Ampla Energia e Serviços

Energy Loss Control and Automated Meter Reading Using EIG's Shark® 100 Meters

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Ampla Energia e Serviços is a private company that supplies electricity to 2.3 million customers in 66 cities in Rio de Janeiro State, Brazil. Ampla is managed by Endesa, a Spanish company active throughout South America.

Ampla's 108 substations are fully automated. The biggest problem the company faces is the disparity between the amount of energy Ampla supplies to its customers and the amount of energy the customers actually pay for. This disparity, referred to as energy loss, amounts to 18% of billable energy. In order to address this problem, Ampla has installed multiple energy meters in all of its substations. These meters are used to measure and compare the amount of energy supplied to customers with the amount of energy that Ampla is paid for.

DIFFICULTY COLLECTING RELIABLE SUBSTATION METER READINGS

Ampla's substations were equipped with both meters and protective devices. However, while the protective devices are set up to communicate with the Remote Terminal Units (RTUs), the meters are not. The communication between the RTUs and the Control Center is facilitated by a mix of optical and radio links.

Figure 1 illustrates the substation communication between protective equipment and RTU. As shown in the figure, the meter is not communicating with the RTU.

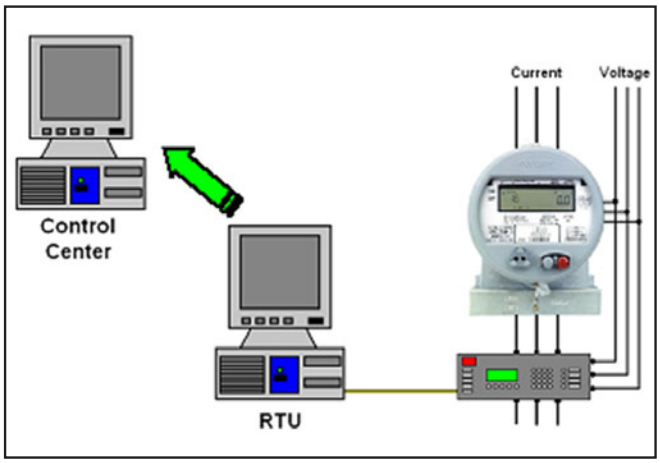

Figure 1

Project Thumbnail

Application
Power Utility Company servicing Rio de Janeiro, Brazil

Equipment
Shark® 100 Meters

Benefits
- Improved electrical monitoring of substations
- Full access to meters' historical data
- Improved energy usage data analysis
- Scalable architecture for simple expansion of system
- Fully compatible with SCADA architecture
- Lower operating costs
- Improved reliability of energy usage data

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The substation meters were made up of multiple models from various meter manufacturers. The meters were set to record energy values every five minutes. As the meter data was not collected automatically, Ampla personnel needed to physically visit the substations in order to download historical data from the meters. Ampla estimated that their monthly cost to collect meter readings was approximately $30 per meter per month, for a total of $36,000 a year per 100 meters.

In addition to the high cost of manually collecting the data, analyzing the data was time-consuming and difficult due to the following factors:

- The meters' data could become lost or corrupted.
- Some of the meters generated unusable files, i.e., some meters generated text files, while others generated Excel© files.

Ampla's Utility operations engineers decided to implement a new process utilizing centralized monitoring systems. Their objective was to allow the meters to be read using the existing SCADA telemetry. A study was done to determine what was required for the new system to work. The study showed the following system requirements:

- Accurate measurement, display, and analysis of energy measurements utilizing one meter model.
- A programmable system able to communicate with the SCADA system using MODBUS protocol.
- Durable equipment that was able to stand up to the rigors of a substation environment.

As a result of their study, Ampla selected the Shark®100 meter from Electro Industries/GaugeTech for their substations. One of the reasons that the Shark® 100 meter was chosen was its accuracy—the meter has 0.2% accuracy (meter accuracy is commonly 0.5%). Another reason for Ampla's choice is that the Shark® meter was found to be fully compatible with the existing SCADA system.

SYSTEM INSTALLATION

Figure 2 illustrates the system architecture implemented as a result of Ampla's study. It shows direct communication between the Shark® 100 meter and the RTU. The connection between the meter and the RTU was accomplished with an RS232/RS485 converter, which made the network very easy to install, as multiple meters could be connected via one converter. This connection is illustrated in Figure 3.

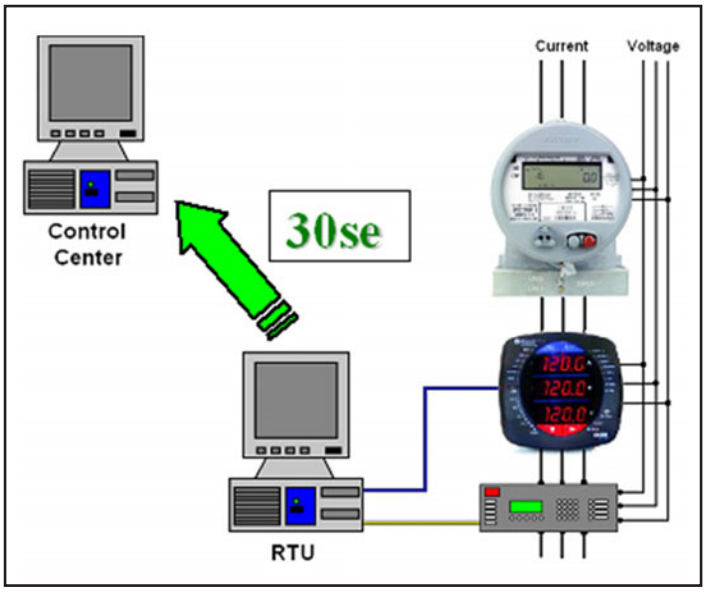

Figure 2

In the new system architecture, the Shark® 100 units served as the main meters, with the old meters being used only as backup. Direct network communication between the Shark® meters and the RTUs allowed the Shark® meters' information to be sent to the Control Center every 30 seconds and recorded every 5 minutes. Each month, the RTU was able to reset automatically the Shark® meter's energy measurements.

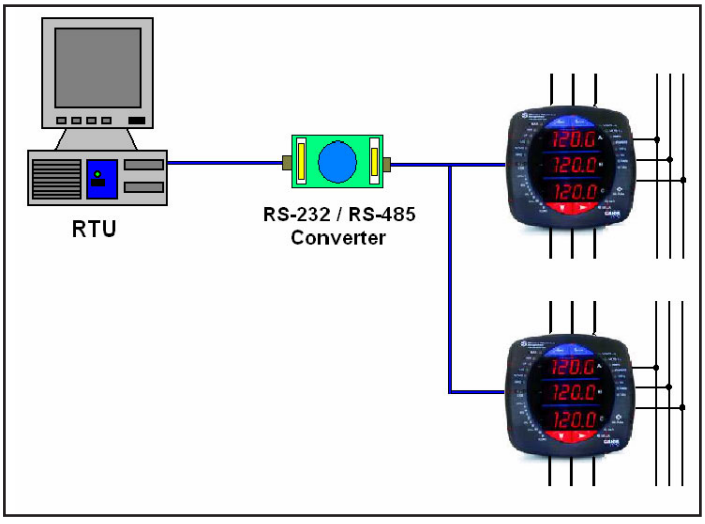

Figure 3

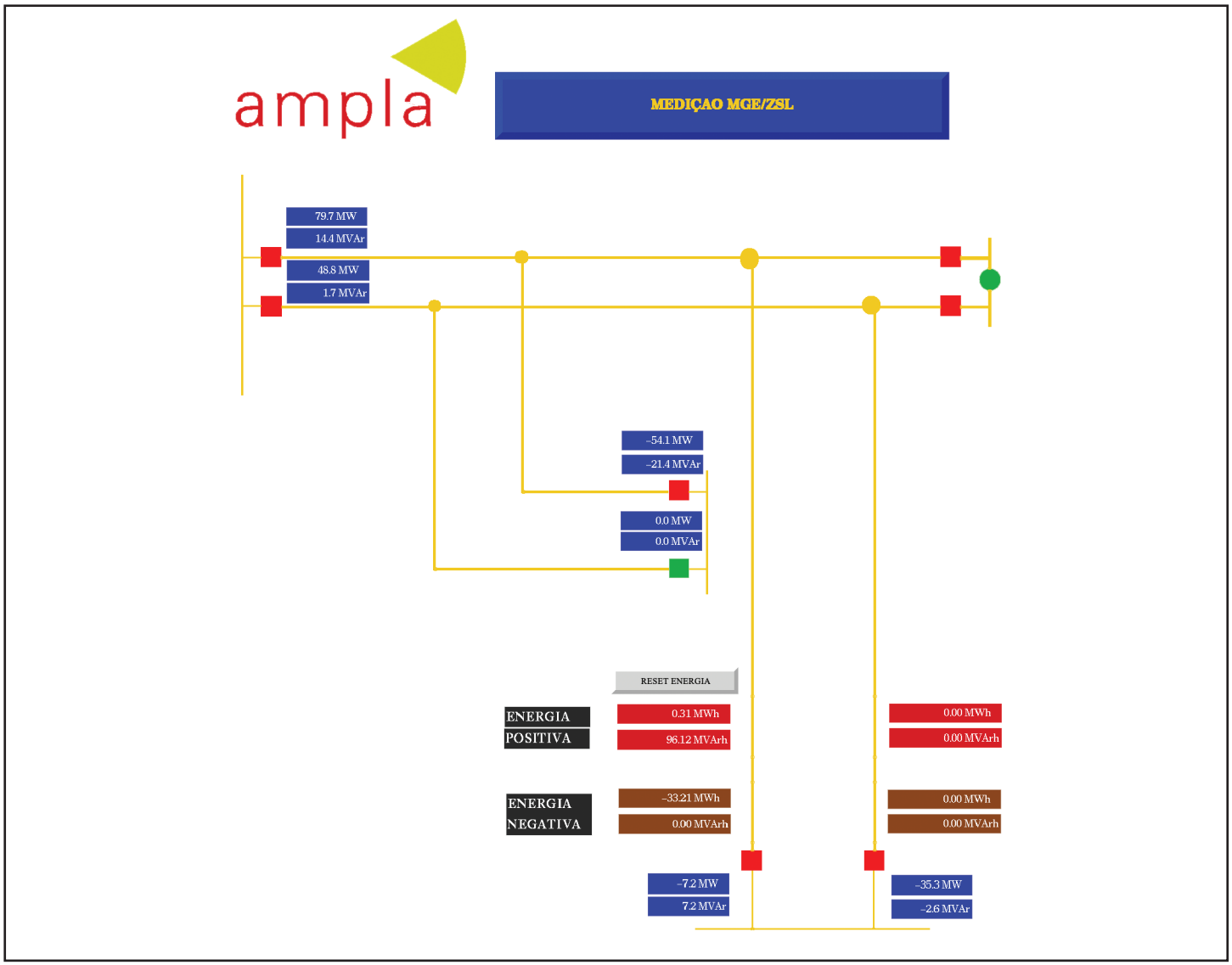

Figure 4

The SCADA diagram for the energy management system is shown in Figure 4. With the implemented solution:

- Ampla engineers are able to continuously compare online the measurements from the Shark® 100 meter with the measurements from the protection systems.
- Positive and negative active energy and positive and negative reactive energy from the Shark®100 meter are viewable along with the power measurements from the protection systems.
- Personalized reports can be generated using a Historical Data Server containing the meters' measured readings.

ADVANTAGES OF THE NEW SYSTEM:

Reliable energy data, personalized reports, and rapid data delivery are some of the advantages of the Shark® metering solution. Because the Shark® 100 meters utilize the most recent technology available and fully support an automated energy management system, they have provided a perfect solution to Ampla's need for energy loss control and automated meter reading.

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