WPO Leads Renewable Energy Asset Management with Dash

Executive Summary

- Largest independent European asset management firm ensures premium service with fit-for-purpose data analytics systems spanning six gigawatts of renewables sites globally (about the electricity needs of a city like Paris).

- WPO built a platform of Dash apps, each tailored to answer a specific business case of renewable assets management.

- Python and Dash versatility enable granular drill-down from the portfolio to individual asset levels, backed by home-brewed advanced data analytics and business knowledge.

- Proactive analytics help protect wind and solar farm operators from costly downtimes, maximize energy production, and boost renewable energy's competitiveness in the market.

Alban Jéhu

Product Owner of WPO Dashboard

"We are creating exactly what we want with Dash. In the same screen you can see KPIs across all our asset types, and you can drill down very efficiently. It allows us to create trust and transparency with our customers, who get to see what our engineers are recording and writing in real time."

A comprehensive client experience

WPO is the leading independent services provider in the EU and UK for renewable investors. With origins in wind prospect operations, WPO's portfolio has expanded to hydropower plants, solar parks, wind farms, and battery storage sites around the world.

This GIF, powered by the Plotly Python graphing library, updates regularly to show WPO's last 48 hours of data flows.

To provide excellent differentiated service to their clients, WPO coordinates across multiple stakeholders and diverse data systems to provide secure, relevant views of real-time advanced analytics on asset health and performance. These insights are then shown to the clients through their comprehensive Dashboard platform, which they built with Python and Dash.

WPO Dashboard is available with single sign-on on mobile and desktop devices for easy access, anytime, to the latest KPI updates and data flows.

WPO's Dashboard solution is the platform on which WPO orchestrates its services, and it serves as both an internal tool and an external portal for clients. Over 40 customized dashboards, reports, and web applications built in Python with Dash ensure a unified, data-driven experience for site operators, maintenance crews, investors, and WPO's managers. The platform's diversity, enabled by Dash, gives it extraordinary versatility and proves to be performant after two years of battle testing.
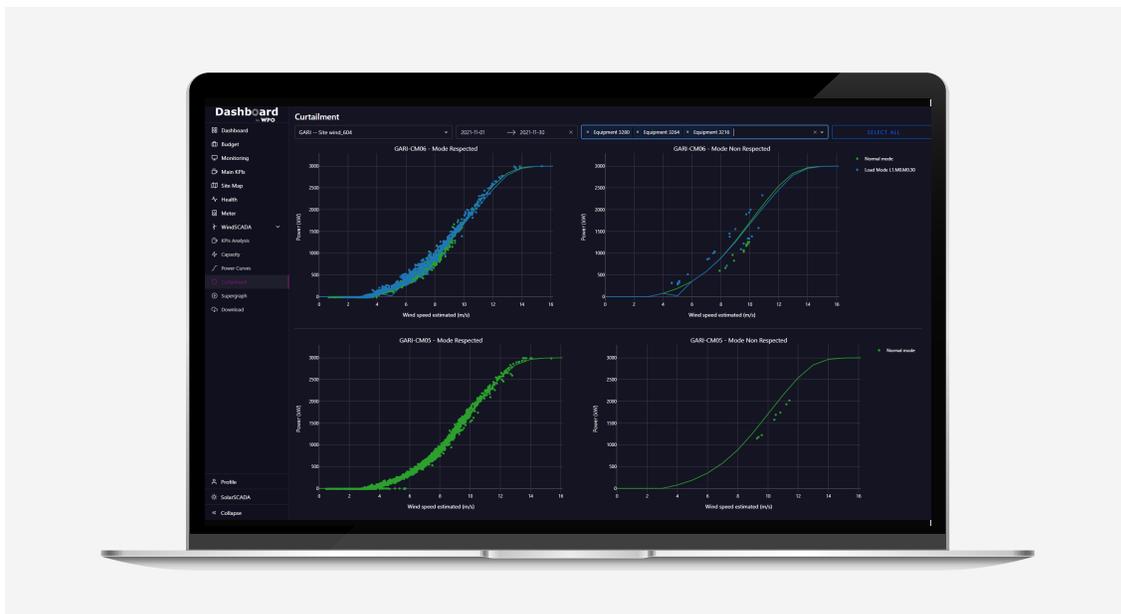

Joachim Audouard
Lead Developer at WPO

"Using the wide range of Dash features like JavaScript, Python, pattern matching callbacks, and the vast set of components available, there is virtually no business case for which we cannot build a fit-for-purpose app. We can focus our efforts into careful data management and processing and trust Dash for fast, robust app development."

Proactive auditing and curtailment compliance

For WPO's wind farm clients, WPO's Dashboard solution has been critical for resolving unnecessary impediments to energy production. Wind farm operators must respect environmental and safety regulations, and navigate changeable external factors like weather, seasonality, and hardware limitations, all while maximizing energy production.

Turbine manufacturers often hard-code curtailments into a turbine's control software, which restrict its operation according to specific requirements, such as noise limits during certain hours, or a cap on energy output to prevent the grid from overloading. These are meant to facilitate a wind farm's compliance with regulations, but operators have experienced negative repercussions when the software is not up-to-date with current regulations. WPO's curtailment analytics provide an evidentiary counterpoint to help resolve these issues.

WPO's Dashboard curtailment analysis Dash app is a nice use case for Dash's pattern-matching callbacks and classification algorithms.

Alexandre Bertrand

Managing Director at WPO

"You always need a contradictory analysis. We offer a systematic analysis for an affordable price and in a completely independent way. By monitoring effectively how the turbines behave and perform, we provide our customers with evidence if anything should or shouldn't be curtailed, and whether it is. This is highly appreciated when it comes to discussion with turbine manufacturers or authorities. "

Some curtailments should apply only under specific environmental conditions, like a certain range of temperatures or wind speeds, or only at specific times of the day or year. WPO's Python analysis checks clients' turbine data against 15 criteria to determine if any "zombie curtailments" may be unnecessarily impacting a turbine's performance. Leveraging Python and Dash versatility, WPO's team was able to build out a wind curtailments application around this analysis, giving managers, operators, and investors intuitive access to the same insights despite varying rules, conditions and on-site systems for all the wind turbines.

Furthermore, other Dash applications grant views for high-level revenue KPIs or turbine-level conditions, or even for assets' customer invoice management - there's a Dash app for every stakeholder level.

The extensive availability of such rich and usable data has real payoffs. Getting comprehensive, to-the-minute visibility on everything from machine data and environmental conditions to revenue and production impacts has enabled some WPO clients to define more efficient curtailment strategies, all of this resulting in AEP (Annual Energy Production) increase by up to two percent. It also facilitates close cooperation with turbine manufacturers on turbine software updates that benefit the wind industry as a whole. Additionally, WPO Dashboard also makes it easy to proactively assess if a wind farm is infringing on any curtailments, and equips operators and investors with the information they need to address an issue before it reaches a costly litigation or shutdown.

Harnessing the power of Python and Dash

As an independent firm, WPO required tools that would provide a lean but impactful way to deliver advanced analytics across a diverse portfolio for an array of stakeholder needs. Python and Dash fit that need by abstracting away the work of building complex user interfaces, while still enabling WPO to create tailored, custom applications specific to renewables asset management. The result is a robust suite of fit-for-purpose applications that distinguish WPO's services from the competition by optimizing clients' operating strategies, helping reduce costly risks, and ensuring a competitive place for renewable energy in the market.

Want to learn more?

We've just scratched the surface. WPO is using Python and Dash for a range of use cases in renewables asset management. Watch plotly.com/resources for additional user stories featuring their work!

About Plotly

Founded in 2013, Plotly is a data visualization company focused on taking data science out of the lab and into the business. Plotly makes it easy to build, deploy, and hyperscale interactive analytic apps, graphs, and visualizations in any programming language. Plotly's libraries are used by millions worldwide and embedded into mission-critical applications across the Fortune 500. For more information, visit https://plotly.com.

About WPO

Founded in 2008, WPO provides specialist services for over 6 GW of wind, solar, hydro and storage assets in 11 countries with 90 employees present in 36 service points. The covered portfolio has a capital value of € 7bn, generating over € 1bn of electricity sales annually. In addition to technical and commercial management of renewable assets, WPO integrated services also includes technical due-diligence, site inspection, testing, power purchase aggregation and insurance brokerage. For more information, visit https://wpo.eu.