Moving towards a new Paradigm for the Buildings Sector

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As EU policy makers wisely move us towards a sustainable energy system, the Buildings sector is under great pressure to take a giant step forward and provide its needed contribution for this goal. After first publishing the EPBD in 2002, that required EU Members States to establish an Energy Certification System for buildings, as well as regular mandatory inspections for boilers and air-conditioning systems, the EPBD was recast in 2010 and it came out with even greater challenges.

The 2002 EPBD required EU Member States to have building regulations establishing minimum levels of energy efficiency and to ensure that every new building would meet them. However, it did not set any target on the minimum requirements that MS would be expected to set. It simply expected MS to behave in a responsible way and to establish ambitious minimum requirements. A few years later, it was quite clear that, although every MS had moved in the right direction, the minimum requirements set by many MS were not really ambitious enough yet.

This prompted the 2010 recast of the EPBD, where objective targets were placed on MS to establish ambitious minimum requirements. Firstly, it imposes a "cost-optimal" regulation based on a life-cycle analysis of reference buildings and packages of improvement measures to establish optimal minimum requirements that must be among the best of all the cost-effective solutions. Secondly, and this is where the new paradigm for buildings comes in, it establishes the far-reaching goal that every new building to be constructed within the EU from 2020 onwards must be a "nearly –zero-energy" building (NZEB). This represents a real step-change relative to the present way of designing and building, both from an architectural perspective and from the side of technical systems, including HVAC and lighting. We can't simply go on using the same practices we now use with just small adjustments. Current practices must be overhauled. We must learn new processes and industry needs to develop yet better equipment and tools. Even the workforce needs to be re-trained, because a NZEB must be built by specialized crews. Recognizing this need, the EU Commission has already launched the "BUILD-UP Skills" initiative, involving all MS, with this precise objective: train the workers that will be able to build NZEBs in just a few years from now.

As guest-editor of this issue, I invited a few experts to explain the underlying principles and methodologies for this on-going step-change. You will find a report on the present building stock in Europe; an insider view of why good HVAC designs not always result in well-performing buildings at the end of construction; a detailed explanation about the cost-optimal regulation and how MS are implementing it; a insight of how the NZEB concept is currently being treated by the EU MS; news about better equipment requirements (eco-design); and you will find front-runner examples of NZEBs in a cold and a moderate climate. We also hear how EU's Intelligent Energy programme is supporting these issues.

But real sustainability does not end with building design. The best performing building can easily become an "energy hog" if it is not properly maintained. That's why the new EPBD requires inspections for all heating and cooling (including ventilation) systems, or equivalent measures. A discussion about the possible role of system monitoring as a cost-effective alternative to regular inspections is also included in this issue.

Achieving the new NZEB paradigm in less than a decade is a great challenge that needs everybody's best effort. The HVAC professionals must certainly play an important role at all stages: design, equipment, construction, maintenance, monitoring and auditing. This shall surely remain a hot topic during the next few years.