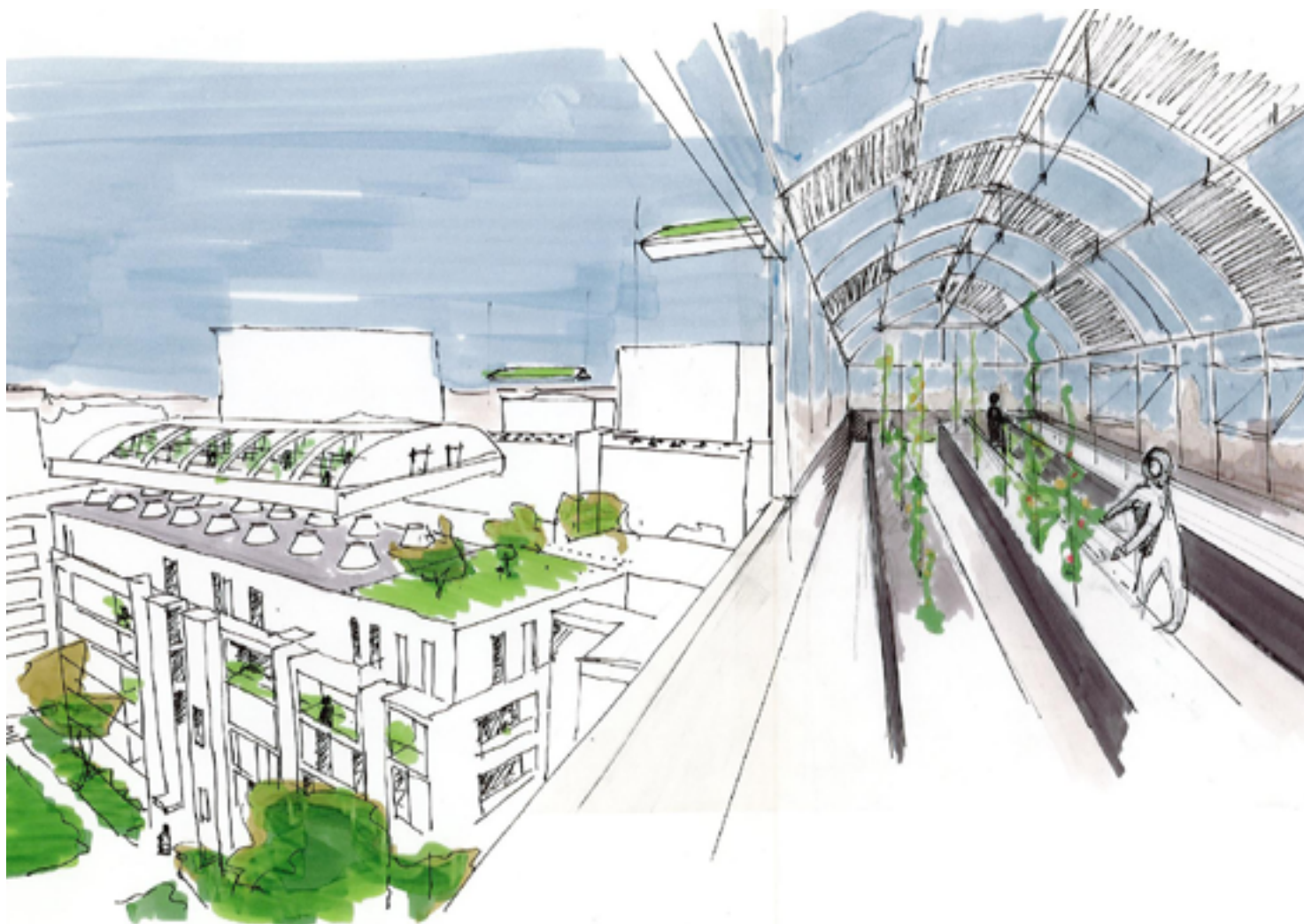


# Urban vegetation services

CSTB supports its partners  
in sustainable development

More than 30 years of research and consulting  
allow today the CSTB to foster innovation  
by integrating nature in urban projects.

[recherche.cstb.fr/en/](http://recherche.cstb.fr/en/)



CSTB experts put together their skills to meet public and private sectors needs.

## VEGETATION AT THE VERY CORE OF THE CITY

CSTB supports building and urban development at 4 scales, from the material to the city via the building and the district. The establishment of vegetation in an urban environment presents many challenges that need to be tackled.

### BIODIVERSITY

Nature in the city  
Social impact

### AMBIANCES

Thermal comfort  
Acoustic confort  
Energy performance  
Lighting

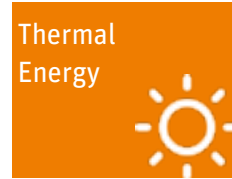
### REGULATION

Standards  
Building code  
Local Urbanism Planning  
Territorial coherence scheme  
Technical Appraisals and  
Experimental Technical Assessments

### CLIMATE

Reduction of pollution  
Urban heat island  
Water management

## GREEN ENVELOPE SERVICES



Thermal comfort demands becoming higher leads to an increase in energy demand. The greening of surfaces and urban spaces improves the comfort of cities, efficiency of buildings and offers high sun protection for buildings and their occupants.



Vegetation is a solution to limit the increase of pollution by trapping pollutants and sequestering carbon (CO2) and to improve urban environments. The choice of plants must however be made carefully to limit the emission of allergens by certain species.



Vegetation contributes to the mitigation of the urban heat island phenomenon by creating freshisland and has a direct and indirect impact on reducing the carbon footprint of a city. Likewise, it regulates the flow of water during heavy rains (floods).



Vegetation contributes to actions in favor of the environment and biodiversity: urban water management and ecosystem functions of plants, among others.



Vegetation is an ideal bioclimatic strategy for mitigation of high lighting, acoustic insulation and acoustic absorption.



BIM digital models make it possible to identify the potential of greening. Using connected objects, the performance of these systems is assessed, modeled and optimized.



The French Technical Appraisal (ATec), Technical Application Documents (DTAs) and Experimental Technical Assessments (ATEX) are at the service of the safety of greening processes of buildings. The Resistance and Fire Reaction laboratories approved by the Ministry Interior of Defense, answers to the issues related to fires.

## Research & expertise

ACOUSTICS	WIND EFFECTS	FIRE SAFETY	ENVIRONMENT
<p>Products and systems characterization at the LABE</p>	<p>Full scale tests in the Jules Verne climatic wind tunnel</p>	<p>Reaction to fire and fire propagation tests</p>	<p>Urbanwater characterization Biodiversity impact</p>
<p>Acoustics impact simulation and optimisation</p>	LIGHTING	<p>New test platform dedicated to fire safety of roofs</p>	<p>Climate impact (urban heat islands, heatwaves, pollution)</p>
<p>CSTB developed software supplied by test results from the LABE</p>	WATER MANAGEMENT	THERMAL	BIM
	<p>Grey water reuse</p>	<p>Thermal and energetics impacts assessment (measures/models)</p>	<p>Numerical models developed by the CSTB Data visualisation in the immersive rooms of the CSTB</p>
	<p>Urban water qualification</p>		

More information: [recherche.cstb.fr/en](http://recherche.cstb.fr/en)

## EVALUATION



CSTB is piloting the evaluation of the vegetated kits implemented in façade and rooftop through the instruction of Technical Appraisals (ATec) and Experimental Technical Assessments (ATEX).

More information: [evaluation.cstb.fr/en](http://evaluation.cstb.fr/en)

## EDITIONS AND TRAINING



### LES TOITURES VÉGÉTALISÉES (French)

Conception, réalisation et entretien



### TOITURES-TERRASSES (French)

Prescriptions techniques et recommandations pratiques

Etanchéité des toitures terrasses

Isolation des toitures terrasses

Toitures végétalisées



### L'ÉTANCHÉITÉ DES TOITURES-TERRASSES (French)

Conception et réalisation

En application des DTU 43.1, 43.3, 43.4, 43.5 et 43.11



### L'ARBRE EN MILIEU URBAIN (French)

Choix, plantation et entretien



### ISOLATION DES TOITURES-TERRASSES (French)

Conception, mise en oeuvre et entretien

En application des DTU de la série 43

More information: [boutique.cstb.fr](http://boutique.cstb.fr)

## REFERENCES

### R&D - EXPERTISE

**REVEQAU** - Roles of the vegetated envelopes on the air quality in urban area - *submitted to Primequal - ADEME*

**PROOF** - Photovoltaic and Green ROOF - *submitted to the ANR*

**GROOF** - Greenhouses to Reduce CO<sub>2</sub> on roofs - Interreg

**THERMAL IMPACT STUDY** - On constructions in tropical climate - DHUP

**LIPU** - Action-Research on the Edge & urban landscapes - Interreg

**THINKNATURE** - Development of a multi-stakeholder dialogue platform and Think tank to promote innovation with Nature based solutions - H2020

**SOFTWARES CSTB** - Mithra-SIG, ICARE, MithraSON, EveCity v3, Lab'Urba

**MATRIOCHKAS** - New methods of evaluating performance of different techniques to better treat rainwater (Nantes Métropole) - ANR

**TERRACES** - Urban cooling role of the Urban vegetation - ADEME

**INOGEV** - Urban water management - ANR

**VEGDUD** - Urban vegetation stakes - ANR

**HOSANNA** - Acoustics role of urban vegetation - H2020

**TVGEP** - Urban rain water management - RGC&U

### EVALUATION - INNOVATION

**ATec** - of a green roofing system

**1<sup>st</sup> ATEx** - Urban agriculture on a roof

**ATec** - Rain water

**ATEx** - International Center of Parietal At, Lascaux  
**1<sup>st</sup> ATec** in vegetated reported cladding

**ATEx** - University campus Citadelle, Amiens

**ATEx** - Brest maritime prefecture

**1<sup>st</sup> ATec** - of a green roofing system

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le futur en construction