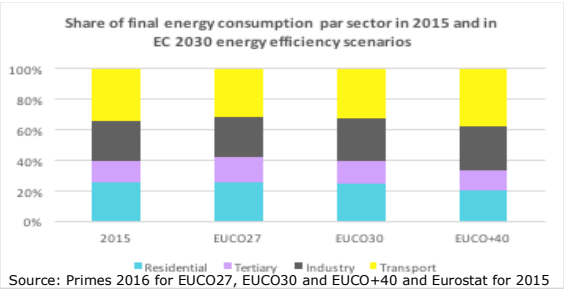
How the building sector could unleash the 4th Industrial Revolution in Europe?

Highlights

- Renovation rates considered by the Commission for the preferred option of 30% binding energy savings are far too low to enhance the emerging energy renovation market and trigger large scale renovation projects.
- Public funding (both EU and national) currently delivers mainly a shallow renovation which does not require nor trigger innovation.
- EU regulations should be based on a holistic approach and should go beyond energy use in the use phase to include criteria such as health, comfort, resource efficiency and recyclability.
- Energy renovation is a unique opportunity to unleash the 4th industrial revolution in Europe. Large scale renovation projects will require the use of 3D printing, scanning buildings with drones to establish the databases needed to design innovative solutions and sustainable energy renovation kits allowing to reach the level of net zero energy/carbon building.
- A third independent party is needed to facilitate the energy renovation market by working upfront on the identification and mitigation of all risks together.

Policy context

The "Clean Energy for All Europeans" package, released November 30th by the European Commission confirms the pivotal role of existing buildings in the decarbonisation of the EU energy system. In fact, the building sector is projected by the Commission to lead the moderation of energy demand (see graph below). However, the renovation rates considered by the Commission for the preferred proposed option of 30% binding energy savings target is below 2% using the bottom-up model (BEAM²) or slightly above 2% using the top-down model (PRIMES). Such low renovation rates are equivalent to those reported by several Member States. Triggering large scale renovation projects by the proposed 2030 framework is therefore doubtful.



Source: Primes 2016 for EUCO27, EUCO30 and EUCO+40 and Eurostat for 2015

Existing EU Policy framework

The EU policy framework, aiming at reducing energy consumption in the use phase of buildings, is one of the most comprehensive ones in the world. However, this comprehensive framework suffers from its fragmentation (see figure below). In fact, each instrument and very often each measure or set of measures addresses concerns of individual groups (stakeholders/industry). The holistic approach is therefore missing and existing public funding (both EU and national) deliver shallow renovation which does not require innovation.

The fragmented EU policy diamond

Towards a 4th industrial revolution?

The necessary contribution of the EU to the implementation of the Paris Global Climate Agreement requires Europe to modernise its renovation concept. The current model is based mainly on grants which allow the implementation of "low hanging fruit" solutions by ESCOs. This model cannot lead to net zero energy/carbon building stock by 2050.

It is first important for policy makers and industry to acknowledge that the driver behind energy renovation work is very often providing more/better comfort for its occupants and/or increasing the market value of the property. It is therefore important for EU regulations to go beyond energy use in the use phase and to include other sustainability criteria such as resource efficiency, different comfort levels (lighting, acoustics, olfactory…), recyclability and health impacts. This would foster innovation in sustainable construction materials.

The second step is to have a clear, measurable and easy to monitor target in each member state. The current nearly zero energy and major/deep renovation targets have created confusion among many stakeholders. Moreover, this confusion has led to inertia in innovation. Solutions implemented today are those invented years ago, while the world is moving towards the use of drones, 3D printing and full automation of buildings. In fact, the first 3D printing building was delivered in Dubai in May 2016 while Europe is still struggling with data collection of energy consumption of its building stock.

Combining 3D printing, scanning buildings with drones to establish the databases needed to design innovative solutions and sustainable energy renovation kits -per construction periods, climate zones and building types- represent a unique opportunity for Europe to unleash the 4th industrial revolution.

However, for this revolution to take place in Europe, innovative business models would be needed. The existing ESCO models do not allow to deliver net zero energy/carbon buildings. The third step is, therefore, to organise the demand and the supply of energy renovation through a third independent party whose role would be to identify the risks and work upfront on their mitigation. A good example of a such facilitator is the one established in the Netherlands (Energiesprong) for net zero renovation of social housing. Expanding this model to all type of buildings should trigger large scale renovation projects and consequently lead to economies of scale.

Recommendations to Build Upon

- Proposing stakeholders' energy renovation strategies that would unleash the 4th industrial revolution in Europe if the strategies planned by governments are not ambitious enough. Common guidelines to ensure national strategies across Member States are aligned in terms of long and short term ambition level are needed.

- Building new partnerships with financial institutions, construction industry, innovators and public authorities to create the business models and the technologies needed to renovate Europe to the net zero energy consumption level.

- Selecting the most advanced/ambitious municipalities for the design and the implementation of the ambitious renovation strategies co-developed with BuildUpon partners. Ambitious municipalities could be selected among the Covenant of mayors signatories.

- The upcoming period is crucial for the design/implementation of ambitious renovation strategies. BuildUpon partners should remain engaged!