New Annex Proposal: Cost-Effective Commissioning for Low-Energy Buildings

Problem: Commissioning methods and tools are required to ensure that advanced components and systems reach their technical potential and operate as required to achieve Zero Energy Buildings (ZEB[1]) in practice. Likewise, commissioning methods and tools need to emphasize advanced operating strategies to make conventional and existing buildings become low energy buildings and extend commissioning beyond the current emphasis on achieving design intent.

Currently, documented commissioning methods are only available for conventional HVAC systems and do not address the systems and system combinations that are expected to be important for ZEB, such as building scale combined heat and power, integrated control of lighting, blinds and HVAC, and cooling techniques such as evaporative cooling and natural ventilation. Without suitable methods and tools to ensure the correct interaction between components and systems, their performance in the field can be expected to fall significantly short of what is required.

The usual practice when commissioning buildings is to attempt to make the building work as designed. This is seldom appropriate when retro-commissioning existing buildings. There have almost always been changes in the use or configuration of the building since design that require the commissioning provider to "redesign" the operation of the building to achieve optimum performance. Even new buildings can often operate 5-10% more efficiently than designed if they are optimized based on actual occupancy and use rather than the information available to the designer. There is a need for methodologies and tools to support this "field optimization" approach to commissioning.

For commissioning to be applied routinely to advanced systems as they emerge, it needs to become standard practice for conventional systems. It is generally recognized that demonstrating cost effectiveness will remove a major barrier to the wider market acceptance of commissioning. The use of automated tools that speed up the process and reduce dependence on scarce and relatively expensive skilled practitioners is expected to further broaden the market for commissioning. To maximize the impact of the project, we plan to work primarily with large owners, property managers and service companies. These stakeholders are interested in the benefits of commissioning averaged over a set of buildings and are less concerned about the risk that the benefit in a particular building may be lower than average.

For commissioning, whether initial or retro, the scientific merit lies in the application of engineering principles to the operation of buildings, in contrast to the intuitive approach that is currently generally employed.

Goal: The goal of the proposed annex is to enable the cost-effective commissioning of existing and future buildings in order to improve and optimize their operating performance.

Approach: Advance the state-of-the-art of building commissioning by:

- Extending previously developed methods and tools to address advanced systems in low energy buildings
- Developing methodologies and tools to enable optimization of operation of buildings in use.
- Quantifying and improving the Costs and Benefit of Commissioning, including the persistence of benefits and the role of automated tools in reducing costs and improving persistence

The proposed annex will also exchange information on commissioning practices in different countries and disseminate relevant information to national practitioners.

Vision of Annex Products/Outcome: The outputs will include methods and tools for commissioning low energy buildings, methods and tools for field optimization and information on the costs and benefits that can be used to promote the wider use of commissioning.

Countries Interested: Sweden, Germany, Japan, Canada, France, the Netherlands, France, Norway, United States.

Planning Workshop: An open workshop will be held on October 20, 2004 in conjunction with the ICEBO conference and the final Annex 40 meeting. The purpose of the workshop is to prepare a clear work-plan that elaborates the objectives and defines the technical and leadership roles for all the participants in the Annex. Particular attention will be paid to matching the skills and experience of the various participants to the approach and methods identified for the different tasks. As part of the preparation of the proposed Annex work plan, the workshop organizers will update previous reviews of the cost-effectiveness of commissioning and the state-of-the-

[1] The term Zero Energy Buildings or ZEB will be used throughout to refer to the class of all advanced buildings that use substantially less energy than current practice buildings.

art in automated tool development. The team will also ellicit input from other stakeholders as part of the process of generating an assessment of the technical requirements for commissioning advanced systems in low energy buildings. This assessment will be used to guide the formulation of the work-plan for the Annex.

Please send comment regarding:

- The content of this annex description
- Interest from your country to take part
- Possible teams interested

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