

Monitoring Generation at Salt River Project's Hassayampa Switchyards

CASE STUDY

The Salt River Project (SRP) Agricultural Improvement and Power District is an integrated electrical utility, providing generation, transmission and distribution services to retail customers in central Arizona. The Hassayampa Switchyard (HAA) is one of SRP's 500kV transmission facilities, with 10 bays. Power flows in and out of the yard to and from four different independent power producers (IPPs), the Palo Verde Nuclear facility, and several other substations.

Challenges

SRP faces a number of challenges in managing and monitoring its Hassayampa generation facility. To operate the site economically, SRP needed an energy management system that could provide:

- Affordable combined instrument/transformer loss compensation
- Aggregation and scaling of real-time data that could be pushed to a central RTU
- MV90 integration
- Energy integrators that would operate based on the status of the generator site breakers
- Power factor monitoring
- Advanced security

Solution

An ION energy management system from Power Measurement was chosen to fill SRP's need for integrated, multi-functional monitoring. ION 8400 intelligent metering devices provided all the functionality SRP was searching for, at an affordable price.

Six of the 10 bays in the Hassayampa Switchyard are currently operating. Each bay has several ION 8400 meters including a primary and secondary meter on each metering point for partial redundancy.

Affordable Compensated Values

Each of the generator's outputs needed to be adjusted to allow for transformer loss. Because metering on the primary or high-voltage side of a transformer is prohibitively expensive (as much as US\$250,000 per metering point), SRP required an economical alternative.

The ION 8400 meters chosen as part of SRP's overall ION solution can accurately account for transformer and instrument losses from the less expensive, secondary side of the transformer, using a series of complex algorithms. This saves substantial installation costs without sacrificing accuracy or functionality.

Scaled & Aggregated Real-Time Data

SRP needs real-time data available to different parts of its operations for market settlement and billing purposes, particularly because it is connected to other power-producing facilities, and the usage and output of each must be tracked accurately. Ensuring that the data is available to everyone who needs it can be complicated in a facility as complex as Hassayampa Switchyard.



Application: Transmission facility monitoring

System: **ION 8400™ Meters**

- Benefits:
- Cost-effective bi-directional monitoring
 - Easy MV90 integration



Salt River Project's
Hassayampa Switchyard



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The multiple communications options available through the ION 8400 meters simplified the sharing of information. Using Modbus as the primary communications system, the bays are divided into four Modbus loops. Four ION 8400 meters are configured as Modbus Master devices, with one meter located on each loop to control all the other meters on the loop and its associated generators and merchant sites. These Modbus Master meters obtain real-time information from all meters connected to their Modbus loop and perform scaling and aggregation, then write scaled values to a central data collection point - SRP's Harris RTU, which is also connected as a Modbus slave device.

Not only does this Modbus system simplify the data-collection process, it also provides a valuable backup function. Because the Modbus Master ION 8400 meters store the logged data as well as sending it to the central RTU, if the RTU fails or the communication links are disabled, the data can still be retrieved manually from the individual meters.

Simple MV90 Integration

Like many utilities, SRP uses MV90 as the backbone of its billing system. The ION energy management system can communicate directly with SRP's MV90 billing system. The Modbus Master meters provide revenue data from the points they monitor directly as well as the data from all connected Modbus slave devices to MV90 via the ION protocol. The information can be sent to MV90 at user-defined intervals (in minutes, hours or days), so that it is available whenever necessary for billing functions.

Breaker-Sensitive Energy Integrators

Because the meters gather data for billing purposes, data only needs to be gathered when the merchant sites are drawing power from SRP - that is, when their generators are not producing power. The meters automatically stop and start recording based upon the breaker status of the merchant sites: when the generators go offline and the breakers open, the meters record how much power the site draws from SRP so that they can be billed for use; when the generators go

online and the breakers close, the meters go offline, as the merchant sites produce their own power and it isn't necessary for SRP to monitor usage.

Efficient Power Factor Monitoring

SRP also tracks power factor throughout Hassayampa, using the data as part of its billing calculations for industrial customers. The ION 8400 meters easily monitor both leading and lagging power factor continuously, making the information available for analysis and billing usage through the Modbus communications loops.

Advanced Security

Advanced security is also a crucial requirement of SRP's grid metering system, to ensure data integrity for billing purposes and privacy, because the information provided to each of the generator owners on generator operating costs and profits are confidential.

Summary

With an ION enterprise energy management system, SRP was able to fulfill its requirement for economical and functional metering at the Hassayampa Switchyard. Accurate compensated values and other operational data is collected automatically and made available to multiple users through simple, robust communications channels. MV90 integration means no disconnect between monitoring and billing. Power factor monitoring allows SRP to ensure the quality of the power supplied to the grid. And advanced security features mean everyone can rest assured that the information is going to the right place, and nowhere else.



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