Building EQ
intelligize your energy management

Building EQ-Symposium in Berlin, October 1, 2009

The Building EQ Project

„Tools and Methods for Linking EPBD and Continuous Commissioning”

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EPBD

- EPBD -Energy Performance of Buildings Directive (EPBD, 2002/91/EC, since 4th January 2006 in all MS)
  - Prescribes Energy Performance Certificates
  - Principles how to calculate the energy consumption of buildings (considering heating, cooling, ventilation, air conditioning, DHW, lighting)
  - Minimum requirements for new and renovated buildings
  - Inspection of boilers, heating and air conditioning systems
- EPBD-Recast – the new EPBD (→ 2010)
  - Smart meters in all new buildings and major renovations
  - (+ many other amendments…)

“Commissioning” (Cx)

- First established in UK
- Today biggest market / associations in USA
- *“Commissioning is a quality-oriented process for achieving, verifying, and documenting whether the performance of a building’s systems and assemblies meet defined objectives and criteria.” **

→ *could be used as “quality assurance procedure” for EPBD*

- Types of Cx*
  - Initial Commissioning
  - Retro-Commissioning
  - Re-Commissioning
  - Ongoing / Continuous Commissioning

* “Commissioning tools For improved energy Performance”, Results of of IEA ECBCS ANNEX 40, 2004

Continuous / Ongoing Commissioning (CC™ / OC)

- *"Continuous Commissioning is an **ongoing process** to resolve **operating problems,** improve **comfort,** optimize **energy** use and identify retrofits for existing commercial and institutional buildings and central plant facilities."***

***["Continuous Commissioning Guidebook", Claridge et.al., Energy Systems Laboratory, Texas A&M University, Federal Energy Management Program, USA, 2002]*

- *"CC = **Clarifying** Owner's Project **Requirements** (OPR) from viewpoints of environment, energy and facility usage, and … **realize** a **performance** of building systems requested in the OPR through the **life of the building**"**

**[IEA ECBCS Annex 40, Glossary of Terms, 2004]*

Why link EPBD and OC?

- Building sector is responsible for approx. 40% of the European end energy consumption
- The saving potential of optimising the operation ranges between 5 -30% in non-residential buildings (no- or low-cost measures)
- OC is seen as a prerequisite for the persistence of energy-efficient operation of buildings
- Certification can deliver a target value for the energy demand
- But today, after certification, usually there is no continuous evaluation of building performance

→ While certification can assure the principle energy efficiency of building structure and HVAC components, OC can assure an energy efficient operation (especially if utilization changes)

→ OC could be a quality assurance procedure (as an amendment for the EPBD)

Aims of Building EQ

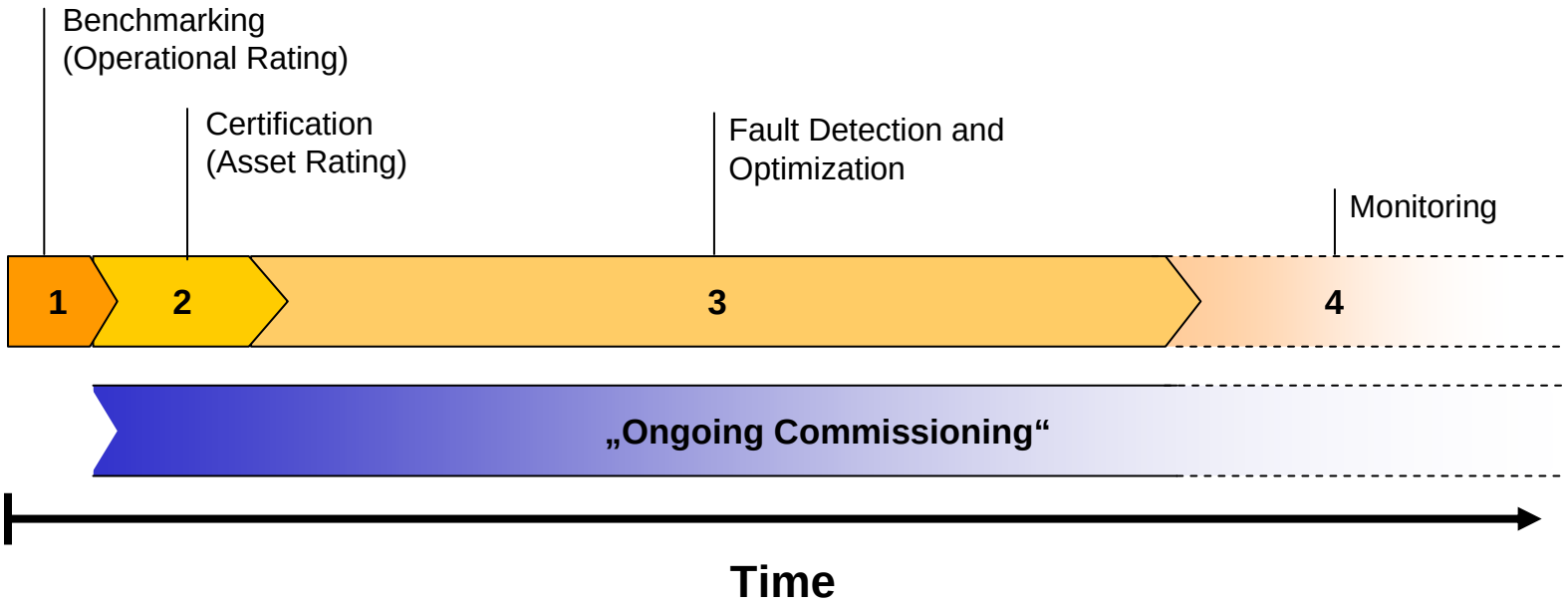
“Tools and Methods for Linking EPBD and Continuous Commissioning“

- Identify the possible links between EPBD and OC
- Define a general methodology for a cost effective ongoing commissioning that is based upon the general regulations of the EPBD
- Provide tools that can support this methodology
- Evaluate the methodology in at least 12 demonstration buildings
- Disseminate the results

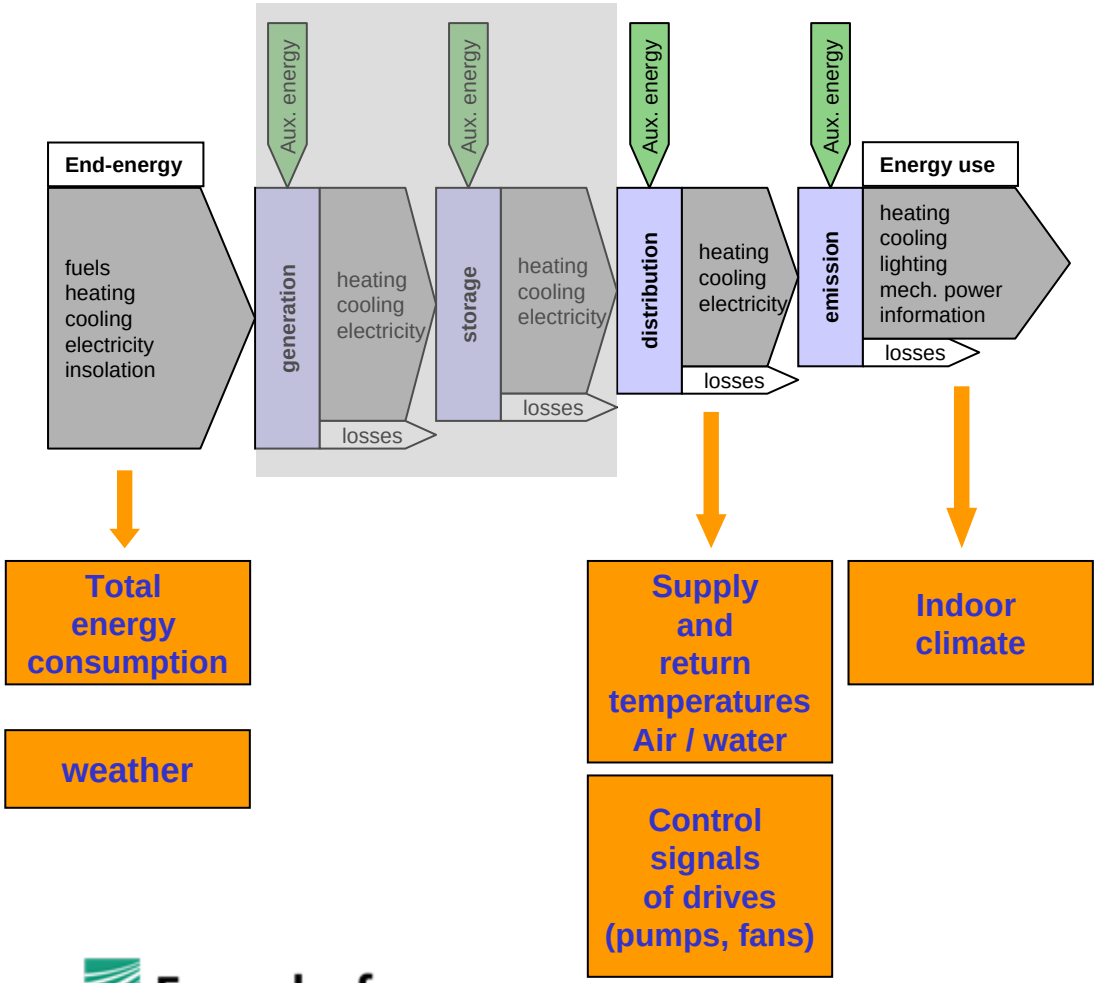
Demonstration Buildings

Building EQ Approach

- 4 Steps
- Put effort only when and where necessary
- As far as possible: standardization and automation
- Based on minimal data set

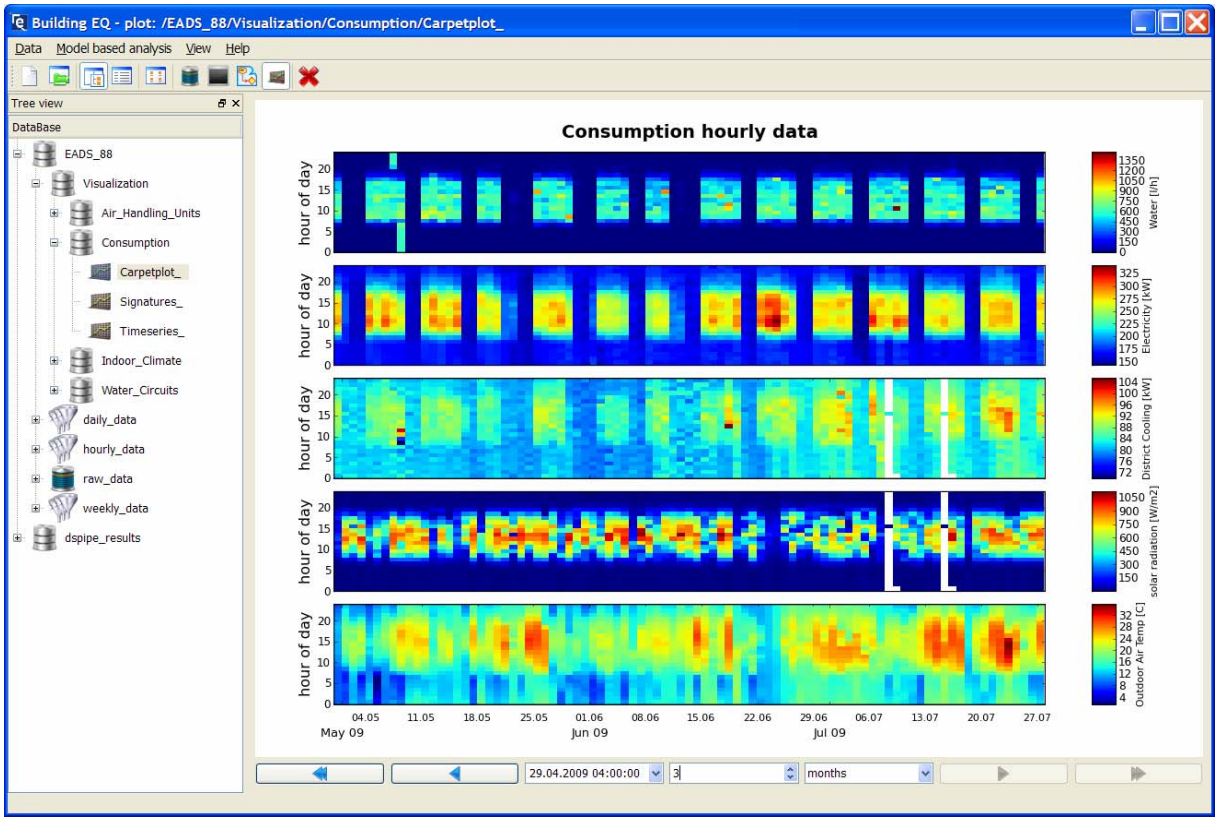


Minimal Data Set



- Record weather data in order to identify climate dependent part of load
- Try to follow the whole “way” of energy through building from delivered energy to requirements (indoor climate)
- Record signals that have great influence on energy comsumption / comfort
- Minimize cost, exploit sensors that are inexpensive or even readily available

Building EQ Tool



- **Data handling**
  (Import, export, sampling, grouping, filtering)
- **Data Visualization**
  (predefined visualization based on minimal data set)
- **Model based analysis**
  (asset rating)
- [**Statistical analysis**
  (monitoring, outlier detection)]

Most Important Findings

- Currently, the link between EPBD and ongoing commissioning is weak
- Currently, the diversity of different national implementations makes a common approach on European level difficult (…impossible)
- Energy saving potentials could be identified by ongoing commissioning / monitoring in most of the buildings.
- Many barriers (technical, administrational, security) were identified for the introduction of an ongoing commissioning process
- Buildings (and BAS) are not designed/prepared for evaluation of building performance
- General approach appreciated by most building professionals
- However, many open questions concerning the details (reference values for benchmarking, standards for interoperability (information, measured data, calculation methods), automated fault detection…)

We like to discuss…

- Statements:
  - EPBD is a good starting point for ongoing commissioning
  - Ongoing commissioning / monitoring is necessary for the energy efficient operation of buildings
  - Standardization and automation is crucial
  - Massive problems (technical, administrative) to acquire minimal data set
- Question:
  - Is it worthwhile extending the certification according to the EPBD with a prescribed ongoing commissioning?

Overview Programme

10:10 – 12:15	**Session I:** Building EQ
12:15 – 13:30	*Lunch*
13:30 – 15:00	**Session II:** Certification
15:00 – 15:30	*Coffee break*
15:30 – 17:00	**Session III:** International Practice of Commissioning
17:00 – 18:00	Discussion

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