CONFRONTATIONS EUROPE

Confrontations-Europe – Energy and Climate Group

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ENERGY EFFICIENCY: TAKING FLIGHT IN BUILDING

This briefing summarizes the contributions of the four panelists:

- ***Mr. Paul Cartyuvels,*** *Director of European Affairs, Bouygues.*
- ***Mr. Olivier Flechon,*** *Department Head, National Solar Energy Institute, CEA/LITEN.*
- ***Mr. Robin Osmont,*** *Head of Economic Affairs and of the Electric Industry Observatory, Union Française de l'Electricité.*
- ***Mr. Sylvain Robert,*** *Energy Efficiency Unit, Directorate-General for Energy, European Commission.*

This text is a summary of their introductory presentations, their answers to participants' questions, and participants' contributions.

INTRODUCTION:

Following the COP21 climate agreement, the European Union announced its intention to reduce its total greenhouse gas emissions by 40% of 1990-levels by 2030. To conform to this goal, on 30 November 2016, the European Commission published a group of proposal titled, **"Clean Energy for All Europeans"** (or "Winter Package"), comprised of revisions to **eight pieces of legislation** concerning renewable energy, energy efficiency and building energy performance, the electricity market and the security of the electricity supply, the rules for a system of governance for the Energy Union, a new pathway for ecodesign, as well as a strategy for connected and automated mobility.

In regards to **energy efficiency,** the EU executive branch is counting on a **binding EU-wide goal of 30% by 2030** instead of the 27% initially set.

The 23 March 2017 seminar examined the new ideas within the 30 November 2016 proposals on the energy performance of buildings and the expected results. Then, it presented the reactions of the construction industry, particularly their general opinion of the texts (the accompanying financial and legal devices and the material and personal resources) and of the electricity sector concerned by the interactions between different climate policies. Finally, the seminar examined the impact of new technologies (materials, modi operandi) in terms of economic and ecological efficiency for the construction sector.

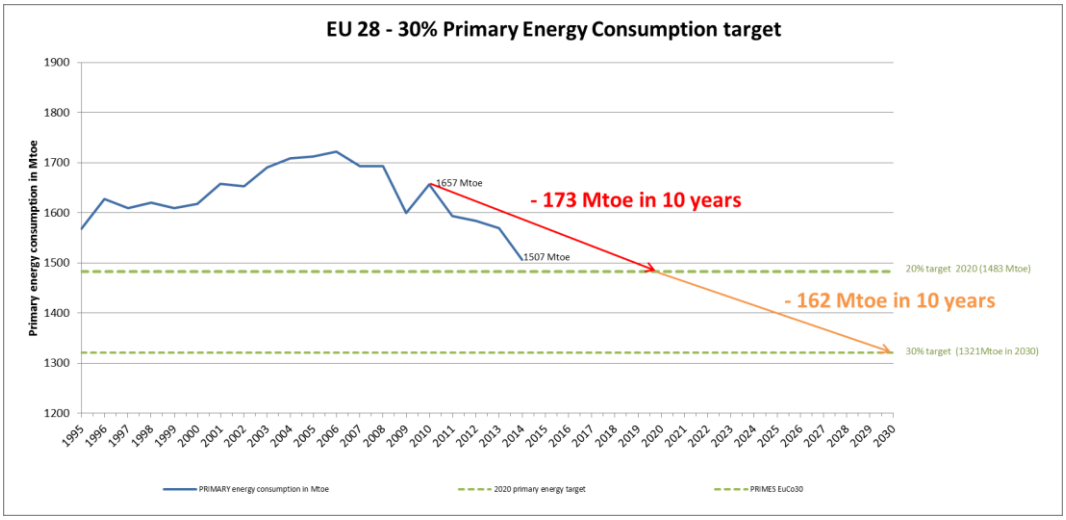
THE EUROPEAN APPROACH:

On 20 and 21 March 2014, the European Council outlined energy efficiency's contribution to reducing energy costs and energy dependence. The European Union defined minimum energy efficiency standards, labeling and eco-design rules for products, as well as services and infrastructure. These measures should improve efficiency at every step in the energy chain, from energy supply to consumer use.

a) Increasing the Energy Efficiency Objective

With the Winter Package, "Clean Energy for All Europeans," the European Commission has made energy efficiency a priority. In fact, energy efficiency has a strong potential to reduce greenhouse gas emissions; thus, increasing the objective by 3 percentage points would help maintain the emissions reduction trajectory to conform to the COP21 commitments.

The graph below shows that primary energy consumption in the EU since 2010 is in decline (a reduction of 150 million tonnes of oil equivalent between 2010 and 2015).



Source: European Commission – Primary Energy Consumption Projection

The new Energy Efficiency Directive states that primary energy consumption increase from 2005-levels can't exceed 1321 Mtoe in 2030.

The graph indicates that to achieve this objective, primary energy consumption should be reduced by 162 Mtoe between 2020 and 2030. According to the Commission's impact study, projections on the return on investment in the 30% scenario would yield additional benefits in terms of job growth (+400,000 jobs by 2030) and of economic growth (0.4% increase by 2030) compared to the 27% scenario.

This objective would maintain the trajectory that has been initiated.

b) The Priority Given to Buildings

Buildings constitute 40% of the European Union's total energy consumption. This sector is growing, as are its energy needs. By limiting these needs, the EU will reduce its energy dependence and greenhouse gas emissions and make progress towards its goal of reducing its total energy consumption by 30% by 2030. Since 2002, the first measures **(2002/91/EC, repealed by Directive 2010/31/EU)** have aimed to improve the energy performance of buildings in the EU, taking into account different climate conditions and local particularities. Their provisions would set minimum requirements and a standard methodology. They would cover energy used for heating, hot water production, cooling systems, ventilation, and lighting.

Despite promising results, approximately 75% of existing buildings remain inefficient in the energy plan, and among Member States, only 0.4%-1.2% of the building and housing stock is renovated each year. Thus, the objective of the **Directive 2010/31/EU** revision is to accelerate the renovation of existing buildings, a solution beneficial to the reduction of greenhouse gas emissions and to the fight against energy insecurity.

The revised directive emphasizes:

- Integrating long-term renovation strategies, support for the mobilization of funding, and the establishment of a clear vision for a decarbonized building and housing stock by 2050.
- Promoting "information and communication technologies" (ICT) use and smart technology in order to guarantee the efficient functioning of buildings, the comfort and health of users.
- Streamlining previous provisions.

The new proposal shows the bottom-up thinking process striving to make the transition in the building sector simpler, smarter, and more efficient.

Among the legislative provisions, it's necessary to point out certain **technical and regulatory innovations.**

Article 10 includes an obligation to link financial measures to energy performance diagnostics (A method for characterization of the energy performance, which is implemented in all of the Union buildings. It is commonly used in France).

Articles 8.2 and 8.3 are devoted to a new concept: "electro-mobility," which will involve installing recharging stations at commercial buildings *(a recharging station for each parking lot with more than 10 spots by 2050)* and private residences *(wiring for new construction and large renovations with more than 10 spots).*

Another innovation, the creation of an "intelligent meter" (Article 8.6), will assess a building's ability to optimize its needs and to manage demand, thus enabling:

- Adaption to occupants needs.
- Maintenance and operation facilitation.
- Network exchange.

The Commission services have launched a study to clarify the potential scope of this indicator, as well as the modalities according to which it could be applied. This study aims to feed the exchanges between the Commission, Member States and stakeholders, with a view to the finalization of the definition of the indicator and its implementation. This study develops a collaborative approach to ensure that all stakeholders are consulted.

The objectives of the study better characterize the intelligent building technologies, define a methodology for the calculation of the indicator, as well as assess more precisely the impact and the potential benefits of the indicator. The technological neutrality of the indicator is a factor structuring in the development of this study.

THE APPROACH OF PRIVATE ACTORS:

The representatives of the private sector expressed nuanced positions; some welcome the continued advancements of the proposals, but warn the European Commission of the technical and financial constraints and the risks of interaction and of technological evolutions.

a) The Need for a New Business Model

The proposal is relatively welcomed by the construction sector; the industry recognizes that the difficulty henceforth will be to convince the 27 governments. Outside of the purely political aspects of the Winter Package, some concerns were expressed, particularly on the **funding** and **business model.**
In terms of financial instruments, the European Commission is proposing an initiative titled, **"Energy Performance of Buildings,"** of which the goal is to free up and mobilize private and public investment (€10 billion by 2010). The initiative consists of three axes to:

- Better use public funds, especially with the creation of flexible funding platforms.
- Create an aggregation system helping project heads complete projects.

- Strengthen the confidence of project promoters, financiers, and investors.

This plan is welcomed by the actors but they highlight that the initiative is purely guiding. In fact, the legislative incorporation of the financial component was weak relative to the principle of subsidiarity. This point sparked comments and questions. The funding that the European Commission has discussed isn't a functioning financial regulation; how will it then concretely signal private investors to withdraw?

The true issue is the **link between the funding means and the business model.** It seems difficult to create a standard model, however. The Bouygues Group is experimenting with different configurations on its construction sites. It appears that the business model must integrate more and more with services, like operation and maintenance, which require an information exchange with users. On that note, Bouygues launched a renovation project of a tower in Lyon that allows for the creation of a highly energy efficient, positive-energy neighborhood (a system offsetting fossil fuels with biofuels).

The above case indicates that, while there isn't a standard business model for individual companies, the industry is on the right track. One of the reasons is the lack of training for product suppliers and of energy efficient services. In France, 380,000 craftsmen can supply these products but lack the technical skill to install them. Underlying this situation is a need to address actor accountability. The need for qualified personnel is also a challenge for big construction groups. To illustrate the rise in technicality, it should be mentioned that the sector is undergoing digitalization; construction site take-down is now digitized.

In all, the proposals seem to be going in the right direction. However, the question of training and the business model issue clearly constitute the sector's main concerns. To ensure that energy efficiency in buildings and construction takes off, the creation of a standard business model and simplified access to funding appear to be essential.

b) Evaluating Energy Efficiency: The Need for Relevant Criteria

The new proposals **(Article 7)** generalizes providers' and distributors' requirement to annually return 1.5% of energy savings to consumers in final prices in 10 years **(1 January 2021 – 31 December 2030).** Such a measure would attract private investment and sustain new emerging actors on the market. To take into account national specificities, the Member States can likewise satisfy this requirement through alternative measures with the same effect, such as a mechanism to materially support energy efficiency. The energy savings will have a cumulative effect of 15% by 2030 (1.5% x 10).

The application of this article will be adapted to various situations, such as:

- Providers' and distributers' sales in the ETS.
- Energy savings in energy transport, on the condition that the criteria in Articles 14 and 15 are fulfilled.
- Energy savings gained by work conducted between 31 December 2008-2020 and their later effects.
- Energy produced in buildings with renewable energy installations.

Regarding the impact of this measure, professionals estimate that the 1.5% reduction doesn't take into account the level of energy efficiency differences between different Member States, the marginal cost of increasing energy efficiency, or the changes in economic activity. It seems timelier to lower energy intensity, which would constitute a more relevant indicator, integrating the trending changes in energy consumption. Otherwise, the different tools won't receive automatic feedback; waiting, for example, for a complete analysis for the energy performance certificate. On the other hand, operators welcome the principle that buildings' renewable energy production be excluded from calculations measuring energy efficiency.
Another concern has arisen: the static nature of the **primary energy coefficient,** which reduces the annual primary energy consumption in a home, including heating, cooling, lighting, clean hot water production, and auxiliaries (pumps and ventilators). This evaluation tool enables ordering energy supplies in any given moment, but this could quickly change, notably with renewable energy's penetration into electricity production. The evolution of the electricity mix shouldn't be considered, especially when the choice of energy

used for heating a new building could favor sources that will emit CO_2 for the duration of the buildings' life. Moreover, for the sake of simplification, the **Union française de l'électricité (French Union of Electricity)** proposes a coefficient of zero for renewable energy.

c) Evolutions & Technologies

In this phase of the building market's transformation, it's questionable whether certain apt technological evolutions can improve existing methods.

This is the case for insulation. Technology for insulation has made concrete advances, but as all research efforts have been concentrated on the area, other types of equipment have been neglected. For the specialists at CEA Liten, the goal for heating renovation can only be achieved by a comprehensive approach, including insulation, air quality, heating, hot water production, cooling, and ventilation problems, without forgetting the comfort needs of users.

Thus, a complete renovation of a building translates into a combination of solutions to optimize performance: insulation, storage, energy capture, and management.

- In terms of insulation, in order to limit heat-loss in homes, the CEA is working on the development of an innovative insulation coating using silica aerogels. A coating would be applied to the exterior surfaces of a building in order to achieve a thermal lining. Energy consumption in heating could be reduced by 50%.
- In terms of storage, multiple technological solutions exist (thermal, hydrogen, thermochemical, and electrical). The fact remains that their development is slow. The priorities pushing to make these technologies more competitive are cost reduction, extending lifespan, system security, integrating renewable energy, and valuing self-consumption. Self-consumption poses the challenges of self-storage and cost. As long as the expenses aren't depreciable for consumers, commercialization on the big-scale won't be possible.
- For energy capture, buildings collect little to no heat (geothermal energy) or wind and using external energy remains difficult. But researchers are working on "heat storage in phase change materials." For example, a façade getting all-day sun exposure accumulates heat that could be used in the evening.
- In terms of building management, research is limited. It would be necessary to learn how to model buildings to enable a precise technical evaluation in order to implement customized solutions for each structure.
- Controlling buildings requires their functioning to be intelligent and innovative. Energy consumption must be controlled by automating household equipment, making it responsive to internal and external conditions, with the final goal of reducing daily energy use without harming the habitants' comfort. This control could determine a level of thermal inertia needed to guarantee comfort.

Overall, the research on energy performance needs to improve existing methods and to sustain research on all technologies. In supporting the overlap of complementary solutions, we can hopefully obtain important gains in energy efficiency in habitants' daily use.

d) The Interactions Between European Climate Policies

The diverse climate policies have the same objective: reduce greenhouse gas emission. Europe's climate arsenal includes the ETS, the 30% energy efficiency objective, the 27% renewable energy objective, and the "effort-sharing" mechanism for sectors outside of the ETS.

The link is strongly criticized in terms of economic rationality. Certain actors are unhappy that the European Union has kept the idea of multiple objectives despite the risk of interactions between them, which could result in additional costs. It's a bet on the future and on the real adaption capacity of Member States. For the Union française de l'électricité, raising the energy efficiency objective by 3 percentage points would lead to a

40% reduction of the ETS carbon price. For this reason, its members propose a non-binding objective of 30% in order to prevent the risk of overlap.

Note that some actors wish a reframing of the climate objective around a criterion. By pursuing only, a reduction of C02 emissions, we introduce sufficient flexibility so that Member States can choose the tool both economically and environmentally efficient, with respect to the principle of subsidiarity.