Output Case 12
Energy benchmarking and monitoring tool and statistics on most profitable energy measures

Case owner: PP1, County Board of Dalarna, Sweden

EFECT4building project develop a toolbox with a set of financial instruments for building managers to implement more energy efficiency measures. Tools belong to one or more of the following categories: Financial calculation, Bundling, Funding, Convincing decision makers, EPC, Multi service contracts, Green Leasing contracts and Prosumerism. This case is connected to technology solutions and financial calculations.

Background and motives

Many energy audits is being done, but not in a standardized way and data is not collected in a way that makes it possible to benchmark results. This means that we miss the opportunity to gain general new knowledge on energy use in different type of buildings/operations/companies. To find out if energy use is at the same level as other similar operations, benchmarking data is valuable to indicate abnormally high energy use for some particular energy user.

Data from energy audits can be collected in a database to make it possible to extract statistics and benchmarking data. Such database has been developed by the company Nordic Energy Audit, started at Linköping University. Data has been collected from all energy audits financed with grants from the National Energy Agency in Sweden, during the last years. The database consists of more than 5000 energy measures, whereof 500 from energy audits made in real estate companies.

The data in the database can also be used to reduce the time for making energy audits and for finding more possible measures. Experience shows that the time for making the audit can be reduced by half at the same time as the expert will find double amount of measures.

The EFFECT4buildings project identified a big need for this tool and to make it more user friendly for building managers to insert data and to use it for benchmarking as well as using it as a monitoring system. For that a cooperation with Nordic Energy Audit started.

Method

The project has in cooperation with Nordic Energy Audit further developed the web tool made by the company to make it possible for building managers to use in an easy way. Project partner and building managers has tested the tools and given feedback for further improvements.

In TWGM4 in Tallinn a workshop was organized to present the web tool and the database. As preparation for the workshop, fact sheets were produced based on statistics in the database to show common and profitable energy solutions that was discussed by building managers and partners in the workshop.

In TWGM5 in Vidzeme a workshop was organized to discuss how energy audits is being done in different countries and in what way energy measures should be presented in the best way. Partners also discussed the benefits from using a common standard for energy audits and how countries in the Baltic Sea Region could cooperate to increase the pace and quality of energy auditing.

Results

Benchmarking and monitoring tool

Information about the web tool and database with energy measures can be found on Nordic Energy Audit web site; www.nordicenergyaudit.se

and in this short presentation;
https://drive.google.com/open?id=0B6PQBPinqbwpWmYyek1CelpTUkE

Discussions about the potential for the tool lead to the conclusion that Baltic Sea Region would benefit from developing the tool further together and to implement a new more effective way of doing energy audits, which lead to the initiative to be work more on this in a platform project in Interreg Baltic Sea.

Statistics on energy measures in real estate companies in Sweden, based on 500 energy measures presented in energy audits.

Statistics of energy measures from 3 groups have been compiled. It shows how common/often different types of measures has been proposed and how profitable they are. By calculating saved MWh per per invested 100€ (MWh/100€) the most cost-effective measures have be identified.

Heating & Cooling

Category: Heating	**Number of listed measures**	**Annually average saved MWh/ invested 100 €**
Insulation of building envelope	20	0,18
Reduced temperature for spaces	29	7,55*
Changing of windows	6	0,05
Reduced infiltration (sealing of building envelope)	9	0,61
Heat recovery from processes	8	0,59
Control strategy measures (regarding heat system)	8	0,61
Adjustment of heating system	7	0,31
Changing of heat/cooling system	16	0,32
Installation of ceiling fans (reduce temperature differences)	1	0,29
Other	23	0,63

Category: Cooling	**Number of listed measures**	**Annually average saved MWh/ invested 100 €**
Comfort cooling	1	1,84
Adjustment of cooling system	2	1,55
Insulation of building envelope	1	0,12
Adjustment of temperature for spaces	2	N/A*
Changing of cooling system	6	0,63
Other	1	0,29

* Adjusted temperatures does not, in most cases, have an investment cost (or very low).

<u>Conclusions</u>

For heating the most common measures are to improve insulation of the building and to reduce the indoor temperature, but also investments in new heating systems. The most cost-effective measures, that makes sense to start with, is to make sure indoor temperature is set correctly and to seal the building from leakage.

For cooling the most common measure is to invest in new/other cooling systems, while the most cost-effective measure is to maintain/adjust the cooling system correctly.

Ventilation

Category: Ventilation	**Number of listed measures**	**Annually average saved MWh/ invested 100 €**
Time- control of ventilation	50	7,81
Demand- control of ventilation	29	3,09
New ventilation units	38	0,45
Heat recovery (e.g. on exhaust air)	10	1,02
Other	38	5,12

Conclusions

For ventilation the most common measures are to invest in time control of ventilation or to invest in whole new units. The most cost-effective measure is to invest in time control or demand control.

Lighting

Category: Lighting	**Number of listed measures**	**Annually average saved MWh/ invested 100 €**
Install more efficient luminaries	47	0,46
Presence control and/or sectioning of luminaries	29	0,84
Other	13	1,66

Conclusions

For lighting the most common measures are to invest in more efficient luminaries, but the most cost-effective measure is to invest in presence control.