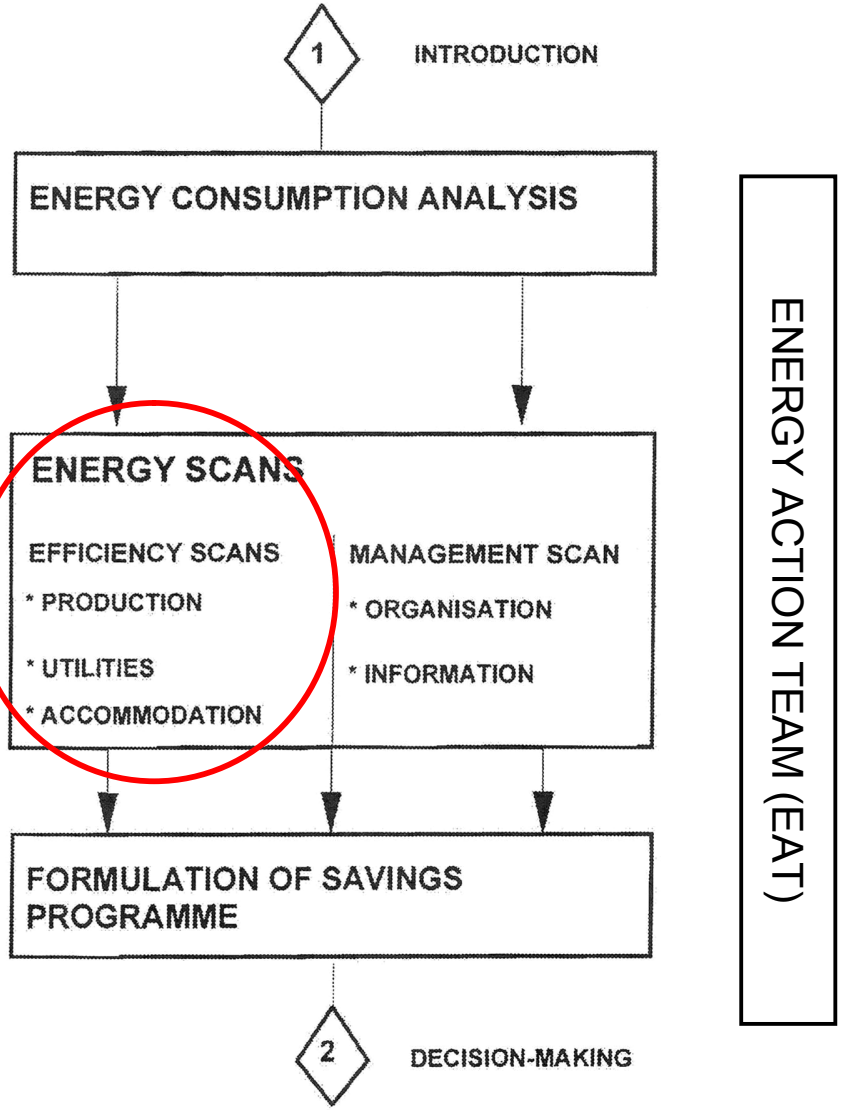

1
INTRODUCTION
ENERGY CONSUMPTION ANALYSIS
ENERGY SCANS
EFFICIENCY SCANS
* PRODUCTION
* UTILITIES
* ACCOMMODATION
MANAGEMENT SCAN
* ORGANISATION
* INFORMATION
FORMULATION OF SAVINGS PROGRAMME
2
DECISION-MAKING
ENERGY ACTION TEAM (EAT)

Efficiency Scans

OBJECTIVE OF EFFICIENCY SCANS:

- to identify energy saving options on basis of the main ECA findings
- to guesstimate or quantify the percentage of energy-efficiency improvement of identified measures and projects

TYPES OF EFFICIENCY SCANS:

- General Scan (based on Process-Input-Output Model) (Handout: "QES 4. General Scan")
- Production or Utility Scan (for groups of similar processes like drying or heating)
- Specific Scans (for specific equipment like furnaces or pumps)

Efficiency Scans

PROCEDURE OF EFFICIENCY SCANS:

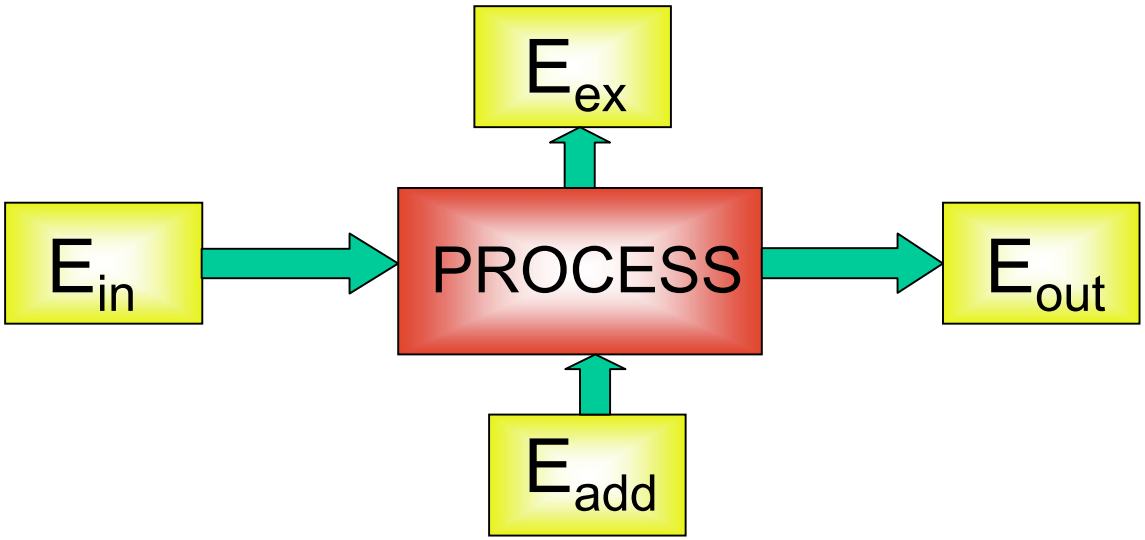
- Systematic brainstorming of reduction options according to procedure and/or questions of Efficiency Scan Handbook
- Reporting of generated ideas without discussion
- Evaluation and ranking of options (longlist => shortlist)
- Quantification of energy saving of all individual options from shortlist
- Rough evaluation of technical and economic feasibility of all individual options from short list

Note:

Pragmatic demarcation is crucial for effective mix of scans

Efficiency Scans

GENERAL SCAN BASED ON PROCESS-INPUT-OUTPUT:



E_{in} : Energy Content of incoming mass flow (products, gases, water, etc.)

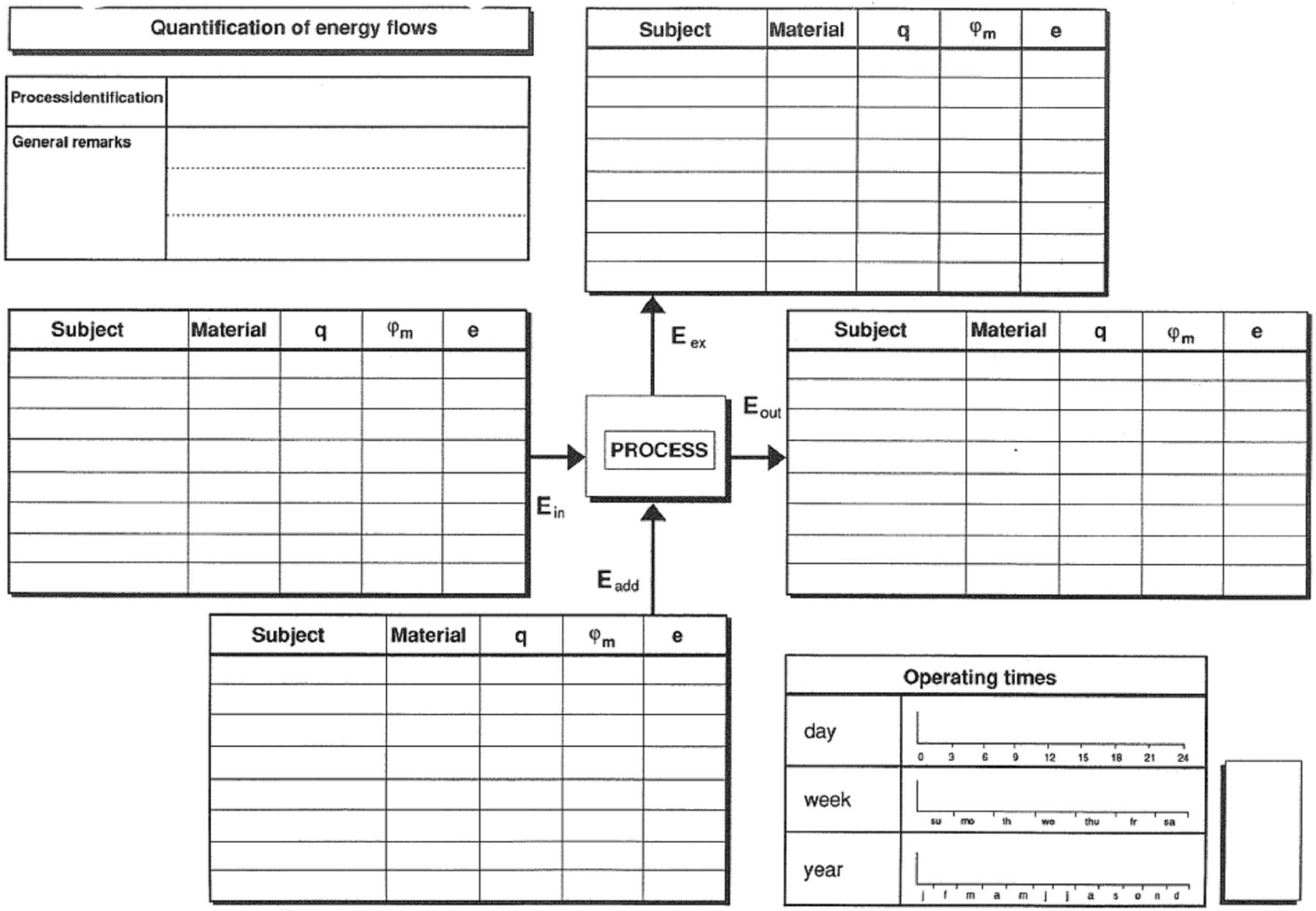
E_{out}: Energy Content of outgoing mass flow (products, gases, water, etc.)

E_{add}: Energy added to process (gas, electricity, EC of added gases or water)

E_{ex} : Energy extracted from process (waste heat, used gases, losses)

Efficiency Scans

Standard format (example):



Efficiency Scans

ILLUSTRATION OF PRODUCTION SCAN (1 of 2):

- Selection of production unit (from large to smaller sized units, e.g. at least >1 % of total energy consumption)
- Total scanning time is preferably less than 1% of total annual energy costs, this rule of thumb has to be applied consistently for each individual scan
- Description of process (flows, demarcation, equipment, process conditions, etc.)
- Systematic analysis of production process (based on questions like: Why like existing situation? How can production process be modified / simplified / optimised / intensified / better controlled / etc.?)

Efficiency Scans

ILLUSTRATION OF PRODUCTION SCAN (2 of 2):

- Generation of Energy Saving Options based on answering of scan questions
- Immediate reporting of options (standard formats)
- Production process questions like:
  - What is the basis and/or background for process and product specifications and operational instructions?
  - How can process and product efficiency be improved?
  - Which critical process conditions are measured and controlled?
  - How are maintenance and quality assurance planned?
- Checklists with recommendations and suggestions like:
  - Visibility of energy costs for management and operators;
  - Decrease % off-spec production and internal reprocessing

Efficiency Scans

ILLUSTRATION OF SPECIFIC SCAN (FURNACE):

- Specific equipment checks like:
  - Temperature treatment of feedstock and (intermediate) products
  - Furnace temperature control, temperature gradients, heat losses, fouling, corrosion leakage, etc.
  - Heat transfer, waste heat recovery, temperature levels of cooling water, low, medium and high pressure steam
  - Combustion air preheating
  - Condition of furnace, maintenance scheme, impact of modifications or replacement, isolation, etc.
  - Batch or continuous operation, load, comparative analysis, etc.
  - Actual process conditions versus design conditions
  - Operational disturbances, process control, environmental permit
  - Alternatives for heating by furnace, application of new technology

Management Scans

IMPORTANCE OF MANAGEMENT SCAN:

- Management Scan investigates the quality of energy (and/or environmental) management (EM) within company
- It assesses to what extent EM improvements are desirable and/or necessary
- Management Scan is performed for two reasons:
  - to ensure that sufficient attention is and will be paid to the efficient use of energy;
  - to ensure effective implementation of the proposed Energy-Efficiency Programme.
- It focuses on INFORMATION and ORGANISATION:
  - energy (and/or environmental) monitoring (supervision)
  - organisation of energy (and/or environmental) management

Management Scans

CRUCIAL CHECKS OF MANAGEMENT SCAN:

- Energy (supervision) monitoring means regular and systematic collection of energy data (also combining them with relevant production data) and the structured processing of these data into relevant management information. An adequate energy information system is an essential condition for ensuring structural attention for the energy-efficiency improvement within a company.
- Organisation of energy management entails the allocation of duties and responsibilities required for controlling the company's energy consumption.

Management Scans

TWO PHASES OF MANAGEMENT SCAN:

1. Checks on energy and environmental monitoring are largely elaborated during the Energy Consumption Analysis (ECA).
2. Checks on organisation of energy management take place during execution of efficiency scans.

Both results are digested in draft EPS reports and need to be explicitly discussed during final presentation.

Comments on INFORMATION and ORGANISATION by general management will be incorporated in final report.