# UTILITY CONSUMPTION ANALYTICS

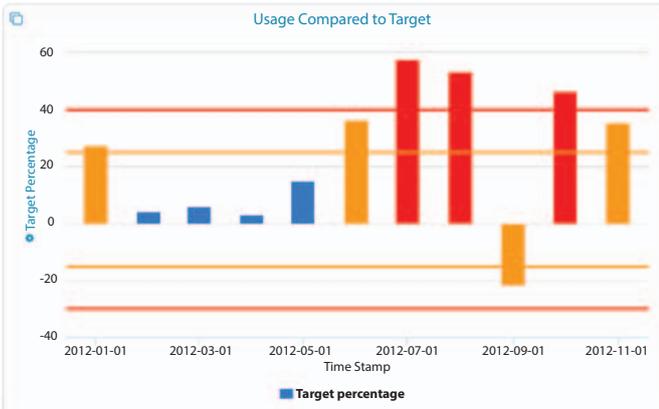## Helping Companies Dramatically Reduce Electricity Costs

**By Ben Tai**

Utility consumption analytics is crucial in the efficient management of manufacturing operations where utilities are the core ingredients for both processing and production. The analytics is so important because the management has to monitor beyond the utility consumption. This prevents waste while identifying potential savings in order to achieve the objective for increasing overall profit. Typically, sensor data from different sources and vendors feed a series of servers with analog information from a wide variety of devices such as meters, valve sensors and thermostats. This data must then be exported, combined, and filtered to reveal insights into utility consumption during the entire manufacturing process. The most commonly seen method among manufacturers to aggregate different source data for consumption goal analysis has been using spreadsheets, which is not just tedious and error-prone but inherently lacking in real-time capability, creating extended periods of limited visibility to the manufacturing process and potentially resulting in needless waste.

Using business intelligence (BI), manufacturing process data such as meter readings can be automatically imported based on a user-defined schedule with a granularity down to the level of minutes. The real difficulty is finding a data analysis platform that is affordable and functional for non-IT professionals such as plant managers. Most BI vendors tout ease of use but the majority are fraught with complexity. Usually ease of use would only refer to IT's ability to administer. There are just very few cloud-native BI tools that don't require a data warehouse or continuous help from IT professionals that are already overloaded with other tasks. Make sure you carefully review required IT commitment. If hardware or software license fees are due upfront, that's a good indication that these will consume IT resources.
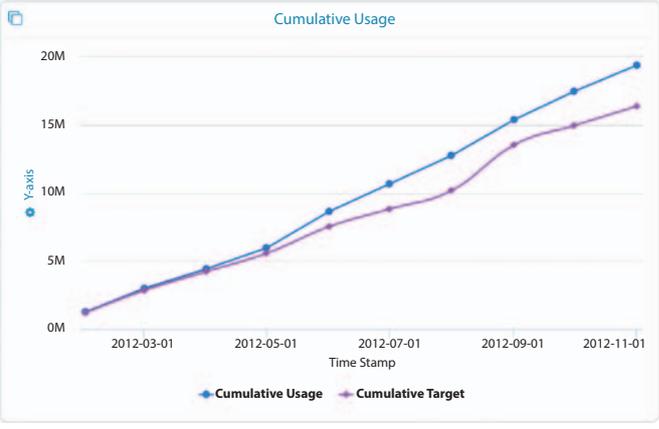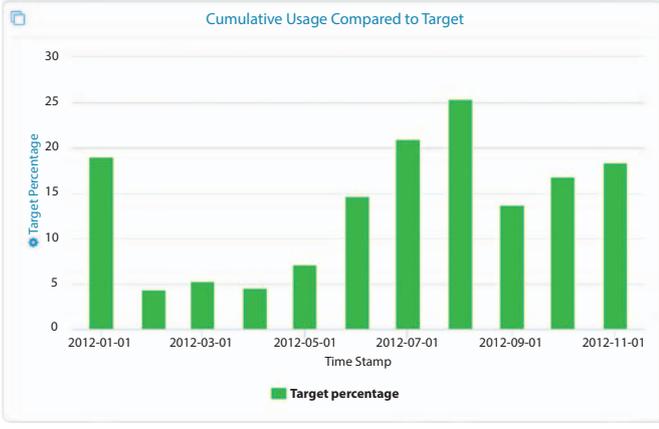
One of the world's largest beverage companies uses self-service BI tool to analyze its electricity consumption. Its electricity meters are wired to PLC devices which then upload readings periodically to its monitoring and data management system. However, typical monitoring and data management systems do not offer analytical capabilities, at least not in a way that non-technical users could utilize, for example, to easily establish and monitor their desired consumption goals. As a result, prior to adopting BI tool, in order to analyze consumption data and identify potential waste, managers needed to export meter readings into spreadsheets, and start the tedious and error-prone manual data processing from there. Due to the massive amount of meter readings being generated every day, manual analysis can never keep up and they are almost always looking at outdated analysis results, not reflecting the current consumption, let alone helping figure out when, how, and where to save in the future. Using the cloud-native self-service BI tool, data import process is automated by directly tapping into the PLCs and acquiring real-time data at minute level intervals. More importantly, the self-service BI tool is designed from the ground up with business professionals in mind and therefore does not rely on any IT centric infrastructure such as data warehouse nor require any programming skill to build analysis. Via the intuitive and easy-to-use UI, managers are able to build their own analysis in a matter of days, easily implementing custom computations based on their own rules of determining electricity consumption goal such as based on the specific product being produced, weekday vs. weekends, seasonal fluctuations, etc. and eventually putting data visualizations onto a dashboard, accomplishing all these without any programming. Editing the consumption goal is also as easy as creating it, allowing managers to quickly perform what-if operations on their analysis and observe how that would affect their future planning. And since all the data and analytical logic is centrally stored and organized in the cloud, users only need to build the analysis once. After that, the dashboard would just automatically refresh and display the latest data with each batch of data import.

By bringing in meter readings into their BI tool automatically (make sure your BI vendor has this capability) and then easily

## Usage Compared to Target

Target Percentage vs Time Stamp (Target percentage)

## Data integrity

| Meter | Total readings | Missing readings |
|---|---|---|
| 3-000-0272-41 | 35140 | 4 |
| 3-005-2430-42 | 35140 | 4 |
| 3-016-3498-57 | 35140 | 166 |
| 3-029-5385-41 | 35140 | 14112 |

## Cumulative Usage Compared to Target

Target Percentage vs Time Stamp (Target percentage)

## Cumulative Usage

Y-axis vs Time Stamp (Cumulative Usage, Cumulative Target)

building what-if analysis based on historical consumption patterns, they are able to obtain real-time insights in their manufacturing processes and identify areas for improvement.

With many BI tools analytical logic can be implemented without requiring any programming. This company is able to put together analysis that determines questionable readings and detects missed readings based on customized criteria. Without any programming, they can continually assess the data integrity of the data streams and tell whether the data collection component is working properly at a quick glance. The threshold for flagging questionable readings is fully customizable thus can be quickly adjusted to accommodate changes in manufacturing procedure. Moreover, the company is also able to set up substitution logic that identifies abnormal readings which are most likely due to device malfunction or meter overflow, and replace those abnormal readings with configurable substitutes which normally derive from average historical readings. So as to avoid the situation where a few enormous large values in the data completely ruin the entire analysis (e.g., by dwarfing rest of the data points on the line chart).

To push analysis automation even further, measurement thresholds can also be set within the BI tool to proactively alert responsible users of worrisome trends in utility usage via emails or text messages. So that managers do not have to stare at computer screens all day long and worried that they would otherwise miss something important. Those alerts can also be acted upon immediately by creating a task in the BI tool and assign it those who are responsible. By utilizing the cloud-native self-service BI tool to automate the entire process from data import, analysis generation, to acting upon the results. The company has made significant improvement on speeding up issues identification process in their utility consumption as well as shortening their

response and decision making cycle to prevent waste and capture savings in utility costs to drive up the profit.

Thanks to the cloud-native nature of the BI tool, utility consumption analytics solutions can be easily rolled out to multiple distributed facilities. Both the data and the analytical logic are centrally managed in the cloud and can be shared securely to authorized user/parties. Centrally controlled data and logic offers a single version of truth eliminating the headaches of spreadsheets with corrupted formulas being routed across departments.

Companies leveraging cloud-native self-service BI for utility consumption analysis are experiencing considerable amount of savings from the real-time monitoring of cumulative consumption on a daily basis and the constant comparison of actual usage vs. goals. Being able to automate the process of data collection and analysis generation creates a real-time defense against waste and inefficiency.

## FURTHER INFORMATION

DrivenBI data analytics products provide data insights to organizations worldwide. DrivenBI is simply a one-stop shop, offering proven data analytics platforms for business users to enable data analytics solutions that can be deployed and accessed via Public Cloud, Private Cloud and Hybrid Cloud.
Contact DrivenBI at info@drivenbi.com http://www.drivenbi.com/

## ABOUT THE AUTHOR

Ben Tai is founder and CEO of DrivenBI
Ben holds Master of Science degree in Electrical Engineering from NYU Tandon School of Engineering, studied American Culture at Columbia University and Business Administration at USC Marshall Business School.