ACADÉMIE DES TECHNOLOGIES

POUR UN PROGRÈS RAISONNÉ, CHOISI ET PARTAGÉ

# Modifying thermal regulations for new buildings to reduce greenhouse gas (GHG) emissions at least cost

## Advice Note

**adopted by vote by the National Academy of Technologies of France (NATF)**

**in Plenary session, July 5, 2017**

In autumn 2016, in compliance with decisions taken at the COP21, France lodged with the UN headquarters the French nationally determined contributions (NDC) for the Climate. As of now, only GHG (greenhouse gas) emission reductions are compulsory. Strategies to improve energy efficiency and the development of renewable energy sources must therefore be subordinate to the NDCs, while taking into account the development of associate industrial sectors and their economic efficiency to limit GHG emissions at least cost.

The future regulations for new buildings, so-called RBR 2018-2020[1] do not take this change into account and continue to consider the various targets without a ranking of priorities, based on the development/construction of positive energy buildings and 'territories' (with, as respective acronyms, in French, BEPOS and TEPOS). They make no assessment of the cost/tonne of avoided GHG. Moreover, the list of technical solutions authorized is limited and thus prevents *de facto* other solutions that would provide a better economic and social cost-benefit ratio.

The National Academy of Technologies of France (NATF) proposes that five key analytical parameters be considered to modify the Regulations cited.

1. **Assessing an annual positive energy status report (for a building or a territory) is no guarantee that GHG emission will be reduced and indeed carries no economic significance.**

   The fact that over a given year the use of fossil fuel energies is offset by production of photoelectric power or via other renewable energy sources, does not guarantee limitation of GHGs even if we can observe some remarkable 'BEPOS' (building) operations, in terms of their energy consumption and savings and also in relation to reduced GHG emissions

[1] RBR, acronym in French for 'Responsible Building Regulations', is a project that relates to new buildings for the years 2018-2020.

Moreover, relying on a purely energy parameter BEPOS implies, *de facto,* that we are able to compensate for times when energy is rarefied and expensive by substituting for times when energy is plentiful and inexpensive; this again carries no economic significance.

2. **Introducing the concept of low-emission capacity buildings (LECB) as a primary consideration**.

NATF recommends that the regulations be based on the concept LECB, to avoid the construction of new buildings (that will still be standing at the end of the 21st Century), continuing to emit significant quantities of GHGs: economic technical solutions (materials, systems and regulations) do exist for any kind of housing, with the proviso that a reasonably low annual level of emission (in kg of $CO_2/m^2$) for thermal uses be established.

3. **Promoting heat production using renewable energies (REE).**

To reduce the fraction of fossil fuels energies – where imported fuel is negative in our balance of trade – NATF recommends that we increases the fraction of REEs to produce heat via systems that are proven to be economic (accumulation heaters, hot domestic water, solar thermal panels, recuperation of low temperature heat, biomass heat, heat distribution networks, biogases, *etc*.) planning for consumption as near as possible to source generation.

Heat production using electricity will enable us, notably, to use remote renewable energy production when available. When making an energy consumption status assessment, this remote energy provision must be given an *a minima* coefficient as favourable as for domestic gas whenever the electricity source has a low GHG carbon content, *e.g.,* 100 $gCO_2$/kWh, which is considerably lower than systems that use fossil energy sources.

4. **Building energy systems should be designed to optimize various energy uses, through power inputs via networks and local REE based production in order to minimize GHG emission levels**.

Installing REE production, notably photovoltaic electricity, with the buildings as array supports, implies that that we set up flexible (or mobile) uses as a function of national (or local) resource availability. It also implies that electricity and heat storage facilities be installed as soon as associate economic efficiency has been demonstrated as viable and effectively allow emission levels to be reduced: day-night use switching is already efficient, but weekly and/or seasonal periods should also be developed. Such considerations apply to all housing in France, including low-cost 'social' housing.

5. **Maintain cohesion, coherency and national solidarity in regard to development of new electricity production and distribution systems**.

If we consider mobilizing actors and resources to reduce GHG emissions as a welcome step, NATF is also of the opinion that – as in the case for buildings – more promotion is needed to favour 'Low emission territories' (as distinct from TEPOS (positive energy territories). This concept carries the risk of forcing use of costly local resources rather than call on less costly sources in neighbouring territories. Moreover our strategy for independence and guaranteed energy supplies is defined at a national level. *In fine*, it is this strategy that is responsible for the resilience of oil, petroleum products, gas and electricity distribution. Local authorities must also be invited to participate in the effort to ensure global efficiency of these systems, compliant with the notion of national solidarity.