

PHD research
Environmental
quality in
neighbourhood in
reconstruction

Research field :
geography and
land-use

Thesis advisor :
Marie Christine
Jaillet

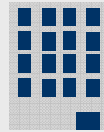
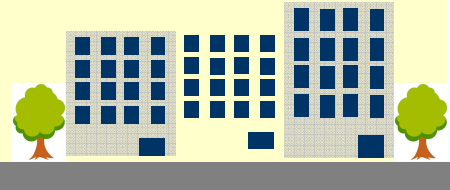
Co-thesis
advisor
Sinda Haoues
Jouve

How is climate taken into account in sustainable urban design? Focus on French urban eco design processes

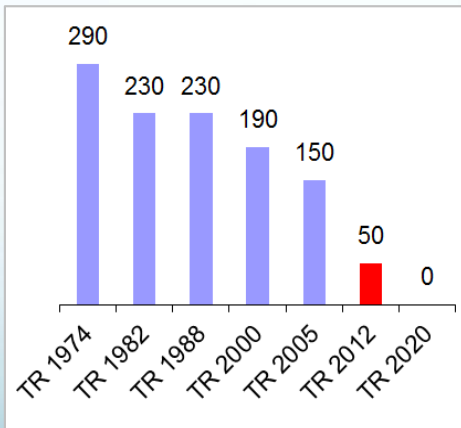
Delphine Chouillou, Sinda Haoues Jouve

Plan

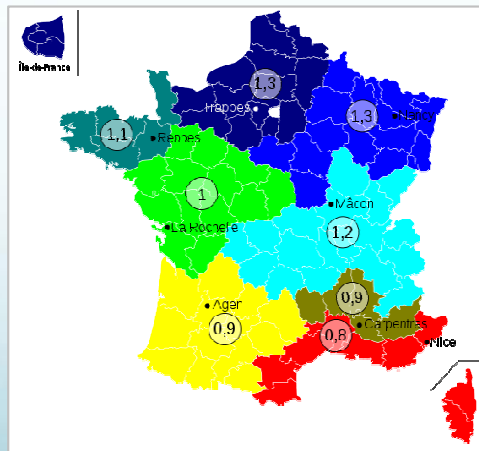
- 1. French urban legislation regarding climate**
- 2. Climate in the 3 French eco design processes**
- 3. Climate in 2 cities eco design processes**
- 4. Conclusion**

	Scales	Building 	Neighbourhood 
Global warming challenges			
<p>1. French urban legislation regarding climate</p>	<p>Mitigation</p> <p>To reduce greenhouse gases emissions</p>	<p><u>Thermal regulation</u> (2012)</p> <p>Energy consumption</p> <p>Renewable energy</p>	<p><u>No regulation constraint</u></p> <p><u>Incentive planning</u></p> <p>Energy consumption of public lightning</p> <p>Traffic reduction</p> <p>Public transports</p>
<p>2. Climate in the 3 french eco design processes</p>	<p>Adaptation</p> <p>To face strong urban heat island, drought, flood, ...</p>	<p><u>Thermal regulation</u> (2012)</p> <p>Summer confort</p>	<p><u>No regulation constraint</u></p> <p><u>Incentive planning</u></p> <p>Bioclimatic design (taking into account climate)</p>

3. Climate in 2 cities eco design processes



New home energy consumption (kWh/m²)



Environmental laws

- 2000 : environmental laws constraint urban planning
- 2004 : climatic plan at national scale
- 2010 : Grenelle law 2
- 2012 : climatic plan at local scale

4. Conclusion

Methodology

Neighbourhood eco-design process :
High environmental quality planning decision making tool

1. French urban legislation regarding climate

Object of study : Neighbourhood eco-design processes

2. Climate in the 3 french eco design processes

French eco design processes



2 examples of eco design processes in cities



3. Climate in 2 cities eco design processes

International correspondance



4. Conclusion

Research purpose : Study how climate is taken into account

Means : Analysis of methodology documents and communication documents ...

1. French urban legislation regarding climate

Design



Environmental Approach of planification (2014)

No preset assessment

No imposed indicators



Public operator
Environmental expertise


2. Climate in the 3 french eco design processes

3 different designers

3 different approaches

3 neighbourhood scale processes


Project management



Certification environmental high quality planning (2010)

Assessment of the design process


No imposed indicators



Private organisation
Technical support

3. Climate in 2 cities eco design processes


Recognition



Label Eco neighbourhood (2012)

Assessment of the final project

Numerical indicators



State
Incentives

4. Conclusion

Flexible themes



7 topics

Energy and climate
Water
Transportation
Waste management
Biodiversity and landscape
Contaminated soils and brownfields
Noise



3 goals / 17 topics

Neighbourhood coherence
Territory and local context
Density
Mobility and accessibility
Heritage, landscape and identity
Adaptability

Natural resources
Water
Energy and climate
Materials and equipment
Ecosystems et biodiversité
Natural and technological risks
Health

Social life
Project's economy
Diversity and use
Atmosphere and public spaces
Integration and education
Local social dynamics

Strict assessment grid



4 topics / 20 commitments

Quality of life
Density
Social mix
Health and security
Architectural quality and quality of life
Local heritage

Territorial development
Economic development
Walking distance
Local consumption
Soft mobility
Digital transition

Resources protection and climate change adaptation
Urban planning fitting climate change
Energy sobriety, renewable energy
Waste management
Water management
Biodiversity

Climate → Secondary concern
« Opportunistic » topic : leans on other topics' levers of action
Climate : recent concern

New Label : 2012
Climate is highlighted
Promotes national level considerations
on local scales

Mitigation levers



Energy sobriety of buildings: *energy consumption*
Production of renewable energy: *energy production*
Energy sobriety of public lightening: *energy consumption*
Limitation of car use: *functional mix, soft mobility, public transports*

- **Themes focusing on GHG emissions: energy and mobility**

- Very strict: **generic levers of action**, shared by the three approaches.
- Often quantifiable thanks to numerical indicators

→ **Benefit from the experiment of the energy topic (older and better known)**

Adaptation levers



Presence of vegetation
Presence of water
Urban morphology dealing with airflows
Use of light colored materials



Presence of vegetation
Control of sunshine: *level of solar radiations on surfaces*
Control of winds
Considerations of local climate
Considerations of local characteristics



Presence of vegetation: *% of the surface*
Presence of water: *integrated management*
Limitation of the waterproofed surface: *% of the surface*

- **Less prescriptive: variable levers**
- **Difficult assessment: numeric indicators are not always relevant**
- **Qualitative assessment**

→ **Difficulties to identify the levers of action: need for further expertise, taking into account local characteristics**

→ **Lack of expertise and knowledge about this new issue**

Local processes : Focus on Adaptation challenge

Grenoble

2014

Awareness of climate concerns

« A sustainable urban planning seems to be one of the priorities in tackling climate change and adapting to it »

7 themes

Wintertime comfort

Summertime comfort

Revegetation

Water cycle

Energy production means

Accessibility and parking

Reduction of urban disturbance

Toulouse

Currently under validation

Awareness of climate concerns

« For Toulouse Métropole, the sustainability of the city is part of a global approach taking into account climate change »

11 targets

Development projects' localisation

Energy, air, climate

Urban and architectural density and quality

Intermodality and mobility

Public space, heritage and landscape

Water cycle

Nature in the city

Live together

Social demand and appropriation

Control over the costs and financing

Project management

1. French urban legislation regarding climate

2. Climate in the 3 french eco design processes

3. Climate in 2 cities eco design processes

4. Conclusion

Local processes enable to further take into account adaptation concerns

Aware cities

A full-fledged theme : integrated approach (in opposition with national approaches)

Adaptation levers and assessment

Grenoble

Toulouse

Adaptation SHARED levers of action → Exhaustive list

Presence of vegetation
Presence of water
Climate considerations: rain, wind, sun, humidity
Limitation of mineral
Limitation of air-conditioning (heat emission)
Materials

Assessment through « operational indicators »

Shaded outdoor spaces in summertime
Walls/roofs ability not to warm up urban areas
Green surfaces
Outdoor space thermal inertia
Green roofs

Qualitative assessment

Adaptation sub-topics

Limitation of urban heat island: vegetation, materials, micro urban climate concerns

Design and construction of passive public spaces: soils waterproofing, green surface, shadow, street furniture

Creation of a passive summertime and wintertime comfort : urban morphology

Cities have developed their own expertise and competences

- Skills improvement: specialised knowledge and accurate indicators
- Enables a better appropriation of the issue
- Can discourage cities which do not have the sufficient technical means

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Conclusion

1. French urban legislation regarding climate

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	Legislation	National processes	Local processes
<p>Climate</p> <p>Neighbourhood scale</p> 			<p>Grenoble</p> <p>Toulouse</p>
	INCENTIVE	<p>Mitigation : PRESCRIPTION</p> <p>Adaptation : INCENTIVE, local authorities' initiative</p>	Adaptation : PRESCRIPTION

Adaptation → Local processes could be the solution to implement it

- Cities awareness
- Skills improvement