TIMEPAC Academy

Session 4

Re-Co and EPC

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22 March 2024

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The EPC & Re-Co investigation phase

- The Investigation Phase of an EPC as well as Re-Co typically begins with a site visit.
- The visit creates an opportunity to bring together owner or owner's representative, facility staff, and any contractors or other professionals who may be important to the process, such as controls contractors, maintenance service contractors, or consulting engineers who are familiar with the building and the owner's operating requirements.
- The core of the Investigation Phase is a systematic analysis of the building's performance through direct observation, review of building documents and O&M practices, and monitoring and testing of building systems.

Documentation review (1)

One of the first actions a provider must undertake during Investigation is a thorough review of building documents. It is recommended to prepare a questionnaire for in-house facility staff, that can also be assigned to answer questions and help gather necessary building documentation for the provider.

Owner's Operating Requirements

- The Owner's Operating Requirements is one of the important documents for the provider to review.
- This document addresses the owner's comfort requirements such as space temperature, humidity and outside air fractions, and building schedules.
- The objective of any recommissioning project is to ensure that the building is operating as needed by the owner. A comprehensive and dynamic EPC should reflect this status.

Documentation review (2)

To the extent possible, the owner should gather the following additional documents for the recommissioning provider's review:

- Original design documentation;
- Equipment lists, with nameplate information (including age and energy efficiency rating where appropriate);
- Drawings for the building's main energy-consuming systems and equipment, including controls, mechanical, and electrical;
- Control system documentation, including point lists, control diagrams and narratives on the sequences of operation;
- Operation and maintenance manuals;
- Testing, adjusting, and balancing (TAB) reports;
- Previous commissioning reports; and
- Previous energy studies

The most common performance improvement opportunities

Building Envelope Upgrades: Assessment of the building envelope during the site visit can reveal opportunities for improving insulation, sealing air leaks, and upgrading windows and doors. Enhanced insulation and air sealing can reduce heat loss or gain, improving overall energy efficiency and occupant comfort.

HVAC System Optimization: Inspection of heating, ventilation, and air conditioning (HVAC) systems can uncover opportunities for optimization. This may include upgrading to more efficient equipment, improving ductwork insulation, implementing zone controls, or enhancing maintenance practices to ensure optimal performance.

Lighting Upgrades: Evaluation of lighting systems can identify opportunities to replace outdated or inefficient fixtures with energy-efficient alternatives such as LED lighting. Additionally, installing lighting controls such as occupancy sensors and daylight harvesting systems can further reduce energy consumption.

The most common performance improvement opportunities

Renewable Energy Integration: Analysis of the site's suitability for renewable energy technologies, such as solar panels or wind turbines, can be conducted during the data collection process. Integration of renewable energy sources can help offset electricity demand and reduce reliance on traditional energy sources.

Building Management System (BMS) Enhancements: Assessment of the existing building management system (BMS) can reveal opportunities to optimize control strategies, scheduling, and setpoints for HVAC, lighting, and other building systems. Upgrading or fine-tuning the BMS can lead to significant energy savings.

Water Efficiency Measures: In addition to energy considerations, the site visit may also identify opportunities for water efficiency improvements. This could include upgrading fixtures to low-flow alternatives, implementing water recycling systems, or addressing leaks and inefficiencies in water distribution systems.

The most common performance improvement opportunities

Occupant Behavior and Awareness: Observations of occupant behavior and awareness during the site visit can highlight opportunities for energy-saving initiatives such as employee education programs, energy usage monitoring, and incentive schemes to encourage energy conservation practices.

Building Commissioning and Re-commissioning: Assessing the building's commissioning history and current operational performance can reveal opportunities for commissioning or re-commissioning activities. These processes ensure that building systems are operating as intended and can identify and rectify any deficiencies or inefficiencies.

By identifying and addressing these common performance improvement opportunities during the EPC generation process, building owners and operators can enhance energy efficiency, reduce operating costs, and improve the overall sustainability of their facilities.

EPC as a support for Re-Co activities

- EPC for large volume buildings in Slovenia (and soon in other MS) determines the use of dynamic energy simulations (as done in TIMEPAC).
- A detailed whole building dynamic energy model simulates the overall building performance needs to consider various building specifications and characteristics, including internal loads and schedules and technical energy system specifications.
- The accuracy in using these simulation programs depends on the ability of the user to input parameters that result in a good model **of actual building energy use**. Thus, it is necessary that the parameters of the model be fitted to the actual physical system, which is called **model calibration**.
- Calibration of the existing building simulation model is key to correctly evaluating the energy savings that are achievable through retrofit.

Need for calibrated energy models

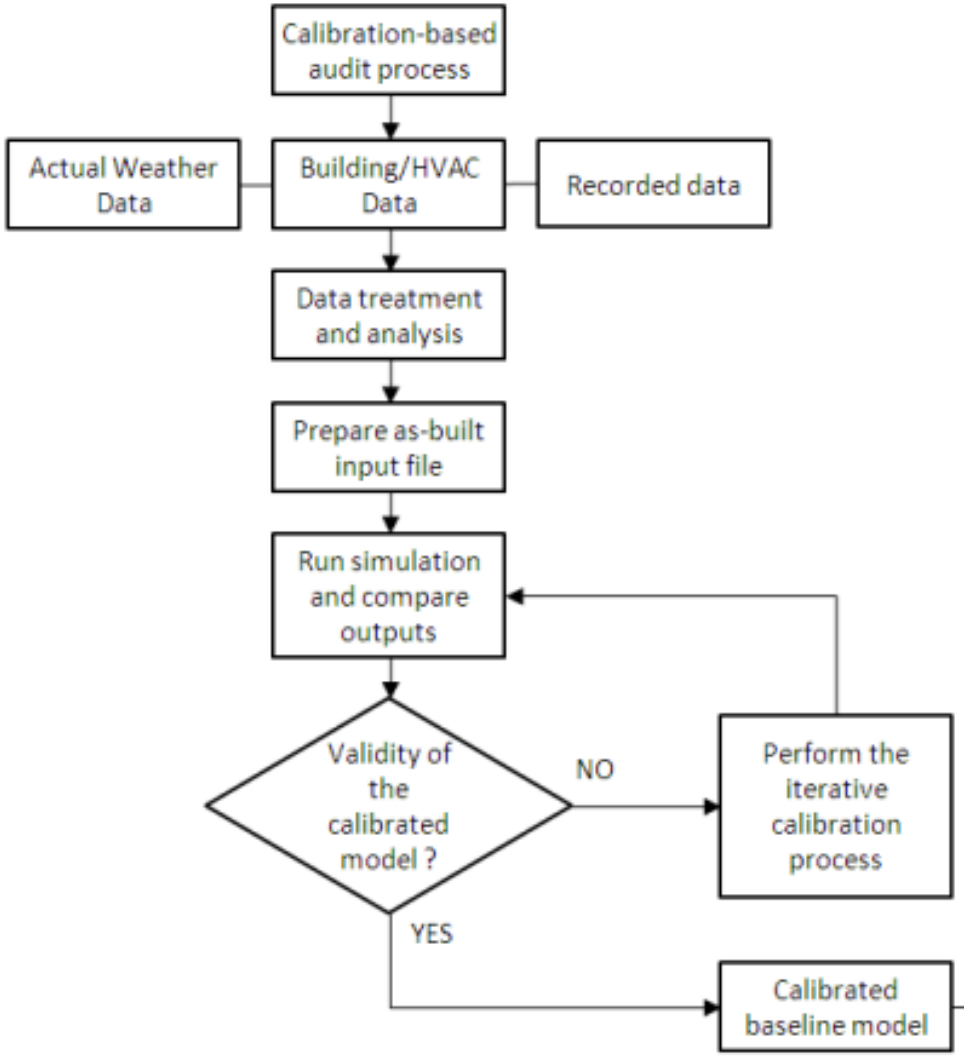
Using dynamic models to help in understanding the thermal behavior of an existing situation requires the dynamic model to be able to closely represent the actual behavior of the building under study. This adjustment process is called “calibration”.

This definition of the calibration process leads to numerous questions:

- What are the initial objectives of the calibration? What is the calibrated model intended for?
- Which level of details is required for the model? Which type of BES model should be used?
- Which level of accuracy do we need to reach?
- Which type of data should we gather from the building and which difficulties do we have to face? What are the time-step and the accuracy of the measurements?
- How should we proceed to adjust the parameters of the model? On which parameters should we focus?
- How can we define “accuracy” of the calibration? How much are we confident in the quality of the calibration and what are the abilities of the calibrated model? Does it match with the pre-defined objective (control optimization, ECMs evaluation...)?

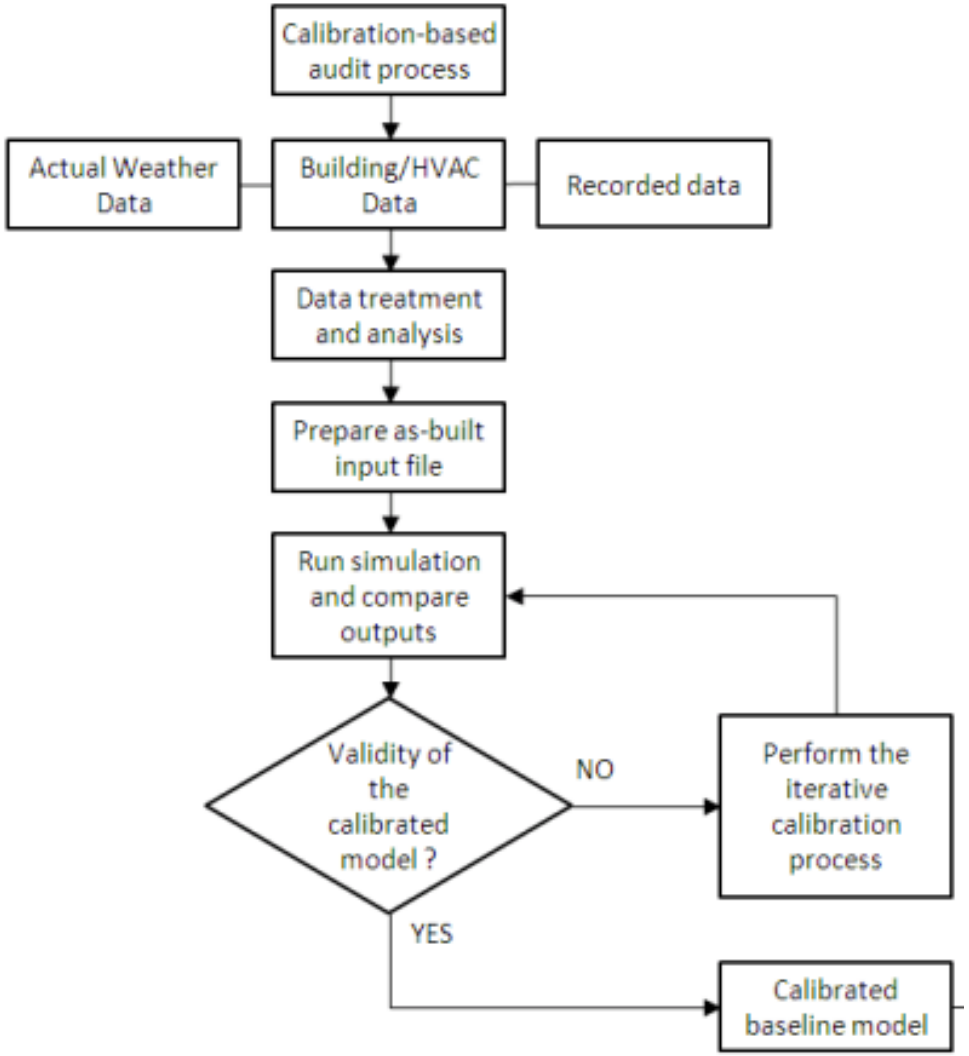
EPC & Re-Co go hand in hand (1)

- Utilizing calibrated building energy simulation models offers a versatile array of applications, ranging from enhancing HVAC system operations to the ongoing evaluation of energy savings resulting from initiatives such as energy retrofits.
- The successful execution of Re-Co initiatives necessitates a comprehensive analysis of their impacts across various domains, including energy consumption, financial expenditures, and environmental implications. Such thorough evaluations can only be effectively conducted through dynamic energy simulations.



EPC & Re-Co go hand in hand (2)

- Consequently, an EPC reinforced by dynamic energy simulations presents a significant opportunity not only for establishing a baseline but also for pinpointing priority areas for recommissioning activities.
- This integrated approach ensures a holistic understanding of a building's energy performance and facilitates informed decision-making regarding recommissioning strategies.



TIMEPAC The new EPC for Europe

If you would like more information, please visit www.timepac.eu or contact us at

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Thanks for your attention!

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033819