THE HIGH PERFORMANCE PORTFOLIO:

ENERGY TRACKING AND ACCOUNTING

BETTERBRICKS
Bottom line thinking on energy.

SUMMARY:

Knowing how a building uses energy over time – whether over a day or over a period of years – is critical to managing operating expenses and improving energy performance. A variety of tools and resources are available to track and monitor building energy consumption, costs, and other metrics. What are the differences among these different levels of energy tracking? Who should use the information, and how?

At a basic level, reviewing energy bills allows managers to monitor costs. Benchmarking with ENERGY STAR's Portfolio Manager lets management teams identify monthly or yearly patterns and obtain a normalized metric of energy performance. Digging deeper, 15-minute interval data shows whether daily energy performance falls within expectations and begins to identify specific equipment or procedures to target to improve energy efficiency.

A combination of these methods helps building operators and management to identify trends and outliers, and ultimately to enhance energy performance through greater consciousness and awareness – and track how performance relates to a plan of action.

IN DEPTH:

The adage "You can't manage what you don't measure" is apt – knowledge is power when it comes to improving energy performance. Property managers, building operators, asset managers, and owners use a variety of tools to gather data and measure energy performance. This information forms three distinct "levels" of energy tracking, each of which provides insight into certain aspects of energy performance.

LEVEL 1: BILL REVIEW AND PAYMENT

The most basic level is monitoring utility bills, just as you might monitor how much money you spend on gas each time you fill up your car. Utility bills are typically monitored in varying capacities by property managers and engineers.

ELECTRIC BILLS AND LOAD FACTOR

Senior building engineers recommend periodically checking the load factor – the ratio of the actual kWh delivered to a building in a designated period of time to the total possible kWh that could be delivered, based on peak demand. The average load factor for an office building is typically around 50%.

Load Factor = Total kWh Used / [Peak kW Demand x Days in Bill Cycle x 24 Hours/Day]

A load factor significantly higher than 50% for an office building may indicate that the building systems are operating longer than average. As operating hours are reduced or energy efficiency increases, the load factor should generally decrease.

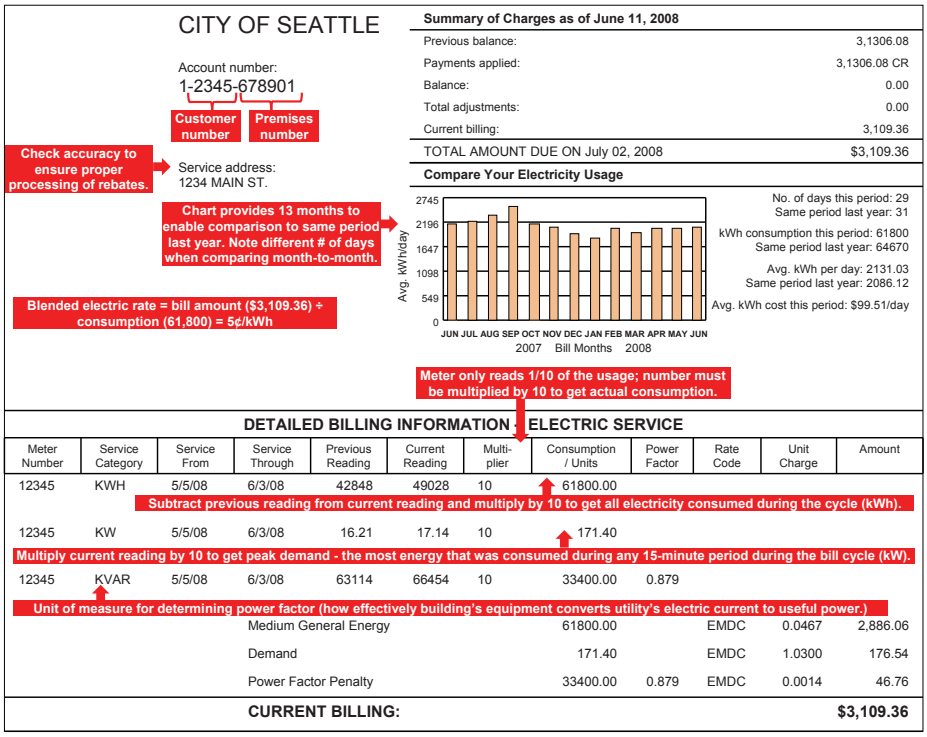
Organizations track billing information at the property and portfolio level; this accounting may occur at the property, off-site at a centralized corporate location, or via a utility billing service provider.

Some companies use advanced software (available commercially or through a utility provider) to view energy information in a comprehensive, interactive "dashboard" format, with meaningful metrics of energy and financial performance. Users can select from a variety of charts, graphs, and reporting formats to analyze utility bill data, often with the help of the software company's technical support or training. Many leading commercial tools link data to ENERGY STAR Portfolio Manager (see Level 2) and enable trend logging (see Level 3), serving as a bridge between utility bill monitoring and more enhanced levels of awareness. Software programs include Advantage IQ, Utility Manager Pro, and Energy WorkSite. The BetterBricks Web site has a list of commercial as well as utility company software tools available in the Northwest.

However utility bills are tracked, it is important that the on-the-ground building staff has access to – and consistently monitors – the data. Avoid finding yourself in a situation where you don't know where utility data is housed or who is responsible for reviewing it. Building staff should regularly compare meter readings to billing data, double-check that your property is on the correct rate schedule, and generally ensure the accuracy of the bills. Further, property managers should track actual costs against budget projections and use this information to identify issues and financial exceptions (when energy costs are significantly higher or lower than the budget line item). Because the utility bills ultimately impact tenant operating expense allocations, and variances directly impact expense stops and base years for new leases, it is important that bills are reviewed and shared with accounting staff and building management.

It's also important to look for trends in both consumption and costs. If costs are increasing but consumption is going down, this signifies an increase in rates, not to be confused with a decrease in efficiency. Many utility providers will compare usage and costs to the same month from the previous year right on the bill; this is a good place to start to identify whether the building is experiencing an upward or downward trend, but it doesn't give the whole picture – for example, extremely hot or cold weather or changes in tenancy may be influencing relative energy performance and should be further investigated.

This example identifies how to interpret some of the information available on a typical electric bill.



Sample Electric Bill Explanation and Calculations

LEVEL 2: ENERGY STAR BENCHMARKING

To address the issues that make consumption and costs by themselves incomplete metrics, the U.S. EPA ENERGY STAR program created the national energy performance rating system. The rating is housed in Portfolio Manager, an online tool that normalizes data for some of the factors that complicate energy consumption (such as weather, occupancy, and building function), generating a 1-100 rating for many types of buildings. The normalization embedded in the rating allows buildings to be compared to other, similar buildings, ensuring that increased air conditioning use during an abnormally hot summer or an increase in occupant density is not interpreted as a decrease in efficiency. At a greater level of scrutiny than keeping tabs on your gasoline receipts, the energy performance rating is similar to measuring a car's miles per gallon rating.

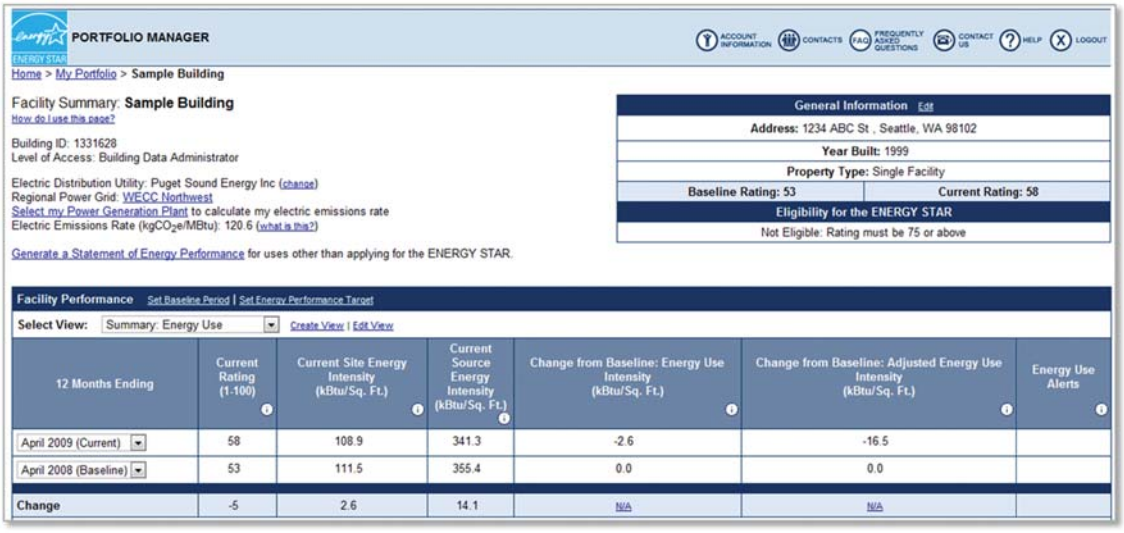
Regardless of whether a building is eligible for a 1-100 energy performance rating, Portfolio Manager provides high-level trending and energy performance monitoring, tracking metrics including greenhouse gas emissions, consumption, costs, weather-normalized energy intensity, costs per square foot, and many more metrics.

The process of entering the necessary data into Portfolio Manager, establishing an energy performance baseline, and monitoring trends is referred to as benchmarking. A range of individuals within a real estate organization may be involved with benchmarking energy performance at a property. Property managers, engineers, and other on-site staff may be responsible for collecting the necessary occupancy and utility bill data.

Once a building is benchmarked, its rating and other metrics are useful for high-level energy performance monitoring and tracking. The data might be shared with asset managers and senior executives to help reinforce accountability for energy performance and compare multiple properties within a portfolio. The data outputs are also relevant to monthly, quarterly, and annual monitoring of energy performance, and savings trends at the property level.

Portfolio Manager is equipped with features that facilitate sharing information, allowing users to:

- Set baselines from which to measure progress
- Create views that show preferred metrics in a certain order



PORTFOLIO MANAGER

ACCOUNT INFORMATION | CONTACTS | FREQUENTLY ASKED QUESTIONS | CONTACT US | HELP | LOGOUT

Home > My Portfolio > Sample Building

Facility Summary: **Sample Building**

How do I use this page?

Building ID: 1331628
Level of Access: Building Data Administrator

Electric Distribution Utility: Puget Sound Energy Inc (change)
Regional Power Grid: WECC Northwest
Select my Power Generation Plant to calculate my electric emissions rate
Electric Emissions Rate ($kgCO_2e$/MBtu): 120.6 (what is this?)

Generate a Statement of Energy Performance for uses other than applying for the ENERGY STAR.

General Information Edit	
Address: 1234 ABC St , Seattle, WA 98102	
Year Built: 1999	
Property Type: Single Facility	
Baseline Rating: 53	**Current Rating:** 58
Eligibility for the ENERGY STAR	
Not Eligible: Rating must be 75 or above	

Facility Performance Set Baseline Period | Set Energy Performance Target

Select View: Summary: Energy Use — Create View | Edit View

12 Months Ending	Current Rating (1-100)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Current Source Energy Intensity (kBtu/Sq. Ft.)	Change from Baseline: Energy Use Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use Intensity (kBtu/Sq. Ft.)	Energy Use Alerts
April 2009 (Current)	58	108.9	341.3	-2.6	-16.5	
April 2008 (Baseline)	53	111.5	355.4	0.0	0.0	
Change	-5	2.6	14.1	N/A	N/A	

Sample Portfolio Manager Facility Summary

- Generate a Statement of Energy Performance summarizing the building's performance in a brief snapshot
- Download an Energy Performance Report, summarizing the performance of a group of buildings

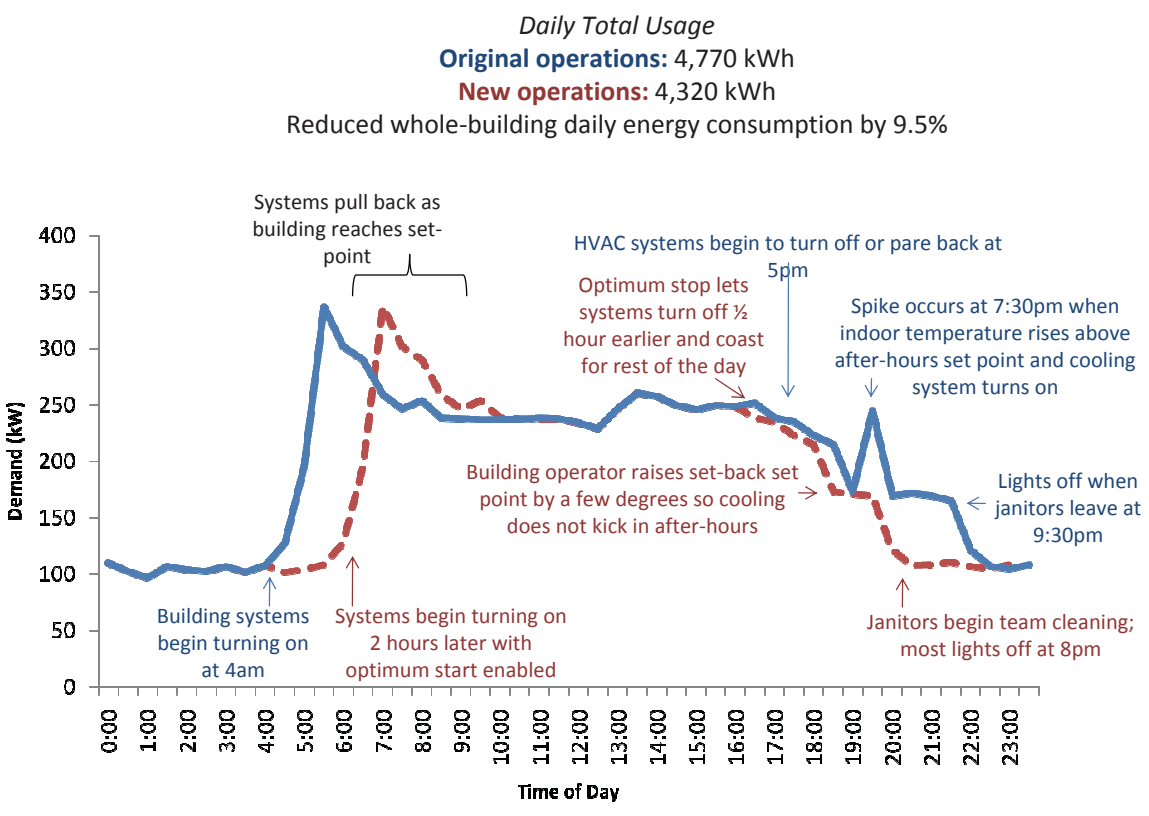
LEVEL 3: TREND LOGGING AND INTERVAL DATA

Zooming in another level from monthly data, real-time metering data (or interval data) may be used to identify anomalies in energy use for quick reaction at the building level on a daily basis. Interval data gives building energy demand over intervals as short as 15 minutes. The practice of using this information to analyze and understand building energy use is known as trend logging. Continuing the car analogy, interval data is similar to the display of real-time information across your dashboard – speed, RPM, temperature, and more.

Trend logging is particularly useful to on-the-ground building engineers and property managers. Graphs of interval data (or load profiles) can help them pinpoint exactly when the building is experiencing peaks in energy use, which set peak demand rates and can lead to identification or confirmation of what is using the energy.

Examples of issues that can be identified are shown on the sample graph below. In addition to the examples on the graph, also look for unnecessary weekend, holiday, and after-hours operation. Staff should be trained to identify problems that may be able to be corrected at little or no cost – since the cause of unusual energy use patterns is often an operational or controls issue.

Sample Weekday Interval Data Graph



This data may be available from the utility company for free or a small fee, sometimes with the installation of a special meter, and in many cases is available to be downloaded at the building operator's convenience from the utility Web site.[1]

[1] A building's energy management system (EMS) may also provide interval data, but due to their complexity, EMS capabilities will not be covered in detail here.

THE BOTTOM LINE:

- Beyond paying the monthly utility bills, managing energy performance requires staying on top of a variety of other information.
- A combination of energy tracking and accounting mechanisms can help you get the whole picture, including:
  - Annual and monthly metrics of costs and consumption as identified by monitoring utility bills
  - Normalized, comparable energy performance indicators accessed through ENERGY STAR Portfolio Manager
  - Day-to-day hourly monitoring, available through interval data
- Different individuals need access to different levels of information, but real estate practitioners should understand all the data sources, where each one flows to, and how they interact with each other. A high performance building needs all three levels of energy tracking.
- Monitoring trends and promptly identifying outliers can avoid potentially costly issues that detract from energy performance, while also highlighting positive trends and quantifying savings from energy improvements.
- Tracking only gets you so far – understand what the data is telling you, and then follow through with actions to improve energy performance – leading to better management of costs.

USEFUL LINKS:

The High Performance Portfolio
www.betterbricks.com/office/framework

Benchmark energy performance with ENERGY STAR Portfolio Manager:
www.energystar.gov/benchmark

To learn more collecting and interpreting energy data, as well as to locate tools for tracking utility consumption, visit the Performance Indicators page on the BetterBricks website:
www.betterbricks.com/detailpage.aspx?id=491

Visit the BetterBricks Building Operations Web site for guidance to improve performance:
www.betterbricks.com/SubHomePage.aspx?ID=6.

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