

# Modelling of long-term deep renovation strategies for the Belgian building stock

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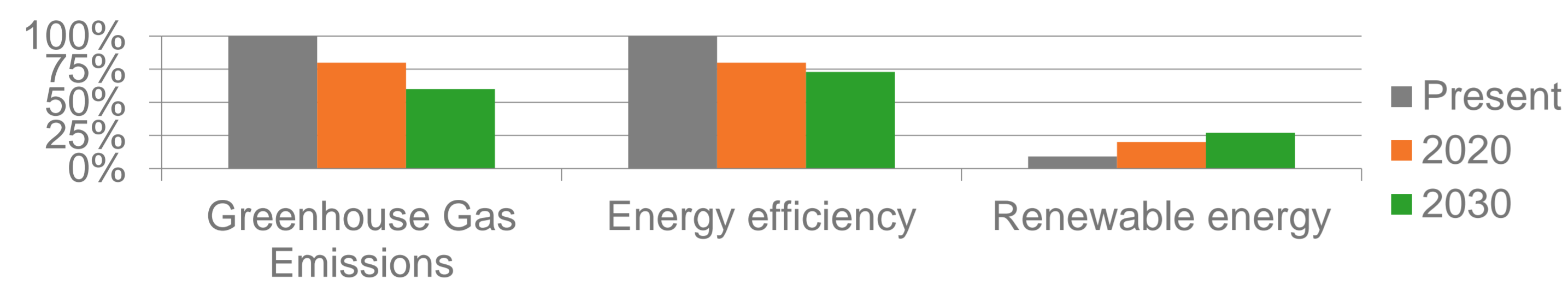
## ► RESEARCH INFORMATION

### KEYWORDS

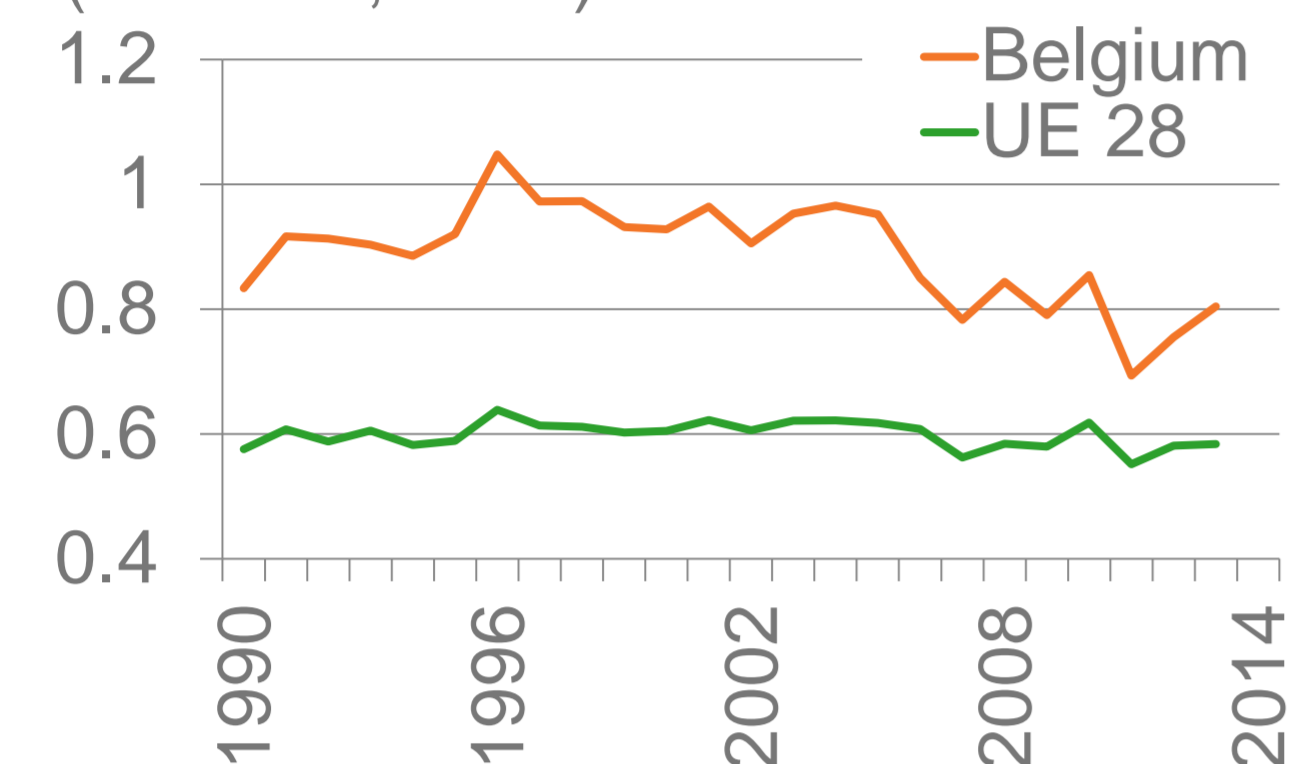
Multi-criteria analysis, building energy performance, policies, action plan, systematic strategies

### CONTEXT

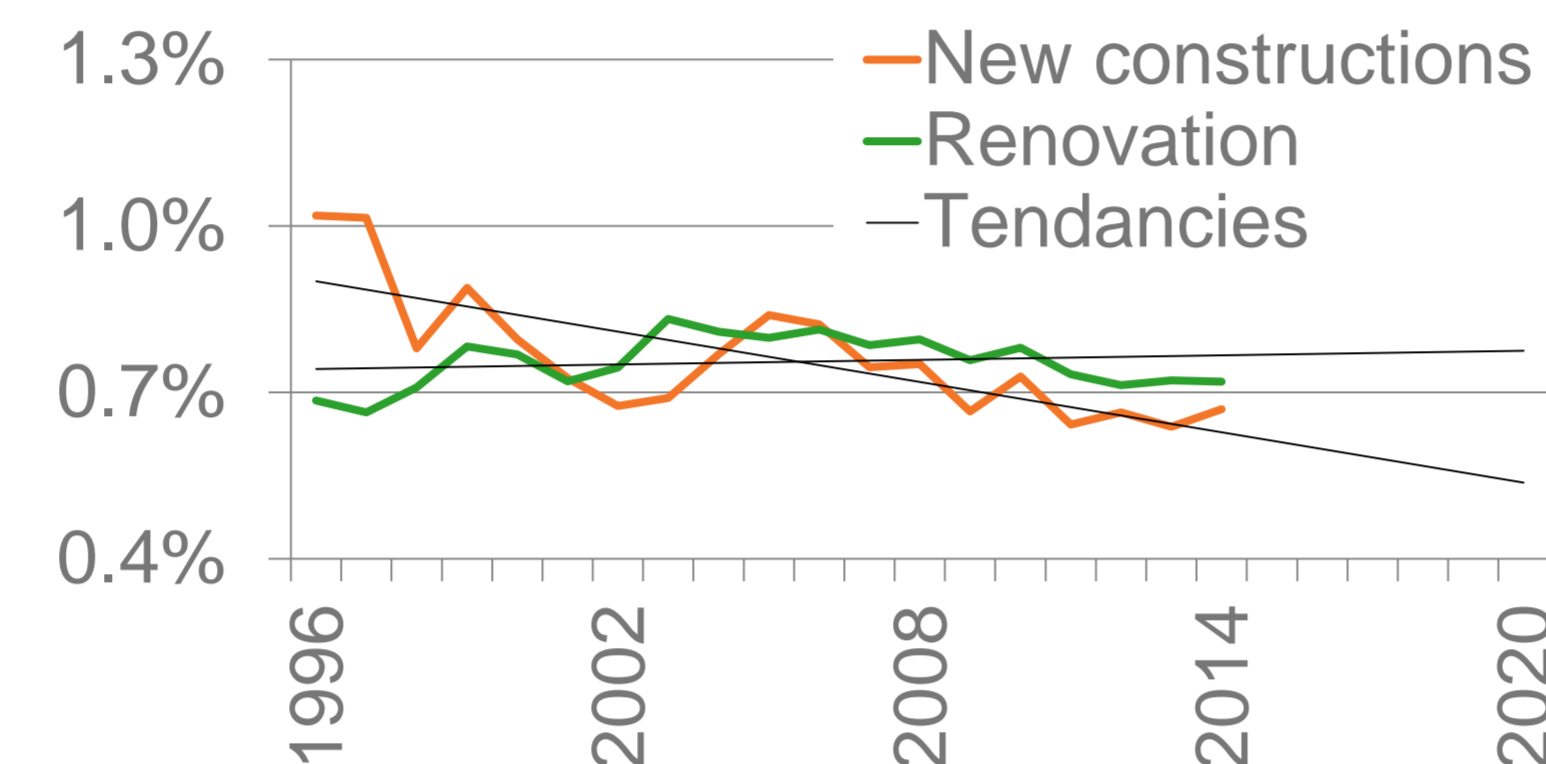
► Fig. 1: UE objectives for 2020 and 2030 (UE, 2015)



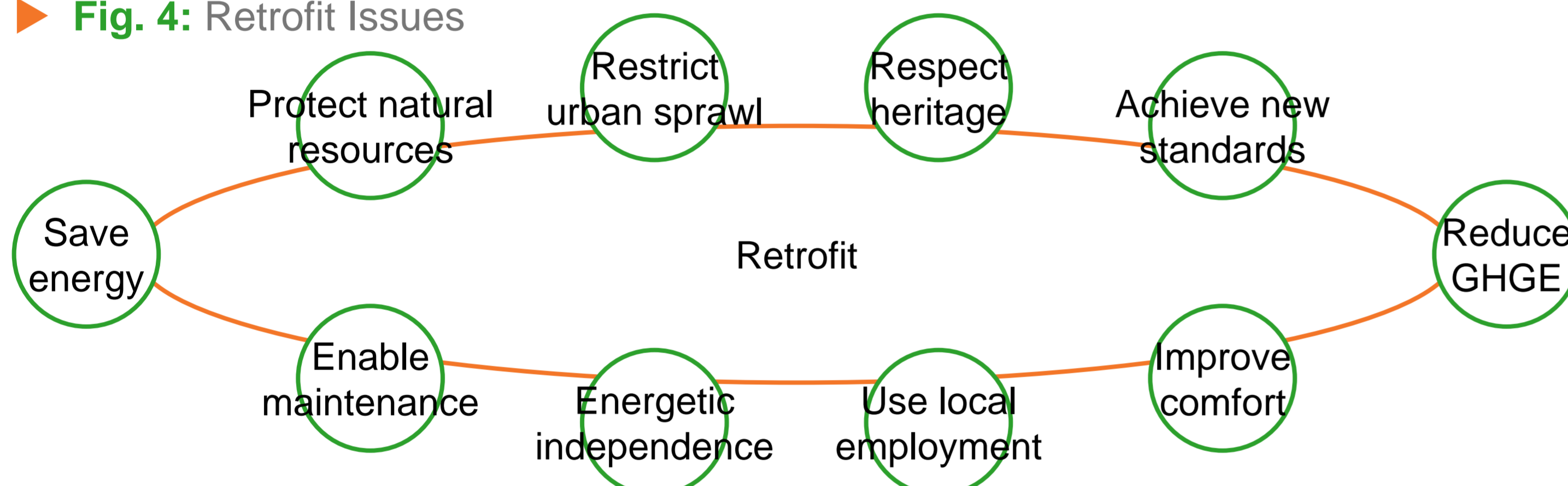
► Fig. 2: Final energy use for residential sector (TOE/per.) (Eurostat, 2015)



► Fig. 3: Renovation and new construction rates in Belgium per year (DGSIE, 2015)



► Fig. 4: Retrofit Issues

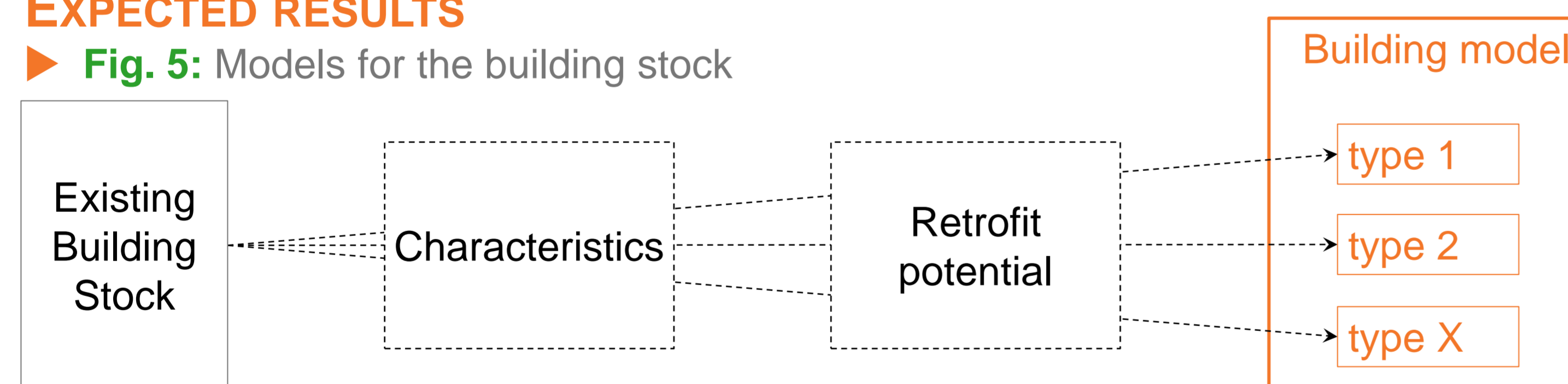


### OBJECTIVES

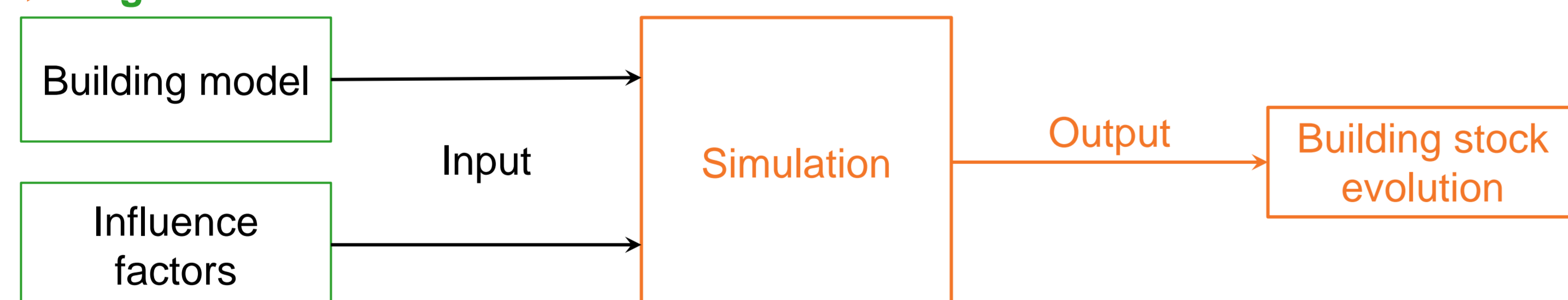
- What is the state of the renovation market in Belgium?
- Who are the different stakeholders in renovation?
- What are the barriers to the increasing of retrofit rate in Belgium?
- What are the existing strategies to increase the retrofit rate?
- What are the factors influencing the retrofit rate ?
- What is the most suitable strategy to increase the retrofit rate in Belgium ?
- How can we increase the renovation rate in Belgium?

### EXPECTED RESULTS

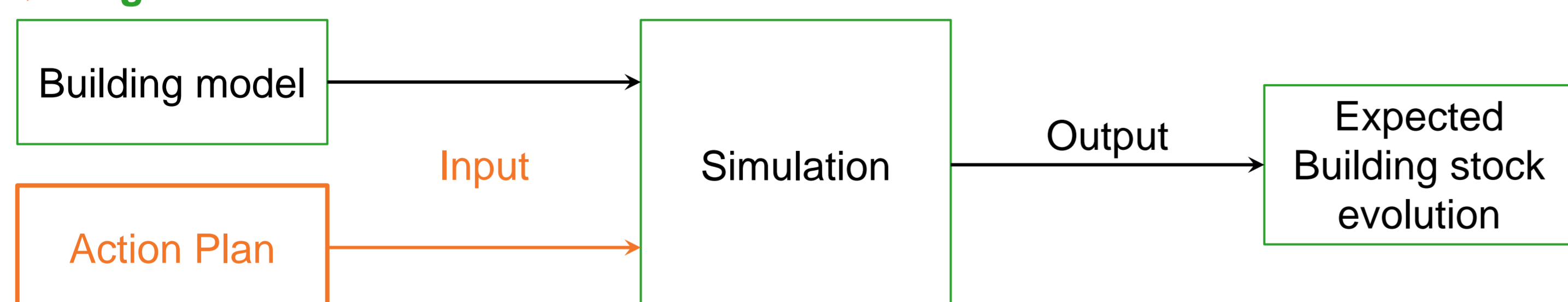
► Fig. 5: Models for the building stock



► Fig. 6: Simulates Influence Factor effect



► Fig. 7: Create and validate an Action Plan



### ► CONTACT

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## METHODOLOGY

The methodology of the research project is briefly presented in the map below and is illustrated by Fig. 8.

**Work package 1:** State of the renovation market in Belgium and existing strategies to increase the retrofit rate in Europe, through literature review, interviews with stakeholders and survey.

**Work package 2:** Identification, definition and comparison of individuals factors, both economics than energetics and comfort, influencing positively or negatively the different strategies to increase the retrofit rate through the result of the WP1 and the analysis of different cases study in Belgium.

**Work package 3:** Classification of the Belgian building stock through energetics types, on the basis of existing models. Comparison of the retrofit potential of these different types. Proposition of a complete model which would be the basis of later simulations.

**Work package 4:** Proposition of estimated impacts of WP2 factors on the retrofit rate of WP3 model.

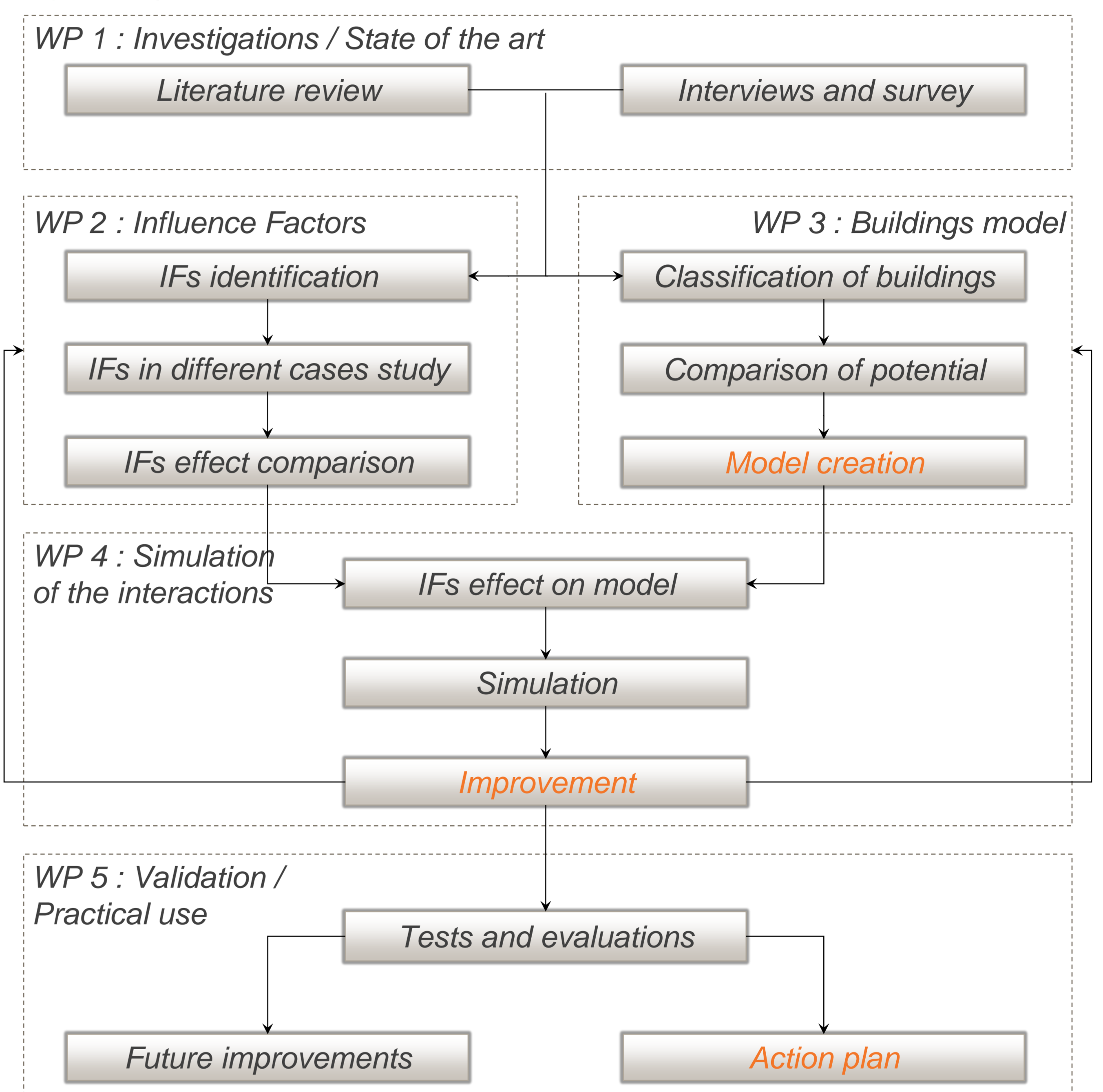
Incremental improvement of their interactions by successive simulations, comparisons to the expected results.

Potential improvement of influence factors characteristics

**Work package 5:** Global validation : tests of the model on existing cases and comparison to real results, evaluation and recommendation of different stakeholders on obtained results.

Creation of an action plan, based on the previous WP4 model.

► Fig. 8: Organisation chart of the research project



## ORIGINALITY

There is no binding long term renovation strategy and target for renovation for the Belgian building stock. The proposed research enables the development of a multi-criteria model (economic, ecological, comfort), allowing the development of a strategy with renovation target priorities. The action plan and building stock classification developed by this research will enable the institutional policy makers and investors to bring the entire Belgian building sector up to nearly-zero standard by 2050. The research will help in the formulation and implementation of an effective long-term policy and legal framework for the achievement of the EU 3% renovation rate objective.

## ► REFERENCES

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