



The CELSIUS response to the revision of the Energy Performance of Buildings Directive

The FP7-funded Smart Cities project CELSIUS (www.celsiuscity.eu) aims to facilitate the deployment of smart district heating and cooling systems across cities in the EU. It brings together excellence from 20 key partners along the value chain: cities, industries and leading universities in the partner cities Gothenburg, London, Genoa, Rotterdam and Cologne. In the hope of creating ripple effects across Europe, the project is committed to recruiting 50 cities into the CELSIUS vision. The goal is to assist the new CELSIUS city members with practical information necessary for the development and maintenance of their DHC systems - including technical, social, economic and legal advice.

1. Overall assessment

The 2010 version of the Energy Performance of Buildings Directive (EPBD) has made significant strides towards its goals in relation to increased energy performance of buildings and reductions in GHGs across Europe. The results could however have been far better if the directive was designed to address energy at a systems level as well as a building level. The current framework is merely focusing on the performance of individual buildings and does not encourage the consideration of buildings as individual components within a larger energy system. For instance, it does not encourage solutions that take advantage of energy infrastructure operating at a district or city level, such as district heating and cooling (DHC) systems. DHC systems are not only very efficient, in urban environments with high heat densities, due to economies of scale and scope but they can also recover excess heat – that otherwise would be wasted – from a wide range of sources, including industry, sewage water, waste incineration etc and thus have a positive impact of the overall energy performance of a city or a district. District heating can furthermore support roll-out of renewable energy technologies by providing infrastructure that supports grid balancing and energy storage in the form of heat as this allows effective integration of intermittent renewable energy sources.

The Heat Roadmap Europe (HRE), a research initiative carried out by Aalborg and Halmstad Universities, offers robust and compelling evidence that with a district level energy efficiency policy framework based on optimising the combination of demand and supply side measures, the EU could achieve its main climate and energy objectives, most notably an 80-95% GHG reduction compared to 1990 levels, for roughly €100 billion less per year between now and 2050 compared to a scenario in which energy savings targets are pursued through building-level measures alone. The current version of the EPBD directive allows for member states to neglect these kinds of macro- or neighbourhood level effects when calculating cost optimality and instead encourages focus on individual building investments alone.

The Commission should also assess the opportunity to assign waste heat the same status as renewable energy due to its ability, when integrated into district heating networks, to also directly reduce greenhouse gases and primary energy demand

2. Discrimination against larger neighborhood or city level energy systems

The focus in the directive on individual buildings has led to an implementation bias towards on site solutions, such as individual gas boilers and electricity driven heat pumps, and a discrimination against larger neighbourhood or city level energy systems even though in urban areas with high heat densities they tend to be more resource efficient. The reason is that the EPBD and the definition for what constitutes a Nearly Zero Energy Building (NZEB) allows for member states to exclude on site produced energy from the performance calculations, which leads to a situation where the indicator does not reflect the actual energy consumption of the house. Further, no alternative assessment is actually being made to assess whether the on-site solution is a better choice compared to, for instance, connection to a district heating grid.

Secondly, as for instance in the case of Sweden, the building codes stipulates that energy consumption should be measured by the amount of energy delivered to the building and not the actual net energy that is used to heat the building. This approach too favors on-site heating installations and actively discriminates against centralized heating systems, such as district heating systems. It creates financial incentives to generate heat inside the building instead of, where it is the best option, connecting to the district heating network.

The limited scope of the directive constitutes a barrier to really reduce primary energy and GHGs and not just final energy consumption. In order to provide an accurate picture of the energy performance of a building it is essential that the ways of calculating energy performance reflect primary energy consumption rather than just final energy consumption and that it looks at the net energy used in the building and not only on the amount of energy delivered to the building. It is of utmost importance that the building codes/energy performance standards that flow from the EPBD at a Member State level encourage solutions that deliver an overall better energy performance. Consequently the playing field in which building and system level heating and cooling solutions are competing needs to be evened out allowing for fairer competition and an optimum solution.

3. Investments and funding

The directive has indeed helped accelerate investments in energy efficient buildings, but as the directive favors on site solutions it has mostly pushed towards individual building measures, such as solar panels, heat pumps and individual boilers. We would like to encourage investments in cost-effective and resource efficient district or city wide systems where these are the carbon and



cost optimum solutions. The EPBD should encourage the consideration of all viable energy systems, both individual and communal, with no bias to any one solution but to encourage the cost and carbon optimum solution to be pursued.

More EU funds should be allocated to municipalities and regional actors to implement integrated plans that look at both the utilization of available resources, such as RES and residual heat, along with energy savings measures. This would allow for neighbourhood level decarbonisation plans that bring together the optimum combination of energy efficiency and low carbon energy supply. Further, when it comes to developing larger energy efficiency and energy generation and distribution projects, such as district heating and cooling, the EU should explore opportunities for creating or enabling the establishment of a dedicated project development funding stream or programme, similar to the EIB's ELENA programme, that allow cities to assemble the specialist technical, financial and commercial support that they need to develop a pipeline of commercially viable projects that they can then seek funding for from public or private sector investors. Additionally, we encourage the establishment of a new investment mechanism or fund that recognises the inherent risk profile of district heating and cooling projects, high in their early operational stages and dropping off as consumers are signed up. This would make long-term flexible capital, up to 15-20 years, available which would really catalyse delivery of district heating and cooling projects and trigger private sector investment in them.

4. Energy Poverty

District heating and cooling technology is important in the fight against energy poverty as it provides affordable and secure heat to the citizens. For one, district heating systems lower the costs of energy generation through economies of scale and efficiency, for instance fuel efficiency is considerably increased through the use of combined heat and power (CHP) technologies. This provides a greater control over fuel costs and enables cities to protect their citizens, to some degree, from the inevitable market fluctuations observed in the energy retail market that result in rising fuel prices. Second, for the customer, it is a smaller investment to connect to a community level system than to invest in an individual energy production installation.

The EPBD should recognize district heating and cooling technologies as efficient ways to provide affordable and secure energy to citizens. The fact that the current version promotes onsite solutions steers in the opposite direction and does not always result in cost-optimal solutions for vulnerable consumers.

5. Renovation of the existing building stock

There is indeed an urgent need to renovate the existing buildings stock. It is however always a risk involved when comprehensive and costly investments are forced upon building owners. It is important that public sector building renovation is looked at in the context of both system level solutions and building level solutions and that these buildings form part of a wider decarbonisation plan at maybe a neighbourhood level. A mandatory target might not encourage this approach but



force buildings to be renovated in isolation purely to meet a target. In order to achieve a thoroughly reconstruction of the building stock, there is a need for financial instruments and incentives rather than mandatory targets. Furthermore, it is crucial to define what constitutes a public building in this regard. Does public building only refers to government buildings or does it also include all properties owned by a local authority, i.e. as in the case of the Swedish *Allmännyttan* (public housing).

6. Best practices at local level

Cities often have far more ambitious emission reduction targets than their member states and are really taking a leading role in promoting and often delivering energy efficiency, energy supply, including in scaling up renewable energy sources and energy distribution infrastructure. The Covenant of Mayors has shown that cities' average greenhouse gas emission reductions to 2020 are estimated to be 28 %, compared to the EU member state target of 20%. We believe that district heating and cooling networks, deployed where there is sufficient heat density, has a very important part to play in developing a secure, sustainable, competitive and affordable European energy system that will help it meet its climate targets in the most cost effective way. Each of the CELSIUS' five partner cities; Gothenburg, Cologne, Genoa, London and Islington Council, and Rotterdam are committed members of the Covenant of Mayors and have ambitious climate and energy goals with district heating and cooling networks, making increasing use of waste and environmental heat sources, playing an important part in helping us achieve those goals. The CELSIUS project will also be actively supporting cities across the EU to develop their ambitions around district heating and cooling.

Local authorities have a particularly important role to play when it comes to district heating and cooling. Cities often control many of the local heat sources that can be recovered and used in district heating and cooling systems, such as for example heat from waste incineration, heat from sewage water, from metro systems etc. Furthermore, many ownership models for district energy involve the public sector and the most common model in the EU is the one where the municipality owns the entire system. Even if the systems get privatized later once operational and returning a profit cities tend to maintain at the very least a strategic interest in the system if not a financial one as well. Cities can also accelerate development of district energy, for instance through providing financial support in the form of grants or loans, funds, tax reductions etc, guaranteeing consumers by connecting public buildings or development of favorable policy and planning frameworks that support DHC in areas of appropriate heat density. Through visions and long term targets, energy master planning local authorities can create a stable framework and help to avoid or overcome conflicts between stakeholders. Long term targets can also help to provide policy security that attracts private sector investors who need to be confident that the market parameters that influence their investment decisions will not change. We have examples of ambitious long term visions and targets in the CELSIUS project, for instance the Gothenburg Climate Strategy and London's Climate Change mitigation and Energy Strategy.

