power for good

The drive for data

A guide to getting the most from your asset's data

Foreword

In the wind and solar world, there have been a number of recent and impressive technological advances. Despite this, there has been one under-explored area: asset data. Now, some owners are realising the power of asset data, and it's hoped that more will follow suit soon.

There couldn't be a better time for this asset data revolution. While renewable deployment continues at pace around the world, many assets are ageing and there are economic pressures too. In order to navigate the complexities of the evolving market, asset owners need more than just information, they need data transformed into insight and action in the context of their business.

At the forefront of this revolution stands RES and its Anemo digital services. Committed to meeting burgeoning data needs, we guide you through the intricacies of data prioritisation, focussing on the information that matters most. On top of this, we provide the expertise to unravel the complexities of asset data, helping you not only comprehend but also leverage its potential to drive performance.

We pride ourselves on being a one-stop shop. By providing a holistic view of asset performance, we give you the tools to optimise performance, streamline processes, and unlock growth.

Are your assets performing as well as they could be?

Wind and solar power are on the rise. In 2023, Europe installed 18.3 GW of new wind power capacity. On top of this, wind and solar generated a record 12% of global power in 2022, with record numbers of new wind turbines being installed worldwide.

In addition, at last year's UN COP28 Climate Summit, 118 governments signed the Global Renewables and Energy Efficiency Pledge, agreeing to triple worldwide installed renewable energy generation capacity to at least 11 terawatts and to double the global average annual rate of energy efficiency improvements from around two percent to more than four percent every year until 2030.

As the volume of renewables deployed continues to increase, it is imperative that we ensure these assets are performing to their full potential. And of particular importance is ensuring that ageing assets continue to perform to their full potential.

The first step to optimising performance is leveraging asset data. Whilst technology has advanced at pace, giving us access to more and more data, it's important that the "right" data is gathered and being used. This is an area that owners have struggled with for years due to lack of access. In addition, owners sometimes lack knowledge about how to understand data in the context of their portfolio and business goals. Data is key though. The right data can shine a light on how assets are performing as well as how owners can rectify issues.

Let's delve into how asset data can help owners succeed and shed light on how RES can help.

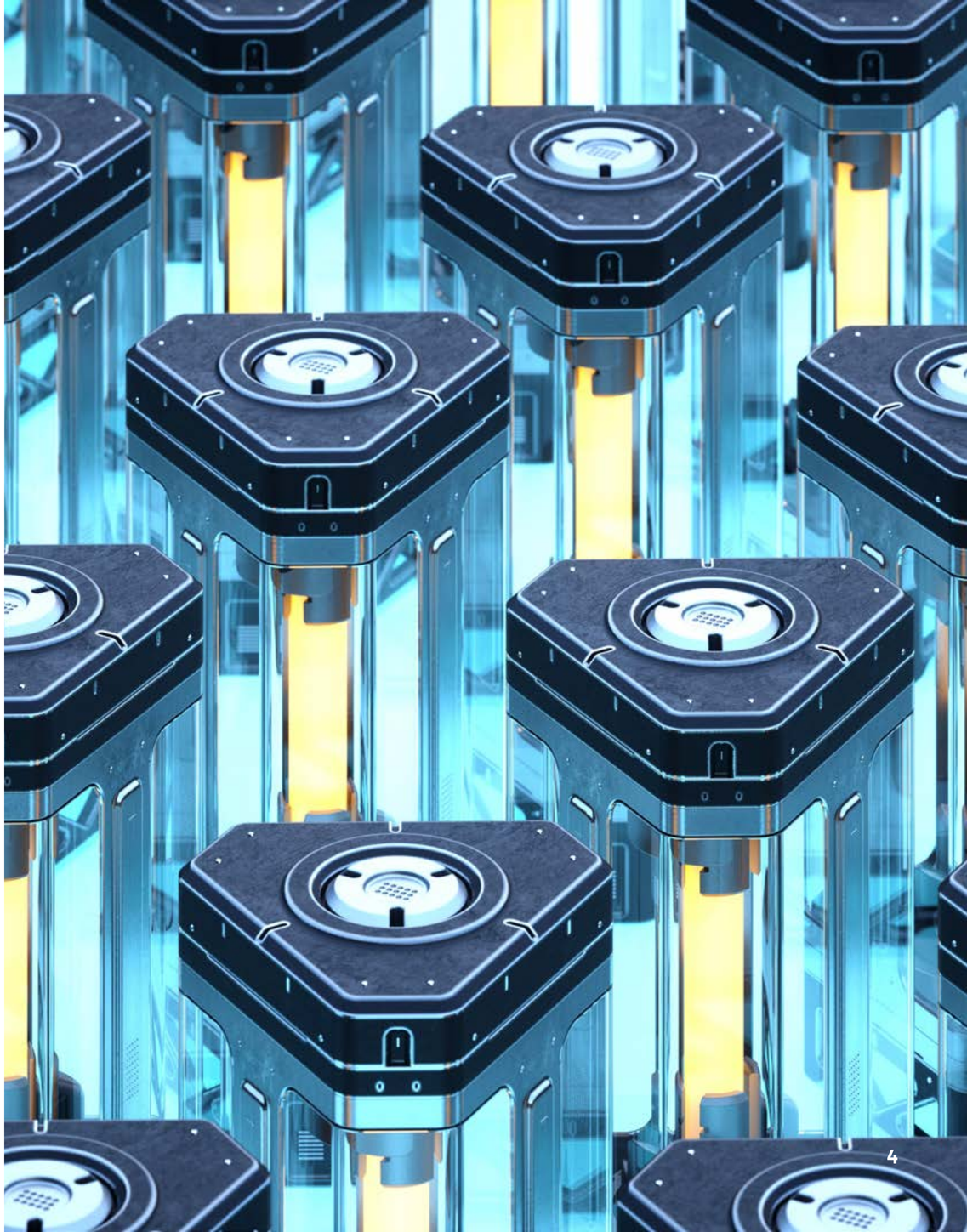
Unlocking the potential of asset data

If you want to know how well your assets are performing, you first need to access your asset data. This will enable you to spot areas of underperformance and diagnose root causes.

Admittedly, some data sources are harder to obtain than others. Typically, asset owners and operation and maintenance (O&M) providers work with low-frequency data.

Standard practice for many, 10-minute averages can shine a light on a number of common issues affecting asset performance. But while low-frequency data can uncover symptoms, high-frequency data (i.e. data collected at a very rapid rate) is better-placed to help diagnose issues.

Indeed, when combined with 10-minute data and analytical tools built by subject matter experts, higher-frequency data can help owners realise the optimal state of their assets and draw up a roadmap to improve their assets in the most capital-efficient way.



The role of high-frequency data

There are some key benefits of higher-frequency data. The first is accuracy. High-frequency data can provide a clearer picture of asset performance, health, and efficiency. Allowing for a more detailed analysis of system performance, high-frequency data can help owners identify trends, anomalies, and potential issues more effectively, and help owners pinpoint specific actions.

Another is maintenance. Monitoring the conditions of turbines at shorter intervals allows for the early detection of issues, laying the ground for a more proactive approach to maintenance. This detailed data can help asset owners develop sophisticated predictive models, improving the accuracy of OPEX models or forecasts. After this, with a more precise understanding of conditions, owners can make more informed decisions about when and how to adjust system parameters for optimal performance.

The differences between high-frequency asset data and low-frequency asset data are akin to a patient undertaking a health check. Here, a visit to the doctor's office is valuable, but will only uncover what can be uncovered with the doctor's eyes and ears. It is only through technology – scans and monitors – that the patient's condition can be properly diagnosed.

The role of access and knowledge

Historically, OEMs haven't shared high-frequency data with owners or O&M providers, as there hasn't been a reason for them to do so. Instead, they have provided access to 10-minute data (ODBC Scada) or at best OPC 1-sec data – but the latter often only at a cost.

On top of this, asset data access has been even more complicated for owners with a multi-brand fleet. After all, there are no unified industry standards for data access – something that's largely thanks to vendor silos prevalent in the industry.

But access isn't the only problem; knowledge is too. Indeed, owners are sometimes unaware of the power of asset data; they don't know better quality or higher frequency data can provide more detailed and actionable insights. Other times, they know that good-quality data exists – but lack the internal capabilities to access, unpack and understand this data on their own. In both these instances, partnering with an energy solution provider can really help.

How can enhanced data help?

Asset-data-driven decision-making can unlock a new level of asset performance optimisation, drive better annual energy production, reduce asset downtime, and enhance predictive maintenance.

Wind Farm, Washington State, US

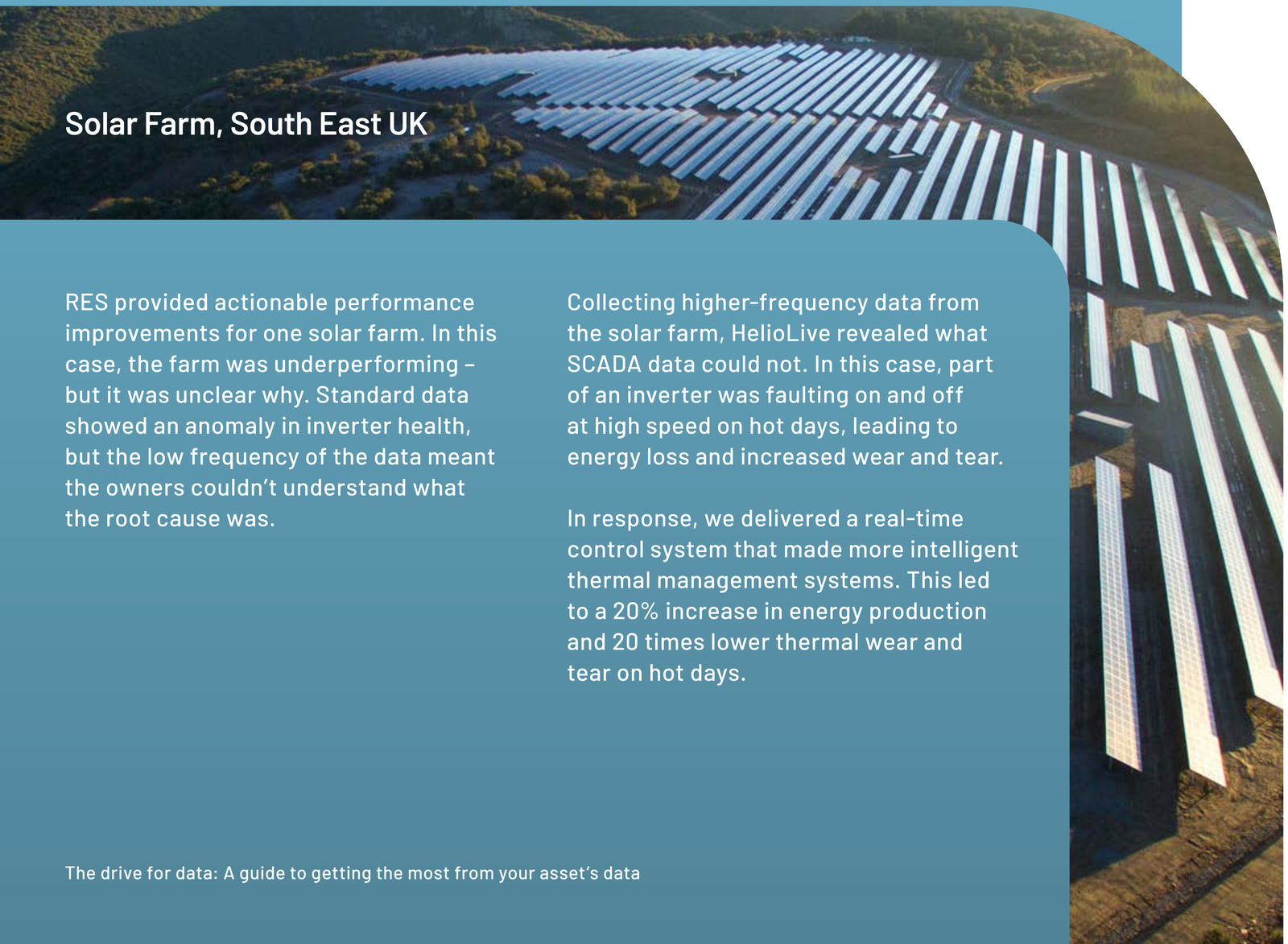
RES recently helped a 205MW wind farm in Washington boost its performance using its Anemo digital services. Consisting of 89 Siemens 2.3 MW wind turbines, the team conducted a health check of all turbines across 2 sites, using existing raw high-frequency controller data from the turbines.

This uncovered room for optimisation, specifically with regard to the turbine controller parameter settings. It also identified significant single-pitch rotor imbalances and mass imbalances. These needed correcting to manage fatigue loads and mechanical main component failure rates.

Our technicians prepared data-driven recommendations for every sub-system, component, and sensor issue on each turbine. While some corrections could be made remotely, we helped onsite technicians with field corrections that could be made to improve turbine performance further.

Once parameter settings were optimised and pitch calibrations completed, a new and healthier performance baseline was established for each turbine. This resulted in a reduction of turbine fatigue loads, a reduction in the rate of component failure, and an increase in asset lifespan.

Image by **White Creek Wind I, LLC**



Solar Farm, South East UK

RES provided actionable performance improvements for one solar farm. In this case, the farm was underperforming – but it was unclear why. Standard data showed an anomaly in inverter health, but the low frequency of the data meant the owners couldn't understand what the root cause was.

Collecting higher-frequency data from the solar farm, HelioLive revealed what SCADA data could not. In this case, part of an inverter was faulting on and off at high speed on hot days, leading to energy loss and increased wear and tear.

In response, we delivered a real-time control system that made more intelligent thermal management systems. This led to a 20% increase in energy production and 20 times lower thermal wear and tear on hot days.

How RES can help

RES partners with wind and solar projects around the world to boost their operational efficiency and optimise their assets' performance. From honing parameter settings to delivering real-time control systems, we flex to your project's needs.

We combine high-quality and high-frequency data with deep domain knowledge to help owners realise the potential of their assets. We're a one-stop shop. This means that not only can we access and analyse your asset data – but we can deliver on data-driven recommendations too.

Providing access to higher frequency data as well as sophisticated analytics with in-built subject matter expertise, we lay the groundwork for more informed decision-making. Our goal? To optimise your performance, boost your project's operational efficiency, and maximise your output.

An optimised future

Every asset owner wants to ensure maximum yield and minimise downtime. After all, operational costs can be significant, and consistently delivering electricity to the grid and meeting energy production targets are key to maximising profits.

As the renewables sector continues to grow and mature, asset owners must manage fleets that are both larger and older. Therefore, it is essential that owners leverage data to effectively manage the health, uptime, and productivity of their renewable fleets.

With the right asset data analysis, owners can unlock the ability to operate their assets better than they ever have.

"We work alongside RES to actively manage our portfolio, preserve and enhance value for shareholders and deliver long-term sustainable returns. Coming up with new technological solutions is really important for us. It helps us increase energy yield and also reduce turbine stress. In doing so we can extend operational life."

Minesh Shah
Managing Director at InfraRed Capital Partners, Investment Manager of TRIG

For more information on how RES can help you get the most from your asset's data, contact one of the authors or visit res-group.com/digital

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