Building EQ
intelligize your energy management

Newsletter Issue 1 | May 2007

Energy Savings Up To 30 Percent With Low Financial Investment

For two years now, Christian Neumann has been a project leader in the field of energy efficient buildings at the Fraunhofer Institute for Solar Energy Systems. Within the context of his activities, he sees a great demand in the area of automated energy management for non-residential buildings. As a result, he initiated the project "Building EQ - intelligize your energy management" in which useful tools are developed co-operatively with top partners in this field.

How long have you been working on the topic of optimized energy management for non-residential buildings?

I have been working on this topic for at least the past five years. It began with a German-wide project "SolarBau:Monitor" in which the often large difference between planning and reality was analyzed in 25 non-residential demonstration buildings. In this project, I gained a lot of valuable experience in the operating analysis of buildings.

How did the idea for this project come about?

The idea grew out of the experiences gained in the Solarbau:Monitor project. The question that primarily occupied me was: What are the causes for this large difference between planning and reality? With the EPBD - the European Performance of Buildings Directive - a legal basis has been established that lays the groundwork for a detailed building examination. Above all, I was interested in how the EPBD can be applied to further use the extracted data in the operating management.

Why have you introduced this project on the European level?

A major reason for the co-operation is, of course, the large competence level of the individual partners who are involved in this project. Serving as a basis for the certification of energy efficiency in buildings, the EPBD offers a good starting point for a European-wide solution in the area of operational management and optimization. In spite of the different practices on the national level, we believe that a co-operative approach makes sense here.

How great is the demand for the tools that you are developing?

In total, I see a large market potential. Currently the demand is still low, and this is due to the lack of information at the market level. This point is considered in the project concept. We are resolving this deficit by setting up a web page, carrying out intensive public relations work, circulating a regular newsletter and offering workshops. Due to the current climate debate, this field is expanding very fast. With the use of energy optimization, the potential energy savings in energy costs ranges between 5 and 30%. Especially exciting is that these savings are possible with a low financial investment.

How do you inform the public about this tool?

We communicate information in a variety of different ways. Already the project has been presented at international events and has been met with great resonance. In addition, third parties

Christian Neumann initiated the project "BuildingEQ"

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have come forth and are interested in following the project as "official observers."

Who will ultimately use these tools?

The project is directed towards groups of people at basically two different levels: On one level are the system operators who hold a detailed expertise about the system technology. The developed tools are intended to simplify analysis and to provide assistance on the operating level. On the second level, information about the building management is provided for the building owner in the form of benchmarks. Such data is especially relevant for building management specialists as well as for building planners and energy consultants. In contrast to the annual values in the Energy Pass, we are interested in collecting hourly measurement data, with which we can create a detailed picture of the operation.

What challenges exist due to the large differences in the EPBD between the various countries?

The organizational contents and the level of implementation vary greatly between the countries. For example, in some countries complete procedures already exist. In others first submissions have been developed and yet. In some the implementation has not yet been carried out. We have already performed a survey about which data will be available after the certification. In addition to carrying out the EPBD, it is our aim to work out recommendations on how the EPBD can be usefully expanded - especially in the areas of monitoring and analysis.

What are the long-term prospects?

We will attempt to work out a basis for a useful supplement of the EPBD in the areas of operational ratings, consumption passes and efficient system operation. We will also continue working in these areas after the project has been completed.

Intelligent Energy Management for Buildings Project Description

Origin

Based on his many years of experience in the area of operating efficiency, Christian Neumann sees a large potential in the further development of energy management for non residential buildings. As project leader in the area of energy efficient buildings at the Fraunhofer Institute for Solar Energy Systems, he is daily working on the possibilities of an intelligent energy management for buildings. Six competent European partners have co-operated in jointly initiating the project "Building EQ". The results of the three year project will be tools and procedures for monitoring and optimizing the building operation.

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The project will be developed and carried out on the basis of twelve demonstration buildings. According to the Energy Performance of Buildings Directive (EPBD), an energy pass will be drawn up for each of the buildings at the beginning of the project according to the relevant national guidelines. At the same time, the building energy consumption as well as other operating data of the building shall be recorded hourly and transferred to a central server via data telecommunications. A tool is to be developed which makes use of the collected building data and energy pass data in order to optimize the building operation and enables faults to be recognized and remedied.

Objectives

With an intelligent energy management system, building owners can save an average of 20% of their energy costs. The tools strive to make the optimization process easier and less expensive than today. This solution is especially interesting for energy agencies, energy consultants, building owners and for industry in the area of facility management.

First Demonstration Building Contracted

In April 2007, the first of the twelve demonstration buildings was contracted. ThyssenKrupp Real Estate GmbH provided the "Kreuzgebäude" in Essen, Germany. The real estate company in the ThyssenKrupp concern manages buildings with different use within the scope of the Corporate Real Estate Management concept, designated as the success-oriented management and marketing of office real estate.

The building has a net floor area of 20,000 m^2 and is supplied by district heating and a air conditioning system (Multi-Split Unit).
The end energy use lies in the normal range of about 150 kWh per square meter and year.
Within the context of BuildingEQ, an Energy Demand Pass will be drawn up and the potential energy savings will be identified.

The "Kreuzgebäude" is a typical office building constructed in the 1980s.

Kick-off meeting

The first meeting of the Partners took place in February 2007 in Freiburg, Germany at the Fraunhofer Institute for Solar Energy Systems. At this meeting the project members became initially acquainted. Additionally decisions on the necessary requirements for the demonstration buildings, for example, stood in the forefront. It was decided that the useful floor area of the buildings must be at least 3 000 m² and that a minimum configuration of an HVAC (Heating, Ventilation, Air Conditiong) system should be present. Despite the different initial conditions existing in the European countries, the partners could agree upon a minimum criterion defining the measurement data to be collected.

The next meeting will be in Helsinki in June 2007 at the same time as the congress Clima2007.

Partner

The project members come from four different countries (Germany, Italy, Finland, Sweden). They are made up from the following institutes and companies:

Fraunhofer ISE, as co-ordinator, initiated the project. Fraunhofer has more than 15 years experience in monitoring, simulation and optimising in the residential and non-residential buildings sector. Fraunhofer ISE formed the consortium.

The Energy Agency (EARFI) is the partner for the task of dissemination. With its numerous dissemination channels and experience in the field of marketing and public relations, it is an ideal partner. EARF is located in the same town as the co-ordinator which is seen as a major advantage for an effective dissemination.

Ennovatis is one of the market leaders in the field of energy management and monitoring. The company holds a large expertise due to their experiences gained at the University of Stuttgart. ennovatis already provides software and hardware for the development of building concepts and monitoring.

CIT Energy Management AB is active both nationally and internationally. Their operations focus on building energy use and indoor climate. CIT Energy Management has grown from the research activities at Chalmers University of Technology, Gothenburg, Sweden.

Politecnico di Milano is the largest technical university in Italy and the leading Italian organisation on energy systems research. In close co-operation with manufacturers and building manager associations, the Energy Studies department (Dip. Energetica) develops new procedures and concepts for energy use in buildings. The researchers have long-term experience on building simulations and energy systems simulations.

Granlund is Finland's leading building services consulting firm. Their core business areas are building services design, facility management consulting, and the development and sale of design and facility management software.

What will be the outcome?

The consortium aims to develop a tool which provides a web-based service for analyzing energy consumers. Up to the end of the project, this tool will be available for download from the project webpage.
Energy consultants, facility managers or other interested specialists can download the software and install it on their own server. Afterwards, it must be ensured that the hourly recorded measurement data of the investigated buildings are automatically transferred via internet to the databank and stored.

The tool draws from this databank and indicates within a short time span if operating faults occur in the system.

EPBD - Energy Performance of Buildings Directive

The Directive 2002/91/EC (EPBD, 2003) of the European Parliament and Council on energy efficiency of buildings was adopted on 16th December 2002 and entered into force on 4th January 2003.

This EPBD is considered as a very important legislative component of energy efficiency activities of the European Union designed to meet the Kyoto commitment and responds to issues raised in the Green Paper on energy supply security.

The Directive is set to promote the improvement of energy performance of buildings. Within some general principles and objectives, it is the individual responsibility of each EU Member State to choose measures that corresponds best to its particular situation (subsidiarity principle).

It will greatly affect awareness of energy use in buildings and is intended to lead to substantial increases in investments in energy efficiency measures within these buildings. It presents a great challenge for the transformation of the European building sector towards energy efficiency and the use of renewable energy resources.

The 4th of January 2006 was the official deadline by which the 25 Member States had to transpose the Directive into national law. Member States may, because of lack of qualified and/or accredited experts, have an additional period of three years (before January 2009) to apply fully.

The directive can be downloaded here:
http://www.buildingsplatform.eu

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