

# 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<sup>1</sup>.

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 2021 the European Commission has restructured the Union framework for the taxation of energy products and electricity, in order to follow the pathway proposed in the European Climate Law and deliver an increased level of ambition for 2030.

The previous Energy Taxation Directive was disadvantaging petrol compared to diesel, in the form of a lower minimum rate for diesel, thus creating higher demand for diesel.

The 2021 framework introduced a no differentiation of tax treatment between commercial and non-commercial diesel as well as business and non-business use for heating fuels and electricity<sup>2</sup>. With these reforms, 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<sup>3</sup>.

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<sup>4</sup>.

1. Source: McKinsey & Company, Executive Summary "Global Energy Perspective 2022" – April 2022
2. Source: European Commission, COUNCIL DIRECTIVE restructuring the Union framework for the taxation of energy products and electricity – July 2021
3. 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>
4. Source: McKinsey & Company, Executive Summary "Global Energy Perspective 2022" – April 2022

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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<sup>5</sup>.

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.

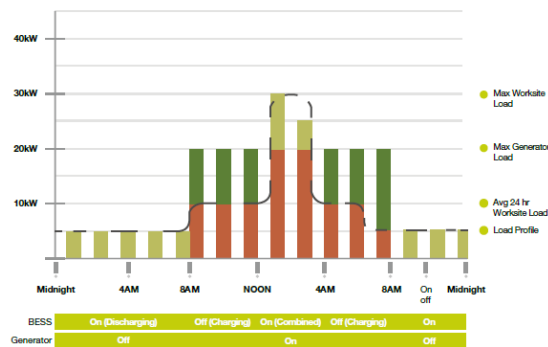
Hybrid power systems manage the operation of diesel generators, which often operate at a low load. The fuel economy of diesel generators is not convenient when working at low load since more fuel is consumed at 10% load to generate one kilowatt hour of energy, with respect to working at 50% load or above.

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.

### How it works 24h on site



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.

# COST SAVING ANALYSIS – HYBRID SOLUTIONS

## RESULTS

With the solutions in hybrid mode, users can reduce fuel consumption around 50% with a reduction of CO<sub>2</sub> 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
CO <sub>2</sub> E OUTPUT (KG)	21.845	CO <sub>2</sub> E OUTPUT (KG)	10.922	CO <sub>2</sub> E OUTPUT (KG)	1.162
CO <sub>2</sub> E REDUCTION (%)	0	CO <sub>2</sub> E REDUCTION (%)	50	CO <sub>2</sub> E REDUCTION (%)	94,7
FUEL COST (1.9 €/l)	€ 13.151,04	FUEL COST (1.9 €/l)	€ 6.575,52	FUEL COST (2.15 €/l)	€ 7.440,72
HIRE COST*	€ 715	HIRE COST*	€ 2.384	HIRE COST*	€ 2.384
<b>TOTAL COST</b>	<b>€ 13.866,04</b>	<b>TOTAL COST</b>	<b>€ 8.959,52</b>	<b>TOTAL COST</b>	<b>€ 9.824,72</b>

\*Hire Cost based on average UK rental price 2022. An exchange rate of EUR 1,192 has been applied (average exchange rate 2022).

-50% FUEL LITERS

-50% CO<sub>2</sub> EMISSION

-35% 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 € 58.878,24.

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 performances 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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