

How to Solve Off-Grid Hybrid Power Issues



What you need to consider when powering off-grid sites

How to Solve Off-Grid Hybrid Power Issues

Introduction

When you think about the drawbacks of using diesel generators in off-grid hybrid power situations, nine times out of 10 you think of the need to refill the things – and the drive to get there.

Rolling a van exponentially adds to operating expense (OPEX), but there's actually more to it than that. As part of our research for SYNERGi, our advanced battery and genset management solution, we identified 14 issues to look out for when considering reliance on diesel generators for powering off-grid hybrid power sites such as remote mobile network operator (MNO) towers.

If you're considering such a setup or already managing sites like this, take a look and consider how these issues are affecting your bottom line.

1. Generators stalling during battery recharge

Let's start with an easy one – if the generator stalls during charge the whole operation comes to a halt. In fact, it's often a race against time to roll a van out before the remaining battery life ends – a situation which is then further complicated if the system managing the Genset uses a lockout after stalling. This is fairly common, and all add to the OPEX of using diesel remotely.

2. The inability to run Genset at optimal power

Running the Genset at optimal power levels that get the job done but aren't wasteful is the dream. To solve this problem you need to adjust power output to match the generator's optimal load point. However, this typically requires manual adjustment when setting up your Genset and battery management system. And this can mean expensive, time-consuming site visits every time you need to make an adjustment.

3. Extensive site-by-site customisation during the run-up

With off-grid hybrid power, each site must be tuned to optimise generator load, ensure the Genset doesn't stall during battery recharge and make myriad other adjustments. This all takes time to accomplish manually.

4. Granular current limit control results in unbalanced phase loading

In many instances, adjusting power on-site to suit a generator is performed by pulling out rectifier modules. But as these modules are typically single-phase, this immediately creates a phase imbalance on the generator which, in the long term, can lead to generator failure, expensive repairs, and possible site down-time.

5. Genset may stall due to poor servicing

Regular servicing should be a priority in your asset management plans, but you can't always assume that every service is thorough.

Advanced battery and Genset management systems typically feature alarms that can notify you of a dirty air filter, bad oil, poor fuel quality, and the subsequent power de-rating that comes with it the moment they happen.

6. No accounting for atmospheric changes

Weather changes are one thing – if your Genset is getting rather hot under the collar you need to know about it. But what about altitude? Setting up each cell phone tower Genset requires about a day's worth of tuning to fit the site's altitude and the levels of oxygen in the air.

7. No alarms or little information available when "basic" Gensets are used

This is information blackout territory, the kind of situation that hobbles budgeting and planning because you're essentially flying blind. You might be forgiven for thinking that low-grade Gensets are completely incompatible with the technology that can provide alarms, but that isn't always the case.

8. Limited hybrid cycle triggers (when to start battery recharge)

Looking after your battery on site is a key consideration. However, if you start the generator too soon you waste generator run time and if you start it too late you destroy the battery. Not to mention all the noise created which can impact any nearby settlements – a key consideration in rural villages where programming quiet nights can be essential for continued local support.

Setting these parameters manually can be complex and time-consuming.

9. Limited generator stop triggers

Hybrid cyclic charge-discharge systems are all about saving diesel. This means both running the generator at optimal efficiency and for as short as possible. Without an advanced battery and Genset management system in place, the number of triggers at your disposal to stop the generator can be very limited, which means less opportunity to save diesel.

Stop triggers also have a part to play in topping-off batteries. The bus voltage figure can be fairly inaccurate, requiring you to top off recharges with a little more voltage just to make sure the battery is full. If you can't measure the required top off correctly, this can lead to longer than necessary battery recharge times and waste fuel.

10. The ability to automate an extended charge if battery capacity ramps down over time

Programming periodic extended charges is one way to ensure your battery stays in peak condition, but to be in a position to programme this you need to have a level of advanced system management in place.

Battery health is crucial so not being able to programme extended charges is an opportunity lost.

11. Limited logs make it difficult to prove warranty claims

So something is wrong with the battery. Let's claim on the warranty. But what if the warranty requires evidence, like charge/discharge depth and length over the battery's life, and operating temperatures? If this is the case, you need the data on hand to prove your case.

12. Complicated control for the site technician

Guesswork is not the natural habitat of the technician. You rely on them to fix the problems, but finding the cause of problems can sometimes involve more guesstimating than estimating if the assets they're assessing are overly complicated to control. Ease of use isn't about making a technician's life easier, it's about minimising downtime due to the complications of identifying problems and implementing solutions.

13. Dual Genset control becomes problematic

Problematic is an understatement. Take the manual management issues of one genset, involving many of the above pain points, and double it.

14. Incomplete solutions

And lastly we come to a question of componentry. In off-grid hybrid power solutions, non-integrated power conversion modules can lead to expensive add-ons of third party gear that aren't optimised to fit site requirements.

If you're looking at hybrid power, make sure what you get is a complete solution with no hidden extras or compatibility headaches.

Conclusion

So there you have it, the 14 common pain points that came out of our research into the real world limitations and roadblocks of operating diesel generators for powering remote MNO tower sites.

Unlike its competitors, SYNERGi offers rugged, patented Kiwi technology based around dynamic capabilities that take away as much manual interaction as possible. In the process, it extends the life of battery assets, reduces emissions where diesel is used, and minimises overall site-specific operational costs (OPEX) by up to 90%. Powering everything from communications to air conditioning is optimised to minimise OPEX and environmental impact, and maximise usability. And it does it all from one hub typically no bigger than a two-metre tall 19-inch rack installation.

Alternatives would have seen core systems such as communications, building lighting, alarms, and air conditioning all powered from separate systems that require individual set-up and training for personnel.

About SYNERGi

SYNERGi is the industry's most advanced hybrid solution. Our unique SYNERGi system will maximize benefits and deliver increased uptime as it dynamically optimizes and self-heals. It intuitively and intelligently blends multiple energy inputs; energy optimization made simple. The field results and related patents prove it. Specifically designed for easy integration of renewables to support solar and wind inputs – now and in the future.

Key Features & Benefits

- Maximizes site uptime and limits human intervention
- Remote site management, reporting and control
- Dynamically optimizes any AC generator
- Self-healing and automatically adapts to varying conditions