CASE STUDY

HYBRID SOLUTION FOR EV CHARGING

The first hybrid (Bio-methane gas generator + Battery) EV charging installation in the UK & Ireland.

The system is a 100% renewable solution.

Location

Middlewich, UK

Product configuration

GGW50G generator running on biomethane, and battery energy storage

Application

Electric vehicles charging
(8 x 22kW EV chargers)

CURRENT FRAMEWORK

Growing public concern around climate change and sustainability initiatives are accelerating the possibility of a greener energy future while loosening the use of fossil fuels.

In 2020, the UK took the step to end the sale of new petrol and diesel cars by 2035[1].
At the same time, the UK Government also committed to boosting the development of clean, green technologies to support the zero emission vehicles, including battery packs[2].

Alongside the proposed mandates, the UK government has promoted other initiatives aimed at increasing the proportion of green gas, such as biomethane, in the grid as a practical, established, and cost-effective way to reduce carbon emissions and increase energy security[3].

1. *UK Government, https://www.gov.uk/government/publications/transitioning-to-zero-emission-cars-and-vans-2035-delivery-plan*
2. *UK Government, https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030*
3. *UK Government (Department of Energy Security and Net Zero, Green Gas Support Scheme Mid-Review Consultation, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1145002/green-gas-support-scheme-mid-scheme-review-consultation.pdf*

PRAMAC

HYBRID SOLUTION FOR EV CHARGING

TECHNOLOGY

PRAMAC's technology provides a number of green energy solutions. These consist of an Electric Power-Generator running on bio-methane, connected to a battery energy storage system (BESS) which provides power to an Electric Vehicle charging station.

With its composition of up to 95% Methane (CH4), bio-methane is the perfect fuel to run a gas generator set.
Bio-methane is a renewable green fuel, which does not increase carbon dioxide emissions in the atmosphere, since the same amount of carbon dioxide would be released if organic matter (from which biomethane is produced) were simply left to decompose naturally[4].

CHALLENGE

The EV charging station had no grid capacity available, and required an energy system to be able to support their needs.

Instead of relying on diesel generators, it was opted for a cleaner and more economical source of power:the use of a battery energy storage system in hybrid mode with a generator running on bio-methane.

SOLUTIONS

PRAMAC model GGW50G, 45 kVa / 36 kWe, Prime Power (PRP), Generac 4.5L Natural Gas engine, Stoichiometric (rich) Burn in hybrid mode with a battery energy storage system of 800 Ah LFP battery.

PRAMAC GGW50G gas generator, with its advanced stoichiometric burn control, is capable of meeting the application requirements, while providing the lowest exhaust emissions in the industry.
With its 10 seconds start capability and high load impact, the generator is activated every day to provide immediate power for EV charging .
The robust and durable enclosure is compact and sound-resistant to reduce both footprint and noise emissions.

In collaboration with a gas storage company, a Pramac's partner supplied both the fuel delivery system and the Compressed Fugitive Methane (CFM) to run the generator and power up the chargers.

When gas escapes from industrial equipment or other processes where it is intended to be contained, due to leaks or the existence of other unforeseen or unexpected escape routes, the resulting emissions are called fugitive.

It is well known that these emissions are a problem in the oil and gas industry, for example from sources such as oil wells and gas plants, it is less well known that fugitive emissions from agriculture, particularly livestock farms from manure, also has a big impact.

Capturing 1kg of fugitive methane is the equivalent of capturing 27kgs of CO2.

HYBRID SOLUTION FOR EV CHARGING

The hybrid system is connected to 8 charges, with each charger being 22 kW.

The system uses the inverter chargers to provide system power which is generally sourced from the system battery. The generator is started when the battery SoC reaches 70% and stopped at 90% which ensures minimum run time and good genset loading when operating. The system output capacity varies according to operational state, so that the EV chargers are Dynamic Load Management (DLM) controlled as a local network to draw only what is available, this has four basic states – inverter, generator, boost (inverter + generator), and sleep.
The system is controlled and monitored via GST Manager which can maintain an overview of many sites and perform reporting and statistical analysis as required.

RESULTS

This represents the first hybrid (Bio-methane gas generator + Battery) EV charging installation in the UK & Ireland.

PRAMAC and the other key partners have collaborated in a completely new field with a hybrid solution, understanding the market needs and development.

By running the generator on fugitive methane, we were able to be carbon negative.

With Ultra-Low emissions, fast start and high block-load impact capability,
PRAMAC generators are designed to withstand the most challenging and demanding applications.