



IGSS

Interactive Graphical SCADA System

# CONNECTIVITY

Circular economy - From waste to biogas

Foto by Claus Haagensen

## Nature Energy Biogas A/S, Denmark

Europe's largest biogas producer reaps the rewards of using the IGSS SCADA system to monitor and manage all their plants.

[www.igss.com](http://www.igss.com)

Life Is On

**Schneider**  
Electric



Foto by Skovdal &amp; Skovdal Film &amp; Fotografi

## Integration between IGSS SCADA and other systems helps optimize production and the quality of biogas for heating and transport.

Nature Energy owns and operates 13 active plants in Denmark and with a production capacity of 181 million m<sup>3</sup> biogas it is Europe's largest producer of green biogas for the gas grid. In addition, they also own 20 CNG filling stations. Their active plants convert 4.4 million tons of food waste, animal manure, etc. to green natural gasses – enough to heat 157,000 households or 8,000 buses that drive 30,000 km each, every year, with CO<sub>2</sub>-neutral energy.

## Same platform: Better collaboration around plant optimization

All Nature Energy's biogas plants use the IGSS SCADA system from Schneider Electric for data collection and monitoring. Several of the plants are almost identical. "It is quite unique and a major advantage to have the same platform, because we gain synergies in our operations and maintenance work," says Nature Energy's IT Manager Jeppe Fugl Villumsen. "This allows us to learn from each other and to try out something in one place before rolling it out to other plants." And according to Aron Tossell, Operations Manager for Nature Energy Midtjylland, it also makes it easier for operations managers to work together: "We can share experiences plus view alarms and operational data from other biogas plants in our own IGSS system."

An important part of IGSS is the summaries that display key readings and operational data. These are also used at Nature Energy's central laboratory in Odense by the biologists, who conduct analyses when, for example, the operations managers make trial adjustments to the plants with the aim of optimizing operations.



### Nature Energy

Founded in 1979 under the name Naturgas Fyn (NGF).

- 18 biogas plants in Denmark
- Over 100 million m<sup>3</sup> biogas produced in 2018
- Europe's largest producer of green biogas for the gas grid.



## Challenge: Quantity and quality

"Our most important job at the plants is to optimize daily operations. Gas production and plant efficiency are important key performance indicators along with minimizing loss and maintenance," says Aron Tossell. The biogas must also be of the right quality when used for heating and fuel. "Our customer, Danish Gas Distribution, measures the quality of the biogas supplied based on a number of parameters, such as dewpoint and content of oxygen, CO<sub>2</sub> and methane," says Villumsen.

The primary quality of the biogas is determined by factors such as the composition of the raw materials, i.e. livestock manure, bedding and food waste. "We keep a close eye on all the quality parameters at the plants, so that we can adjust our operations and the biological processes accordingly - and avoid production loss," says Aron Tossell.

"The values measured by the gas distribution company are taken from their PLC into our IGSS system, and we are notified by an alarm if there are any

deviations.”

All user actions such as start, stop and adjustments to the plant are registered in the IGSS logbook (*Audit Trail*) and used, for example, for fault detection together with the Playback function, where you can rewind and see the actual values before and during an incident. At Nature Energy, the *IGSS User Administration* module is integrated with a *Windows Active Directory*, so the many users at the plants, in the hosting centre and at the central laboratory only need to log on one time.

The IGSS system's *Notifier* function is used for duty planning and for sending out alarms via SMS to employees on duty at evening and night shifts; they get full access to the entire IGSS system via VPN and TeamViewer.

### Result: Import of data to IGSS makes production optimization easier

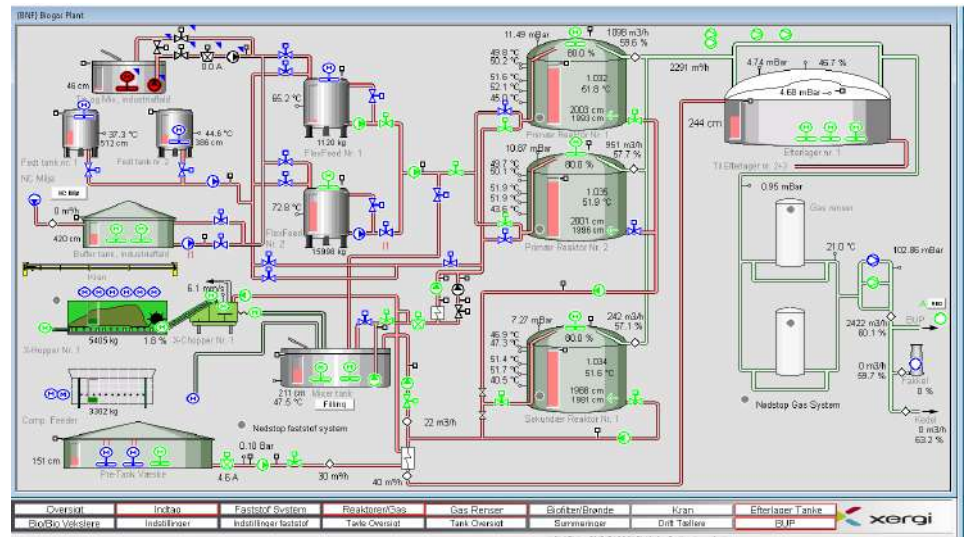
The IGSS SCADA system monitors the biogas production, tank systems and compressor stations in all Nature Energy's plants. Some plant parts are supplied with another system, such as the gas upgrading plant, which uses water scrubbers to remove the CO<sub>2</sub> content in the gas. “A typical challenge of having different suppliers is when the systems cannot communicate with each other, so you have to monitor them separately.

This makes it more difficult to optimize operations,” explains Aron Tossell. “Thanks to our suppliers working closely together, we now receive signals from the upgrade plant directly into IGSS.”



*It's important to maintain a consistent production flow with as few fluctuations as possible, among other things due to the capacity in the gas upgrading plant.*

*The IGSS system's readings and graphs provide a good overview and deliver the data for the operation managers' reporting.*



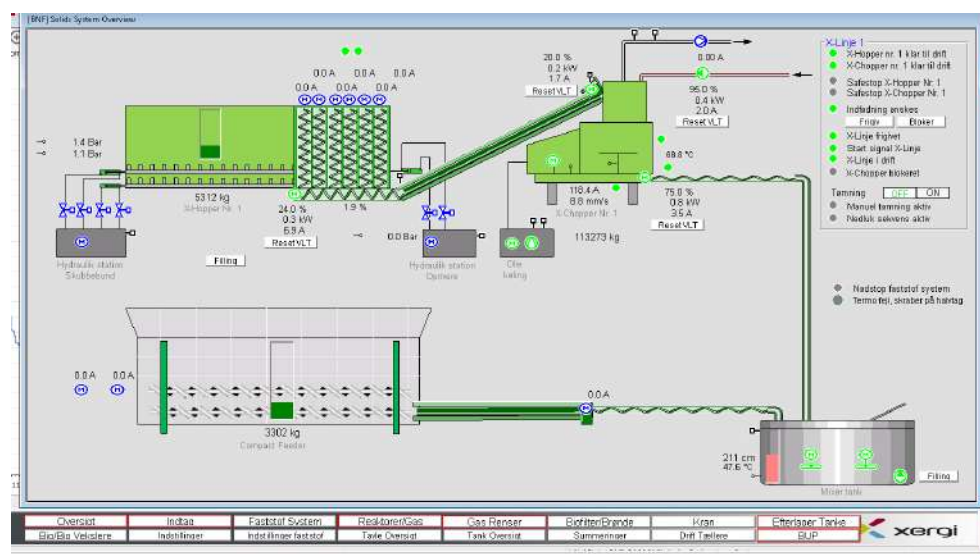
### Danish Gas Distribution

Acquired the gas distribution network for Funen from Nature Energy in 2018 and use IGSS to monitor pressure, flow and temperature on the gas grid.

The system that controls the crane and handles the feed of bio waste needs careful attention and maintenance. Therefore, it also has an interface with IGSS for monitoring and alarms.

*“Data is also transferred from the IGSS SCADA system to our Business Intelligence System.”*

*Jeppe Fugl Villumsen*



## Circular economy with CO<sub>2</sub> reduction and recycling

The residual product - nutrient-rich manure - is returned to the farmers, who are both raw material suppliers, co-owners and customers of Nature Energy. “We borrow the liquid manure from the farmers and return it with a higher fertilizer value following degassing. At the same time, greenhouse gas emissions from farming are minimized. The liquid manure also helps transport other gas producing components, so there are benefits throughout the entire circuit,” says Villumsen. “Surplus CO<sub>2</sub> at our biogas plant in Korskro is sold to Strandmøllen, where it is cleaned and condensed in a new CO<sub>2</sub> plant, the first of its kind in Denmark. The plant will cover approx. 25% of Denmark’s CO<sub>2</sub> consumption to produce e.g. carbonated soft drinks.”

## Object-oriented system design

Different system integrators have designed Nature Energy’s biogas plants and the IGSS systems, based on Nature Energy’s requirements. These include Xergi - one of Europe’s leading suppliers of turnkey biogas plants, which Nature Energy has since acquired. “Xergi has extensive experience of using IGSS as SCADA in biogas plants both in Denmark and abroad, so it was obvious for us to use IGSS at Nature Energy’s plants.

IGSS stands out for being a highly stable and flexible SCADA system, making it particularly suitable for use in a biogas plant. We also find that the system’s object-oriented approach provides a shorter engineering time compared to other systems.

From an operational perspective, the system stands out with its excellent data logging and graph facilities plus a smart **Playback** function that provides the operations staff and Xergi with excellent options to optimize the plants’ operations,” explains Project Engineer Bo Nielsen from Xergi.

Niras provides technical support for IGSS and performs upgrades to the latest version.

“We have been working for NGF/Nature Energy since 2006, first by implementing the entire gas distribution part in IGSS, and subsequently with the biogas expansion. Our role is the overall SCADA design of the plants, ensuring a common user interface and consolidation of the individual plants as well as support and upgrade of the overall SCADA system. Throughout the entire process, we have enjoyed an excellent sparring relationship with both Nature Energy and Schneider Electric, with the aim of finding the optimal SCADA solution as plant types and requirements have developed over time,” says Project Manager Erik Thomsen from Niras. “We have since the beginning been in dialog with the IGSS team at Schneider Electric about how the SCADA system best supports our needs,” Villumsen adds.

## The future: Expansions and green initiatives

With Nature Energy’s rapid expansion in recent years, focus has mainly been on putting the many newly built biogas plants into operation. “Today, the plants run very well, so we are now focusing on spotting opportunities to optimize operations and to be

### IGSS SCADA Hos Nature Energy

Identical structure at all plants. Comprises in total:

- 1 IGSS server at the hosting centre in Odense
- 1 terminal server for user access
- 7 x 2 operator stations at the plants.
- 7 x 1 Single-user Back-up, which takes over if the IGSS server is out of action

ahead and proactive, e.g. by checking pumps etc. and conducting necessary inspections before the weekend to avoid break downs. We also need to get better at taking advantage of the IGSS system's opportunities, such as reports and exporting data, so that we minimize manual data entry," Villumsen concludes.

Measures are also in place to make the production even more sustainable and profitable. A new plant with a biological scrubbing technology will remove sulphur dioxide without using iron chloride. Trials are being conducted together with universities to increase the quality ratio between biogas and natural gas from 60% to 100% e.g. by using hydrogen. Another trial will increase the gas extraction and nutrient content in the residual product (liquid manure) via a BioBang cavitation technique in a plant where the valves are monitored by IGSS.

Nature Energy continues their expansion to help ensure Denmark's conversion to green energy.

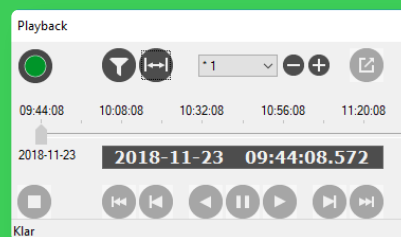
## Want to know more?



IGSS: Interactive graphic SCADA system for the management, monitoring and optimization of process plants. Learn more at [www.igss.com](http://www.igss.com).



IGSS Notifier: Duty planning, alarm handling and notification via SMS and e-mail. Read more. >



The playback function allows the operator to replay a step-by-step analysis of historical data and process incidents. Read more. >



IGSS Audit Trail: Registers all user actions carried out by IGSS operators. Read more. >



Nature Energy produces green gas – biogas - by reusing livestock manure, food waste and other waste products from society. [www.natureenergy.dk](http://www.natureenergy.dk)



DGD ensures that gas customers have a stable and secure gas supply, while actively contributing to the transformation to green energy. [www.danskgasdistribution.dk](http://www.danskgasdistribution.dk)

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August 2019

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