

French landmarks about diagnoses in existing buildings

IEA ECBCS Annex 46

R. Cantin & G. Guarracino
LYON, FRANCE



Repository of good practices on energy diagnoses within industry

- Document BP X 30-120 (2006) - CEN/CLC Sector Forum « Energy Management » - AFNOR
- The document is sent for information of the sector forum participants
- Summary...

Scope & General principles

- Energy-using companies
- Energy suppliers
- Public authorities...

- Energy diagnosis within Industry is
 - Providing a description of the company's global energy situation
 - Quantifying possible energy savings
 - Defining the measures needed to achieve such savings

Three stages of the energy diagnosis within Industry

- Stage 1: analysis of the data available on the industrial site
- Stage 2: extending the analysis of the main savings sources identified in the first stage
- Stage 3: specify actions to make energy savings and describe the solutions as accurately as possible

Recommendations on mutual commitments – Bibliography and sites

- From the diagnostician towards the industrial
- From the industrial towards the diagnostician

- References and useful sites...

Comments

- The scope and objectives are not those that are in the annex 46:
 - Building designers, architects and engineers
 - Energy Retrofit Measures are not explicit
- It is an analytical approach
- The biography and useful sites have to be updated...

Audit & Diagnosis

- **Audit:**
 - set of methods used to analyse the status of the object considered at a given time
 - also the result obtained, i.e. all elements reporting the status
 - thus the energy audit of an existing building represents the process used to analyse thermal and energy specifications for a building, and also represents the findings of the analysis
- **Diagnosis:**
 - Overall procedure incorporating the audit plus propositions for improving initial status, generally figures

Multiple targets for diagnoses

- To reduce the energy consumption
- To reduce the greenhouse gas emissions
- For retrofitting buildings:
 - To reduce the impacts on the environment
 - To improve the indoor environment

Various Methods (1)

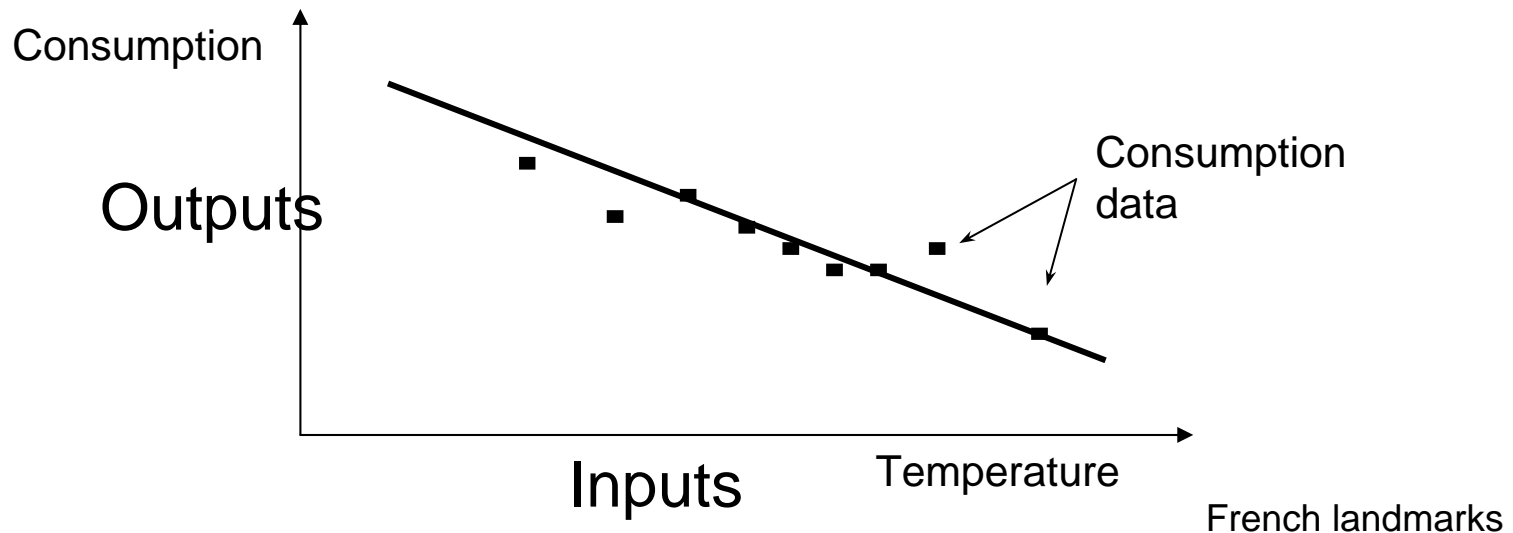
- Pre-diagnostic methods aim to classify improvement targets in descending order of probable importance, in terms of energy and financial savings
- Ratios: amount spent per person, per m^2 , per m^3 , oil equivalent, thermal power for heating per m^3 , age of boilers, electricity consumption and power used per m^2 , water consumption per user...

Various Methods (2)

- Explanatory methods used for prediction are based on analytical models representing the building and its equipment
 - Static methods are based on reconstructions of consumptions which are used to evaluate different schemes for improvement on an energy and economy basis, often inspired by design tools for new buildings – tools for professionals and tools for the general public
 - Dynamic methods are real simulation models (with time steps) aiming to highlight temporary situations based on inertia in the building and its heating system

Various Methods (3)

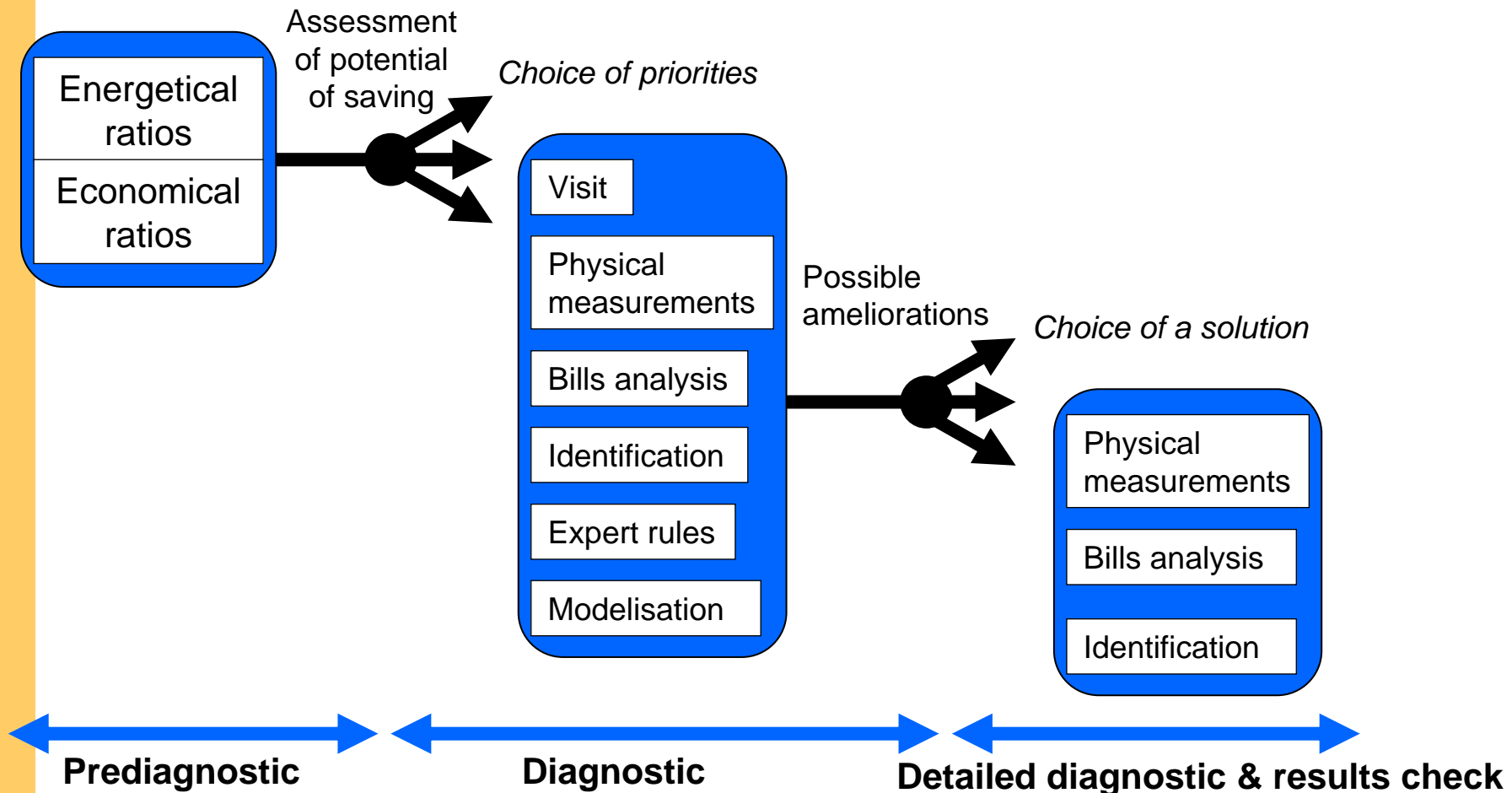
- Identification Methods consist in making an overall estimation of essential thermal specifications of a building and its heating installation – Energy signatures



Various Methods (4)

- Specialized diagnosis:
 - Heating systems (boilers, burners...)
 - Natural ventilation
 - Air leakage
 - Permeability of facades
 - Watertightness of roofs
 - Collective domestic hot water
 - ...

From prediagnostic to results check



From outside to inside

- Environment / site (urban, river...)
- Building
- Subsystems (building envelope, equipments,...)
 - Elements of subsystems (Walls, roof...)
 - Components of elements (windows, doors...)
 - Material of component (concrete, stone, mineral wood, steel,...)
- Indoor environment
- Occupants

Diagnoses of an existing building

- To link different approaches
 - From the first floor to the roof
 - From global to local
 - Building level: a top down approach in which the main target is on the energy consumption of the whole building
 - Component level: a bottom up approach in which the main target is individual items of equipment
- Difficulty: To consider interactions in the existing building before retrofitting – non additive impacts of ERM

References

- Document BP X 30-120 (2006) Repository of good practices on energy diagnoses within industry – AFNOR – ADEME
- « L'audit dans les bâtiments existants – Points de repère ». Plan Construction et Architecture – Agence Française pour la maîtrise de l'énergie