VOTORANTIM ENERGIA'S WIND AND HYDRAULIC POWER PLANTS AT THE USERS' FINGERTIPS WITH ELIPSE MOBILE

Elipse Software's platform allows Votorantim Energia's users to monitor the performances of its wind and hydroelectric plants via tablets or smartphones; operation is no longer restricted to the Operations Center

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Needs

Votorantim Energia is a Brazilian energy company established in 1996 by the Votorantim Group, one of the largest industrial conglomerates in Latin America, to manage the group's energetic assets. Specialized in building and operating hydroelectric power plants and managing the energy supplied to the corporation, its subsidiaries, and other companies, its generating park reaches 2,604 MW of installed capacity, distributed between 33 hydroelectric and five co-generation power plants.

In 2016, the company invested over 360 million dollars in wind energy, building seven wind parks in the state of Piauí (northeast of Brazil) with 198 wind turbines altogether that reach 206 MW of installed capacity. This investment represents 93 MW of assured energy on average, marketed in the 22nd Auction of New Energy, sponsored by the Electric Energy Market Chamber (EEMC).

"This project is a landmark in the history of Votorantim, because it represents our first foray into the wind power market. This new, cleaner energy source, with state-of-the-art technology, has expanded our generation portfolio and diversified our energetic matrix. This is only the beginning of our story in the wind energy market," said João Miranda, Votorantim's CEO.

Being able to control its power generation process in real time, in order to improve the group's assets management, was a key point for the company. To do so, Votorantim Energia hired Energia Automação, which in turn developed an automation application based on Elipse Mobile's platform.

With the solution by Elipse Software, the company was able to provide its operational, management, and executive staffs with a technology that enabled them to oversee the Ventos do Piauí Wind Power Complex and its 17 hydroelectric plants via smartphones, tablets, and notebooks. Both the application and the wind power plants stated operating earlier this year, in January 2018.

System's Architecture

Energy generation at your fingertips: This is the concept behind Elipse Mobile, the application employed in this project by Votorantim Energia. Installed in a cloud-hosted server, the application runs in Windows Server 2012 operating system. The information about the hydroelectric plants and the window park is sent to the software via a couple of Elipse Power servers, another solution by Elipse Software tailored to the energy sector. Both platforms work as a hub for the company's operations center, and the Elipse Mobile interface can be accessed from mobile devices from six different user groups.

Solution

A grand total of 130 Elipse Mobile screens were contextualized to allow Votorantim Energia's water and wind power complexes' power generation to be quickly ascertained. With these screens, users are able to monitor information from several different levels, from the complex's total energy generation to the details in each individual wind turbine, for example. The application's initial screen works as a menu, from where the user can browse either the wind power complex or the hydroelectric power plants, as seen below.

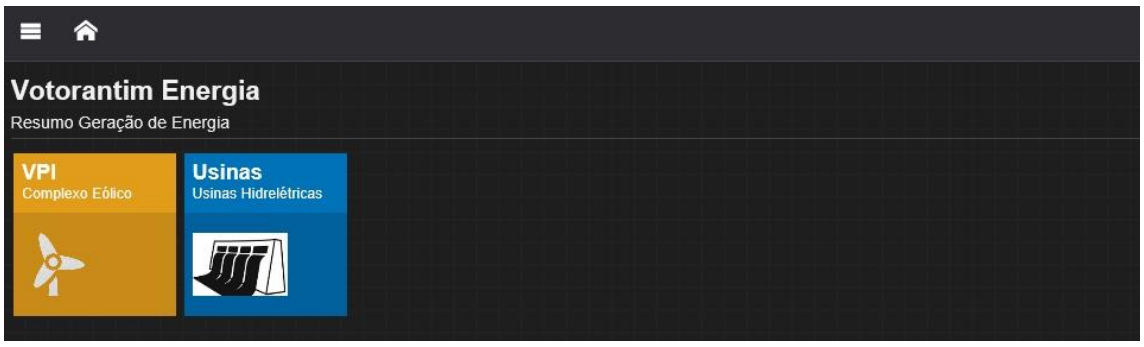

Figure 1. Initial screen

Wind Power Complex Supervisory

By clicking VPI, the next screen will display a summary of the energy being generated at Ventos do Piauí Wind Power Complex. With it, the user will be able to follow all 98 wind turbines in the complex and check their operational statuses, as well as the total amount of power generated by it in the context of its seven wind parks. The number of working wind turbines in each park

can also be monitored on this screen, in addition to the collector substation's energization status and the connection bay with the 500-kv transmission line.

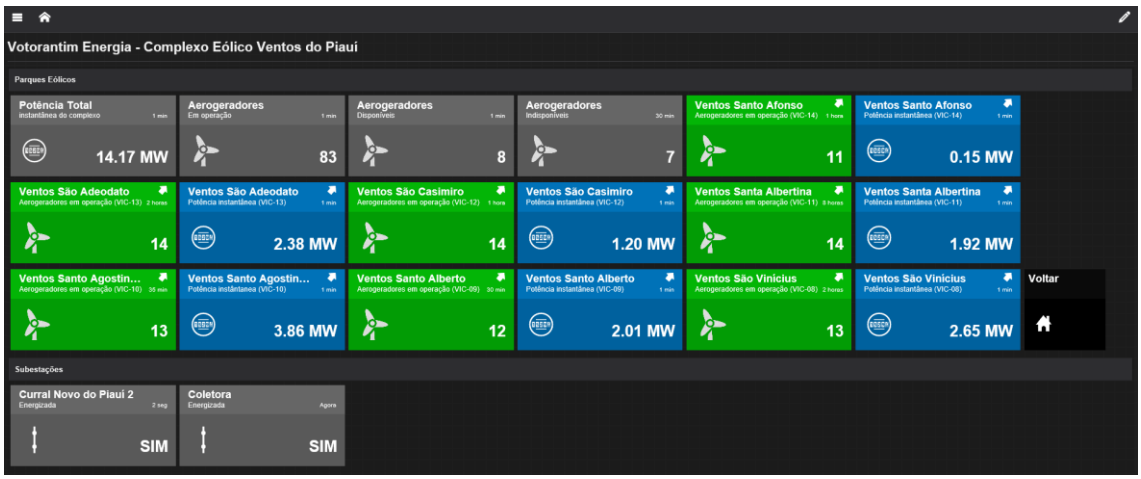

Figure 2. Monitoring Ventos do Piauí Wind Complex

By clicking an icon from any wind park in the complex, the new screen will monitor all its working turbines, their instant active power, the whole generation in the park, and the environmental data providing from the park's anemometer, such as: wind speed, temperature, relative humidity, and air pressure.

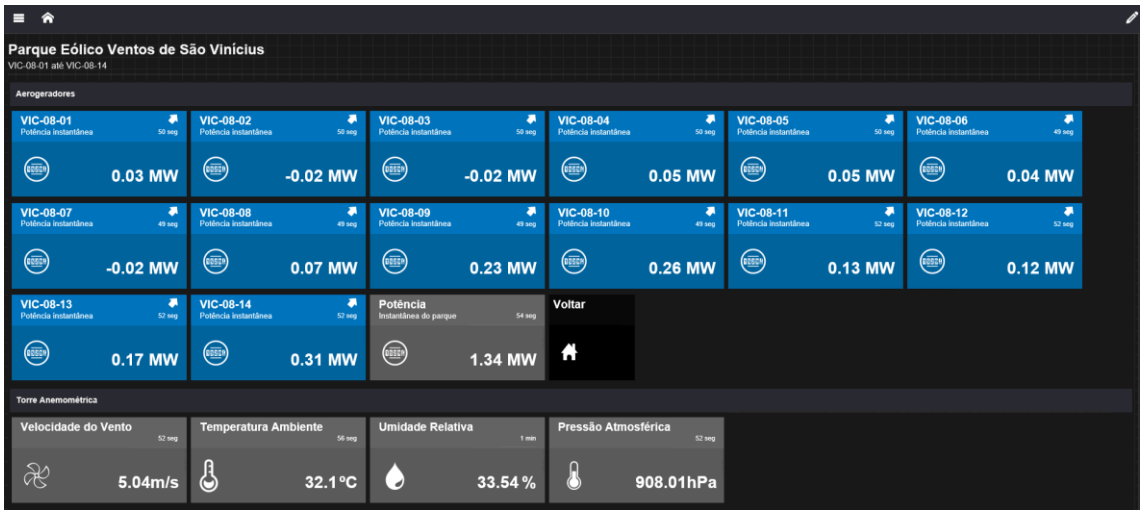

Figure 3. Monitoring Ventos de São Vinícius Wind Park

The last item in the application's wind hierarchy is the individual monitoring screen for each of its 98 wind turbines. To access any of them, the user just needs to click the desired turbine's

icon and they will display all the information on the device, such as: status, active power, monthly availability, and total working time.

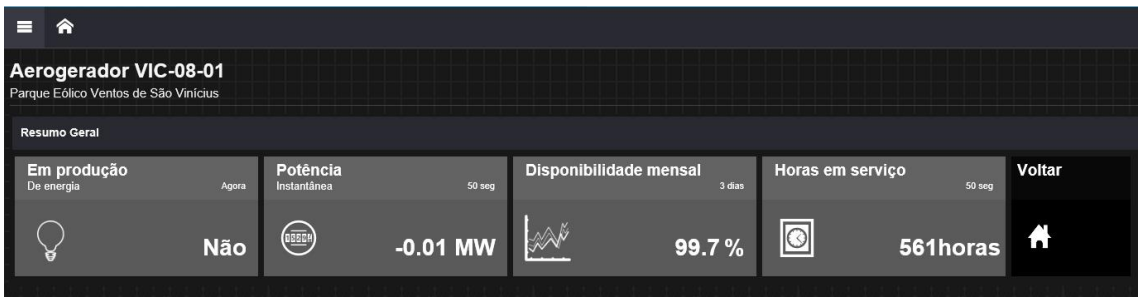

Figure 4. Monitoring one of the wind turbines at Ventos de São Vinícius Wind Park

Hydroelectric Plants Supervisory

By returning to the application's initial screen and clicking <Plants>, the new screen displays a menu for accessing information pertaining to the two groups of hydroelectric plants from Votorantim Energia: both the ones that are connected to the NIS (National Integrated System) and the ones that aren't. On this screen, the user will be able to follow the amount of energy generated by each of these two groups, as well as the overall energy generated by each hydraulic complex.

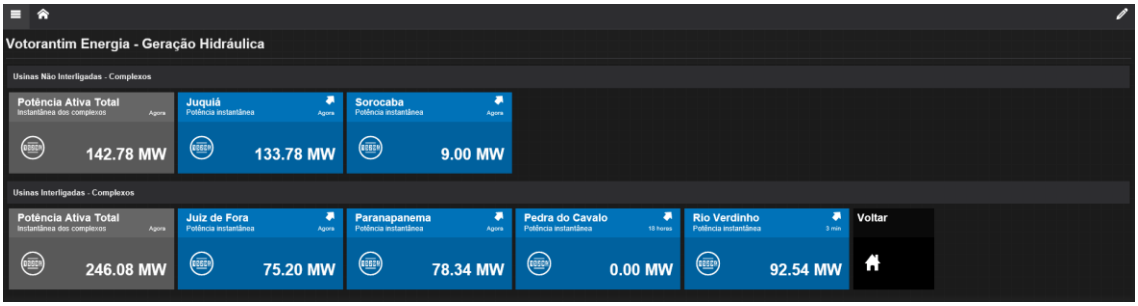

Figure 5. Hydroelectric Plants supervisory

By clicking each group's button, the new screen will display information regarding their hydroelectric plants. With it, the user can monitor both the active and reactive power generated by the complex, as well as the reactive power produced by each plant individually.

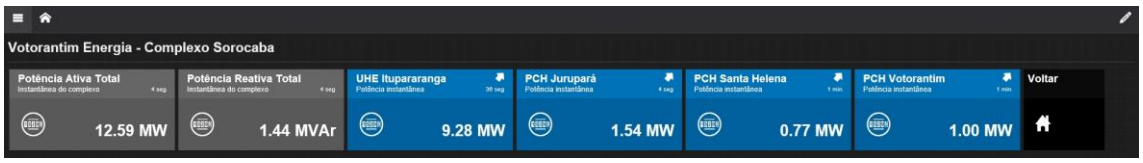

Figure 6. Monitoring Sorocaba Complex

The last item in the application's hydraulic hierarchy is the supervisory for each of the 17 plants in the complex. With this screen, the user will be able to monitor the active and reactive power generated by each plant's generator, its breakers' statuses, and the level in the reservoir supplying the hydraulic turbines.

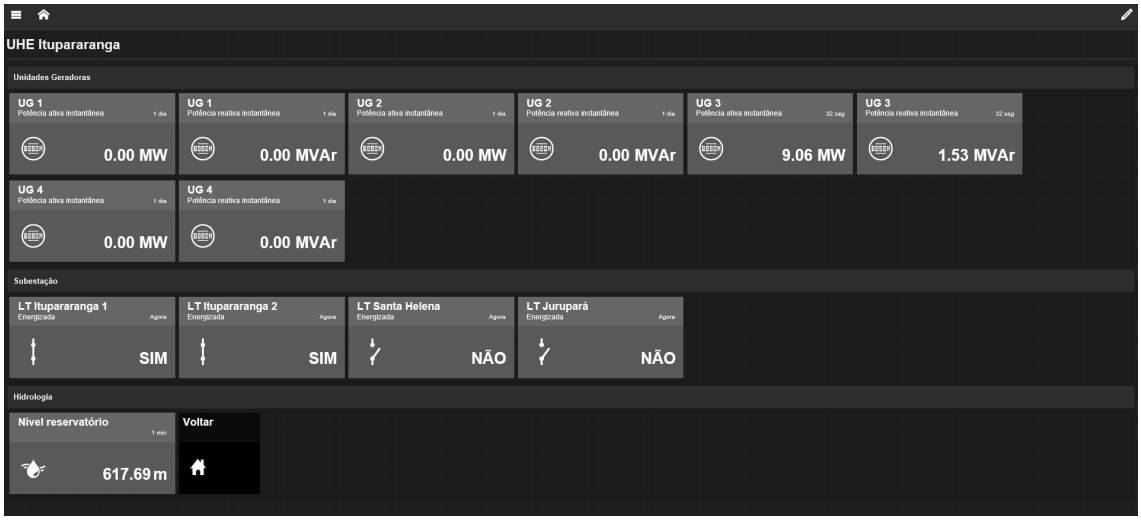

Figure 7. Itupararanga Plant's supervisory

Benefits

According to João Augusto Nogueira Vanzeli, Votorantim Energia's Engineer III, the greatest benefit resulting from Elipse Mobile as their supervisory is that the system's operators no longer have to physically engage with the Operations Center to be able to monitor the complexes statuses.

"Now, with Elipse's solution, I can do this from my home, with a tablet or smartphone connected to the internet," he said.

Otávio Pereira, Energia Automação's Systems Analyst, agrees with Vanzeli: "The application's selling point is its accessibility, the fact that the whole system is now "at our fingertips", via tablets or smartphones. Before Elipse Mobile was adopted, the main information from Votorantim Energia's generation portfolio could only be monitored by the Operations Center or

then locally in each plant. Now, thanks to this solution, we can monitor the KPIs anywhere there is connection to the internet," he said.

Other benefits:

- With Elipse Mobile, other departments from the company, such as Engineering and O&M, can monitor the plants' performance in real time, in order to faster detect and counteract on any issues that are damaging to the power generation, such as any unexpected shutdown, thus improving the operations indicators.
- With this application, Votorantim Energia executives can monitor the machinery availability indicators in order to make better decisions regarding generation and availability goals.

DATASHEET

Client: Votorantim Energia

System Integrator: Energia Automação

Elipse Package Used: Elipse Mobile

Platform: Windows Server 2012

Number of Copies: 6

Number of I/O points: 60,000