

Fact-sheet - How to monitor the energy consumption?



What is the objective?

The term “Energy” covers all types of energy sources: electricity, fuel used for on-site transport, energy for supply to equipment and boilers (e.g. coal, coke, wood, fuel-oil, propane, LPG); and other forms of energy (e.g. steam and compressed air)¹.

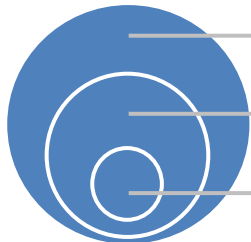
Why the energy consumption of the factory has to be monitored?

- 1) To get a clear picture of **the energy use breakdown** in the factory and to **identify hot spots to save energy**.
- 2) To **calculate the indicators** such as “average electricity consumption per unit of product produced” and
 - **Measure** the energy savings achieved month by month or year by year;
 - **Compare** it with the average in the industry. This indicator helps the production site to know if its performance in terms of energy consumption is above the average (means savings are possible) or below the average (already a good performance).
- 3) To **calculate the Greenhouse Gases (GHG) emissions** related to the energy consumption so the carbon footprint² of the site is known.



How to achieve this objective?

Step 1: Install electricity meters to track the different uses of energy in the production site. Where energy meters should be installed? By order of priority:



1. **Factory level**: meters for total energy supply. Example: meter at electricity supply point(s)
2. **Section/process/utility level**: meters for different production sections, Effluent Treatment Plant (ETP), offices, etc.
3. **Single machines level**: meters for machines with high energy consumption

Step 2: Install steam meters (if relevant) at the boiler(s) level to start (then at pipelines level and equipment level). Compressed-air flow meters can be necessary as well if compressed-air is produced on-site;



- Regularly check the **calibration**³ of the meters;
- Make sure a regular general **maintenance** of the meters is ensured.

Step 3: Write a procedure about how to take the readings from the meters and how often (daily for example);

Step 4: Appoint an employee⁴ to:

- **Take the readings** from the meters and to **collect** from the energy bills the data about the energy consumption (ex: bill for natural gas purchased) and ask him to report the data in a dedicated notebook;
- **Compile** the monthly data in a file indicating clearly the energy consumption for each type of energy used in the factory (electricity, steam, natural gas, diesel, etc.).

¹ Source: GSCP_ **ENVIRONMENTAL IMPLEMENTATION GUIDELINES** - OCTOBER 2010.

² **Carbon footprint**: according to the UK Carbon Trust, a 'carbon footprint' is "the total set of greenhouse gases (GHG) emissions caused by an organization, event or product.

³ **Calibrate**: to check a measuring instrument to see if it is accurate (Source: Cambridge Dictionary). The calibration of an instrument/tool assures that the measurement errors are minor (the error range is kept within the desired limits).

⁴ The environmental manager can appoint an employee for the readings to take and data to report, then he or she should be in charge if the steps 5 and 6.

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Step 5: Analyze the energy consumption (compare the consumption month by month and monitor the indicators “electricity consumption per unit of product produced”, “natural gas consumption per unit of product produced”, etc.);



Compare your factory’s performance with the average performance in your industry if data are available. See for example, data for the textile industry⁵.

Step 6: Calculate the Greenhouse Gases (GHG) emissions of the factory if requested as per law or by your customer.



Common non-compliances

No analysis of the electricity consumption

The factory keeps the electricity consumption records, day by day only, and there is no indicator “electricity consumption per unit of product produced” calculated and monitored on a monthly basis.

The factory explained they have implemented energy savings practices but there is no calculation of the kWh saved so there is no evidence of the effectiveness of the actions implemented and the factory cannot communicate on the energy savings targets met.

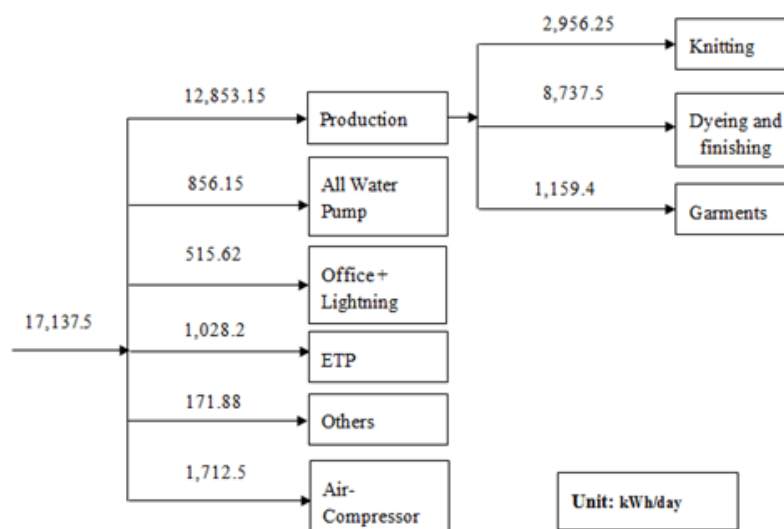
Not all the sources of energy are monitored

The factory keeps only the electricity consumption records but there is no record of the steam consumption and natural gas consumption. The factory is therefore not able to monitor the energy use breakdown. If the steam consumption is not monitored and not analyzed month by month, the factory might not notice an excessive steam consumption due to a steam leak (for example).



Good practices

The electricity consumption of a factory can be monitored for different sections and uses to get the diagram as below which clearly shows **the energy use breakdown** in the factory and helps to **identify hot spots to save energy**:



Electrical Energy Balance Diagram

⁵ Water consumption average in textile industry: 111 L/kg of fabric
 Electricity consumption average in textile industry: 0.75 kwh/kg of fabric
 Steam consumption average in textile industry: 9 kg/ kg of fabric
 Source: International standards as per IFC PaCT (Partnership for Cleaner Textile) programme