

# Energy productivity measurements



Alex von Braun in a recent paper, **How to Measure Energy Productivity**, highlights the importance of new technology that allows for more accurate measurement of EP.

The advances in energy monitoring systems see EP being measured more accurately through frequent data reporting. This, Von Braun says, allows for **granular examination of operational integrity**, while **wireless, self-powered sensors** are designed for **easy installation and execution**. The result is a lot of game-changing information – so much, in fact, that it can be overwhelming to even decide where to begin or how to comb through it all.

The new technology that can measure energy consumption continuously on any piece of equipment or area means that a more comprehensive picture of energy consumption can be measured. This enables organisations to better assess where EP can be improved.

**‘No matter what the KPI or managerial approach, energy productivity calculations – and the underlying energy insights – help shine light on parts of an organisation that managers would otherwise be dumb to. Even so, you shouldn’t pat yourself on the back after arriving at a blind calculation for energy productivity. That’s where the real work begins. Starting from that calculation, you have all the pieces of the puzzle. You still have to put them together,’**

Von Braun, says.

**Measuring energy productivity** as a standard-setting benchmark across all types of industries calculates an **organisation’s output, revenue, or profit per unit of energy**. ‘This breaks down how much energy is costing an organization relative to its output. The resulting numbers provide key metrics against which to assess the organization’s energy consumption: is this healthy energy productivity, or does usage need to increase or decrease? Just like a driver can operate a vehicle according to certain basic principles to improve gas mileage, energy productivity shows managers how to steer their businesses to optimize energy usage’, writes Von Braun.

So, how do organisations measure energy productivity? Von Braun presents what he calls a simple formula for calculating energy productivity. **‘Take a metric against which to measure productivity and divide that metric by the number of kilowatt hours (kWh) consumed. This ratio is called the normalisation of energy productivity and it reflects a blind energy measurement for a facility’s most basic functions, before taking variants and specifics into account.’**

For organisations spread across multiple campuses or multiple production lines, those location-specific measurements can then be compared against each other to calculate an ‘ideal’ energy productivity standard, he says. **A common benchmark for normalisation is square footage**, but this metric can be whatever makes the most sense for that particular operation or industry. Other common denominators include the **number of employees**, the **amount of revenue** generated and the amount of **profit** earned.

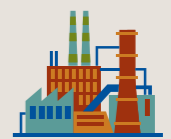
Just how managers choose to measure energy efficiency can depend on the nature of the enterprise. Von Braun points out that in a **hospital** – a multi-faceted, high-energy facility – managers might choose to measure energy productivity in a number of ways. **‘Energy productivity can be calculated per-patient-per-day-of-occupancy, per available bed, per hour of operating room time or even by number of CAT scans performed. A hospital trying to reduce energy spend per bed and one looking to increase efficiency through its equipment use would calculate energy productivity differently and arrive at different operational conclusions depending on the calculation methodology,’** he writes.

This approach may differ with that of a **cement manufacturer**. **‘Taking the different material costs and multiple sub-processes into account, a cement manufacturer may not benefit from a single energy productivity calculation based on square footage or number of employees. Each process, from the rock-crushing to the time spent in a kiln, could have its own energy productivity measurement, nestled under a larger umbrella.’**

Von Braun says that while the calculation alone may be simple, calculating EP is more complicated. How **energy productivity is calculated** and carried out depends on the needs of the **industry and the outlook of the people making the decisions**.

Von Braun gives the example:

**‘Optimised energy performance in a hospital setting looks completely different from operational efficiency in a factory – so a great deal of customisation is required to establish the most meaningful key performance indicators.’**



In order to find the most meaningful key performance indicators (KPI) once energy productivity is established a number of factors have to be considered. Just how EP can be measured, and its impact on KPI, differs across various industries.

The energy productivity calculation can also be influenced by who’s conducting it. Generally, there are three different parties who examine an operations energy usage, says Von Braun, these are **energy managers, operations managers and financial professionals**.

‘All three have different methodologies and end goals when looking at energy productivity and energy KPIs. An energy manager may review energy usage by category, such as lights or machinery, while an operations manager is more interested in the relationship between energy spend and total production or throughput, and a financial professional is interested in a more straightforward consumption/spend approach,’ Von Braun points out.

**‘The new real time device level energy data technology has improved our ability to measure EP and allows us to build a clear picture of a business’s energy usage and operational health.’**