

Using Predictive Energy Analytics to Reduce Operational Costs

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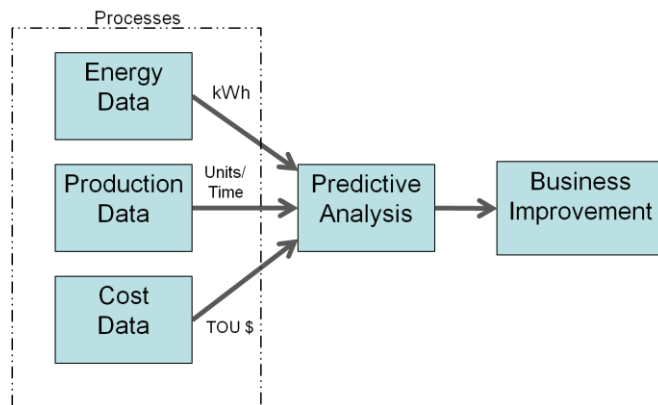
Problem

Energy cost mitigation at a California wastewater facility was extremely difficult due to many factors outside the control of plant personnel, including the dynamics of wastewater flow, energy sources, and the requirements of integrating effluent from multiple municipal agency treatment facilities provided at various levels of water treatment. Dissimilar data collection platforms and “raw data only” reporting compounded the issue.

Goals and Objectives

The primary goal of the project

was to provide the operators with real-time, on-demand energy analytics. These data are acquired from their energy sources, production information



and utility tariff cost structure to reduce total overall operational expenses, provide power quality assessment, and provide clarity of actual energy use to establish uniform energy management requirements.

The steps to accomplish this goal were;

1. Capture real-time energy and process data,
2. Integrate with onsite distributed energy generation (solar photovoltaic (PV) and co-generation from digester gas) and,
3. Perform predictive analytics which provided the operators with immediate feedback for capacity and energy requirements.

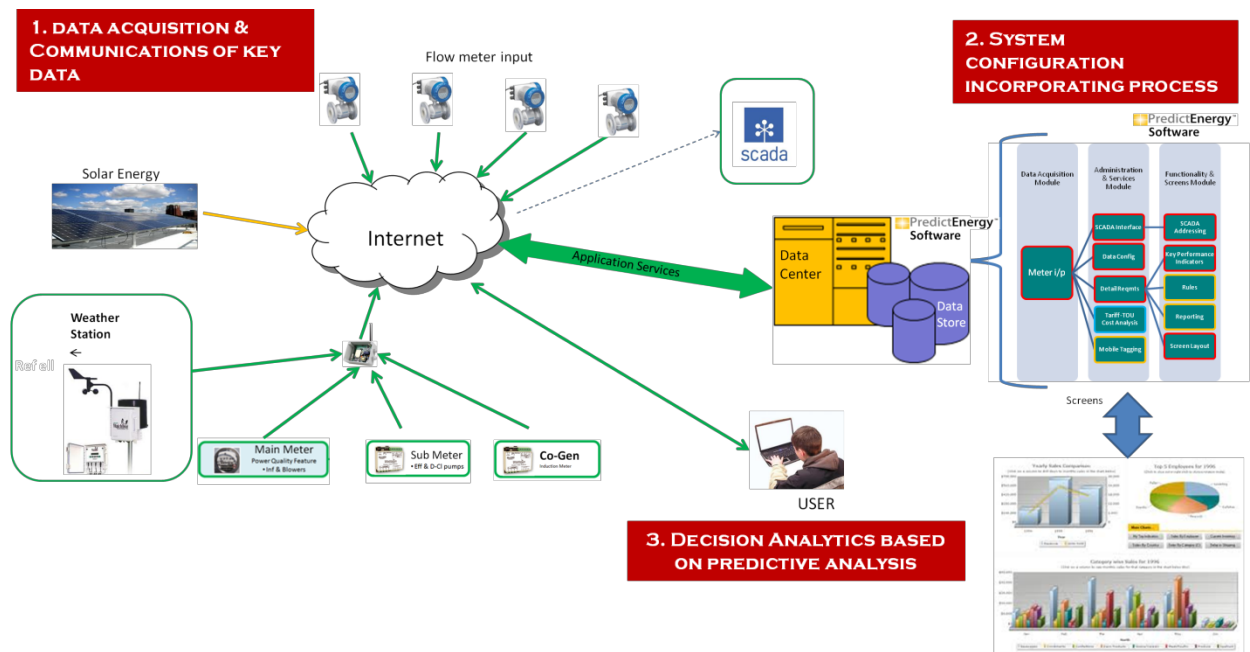
An additional goal was to quantify the energy cost allocation based on the actual utility tariff schedule to each of the four cooperative wastewater agencies for pumping and processing.

The Process and Solution

Existing SCADA and metering onsite was insufficient to collect the required data in a cost-effective, timely and efficient manner. To provide the level of analytics needed, PredictEnergy™ scales and manages data by capturing and developing historical, current and predictive energy data from the utility and distributed energy sources. This information is managed in the PredictEnergy™ data stores. To incorporate the client's business context, the predictive analysis is conditioned by the business and waste management processes of the client. These are the key elements which impact the

energy cost equation, and include specific client business and waste management processes related to their location.

Energy and flow data were installed at key points including main power meter, specific load centers representing the process, PV inverter output, co-gen output, weather station, and SCADA interface. Now, with real-time data available, information could be processed using Helio Energy Solutions predictive analytics software (PredictEnergy™) configured specifically for the client's plant operations. The data acquisition, process inputs and analytics were defined using a series of facilitated requirements sessions allowing the plant operators to identify the key inputs and their relationship to their processes for which they needed visibility.



Energy sources (utility, cogen and solar pv) were paired against energy uses (facility process and member agency facility pumping). The energy analytics used utility tariff

analysis to calculate real-time energy costs for pumping and processing, optimize co-gen energy cost off-set, and quantify the cost avoidance provided by the solar PV.

The Results

These analysis identified opportunities for the operator to shift process loads and energy source usage to minimize both operational expense and energy costs. Energy cost reductions of 3-5% were immediately recognized. Operational cost reduction in the form of process load reduction, man hour reduction and cross billing error reduction were estimated to exceed 15%. Due to the significant cost savings as compared to the nominal cost of PredictEnergy™, an astounding simple payback of less than one year was realized.

Additionally, the operators gained the ability to quantify their service to the other wastewater facilities in the form of real-time flow rate, pumping energy usage and pumping energy costs. This effectively provided feedback to these facilities which eliminated operator man hours for manual raw data collection, utility bill review and evaluation, and usage estimation. Each of the other four facilities gained the potential for their own energy cost savings.

The facility continues to gain operational cost reduction using the homogenized data collection and presentation platforms of their SCADA and predictive analytics toolset.