Sustainable Buildings and Construction in France
An Overview of Public Policies
Nov. 2018

Through the organization of the Cop21 in Paris in 2015, France has positioned itself as a leader against global warming. After succeeding in bringing 195 countries to work together to limit global warming to well-below 2 Celsius (2°C), it now has to assume its position and demonstrate its engagement and exemplarity.

Buildings in France, totalizing less than 4 billions m², are responsible for more than a 25% of greenhouse gas emission and 40% of energy consumption. The national government has launched an ambitious policy to foster the transition toward sustainable buildings, part of its climate strategy (Stratégie Nationale Bas Carbone). It relies on several lever: regulation, innovation support, capacity building for construction actors, and financial support. Over the last decades, France has developed a comprehensive legal & regulatory framework on sustainable buildings and construction. It sets ambitious targets for a more efficient use of energy in buildings and takes into account emissions along the whole value chain (from production of materials to recycling; from energy production to energy use by final consumers).

This Policy framework is awarded. France is ranked n°1 in sustainability by Jones Lang LaSalle in its Global Real Estate Transparency Index 2018, and second in buildings energy efficiency by the American Council for an Energy-Efficient Economy in its International Energy Efficiency Scorecard 2018.

Drawing on its expertise and commitment for a sustainable construction sector, in its territory (Europe and overseas départements located the inter-tropical zone), France has initiated the Global Alliance for Buildings and Construction (GABC) at the 21st Conference of Parties (COP21 in 2015) and the assistance Programme for Energy Efficiency in Building (PEEB) operational since 2018. It aims to raise awareness, promote national strategies (i.e. National Government Call launched at Clean Energy Ministerial 9 in may 2018 : signed by Argentina, France, Germany, Mexico, Morocco, Swiss), and facilitate the global transition towards for low-emission, energy-efficient and resilient buildings.

This paper is organised in six sections:
I. - A Strong and Inclusive Governance to Support Public Policies
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**SUSTAINABLE BUILDINGS AND CONSTRUCTION IN FRANCE - AN OVERVIEW OF PUBLIC POLICIES**
I/ A Strong and Inclusive Governance to Support Public Policies

France has established a multi-actor governance to support its sustainable buildings and construction public policy. This governance is based on:

- **The Construction and Energy Efficiency Council**, on the one hand, is a consultative body representing all stakeholders in the construction field for the development of standards/regulations in the construction sector. The CSCEE (order n° 2015-1554) can take up any regulatory or legal issue related to buildings and construction and deliver recommendation to the Minister on their goals and guidelines.

- **The Sustainable Building Forum** (Plan Bâtiment Durable) on the other hand, launched in 2009, gathers a large network of private and public actors to find solutions for a sustainable transition in the construction sector. Its permanent team helps spreading relevant information towards professionals (regulatory and legal change, issues at stake…) while the multi-actors thematic working groups allow participants to formulate recommendation for public policies.

II/ The 2050 Ambition for Energy Efficiency and Resilient Buildings in France

The building sector in France is responsible of more than a fourth of the greenhouse gas emission (see CITEPA data “plan climat” format) and a large share of the energy consumption. Pursuant with the European and national objectives, renovation actions have been considered as paramount for efficient public policies. Since 2015, the ecological transition law (Loi de Transition Ecologique or LTE) define ambitious middle and long term goals and guideline for buildings energy efficiency improvement:

- **The 2018 Building energy renovation plan, part of 2017 climate plan**, makes buildings’ energy efficiency a national priority, and aims to create the condition to housing renovation massification, in particular in collective housing, to improve innovation and skills and to deal with energetic precarity in order to reach the 2050 goals: the ambitious renovation rate of **500 000 housing/year** by 2017 in France. With at least 250 000 low-income households, it intends to contribute to lower energy poverty by 15% in 2020 housing. It sets up a communication campaign :“FAIRE” (Doing) which aims at federating all the initiatives on renovation and insists not only on energy and money savings but on comfort in the housings.

Voluntary initiative : under the plan batiment durable more than 120 public building, office or commercial building owners commit for energy efficiency (charte tertiaire)

2050 target : Building stock at low consumption level 80kwh/m²/y

Renovation targets : -private housing 380 000 renovations/year -social housings 120 000 renovations/year
• **National Climate Adaptation Plan 2010-2015.** The built environment must be adapted over time as buildings have a lifespan in decades, a timescale during which global warming will be stronger. The first national climate adaptation plan (PNACC) in its section Urban Planning and the Built Environment action sheet, aims to develop:

1) measures to pre-empt undesirable phenomena, such as the rise in air conditioning use,
2) new urban development on land which is liable to flooding in the future
3) new urban developments likely to exacerbate the effects of heatwaves,
4) and the construction of new energy-efficient buildings but do not provide future adequately comfortable summer temperature in the context of climate change.

• In the second half 2018 a new version of the PNACC was published. The issue of inter-linkages between adaptation and mitigation actions will also be considered in France’s new Low carbon development strategy.

**Key measures are:**
- the promotion of the use of more efficient cooling equipment (air conditioning) or equipment using renewable or recoverable energy,
- and the reinforcement of comfortable summer temperature requirements in the building’s heating regulation (reduce the need for air conditioning).

**Private initiative.**
Since February 2018 the voluntary label HQE for Housing includes a “Resilience” criteria

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**Figure n°2 :** Targets of the Ecological Transition Law 2015-992

**Energy performance of residential buildings**
III/ An Enabling Regulatory Framework Setting Ambitious Targets and Incentives

A/ Insuring the exemplary of the public buildings:

- **National government owned buildings energy efficiency target for 2022.** The national government has set the ambitious target of decreasing the energy consumption of its own building (< 0.1 billion m²) by 15% before 2022. To achieve this ambitious target, France intend to invest 1.8 billion euros into renovation energy performance contract (CPE) an innovative financial tool which combine both physical renovation and assistance.

- **Local authorities owned buildings support.** At the local level, more than 3 billions euros are invested in renovation of local authorities owned public buildings (<0.3 billion m²). The Caisse des Dépôts et Consignations, the investment bank of the French authorities, provides financial support to the local authorities.

- This strategy is reinforced by initiative such as the Concours Cube 2020 that awards energy saving made through optimization and behavioral change.

**B) Existing Buildings. The legal and regulatory framework creates obligations of renovation:**

- **Renovation in less energy efficient buildings:** All residential buildings whose primary energy consumption is higher than 330 kWh/m²/year must be renovated. Energy refurbishment works become mandatory when: renovating a facade re-roofing or undertaking a loft conversion. This measure takes advantage of the opportunities afforded when carrying out major building works to cut energy use and reduce heating bills at lower costs. It applies to housing, offices, education buildings, commercial property and hotels.

- **Obligation of energy refurbishment in commercial buildings to decrease by 60% decrease their energy consumption by 2050:** it applies to offices, education buildings and commercial property of more than 2000m². Each building must carry out an energy audit and adopt relevant actions to reach a 40% decrease in final energy consumption by 2030.

- **Energy Efficiency criteria for « decency » for renting:** lessors must ensure that minimum energy performance conditions are met when renting housing.
C) New Buildings. The legal and regulatory framework towards net zero energy and clean buildings

- **The Energy regulation of the Building code** or RT for Thermal regulation, framed the progress in the energy efficiency of buildings. It is the core measure of the long term energy performance of the building stock. RT has been reinforced in 6 steps (1974, 1982, 1988, 2000, 2005, 2012) over the last decades. An important mile tone in the progressive reinforcement process was the **RT2005** that introduced an “absolute energy consumption limit by m²” that has been strongly reinforced in the 2012 version of the law. That version also deal with summer comfort in building to bring further resilience to climate change and limit air cooling consumption. Key actor is the **CSTB** which develops the computing kernel of RT calculation rules (COMETH).

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**Figure n°3**: incremental regulation reinforcement towards BBC (retrofit) and nZEB (new)

**Target 2020**: All new buildings have to be Near Zero Energy Buildings and low carbon buildings

**Compliance**: The implementation of the regulation is being controlled before and after the construction works. Around 170 civil servants are in charge of this control, at national level
• **The next 2020 Environmental regulation of the Building code.**
  To allow for a broader understanding of the environmental impact of buildings the RT regulation will likely evolve toward the RE2020 (Environmental regulation), a more comprehensive framework where all the environmental impact of buildings, starting with the carbon footprint, will be considered rather than energy efficiency alone.

  It aims to develop the concept of Positive Energy Buildings (Bâtiments à Energie Positive - BEPOS). Notably, heating energy requirements are set below 15 kWh / m² per year. Besides better thermal insulation and smarter use of energy, RE2020 encourages additional energy production features so that net energy spending becomes negative (below 0 kWh / m² per year on average).

  Every developer will have to perform a life-cycle analysis of the building and reach new requirements regarding the carbon footprint. The RE2020 will define the methods and dwells on the construction product and equipment database INIES.

  To propose this new regulatory framework, the government has set the **E+C- initiative Référentiel Energie Carbone 2016** : a trial phase gathering all construction actors, to experiment the regulation, prepare the stakeholders and assess its technical and economical impacts.

**D) Specific context of buildings in inter-tropical climate**

  More than **2 million citizens** are living in french territories located in the inter-tropical zone. The climate and way of life in the overseas departments make the metropolitan regulations unsuitable for the thermal, acoustic and aeration requirements of new housing constructions.

  A **specific regulation** was developed named **RTAA DOM 2016** aiming: solar protection, 50% solar coverage of hot water production, limitation of air conditioning use, etc. Antilles set recently also regional regulations.

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**E+C- initiative**
E) Voluntary certifications encourage and bring recognition to exemplary building

Private and Public actors are also collaborating to develop:

- **Energy labels.** In new building the progressive reinforcement of the energy regulation has been paved by the promotion of voluntary energy labels (HPE, THPE,...). Since 2006 the association **Effinergie** is gathering local authorities and building actors to establish ambitious voluntary energy labels (BBC effinergie, BEPOS effinergie,...)

- **HQE Green Building label.** Second green building certification in the world, the **HQE** (High Quality of Environment) is based on a quite unique vision of sustainable building: not listing actions to be taken but the results to be achieved (including energy performance and climate change). An approach placing the man at the heart of the project with a management culture to work together and facilitate the involvement of stakeholders. A model-free approach where solutions must be adapted to the characteristics of each project.

- **Environmental database.** To help foster and generalise the eco-design of building the national reference database **INIES** gathers environmental and health declarations for products, equipements and services. Data of construction product (FDES) and equipments (PEP) are **certified** by a third party. It’s managed in a participatory manner by actors in the construction field including, regulated by public authorities and is governed by a multipartite protocol with the **AIMCC** (association of the industry of material and component for the construction) and owned since 2011 by the **association HQE**.

- **Low carbon Label:** the ministries in charge of the environment and housing launched in 2016 **E+C-** experimentation in order to prepare the future environmental regulation on new buildings with all the stakeholders involved in the construction process. It delivers a method to assess the carbon footprint of the building through a Life-cycle analysis, sets different targets and gather technical and economical data on buildings. Developers can apply to the E+C- label to testify the performance they achieves.

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HQE green label  [https://www.behqe.com](https://www.behqe.com)
INIES database  [www.inies.fr](http://www.inies.fr)
E+C- experimentation  [www.batiment-energiecarbone.fr](http://www.batiment-energiecarbone.fr)
F) Consumer information is the keystone of energy efficiency and renovation:

- **Energetic performance diagnostic.** Complying with European Union regulations, a readable indicator of energy performance has been created: the energetic performance diagnostic (DPE). Making and displaying a DPE has become compulsory in most building and housing (mandatory in most public buildings; for sale or renting advertisement). To improve the diagnostic rightness the method has already evolved twice since 2007 to assess the overall energetic quality of the building through the precise evaluation of all its components. By 2020 the DPE will further evolve to give clearer and simpler information to end users of building.

- **Energy renovation platforms** at regional and city level have been fostered and tasked with improving legal, technical and financial information and support provided for home owners carrying out energy renovations. Besides providing information, those platforms facilitate projects by qualifying suppliers and connecting them with users. Decision making is indeed a long process, in particular for joint ownership property that require an extensive support and to bring forth the benefits, tackle the complexity and convince co-owners.

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**Figure no 4:** energy and GHG emission tag
IV/ Innovative Financial Incentives to Support the Transition

With a financial support need estimated over 2.5 billion euros per year, buildings are a central part of the French climate policy. In order to finance these actions, France has been the first country to issue a large amount of green bonds - 14.5 billions euro in total. Green bonds are financial assets that provide the user information on the compliance of the borrower with a given set of engagements. To reach his ambitious targets, the government has developed a broad portfolio of instruments. Since the “plan climat 2005” incentive measures rely on tax credits and subsidies:

- **Tax credits.** To trigger the transition in buildings, important supports have been planned in the form of tax credits. The Tax credit for energy transition supports energy efficiency work for the main residence for up to 30% (8000€ to single person and 16000€ for a couple) and household whom invest in energy efficiency will also benefit from a reduced VAT (5.5%) and a reduced property tax (municipal level vote).

- **Subsidies.** Alongside these tax reduction, the ANAH, in charge of the renovation of the lower income household buildings have been implementing a large set of subsidies. To support the lower income household effort on energy saving, the ANAH has created the specific program “Habiter mieux” (live better) which finance 60% of their work’s costs. This initiative is completed with the Energy voucher to finance their energy and energy efficiency expenses.

To foster private investment in buildings energy efficiency the government implemented a set of innovative financial instruments:

- **Loans.** including a “zero rated eco-loan scheme” available for housing owner to fund energy efficiency works on their main residence. At the same time it created a guarantee fund for energy renovation to insure commercial loans for renovation works.

- **Energy service contracts.** This could be used either through the third party financing (STF) which are public-private entities using the stream of cost saving income to provide technical and financial assistance for efficiency works and repay the renovation works, or through the “prêt avance mutation”, a reverse mortgage scheme on energy efficiency. France is one of the top country in energy service contracts (n°1 in share of ESC market compare to GDP)

Impact : more than 2 million households benefit from tax credits since its introduction in 2015

Impact : CO2 allowances auctioning finance the thermal renovation of 100,000 house units over 2014-2015
• Energy savings Certificate. The national government have launched a cap and trade system since 2006 under the Energy saving certificate (CEE) scheme. This requires energy provider to either implement energy saving measures or to buy CEEs to energy savers to finance their actions. It finances renovation works as well as programs aiming at fostering decisions to renovate the housings. A specific goal is established to chanel CEE to energy poor households.

Finally, through the Feebat initiative, a better formation to energy refurbishment as been implemented for renovation works companies. it also helps develop improved initial formation of future buildings workers to increase their skills awareness of the environmental challenges.

V/ Fostering Innovation in Renovation Works

Since 2015, innovation in renovation works are supported through the “PACTE” program. It provides renovation work companies and workers with the best practices to avoid defect in their process (thermal bridges, …), efficiently integrate new construction techniques.

Energy performance of a building can’t yet be assessed with enough accuracy, the impact of weather conditions, inhabitants behaviors and the inherent performance of the construction have yet to be assessed separately so as to precisely monitor the real effect of renovation works and bring higher quality to control them. The program supports research on that field to provide in a couple of years, public authorities and stakeholders with consistent tools.

Since 2017, the french government also supports the use of BIM as a tool to improve the construction and renovation processes but also operation and maintenance of the building to reduce costs, delays and anticipate renovation.

It also provided stakeholders and public authorities with guidelines and a comprehensive framework to efficiently design “connected building” that provides services to inhabitants to help them control and reduce their own energy consumption through technology. Energy temperance along with energy efficiency and renewable energies is the third stake to address to reduce dramatically energy consumption. It deals with how efficiently the digital infrastructure is designed but also data protection and security.

Two charts gathering construction stakeholders were signed by the French minister of housing in 2017.

Impact : Climate impact of energy savings certificate is evaluated around 7 MteCO2 saved in 2015*) mainly in buildings. During the third period (2015-June 2018) roof insulation represents 28%, wall insulation 10%, and building renovation 6% of delivered energy saving certificates.

*) 6th french National Communication to UNFCCC page 129
**) Lettre d’information « Certificats d’économies d’énergie » mars 2018, page 2
Aside from classic regulation and financing, France is continuously improving its capacity to assess and measure the impact of its policies on building energy efficiency.

- **Statistics.** Traditionally data concerning energy status of buildings are provided by CEREN (joint entreprise of electricity and gas grids operators, and ADEME) and the general French Housing Survey (every 4 to 6 years) from the national statistic office (INSEE).

- **Energy performance diagnostic data base.** Since 2013, the ADEME, has been building a large database with data collected through the DPE evaluation (energy performance diagnostic). Already summing up to more than 5 millions evaluations, the ADEME is using these data to help the state increase the robustness of the DPE to take better account of the discrepancies between buildings.

- **Compliance.** To collect data on new buildings, a new set of incentives have been created. This aim to complete the DPE which can suffer from variation related to the intensity of the housing market. Similar tests have been implemented to verify the conformity of the new buildings with the energy efficiency targets. Based on voluntary declaration it already include more than 100 000 data.

- **Surveys OPEN and TREMI (since 2017):** survey intends to get a new insight on the energy efficiency challenge in housing through the identification of energy consumption behaviors and investments.

- **Private initiatives** such as l’observatoire de l’immobilier durable (sustainable real estate observatory - OID) are also collecting data on voluntary basis to benchmark the environmental performance of buildings and property portfolio.

- **National Observatory for Construction.** Finally, a national observatory for construction have been launched to combine late technical and economical data (plan rénovation, action n°2).

These databases will allow for a comprehensive tracking of the evolution of the french effort in energy efficient building, to measure the impact of the policies and to adjust if necessary to achieve its ambitious target.
France has already taken many measures to achieve its ambitious goals on energy efficiency improvement for buildings.

The French government has set an innovative regulatory framework to create incentive for public and private renovation work, it has delivered financial support and created new tools to accompany the transition towards more sustainable buildings through the creation of better skills and information.

It pursues and intensifies its effort by implementing new regulation (RE2020) and developing new tools (DPE, E+C-) while enforcing accompaniment toward the construction actors.

However, challenges ahead remain as the construction sector is still responsible of more than a third of the greenhouse gas emissions and a large share of the energy consumption.

The potential saving and emission cuts are particularly significant in France, notably because more than 54% of the residential buildings were built before any energy efficiency regulation (1975, ADEME 2015). This implies that important efforts are still to be done.

To succeed in reducing its greenhouse gas emission and comply with its engagements, France will have to deploy unprecedented political means in the sector.

Figure n° 5 : Building stock in France
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Web resources

- Global Alliance Buildings and Construction [www.globalabc.org](http://www.globalabc.org)
- Programme Efficacité Énergétique dans les Batiments [www.peeb.build](http://www.peeb.build)
- Construction and Energy Efficiency Council
- Plan Batiment Durable [www.planbatimentdurable.fr](http://www.planbatimentdurable.fr)
- Centre Scientifique et Technique du Batiment (CSTB) [www.cstb.fr](http://www.cstb.fr)
- Caisse des Dépôts et Consignation (CDC)
- Effinergie Association [www.effinergie.org](http://www.effinergie.org)
- Haute Qualité Environnementale Association (HQE) [www.hqegbc.org](http://www.hqegbc.org)
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- Batiment Bas Carbone Association (BBCA) [www.batimentbascarbone.org](http://www.batimentbascarbone.org)
- Agence De l'Environnement et de la Maitrise de l'Energie (ADEME) [www.ademe.fr](http://www.ademe.fr)
- Agence Nationale de l'Amélioration de l'Habitat (ANAH) [www.anah.fr](http://www.anah.fr)
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