



New Strategies and Trends for Managing Energy Consumption

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1. Introduction

What if a material supplier called you to offer a permanent 15% discount on one of your main components? Your margins would certainly look better, but could this enable your sales and marketing colleagues to pursue new business with attractive pricing? Well, reducing the energy component of your COGS can do just that. Unfortunately, most manufacturing and industrial operations manage energy as a fixed cost, to be allocated as overhead regardless of actual consumption. This white paper will introduce a concept called ABC4E, or Activity-based Costing for Energy. We'll discuss why current fixed-cost methods of energy management don't lead to this potentially game-changing capability. Several key concepts led to this breakthrough and opportunity.

- Real-time costing of energy usage based on dynamic rate schedules
- Event-based Energy Management which links operational events to energy use
- Using Energy Intensity as a KPI (Key Performance Indicator) to learn true costs of operations
- Adding energy as a variable component of COGS in ERP



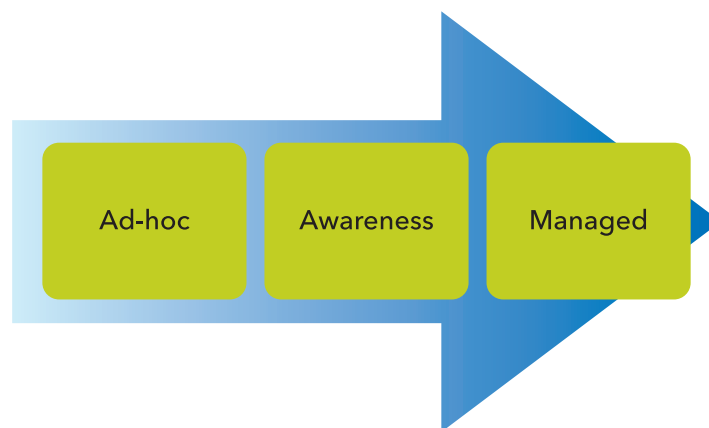
2. State of the Industry

Most global corporations and large regional companies publish a Corporate Responsibility Statement (CRS) to their shareholders and community. Stating long-term goals for reducing energy and water use is a common theme of sustainability. Each organization determines how to accomplish their goals and report progress. As the corporate initiatives roll down through the organizations and business units they become part of annual operating plans and are often included in the rewards system for executives and managers. Eventually, they reach the execution state where a baseline is determined and improvement is expected and measured.

3. The Energy Management Journey

As in any human endeavor, energy management becomes an organizational and personal journey. After many client engagements, we've found a wide range of progress organizations are having through this journey. Separating the journey into three stages provides a good framework to discuss a current state of Energy Management maturity.

Stages of Energy Management



Ad-Hoc

In Ad-hoc energy management, the obvious low-hanging fruit for energy savings has been addressed. This includes lighting, efficient motors and drives, and tuning of the HVAC operation. There is a presumed payback but it's difficult to tell if the efforts work and if the benefits are sustainable. There also may be unintended consequences that negate the achieved benefits. Some measurement of energy use occurs, often via online utility data or manual meter reading. Progress may also be driven by a specific individual — and is then subject to decline if that person leaves the position or the organization.

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Awareness

At this stage, the organization has real-time energy data that can be used to understand how energy is used, patterns of usage, and cause / effect. This real-time data can also be used to establish the baselines for improvement and follow-on measurement. More realistic allocation of cost can occur and deviations to plan are easily detected and investigated. The Awareness stage also enables experimentation with operational changes and a rigorous ROI validation protocol.

Managed

In this stage, energy management is an organizational competency. Everyone in the organization understands how wasting energy results in measurable costs and affects the bottom line as much as wasted material or unplanned labor. Energy becomes a component of the variable cost structure and is managed like a material. This is ABC4E.

4. Moving from the Ad-Hoc stage to Awareness

In the journey from Ad-hoc to the Awareness stage, a common situation occurs with site-level sub-metering. Sub-metering provides the basic measurement of energy usage and is essential. Once the meters are installed and commissioned, a large quantity of data is captured. This data can be used to improve the efficiency of energy distribution and quality. Seeing demand profiles and knowing total consumption is useful, up to a point. What time-based energy data does not provide is specific usage for each energy consuming activity and a direct path to ABC4E.

Invensys is in a unique position to capture energy usage and pre-contextualize the data with other real-time data using the ArchestrA enabled System Platform. For example, we can relate electrical, gas, water, steam, air, and chilled medium consumption to any fixed or variable period event. Identifying data like production ID, item ID, and raw material ID may also be added along with process set points, and process values. Access to production results (units produced) provides **real-time energy intensity**, another unique capability of the Invensys solution.

Once this data is collected and contextualized, it is available for real-time visualization, KPI dashboards, cost reports, business intelligence, and mobile awareness through various Invensys products. Deviations from plan will trigger alarms and also initiate human integrated workflows to mitigate energy waste (including demand charges) and manage SOPs for preventive and corrective actions.

5. Achieving the Managed Stage of Energy Management

An organization that has reached the Managed Stage will use the contextualized data to create energy targets for each energy intensive operation or process. This goes far beyond daily, weekly, and monthly targets and puts the information into the hands of those who can make a difference. Recording the energy consumption for every batch, production order, cleaning operation, or plant startup elevates energy intensity to an indispensable operational metric. A proven energy management solution will enable a data driven approach to your energy cost reduction and sustainability initiatives.

6. How do I begin?

Discuss your energy management journey with us. We can help you understand your current stage and suggest actions to move you toward your goals. Our products, services, and partners will give you a clear path.



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