

BENCHMARKING AS TOOL OF IMPROVING ENERGY EFFICIENCY

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Last-years trend all over the world is RES and energy efficiency improving in order to reduce GHG emissions. This tendency has a lot of importance inasmuch as EU sets oneself many goals in this direction with the 20/20/20 targets regarding GHG emissions, energy efficiency, RES production and biofuels utilization. The most energy-consuming sector is the third one (households and services) with residential and public buildings ahead – 37% up to the total energy consumption in Europe. EPBD's directive has this theme as main one. Many European projects tried to provide information and tools to achieve the 20/20/20 goals but HARMONAC first and iSERV CMB after attempted to give strong bases to achieve them. Especially the latter (starting in 2011 and ending at the end of May 2014) wants to give a strong knowledge in building's inspections of HVAC systems through continuous monitoring and benchmarking action. This project will provide a significant reduction in energy use of HVAC systems, helped by a database with information on HVAC systems performance and buildings energy consumption. This will be possible because of the benchmarking action. But to do that, it needed an energy-performance parameter as objective as possible through which the comparison will be possible.

Many studies were done in this direction from 90's. It is possible find and read a lot of scientific papers different apart, but similar in the conclusions. Were found, in fact, many ways to compute this parameter normalized on building surface, time, climate factor and building age. Some of them, furthermore, with multiple regression analysis, normalized the energy use intensity (EUI) by operational schedule, systems typology – such as chiller, heating system and lighting system – and even occupants' behavior. There are also several softwares which, with the right input, give as output the EUI normalized on as many parameters as are the inputs put into it.

There are, then, many methods with which work. Once that there will be a unique way to calculate this EUI parameter, it will be possible build the database with thousands of building examples. Sensors and monitoring action play a significant role, because thanks them it will be possible make the continuous action about which the acronym of iSERV CMB project speaks out. This continuous updated database, so, will work as benchmark-action field. Monitoring action allows to get the data, the methods allows to determinate an objective value with which work and benchmarking action allows to compare our-building parameter to others and highlight if we consume more or less than other buildings all over Europe.

The strength of the example forces us to get better, that's why benchmarking is a powerful tool. It is zero-costs investment (except for sensors that are at the expense of the European project) and it improves, indirectly, the energy efficiency, understanding where the weak spots in the building are. There are several examples that explain that: one of them is a fifteen-floors building in Genova, north of Italy. Thanks to these projects it was possible meter consumption and loads, study and upload them in the European benchmark-database. After that, was discovered that there was a temperature difference between north and south facades, internal luminosity was insufficient and weekend-days-consumption was equal to week-days, even if nobody was in the offices. Once that this was put on light it was possible fix the problems and both thermal comfort and energy efficiency increased, meanwhile the energy consumption decreased considerably.