

# Digitalizing Metering on Offshore Wind Projects

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## Forward

When providing metering systems and services for grid substations and power stations, high accuracy and dual redundancy are essential requirements for settlement systems where metered energy volumes have high financial value.

Offshore wind systems have faced the added complexity that traditional analog hardware brings. Digitalization and simplification of these traditional communication practices has resulted in increased data accuracy, optimized storage, and streamlined communication.

In this article, Siemens Managed Services Networks business describes the challenges, solutions, and benefits of a recent offshore wind project.

In traditionally equipped offshore wind projects, pulse outputs from meters were connected to the Front End of an Operational Metering Summator (OMS). Four pulses were required from each meter. The Front End could have up to 8 meters connected. For offshore windfarm sites the Front End must be located on the windfarm platform.

The system required two dedicated fibers between the offshore platform and the onshore substation. Special communications hardware including long range fiber transceivers were also required to enable the connection. Further hardware was needed once onshore to connect the signals to the Processor End of the OMS. This provided up to 16 analog outputs to the Grid Control Center (via the substation control system) and two RS232 serial outputs connected to an external data logging system and the site's generation control system.

The original solution had several drawbacks due to the analog nature of the solution including:

- Pulses require extensive wiring, while also being prone to interference
- Maintenance is expensive as a portion of the system resides offshore
- Dedicated fibers are required
- RS232 is an old technology that has short connection distances and is reliant on an additional logger
- Need for extensive hardware for onshore to offshore communications

To overcome these problems Siemens developed a new product called MIDAS.

MIDAS accesses an extensive dataset directly from the meter over Ethernet. This overcomes the drawbacks encountered due to the previously analog solution. The signals remain in the digital domain leveraging the following advantages:

- Reduction of assets offshore, lowering hardware and communications costs. MIDAS can be housed in the onshore substation while the meters remain offshore
- Data for frequency response is stored within the device, further reducing hardware costs by removing the need for an external logger / RS232 serial interface
- Interface to the generation control system is via Ethernet – more reliable, easier to distribute
- Previous analog data is replaced with an Ethernet connection supporting IEC104, 61850 or DNP3 with far more data values being available. Additionally, this

simplifies wiring, less interference and more extensive data

- MIDAS has a built-in Modbus Server providing clients with access to extensive data by their SCADA

MIDAS interfaces to the high accuracy settlement meters and provides multiple digital interfaces to the utility's other systems. MIDAS also provides the generator company with a digital interface to their SCADA or DCS systems and Trading Systems.

MIDAS is a fully digital solution providing far more features from a single, easy to configure, small form factor. Dual redundancy is simple to implement where the highest degree of reliability must be achieved.

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