Meter Data Management Agent

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Trimark is a trusted Meter Data Management Agent (MDMA) throughout California and the United States. Our experience and expertise continues to prove valuable to many utilities, power generators and public agencies throughout the West and other areas of the country. We have over 12 years of experience working in the electric power utility and CAISO business environments.

Trimark is responsible for processing data from over 1,000 meters per month that encompass a wide array of loads as well as many generating stations. Our analysts and systems specialists validate all meter data before declaring it ready for settlement or presentation to the end users.

Trimark operates several meter data management systems and understands the requirements regarding meter data reporting for verification of compliance with load curtailment dispatch orders. By leveraging our services in meter data management, you are ensured accurate and timely reporting of meter data to the ISO.

Trimark has an in-house team of data analysts and programmers capable of processing, validating, and publishing any type of metering data using many technologies or techniques including FTP, XML, EDI 867, CSV, MDEF, CMEP SOAP, or other Web Services.

Data Processing and Analysis

Meter Interrogation

We use a variety of communications techniques to communication to electric meters. The meters will be interrogated and data intervals recorded according to the client's needs.

Data Validation

In addition to the industry mandated checks for meter data validity, Trimark also validates items such as meter identity, time drift, test mode intervals, and sum checks. The system parameters within Trimark's meter reading system will be set to flag all raw data containing meter resets, CRC/ROM/RAM checksum error, clock errors, power outages, pulse overflows, parity errors, alarms, phase errors, or critical changes in a meter's configuration.

Meter Data Estimation:

Whenever estimating data becomes necessary, Trimark will first contact the client in an attempt to identify the nature of usage, any special conditions, or independent meter readings taken during the period of missing data. With such information in hand, Trimark will determine the appropriate historical reference period (for example, same time on previous day, previous week, etc.) to use for creating an estimate of energy usage.

	inverter1	inverter2	inverter3	inverter4	inverter5	inverter6	inverter7	inverter8	inverter9	inverter10
DC Input Voltage (V)	498.0	507.0	468.0	493.0	477.0	474.0	513.0	521.0	505.0	465.0
DC Input Current (A)	115.0	98.0	112.0	106.0	107.0	119.0	106.0	101.0	98.0	121.0
DC Input Power (kW)	57.6	50.6	52.6	52.4	51.5	56.3	54.5	53.1	50.1	56.6
AC Output Power (kW)	56.6	50.6	52.1	52.9	49.9	55.6	54.6	51.7	50.2	55.2
Line Power Factor	0.991	0.983	0.986	0.989	0.913	0.989	0.991	0.986	0.986	0.989

Data Presentation, Processing and Format:

Trimark will provide data to the client over an internet based *WebClient* for review and download as necessary. The data will also be submitted to our clients in an acceptable format such as MDEF or CSV as Settlement Quality Meter Data (SQMD) to be used for billing or other purposes. The data is also available to be reported third-parties such as CSI, the local Utility, CAISO or WREGIS.

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For basic O&M monitoring requirements, the Trimark *WebClient* is a browser-based reporting tool where historical generation, weather and performance ratio data is available for on-demand querying and export to Microsoft Excel for offline analysis. *(fig 1)* The *WebClient* receives a data feed on a daily/hourly basis containing generation and weather data from the monitored facility and presents that data in a graphical format. *(fig 2)*

Using the site data, Trimark can perform a *Performance Ratio* calculation. *(fig 3)* We compare actual generation versus the expected generation, including temperature compensation and derate factors for inverter, transformer and wiring efficiency.

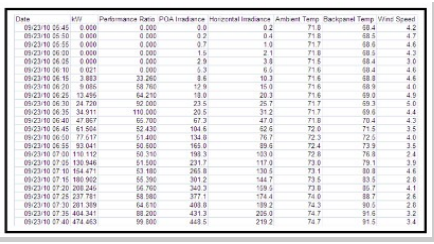


fig 1

fig 2

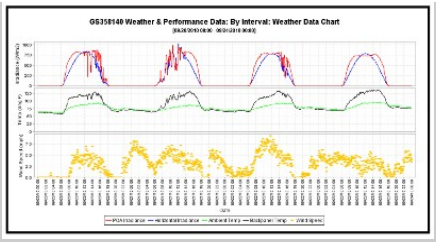
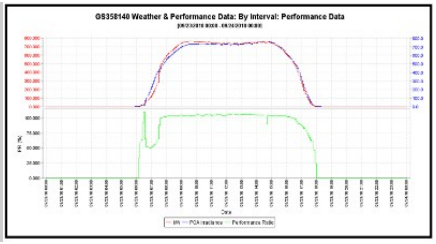
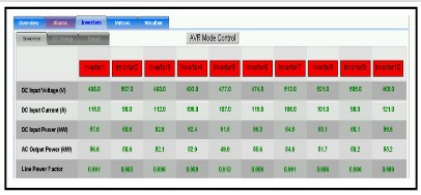


fig 3



Each night, the previous day's data is analyzed for the following conditions and alerts are flagged visually for the viewer: *(fig 4 & fig 5)*

fig 4

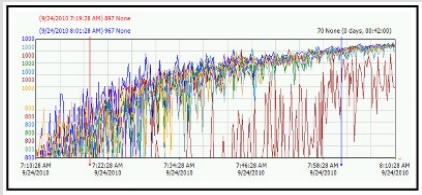


◊ System Not Generating / Data Not Available

◊ Underperforming System
(Based Upon Customer-Defined Low Performance Ratio Threshold)

◊ Overperforming System
(May Be An Indicator of Other System Problems)

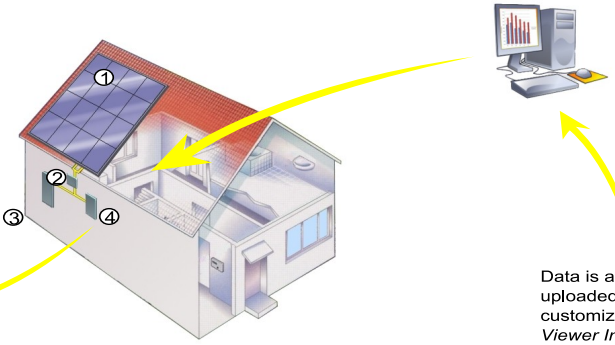
fig 5



In addition to the *WebClient* online monitoring interface, Trimark offers it's copyrighted *Power Viewer* which offers additional data monitoring and customizable interface that allows for incremental data monitoring, report generation, alarms and historical data comparison.

The Trimark *Power Viewer* is a sophisticated monitoring platform offering a wide variety of intuitive display and trend analysis options. *Power Viewer* sites require the installation and onsite commissioning of the *Power Viewer* Gateway. The gateway hardware consists of a Modbus/DNP3 master devise with data logging capabilities, a cellular modem, and an external antenna—all housed in a small wall-mounted NEMA4 enclosure.

① Energy System
② Power Inverter
③ Electrical Panel
④ Trimark Energy Gateway



Data is captured and sent to the *Trimark Server* via a wireless internet connection.

Data is assembled and uploaded to the client's customized *Power Viewer Interface* and available online 24-7 from any PC with an internet connection.

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