

HERITAGE VALUE COMBINED WITH ENERGY AND SUSTAINABLE RETROFIT

REPRESENTATIVE TYPES OF OLD WALLOON DWELLINGS BUILT BEFORE 1914

Dorothee STIERNON¹, Sophie TRACHTE¹,
Michaël DE BOUW², Samuel DUBOIS², Yves VANHELLEMONT²

¹ Architecture & Climat, Université catholique de Louvain (UCL), Belgium

² The Belgian Building Research Institute (BBRI), Belgium



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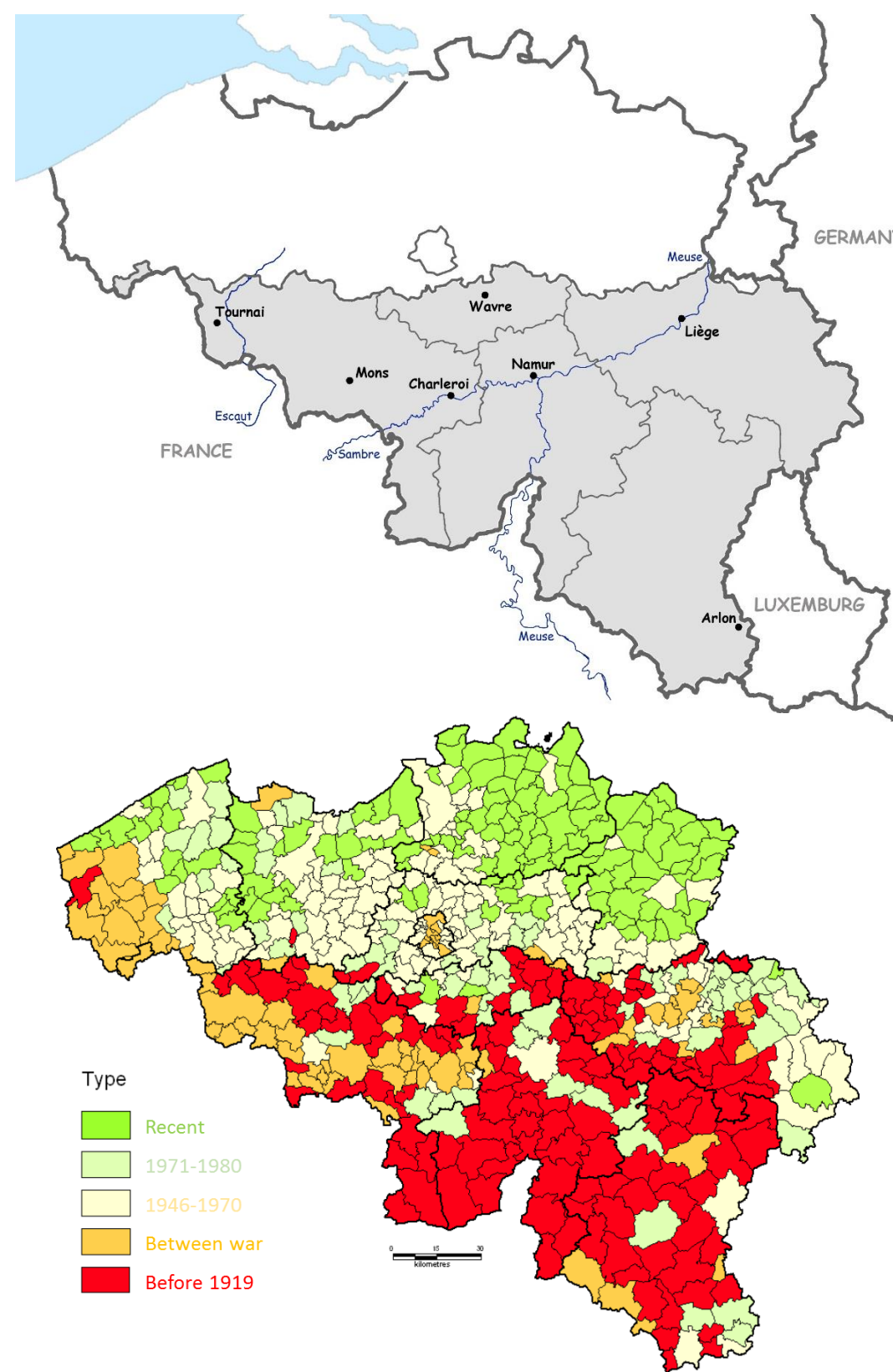
CONTEXT

P-RENEWAL



Rénovation énergétique du bâti wallon d'avant-guerre (1914)
à valeur patrimoniale.

The research project "P-RENEWAL" proposed in the framework of the Walloon Energy and IEA project Call, aims to develop a **methodological retrofitting tool for historical Walloon dwellings built before 1914** in order to enhance heritage value and to combine it with relevant energy and environmental performances. The originality of this research is to consider energy, environmental and heritage aspects in a complementary way, in order to help designers to reach their objective of a greater sustainability.



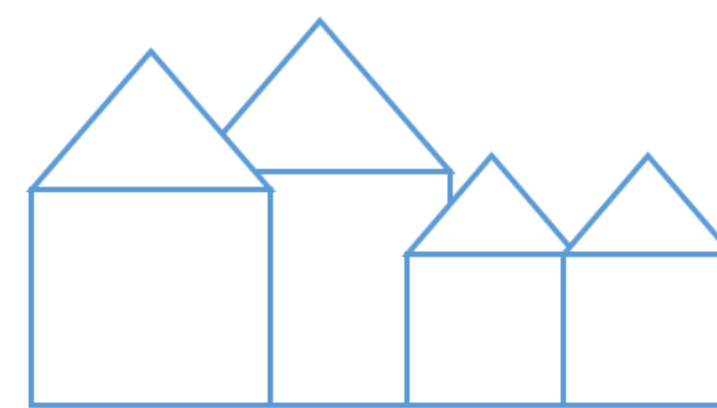
OBJECTIVES

Facing and answering the sustainable development issues:

- Old dwellings retrofitting must take into account :
 - Rational use of resources (energy and other)
 - Water and waste management,
 - Health and well-being of occupants

Facing and answering energy performances
Energy retrofitting of old dwellings

- must take into account heritage value of buildings
- eliminate all the risks of degradation for the building itself



walloon dwellings, listed or with patrimonial character built before 1914

=
Witnesses of our past
added value for our cities
cultural attractiveness

=
> 25 % of the Walloon dwelling stock

Retrofitting

Sustain and pass on old dwellings to future generations
Make it comfortable and "livable" with regard to needs of today and of tomorrow



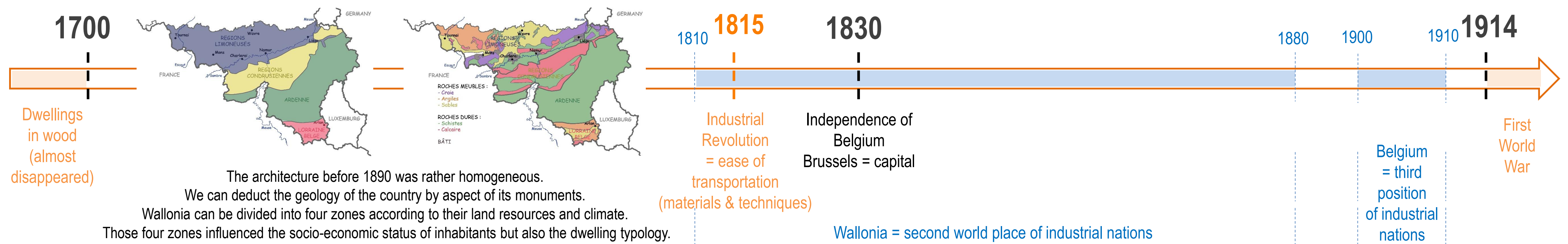
Old dwelling with heritage value = building specificities

- Specific thermal behaviour
- Strong thermal inertia
- Specific building materials and assemblies (elements)

The understanding of the thermal behavior of materials and building is often incomplete and/or with difficulty transcribable in terms of hygrothermal model

METHODOLOGY

This **historical study** focuses mainly on morphology, demography, urban and rural development, economy and types of dwelling. Historical urban and rural development of regions or countries has influenced economic activities and lifestyle and consequently building systems and construction materials.



RESULTS

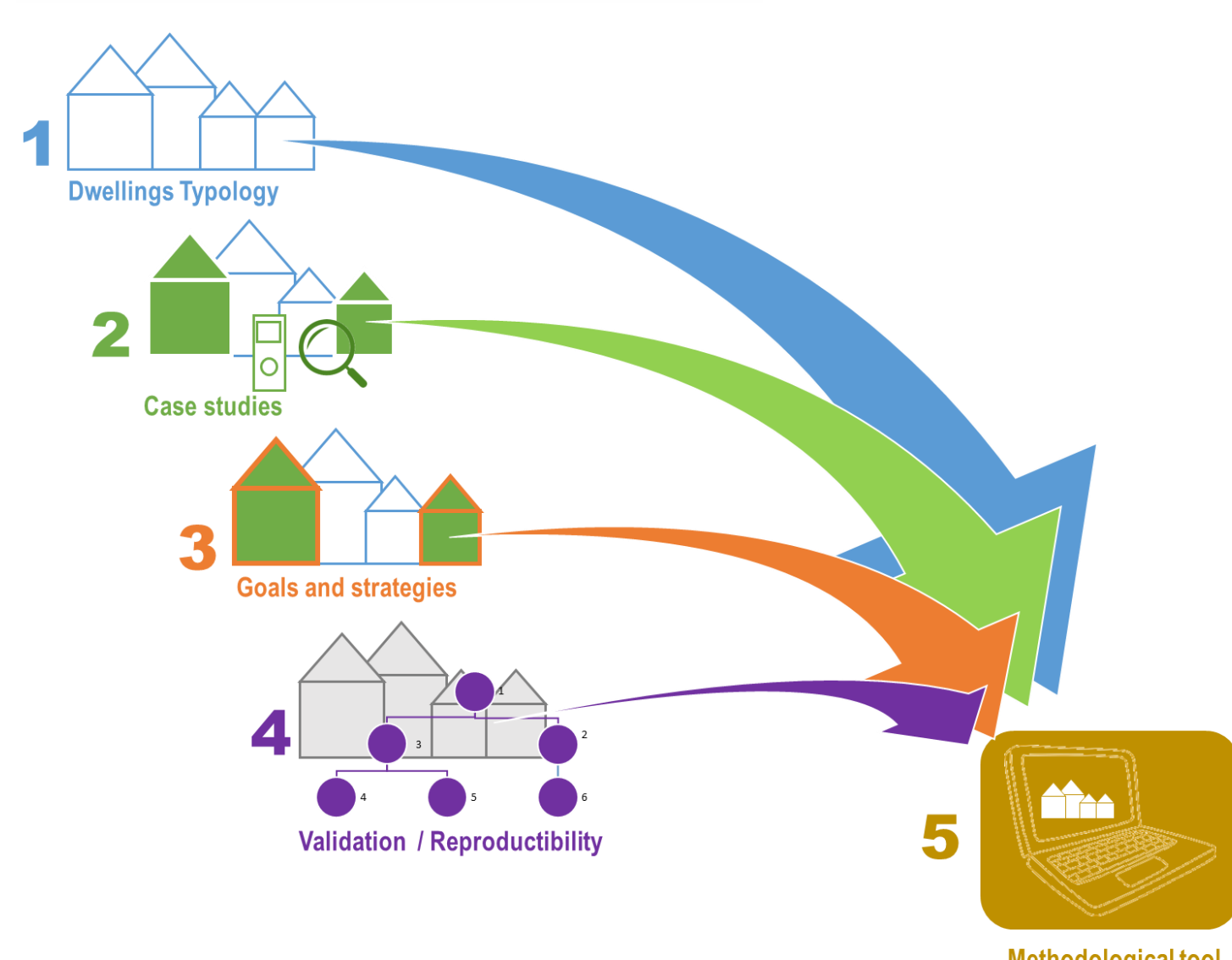
URBAN DWELLING TYPOLOGY

DEFINITION OF DWELLING TYPOLOGY	« Maison bourgeoise »	Modest house	« Hôtel de maître »
Spatial organization		Smaller and less rich than « Maison bourgeoise »: - Small plot; - Width of façade from 4,8 m to 5,5 m; - Depth from 5 m to 8 m; - Height of façade not exceeding 6 m under cornice: 2 floors - 1 or 2 annexes in the interior court (kitchen + toilets); - Simplest expression of the street façade.	Greater richness of form and vaster spaces than « Maison bourgeoise »: - Buried basement; - A deep, wide and covered passage leading to the interior court; - Glazed lantern, above the monumental stairwell; - Width of façade from 8 m to 12 m; - Depth around 15 m; - Cornice height between 15 and 18 m; - Many decorative elements.
Construction system and materials	The construction system is mainly governed by the rules of protection against urban fire. It is based on the constructive system of the Walloon wooden row house. Party walls are made of locally sourced brick and are not structural.		
Houses patterns			

RURAL DWELLING TYPOLOGY

Worker's dwelling	« Farm in block »	« Farm with parallel buildings »	« Fortified square farm »
The discreet small farms with disorganized buildings and poor tiny houses: - Very basic; - Only one room and an attic; - Width of façade around 4 m; - Depth around 4 m; - For mainly seasonal workers; - Often constructed of local stone (rarely in bricks); - Artificial slate for roof.	« Lengthwise farm » - 1 or 2 maximum levels; - 3 parts: family spaces, beasts and the crops; - Width of façade from 12 m to 20 m; - Depth around 12 m; - Local stone for all the house or only a part.	The powerful groups established by the seigneurial and abbatial farms: - 1 building dedicated to the family lives and another for the stable. - 2 buildings : around 5 m x 12 or 15 m - Rich local materials: limestone, marble and oak. Subsequently, in bricks. - Facades: limestone, sandstone or bricks and limestone. - Many decorative elements.	- A quadrilateral fully closed (an alternative is the farmhouse in U) which looks out into a courtyard; - Each section is specifically dedicated: sheepfold, one or several barns, stables and the home.
Differences of materials and tones reflect largely the variety of rocks, remarkable on the scale of this small territory. At the beginning and until 1830, buildings of wood-frame construction or stucco on the frame (with or without filling in the cob) are prevalent. Often, frames of the windows are in limestone. In function of the underground, we found different natural local stone buildings: limestone, granite, schist or sandstone. Later, solid walls of bricks are built.			

CONCLUSIONS



The **study of old dwellings** allows the suggestion of adapted retrofitting strategies. According to the specificities of each studied dwelling type, the methodological tool will identify and propose to adopt strategies of retrofitting (architectural, material or technical). In function of target objectives, the project contains a list of renovation or improvement measures. These recommendations will be prioritized: essential, necessary, ideal or possible.

Proposed **retrofitting strategies** will support improvement of indoor comfort and energy performance of buildings and also reduction of the global environmental impact while integrating preservation of heritage value and reducing risk of building pathologies. Retrofitting strategies will then be assessed on the basis of comfort criteria as well as energy, environmental and heritage value criteria.

This methodology can be applied in other contexts to help any user with data on different scales, from the building to the entire city, to make sustainable decisions.

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CONTACT

Dorothee Stiernon
dorothee.stiernon@uclouvain.be

Faculté d'architecture, d'ingénierie architecturale et d'urbanisme LOCI
Architecture et Climat
Place du Levant, 1/L5.05.04 B-1348 Louvain-la-Neuve (Belgium)
<https://uclouvain.be/fr/facultes/loci/archi-cl>