher hire cost is considerably counterbalanced by the significant CO2 reduction.

In the light of these data, the hire cost has to be considered in relation to the generated savings, confirming that these solutions provide an immediate decrease of costs for the rental players, while obtaining optimal perfomances and low environmental impact.

This is what makes them so competitive: at a lower total cost, it is possible to increase sustainability, reaching two targets with one highly performing solution.

Off Grid Battery Energy Storage Solutions

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