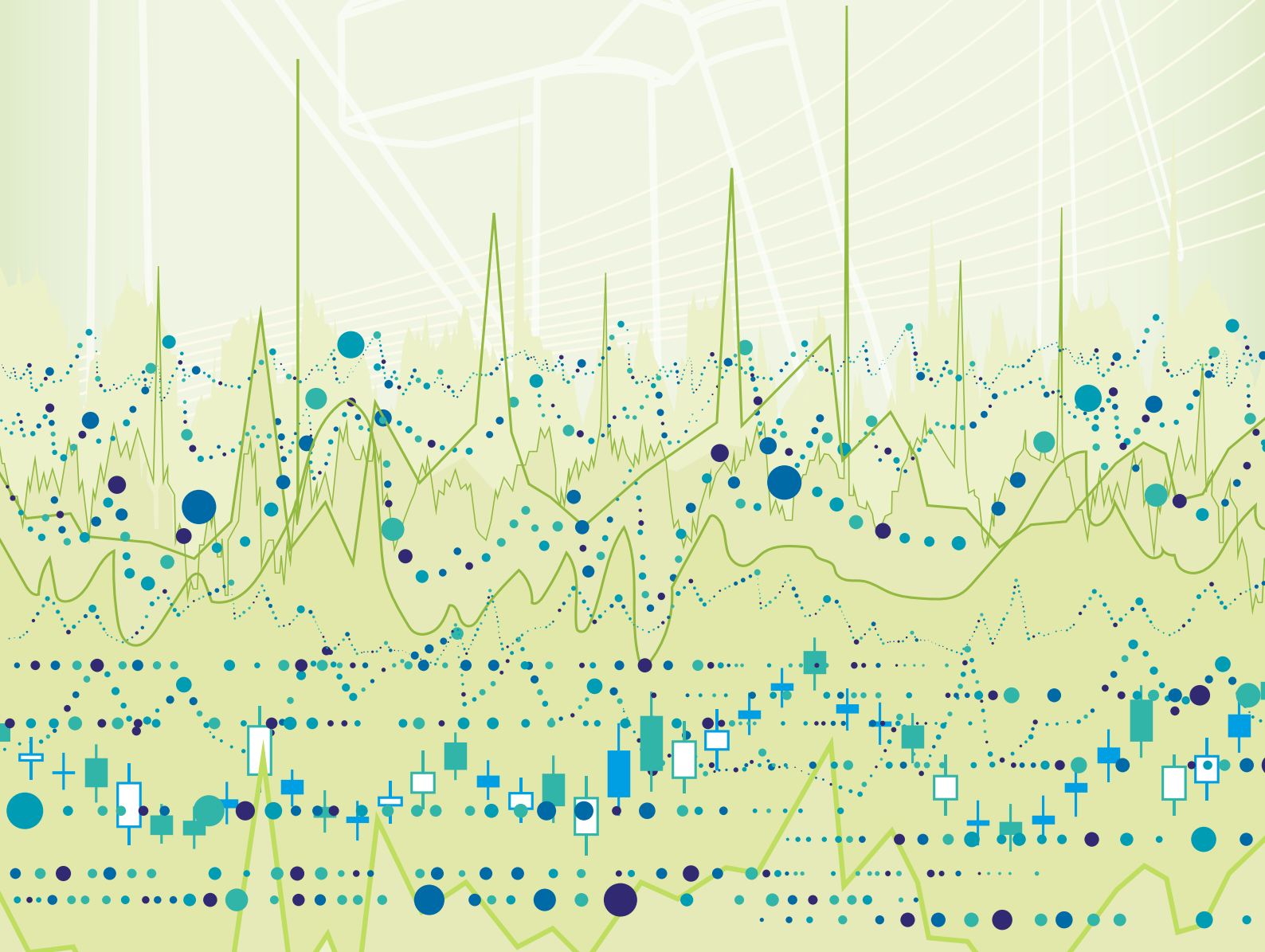
WINDPOWER MONTHLY

GREEN EAGLE SOLUTIONS

OEM SCADA maintenance

A vital service



WHY SCADA SYSTEM PERFOMANCE MATTERS

The performance of a SCADA system is critical to a wind farm operator's role – without it, faults cannot be detected, wind turbines cannot be operated and other analytics systems are rendered impotent. Keeping it in top condition is critical.

Green Eagle Solutions is a software solutions provider for renewable energies with a clear mission: to optimise renewable operations bringing AI-assisted tools to the market. However, the path to enhancing operations starts with the correct generation of data in terms of high quality and integrity, which is directly related to an optimal functioning of the OEM SCADA system. ARSOS (Autonomous Renewable Smart Operations Software) is the platform through which Green Eagle Solutions offers its services, which includes not only intelligent control and integrated analytic capabilities, but also as the foundations of the control and analysis features, it ensures reliable SCADA performance and data quality.

A wind turbine's SCADA system is its nerve centre. This Supervisory Control and Data Acquisition equipment connects individual turbines, and meteorological stations to a central computer, allowing the operator to keep an eye on the behaviour of all the turbines, and the functioning of the whole plant.

If any problems occur, such as turbines stopping, warning or failing, the operator can use information recorded in the SCADA system to identify the root-cause of the incidence. The systems also record energy output, events signals and availability of turbines, which can be used as the basis for warranty claims.

"The SCADA system is the most important part of a wind farm – it is the only thing that has to be functioning all the time. Without it, the plant's operators cannot monitor any problems with the turbine's components and overall performance, which means that they can't support the wind farm owner properly," explains Juan Fernández, cofounder and chief technology officer at Green Eagle Solutions.

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Crucially, other software systems that can provide additional insights such as predictive maintenance, asset management platforms, operational analytics, energy control centre operations and energy trading, and have become increasingly popular in wind farms to enable maximum performance, rely on the data provided by SCADA systems. If the system is not working, or is providing unreliable information, these other tools become useless, Fernández says.

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"If the tools don't receive a proper set of data in terms of quality and integrity, the asset owner won't be able to calculate the real performance of the asset. Without this, they are almost blind in terms of the real value of their asset, which could be higher or lower than they think or expect," adds Alejandro Cabrera, CEO and cofounder of Green Eagle Solutions.

Like any other technology, OEM SCADA systems can malfunction or break down. The most common issues that negatively impact the performance of the OEM SCADA system are the hardware equipment becoming obsolete or in a bad state, which becomes increasingly frequent with age, or the software system falldown or loss of connectivity. Either of these can lead to poor quality communications between the SCADA system and the operator's computer system, meaning that the data is not correctly acquired and stored, impacting realtime monitoring and operations activities.

This is where Green Eagle Solutions can help. Created in 2012 by IT engineers, the company specialises in SCADA systems, which it believes to be the most important part of a wind farm. It is a company whose value proposition begins with a specialised service dedicated to the maintenance of legacy SCADA systems – those that were provided by the turbine manufacturer, , as a crucial step to further enable intelligent control capabilities.

This kind of service has typically formed a minor part within a full-service contract of a wind farm. But it is a very specialist area – some of the SCADA systems date back to the early days of wind farms in the 1990s and need expert understanding. Green Eagle Solutions' maintenance service is provided by SCADA engineers, who have worked with many different brands of system, some even previously worked for OEMs in the development of the original system.

"We're very specialised and believe providing such a focused and dedicated service to take care of OEM SCADA systems brings an innovative proposal to the sector," Fernández says. Juan Álvarez de Toledo, business development manager of Green Eagle Solutions, adds: "You need experts to take care of the older SCADA systems, and our team can ensure the availability of the SCADA system, replacement of the hardware equipment, and the proper generation of data in terms of quality and integrity."

Even SCADA systems that are within their guarantee can benefit from Green Eagle Solutions' expertise and specialist service. Its team can provide 24/7 support to manage the response from an OEM SCADA provider on behalf of their client so that issues are resolved efficiently.

In contrast with other companies' approach, the main aim of Green Eagle Solutions' team is not to fix problems with SCADA systems after they are notified to their service team, but to prevent them happening in the first place by monitoring wind farm operators' systems to detect incidents before the client does.

Green Eagle Solutions' advanced software tools for preventive maintenance enable monitoring of the plant's IT communications, OEM SCADA performance, and the status of the OEM SCADA databases, UPS, switches, firewalls and routers.

Once the team detects an incident for the first time, it starts to work out how to solve the root cause of the problem and find the relevant software solution that will avoid further incidents. "Every incidence related to the OEM SCADA system is traduced into immediate wind farm control underperformance and further lack of data quality and integrity. In short, production and revenue losses. The main focus of our service is proactive service, not reactive, avoiding such losses," Fernández says.

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A STEP-BY-STEP APPROACH

Deployment of Green Eagle Solutions' OEM SCADA maintenance and 24-7 support follows a step-by-step process, which is customised to each client's needs, and the characteristics of their wind farm.

Firstly, a SCADA Audit is performed in order to identify the current state of the SCADA system. This takes into account communications network architecture; status of hardware equipment and software systems; the system's running services; and communication protocols.

The audit is conducted remotely from Green Eagle Solutions' technology hub in Seville, Spain, following all security requirements of its client. The team will then provide all this information to its client in a report, which forms a useful document for future work.

In terms of cyber security, the OEM SCADA audit often reveals systems with low security standards: unprotected networks open to internet, old servers, and discontinued operating systems. One of Green Eagle Solutions' main priorities when launching the OEM SCADA Maintenance service is to build a communications architecture with the highest cyber security standards in the industry. This involves the isolation and securitisation of local networks, hardware equipment and communication lines between the site and other external systems such as control centers or second level monitoring platforms.

Service deployment workflow

- SITE ASSESSMENT
- LABORATORY ANALYSIS
- MAINTENANCE ARCHITECTURE DESIGN
- ON FIELD DEPLOYMENT
- VALIDATE & LAUNCH SERVICE
- SLA COMPLIANCE
  - OEM SCADA **software availability** guaranteed
  - **Hardware equipment** replacement compromise
  - SCADA **data integrity** guaranteed

Next, Green Eagle Solutions will perform a laboratory analysis, which allows it to detect equipment that needs repair or modification, the potential availability improvement of the system, its weak spots or deficiencies, and solutions to communication issues and/or HW (servers, hard-drives, routers, switches, UPS) and SW systems.

The technical team will deeply analyse the status of the SCADA system to detect issues affecting its performance and usability, as well as potential for improvement.

Finally, the information collected from the audit and the laboratory analysis is combined to develop a maintenance proposal, targeting problem-solving and performance enhancement.

After having defined and agreed on a Maintenance Architecture, Green Eagle Solutions' IT team will deploy the service. This includes installing any necessary hardware equipment if required, and establishing all communications with the wind farm as well as the operator's system.

The company will agree a service level agreement (SLA) with its client to monitor the state of the SCADA system from its control centre in Seville, Spain. The SLA guarantees three things – availability of the SCADA system, hardware supply for any equipment replacement that is required, and data integrity. It can retrieve data, and store it in cloud-based databases.

Green Eagle Solutions' services team works remotely from its smart energy control centre in Seville from where it operates worldwide and reacts to three levels of incidents, with the timing of response dependent on the severity. The most severe problems are ones that damage the SCADA system's ability to monitor real-time function of turbine equipment, control and regulation functionalities, failures of SCADA access and communication, and hardware equipment failures.

Medium-severity problems include those where the SCADA system keeps running, but certain secondary functionalities are not available, and there are no alternative tools with similar features, or where the SCADA cannot monitor or download historical data, and there is no alternative.

Incidents classified as more minor include those related to the exploitation of historical data; the display of inconsistent data or values that do not affect the operation of the system; or a request for information about software or the SCADA system, such as updated user manuals.

The exact timing of response to each of these levels is determined by the level of SCADA maintenance plan chosen, and specified in the SLA. Green Eagle Solutions sends each of its clients a monthly report, including comprehensive information about the preventative and corrective maintenance tasks it has carried out. This also includes the time taken to resolve incidents, and information on malfunctions detected by its preventative maintenance tools.

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REAL-LIFE SERVICE

Green Eagle Solutions provides its OEM SCADA Maintenance and 24/7 support service to a variety of companies in the wind sector, including EDP Renováveis, Jorge Energy, RWE and Acciona, among others. Its service has a total capacity of 1,1GW under its care, mainly in Spain, but also in France, Germany and Sweden.

Case study **EDPR**

EDPR has been working with Green Eagle Solutions since 2017. The wind farm operator discovered first-hand the gap that sometimes exists from the OEM's side in terms of providing service to SCADA systems, and so decided to look at other options, according to Gemma Alfonso, SCADA engineer at EDPR, who works in technical support at the company's Remote Operations and Dispatch Centre. While large OEMs have greater knowledge of their equipment and can agree global support on a single joint contract, they tend to prioritise other issues over SCADA support, she explains.

After an initial set-up phase during which Green Eagle Solutions and EDPR exchanged the relevant information, and adapted to working with each other, results began to show, Alfonso says. "Now they work autonomously and act on all problems that arise, providing an adequate response in terms of quality and time," she adds.

Green Eagle Solutions is now providing maintenance services to several Gamesa fleet SCADAs that represent 567MW of EDPR's power generation, as well as a specific Repower plant. Working with a specific SCADA maintenance team has considerably improved how quickly incidents are responded to, Alfonso says. In addition, Green Eagle Solutions autonomously manages maintenance and performance of SCADA equipment to anticipate problems.

"Green Eagle Solutions has been open and adaptable to EDPR's work standards, which is the benefit of developing the relationship effectively from the beginning," she says.

EDPR has found that Green Eagle Solutions has adapted well to different scenarios that have arisen, and importantly, always provided security, Alfonso says. "The continuous and preventive supervision that it is carrying out has resulted in both a lower number of incidents, and incidents having a lower impact," she says.

Case study **RWE**

Green Eagle Solutions' OEM SCADA maintenance team has been supporting 77.6MW of RWE Renewable's Urano and Aldehuelas wind farms for the past six years, providing a three-part service covering preventative, proactive and corrective actions.

The service keeps the SCADA working reliably through efficient maintenance, which avoids unplanned breakdowns, leading to an availability of more than 99%.

Green Eagle Solutions' support means that assets are controlled 24-7 so that action can be carried out immediately if there are any problems, avoiding losses of energy and money and keeping them safe, says RWE's Antonio González, control room leader at RWE Renewables.

In addition, all information is saved in the database, meaning that any performance analysis can be carried out, he adds. Green Eagle Solutions' support has meant that RWE can focus on its core business, knowing that the SCADA systems are in safe hands, González explains.

Working with a specialised software company is different to working with a large OEM, with the main benefits being high-quality service, response time and flexibility, he says. Green Eagle Solutions has continuously improved the service and proactively proposes solutions by listening to RWE's needs, he adds.