

Large scale RES integrated refurbishment R&D is needed



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Building sector not only has the largest potential for reduction of GHG emissions, but also that potential is relatively independent of the cost per ton of CO₂ eqv. achieved. In addition to the energy consumed during the building operation, energy is used for building materials and component manufacturing, as well as for buildings construction (embodied energy). Embodied energy in existing buildings (percentage of which the highest) is clear evidence that the largest energy savings can be achieved by the refurbishment of the existing buildings, particularly residential (highest percentage of the existing).

and expectations. Consequently, concerning the share of buildings in the final energy consumption, and related near and midterm energy saving targets, it is hard to expect that required deep energy refurbishment, planned by the corresponding National Energy Efficiency Action Plans (NEEAPs), can be realized if there are missing developed of “industrial” scale buildings architecture and construction refurbishment technologies and corresponding integrally harmonized HVAC/RES systems, and engineering technologies, developed and validated based on the relevant R&D results. To reach predicted energy saving targets a large scale building energy refurbishment industry has to be developed for all types of buildings.

Energy Refurbishment Industry – Buildings Refurbishment/HVAC/RES industry - commercialized integrated refurbishment design and engineering as a whole integrated process (including codes and standards), is to be established. To approach this goal there is a need for financial support to HVAC and construction industry for the joint R&D, aimed at founding large, industrial scale RES integrated refurbishment technologies and systems for different types of existing buildings/HVAC combinations, including related design and commercial manufacturing.

Energy related impacts of buildings must be considered in their life-cycle analysis focusing all factors relevant to energy use, GHG emissions, and implementing a holistic approach to determine and analyze total building performance: energy flows and interactions between the different technical systems of buildings – HVAC&R and other technical systems, as well as a multiple-domain comfort and IEQ (thermal, light, air quality, acoustics, noise, ionizing and electromagnetic radiation, etc.).

Beside, a series of actions towards Energy Efficiency Improvement and Renewable Energy Sources, conducted by the professionals, national and international organizations, and globally intensive media attention, as well as the governmental bodies policies on the energy saving measures introduced worldwide, realization of the planned activities is far behind the predictions

Developed, mature, commercially available on the market, pre-constructed HVAC/RES/HP and/or HVAC/RES/DHS/HP systems and unified retrofitting construction works as well as corresponding mechanical and electrical subsystems would eliminate important technical and technological barriers to spread deep energy refurbishment projects conducted integrally with decentralized solar, wind, ground or groundwater source HP implementation at the building level, at its yard and/or at the municipal level. In addition, development of the specific hardware and software within the building/HVAC retrofitting system can directly increase competitiveness of related HVAC, heat pumps and other RES systems, including renovated/refurbished Zero and Energy Plus Buildings and smart-grid optimal intelligent control systems industry. **3E**