

Regulatory barriers to innovation for energy savings in buildings: The need for a shake-up

A report by Mr. Jean-Yves Le Déaut, M.P., and Mr. Marcel Deneux, Senator

Synopsis

OPECST was requested to furnish this report by the Bureau of the French National Assembly on May 27, 2013. It follows on from several previous studies carried out by OPECST on energy transition. After a thorough analysis in France and Europe on mechanisms governing access to the markets of construction products, it stresses the need for a new impetus for building physics in France, calls for structural changes of public management concerning the design and application of regulations, as well as for a reshaping of public subsidies for thermal energy-saving in building renovation. Many of its recommendations have already been brought to the legislative level.

A strategic issue

The management of the regulation of construction products is complex and an in-depth investigation was requested by the *rapporteurs*. Almost 270 stakeholders were interviewed in Paris, especially in the context of two public hearings open to the press, but hearings were also held in Franche-Comté, Alsace, Lorraine, Lyon and Chambéry. The *rapporteurs* also met with officials in charge of German policies in Berlin, EU policy in Brussels and visited laboratories in Offenburg, Karlsruhe, Stuttgart and Wurzburg; they also held discussions with professionals in Sweden, in Vorarlberg (Austria), and Finland.

This survey showed that a large part of Europe is moving to conquer the huge markets of energy renovation, and that it would not be consistent to manage French energy transition by technical stagnation. France risks losing the battle for jobs involved if it neglects the tremendous scientific and technological challenge of improving the energy efficiency of its thirty million buildings. This represents a market amounting to at least € 900 billion, the equivalent of three times the

cost of renewing the French electricity production park. Known technologies will not provide enough to reach such a goal. Technological breakthroughs will be required to address these immense needs, both in terms of solutions and in terms of processes. New jobs will be located in countries where the efforts of innovation and industrial development have been accelerated. As far as the dynamics of energy transition are concerned, the analysis of regulatory barriers to innovation is absolutely strategic.

Three angles of analysis

Within the process that regulates market access for construction components, be they materials (e.g. concrete blocks, insulation) or devices (boilers, ventilation or other), the *rapporteurs* specifically identified three sources of regulatory restriction. These are often intertwined in the eyes of entrepreneurs.

The first regulatory hindrance may be found in procedures evaluating the safety and quality of products. In France, these procedures are managed under the regime of "decennial liability" based on the presumption of liability of the professionals in

the case of construction damage. The Scientific and Technical Centre for Building (CSTB) is a public institution that provides technical assessments before products are introduced on the market. It is also part of the certification process (such as ACERMI for insulating), which requires on-going quality control. For the market downstream, the Construction Quality Assurance (AQC), a private organization bringing together key stakeholders in construction, assesses the implementation of products in order to identify potential damage that may occur following construction. **After first acknowledging the double task of the CSTB concerning the functions of prescribing and delivering based on the model used in Germany, the rapporteurs supported the idea of extending monitoring by Parliament to the CSTB. This pattern has already been enacted for most major research organizations. This includes public hearings before the standing committees as part of the remit of the President, appointment of members of Parliament to the board, as well as annual meetings before the standing committees and OPECST for the presentation of the activity report.**

The second source of regulatory barriers to innovation is the existence of public subsidies attached to products, such as sustainable development tax credit (CITE). It may seem paradoxical to analyze subsidies as brakes, yet the adoption of rules for granting them stems from well-known existing product characteristics; innovative products that work on different principles are thus disadvantaged and aid benefiting classical products is a barrier to them. There are as many as 14 national and 347 local subsidies; each has different rules, and no department has a global vision of this complex landscape; actors can only rely on themselves to stay informed. **The rapporteurs proposed a simplification accompanied by a focus on the goal: it would be to replace all subsidies attached to products by a global allocation to each building renovation project. The granting of such an allocation would require a validation from professionals combining the skills of architect and engineer, i.e. "renovation advisers" who would be specially trained and certified.**

The third area of potential barriers to innovation involves the conditions under which building equipment is referenced as part of the implementation of the thermal regulation, known as "RT2012". The quantitative requirements of this regulation are integrated into a simulation tool

called "computational engine". All new construction is subject to the test of this "computational engine" to check if it complies with the RT2012. This implies, firstly, that any new component is technically described as part of the "computational engine". This implementation is studied according to a procedure called "Title V," which leads to the publication of a ministerial order. **The rapporteurs highlighted the lack of transparency of this process, which is covered by anonymity. To restore this transparency, the rapporteurs proposed, firstly, to move to an "Open Source" "computational engine" – the CSTB would lead the community of contributors and establish successive versions. Secondly, to submit any regulatory act to the assessment of a representative advisory body composed of all stakeholders in the sector: the "Supreme Council of Construction and Energy Efficiency". The administration could not differ from the view of the "Supreme Council" without giving a precise explanation.**

The recommendations of the *rapporteurs* thus intended to reactivate the momentum for innovation in a field that has become an essential component of energy policy in France.

Two emblematic situations

The report includes an analysis of two cases illustrating practical problems in the technical evaluation of products: firstly, the case of cellulose wadding, secondly, that of thin insulation films.

Cellulose wadding insulation is an environmentally friendly wood product. It began to take off strongly in France from 2010, through a dozen small businesses that ensured compliance with the procedure for technical advice. But these companies have been hit in full flight by two regulatory difficulties:

- Firstly, by a sudden ban on using boron salts as a fungicide; this is the result of regulatory over-reaction of our department for risk prevention relative to changes in the European REACH regulation; these salts were finally authorized, at a very low density, when it was obvious that the substitution solution (ammonia salts) was worse;
- Secondly, by a warning signal launched by the AQC concerning fire hazards in the case of embedded spotlights; this was the result of a lack

of vigilance during the technical assessment process.

During the summer of 2014, many of the aforementioned businesses failed.

The two *rapporteurs* went to see for themselves how the involved agencies work, attending both the CSTB and the AQC meetings. **Everything seemed to be as well organized as possible. Indeed, the use of experts representing competitors to assess products is inevitable. However, they noted the lack of scientists and architects. Nonetheless, no procedure can prevent the concealed and well calculated operation of influence.**

As for thin films, the focus was on the claim that the performance of a product must be assessed in light of its ease of implementation. In the case of imperfect geometrical surfaces, flexible films are more effective than those insulating classical blocks that need to be adjusted to the joints. Less intrinsic performance is then offset by a *de facto* more successful installation.

But the CSTB disputes the value of a measurement of *in situ* performance and sticks to laboratory measurements on the grounds that a measurement must be reproducible. This case has seen several extensions before the courts in France and other European countries.

The *rapporteurs*, keeping in mind the practical point of view of owners, requested that a protocol for measurement of *in situ* performance had to be negotiated. They found that the CSTB, as it did not deal spontaneously with the issue of the actual performance approach, showed that it was not sufficiently immersed in the world of research, which justified the reforms mentioned above.

Taking into account CO₂ emissions

The previous report delivered on behalf of OPECST by Messrs Claude Birraux and Christian Bataille on December 2009 suggested balancing thermal regulation by adding a CO₂ emission cap to the primary energy consumption cap. This proposal was considered alongside the thesis of considering, for electricity, exclusively CO₂ emission called "marginal", delivered at the height of winter consumption. This thesis is equivalent to assessing the content of CO₂ in French electricity as if it were produced at 100%,

throughout the whole year, by the worst coal plants in Europe.

From this exaggerated thesis, the *rapporteurs* retain the incentive to carry out a specific policy to reduce peak demand in winter, as mentioned in a report by Senator Bruno Sido and Serge Poignant MP carried out in 2010 at the request of the Government. This report highlighted the opportunities of organized and payed self-restriction, the collective interest in the rehabilitation of slums and the need for prohibitive taxes.

Moreover, committing themselves to the assessment of RT2012 regulation delivered on September 2013 by the Advisory Commission on Standards, which is chaired by Mr Alain Lambert, former budget minister, the *rapporteurs* recall that people in areas not connected to gas (25% of the population living in more than two thirds of towns) view their opportunity to choose their energy solution greatly reduced; this would justify a relaxation of the standard primary energy so as to mitigate the additional cost incurred as a result of lesser competition.

They therefore suggest that thermal regulation incorporates two additional adjustments regarding both the geography of gas access and the possible installation of a relay for heating during peak days: wood boiler, connection to a heat network, local recovery of stocked energy.

Thus, they have visited in both Crailsheim and in Baden-Wurtemberg, a system of energy storage on the scale of a neighborhood, based on a hot water tank stocking several million liters which can give back, in winter, thanks to heat pumps, the solar thermal energy accumulated during warmer seasons. This installation illustrates the technological dynamism of some of our European neighbours.

Conditions for innovation-friendly environment

The *rapporteurs* underline that innovation cannot reach its full effect if it is not accompanied by efforts in the fields of training, procurement management and research.

Training, including hands-on learning, helps to handle the innovative solutions and to work in new ways, making possible better coordination between trades. It promotes an additional degree

of personal investment that is essential to achieve airtight frames, with minimal thermal bridges.

Public procurement, which raised 75 billion euros in 2012 in France, should be an opportunity for the state and local authorities to set an example of commitment to performance by considering not only the purchase price, but the full cost along the life cycle, including operation and maintenance.

As far as research is concerned, there is a clear need for consolidation of the scattered forces related to building physics. This move has been already initiated, on the one hand, as part of a programming group of the National Alliance for Coordination of Research on Energy (ANCRE), and, on the other hand, through the constitution of eight technology platforms created by the "Sustainable Building" Plan. Building physics must now have a major role in the national strategy for research because it is a crucial area for the economic future of France. The challenge is to maintain the market share of domestic industry facing European competition that will continue to grow. Inaction would lead to

reenacting the adventure of the Minitel versus the Internet.

Regions must play their part in the momentum of technological dynamism by facilitating *in situ* experiments on their territories in connection with the Scientific and Technical Centre for Building (CSTB).

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For the *rapporteurs*, the future of building is clearly set out by **Professor Dietmar Eberle**, initiator of the movement of "Baukünstlers" in Vorarlberg, a group of architects who triggered the revolution of passive construction in the early 90s: energy performance does not mean that inhabitants must be treated as wasteful intruders; the future of low consumption building lies in the effective inertial thermal mechanisms responsive to their needs.