

Educational buildings stocks refurbishment, a double opportunity: massive energy savings, education of youngsters about sustainable development

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The market of new buildings is limited because the rate of renewal of buildings stock is lower than 1% per year. In order to meet the objective of reduction by 4 of energy consumptions in 2050, the improvement of the energy efficiency of existing buildings is required. Thus, the local authority of Seine et Marne, French department close to Paris, decided to launch an ambitious program on the refurbishment of all educational building stocks.

The aim of this project was to define adapted packages of refurbishment solutions mainly according to their type of construction and typology. The main potential of energy savings were identified thanks to a detailed diagnosis done on each building. They were evaluated by thermal dynamic simulations in a first approach.

An other added value of this project was to check that the whole effective performance of the building meets the energy performance expected by the building owner, in our project the local authority. This paper will focus on this part.

On one hand, the first part of commissioning was to check that energy savings due to the refurbishment of the building meet the initial predictions made by thermal dynamic simulations. On the other hand, the second part of commissioning was to check the sustainability of the whole building performance during the operation phase.

For that, we developed dedicated toolbox for educational sector. This toolbox addresses several actors as local authority, engineering department and energy manager. The objective of this toolbox is to help actors to create the commissioning plan of the building to be refurbished. The toolbox is composed of a guidebook dedicated to local authority and software to implement an energy monitoring in the building.

The objective of the guidebook is to help the local authority, as building owner, in the implementation of the commissioning process of their buildings stock. It defines the key points of an energy efficiency refurbishment and how to check the effective performance of this work in the French context.

The software provides a global monitoring board for continuous commissioning with several pre-implemented indicators about energy consumptions, indoor air quality and global costs. These indicators could be evaluated at each step of the life cycle of the building, i.e. from the design phase to the operation phase. As the level of available information is different at each step, the method of calculation is thus different. This tool could also provide strategic information to define the book of specifications of the building energy management system.

Our work on the educational buildings stock is also a way to inform and thus to educate teaching team and young people to sustainable development by showing them a best practise.