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TECHNICAL DAY

13th of June

TECHNICAL DAY

- French energy/carbon regulation in France (Jonathan Louis - Ademe)
- BDNB French Building Database (Antoine Breitwiller - CSTB)
- District Heating and Cooling (Cindy Melfort - Cerema and Muriel Labonne - Nantes métropole)
- Bio based materials (Baptiste Chauvet – architecture firm CAN-IA et Fionn McGregor - Gustave Eiffel University)

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ADEME
AGENCE DE LA TRANSITION ÉCOLOGIQUE

France's Policy Framework for Buildings: Driving the Transition to a Carbon-Neutral & Resilient Future

A Strategic Overview for the IEA-EBC Executive Committee

June 13, 2025 | Nantes, France

Jonathan Louis
Innovation Coordinator,

Building Department
Sustainable Cities & Territories Directorate

24/06/2025

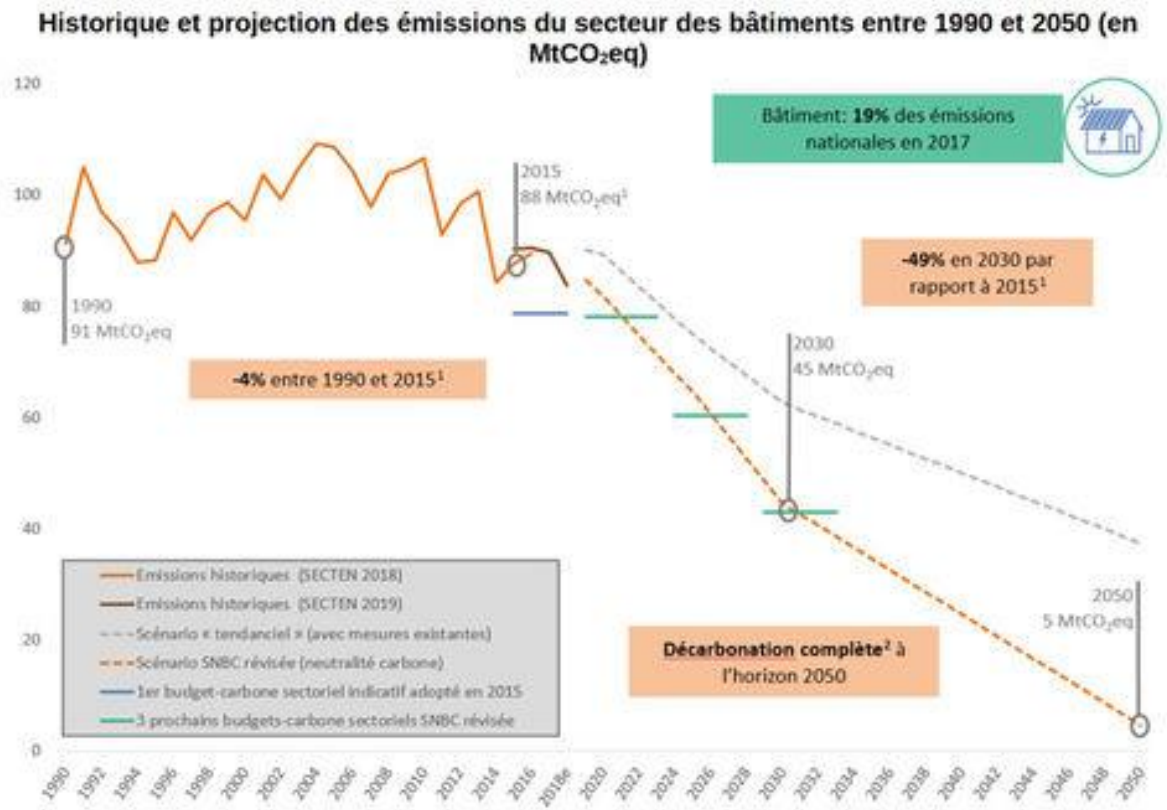
A Carbon-Neutral Building Stock by 2050

A Major Player in our Transition: The building sector represents:

- 43% of France's total energy consumption.
- 23% of national greenhouse gas (GHG) emissions.

Our Overarching Goals:

- Climate: Achieve carbon neutrality by 2050.
- Energy Sovereignty: Reduce dependency on imported fossil fuels.
- Social Fairness: Eradicate fuel poverty and ensure decent housing for all.



RE2020: A Paradigm Shift for New Construction

From Low-Energy to Low-Carbon: The Environmental Regulation 2020 (RE2020) moves beyond traditional energy efficiency.

Three Core Pillars:

- Energy Sobriety & Efficiency (Bbio): Continued improvement in building performance.
- Whole Life-Cycle Carbon (ICconstruction): A groundbreaking shift. We now regulate the carbon footprint of construction itself, including materials, transport, and worksite impacts. This is a major driver for bio-based materials (wood, hemp) and circular economy principles.
- Summer Comfort & Climate Resilience (DH): Designing buildings that are comfortable during heatwaves, preparing our built environment for the climate of 2050.

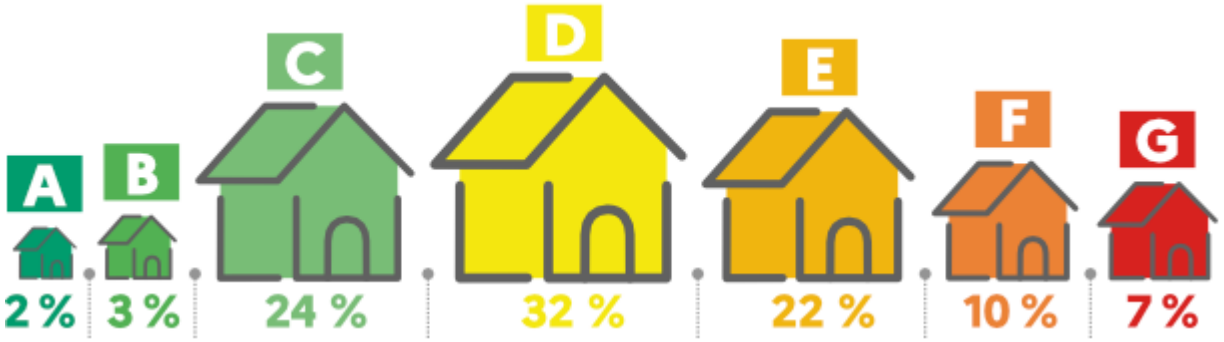
RE 2020
RÉGLEMENTATION ENVIRONNEMENTALE

Tackling the Existing Stock: Diagnosis as a Driver for Action

The Cornerstone: The Energy Performance Certificate (DPE)

More than a label: it's a reliable, enforceable tool that triggers action for sales and rentals.

Driving the Market: We are progressively banning the rental of the worst-performing homes ("*passoires thermiques*"), starting with 'G' rated homes in 2025. This creates a clear regulatory pathway for renovation.



The Tertiary Decree: Mandating Action for Commercial Buildings

Targets all public and private commercial buildings > 1,000 m².

Ambitious, binding targets: Requires a reduction in final energy consumption compared to a baseline year:

-40% by 2030
-50% by 2040
-60% by 2050

Fueling the Change: Unprecedented Financial Support

maprimerénov'
Mieux chez moi, mieux pour la planète

CEE Les certificats D'ÉCONOMIES D'ÉNERGIE

MaPrimeRénov' (MPR): Our Flagship Grant Scheme for Homeowners

A single, accessible, and progressive platform for renovation grants.

Strong focus on deep retrofits (rénovations d'ampleur), encouraging a whole-house approach over single-measure actions.

Budget: Several billion euros annually, demonstrating massive public commitment.

Energy Saving Certificates (CEE): A Market-Based Obligation

Energy suppliers (electricity, gas, fuel) are obligated to finance energy efficiency actions for their customers.

A powerful, complementary financing tool that generates several billion euros per year for renovations across all sectors (residential, commercial, industrial).

Synergy: CEE and MPR can be combined, creating a powerful financial lever for households.

France 2030: Building the Future of Sustainable Construction

Our policy is not just about today's buildings, but about creating the solutions for tomorrow.

The "Sustainable Cities & Innovative Buildings" (SVDBI) Strategy: A key part of the "France 2030" national investment plan.

Key Innovation Focus Areas:

Industrializing Deep Retrofit Solutions: Developing off-site manufactured and cost-effective renovation kits.

New Materials & Circular Economy: Scaling up bio-based and geo-sourced materials, and solutions for material reuse.

Digitalization & Smart Buildings: Using BIM, digital twins, and smart controls to optimize design, construction, and operation.

S**kills & Training:** Investing in the workforce to deliver high-quality projects at scale.

France 2030: Building the Future of Sustainable Construction

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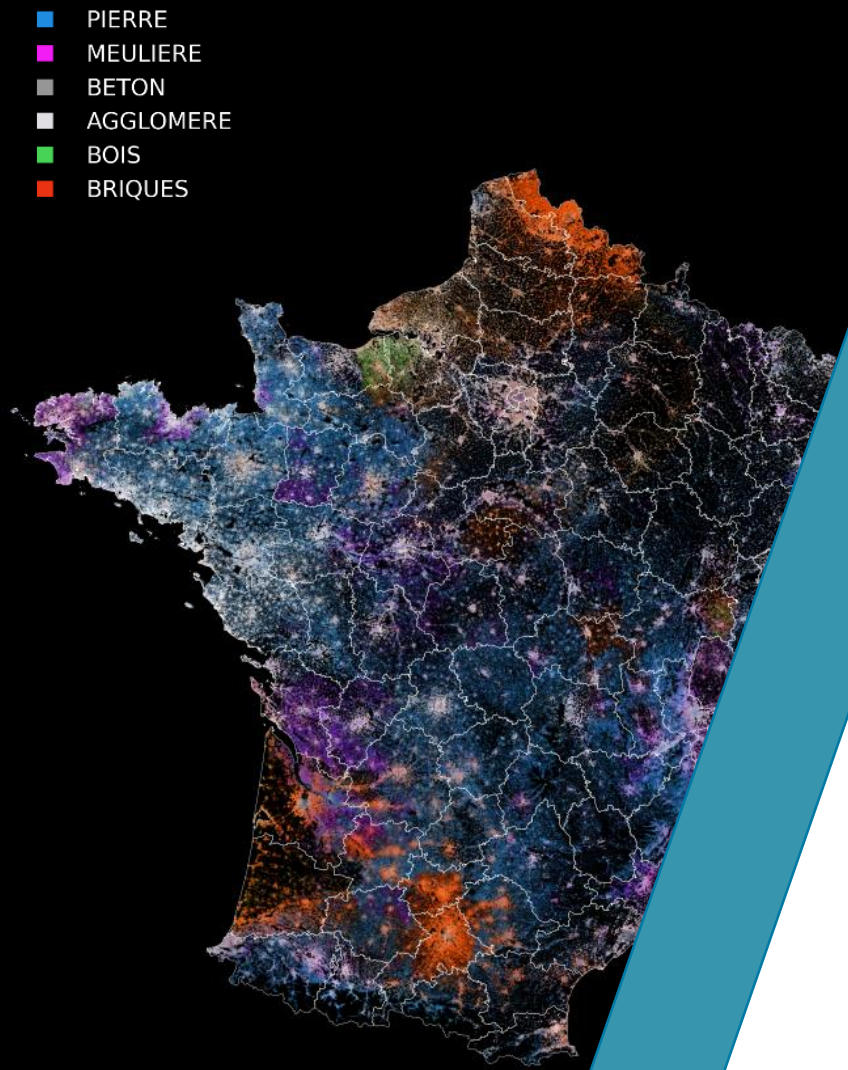
AGENCE DE LA TRANSITION ÉCOLOGIQUE

Thank You.

Jonathan Louis
Jonathan.louis@ademe.fr

Building Department

Sustainable Cities & Territories Directorate



BDNB

FRENCH NATIONAL BUILDING DATABASE

BDNB
BASE DE DONNÉES NATIONALE DES BÂTIMENTS
CSTB

CSTB
le futur en construction

BUILDING DATA: SCATTERED AMONG USE-CASE SPECIFIC DATABASES

BAN

Address

DONNÉES IGN

BDTOPO IGN

3D building geometry

DIRECTION GÉNÉRALE DES FINANCES PUBLIQUES

Fiscal administration

L'OBSERVATOIRE DPE

base DPE de l'ADEME

Energy Performance Certificates

Datafoncier
fichiers-fonciers
dv3f

Demande valeur foncière

Property Sale prices

SDES

Données locales de l'Energie

Real Energy consumption

SDES

Permis de construire SITADEL 2 complet

Building permit

ENEDIS

Base Points de livraison

Energy Networks

GÉORISQUES
Mieux connaître les risques sur le territoire

natural hazards

LE REGISTRE DES COPROPRIÉTÉS

POLITIQUE DE LA VILLE

Base des QPV

MERIMEE

SIRET
Système d'identification du Répertoire des Etablissements

Base SIREN

arcep

Base immeuble localisé

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RPLS

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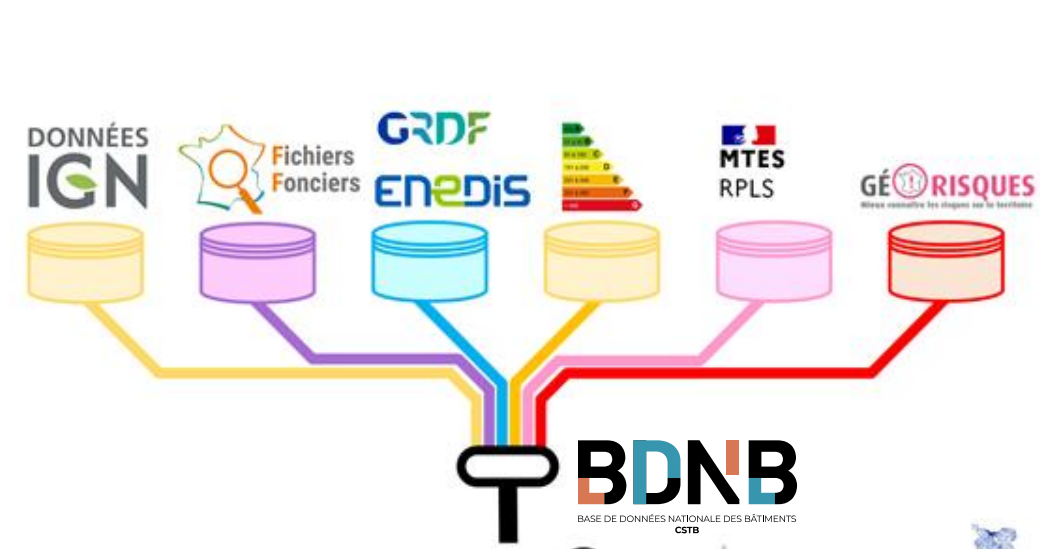
BDNB: A UNIFIED DATABASE FOR ALL BUILDING USE-CASES



GO RÉNOVE

data.gouv.fr

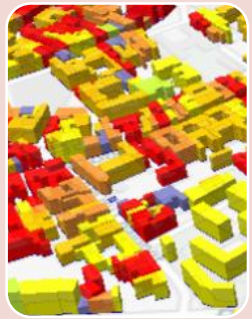
Cross-matching of data

Prediction of missing values

KPIs calculation

BDNB
BASE DE DONNÉES NATIONALE DES BÂTIMENTS
CSTB

Estimated indicators

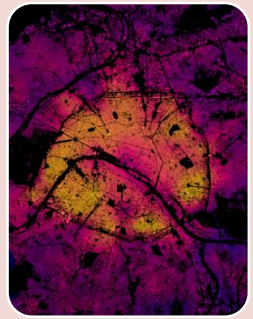


Estimated EPC

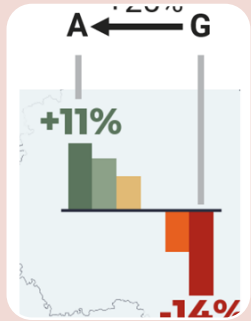
Initial state and renovation

Heatwave Vulnerability

Various heatwave scenario (2030,2050, extreme weather)



Urban Heat Island



Green Real Estate Value

Potential for Connection to District Heating Networks

Vulnerability to risks : clay shrink–swell, fire etc.

…

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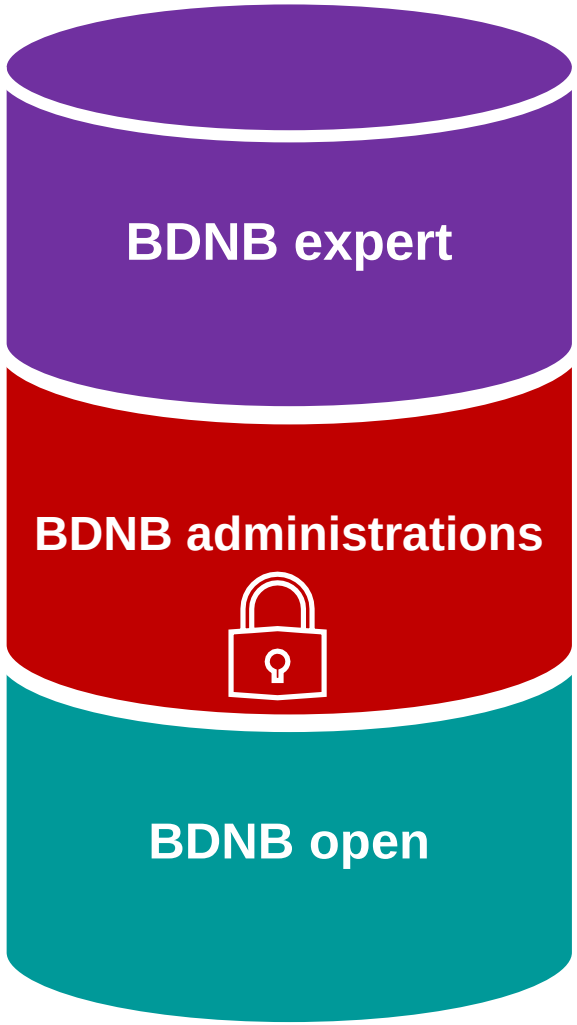
BASE DE DONNÉES NATIONALE DES BÂTIMENTS
CSTB

THREE LAYER DATABASE : FOR PUBLIC AND PRIVATE SECTOR TO USE



Premium Expertise: KPIs and Studies

Confidential administration data layer

Provided only to authorized public administration

Open Data Layer

BDNB is published with open data license for private and public sector to use widely

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BDNB IN SUPPORT OF PUBLIC POLICIES FOR THE ENVIRONMENTAL TRANSITION AND ADAPTATION TO CLIMATE CHANGE FOR BUILDINGS

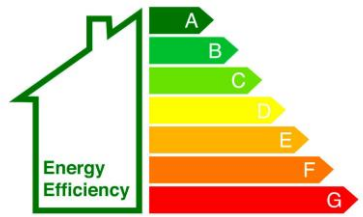
CSTB

le futur en construction

BETTER KNOWLEDGE OF ACTUAL BUILDING STOCK STATE

Real EPC
ADEME DATABASE
(25% of housings)

Estimated EPC
BDNB expert
(100% of housings)



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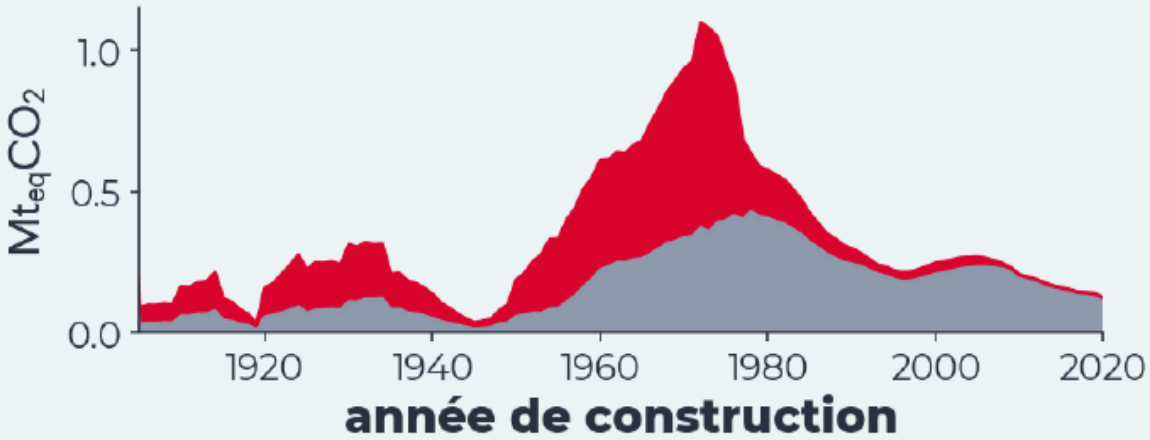
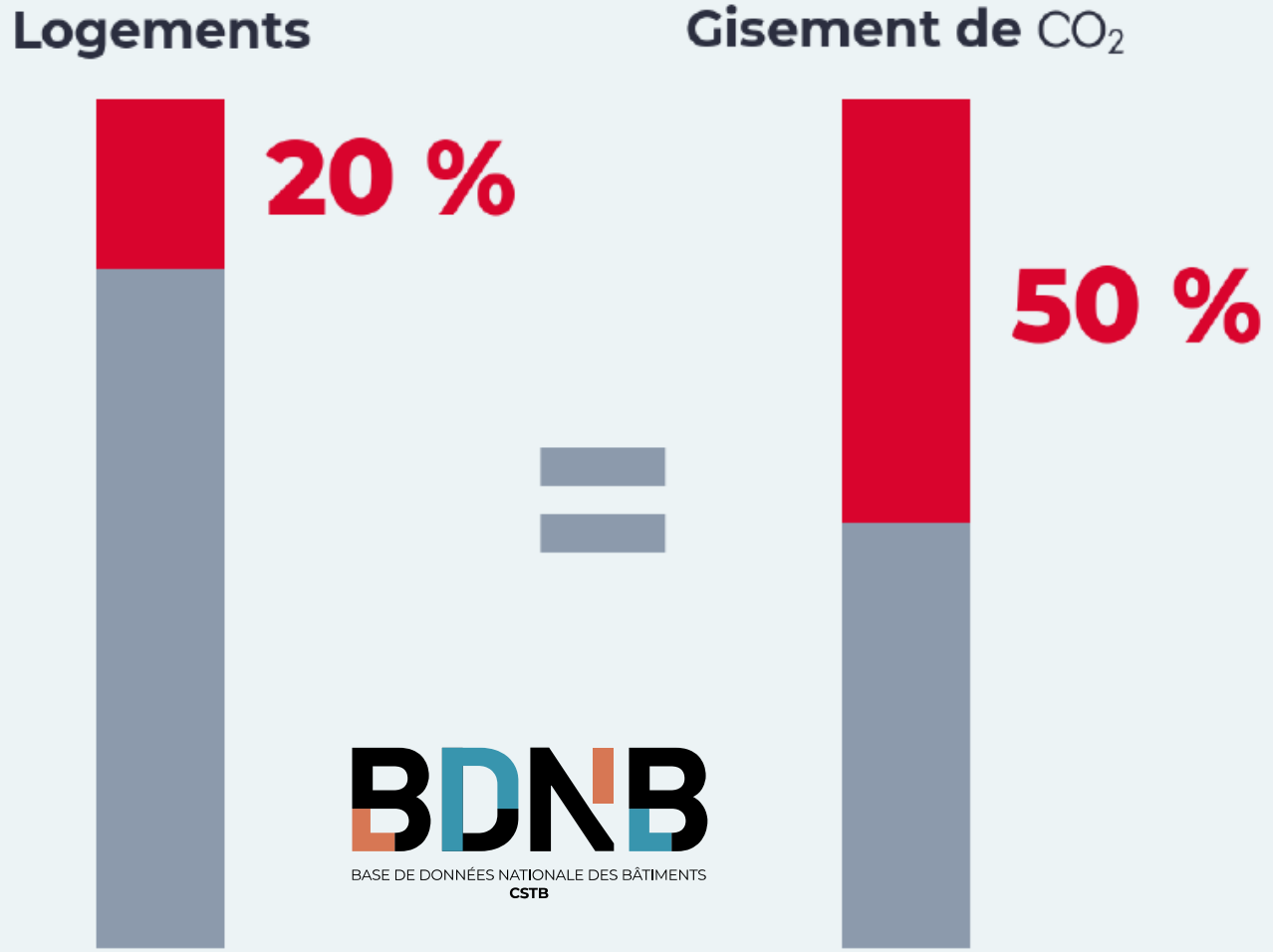
SIMULATING PUBLIC POLICY IMPACTS WITH ADVANCED MODELING

With BDNB we were able to find that heavily renovate 20% of housings only correspond to 50% of the renovation potential of all building in France



* Estimations basées sur une hypothèse de rénovation globale (isolation, changement de chauffage...). Méthode d'évaluation basée sur la méthode DPE arrêté 2021. Périmètre : 5 postes règlementaires : chauffage, ECS, ventilation, refroidissement, éclairage.

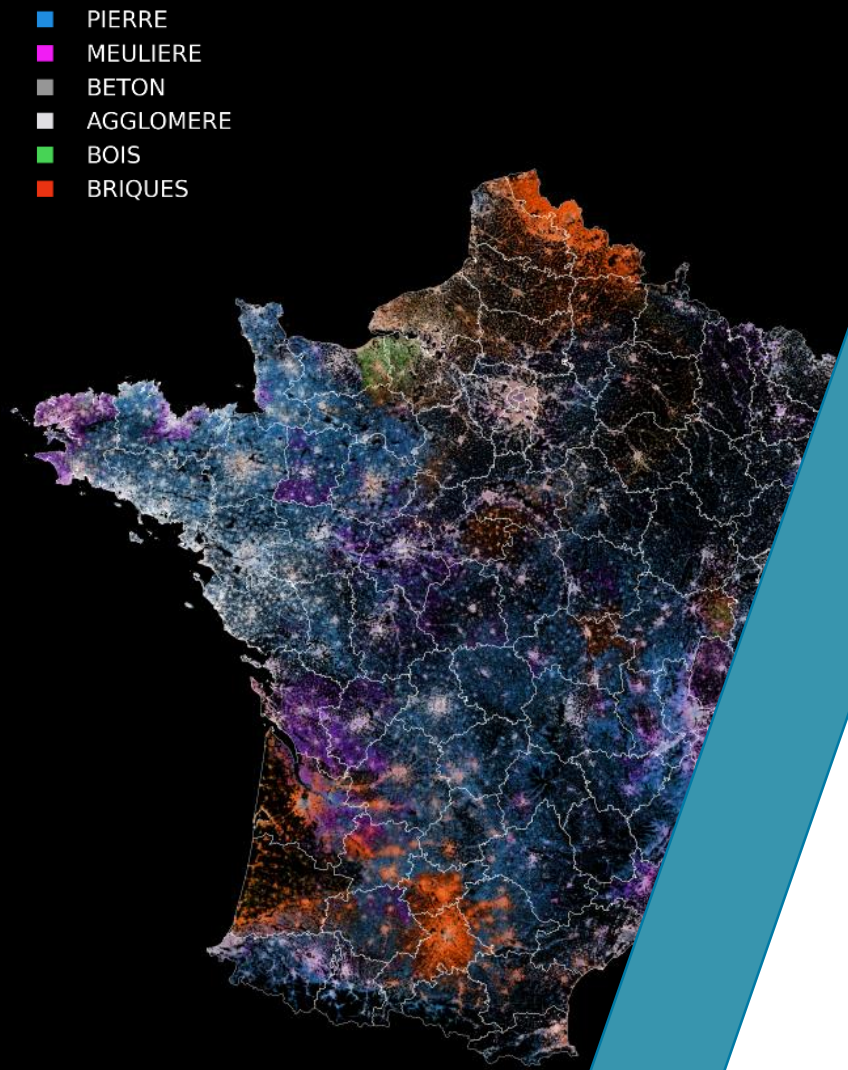


Sources : BDNB 2022-10.b, Fichiers Fonciers 2022, ©BDTOPO 2022, ADEME DPE 2022

IDENTIFY THE SPECIFIC BUILDINGS TARGET OF THE POLICY

Identify the buildings that are in the 20%

BDNB
BASE DE DONNÉES NATIONALE DES BÂTIMENTS
CSTB



THANK YOU FOR YOUR ATTENTION

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District heating and cooling resource center Cerema Nantes

13 juin 2025

Exco Buildings – IEA TCP

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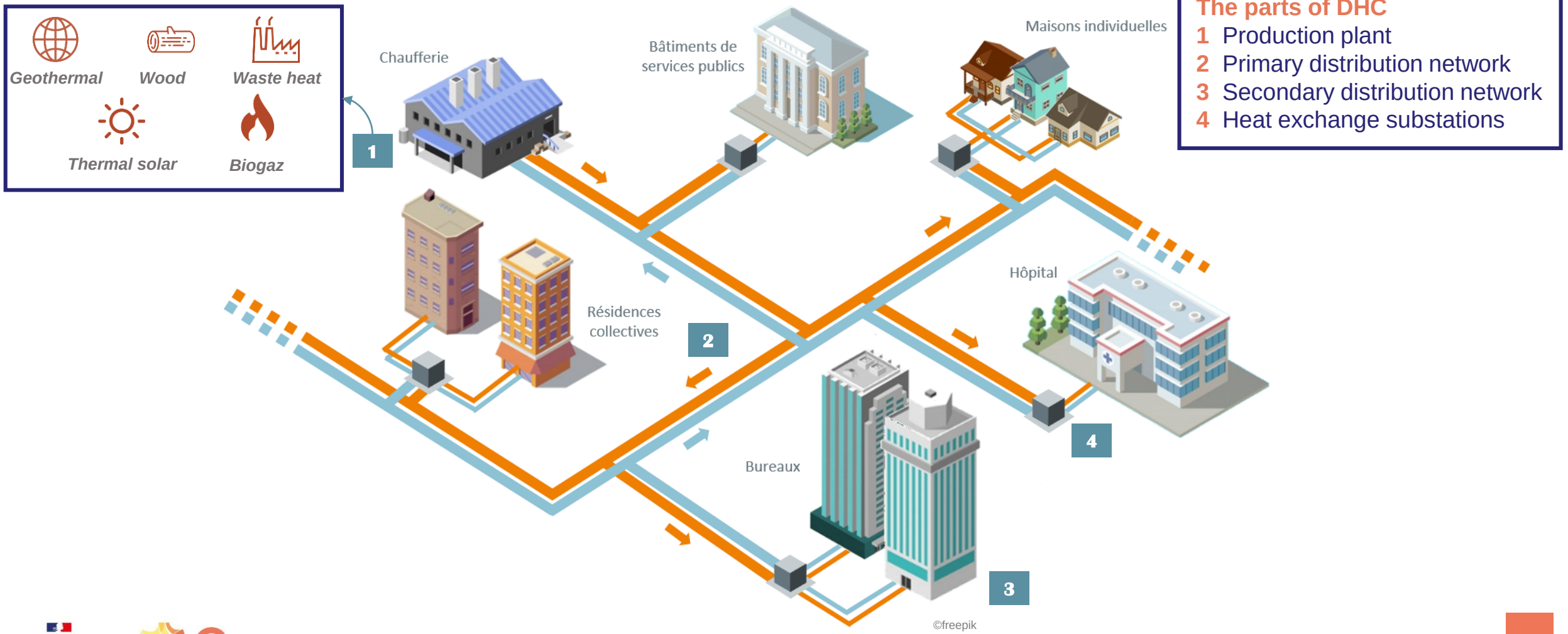
How a DHC works



The parts of DHC

1. Production plant
2. Primary distribution network
3. Secondary distribution network
4. Heat exchange substations

DHC resources center

→ Team of 4 people
+ 1 trainee
+ 1 recruitment in progress

→ Work themes

- A website about DHC : *https://reseaux-chaleur.cerema.fr/*
- National studies about DHC :

Pricing policy of DHC, DHC in other countries (for example in Denmark), policies for automatic connection to the DHC, etc.

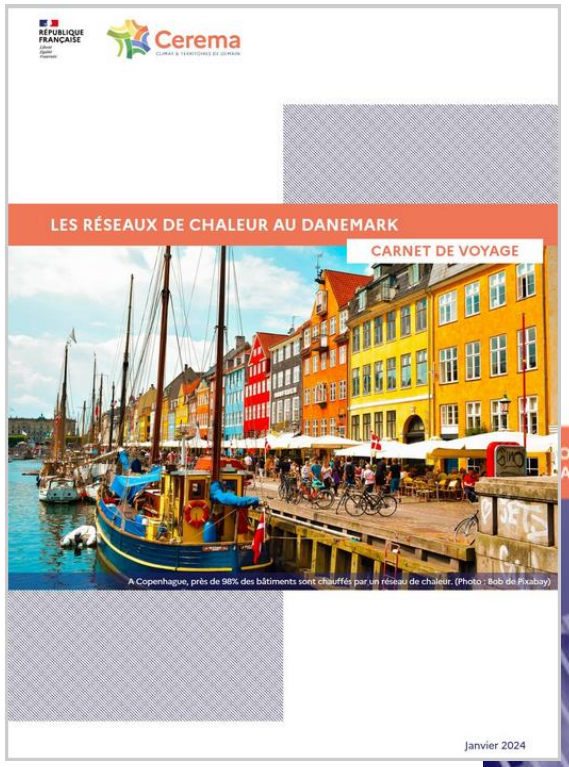
- Support for local administrations in developing DHC :

Awareness campaign, support and advice for planning the development of renewable heat and DHC, participation in technical meetings, etc.

- Production of data and maps :

"EnRezo" project, map portal for renewable energies, European directive on energy efficiency

Some national studies



https://reseaux-chaleur.cerema.fr/espace-documentaire

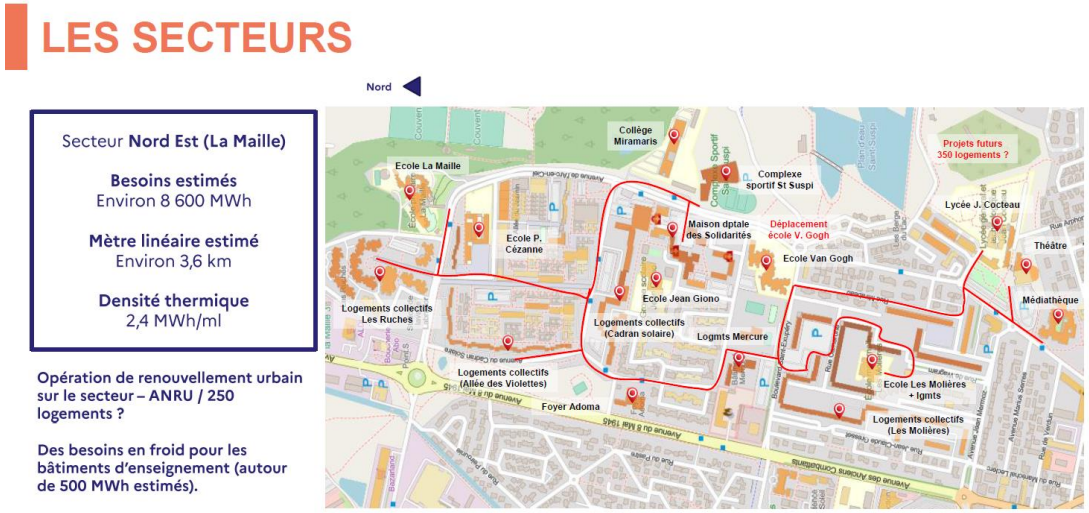
Support for local authorities

Awareness campaign about DHC

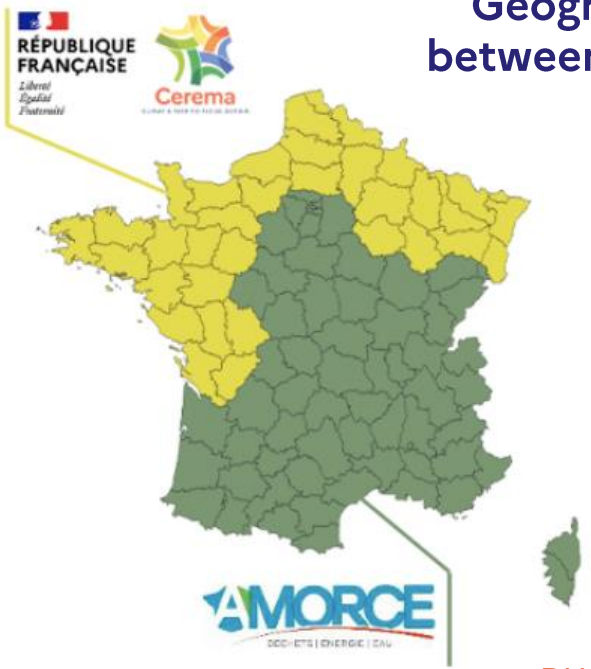
→ Financed by Energy Agency (Ademe) since 2019
→ Analyse the opportunities to build a DHC
→ Objective : Initiate a feasibility study

Some figures
Since 2019
- ***More than 150 local authorites***
- ***70% initiate a feasibility study***

Example of presentation



Geographical distribution between Cerema and Amorce



EnRezo project

Demand of buildings

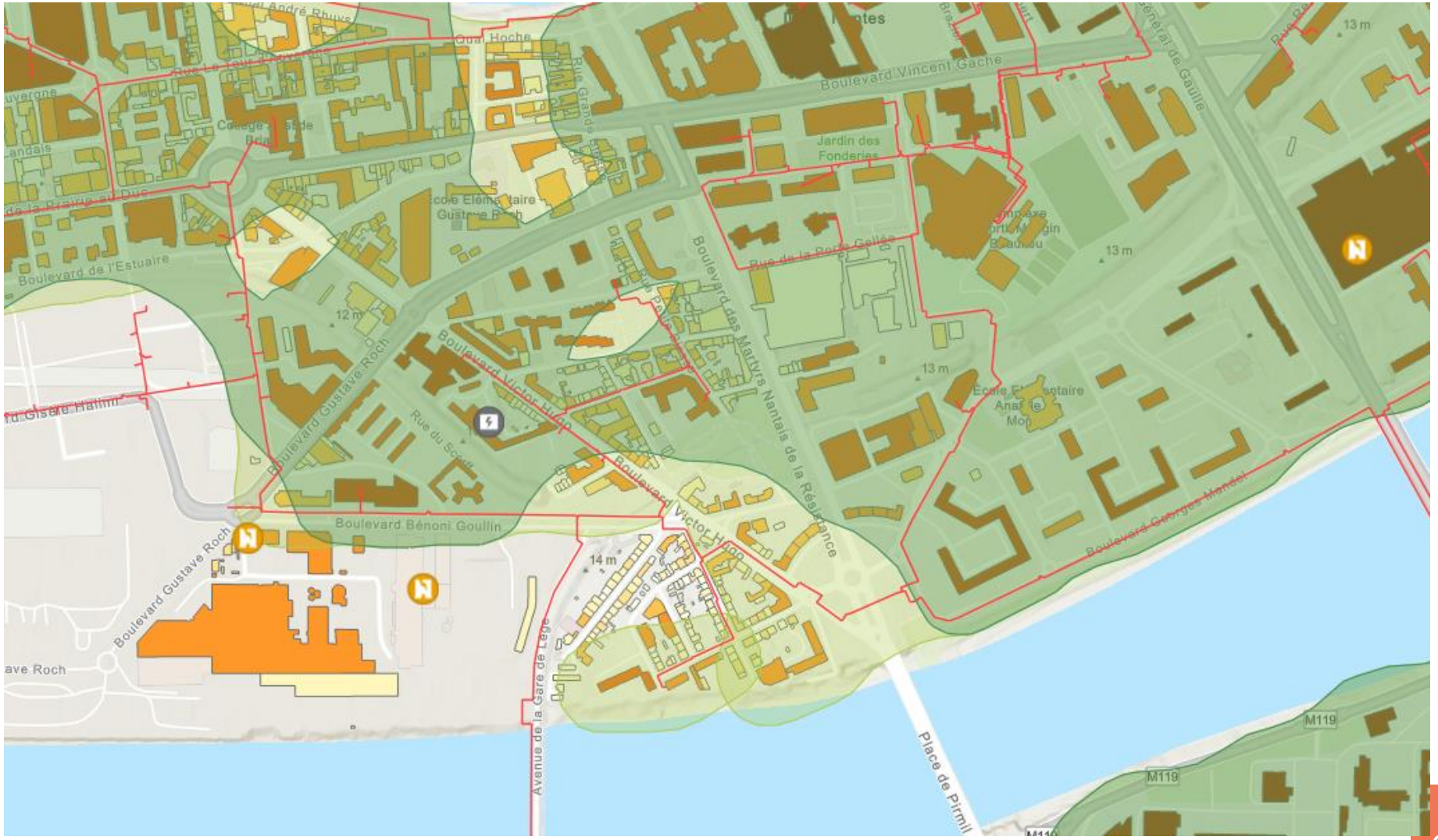
- Commercial, residential and public buildings
- Heating and domestic hot water demand
- Cooling demand

Production plant and DHC

- Waste heat (industry, datacenter, etc.)
- Geothermal, thermal solar, biomass plants
- DHC

Opportunities area

- To develop DHC



EnRezo project

- 4 mapping modules

Accès à EnRezo

Accès à EnRezo - Expert

Accès à EnRezo - 2050

Accès à EnRezo - DROM

- Thematic analyses

- User guide and flyer

EnRezo
CHALEUR ET FROID RENOUVELABLES
Cerema

https://reseaux-chaleur.cerema.fr/espace-documentaire/enrezo

Lien vers EnRezo

https://reseaux-chaleur.cerema.fr/espace-documentaire/enrezo

EnRezo
CHALEUR ET FROID RENOUVELABLES
Cerema

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Thank you for your attention

Contact reseaux-chaleur@cerema.fr

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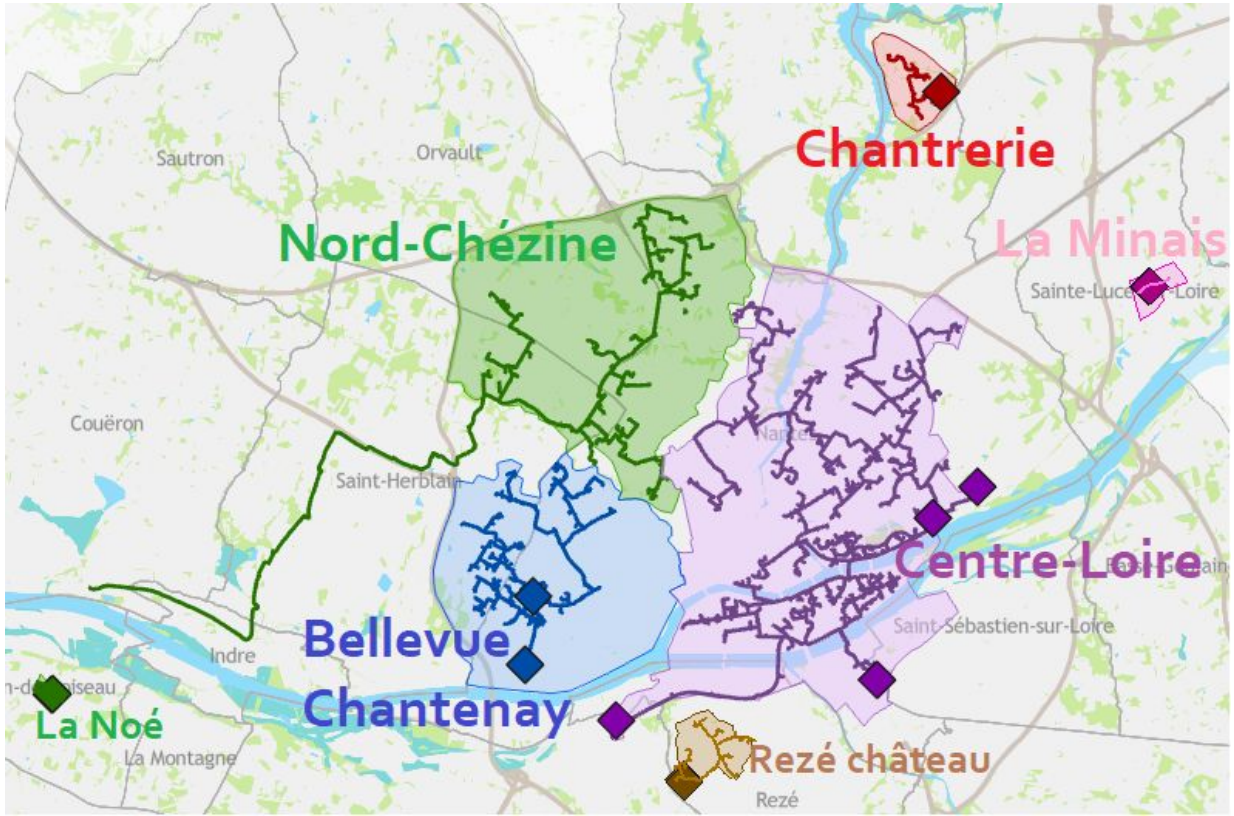
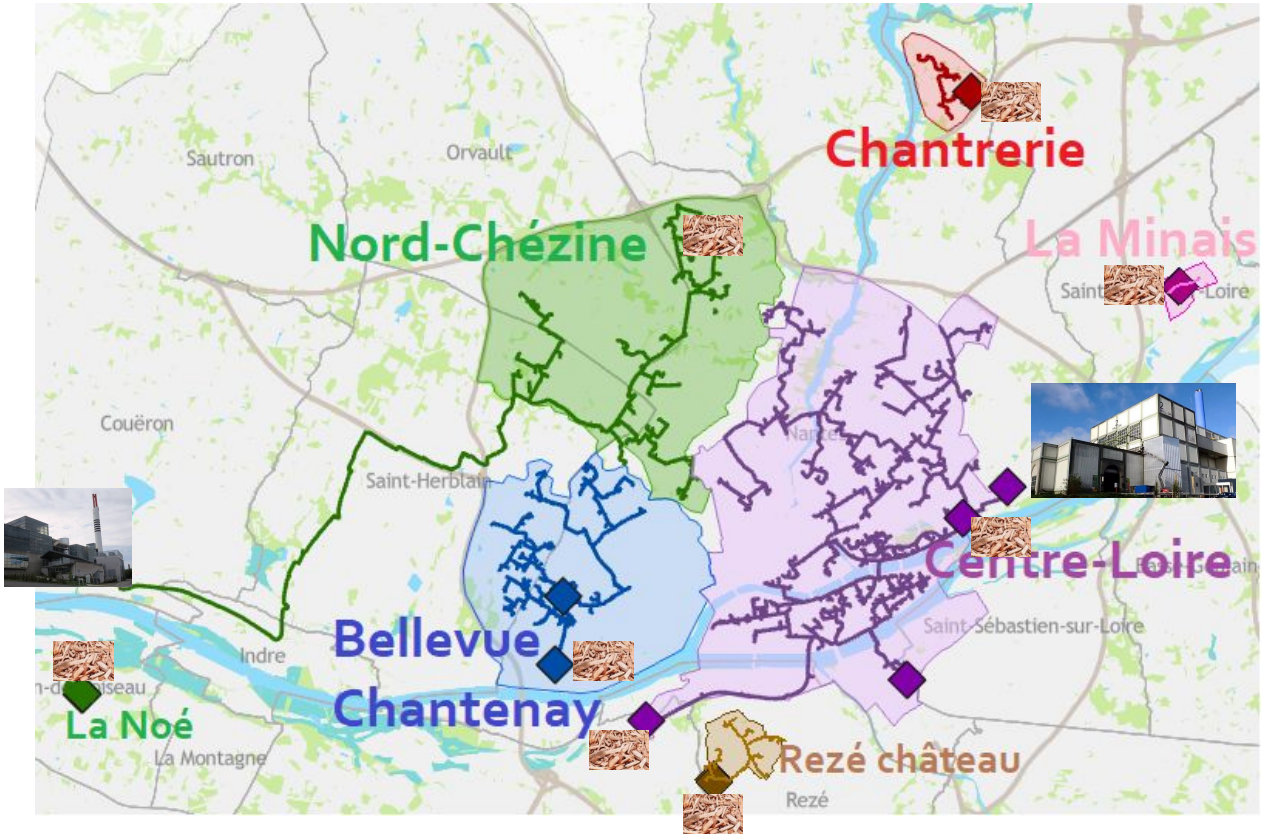
District heating policy of Nantes

Exco meetings TCP de l'AIE
13 juin 2025

DH in Nantes today



DH in Nantes today

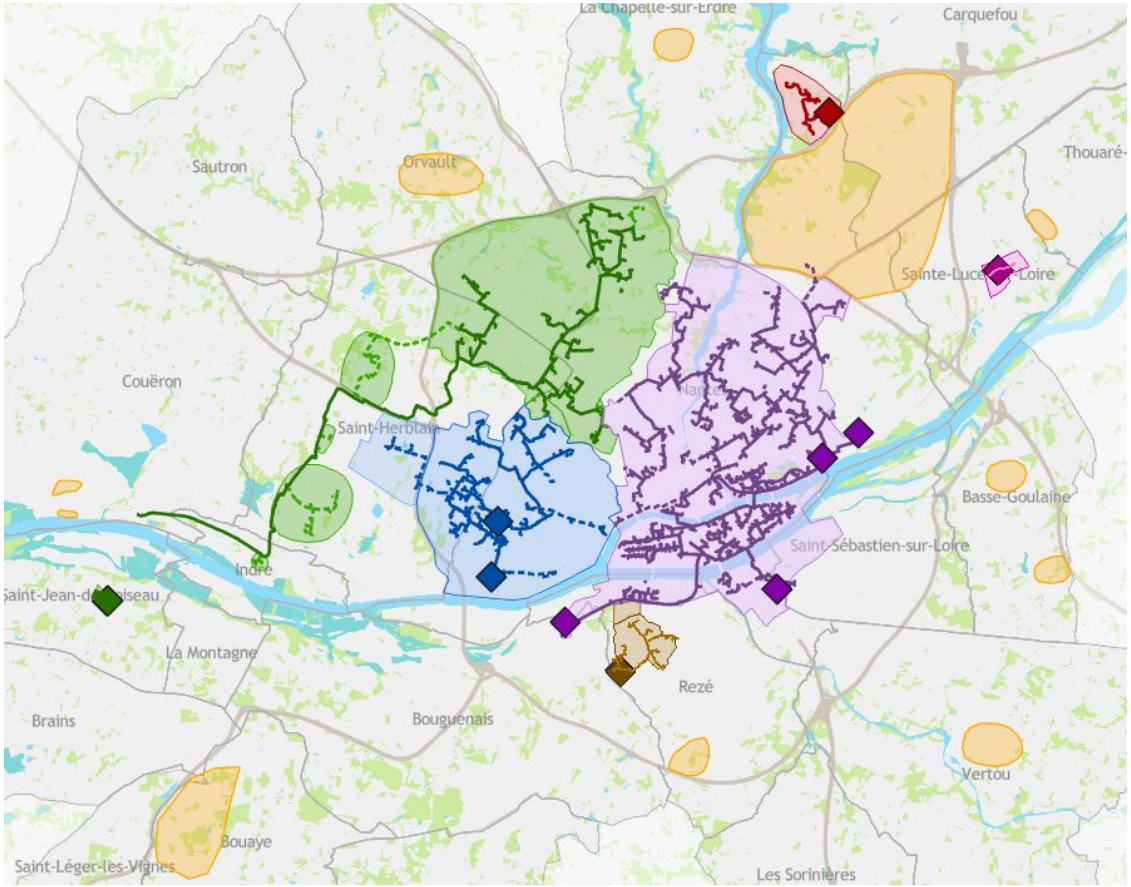


- 60 000 TCO_2/an saved
- 74% renewable and recovered energy

48% waste	26% wood	26% gaz

- 400 GWh heat delivered

DH plan of Nantes [2023:2030]



4 axes to develop DH

Green + interconnect

Extend + 240 GWh

Densify

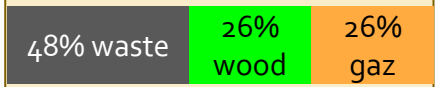
Create (+11 DH) + 60 GWh

DH in Nantes > 2030

- 100 000 TCO_2/an saved
- 80% renewable and recovered energy
  mainly waste and wood
  less gaz (26 -> 20%)
  little solar and geothermal
- 700 GWh heat delivered

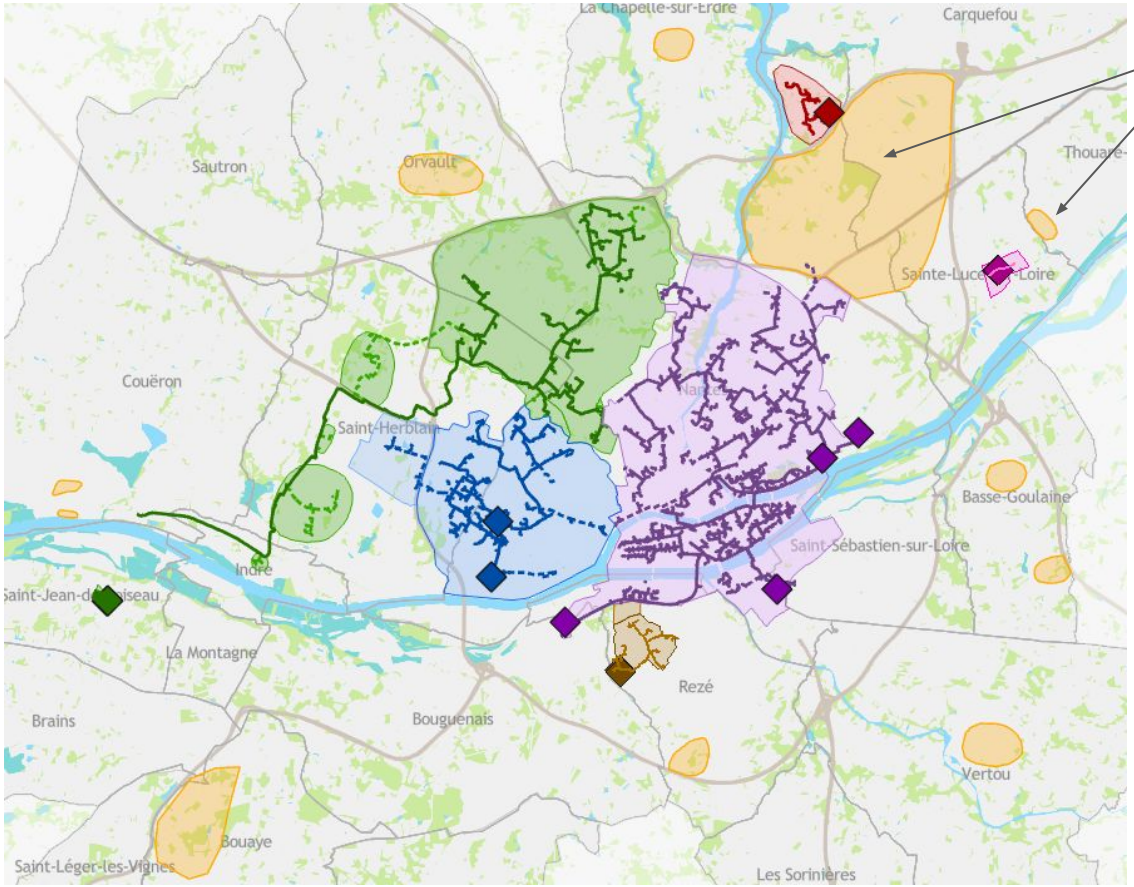
DH in Nantes today

- 60 000 TCO_2/an saved
- 74% renewable and recovered energy



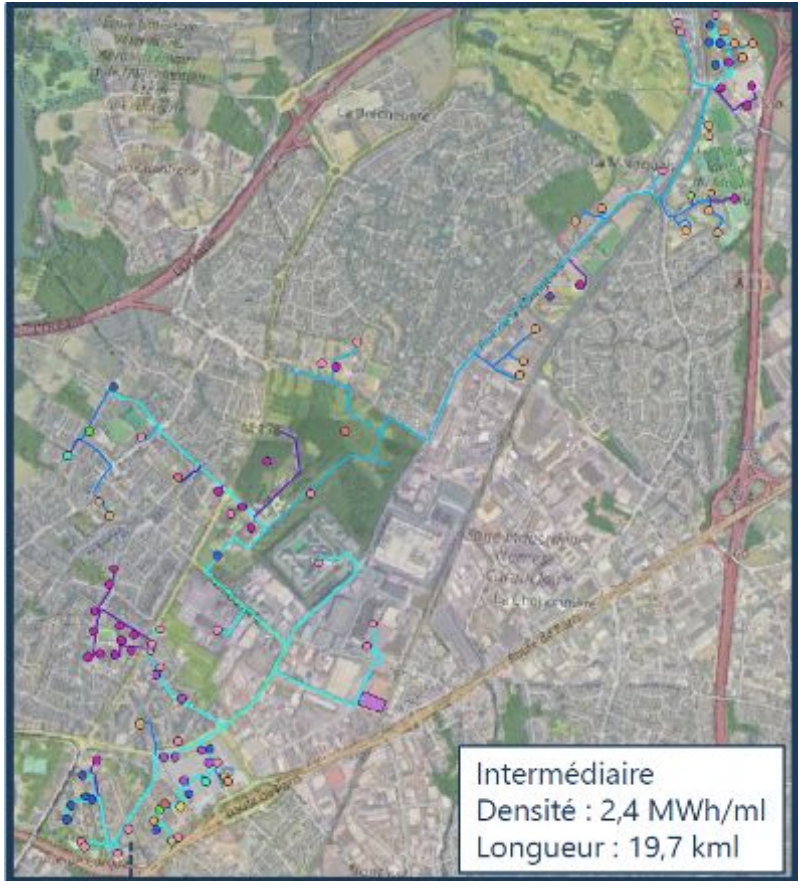
- 400 GWh heat delivered

DH plan of Nantes [2023:2030]



Focus on 2 creations

A big DH to create in 2029 : Nantes-Carquefou



- 8 500 TCO2/an saved
- 84% renewable and recovered energy

70% wood	14% wast	16% gaz

- 50 GWh heat delivered to a 100 subscribers

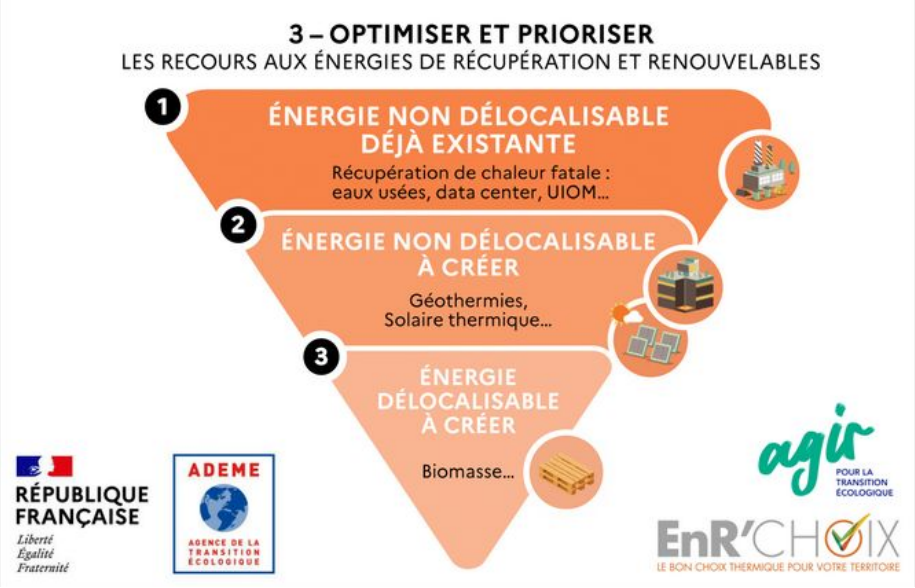
A little DH to create in 2026 : Thouaré

- 220 TCO2/an saved
- 97% renewable

82% wood	15% solar	3% gaz

- 1 GWh heat delivered to public facilities (school, sport…) and housings

Nantes strategy on energy choice



1. waste incineration + waste water treatment plant project on existing DH Bellevue-Chantenay

2. solar project in Thouaré DH + geothermal project in Bouaye DH

3. wood on each DH to supply the quantity requested
   + lowered particules emissions with filters

Nantes strategy on legal support

- DSP (public service delegation) for big DH :
  - private investments,
  - private risk support,
  - private billing of subscribers

- MGP (global performance market) for little DH :
  - public investments,
  - public billing of subscribers

Nantes Métropole

Thanks :)

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BIO-BASED MATERIALS

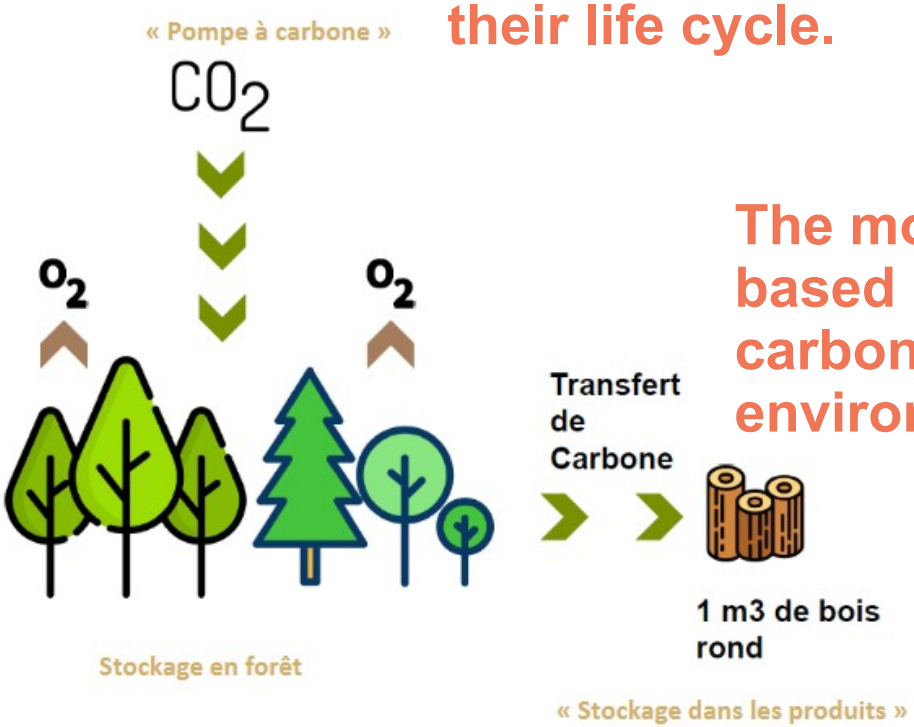
The construction sector in France

Definition

BIO-BASED MATERIALS - DEFINITION

Materials derived from natural and renewable resources

Primarily of plant origin, which capture CO2 present in the atmosphere during their life cycle.



The more a building incorporates bio-based materials, the more it "stores carbon" and helps to limit the environmental impact of construction.

Which materials for which uses?

USE BIO-SOURCED MATERIALS

Straw

Hemp

Wood

Clay

USE BIO-SOURCED MATERIALS

Wood

22,200 homes built from wood in France in 2022

1 in 3 houses is made of wood

Straw

5,000 the number of buildings constructed from straw bales in France.

500 new constructions each year.

USE BIO-SOURCED MATERIALS

Implementation on site

Prefabrication

USE BIO-SOURCED MATERIALS

Industrial bio-based materials

From agricultural sources – Hemp, linen…

From the silviculture sector – Wood

From recycled materials – fabrics, cellulose wadding

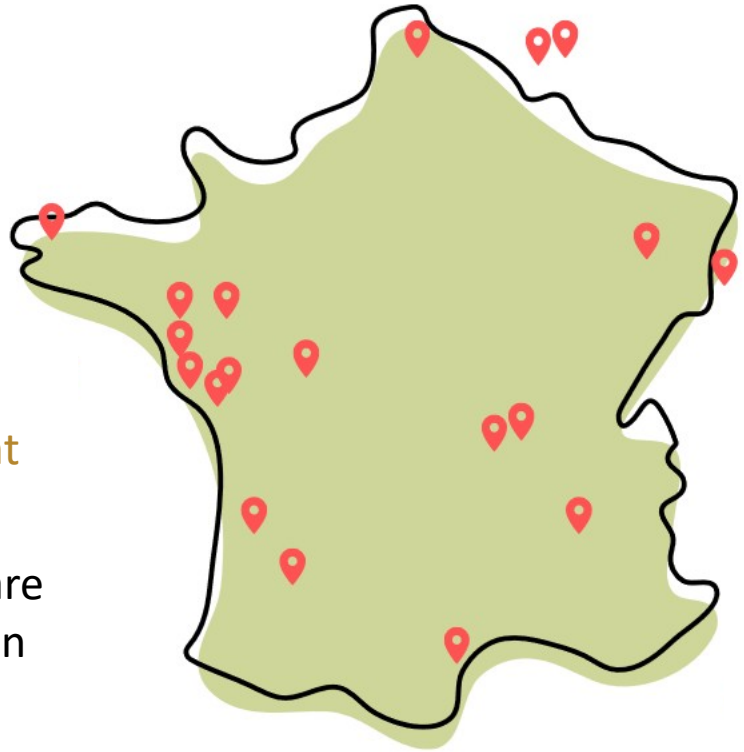
USE BIO-SOURCED MATERIALS

THE BIO-BASED MATERIALS SECTOR ACCORDING TO AICB

19 Production plants

4 000 direct and indirect employment

11 % market share in insulation



ÉVOLUTION EN VALEUR

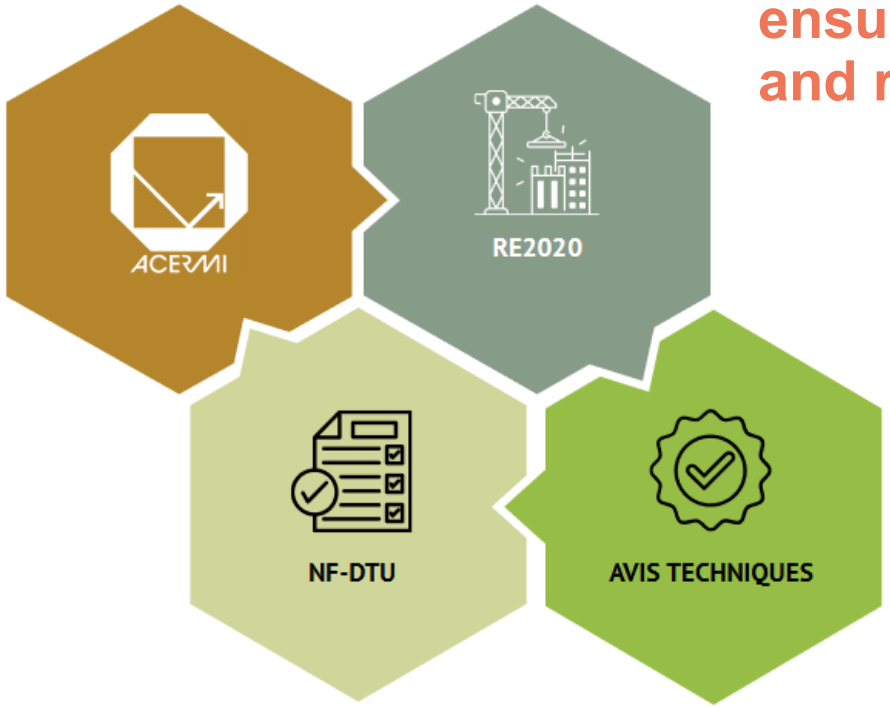
+55%

de CA réalisé entre 2016 et 2023

2023

ASSETS TO MASSIFY

FACILITATING THE USE OF BIO-SOURCED MATERIALS



Development of standards to ensure quality implementations and reassure insurers

Since 2022, construction regulations have promoted the biogenic storage of bio-based materials

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A VISITER

RENOVATION OF AN 8000 M² OFFICE BUILDING

Construction site on occupied site

Internal thermal insulation with production of prefabricated boxes insulated with hemp wool

CONSTRUCTION OF AN ENTIRE NEIGHBORHOOD WITH BIO-SOURCED MATERIALS

305 new homes - 192 collective housing units and 113 individual houses

Straw, clay, hemp bricks, bio-based wool

Construction sites delivered in 2025

Merci de votre attention

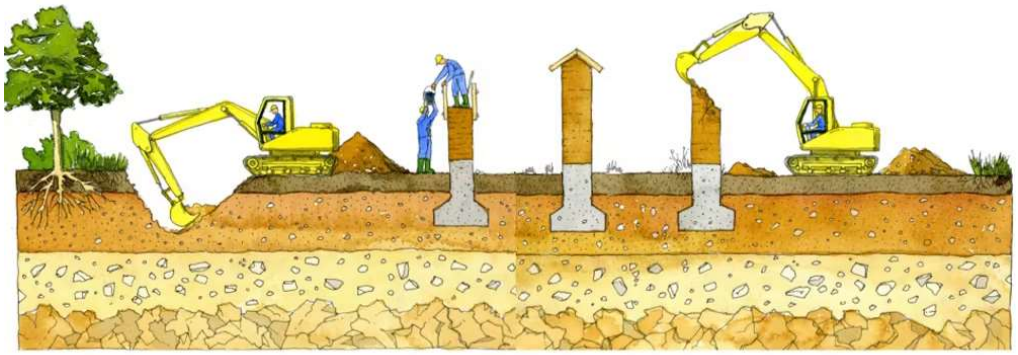
13/06/2025

McGregor Fionn, MAST departement

Earthen materials and indoor thermal comfort

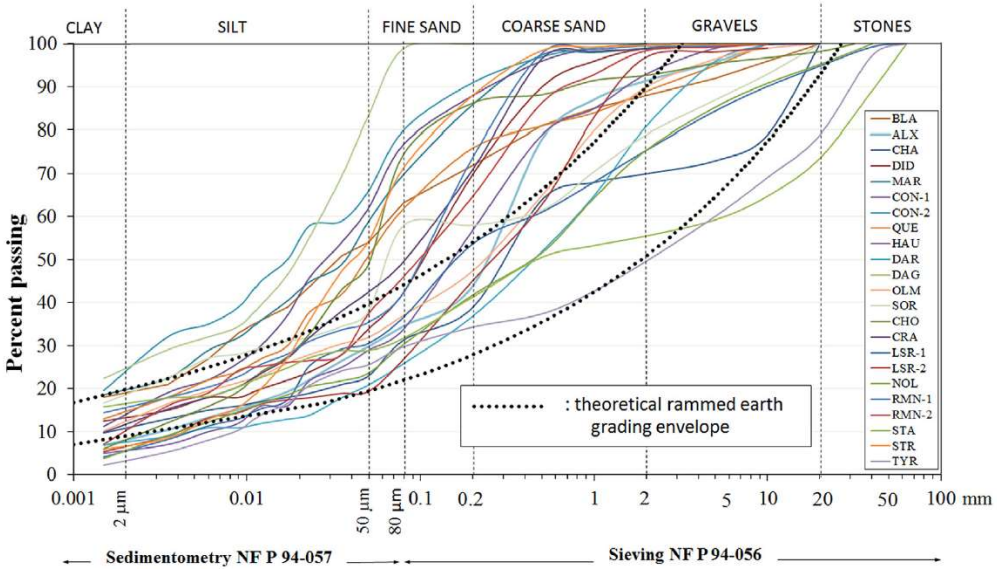
Université Gustave Eiffel

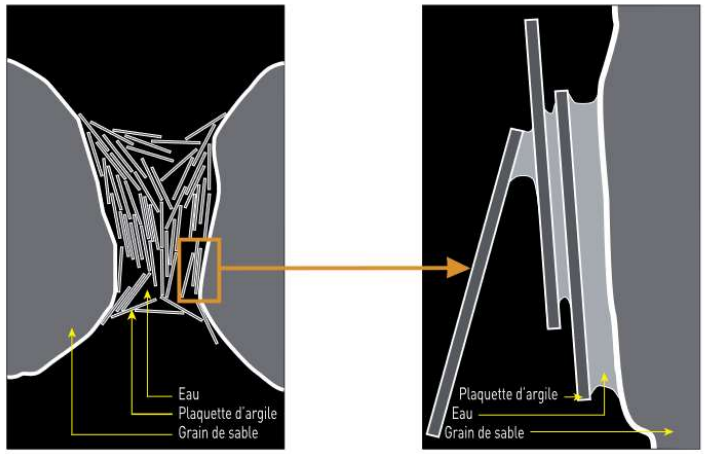
Raw earth material



@ Arnaud Misse

- Low carbon foot print
- Locally available
- No toxicity





Source : Bâtir en terre de Laetitia Fontaine et Romain Anger (Éditions Belin)

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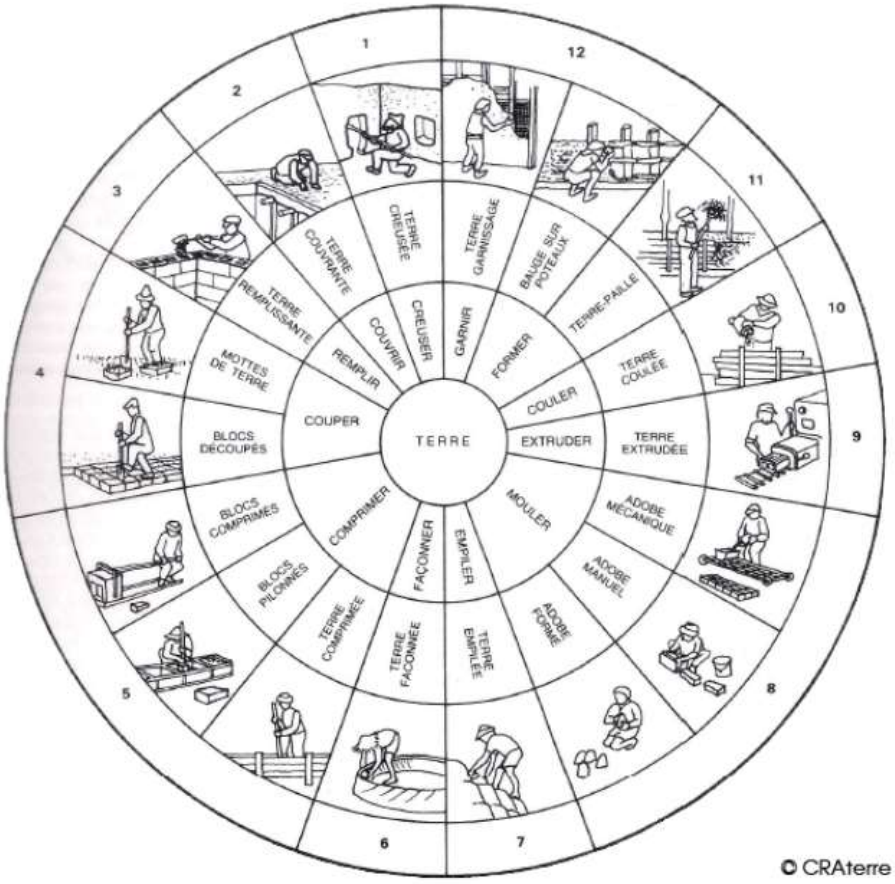

(a) la grande mosquée de Djenné, Mali

(b) La ville de Shibam, Yemen

(e) Forteresse d'Alcazaba, Espagne

(f) Le "domaine de la terre", France

CRAterre, 1989. La roue des techniques. In. HOUBEN, Hugo, GUILLAUD, Hubert, Traité de construction en terre. Marseille : Éditions Parenthèses. p.102. ISBN 978-2863641613.

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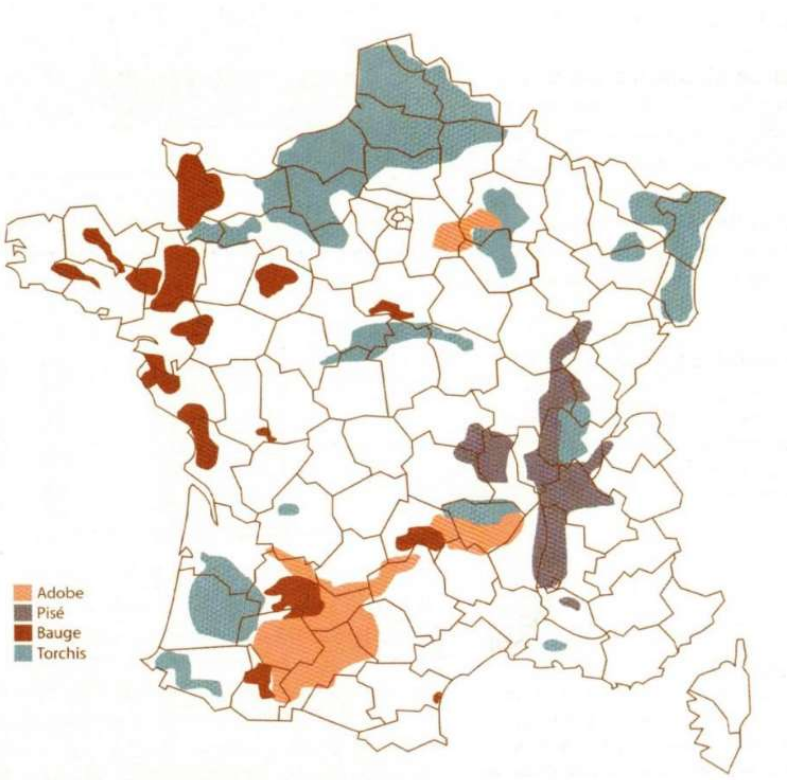
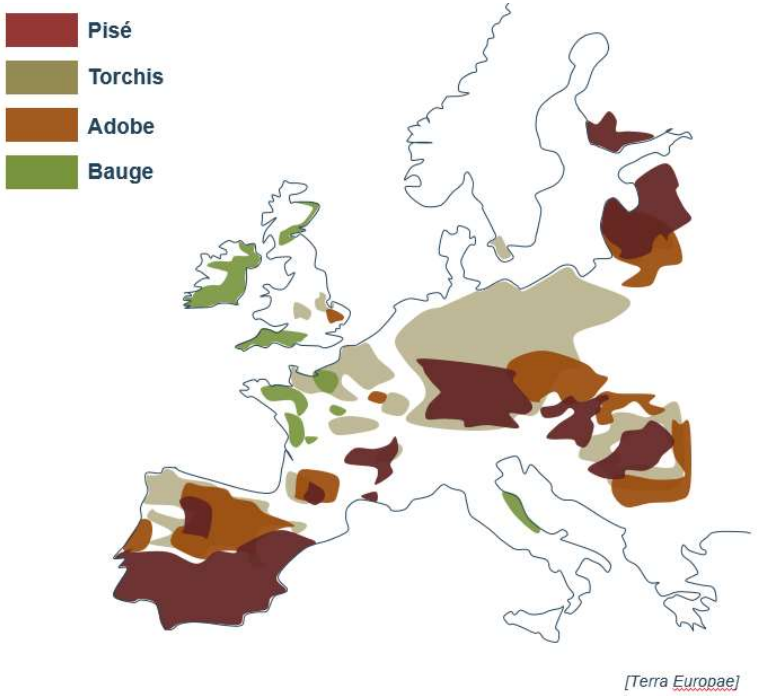
Earthen heritage

- **15% of french heritage buildings (over 1 Million buildings)**





(Lebaset al. 2007)

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Earthen heritage

Fortifications of Saint-Christie d'Armagnac, in the Gers, dated back to the XIIth et XIVth century.

Château La bastie d'Urfé (42) XVth century

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Earthen heritage

E. Mille, CRAterre-ENSAG

https://culture.isere.fr/page/la-construction-en-pise-en-isere

Modern constructions

Réalisations : Nicolas Meunier

Source : Thibault Vialleton, Batiserf

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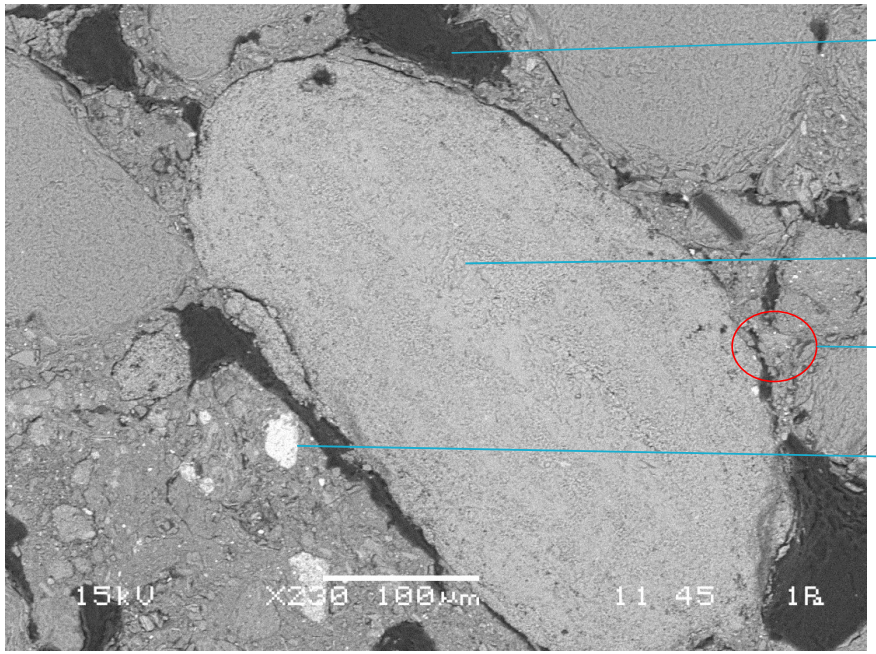
Hygroscopic nature of the material



Large pores

Sand

Clay binding matrix

Silt

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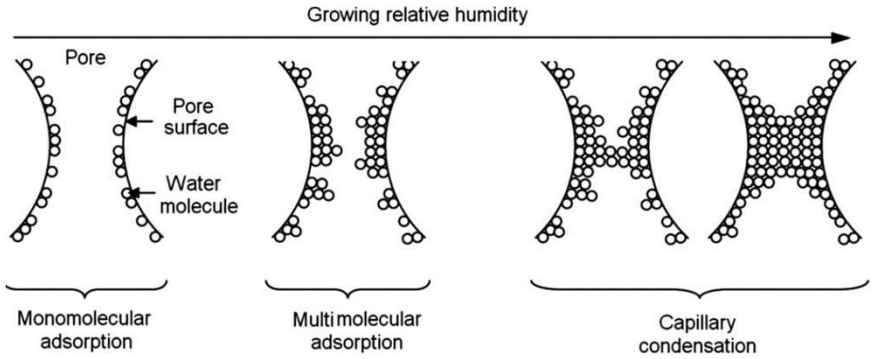
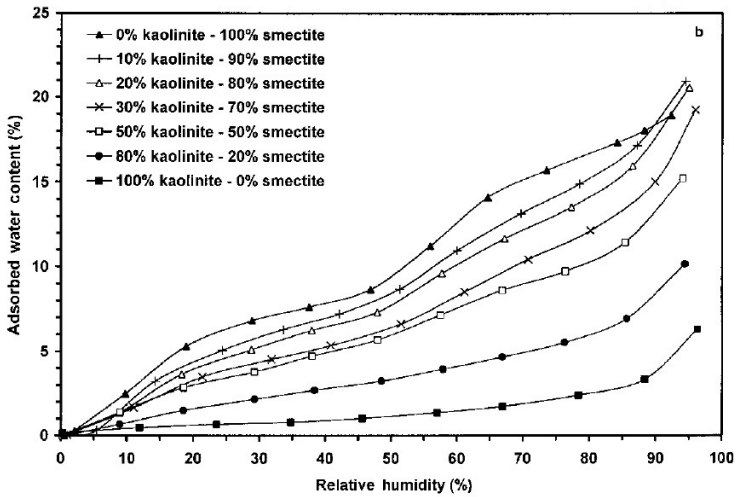
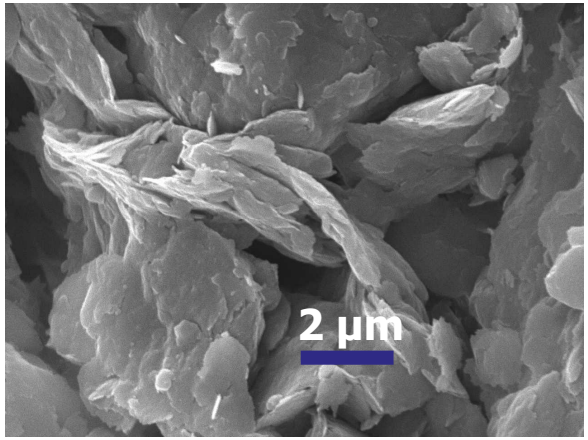
Hygroscopic nature of the material



From Collet et al., 2011





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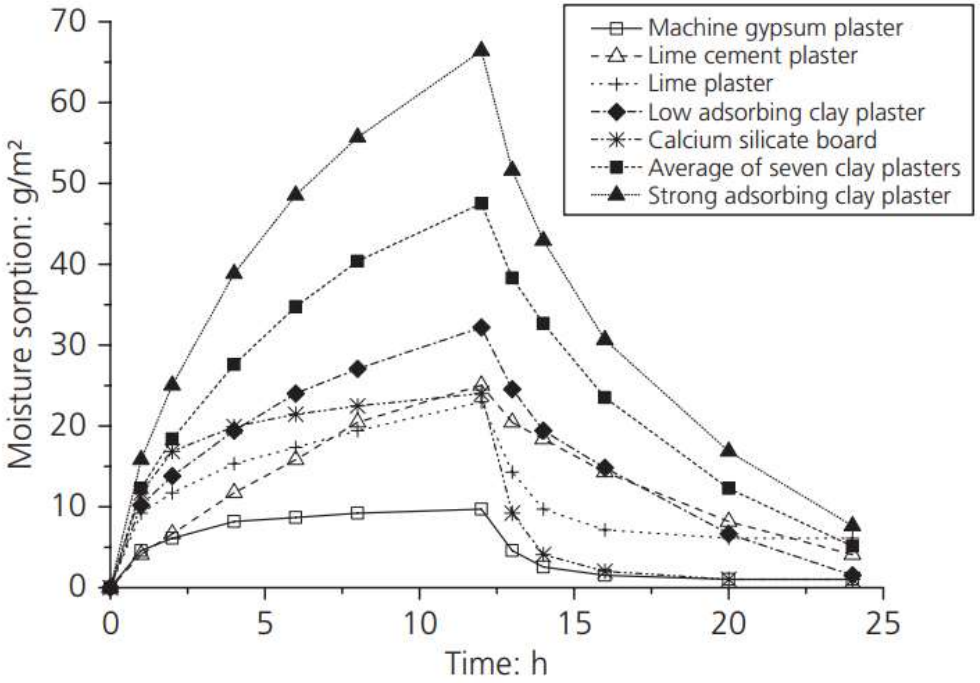
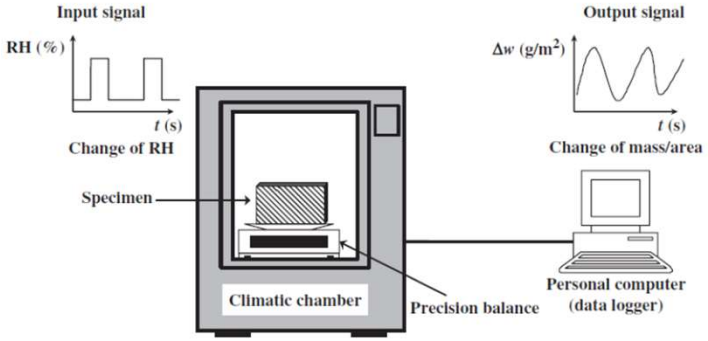
Complex thermal behaviour because of water exchange

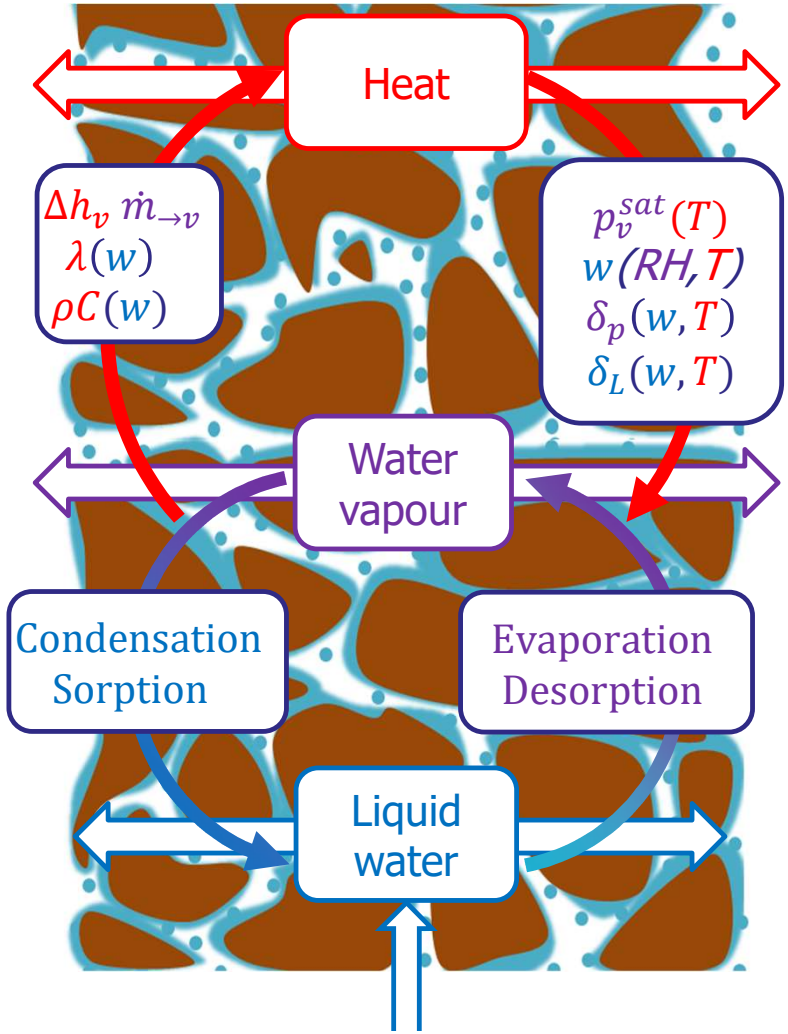


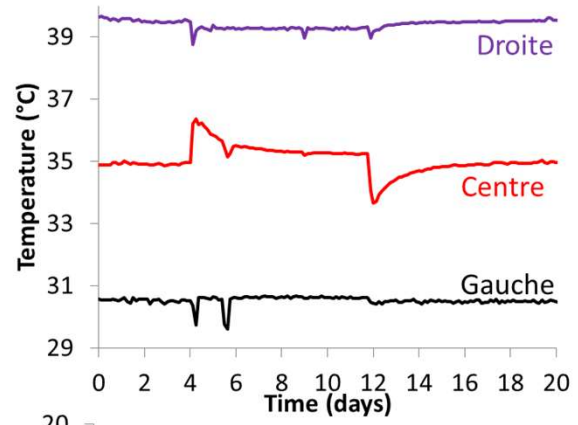


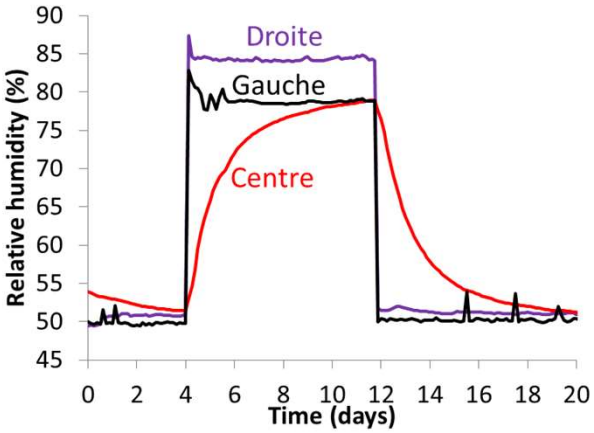
From Delgado et al., 2006

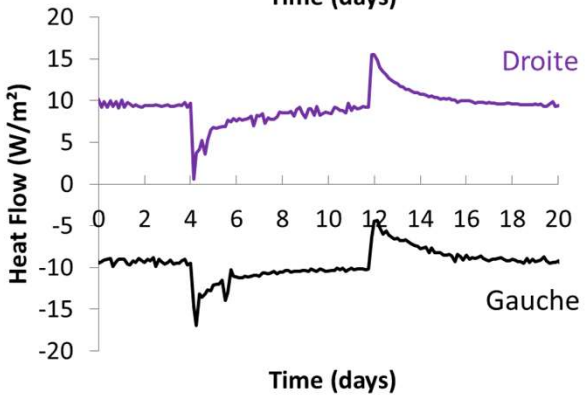
McGregor, F., Heath, A., Maskell, D., Fabbri, A., Morel, J.-C. A review on the buffering capacity of earth building materials (2016) Proceedings of Institution of Civil Engineers: Construction Materials, 169 (5), pp. 241-251

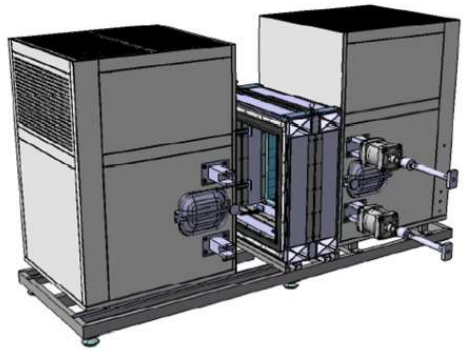
Complex thermal behaviour because of water exchange











UNIVERSITÉ DE LYON ENTPE

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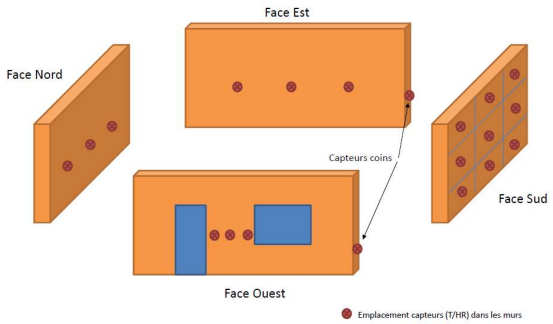
Full scale investigation of the thermal behaviour

EquipEx Sense-City
400m² climatic chamber



PNTERRE

Université Gustave Eiffel

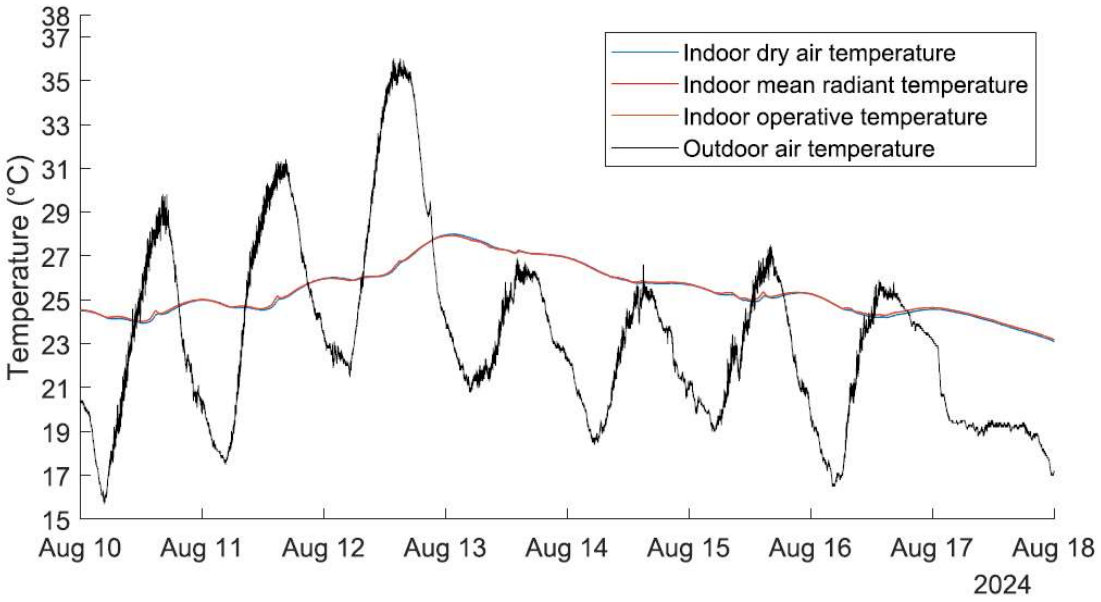
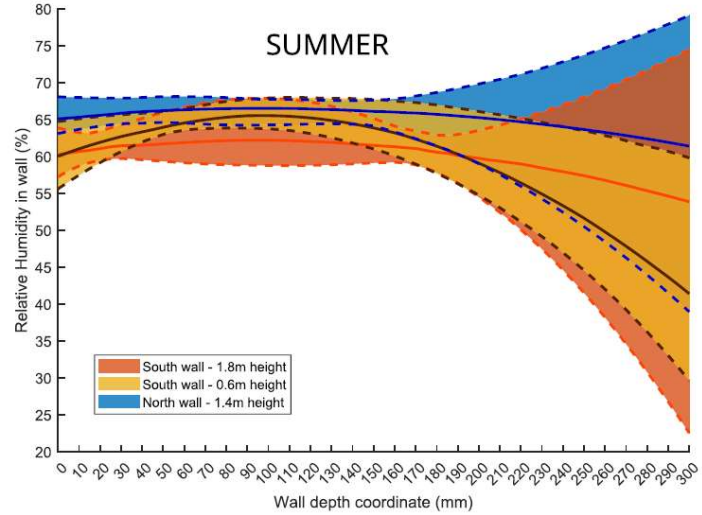
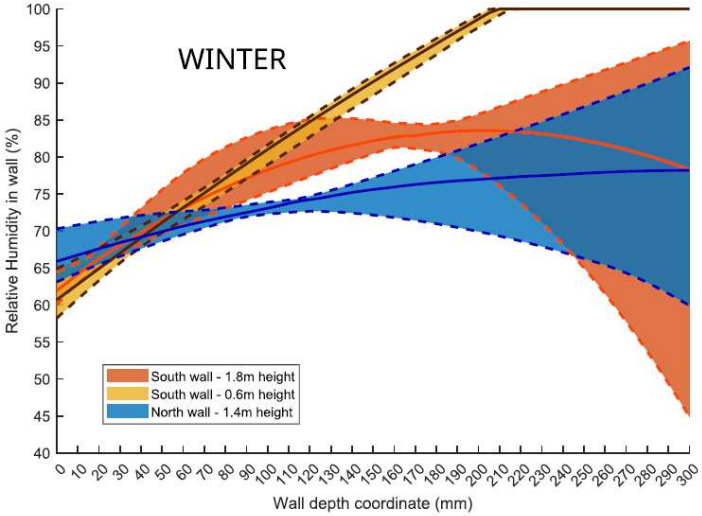


Fig. 12. Indoor thermal comfort and outdoor air temperature from 10th to 18th August 2024.





Full length article

Instrumentation and experimental hygrothermal investigations of a raw compressed earth brick house in Sense-City equipment: From material to building scale

Julien Waeytens [a,*], Myriam Duc [a], Yan Ulanowski [a], Laurent Ibos [b], Thibaut Colinart [c], Hadi Nasser [a], Mostafa Mortada [b], Hamza Allam [d], Abderrahim Boudenne [b], Nicolas Dujardin [b], Kamel Zibouche [e], Etienne Gourlay [f], Jean-Pierre Monchau [g], Fionn McGregor [h]

[a] Univ Gustave Eiffel, Champs-sur-Marne, F-77420, France
[b] Univ Paris-Est Creteil, CERTES, Creteil, F-94000, France
[c] Univ Bretagne Sud, UMR CNRS 6027, IRDL, Lorient, F-56100, France
[d] Univ Bordeaux, CNRS, Bordeaux INP, I2M, UMR 5295, Talence, F-33400, France
[e] Centre Scientifique et Technique du Batiment (CSTB), Champs-sur-Marne, F-77420, France
[f] Cerema, BPE Research Team, Strasbourg, F-67035, France
[g] Themacs Ingenierie, Champs-sur-Marne, F-77420, France
[h] Univ Gustave Eiffel, MAST-GPEM, Bouguenais, F-44340, France

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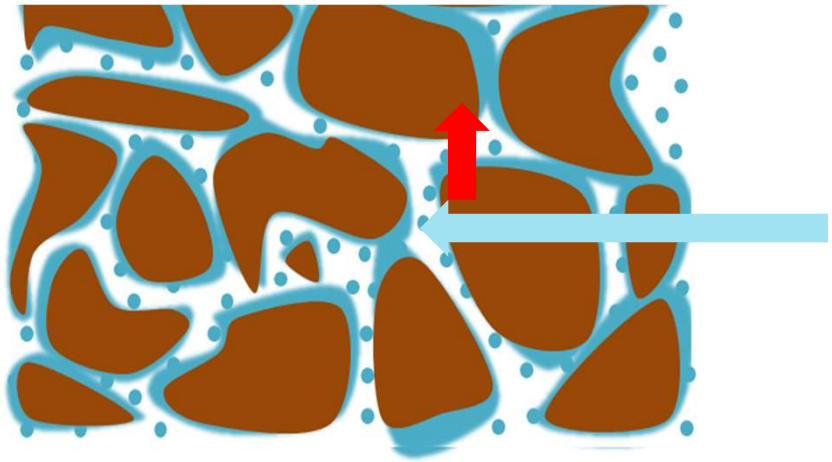
Winter

T=20 °C
RH = 40%

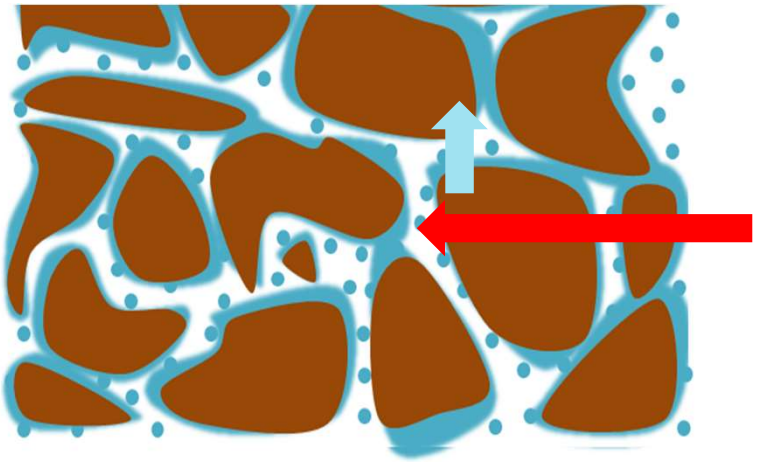


T=5 °C
RH = 76%

- Outdoor temperature decreases
- Moisture is adsorbed and heat is released
- Temperature gradients are reduced
- Indoor temperatures remain stable

Summer

T=20 °C
RH = 40%



T=30 °C
RH = 22%

- Outdoor temperatures increases
- Evaporation process reduces internal wall termperature
- Termperatures gradients are reduced
- Indoor temperature remains stable

PNTERRE

Objectifs : Determine the impact of moisture exchange on energy consumption for new projects

→ Reduce cooling demand (some authors estimate up to 20% for a climatic region like Paris)

Table 3
Energy consumption results of four climates.

		Area of hygroscopic surface			
		0 m^2	32.4 m^2	75.6 m^2	171.6 m^2
Madrid	Total Energy consumption [kW h]	1542.87	1379.88	1273.05	1146.35
	Energy-saving Rate [%]	/	10.56%	17.49%	25.70%
Paris	Total Energy consumption [kW h]	1965.76	1813.08	1705.84	1547.01
	Energy-saving Rate [%]	/	7.77%	13.22%	21.30%
Beijing	Total Energy consumption [kW h]	2752.46	2648.30	2603.44	2561.13
	Energy-saving Rate [%]	/	3.78%	5.41%	6.95%
Shanghai	Total Energy consumption [kWh]	2648.73	2583.43	2542.19	2489.36
	Energy-saving Rate [%]	/	2.47%	4.02%	6.02%

Mingjie Zhang, Menghao Qin, Carsten Rode, Zhi Chen, Moisture buffering phenomenon and its impact on building energy consumption, Applied Thermal Engineering, Volume 124, 2017

Université Gustave Eiffel

Thank you for listenning

Université de Poitiers

Université Gustave Eiffel

Construire en Chanvre

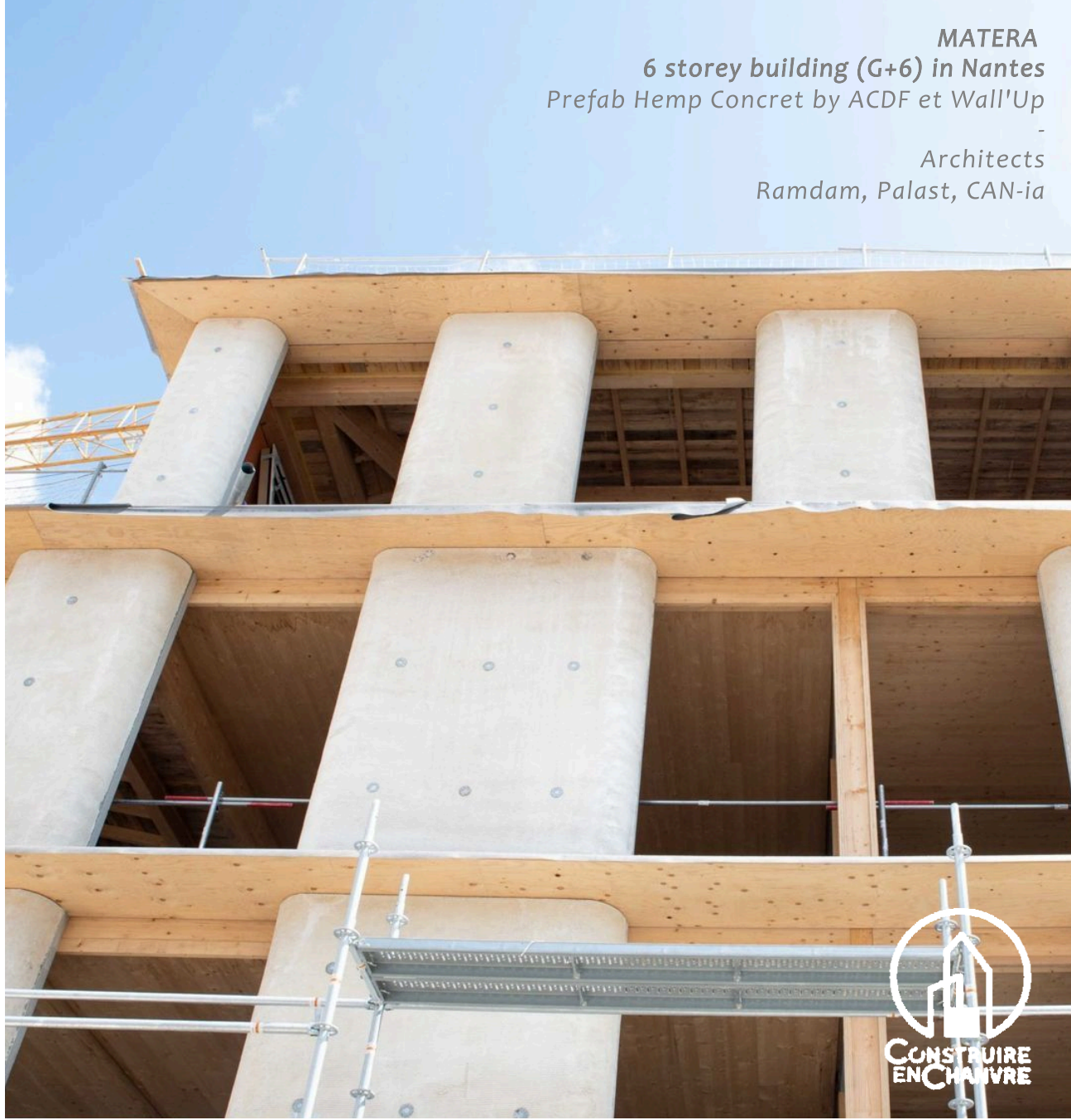
Energy in Building and Communities
Use of Hemp in Construction

June 2025

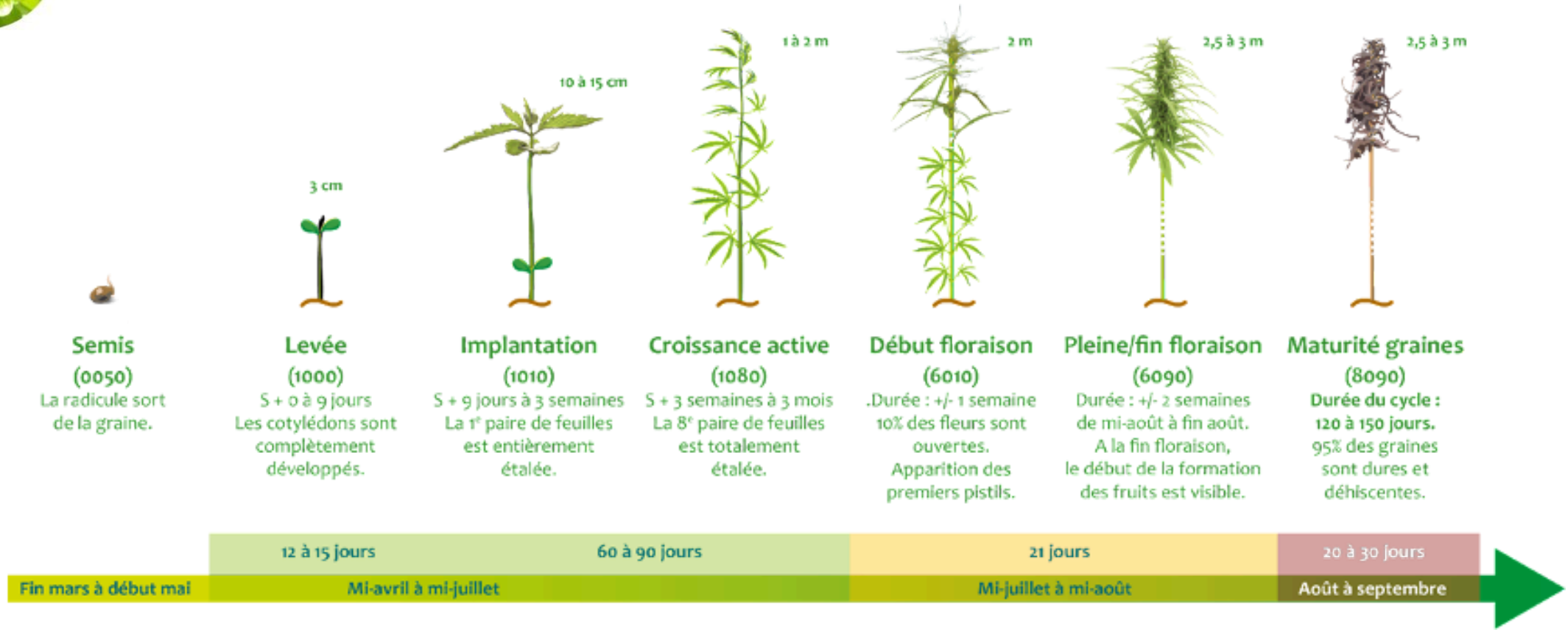
Baptiste Chauvet-Rondreux - Partner ingeneer - CAN-ia
Construire en Chanvre Tutor

Sommaire

- The plant and the Sector (5')
- How ? (5')
- Fire resistance and weather resistance tests (5')
- Some exemples (5')



Seasonality, growth



Selected varieties with less than 0,2% of psychotropic substances

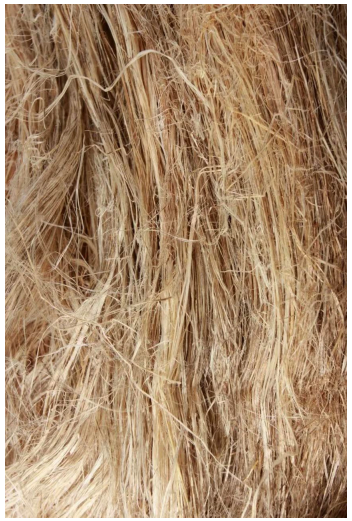
Plan improving the soils (roots consume nitrate)

CONSTRUIRE EN CHANVRE

Products made of hemp

Fiber :

- *Paper*
- *Clothes*
- *Insulation*
- *Cars - Plastics*



Core of Hemp :

- *Buildings*
- *Litter*
- *Mulching*

Seed:

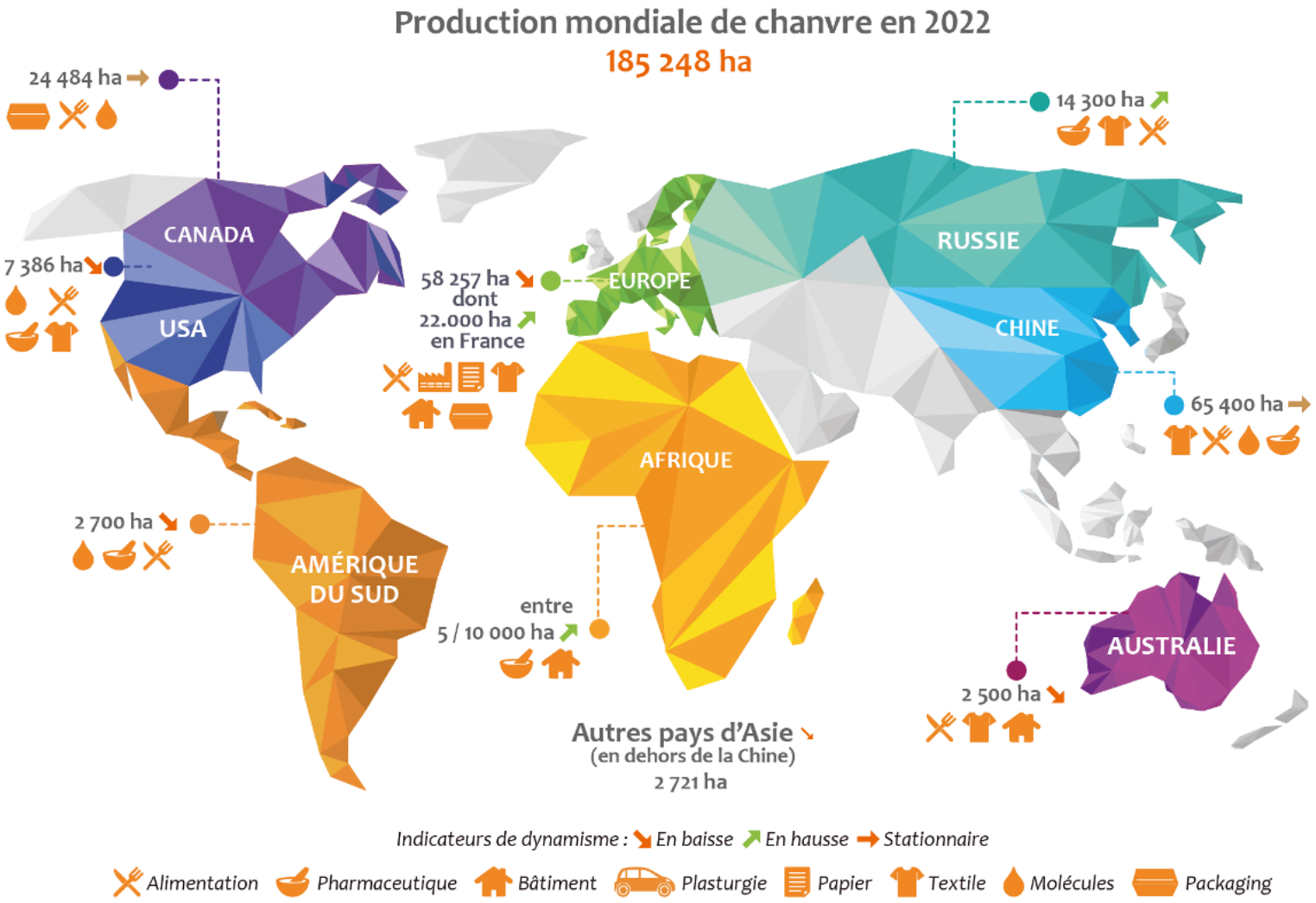
- *Oils*
- *Cereal bars*
- *Birds*

Powder :

(sous produit)
- *Plastics*
- *Fuel*

CONSTRUIRE EN CHANVRE

Hemp culture around the world



China : 65 400ha
Canada : 24 500 ha
France : 22 000 ha
Russia : 14 300 ha
USA : 7 400 ha

interchanvre.org

CONSTRUIRE EN CHANVRE

A "new" idea

Aggregate
("chènevotte" = core of hemp plant)

+

Hydraulic Binder
(lime)

Insulation Hemp Concrete

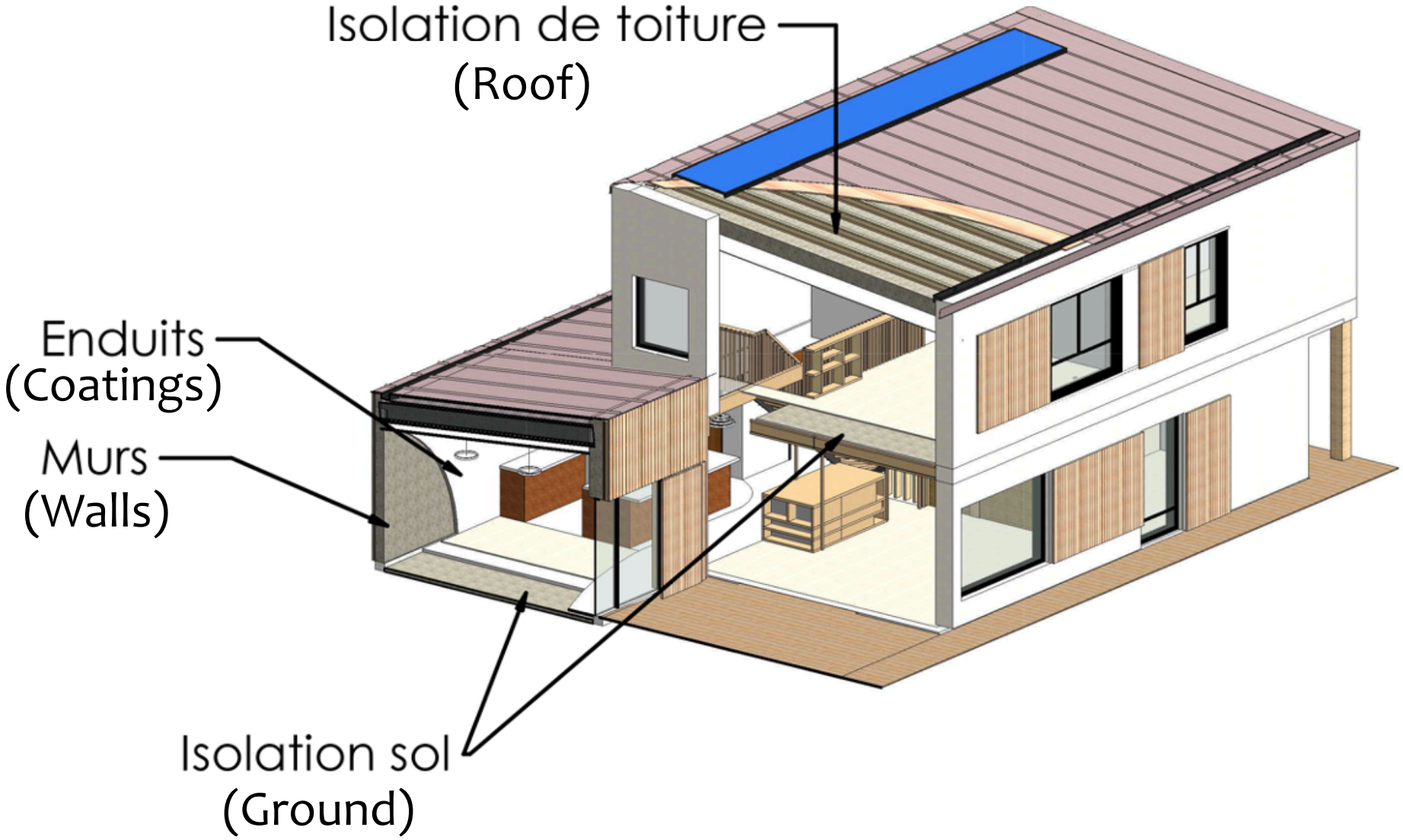
=

High Perforamance insulation with humidity regulation and thermal inertia

Only insulation : Not for structure

CONSTRUIRE EN CHANVRE

Use for building



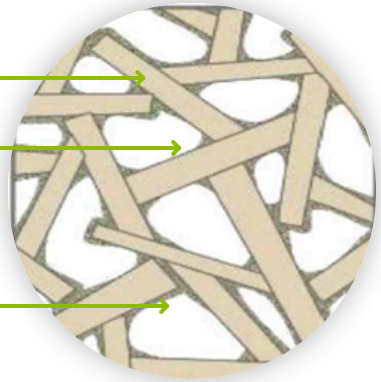
Several hemp concretes

Compressive Strengh raises

Core of Hemp Plante

Hydraulic BinderT

Space between aggregate



ROOF

WALL

COATING

Thermal conductivity drops

The mixture is designed for each purpose.

CONSTRUIRE EN CHANVRE

How it is used

Machine

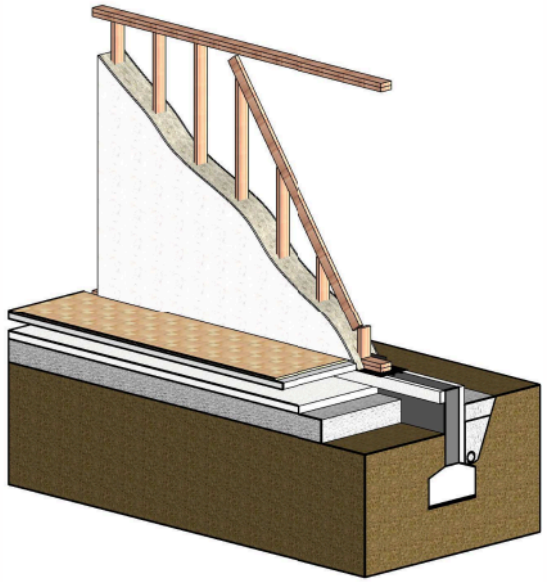
Filling

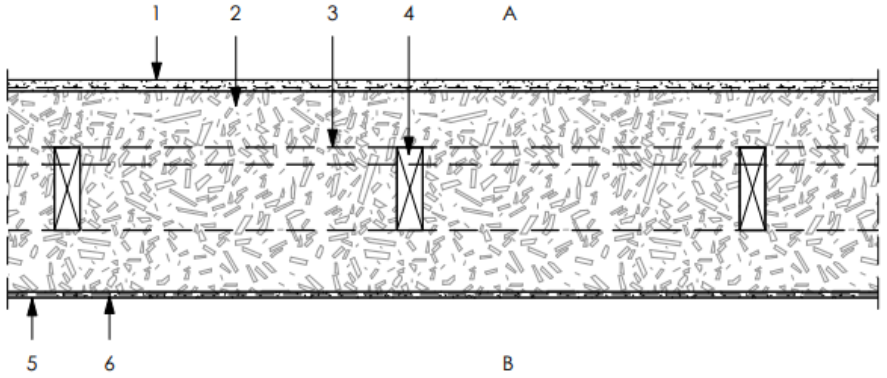
Prefabricated

Hand operated

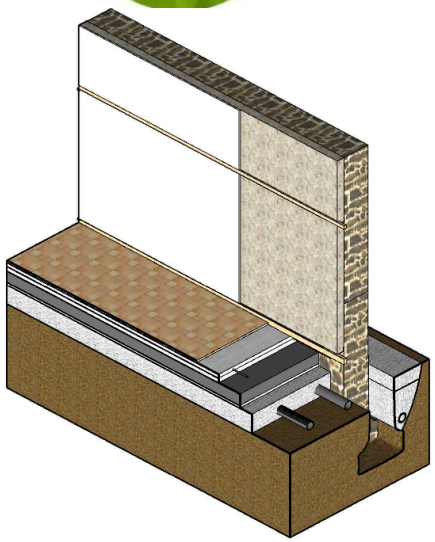
CONSTRUIRE EN CHANVRE

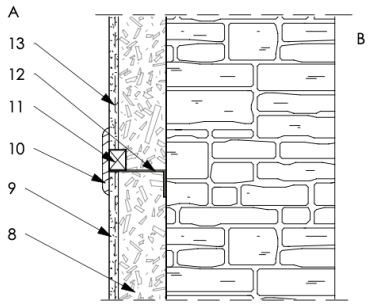
Center wooden structure with coating finish inside / outside

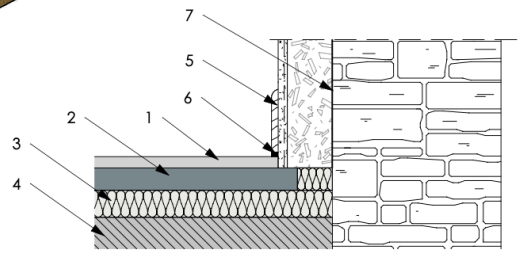




Thermal insulation for an old wall



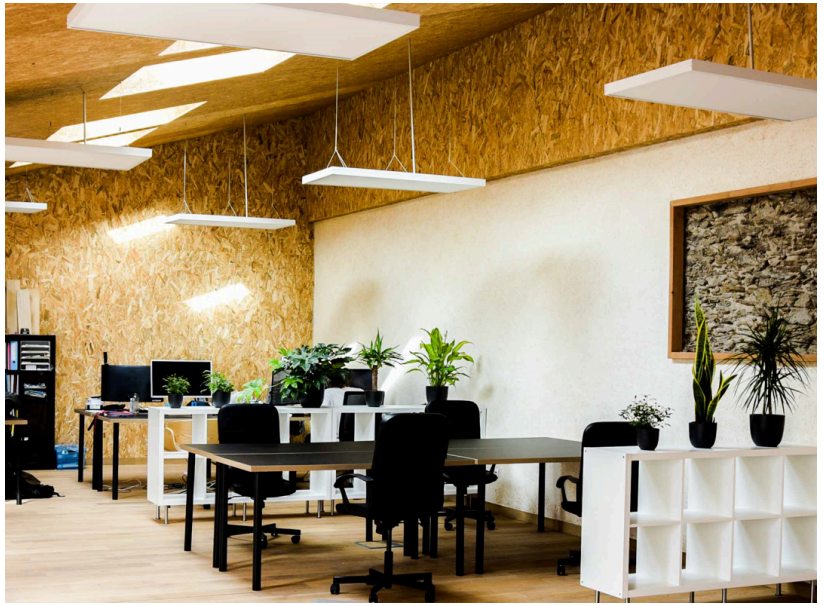




LEGENDE :

A - INT
B - EXT
1 - Revêtement de sol
2 - Chape
3 - Isolant sous chape
4 - Dalle
5 - Plinthe collée
6 - joint résilient
7 - Gobetis anti-salpêtre (selon cas)
8 - Doublage intérieur en béton de chanvre
9 - Enduit intérieur*
10 - Cimaise
11 - Support de fixation (cimaise)
12 - Equerre de fixation
13 - Trame d'enduit

* - Le revêtement doit être ouvert à la diffusion de la vapeur d'eau.



Source : CAN-ia

CONSTRUIRE EN CHANVRE

10-years warranty in France
up to 28 meters high

GARANTIE DÉCENNALE

1. Certified **hemp plant core**
2. Certified **mix lime / hemp**
3. Respect **professional standards**
4. Follow **a specific course**

CONSTRUIRE EN CHANVRE

The 2 more important rules

1. Protect from liquid water

2. Let the steam water go through

Reaction and resistance to fire

Reaction to fire (how it burn)

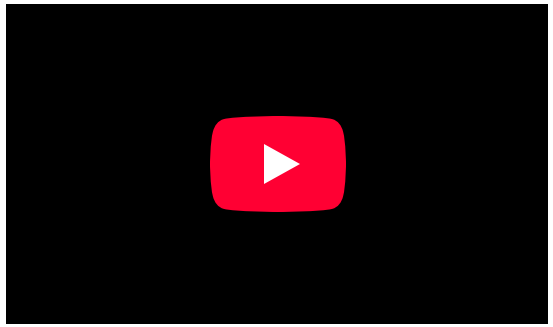
NF EN 13501-1+A1 - One of the highest standards in fire reaction rules. **B-s1, d0**

Fire resistance

Hemp Concrete in walls : 4 hours fire resistance without any finish or coating (After 4h, 80°C temperature on the unexposed part to the fire when it's 1100°C on the exposed part)

Vertical fire spreading

1 hour without a fail (LEPIR2 french test to validate IT249 regulation for 3+ storey-buildings)



CONSTRUIRE EN CHANVRE

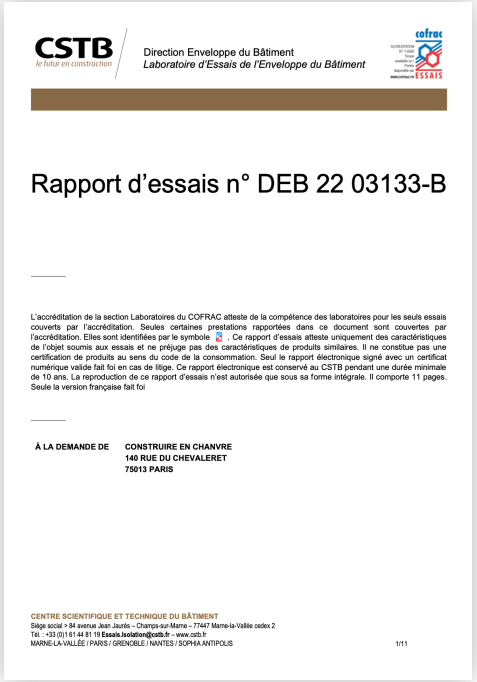
Rain on facade wall (with lime coating)

80 cycles Heat and Rain

1. Heat the wall at 70°C for 3 h
2. Spray the wall at 1 L/m².min
3. Rest for 2 hours and do it again 79 times....

Figure 4. Maquette 1 avant cycles chaleur-pluie

Figure 5. Maquette 1 après cycles chaleur-pluie



CSTB
le futur en construction

Direction Enveloppe du Bâtiment
Laboratoire d'Essais de l'Enveloppe du Bâtiment

cofrac ESSAIS

Rapport d'essais n° DEB 22 03133-B

L'accréditation de la section Laboratoires du COFRAC atteste de la compétence des laboratoires pour les seuls essais couverts par l'accréditation. Seules certaines prestations rapportées dans ce document sont couvertes par l'accréditation. Elles sont identifiées par le symbole . Ce rapport d'essais atteste uniquement des caractéristiques de l'objet soumis aux essais et ne préjuge pas des caractéristiques de produits similaires. Il ne constitue pas une certification de produits au sens du code de la consommation. Seul le rapport électronique signé avec un certificat numérique valide fait foi en cas de litige. Ce rapport électronique est conservé au CSTB pendant une durée minimale de 10 ans. La reproduction de ce rapport d'essais n'est autorisée que sous sa forme intégrale. Il comporte 11 pages. Seule la version française fait foi

À LA DEMANDE DE **CONSTRUIRE EN CHANVRE**
140 RUE DU CHEVALERET
75013 PARIS

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Tél. +33 (0)1 61 44 81 19 Essais.isolation@cstb.fr – www.cstb.fr
MARNE-LA-VALLÉE / PARIS / GRENOBLE / NANTES / SOPHIA ANTIPOLIS 1/11

Ville	Précipitations annuelles moyennes [mm/an]	Nombre de jours de pluie par an [jours]	Précipitations moyennes maximales par jour de pluie [mm/j]
Biarritz	1279	124	15
Brest	1162	110	15

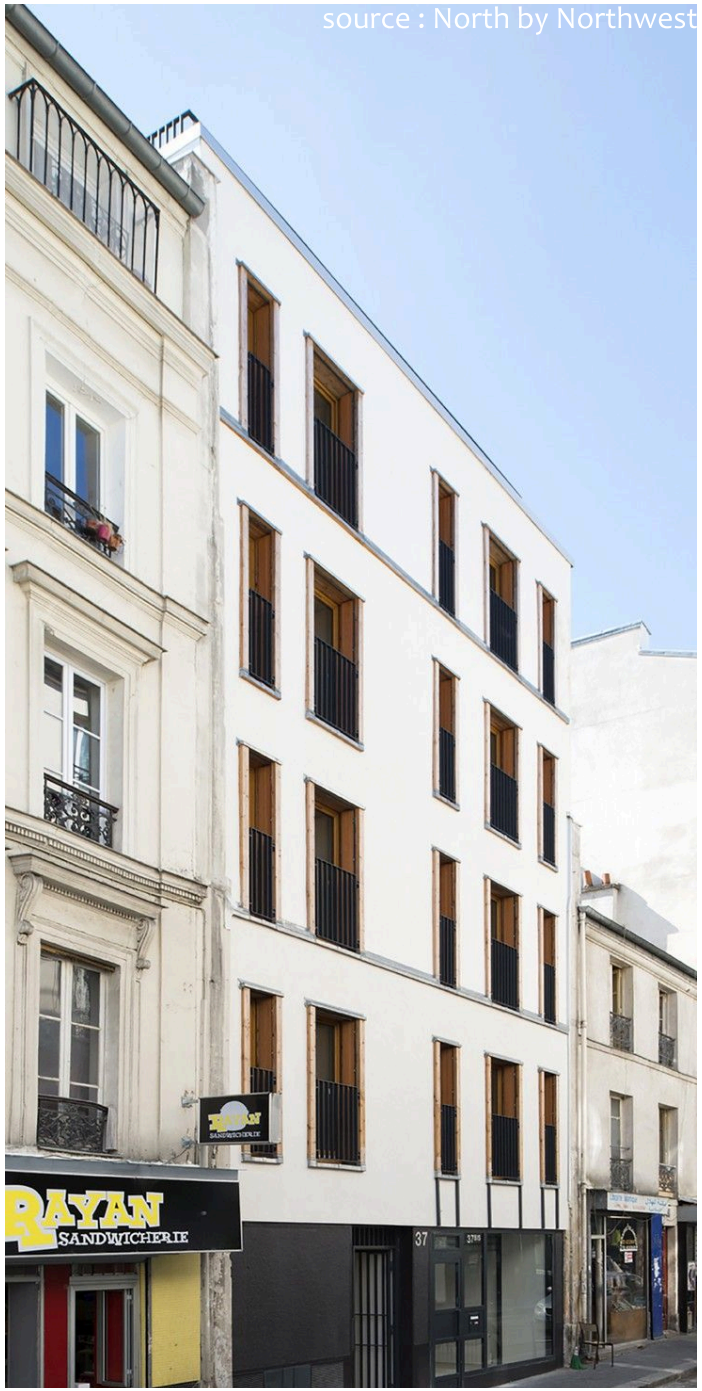
80 times 60L/m² means 4 800mm of rain in 20 days....

Results : only 4kg/m² of water absorbed and no disorder on the wall

CONSTRUIRE EN CHANVRE

Several tests ongoing and coming

1. **France 2030 : NECCITE** project --> provide a guidance with CSTB and ADEME to use hemp concrete for outside thermal insulation (external walls)
2. **PYTHAGORE project :** Highlight the acoustic et thermal performances of hemp concretes (improve the λ)
3. **New rules for roof and coating**
4. Studies **behouviour of wood structure with the water brough by hemp concret**
5. **Sismic capacities**



source : North by Northwest


source : Béal & Blanckaert


source : CAN-ia

source : CAN-ia


source : Barraut Pressacco

Exemples with prefabricated walls

- **Contracting authority :** CAVAC
- **Architect :** CAN-ia
- **Carpenter :** CCL
- **Hemp Concrete :** LB ECO HABITAT

- **Contracting authority :** Bati Nantes & ICEO
- **Architects :** Ramdam & Palast
- **Carpenter :** ACDF
- **Hemp Concrete :** Wall'Up