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PROJECTING 2100 URBAN GROWTH TO ASSESS URBAN CLIMATE CHANGES ON TOULOUSE URBAN AREA (FRANCE)

COMBINING SCENARIOS AND LAND CHANGE / CLIMATE MODELS

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CONTEXT AND OBJECTIVES

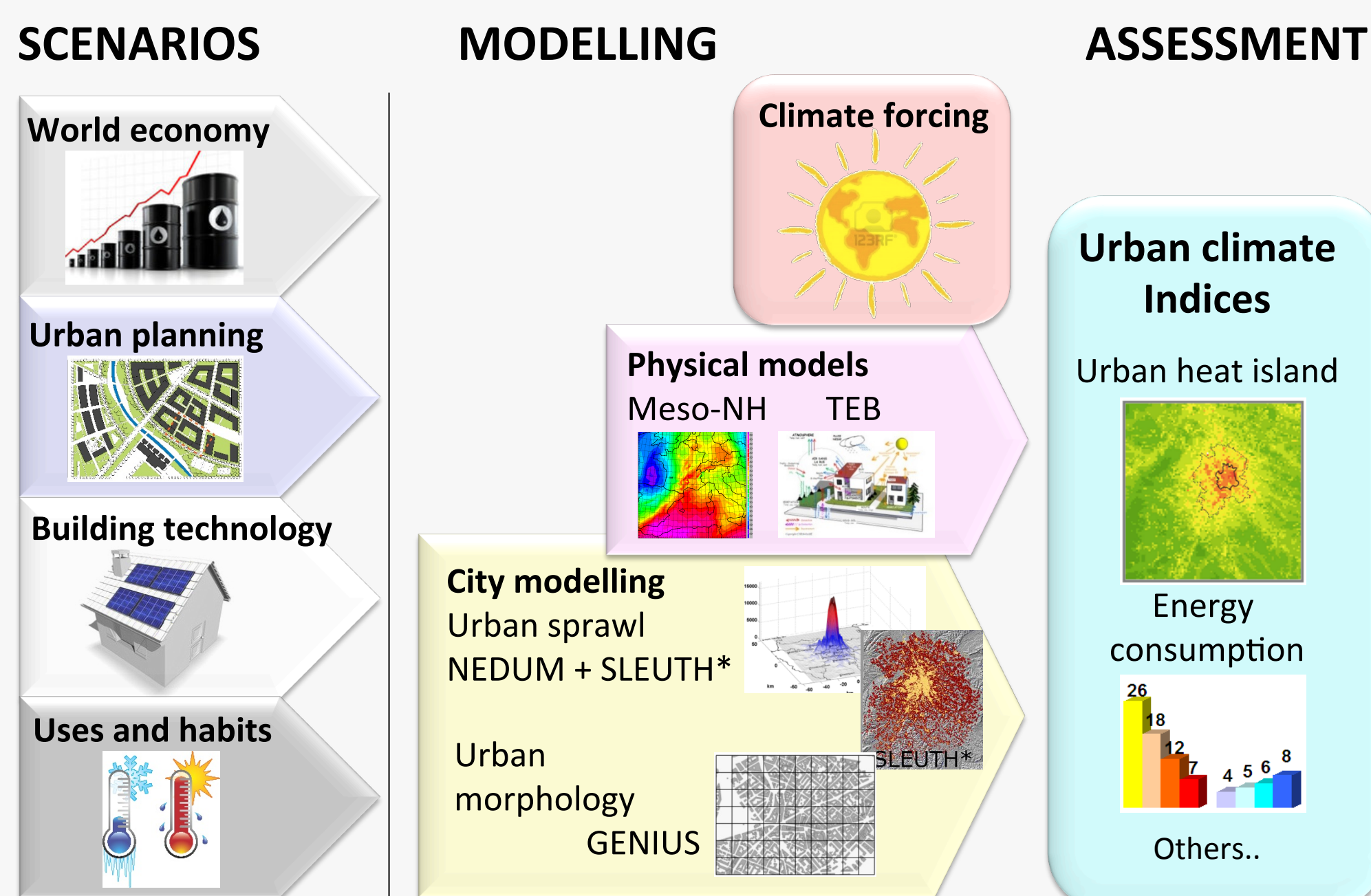
Context

- Build a multidisciplinary and integrated modeling platform to simulate urban processes over the XXIe century : the ACCLIMAT Platform.
- Propose city projections under various urban scenarios and assess their impacts depending on the climate change.
- Produce relevant indicators to evaluate these city projections and support sustainable urban planning

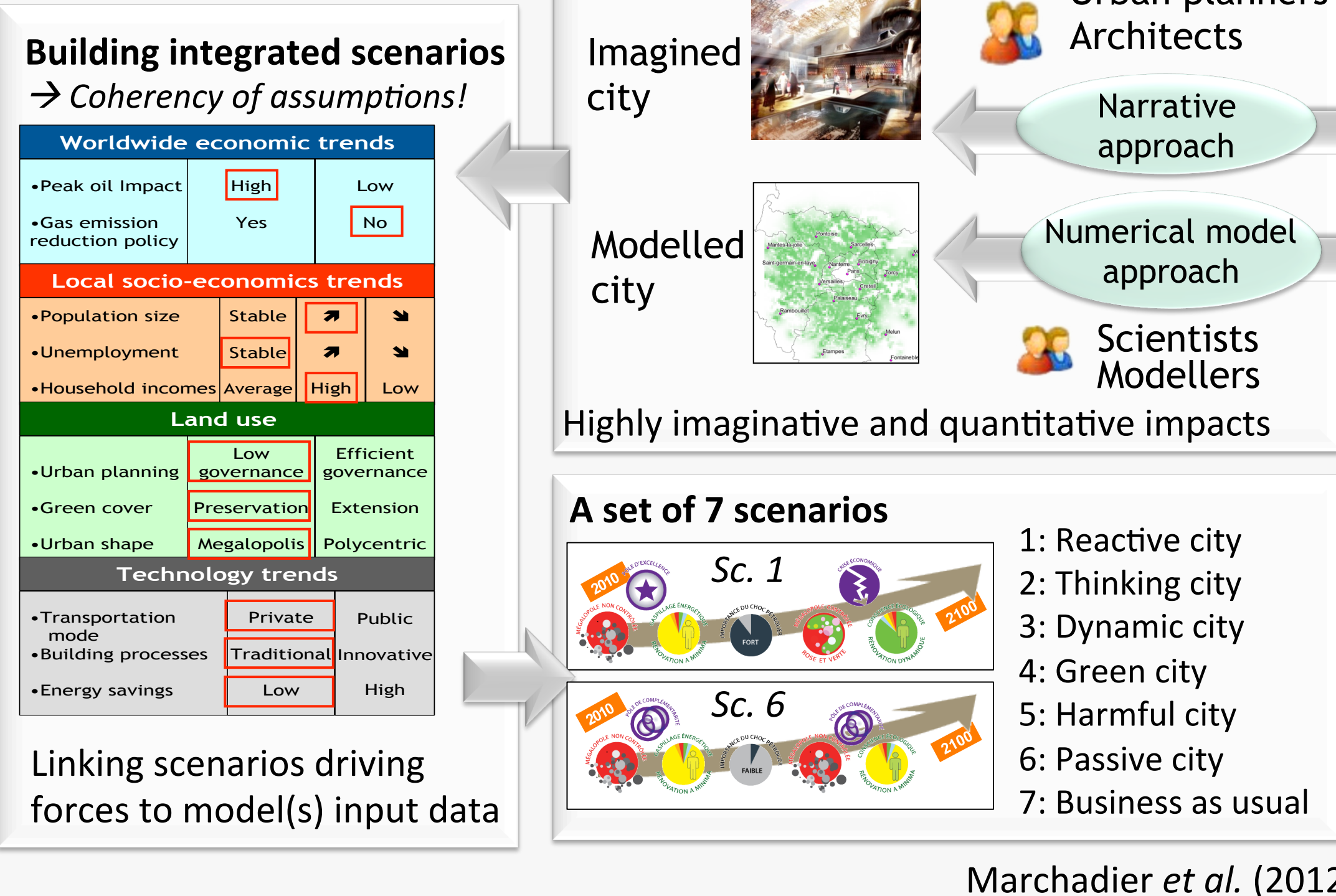
Challenges

- Multidisciplinary** : ACCLIMAT project involves various research field areas: economy, geography, architecture, building materials, meteorology, climate, urban planning.
- Integrated** : The Platform connects models and. This requires to overcome some gaps: scientific concepts, modeling approaches, computing languages, heterogeneous scales...
- Scenario-projections**: Consistent scenarios are built based on worldwide economic trends, regional socio-economic context, urban planning, building regulations and technology trends. These scenarios are simulated under different climate change context.

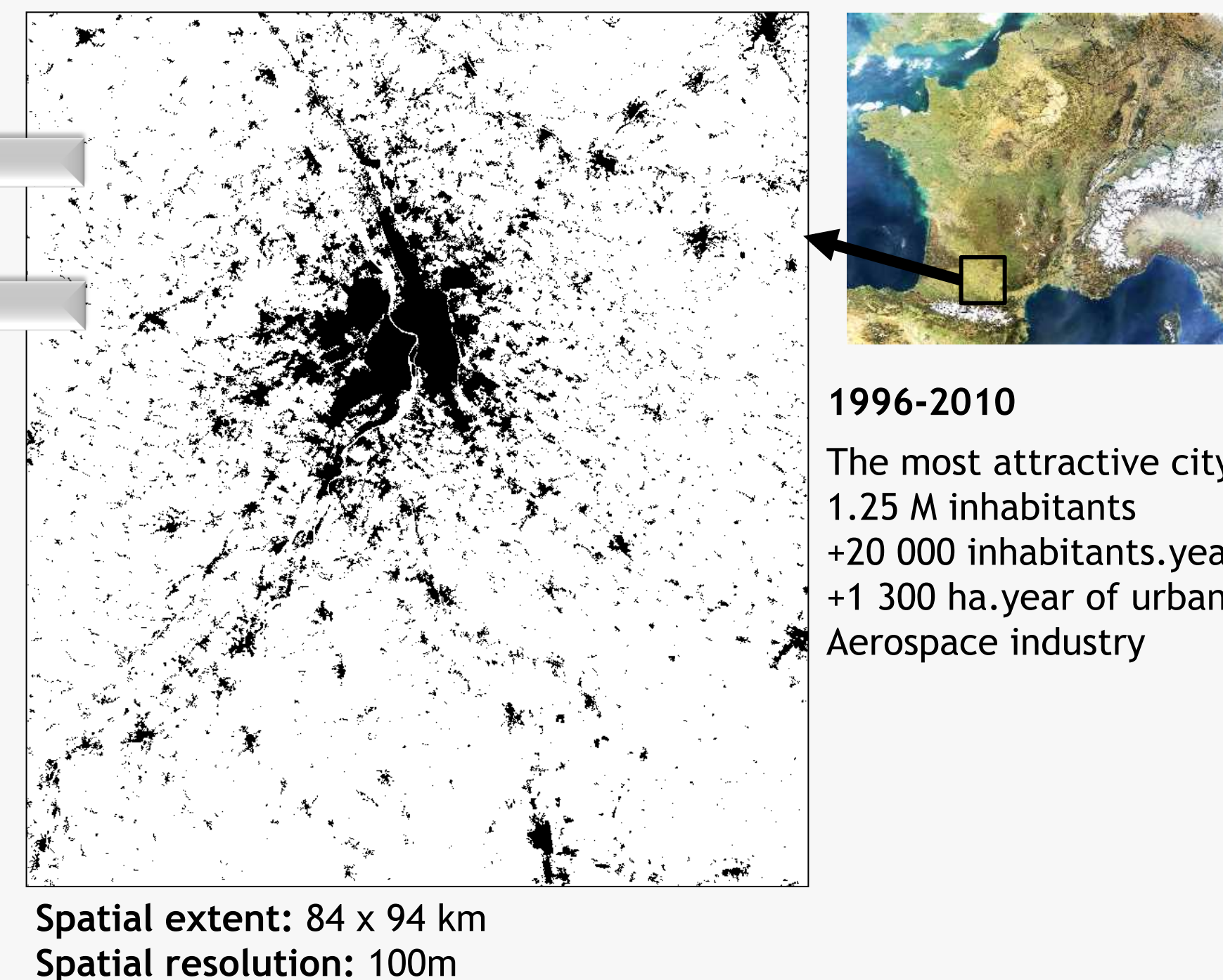
PROJECT METHODOLOGY



SCENARIOS

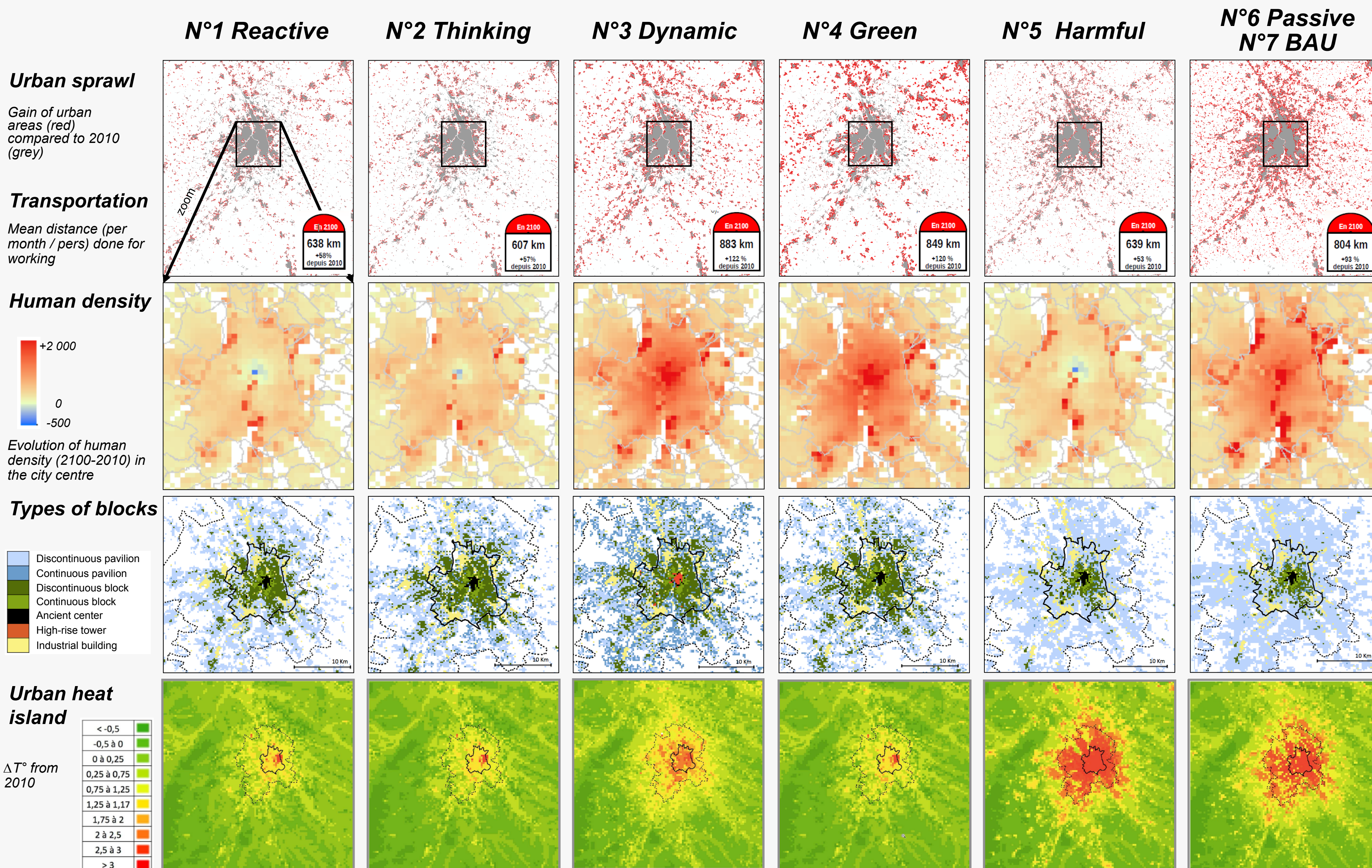


STUDY SITE: Toulouse urban area



RESULTS

Comparison of the simulated scenarios

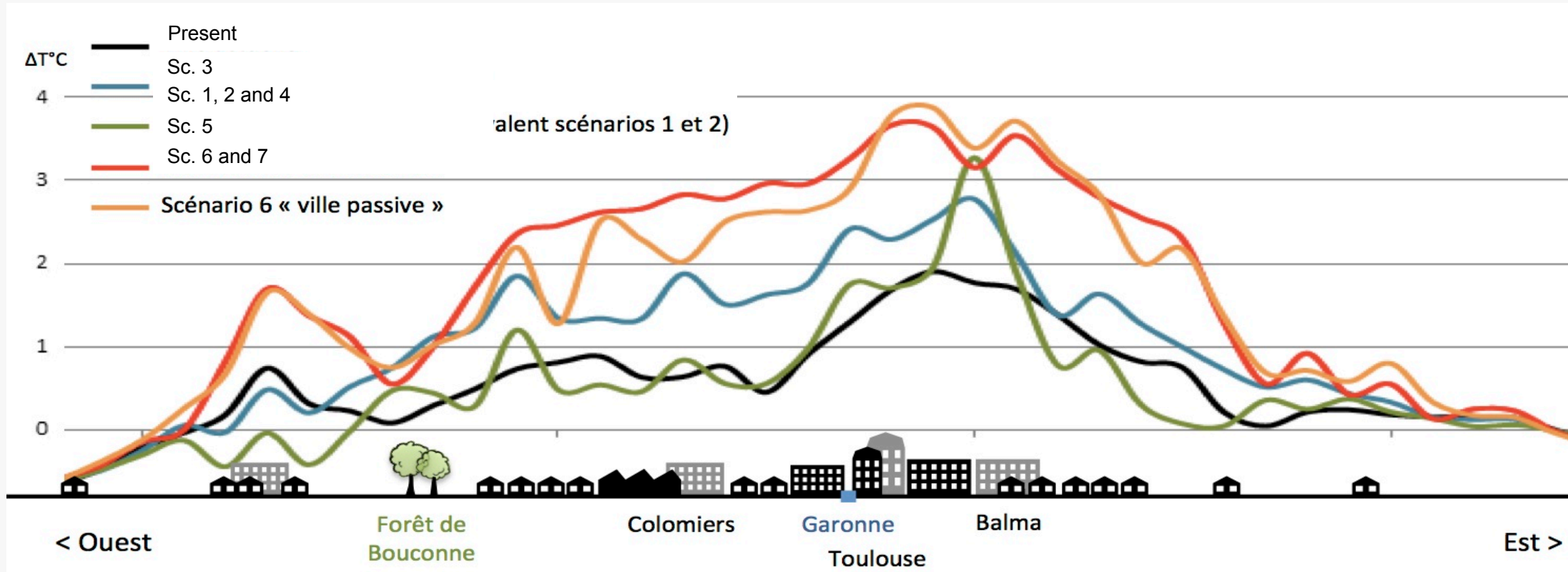


Impacts on urban climate

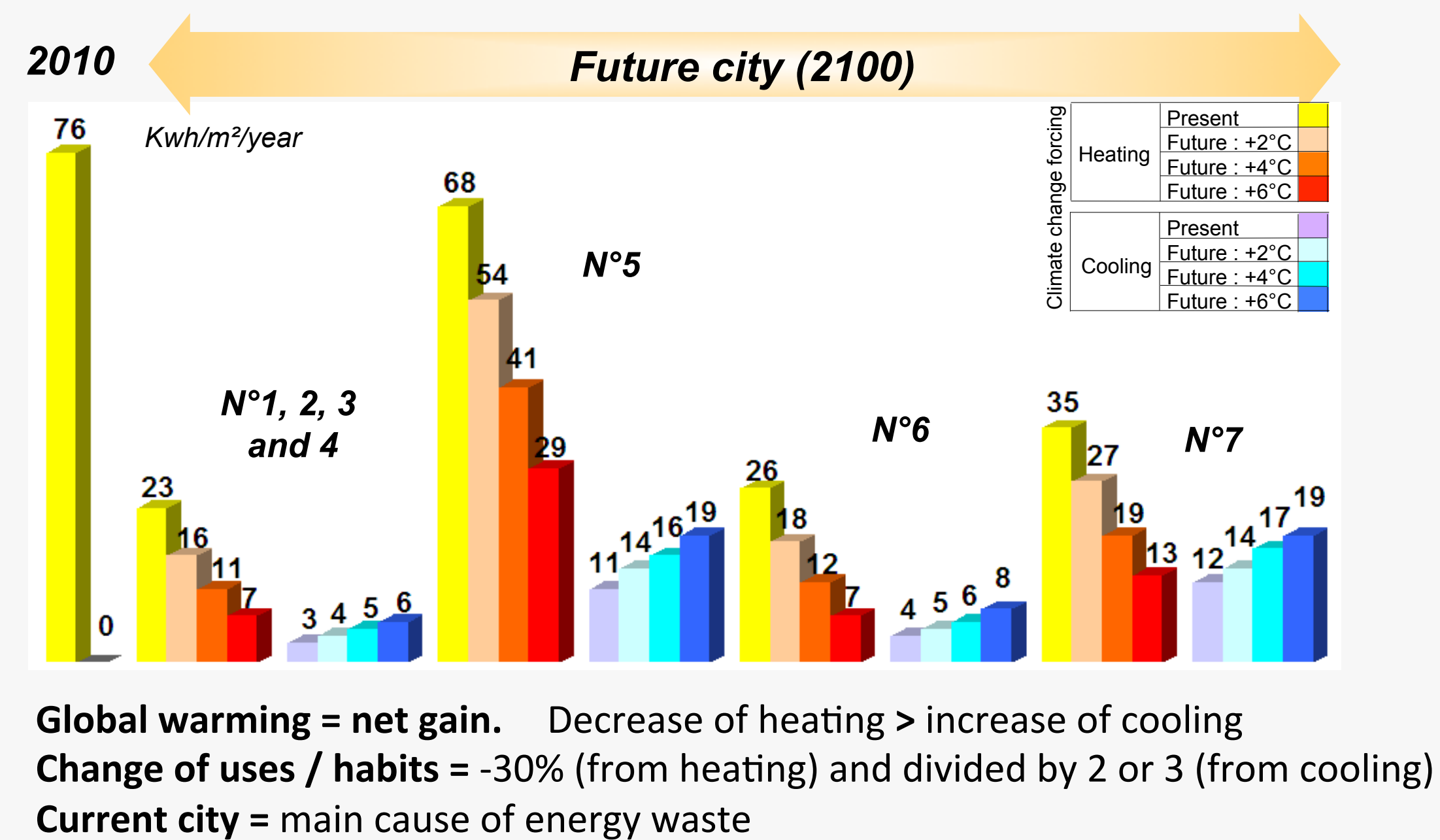
Urban sprawl = UHI from +1 to +3°C

Global warming = +2 to 6°C

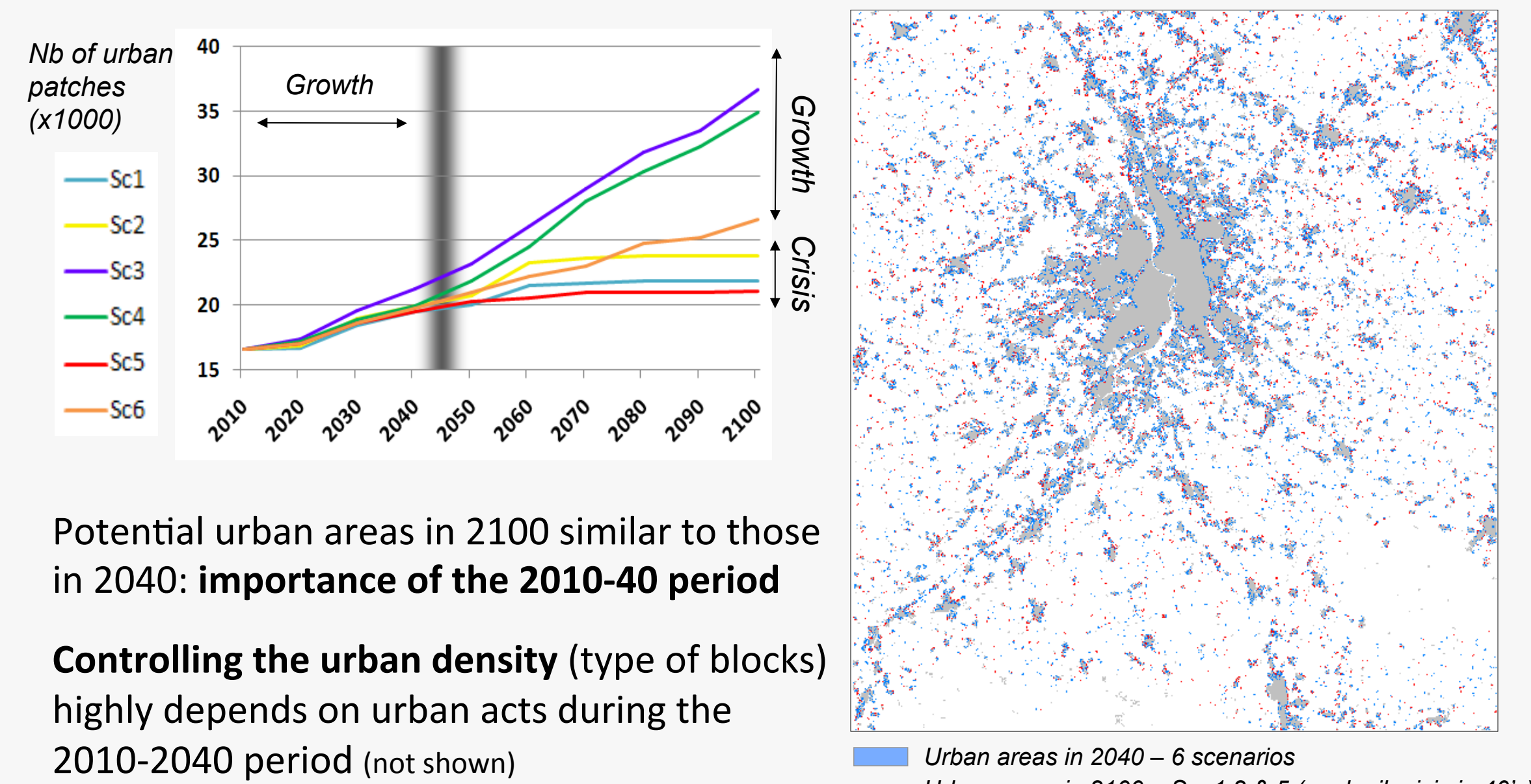
Future urban climate on Toulouse = from +3°C to +9°C



Impacts on energy consumption



Do we need to act soon?



REFERENCES

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- Moine *et al.* (2012) A multidisciplinary modeling platform to draw possible futures of urban climate, ICUC8 - 8th International Conference on Urban Climate – Dublin, Ireland.
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WEBSITE

<http://www.cnrm.meteo.fr/acclimat/?lang=en>

CONCLUSION

A very ambitious project (multidisciplinary and integrated) :

- Combining forecasting and backcasting images of the future to wider the diversity of the scenario
- Developping a platform to couple all urban and physical models and assess quantitative impacts on urban climate
- Coupling economical, geographical and architectural models for simulating long-term futures urban growth.

Key-triggers and futures stakes

- Urban management and policies to mitigate urban climate – urban tools exist but depends on political will
- Future pressure on water supply and electricity have been highlighted
- It is essential to act soon, to change inhabitants energy habits and improve energetic performance of existing buildings.