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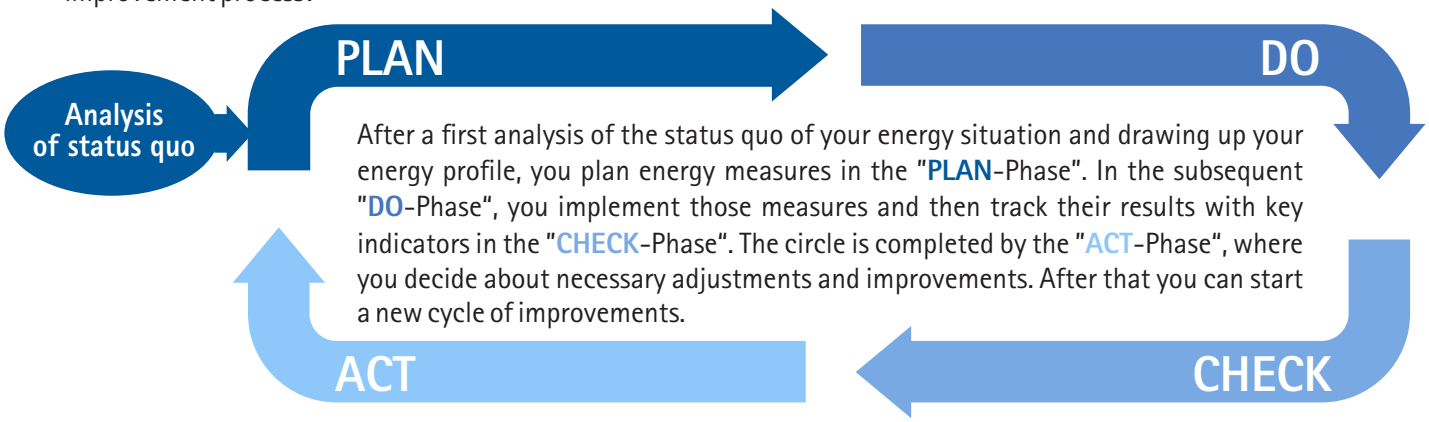
European EnergyManager

ENERGY EFFICIENCY FACT SHEET METAL PROCESSING

This fact sheet provides you with an overview of how to quickly and easily reduce the energy consumption in your business and how to become more energy efficient. It gives you advice on how and where you can begin, including expert recommendations for energy efficiency measures. The fact sheet is structured according to the four phases of a continuous improvement process:



PLAN: Analyse your current situation & plan efficiency measures

STEP 1:

Determine and collect energy data

Where do you find energy data for your business?

- Invoices for electricity, gas, district heating, diesel etc.
- Records of meter readings
- Additional data from energy provider – either upon request or via internet customer portal
- Possibly readings of individual devices
- Estimations (based on equipment list)

STEP 2:

Develop an equipment list and identify your main consumers

Document the type and number of your main devices with the following information per machine:

- Age
- Rated power
- Operating hours
- Actual power

In metal processing, most energy is commonly used in the following areas. You can focus on these first:

- Heating and process heat
- Electric motors
- Lighting
- Compressed air

Expenses for reactive current can also be considerable.

STEP 3:

Create your energy profile

With the help of indicators for your sector (see page 3) you can make an initial estimate of whether potentials for improvement exist for your business. If your electricity supplier provides load profile data (e.g. 15-minute intervals), you can track energy guzzlers during off hours and optimize the connected load.

STEP 4:

Plan energy efficiency measures

A list of measures relevant for metal processing can be found on page 2. An energy check or audit carried out by an external consultant can help you evaluate your overall situation, choose which measures are economical for your business and propose a suitable order for the implementation. Inform yourself about the availability of financial support for the consultant costs and for investments!

Also, compare energy prices from different suppliers.

DO & SAVINGS TIPS: Get active, implement measures

Experts recommend first implementing the so-called "low hanging fruit" measures. These are mostly organisational measures that are associated with relatively small changes in system settings, processes, or staff behaviour. They require little or no investment (e.g. optimisation of the temperature level in the heating system or of pressure in the compressed air system, switching off equipment when not in use). They can serve as a basis for further improvements that require investments.

The following energy saving measures address major energy uses in metal working:

Heating
- Optimise the temperature level
- Optimise settings according to operating times (summer & winter, weekend, night set-back)
- Respect the periodic service intervals for the heating system
- Check heating system (e.g. dimensioning, insulation of pipes)
- Use of thermostatic radiator valves
- Separate heating circuits, if required, and control them individually
- Use circulation pumps with speed regulation
- Consider draught proofing windows and doors, or replacing them with energy efficient ones
- Insulate external walls and top ceiling
- Choose heating system according to company's needs

Compressed air
- Adjust pressure level to necessary minimum
- Regularly control and optimise pressure level
- Ensure the system is shut off outside production hours
- Do not use compressed air for cooling or cleaning
- Regularly check for leaks and have them repaired
- Dimension compressed air system according to needs
- Use short and straight piping system with low-loss coupling
- Keep compressor idling low
- Consider heat recovery from compressors

Lighting
- Ensure regular cleaning of lamps
- Enable separate lighting of specific zones and task lighting
- Use lighting control strategies such as scheduling, occupancy sensors, dimming etc. to turn lights off or down when not needed
- Make greater use of daylight
- Install reflectors
- Install energy efficient lamps (change to T5-Technology, electronic ballasts, LED)

Reactive current (compensation)
- Clarify whether reactive current is charged
- Consider installation of power factor correction

Mobility
- Optimise travel routes for deliveries
- Optimise use of load space
- Employee training on fuel-saving driving (up to 10% savings!)
- Check and adjust tire pressure regularly
- Evaluate using different vehicles for delivery to near vs. distant customers
- In case new vehicles are purchased: take alternatively powered ones (electric, hybrid, CNG, biofuels) into consideration

Organisational measures
- Consider energy efficiency as a criterion for all new purchases. For instance, the initial purchase price of an electric motor accounts for less than 10% of its life cycle cost whereas operating costs including energy make up 90%.
- Train and motivate employees to save energy
- Compare prices offered by different energy suppliers

Electric motors, drives
- Switch off outside production hours
- Switch motors on and off according to needs (with control)
- Use appropriate control strategy, e.g. variable speed drives
- Ensure regular maintenance
- When purchasing new motor: mind the engine efficiency, dimensions, power, transmission losses and possibilities for variable speed control.

CHECK: Identify your indicators

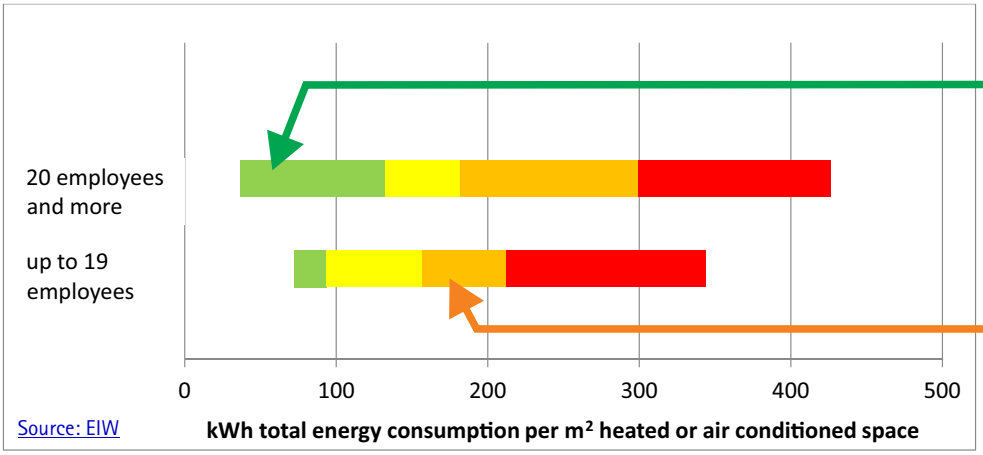
Sectoral benchmarks or indicators allow you to make an initial comparison of your business's energy consumption with that of other metal processing companies. Later, you can view the development of your own indicators over time and thus measure the results of your energy efficiency efforts.

How to calculate an indicator is explained below, using as example two indicators based on a sample of Austrian small and medium sized metal working businesses. You can find additional indicators here:
http://eurem.net/display/eurem/Metalworking

To calculate your total annual energy consumption, add up the consumption of the individual energy sources (electricity, natural gas, heating oil, diesel etc.). Make sure you always consider the same period and convert to the same units (kWh).

TOTAL ENERGY CONSUMPTION PER FACTORY SPACE

$$\frac{\text{yearly total energy consumption in kWh}}{\text{heated or air conditioned factory space in m}^2}$$



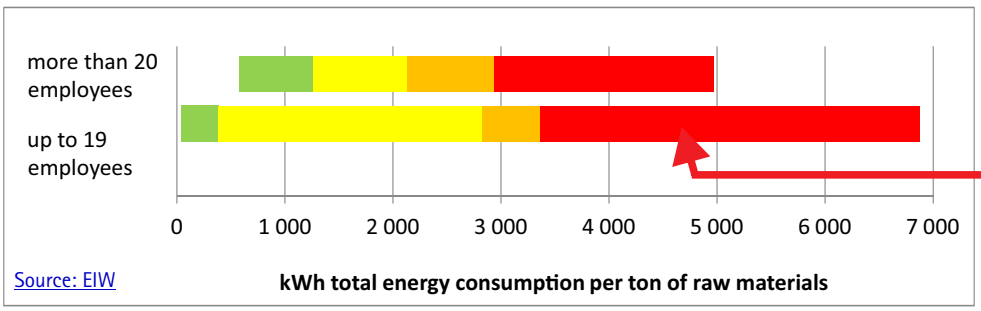
If you are in the GREEN area, then you probably use energy efficiently. You have no immediate need for action, but think about further improvements nevertheless.

If you are in the YELLOW-ORANGE area, then you probably have savings potentials. Inform yourself and plan efficiency measures.

Example: Your total annual energy consumption amounts to 420 MWh, your factory space is 1200 m². This results in 350 kWh total annual energy consumption per m² factory space. This means, for example for a business with more than 20 employees, that the value is rather high compared with similar sized companies in the sample and potentially big savings are available. Keep in mind, however, that factors such as subsector and product range, climatic conditions, or capacity utilization affect these values and therefore they can only serve as a first rough comparison value!

TOTAL ENERGY CONSUMPTION PER RAW MATERIAL PROCESSED

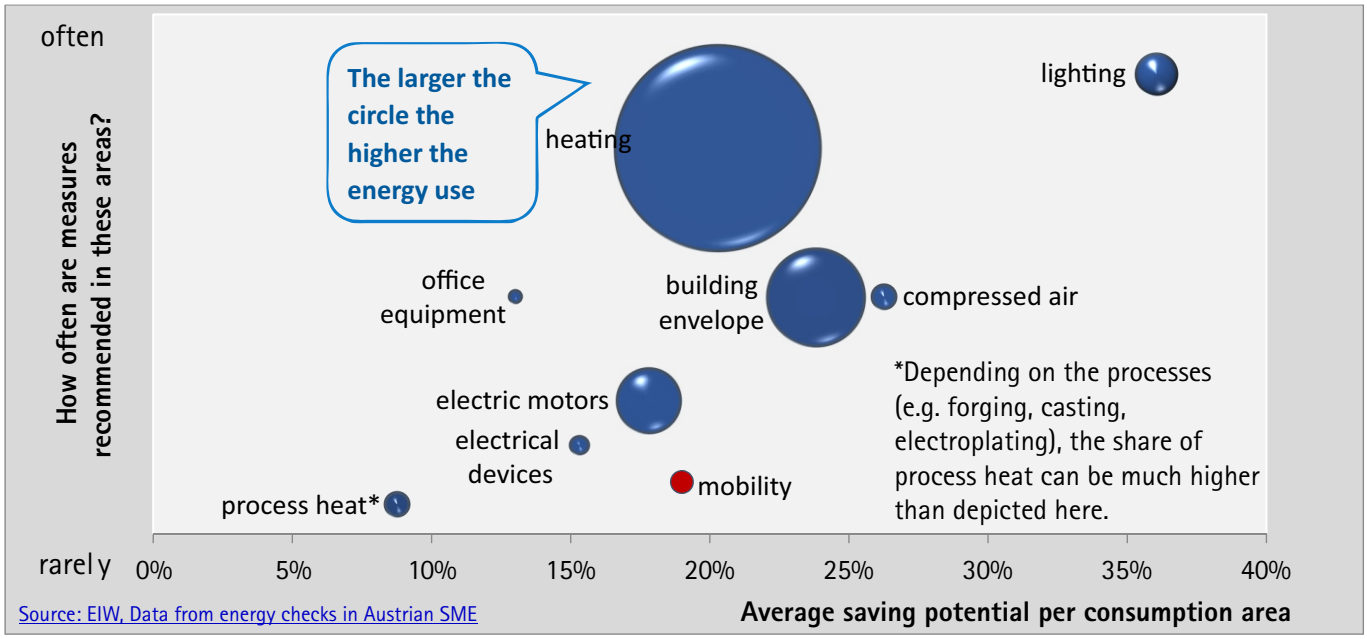
$$\frac{\text{yearly total energy consumption in kWh}}{\text{raw material in t}}$$



If you are in the RED area, then this could be an indication of high potential savings. Localise inefficiencies in your business and implement concrete measures.

ACT: Adjustments & further improvements

When you have successfully implemented the chosen activities, decide whether further measures or adjustments are needed. The following graph shows how often experienced energy consultants have recommended measures in what areas, and the average savings that were expected in these individual areas. For example: measures in lighting were very often proposed, the saving potential here was on average 37% of the energy use for lighting. The small diameter of the circle illustrates, however, that only a small part of total energy consumption is used for lighting.



The involvement of your employees is essential for the energy-efficient operation of your business. Value internal communication highly, inform about energy saving behaviour and about reasons for any changes in procedures, invite suggestions, monitor compliance, communicate and provide recognition for successes. This helps to ensure that efficient use of energy becomes routine and energy consumption is reduced in the long term.

Additional information

- For additional sector specific resources, including success stories of businesses that have saved energy and costs, see http://eurem.net/display/eurem/Metalworking
- To find out more about opportunities to improve your energy situation, you can also contact the EUREM Provider in your country (http://eurem.net/display/eurem/Training+Providers), or an energy agency (http://managenergy.net/energy_agencies) near you.

This factsheet is also available in Bulgarian, Czech, German, Polish, and Romanian with country-specific additional information and contacts on the Sector Corner.

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