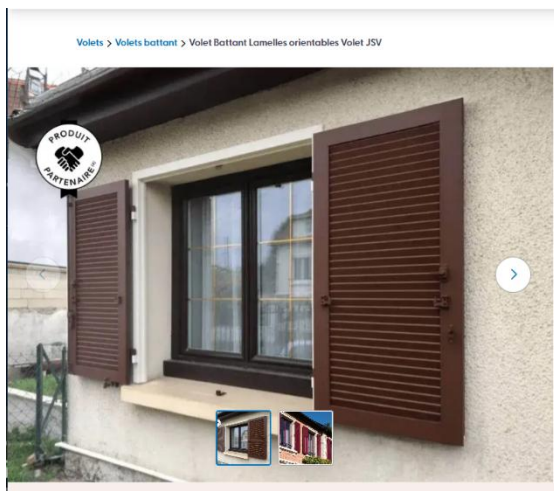


The French Connection

Policies to reduce overheating in buildings in France: guides for the construction industry



www.tryba.com shutters with adjustable louvres



www.glass-systems.fr

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Introduction.

The draft Greater Cambridge Local Plan rightly recognises that buildings need to be designed in the expectation of ever more serious impacts of climate change

One of these impacts is the likelihood of ever more serious heatwaves, which are predicted to be even hotter and of longer duration than the record breaking 39.9C experienced in Cambridge in July 202. These could easily result in significant numbers of fatalities, unless build standards are significantly improved to reduce heat ingress.

Policy CC/DC: Designing for a changing climate¹ states that “development proposals should reflect the cooling hierarchy priority order”. In our view this is inadequate. It needs to be made significantly stronger and clearer, and to learn from countries that already have the sort of climate we are likely to have here in future.

For example, in the Paris heatwave of 2003, thousands died² and mortuaries were overwhelmed. Although the peak temperature was “only” 39.5C, temperatures exceeded 35C for nine days, and nights were unusually warm too. This resulted in an extended period with little relief, which in turn resulted in around 15,000 excess deaths across France, with Paris being worst affected. This event has prompted major changes in France’s heat wave preparedness plans, from healthcare³ to public information⁴.

This review discusses the policies and the guidance given to the French construction industry to reduce the risk of building overheating. It should be noted that this review is based on our own research and personal contacts with French architects and engineers involved in the construction industry.

It is submitted by Carbon Neutral Cambridge as evidence to the draft Greater Cambridge Local Plan consultation, to assist in strengthening Policy CC/DC

The French Planning System

The website Building in France: French Planning Structure for Building and Renovations ⁵ is in English, and is an indication of the number of foreigners seeking to build or renovate. It points out that the control of development in France is comprehensive, and permission has to be obtained for virtually all types of development, even wooden chalets and garden sheds.

The French planning rules and regulations are codified in a single text, the *Code de l'Urbanisme*⁶. Here it states the fundamental rules for any building permit (“*permis de construire*”):

1. Planning permission is part of a building permit within the same document submission; prepared plans and reports can only be submitted by a qualified registered architect.
2. Aesthetic, construction and technical advice is freely given out and published by 92 local Councils of Architecture, Urbanism and the Environment (CAUE) since the 1980s. For example, in the How to adapt your buildings for climate change document⁷ referred to above, detailed information on cooling strategies, to avoid air conditioning, is available
3. Multidisciplinary methods of evolving cooling strategies and low-carbon design within the construction industry have been encouraged at government agency level since 2011. For example, the Inter-departmental mission for the quality of public construction⁸ (*Mission interministérielle pour la qualité des constructions publiques*)
4. Detailed case studies of successful cooling strategies are available through a well-funded national government Agency for Ecological Transition⁹.

Note that in contrast to the UK, in France, Planning officers have no opinions regarding buildings aesthetics (that is the role of architects) The rules therefore state that “An architect is required to submit a request for a building permit (*Permis de construire*), and it cannot be investigated unless a qualified registered architect has "established the architectural project", that is, prepared the plans and written documents, shown site plans, volume and layout, sections, and elevation treatment, as well as choice of materials.” (The only exception is for an individual’s home under 170m²).

There is an excellent system of bodies to provide guidance (see following sections)

French Guidance

In France, excellent advice is provided to the construction sector through a number of bodies

We summarise here some key advice on avoiding overheating from the Centre for Architecture, Planning and Environment in the Dordogne

Specific examples of passive cooling techniques for new and existing buildings are set out in this French example: “How to adapt your buildings for climate change” published in 2023 as guidance by the official Centre d’Architecture, Urbanisme et Environnement (CAUE) in the Département of Dordogne¹⁰.

Key points (note that summer temperatures in most of France, including Paris, are 38^o-40^o for most of the summer, except in areas of high elevation)



The UK Government’s 2023 environment improvement plan¹¹ includes a clear policy steer that organisations must be prepared for global warming levels up to +4°C. The Environment Agency warns¹² that this could result in 40^o C heatwaves every 3-15 years, with peak temperatures rising by 6.6^o C

- 1) **Site energy efficiency strategy** (“*sobriété*”) is defined as efficiently protecting the building to limit the penetration of heat or (creation of) heat islands. It recommends site analysis of sun directions, potential shading by vegetation and roof overhangs, and light coloured roof materials. [To this should be added direction of prevailing winds, see 5(e) below.] External insulation is recommended to give good thermal performance in all seasons, and shutters are suggested with adjustable louvres that keep out sun, but allow daylight in. This is applicable to both new build and to existing buildings.
- 2) **Energy efficiency** (“*efficacité*“): Dealing with thermal mass, particularly the aim to slow the absorption of heat during the day so that the cool of evening may prevail. Six means of achieving this are
 - a. Overshadowing/shading with external shutters (kept closed by day), “casquette”, pergola
Note that traditional French buildings generally have wooden shutters with fixed louvres that are closed at night for security and winter energy savings.
 - b. Limit heat-generating equipment inside (appliances, computers)
 - c. Secure extraction of hot air to the outside by day (rooflight), and super-ventilation by night
 - d. Storage of night cooling in walls/floors/roofs of high thermal mass (eg with shutters open)
 - e. Restoration of stored coolth during the day by means of materials of high thermal mass
- 3) **Passive cooling without “clim”** (= shorthand for air conditioning (“climatisation”))
 - a. Making use of wind and sun for natural ventilation with mechanical stacks, solar chimneys
 - b. “Double flux” ventilation: this extracts stale air from kitchen, bathrooms and toilets to the outside; cool air is ducted into living and bedrooms. A “*Puit Provençal*” to run the external hot air through an earth trench can be used to produce cooled air for this double flux system:

- c. It is noted that **thermal “inertia” by absorption** can be achieved by using thermally massive materials inside the thermal envelope to store night coolth. Materials mentioned are **pisé** (rammed earth), **bauge** (cob), compressed earth bricks, brick masonry, concrete.
- d. **Thermal “inertia” by transmission**: thermally massive materials in the outer shell of the building prevent transmission of heat flow and slow or delay the entrance of heat waves into the building.

4) **Landscape strategies:**

- a. “The higher the amount of vegetation, the more thermal comfort is improved.”
- b. “At building scale, as with external spaces, a covering of vegetation prevents solar radiation from reaching surfaces that would otherwise absorb heat. In this way, temperatures climb less high in the daytime and drop further down at night.”
- c. “A pergola with climbing plants lets in the winter sun. In any weather, the trellis (*la treille*) over a building opening creates shade”
- d. “To lower the ambient temperature, adopt covering for the ground that –
 - i. is of light and reflecting colour (higher albedo)
 - ii. has permeability favouring rainwater infiltration and that also permits evaporative cooling
 - iii. includes plant surfaces that cool the air by means of transpiration (“*evapotranspiration*”).
 - iv. “Avoiding “artificialising’ the ground and a preference for dense buildings are fundamental elements for the improvement of summer comfort. Urban composition that favours ventilation (eg using prevailing winds) is equally a variable to consider.”

5) **Community strategies:**

- a. “the land development unit” of the ATD (Département Technical Agency) works with parish and local community groups to define their construction projects or building renovations.
- b. Here, at each stage, professionals apply their expertise: condition surveys of buildings to be renovated, establishment of a brief after researching the needs and proposals, cost estimation, verification of the energy usage (Schéma Directeur d’Énergie - SDE25), choice of materials guaranteeing comfort and an optimal energy efficiency strategy
- c. Since 2013, the Département Technical Agency has started a Construction Site Technical Assistance (*ATMO = Assistance Technique à Maitrise d’Ouvrage*) associated with lawyers from public procurement (*service Marchés Publiques*) to assemble relevant documents for consultation by tendering construction companies and help to choose the most pertinent tender in terms of their defined objectives.
- d. Following the logic of a wider vision, studies are not limited to the definition of building works, but equally take into account the planting, the reinstatement of soil permeability and the management of rainwater.

French advisory bodies

Councils of Architecture, Urbanism and the Environment

The French “Councils of Architecture, Urbanism and the Environment” – CAUEs - provide useful advice for their region, as the example above, from the Dordogne CAUE. We would love to see their equivalent in the UK.

The intention of CAUEs is to provide “advisory, training and awareness-raising activities, both with local authorities, government departments, the general public, the construction and planning sectors and teachers.” This all sounds conventionally well-intentioned, until you read that of the 101 “départements” in France (including overseas), 92 have CAUEs and these have gradually been created since the “law on architecture” was passed four decades ago on 3 January 1977.

Agency for Ecological Transition (ADEME),

France has for some years had a government agency to deal strategically with climate change: The Agency for Ecological Transition (*The Agence de transition écologique*), which is an existing agency renamed in 2020 at the start of the pandemic. This evolved from a series of previous agencies going right back to the oil crisis OPEC of 1973. The predecessor, created in 1991, was L'Agence de l'environnement et de la maîtrise de l'énergie (ADEME) *, which replaced the AFME¹³ (*Agence française pour la maîtrise de l'énergie*) dating from the oil crisis of 1973.**

Their president, Arnaud Leroy said¹⁴ in 2020“...we deal with mobility, sustainable food, tourism, digital technology, housing, and adaptation to climate change.... Our change of name reflects these developments: we are indeed the Agency for Ecological Transition. With our thousand employees and our 700 million euro budget, we are a unique agency of its kind that many of our European neighbours envy,”

The ADEMA website posted on 4 November 2025: “In France, construction materials represent 390 million tonnes, approximately half of the total consumption of material. If nothing changes, this demand could triple by 2050. In view of the scarcity of resources and rising prices, it is urgent to rethink our routines. This is the issue in the Bâti-Sobre programme, launched in 2023 by ADMEM Ile-de-France (Paris region) and ADEME Provence-Alpes-Cotes d'Azur, with the support of A4MT. Objective: accompanying 30 construction site managers in integrating efficient materials and recycling in their construction projects”

The ADEMA website has an extensive library¹⁵ of downloadable documents, which includes several case studies for cooling adaptation: These include:

BELLEGARDE-SUR-VALSERINE: Guaranteeing the thermal comfort of users in a new multimodal railway station

BORDEAUX MÉTROPOLE: Shading on tramway parking areas to prevent overheating

RENNES COLOMBIER POST OFFICE: Improving summer thermal comfort in a public building

CITY OF PANTIN: Designing a school combining thermal comfort and production of sustainable energy

CITY OF PERPIGNAN: Ensuring the thermal comfort of theatre users

CITY OF PARIS (17TH ARRONDISSEMENT): Taking climate change adaptation into account in an urban development project: the eco-neighbourhood of Clichy-Batignolles

References

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