

4 - Checklist

4-1 Checklist for the workshop

- Check all workshop equipment:
 - Overhead projector and/or video beamer;
 - Flipcharts (including paper, pens and stickers);
 - Slide projector (if required);
 - Video recorder (if required);
 - Lighting;
 - Electricity supply.
- Check unwanted noise sources (e.g. windows, air conditioning, overhead projectors, etc.).
- Check if setting of tables and chairs is suitable (U-shape or island-shape better than typical class room).
- Prepare and check equipment for exercises.
- Organize transparencies and/or slides.
- Prepare yourself for the topic and the teaching units.
- Invite all participants.
- Clearly indicate time, place and date.
- Fix the agenda.
- Prepare a list of the participants.
- Make the agenda visible (e.g. on a flipchart).
- Fix times for starting, lunch, breaks and end (and stick to them as far as possible).
- Think of name cards, if required.
- Feedback session: encourage participants who are quiet, stop participants who are speaking too long.
 - Give clear instructions for group work, exercises and homework, also considering time.
- A workshop with interactive training units should not have more than 25 to 30 participants, ideally 10 to 20.
- Do moderations and presentations in pairs.
- In a series of workshops, have one contact person who is participating in all events.

4-2 Checklist for company work

 <p>Tips for energy saving measures</p>	
Current situation	Measure/strategy

Functions and competences are not clearly defined, energy relevant issues are not efficiently controlled (e.g. energy consumption of a new machine).	Set up an organizational unit "Energy".
No energy saving measures are implemented in the company.	Provide specific training.
High power is coupled with low efficiency, heat sources and cooling units are standing too close to each other.	Introduce production planning with regard to energy efficiency.
Energy consumption and costs are not continuously recorded and controlled.	Implement energy accounting.
High specific energy consumption of the plants, old technologies.	Determine energy indicators.

High SO ₂ , dust or NO _x emissions, no renewable energy sources.	Change to environmentally friendly fuel.
High demand for warm and hot water also in summer.	Introduce solar energy.
High power price, low continuous power.	Implement load management.
High costs of reactive power.	Implement reactive power compensation.
High electricity costs compared to other companies in the sector.	Negotiate prices with energy providers.

High demand of thermal and electric energy at the same time.	Implement combined power-heat plants.
Low efficiency, high temperature of exhaust air, no flue gas evacuation, badly adjusted burner.	Check the boiler.
The heat demand has significantly changed in recent years.	Adjust the burner (change the nozzles).
The heat exchangers of cooling units are not cleaned, the cooling temperatures are not checked, the location is badly ventilated.	Check and service the cooling units.
Losses in the air-pressure system due to leaks, location close to a heat source, no filter maintenance.	Check the air-pressure system.

High energy consumption in spite of low production (e.g. at night or weekends).	Insulate the steam pipes, maintain/renew the condensate discharge.
See chapter 4.3.2.	Boiler/steam
High energy consumption at weekends, no zoned control possible, no thermostat valves, no seasonal adjustment of the room temperature, temperature is not lowered during the night, heaters are covered and hidden.	Improve the heat control.
No automatic gates, windows and doors are in bad condition.	Diminish the transmission loss.
High temperatures, no water saving fittings, no insulation of pipes.	Improve the warm/hot water system.

 <p>Tips for energy saving measures</p>	
Current situation	Measures/strategy
Air conditioning: too much air penetrates from outside, there are sources of heat and humidity in the air-conditioned area, no sun-protection equipment, no adjustment to demand.	Optimize the air conditioning control and avoid sources of heat and humidity in the air-conditioned area.

Volume of air flow is not controlled, insufficient insulation, old processes (convection instead of infrared drying).	Optimize the process heat plants.
Waste heat and wastewater streams at different temperature levels are not used, waste heat generated by cooling units is not used.	Check the use of waste heat.



Checklist

4 – Energy analysis

The space in cooling units is badly utilized, the temperature is lower than necessary, no cooling curtains, interruption of the cold chain, heat source close to the cooling spots.	Optimize the use of the cooling units.
---	--

The intake fence and nozzles of electric drives are not regularly cleaned, the engines mostly run at partial load.	Check the electric drives.
Ventilators and pumps consume a high volume of electricity and are not adjusted to demand.	Build in a frequency converter.

The plant is older than 10 years, no adequate lighting system, no zoned control.	Optimize the lighting system.
No transport concept, no control of the existing motor pool and routes, no transport by ship or railway, public transport is not used.	Optimize transport.

Conversion table of common energy units of the energy sources in [kWh]

1 m ³ natural gas	9.4 kWh	1 kg wood air-dried	4.3 kWh
1 l heating oil	10.0 kWh	1 m ³ wood chips (softwood)	870 kWh
1 kg heating oil	11.9 kWh	1 m ³ wood chips (hardwood)	1 250 kWh
1 kg black coal	8.1 kWh	1 GJ district heating	277.8 kWh

1 Watt = 1 Joule/s

1 kWh = 3 600 kJ

1 000 J = 1 kJ

1 000 W = 1 kW

1 000 Wh = 1 kWh

1 000 kJ = 1 MJ

1 000 kW = 1 MW

1 000 kWh = 1 MWh

1 000 MJ = 1 GJ

1 000 MW = 1 GW

1 000 MWh = 1 GWh

Energy consumption indicator for different building

Energy indicators in kWh/m² a (without warm water use)	Administration building	Administration building (air-conditioned)	Storage, garage
Old building	150	175	140
Old building after renovation	100	110	100
New building - minimum values	95	95	85
Reference values – new building	65	65	60

Source of reference values: Swiss Handbook of Energy (Schweizer Energiehandbuch)



Efficiency and burning time of different lamps

Type	Efficiency (Lumen/Watt)	Burning life (hours, approx.)
Light bulbs:		
Standard	Up to 18	1 000
Halogen	Up to 30	2 000
Discharge lamp: mercury steam-high pressure lamp	Up to 60	10 000
fluorescent lamp	Up to 80	6 000
fluorescent tube	Up to 100	10 000
Halogen-metal steam lamp	Up to 100	7 000
Sodium-high pressure lamps	Up to 130	10 000

Source: Swiss Handbook of Energy (Schweizer Energiehandbuch)