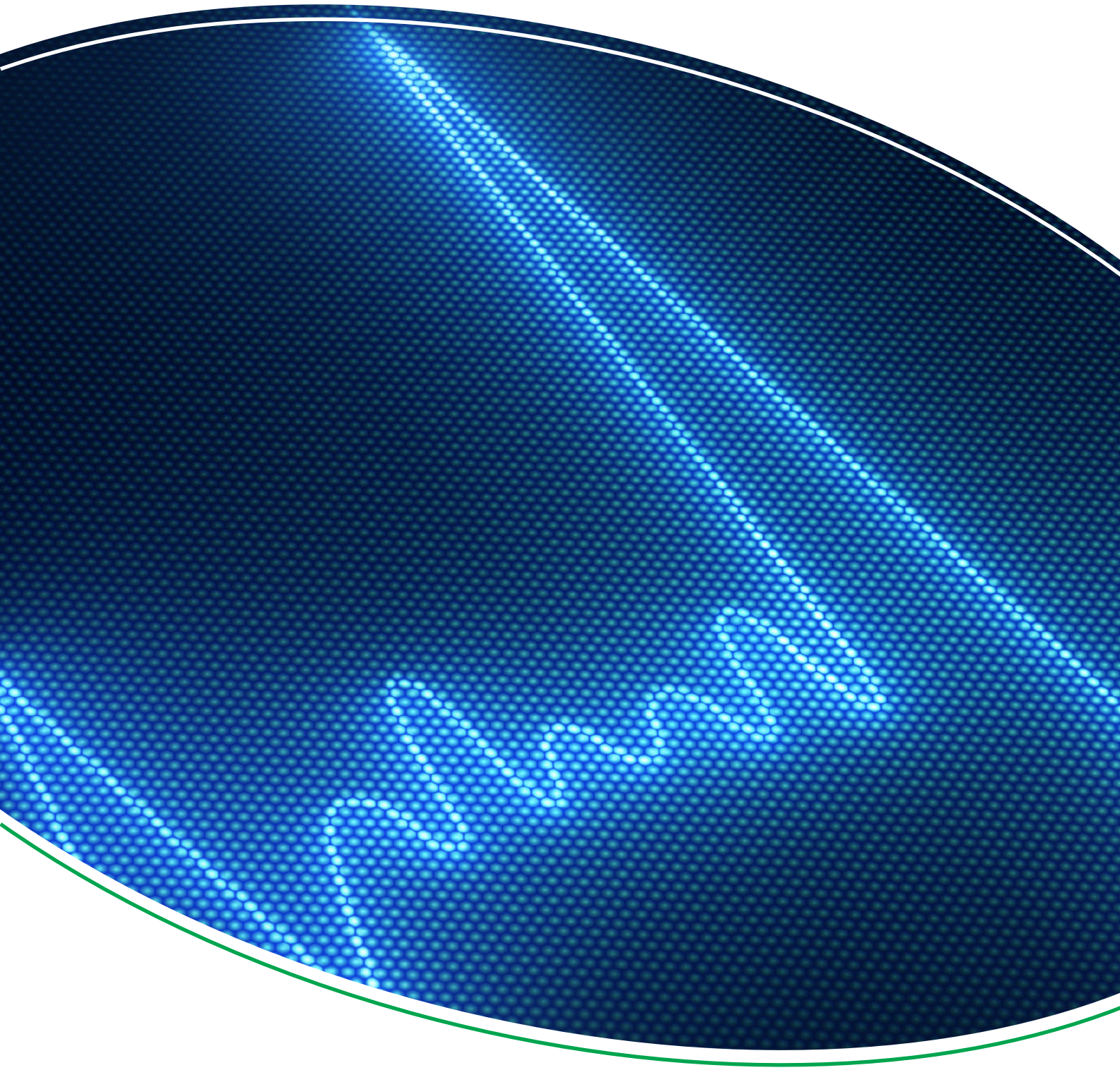

Keep your emergency power systems fit!

Testing and maintenance can mean the difference between well-functioning and a failing emergency power applications

If power to a salmon farm fails for more than 30 minutes, it may result in a loss of up to DKK 20 million in the short term and DKK 400 million in a longer perspective, because the smolt cannot survive even a short failure of the supply of oxygen and light. This is but one example of possible consequences of inadvertent power supply failure – worst case scenario a matter of life or death, for instance if occurring in a hospital. That is also the reason why all companies relying on critical processes have an emergency power plant, which starts up immediately if grid supply is lost.

Suppliers of control systems for decentralised power production often meet customers who do not follow industry recommendations on how to test and maintain their emergency power plants.

“Perhaps it is a consequence of the economic crisis, I don’t know, but we often talk to companies that simply skip testing and maintenance of their emergency power plant. The simple message we have really boils down to: Maintain and run your entire system regularly, “says Henrik Rødtnes, Sales Manager at DEIF, which specialises in control systems for electrical panels and generator sets - with customers worldwide.

Savings affect maintenance

Emergency power systems need to be ready to take over power at all times, and when the power returns, the emergency power system is to transfer the load back to the grid without interruptions and remain on standby for the next grid failure.

In principle this is as simple as it sounds - but only when it works. The problem is that emergency power systems require regular maintenance and test runs to ensure they work properly.

“During the past 6-8 years characterised by economic crisis, many companies have seen severe cutbacks which have also affected their financial ability to maintain emergency power systems. As long as it runs, why do more, they seem to be thinking. But a failing emergency power plant can result in a massive loss. For smaller companies, the loss could well be devastating. At hospitals, it can be fatal. So investing in the insurance, which is what an emergency power plant really is, makes good sense “says Henrik Rødtnes.

In addition to supplying emergency power, generator plants are also used to maintain effect and voltage in the grid supply many places around the world.

“The victim of frequent grid power outages, the Faroe Islands for example uses diesel generators to stabilise grid voltage and effect. And with prices fluctuating during the day in Sweden it has become feasible to use diesel generators when prices are peaking, “says Rene Kristensen, Technical Pre-sales Manager at DEIF.

Keep your plants in shape

Emergency power systems can be designed in many ways, but in general they include a UPS (battery or rotating) which supplies power to the servers, machine plant operating systems and operating rooms in hospitals. The UPS is often supplemented by a diesel generator, which provides energy partly to the UPS, and partly to the operation of production facilities. The challenge is that the plants are idle most of their life and therefore need to be “kept in shape”. But what does it take to ensure that the emergency backup system works when it is needed?

The Hiddenfjord salmon farm is located on the Faroese island of Fútaklettur. In cases of total grid blackout, DEIF backup controllers automatically continue to run in Automatic Mains Failure mode, saving Hiddenfjord’s fragile smolt and its valuable equipment.

Read more here.

When customers ask if they can be sure GlobalConnect’s back-up power systems work, Senior Group Manager Tore Heide Villund’s confident reply owes a great deal to his faith in DEIF’s power management system: “We know it works, because we test it the hard way.”

Read more here.

“All mechanical components containing moving parts must be used regularly in order to make sure they do not become inoperative and faulty. Therefore, it is essential that all contactors and breakers are tested and lubricated at least every third year. The lubricating agent becomes harder over time, and, worst case scenario, the breakers cannot be closed quickly enough, thus risking getting out of phase and short circuits,” Henrik Rødtnes continues.

The start batteries of the generator plant constitute another area to be checked to ensure correct startup of the plant

“A measurement of the battery voltage during startup can reveal if problems are on the way – such functionality can be integrated in some controllers available on the market today, including DEIF’s” Rene Kristensen adds.

Three kinds of testing

In Denmark, it is possible to use the electricity grid as the load for test runs - and it is therefore a good idea to run the generator at 75-80 % of max for an hour or so once a month.

“We recommend performing three tests. 1) cut off the external power supply without synchronisation to simulate a real grid blackout. 2) Test a controlled island operation where you start a generator and synchronise with the grid, deload the mains breaker and go into island operation with your generator without blackout or power interruptions. Then you synchronise with the external supply and shut down the generator. 3) A parallel test stressing the generators with 75 to 80% of their maximum capacity without shutting off the external power supply, “says Rene Kristensen.

“We often talk to customers who are afraid of testing their emergency power systems, which is kind of scary. One of our customers, a large data centre, cuts off the grid power once a month letting their own emergency power system take over the supply. But this is rarely seen. On the contrary, we often encounter companies who are reluctant to test just a part of their emergency power systems,” says Henrik Rødtnes.

Monitoring and testing remotely

DEIF recommends regular testing of the different sequences which are part of an emergency situation.

“When we deliver emergency power solutions, we always train our customers in handling the situations that will put the system into operation. Customers need to become familiar with pushing all buttons. Examples include cutting off the grid power completely, or running the system in parallel operation for a period of time,” says Rene Kristensen.

Today, the test can be done remotely. This is helpful if clients have a large number of emergency power systems placed at different locations, because they can monitor, manage and test functionality from one central location.

In many countries the uptime on the national grid is very high, making some ‘neglect’ the importance of their backup power. But as most know, a chain is only as strong as the weakest link – if you make that link your emergency power system, it may prove costly. We recommend creating solid testing procedures and intervals to ensure a fully operational system at all times“ Henrik Rødtnes concludes.

One of the world’s busiest passenger ferry port, Port of Dover uses DEIF’s backup power control solution offering local & remote control of the mains connection, island operation, mains synchronisation and export control.

Read more here.

Replacing a manually run emergency power system at the Turkish Tokat Hospital, DEIF’s retrofit solution includes load sharing and returning to main power utility without interruption of power. Generators are synchronised with mains power with a smooth transfer of load to grid.

Read more here.

Maintaining and testing of emergency power and generator sets

Check

- Preheating – every day
- Oil, cooling water, fuel – once a month
- Start battery (fluid level) – every six months

Lubrication

- Contactors / circuit breakers – at least every third year

Replacement of

- Engine oil, oil filter, fuel filter, air filter – annually
- Start batteries – every 5 years (or as needed – measure battery voltage during startup)
- UPS batteries – depending on the make and type of each third to fifth year
- Measuring relays on contactors/switches – every 10 years
- The genset control system – every 10 years
- UPS systems, electronics – every 10, 15 or 20 years depending on the manufacturer and type

Test runs

- Load test – generators loaded up to 80 % of capacity – without interruption of the external power supply – power from the generator is exported to the grid – one every month
- Partial test, synchronised switching on and off the generators – once a week for 10 minutes
- Full test, interruption of grid supply without synchronisation – 1 once a month – 1 hour test

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