

Interview of REHVA Board Members on nearly Zero Energy Buildings

The following interview with REHVA Board Members was conceived as the follow up of a previous Board members' interview about nZEB done in the REHVA Journal issue 3/2011. It is intended to be an input for critically facing the first deadline imposed by EU recast for Member States, the definition of intermediate targets toward nZEBs for 2015.

We asked three specific questions to the interviewed Board Members:

- 1) What is still the biggest challenge to reach 20-20-20 target in EU?
- 2) What is the most important action taken in your country towards nearly Zero Energy Buildings?
- 3) Which are the most promising HVAC system technologies to give a boost to buildings energy efficiency?



STEFANO PAOLO CORGNATI, Italy
REHVA Vice-President until 2017

1) What is still the biggest challenge to reach 20-20-20 target in EU?

– Dealing with buildings, the real challenge is the integration among the three 20-20-20 targets. Currently, actions are being implemented for each of these goals: reducing energy consumption and increasing energy efficiency, increasing the share of renewable energies and reducing CO₂ emissions. In my opinion, in next years these strategies, which now are running in parallel rails, should become organically integrated. To reach this goal in new and retrofitted buildings design, the new chal-

lenge is keeping in mind that the loop “reducing energy demand-rising energy efficiency-using renewable energy- lower CO₂ emissions” needs to be faced from the very beginning of the design process by all the actors together at the same decision-making table.

2) What is the most important action taken in your country towards nearly Zero Energy Buildings?

– In Italy, nowadays the major theme of nearly Zero Energy Buildings is coupled with the energy retrofit of the existing building stock. At the current stage, significant incentives are given for buildings' retrofit, with two main measures settled at the legislative level: **1.** tax cuts for buildings' refurbishments, **2.** tax incentives for implementing energy efficiency measures, ranging from thermal insulation improvement to testing of innovative technologies for energy production. In my view, to make nZEBs economically competitive - objects to be sold in today's buildings market - there is a need for government subsidies.

3) Which are the most promising HVAC system technologies to give a boost to buildings energy efficiency?

– Looking at the Mediterranean countries scenario, the most promising technologies in the HVAC market sector are the mechanical ventilation systems with heat recovery and dehumidification, because of their poor implementation in this area. A significant increase in these installations can be foreseen for summer and winter heat recovery systems and for heat pumps, as the general trend is now rapidly moving toward all-electric buildings, possibly with electricity produced on site. Of course, this kind of systems requires a consistent improvement in heat pumps energy efficiency and an increasing use of geothermal and groundwater heat pumps, when technically and economically feasible. Dealing with cooling, another big issue is finding the tradeoff between natural and mechanical cooling. The combined role of thermal mass, which must be properly designed, with natural / mechanical ventilation strategies is still a theme to be investigated and developed in warm and hot climate.



KAREL KABELE, Czech Republic
REHVA President until 2016

1) What is still the biggest challenge to reach 20-20-20 target in EU?

– Year 2020 is approaching and with it the question mark whether the ambitious goals of the European Community in the field of energy performance of buildings and reduction of external environmental load are met. Member States already elaborated steps leading to these goals, European directives are implemented in national legislation and in most countries measures to improve the energy performance of buildings have already come into force. However, an unsolved question is how the market, investors and users, who largely affect the actual energy use by their behaviour, will respond to this pressure. A warning signal is that, although the requirements for buildings have tightened considerably in the recent past, the total energy consumption did not record significant decrease so far.

With the implementation of energy efficiency measures in buildings, new problems are arising, especially dealing with indoor environmental quality and its potentially fatal consequences: for instances, deaths for CO poisoning in sealed homes with gas appliances, the formation of harmful mould,

overheating of buildings. These issues are potential disruption causes toward the achievement of the 2020 objectives. However, one of REHVA's priorities is to promote holistic solutions for energy efficient, healthy and smart buildings. Therefore I am confident that these teething problems of modern buildings will be soon overcome and that, thanks to more than 100.000 top European experts in our member organizations, Europe will continue to pioneer and be a role model in the field of buildings energy efficiency.

2) What is the most important action taken in your country towards nearly Zero Energy Buildings?

– The definition of nearly zero energy as it was published in Directive 31/2010 EC gives great freedom in the interpretation and space for precision at the Member States level. Czech Republic has its own nearly Zero Energy Building definition settled in the Implementing Regulations to the Act on energy management. This definition, expressed numerically by tightening the requirements for thermal insulation of the building envelope and for the share of non-renewable primary energy, is currently being tested in order to verify that these dispositions entail an actual reduction in

energy consumption in buildings. Czech Republic has a long tradition in this field: already in the 90s of the last century, during the development of electric direct-heating, energy evaluations for buildings with very low heating energy consumptions were developed.

3) Which are the most promising HVAC system technologies to give a boost to buildings energy efficiency?

– I believe we can expect a breaking period in view of HVAC systems used in buildings. Dramatic changes in the ratio of energy needs for heating, cooling, hot water and lighting necessarily require a new approach to study and develop the energy systems of buildings. The days when heating was a crucial indicator of the energy performance for Central Europe are over. Modern heating and other energy systems ensuring the quality of indoor environment must be dynamic, with minimal or zero power consumption in stand-by condition, which is due to qualify for the building envelope for the large majority of its running time. At the same time, there is clear pressure on the exploitation of renewable energy sources, so we can expect to solve the problem not only on the conversion side but also in terms of energy storage.



JAREK KURNITSKI, Estonia
REHVA Vice-President until 2016

1) What is still the biggest challenge to reach 20-20-20 target in EU?

– Energy Efficiency is the challenge. EU simply does not seem to have enough capacity to renovate as many buildings as needed to achieve this target. However, many Member States have implemented regulations boosting renovation volumes and deep integrated renovations, which are the only way to tackle indoor climate and energy performance improvements at the same time.

2) What is the most important action taken in your country towards nearly Zero Energy Buildings?

– There are some good national nZEB applications in Denmark, in Estonia and in few others, but, as a whole, national energy calculation methodologies and regulatory frameworks still need major developments to enable successful implementation of nZEB targets European wide. nZEB requirements do not necessarily need to be too sophisticated at the end of the day they are just primary energy limit values for major building categories. However, to set such kWh/m² values (for building categories listed in EPBD Annex I), comprehensive methodology and input data definition are needed. Energy calculation methods and tools are an issue – available commercial simulations tools which are easy to use, flexible and

reliable have needed development efforts measured in tens of man-years. If authorities do not accept such tools, many years are needed to develop national ones. EN standard package under revision (2nd generation EPBD standards) will provide good guidance, but upgrading and development of national tools takes time.

National nZEB applications launched so far have shown major systemic problems that are not easy to solve in short time perspective. The primary energy requirement has been between 20 and 200 kWh/m²y and in about half of MS on site renewable energy production has been not yet implemented in energy calculation methodology. National applications not consistent at all and with different level of ambition have made inter-comparison almost impossible.

One of the most positive developments in EPBD implementation has been the cost optimality approach. Cost optimality of existing energy performance minimum requirements has been tested in MS with net present value of global cost calculation method which was launched as European regulation accompanying the directive. As a result of this exercise, many MS have already shifted minimum requirements to the cost optimal level. The problem is that in many MS it has not been possible to bridge

the gap between the cost optimal energy calculation methodology and national energy calculation methods used in the compliance assessment. Implementing the key elements of the cost optimal methodology – delivered and exported energy and non-renewable primary energy indicator – to national energy frames, and allowing the same tools that have been used in cost optimal calculations (simulation tools) could solve the problem of nZEB national applications. National authorities should understand that nZEB is not just setting couple of new numeric requirements, but in most cases a major upgrade of the whole energy calculation and regulatory system. In the communication to MS, guidance by European Commission is taking a crucial role, as REHVA has already published nZEB guidance and European standards will soon be available.

3) Which are the most promising HVAC system technologies to give a boost to buildings energy efficiency?

– I do not see any problem with HVAC or other technologies needed for nZEB. I have written one of the most technical books on cost optimal and nZEB buildings. I do believe that all the technologies we need are already there, and, if properly applied, for an affordable price. The latter one is the issue we should work in the building sector.