HYBRID POWER

APPLICATION GUIDE

TOWARDS A SUSTAINABLE FUTURE

The world is facing a difficult dilemma. Our need for power grows, but at the same time we need to cut carbon emissions to combat climate change and set the course towards a sustainable future. Hybrid power solutions can solve this dilemma, letting you reduce emissions without putting reliability and safety on the line. And the technology to do it is mature and available on the market today.

At DEIF, we have the experience and expertise to help you develop and deploy cost-effective hybrid solutions. With our full range of control offerings for decentralised power production, you can reduce your climate impact and contribute to reaching the UN Sustainable Development Goals – and the fuel savings and emission reductions achievable with hybrid power can benefit your business financially and help you comply with current and future legislation.

This application guide introduces you to the world of DEIF hybrid power solutions. Contact us or visit deif.com for more information!

WHAT IS HYBRID POWER?

AND HOW CAN YOU BENEFIT?

Hybrid power covers any given load demand by combining two or more different power sources. Examples include mains power with genset backup, a wind farm with energy storage, or a system with mains power, gensets, renewables, and energy storage. A hybrid power plant can include renewables; in this case, it is sometimes called a hybrid eco-system.

Flexible and climate-friendly power

The ability to combine power sources, and to prioritise sources that meet the load demand while also complying with other key operator requirements, makes a hybrid solution very flexible – and potentially climate-friendly. For example, the system can be configured to prioritise renewables whenever possible, switching to fossil power only when renewable production is not sufficient.

It is this ability to flexibly combine power sources that makes hybrid power solutions both sustainable and reliable. DEIF control solutions add to this flexibility by facilitating quick system reconfiguration, letting you scale and redesign your solution as required.

Supporting your operational strategies

There are many ways of using hybrid power solutions to support your operational strategies. Here are a couple of examples:

- You can use an energy storage system (ESS), for example a battery, to store renewable power for later, using it to run on clean power when renewable production drops, or reserving it for instant spinning reserve or peak shaving capability.

- You can run your gensets at their optimal duty point by combining them with other power sources. This lowers genset fuel consumption and carbon emissions, and it will usually also prolong service intervals and reduce the risk of issues.

Intelligent control is key

The key to realising all of these benefits is intelligent, scalable, and effective system control. To combine the power sources in your hybrid solution and continuously adapt power supply to load demand while prioritising clean power, you need compatible, interconnected controllers that support your operational requirements.

REACH GREEN AND CLEAN GOALS!

MIX OF ENERGY

- Slow and fast reacting energy sources – intelligent control
- Hybrid and Clean, do not need to be green

ENERGY MIX

- Diesel
- Gas
- Battery/storage
- Solar/wind
- Fuel cells
- Hydro

POWER MANAGEMENT SYSTEM

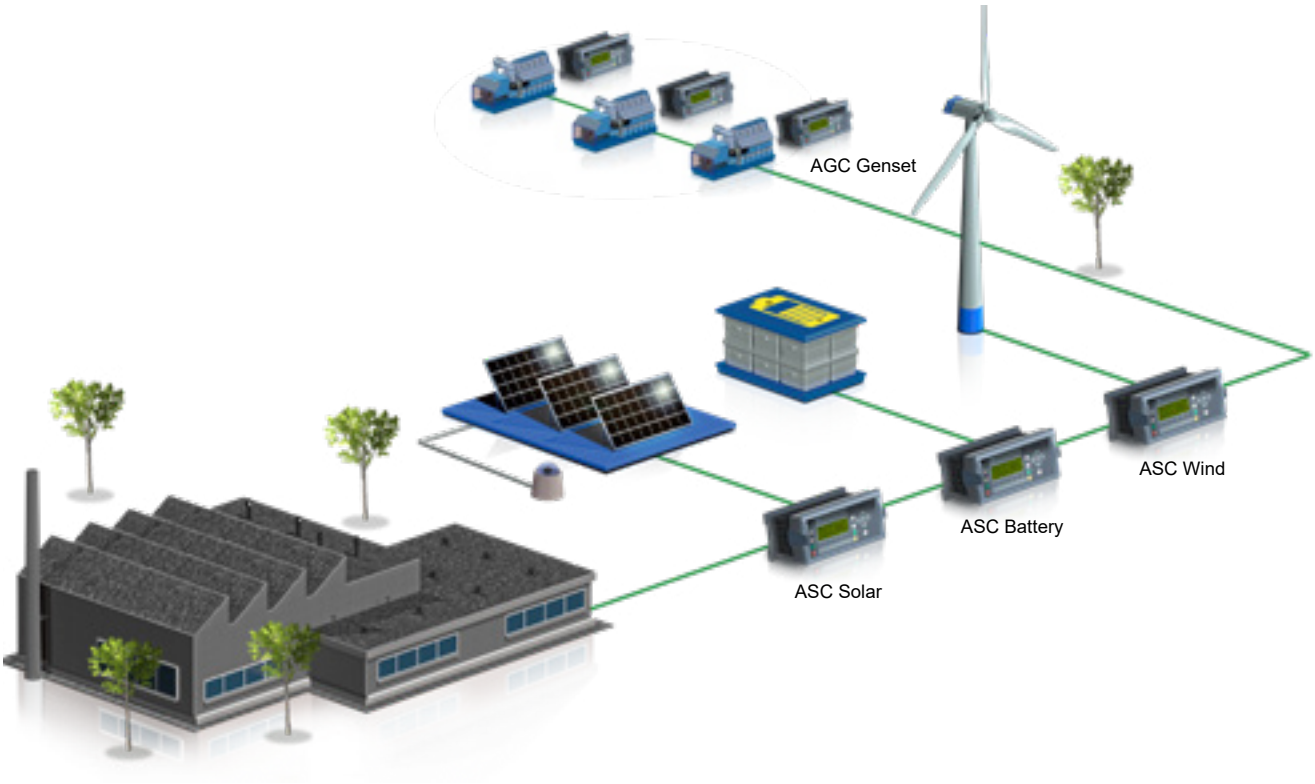
- Reliable
- Safe
- Slow/fast
- Green
- Priority
- Control

A solution for any type of application

Truly integrated hybrid control systems

Off-grid power management - Greenfield

Minimised fuel consumption – maximised PV penetration



Securing uptime with intelligent spinning reserve features, this automated solution guarantees minimum fuel consumption by maximising PV penetration without compromising minimum genset load requirements.

The DEIF power management automatically optimises the number of gensets connected to the busbar. In plants with different size gensets, the system even rotates the gensets automatically to ensure the most fuel-optimised genset match in accordance with the load request. Using CAN bus links between each power source, the reactive system boasts fast response times to changes in load demand or weather conditions.

The system is available as a Power Management or stand-alone solution for retrofits or existing plants.

Power management solution

- ASC-4 applicable with AGC-4 Mk II/AGC 150 controls up to 32 gensets
- Applications up to 16 sustainable power plants
- Minimum genset load for optimal performance
- Spinning reserve to ensure uptime
- Maximise sustainable power penetration

Relevant products


ASC-4

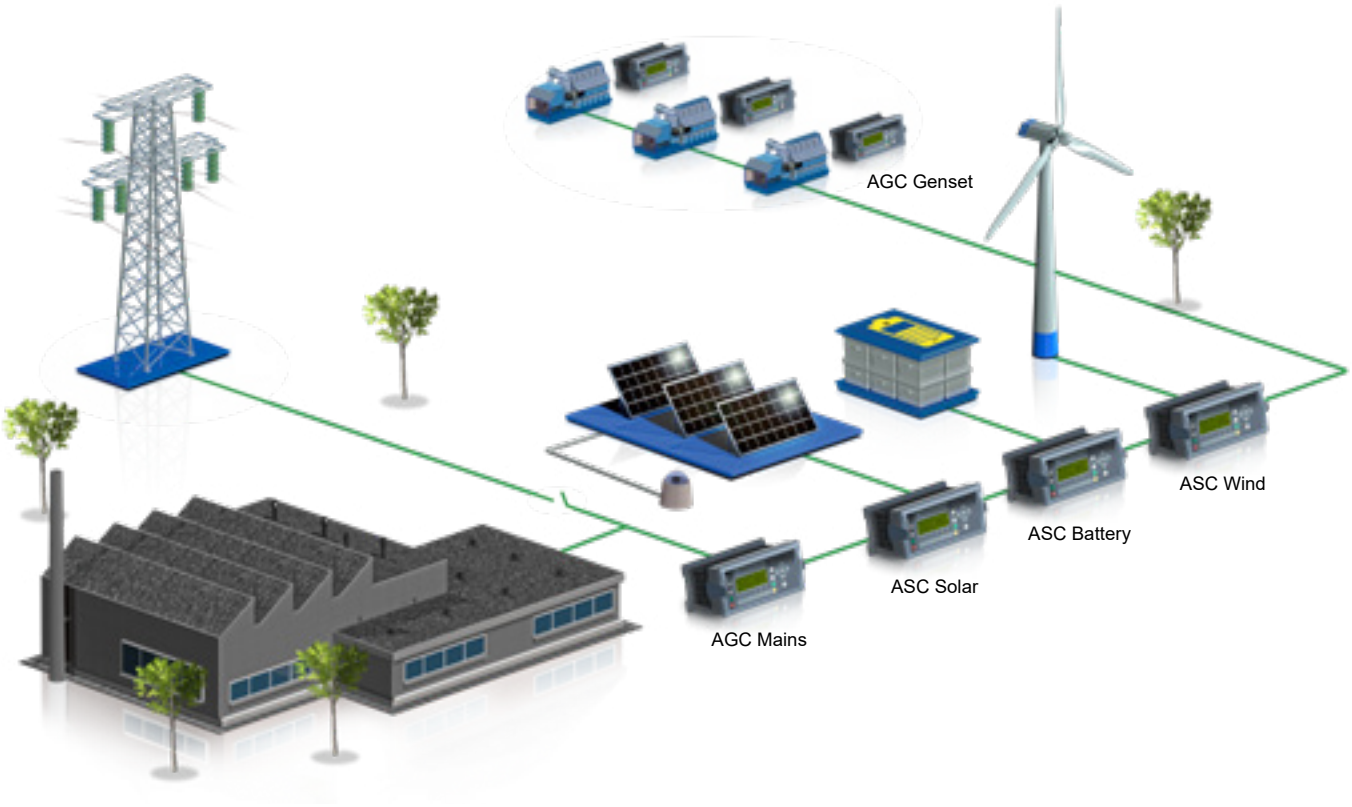

AGC-4 Mk II


AGI 400


AGC 150

Grid-tied power management - Greenfield

Automatic adjustment of power & reactive power



The system secures fixed power to grid at a fixed PF as per customer requirement. This is applicable for self-consumption applications with or without sanction load, and IPP applications.

Automatically adjusting power and reactive power references in accordance with frequency and voltage abnormalities, the system is able to provide grid support.

The system is available both as a Power Management solution for systems with multiple sustainable power sources, or as a stand-alone solution for retrofits or existing plants.

Power management solution

- ► AASC-4 applicable with AGC-4 Mk II/AGC 150 controls up to 32 utilities
- ► Applications up to 16 sustainable power plants
- ► Maximise sustainable power penetration

Relevant products


ASC-4

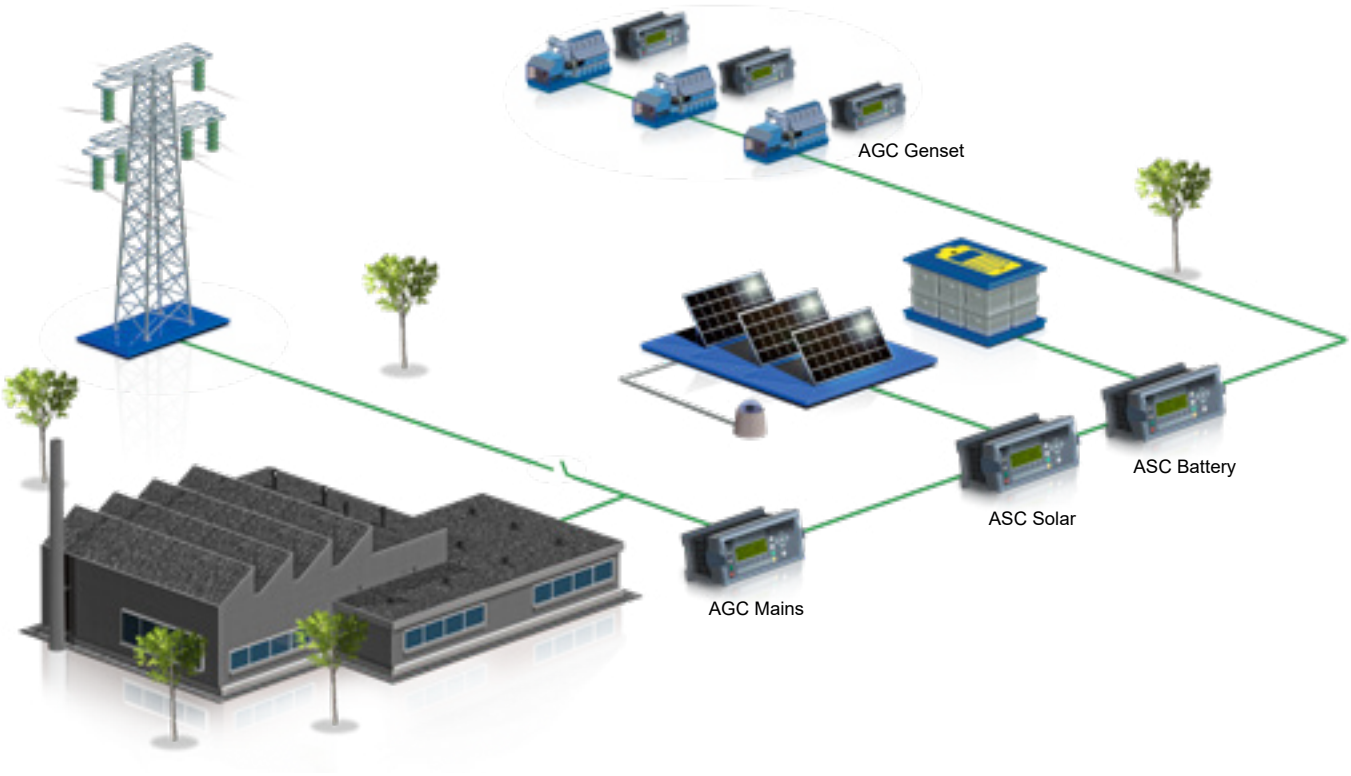

AGC-4 Mk II


AGI 400


AGC 150

Combination power management - Greenfield

Automatic changeovers between off-grid & grid-tied



In combination applications, the system incorporates features and functionalities of both our off-grid and grid-tied technology, automatically adjusting power and reactive power references with grid support if frequency or voltage drops, or rotating the genset to automatically ensure the most fuel-optimised running mode through various load demands.

Supporting fuel-saving in grid-tied operations, all gensets can be stopped to maximise the penetration from sustainable sources. Automatic changeovers between grid-tied and off-grid in case of mains failure are possible, even during operation. The system is available both as a Power Management solution for systems multiple sustainable power sources, or as a stand-alone solution for retrofits or existing plants.

Power management solution

- ASC-4 applicable with AGC-4 Mk II/AGC 150 controls up to 32 gensets/utilities
- ASC PM applicable with AGC PM controls up to 32 gensets/ utilities
- Applications up to 8 sustainable power plants
- Minimum genset load for optimal performance
- Spinning reserve to ensure uptime
- Maximise sustainable power penetration in all operation modes

Relevant products


ASC-4


AGC Plant Management


AGC-4 Mk II


AGI 400


AGC 150

ASC-4 Battery

Automatic sustainable controller

The DEIF ASC-4 Battery is a highly configurable sustainable controller that allows seamless integration of an ESS in greenfield applications with other DEIF controllers such as the AGC-4 Mk II advanced genset controller and other sustainable controllers in our ASC-4 range.

Wide range of control strategies

The ASC-4 Battery handles charging and discharging as required by the operating scenario, based on the state of charge of the ESS or using Schedular-Command timers that allow you to define which sources to charge from, and when. It includes control strategies such as peak shaving, load take-over, fixed power, automatic mains failure (AMF), and mains power export (MPE), allowing it to be used for a wide range of applications. You can define and change the priority of connected power sources.

Energy source, power source, or droop mode

The ASC-4 Battery is suitable for grid-forming or grid-following applications, and it supports energy source or power source functions. It is also able to run in droop mode (acting as a virtual synchronous generator) if the ESS supports this. The ASC-4 Battery can switch operating modes very quickly as required.

The controller has built-in power metering, measuring busbar voltage, current, and frequency before and after the breakers. Operation and mode switches can be configured to be based on these readings, and the ASC-4 Battery can also get power readings from external power meters in the power plant or from third-party controllers.

Full compatibility with wide range of equipment

The ASC-4 Battery can communicate with a BCU (battery control unit) or directly with a BMS (battery management system) and PCS (power control system) over Modbus, allowing it to be used with a wide range of ESSes. It is designed for full compatibility with DEIF controllers, allowing you to set up an EMS quickly and efficiently. An updated compatibility list for the controller is available on deif.com.

ASC-4 Battery features

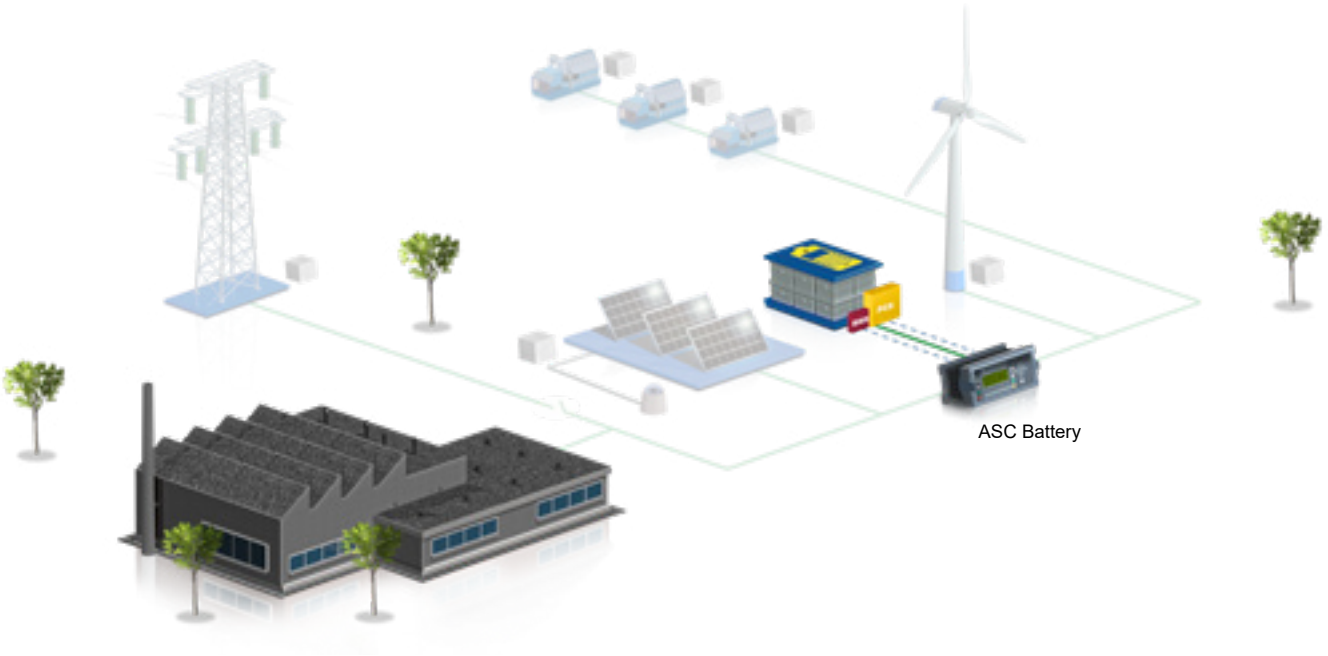
- ESS For integration in greenfield hybrid applications
- Communicates with BCU, BMS, or PCS over Modbus
- Compatible with a wide range of DEIF controllers
- Charging/discharging based on SOC or using Schedular Command timers
- Minimum genset load and optimal genset load
- Define and change priority of connected power sources
- Controls functions, energy source or power source
- Grid-forming, grid-following, or droop mode (virtual synchronous generator
- Built-in power metering
- Highly customisable with user-friendly M-Logic tool

M-Logic provides flexibility and customisability

The setup of the ASC-4 Battery can quickly and easily be reconfigured as needed using the user-friendly M-Logic tool (part of DEIF's free PC utility software offering). This allows the controller to be customised to a wide range of local applications.

ASC-4 Battery Standalone - Brownfield

Automatic sustainable controller



The ASC-4 Battery Standalone is very similar to the ASC-4 Battery (see previous page) but is designed specifically to integrate an ESS in brownfield hybrid applications with an existing energy management system (EMS) based on third-party controllers. The ASC-4 Battery Standalone communicates with these controllers over Modbus and can easily be configured and reconfigured for your application as needed using the free DEIF utility software.

The highly configurable controller is compatible with any power source and a wide range of ESS/inverter brands. The ASC-4 Battery Standalone can be implemented in any power plant, although the functions provided depend on the input and control data available from the existing EMS.

Ideal for ESS rental applications

The ASC-4 Battery Standalone can easily be integrated in single-ESS rental assets, providing emission-free power rental solutions. It ensures full communication with the ESS through its ability to communicate with a BCU, BMS, or PCS over Modbus. This allows you to use it with a wide range of ESSes in any rental application.

ASC-4 Battery Standalone features

- ESS For integration in brownfield hybrid applications
- Flexible control and communication options
- Communicates with BCU, BMS, or PCS over Modbus
- Charging/discharging based on SOC or using Schedular Command timers
- Minimum genset load and optimal genset load
- Start/stop genset based on load or SOC
- Controls energy source or power source
- Grid-forming, grid-following, or droop mode (virtual synchronous generator)
- Built-in power metering
- Highly customisable with user-friendly M-Logic tool

Relevant products


AGI 400


MIC


MIB

ASC-4 Solar

Automatic sustainable controller

The DEIF ASC-4 Solar is a reliable, fully integrated, and optimising link between sustainable power plants and genset power plants. Designed for greenfield applications with other DEIF controllers such as the AGC-4 Mk II advanced genset controller and other sustainable controllers in the ASC-4 range, the hybrid controller can interface with PV solar inverters and other power source controllers, and it can be part of a power/energy management system.

Maximising sustainable power penetration

In any operation mode, the ASC-4 Solar automatically maximises sustainable power penetration, depending on the total load demand on the hybrid plant, without compromising constraints such as minimum genset load demand.

In off-grid operation, the ASC-4 Solar offers a minimum genset load constraint that lowers sustainable power penetration if PV production is compromised. This ensures a certain amount of load on the gensets, eliminating the risk of reverse power situations and impure combustion and exhaust problems.

Ideal for self-consumption applications

In grid-tied applications, the ASC-4 Solar Standalone can feed surplus PV energy to the grid and generate profit in accordance with grid operator feed-in tariffs. Alternatively, it can regulate PV production to match the self-consumption, thereby preventing any feed-in of PV power to the grid if prohibited by grid operator regulations.

Wide range of inverters

The ASC-4 Solar Standalone is compatible with a wide range of PV inverters, allowing you to use it with virtually any PV installation. DEIF is a member of the SunSpec Alliance, and new inverters are constantly being added. An updated compatibility list for the controller is available on deif.com.

ASC-4 Solar features

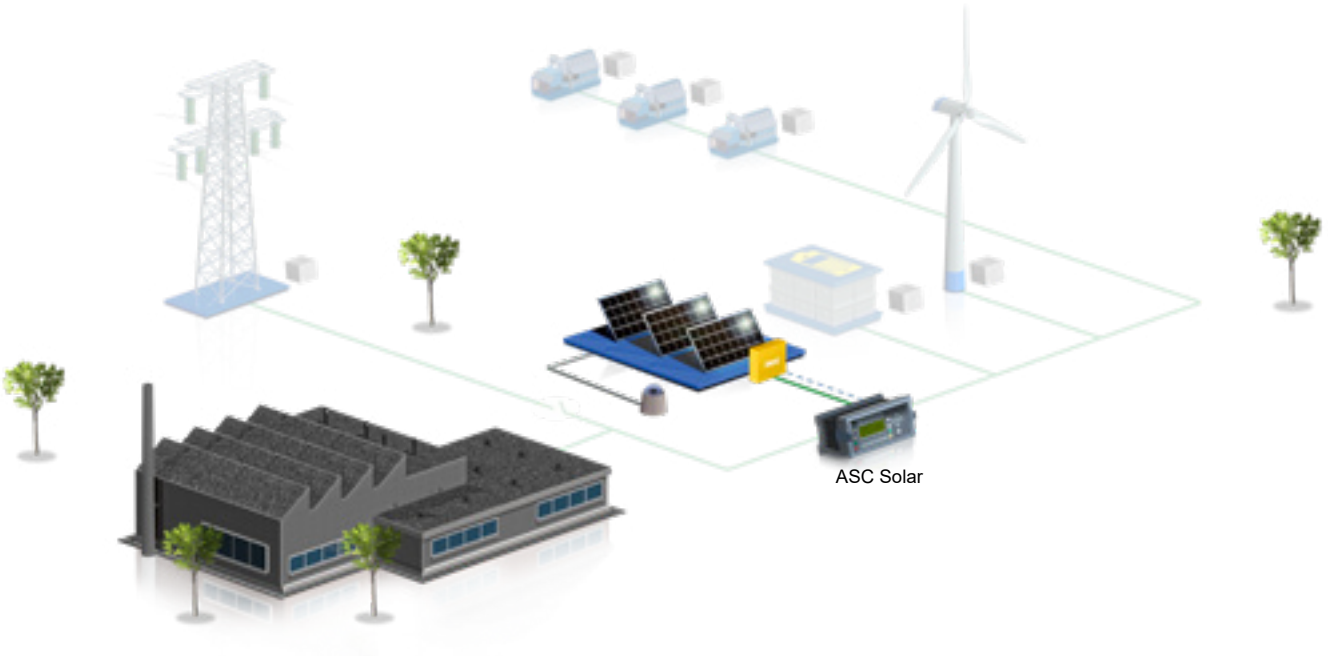
- ► PV integration in greenfield hybrid applications
- ► Maximises sustainable power penetration
- ► Minimum genset load
- ► Spinning reserve support
- ► Ideal for self-consumption applications
- ► Compatible with sky imager solutions and weather stations
- ► Highly customisable with user-friendly M-Logic tool

Compatible with sky imager solutions

The ASC-4 Solar is compatible with leading sky imager solutions, enabling it to predict the weather and PV production and take counter-measures if needed, for example starting up the required number of genset in due time before clouds reduce PV production – and keeping gensets running if forecasts indicate that PV production will drop again shortly.

ASC-4 Solar Standalone - Brownfield

Automatic sustainable controller



The ASC-4 Solar Standalone is very similar to the ASC-4 Solar (see previous page) but is designed specifically to integrate solar power in existing power plants in brownfield applications. The controller uses Modbus to communicate with other controllers in the energy management system (EMS).

Integrates in many different applications

Using Modbus, you can easily supply information about current mains and genset power and breaker positions to the ASC-4 Solar Standalone, and the controller can supply information about current inverter status. This enables you to integrate the controller in an existing plant in a wide range of off-grid or grid-tied brownfield applications.

Compatible with wide range of equipment

The controller is compatible with a wide range of DEIF and third-party controllers, power meters, and measurement transducers, allowing you to optimise control of your plant according to your requirements. The ASC-4 Solar Standalone can control a PV breaker and receive feedback from a mains breaker.

ASC-4 Solar Standalone features

- ▶ PV integration in brownfield hybrid applications
- ▶ Maximises sustainable power penetration
- ▶ Minimum genset load constraint in off-grid applications
- ▶ Ideal for self-consumption applications
- ▶ Compatible with different weather stations and sensors
- ▶ Highly customisable with user-friendly M-Logic tool

Relevant products


AGI 400


MIC


MIB

ASC-4 Wind

Automatic sustainable controller

The DEIF ASC-4 Wind is a programmable sustainable controller that allows integration of one or more wind turbines in any power plant. It is ideally suited for greenfield hybrid microgrid applications, particularly in a power or energy management system (PMS/EMS) with other intelligent DEIF controllers such as the ASC-4 Solar, ASC-4 Battery, and AGC-4 Mk II.

Turbine and park communication

Using Modbus communication, the ASC-4 Wind can communicate with a single wind turbine (interfacing with the turbine's built-in controller) or with an entire wind park, acting as a link between the wind park power management (WPPM) system and the PMS/EMS.

Depending on the capabilities of the turbine controller or WPPM, the ASC-4 Wind can be configured to send and receive set points or start/stop commands, and it can be used for breaker control.

Maximising green power

When deployed as part of an EMS/PMS, the ASC-4 Wind is included in the control strategy of the power plant, balancing the available sources to deliver the required load while maximising renewable power penetration. Its built-in Q factor control allows the ASC-4 Wind to stabilise the power factor of hybrid microgrids (if the turbine controller supports this) if the voltage or frequency is temporarily unstable. In addition, its built-in curtailment counter gives you a useful overview of surplus wind power production.

These features help you improve operation planning and control, for example by helping you identify excessive use of gensets and adjusting operating strategies accordingly so you can maximise wind power use in your applications.

Fully customised solution

The ASC-4 Wind is available as a fully customised solution for specific projects. Contact us to discuss your requirements and find a solution that lets you integrate wind power in your plant.

ASC-4 Wind features

- Fully customised solution
- For integration of wind power in greenfield hybrid applications
- Communicates with single wind turbine or an entire wind park
- Sends/receives set points or start/stop commands
- Breaker control
- Q factor control and curtailment counter

Livø - Danish off-grid island

Security of supply with DEIF power management

»When everything is running as it should, you forget that the controllers are there. When something goes wrong, you are thankful that you have all these control options at your disposal!«

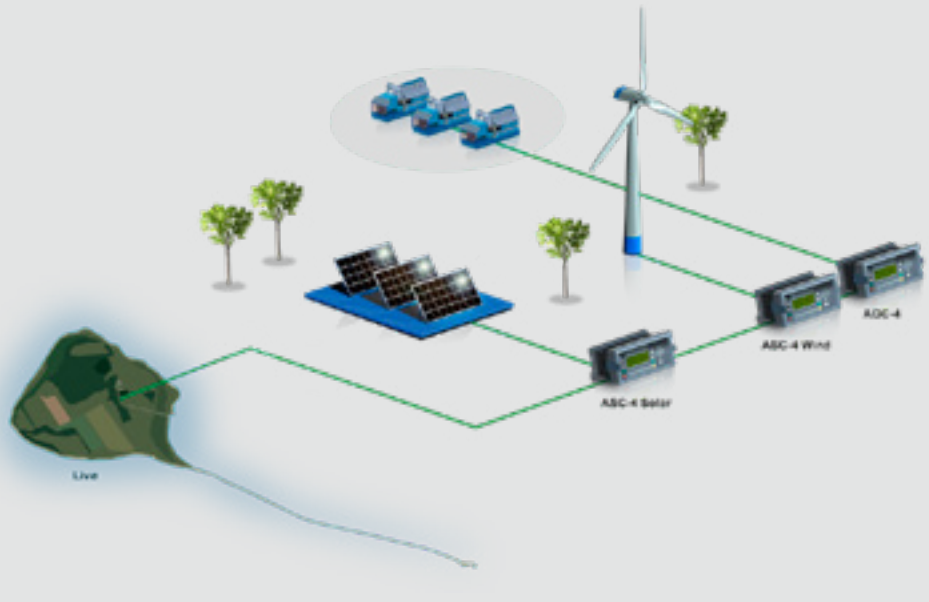
Martin Olsen
Forest Guard
Livø

Green ambition

Using DEIF AGC-4 and ASC-4 controllers, the off-grid Danish island of Livø has acquired a power management solution that ensures security of supply despite significant load variations, and with several renewables in the energy mix. The target is for the island to achieve 100% renewable energy self-sufficiency.

The ambition is to showcase how off-grid communities can achieve energy self-sufficiency and create the foundations for continued habitation. To reach this target, security of supply is all-important, and finding the right control solution is therefore key.

When the new setup becomes fully operational in the autumn of 2019, the island is expected to achieve 50% renewable energy self-sufficiency. There have been no operational issues; in fact, the DEIF controllers have given the island utility staff less to worry about.



Read full case story

Livø

Located approximately 4 kilometres from the coastline, the 320-hectare island of Livø is not connected to the mainland grid, and reliable power and heat must be generated locally.

DEIF is an accredited SunSpec Alliance member.

School campus with own microgrid

‘DEIF is the brains of the system,’ says the contractor

»With DEIF’s help we’ve been able to do strategic management of all these resources.«

Arash Habibi-Soureh
Distributed Energy Resources Manager
Johnson Melloh Solutions

Ease of resource management

The school wanted to save on its electricity bill, so a solar and natural gas generator hybrid system was installed – the first renewable microgrid of its kind in Indiana.

The system consists of a 2 MW solar field, two 750 kW national gas generators, and a connection to the local utility. A peak shaving system controls the school’s power supply. As the demand reaches a certain set-point beyond the solar supply, the system will start the gas generators to take the load. This caps the power from the local utility, explains Brent Beissler, Engineering Manager at Girtz Industries.

A DEIF AGC-4 mains controller monitors the school’s power demand and utility power use from a utility pole a short distance from the solar field, explains Brent Beissler. It communicates to the main controls room onsite via fiber link. There, two DEIF AGC-4 automatic genset controllers manage the peak shaving function. They communicate with an additional two ASC-4 solar hybrid controllers, which monitor the solar arrays.

Read full case story

Ben Davis High School

Ben Davis High School in Indianapolis, Indiana, USA, has about 4,500 students in several buildings over 1.2 million square-feet (110,000 m2).

AGC 150 Hybrid

Small hybrid single controller

The DEIF AGC 150 Hybrid is designed for protection and control of a hybrid installation with PV energy, up to 3 gensets, and a mains connection. It is ideal for small and medium PV plants with up to 16 inverters, for example rooftop PV plants.

Flexible hybrid controller

The AGC 150 Hybrid is a flexible controller that is suitable for both greenfield and brownfield applications. It can be used as a dedicated hybrid controller to fully control one single genset in greenfield applications that also include a mains connection and PV inverters. Alternatively, it can be used as a standalone controller in brownfield applications with two synchronising gensets or three non-synchronising gensets with any brand of genset controller.

The AGC 150 Hybrid is compliant with the SunSpec standards, making it compatible with a wide range of PV inverters. Built to last, it is made of robust materials and has undergone several tests showing that it can stand the wear and tear in all types of harsh environments.

Up to 3 gensets

In both synchronising and non-synchronising applications, the AGC 150 Hybrid can be used in off-grid or mains parallel mode. It handles the power production from the PV inverters and genset(s) to give the highest possible PV penetration and the lowest possible carbon emissions.

AGC 150 Hybrid features

- All-in-one fuel saving controller
- Genset – PV - Mains
- For PV plants with up to 16 inverters
- Off-grid or mains parallel mode
- Mains parallel start/stop genset based on PV power or load size
- Controls up to 3 gensets (synchronising or non synchronising)
- Tier 4 Final/Stage V support
- Built-in 3-phase measuring circuits
- Communication via CAN bus, RS-485, Ethernet, and USB
- Highly customisable with user-friendly M-Logic tool

Supports emission standards

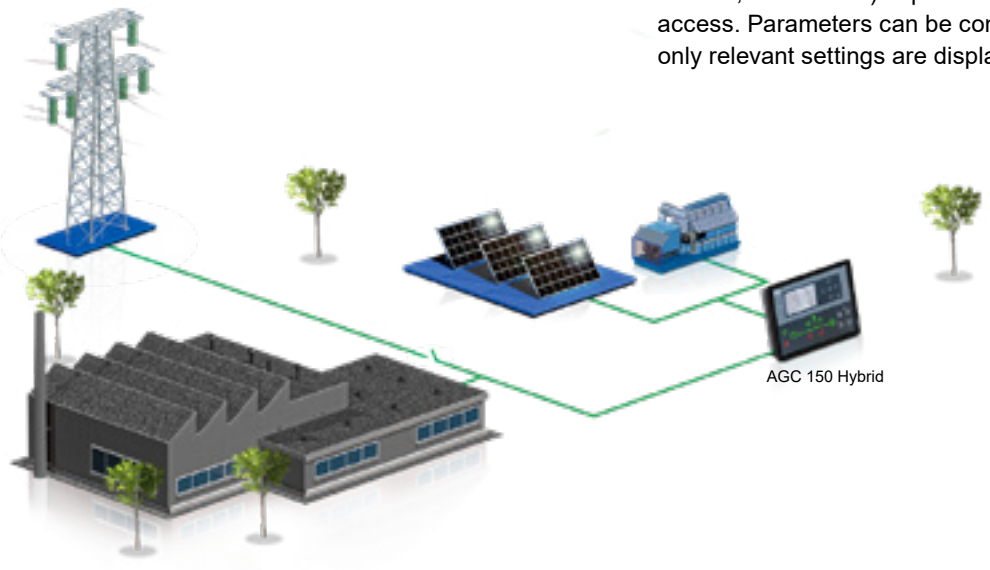
The controller supports Tier 4 Final/Stage V requirements, providing monitoring and control of the exhaust after-treatment system as required by the standard. To ensure sufficient minimum genset load, the AGC 150 Hybrid supports the load with PV power in a safe and reliable way.

User-friendly control

Users get access to important genset information quickly via the sunlight-readable LCD. The controller features illuminated buttons that smoothly guide the operator and make it very easy and intuitive to operate the AGC 150 Hybrid. Only buttons relevant for a function are visible to the user, and the most common functions are quickly accessed using configurable shortcuts.

Role-based access

The AGC 150 Hybrid provides up to three levels (customer, service, and master) of password-protected and role-based access. Parameters can be configured for each level, and only relevant settings are displayed.



AGC-4 Mk II

Automatic genset controller

The DEIF AGC-4 Mk II automatic genset controller can be used as a single genset controller or included in a complete power management system that also includes sustainable controllers in a hybrid solution. It is well suited for synchronising projects in off-grid or mains parallel operation.

Ideal for hybrid applications

The AGC-4 Mk II is plug and play compatible with our ASC-4 sustainable controllers for easy integration of diesel gensets in various hybrid installations. The market-leading solution maximises sustainable power penetration while always securing a sufficient amount of spinning reserve if renewable production drops.

Tier 4/Stage V compliance and grid code support

The AGC-4 Mk II supports many commonly used engine protocols, and we add more with every software update. The controller meets Tier 4 Final/Stage V emission requirements. The controller complies with almost all grid code regulations in use all over the world, including (but not limited to) IEEE 1547, VDE 4110/4105, EN50549-1/2, and ENA G99. Both protections and grid support functions are included, giving you a “single controller fits all” solution

System testing in a safe environment

DEIF’s emulation solution is a standard feature in the AGC-4 Mk II that enables you to interact with the controller in a controlled and safe environment without risking to damage any equipment. All you need to do to perform a complete test of your power management system is to turn on your controller and connect communications.

AGC-4 MI II features

- Up to 32 gensets in one plant
- Synchronisation of up to 56 breakers in one plant
- Multiple operating modes in one software
- Multi-master power management
- Load-dependent start and stop
- Load management
- Emulation for fast training and I/O test
- Automatic Mains Failure sequence
- Approved by TÜV and UL
- Hot standby for full system redundancy – change to backup genset controller on the fly
- Redundant CAN bus for power management
- Close Before Excitation – synchronisation from 6 seconds
- Suitable for hybrid power solutions fitted with ASC-4 controllers

KEZO: reliable renewable power

DEIF controllers play key role in research hybrid microgrid

»The DEIF system is one device that communicates with everything for once.«

Data Specialist
Weronika Radziszewska,
PhD

Smart energy systems

Studies at the Polish research centre KEZO show that hybrid energy storage systems can balance out the instabilities of renewable power production, making green power as reliable as fossil fuel-based power. DEIF ASC-4 and AGC-4 controllers are playing a key role in the KEZO microgrid by enabling control and communication between all system components.

“The DEIF units give us a unique feature: the ability to communicate with each different battery technology,” says Data Specialist Weronika Radziszewska, PhD. “The DEIF system is one device that communicates with everything for once.”

“It provides the functionality to control our production of energy and our exchange of energy with the grid,” adds Electric Power System Specialist Krzysztof Rafał, PhD. “The DEIF system can fulfil multiple functions for us.”

Read full case story

KEZO

Located north of Warsaw, Poland, KEZO is a modern research centre that focuses mainly on renewable energy sources, aiming to develop an integrated hybrid energy system.

Hybrid power for off-grid city

Remote community in Brazil relies on hybrid power plant

»I think it is a unique solution in the market.«

Power Plant Manager
Leonardo Salgardo

Unique controllers

The remote frontier city of Oiapoque, Brazil, is not connected to the national grid. All power comes from a hybrid power plant designed to reduce diesel fuel consumption and deliver greener electricity production.

A DEIF power management system with ASC-4 and AGC-4 controllers provides seamless and intelligent control of the plant, and according to Power Plant Manager Leonardo Salgardo, the controllers are unique.

“DEIF’s controllers were the only solution we could find on the market that could integrate both the thermal and solar plant,” he says. “The controllers from both plants communicate together and provide us with good options for monitoring and supervision. I think it is a unique solution in the market.”

In addition to controllers, DEIF provided training, fast feedback, and sparring for the project.

Read full case story

Oiapoque

Surrounded by mangroves and rain forest, the frontier city of Oiapoque is situated in the northernmost part of Brazil and is a remote community, counting 24,000 inhabitants.

Advanced graphical interface

Multi-touch widget HMI for system monitoring & control

AGI 400 features

- State-of-the-art HMI
- Multi-touch widgets
- Advanced programming tool
- Data-logging and alarm handling
- Complimentary DEIF app templates
- Designed for harsh marine environments
- Available in 7", 10", 15" and 21" sizes

A comprehensive HMI solution, DEIF's AGI 400 series connects to all DEIF Multi-line controllers, as well as third party electronics, via standard defined communication protocols, featuring functionalities which eliminate the need for other instruments, thus saving you both space and wiring.

The AGI 400 series is intended for visualisation and active control in multiple applications managed on board maritime vessels or platforms, where it provides full graphical overviews and user-friendly touch screen control with a quality display that is easily readable even at sharp angles. Monitor or control multiple setups simultaneously, or share data via Ethernet connections, effectively enabling the DEIF HMI to be used as a small SCADA system. AGI 400 supports multiple users levels, and LAN clients, ensuring user control in several levels.

Application examples

- Power management systems – control and supervision: one point management, control and supervision of multiple gensets and bus tie breakers.
- Alarm – handling and monitoring: view historical alarm data and accept active alarms.
- Ship energy monitoring system (SEMS): track your energy consumption to optimise and implement energy awareness on board your vessel.
- Graphical interface – mechanical and electrical systems: system overviews for mechanical and electrical equipment. Trend measured values to monitor operation performance or when carrying out fault-finding procedures.
- Data acquisition and storage

Variant overview

AGI 407

AGI 410

AGI 415

AGI 421

Multi-instrument, MIC

Measure, analyse & monitor your energy distribution network

DEIF's multi-instruments for measurements, analysis and monitoring of 3-phase electric energy distribution networks cover readings of more than 50 parameters.

The instruments have four-quad energy measurement and built-in energy counting and come with free utility software for programming and data viewing.

Ideal for sensing production from gensets/mains as the digital inputs can be utilised for genset/mains breaker feedback, thereby eliminating the need for hardwiring between breakers and the ASC.

MIC features

- 3-phase TRMS measurements
- Voltage inputs 400 L-L AC
- Accuracy: 0.2 or 0.5
- RS-485 Modbus communication
- Digital input
- Relay and digital outputs (optional)
- Supply voltage:
- 100 to 280 V DC
- 85 to 264 V AC 50/60 Hz
- 24 to 48 V DC (optional)
- Ideal for stand-alone retrofit applications

Type	Digital outputs	Digital inputs	Relay outputs
MIC 4002	–	2	–
MIC 4224	2	4	2

Multi-instrument, MIB 7000C

Measure & monitor your energy distribution network

DEIF's MIB 7000C multi-instrument for measurements and monitoring of single-phase or 3-phase electric energy distribution networks cover readings of more than 50 parameters.

The instrument has four-quad energy measurement and built-in energy counting and comes with free utility software for programming and data viewing.

MIB 7000C features

- 1- or 3-phase TRMS measurements
- Voltage inputs 690 L-L AC
- Accuracy: 0.5 or 1.0
- RS-485 Modbus communication
- Supply voltage:
- 100 to 300 V DC
- 100 to 415 V AC 50/60 Hz
- Multiple PV feed-in points

For applications with just one PV feed-in connection point, the ASC will sense the PV production using the integrated three-phase wiring.

For multiple feed-in points, installing the MIC will enable the ASC to accumulate PC contributions from each meter and show the total PV production.

INSIGHT

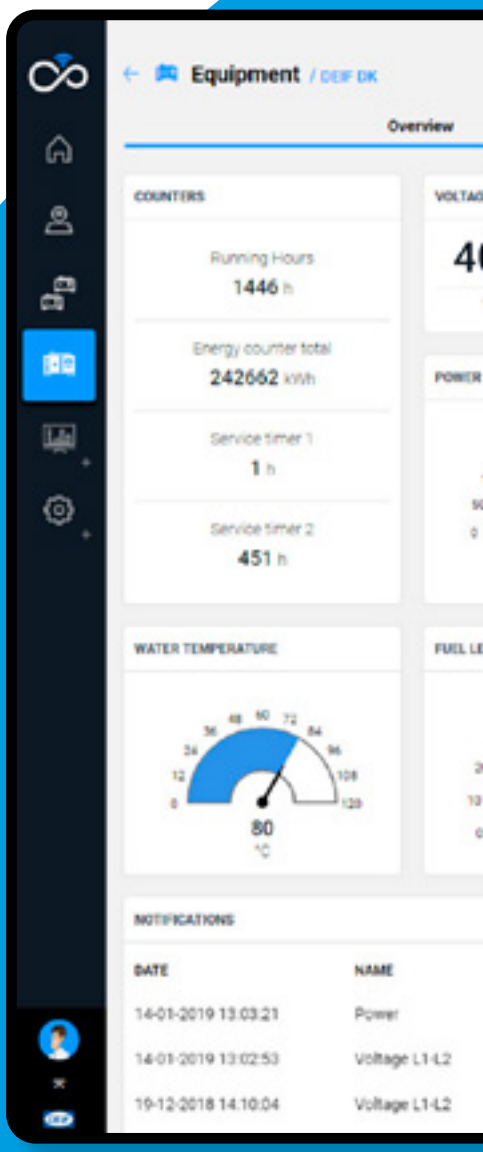
MONITORING JUST GOT A LOT EASIER

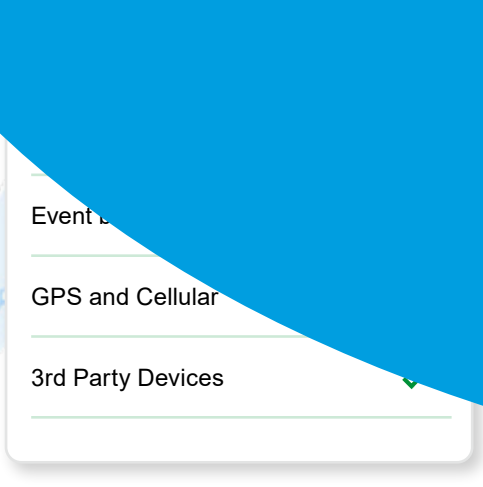
Access your gensets from anywhere with DEIF Insight - a remote monitoring service that keeps an eye on your assets and provide you a complete overview of the operation. No matter how high the quality of your power equipment is, malfunctions can happen. Remote monitoring your assets enables you to react immediately and quickly bring things back on track.

PC, tablet, or smartphone – the choice is yours. Install Insight on various devices and approach your assets anywhere, anytime.

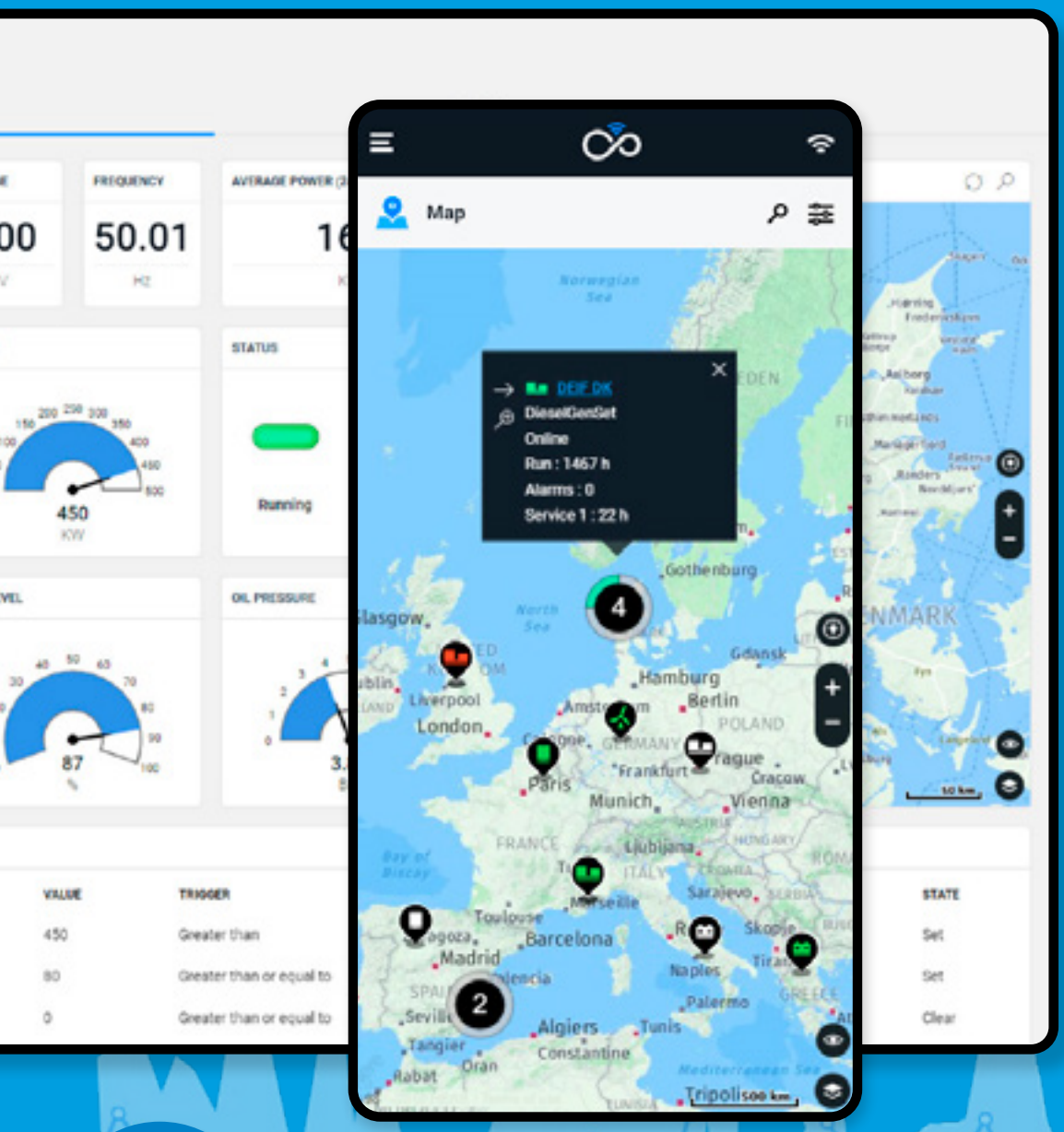
Customise your dashboards so they display the most important parameters and make smarter data-driven decisions.

Your equipment is one of your most valuable business assets. Import your Insight data to your business management system and manage your even business better.





Scan QR code to see Insight presentation video



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