Trainer Instructions: Monitoring Equipment

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Title	**MONITORING EQUIPMENT**
Objective	To obtain an understanding of monitoring instruments used in industry, including the main types, what they measure, and how to operate them.
Minimum duration and approach	▪ A1 session (1.5 hours), including the quiz ▪ Recommended approach: spend up to 1.5 hours to go through the PowerPoint presentation. Depending on how much time is left, either go through the quiz as a group or ask participants to complete the quiz on their own before going through the answers. ▪ Presentation: 67 slides ▪ Textbook chapter: 26 pages
Contents	▪ Electrical measuring instruments ▪ Combustion analyzer ▪ Manometers ▪ Thermometers ▪ Water flow meters ▪ Speed measurement ▪ Leak detectors ▪ Lux meters
Assessment of participants	▪ Pose questions during the presentation. Some suggested questions are included in the trainer notes underneath each slide. ▪ Quiz 1: *Match the monitoring equipment with the parameters measured* ***Name of the equipment*** *1) Clamp on power tester* *2) Combustion Analyzer* *3) Manometers* *4) Thermocouple and Infra red thermometers* *5) Ultrasonic Flow meters* *6) Stroboscope* *7) Ultrasonic leak detector* *8) Lux Meters* ***Parameters measured*** *a) RPM* *b) Illumination Levels* *c) Liquid flow in pipes* *d) Voltage and Current*

	e) Compressed air leakages *f) Pressure head* *g) Carbon dioxide* *h) Temperature* ▪ Quiz 2: *Name at least one monitoring equipment you would need to conduct an assessment of the following equipments/area:* - *Cooling tower* - *Motor load survey* - *Boiler* - *Furnaces* - *Insulation Survey* - *Compressed air system* - *Lighting Survey* - *Air conditioning plant* ▪ There is no workshop exercise for this session.
Other comments	▪ This session does not cover a specific type of energy equipment but explains the different monitoring instruments that can be used to measure a range of parameters, which are needed to assess the performance of energy equipment and the energy savings after options have been implemented. ▪ Monitoring instruments are best explained when demonstrated. ▪ If due to time limitations it is not possible to allocate a full session to monitoring equipment, it is possible to explain monitoring instruments as part of the energy equipment sessions as follows (slides will need to be moved to the respective energy equipment sessions) - Combustion analyzer: boilers session, furnaces session, or fuels and combustion session - Manometers, ultrasonic leak detector: steam session or compressed air session - Thermocouple and infra red thermometers, clamp on power tester: electricity session - Ultrasonic flow meters: cooling towers session - Stroboscope: electric motors session - Lux meters: lighting session