



GrowGreen Online Training Session Internal Stakeholder Engagement



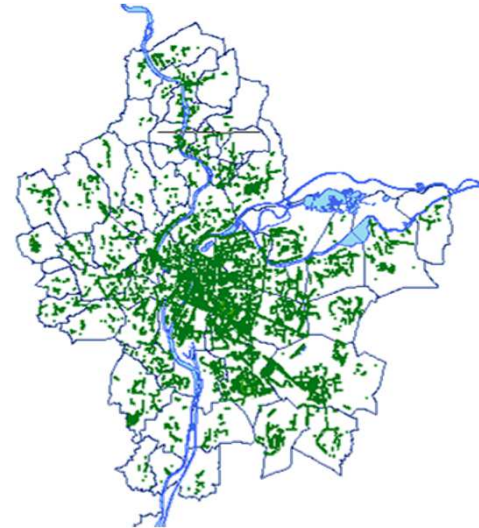
Nature Based Solutions linked to the Lyon Metropole Canopy Plan (2019 French Capital of Biodiversity Award)

Frédéric Ségur – Métropole de Lyon
fsegur@grandlyon.com
18th May 2020

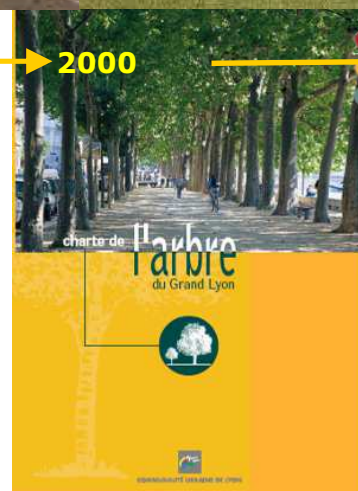
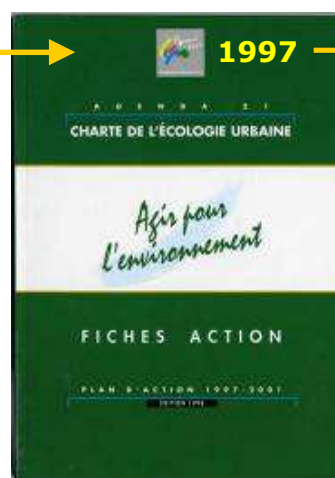
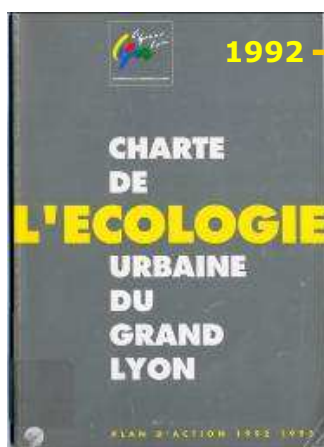


The Trees in Lyon Metropole

- **59 towns**
 - **1,4 million inhabitants**
 - **54 000 hectares**
- **100 000 street trees**
 - **100 000 trees in parks and private properties**
 - **100 000 trees in woods and forests**



Greater Lyon Authority's political commitments in favor of an urban tree strategy

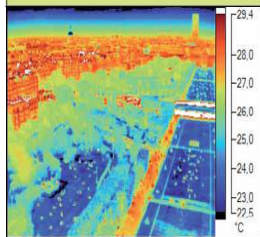


2011 « CONSTRUISONS ENSEMBLE
UNE NOUVELLE CULTURE URBAINE »



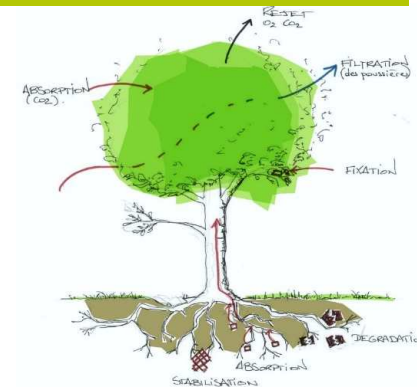
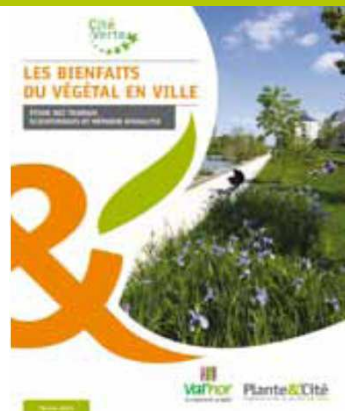
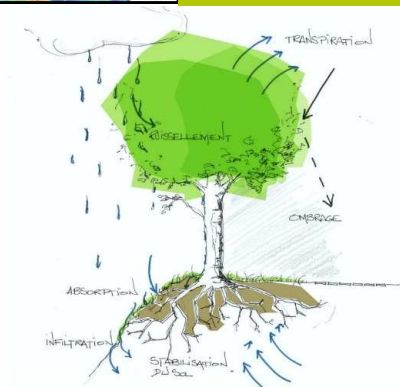
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la métropole



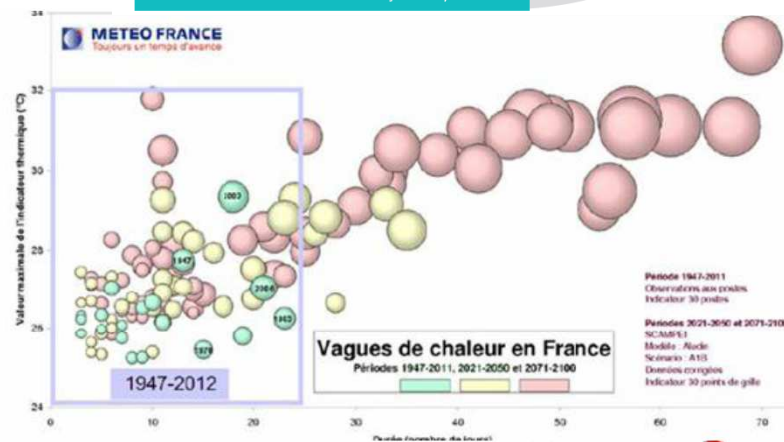
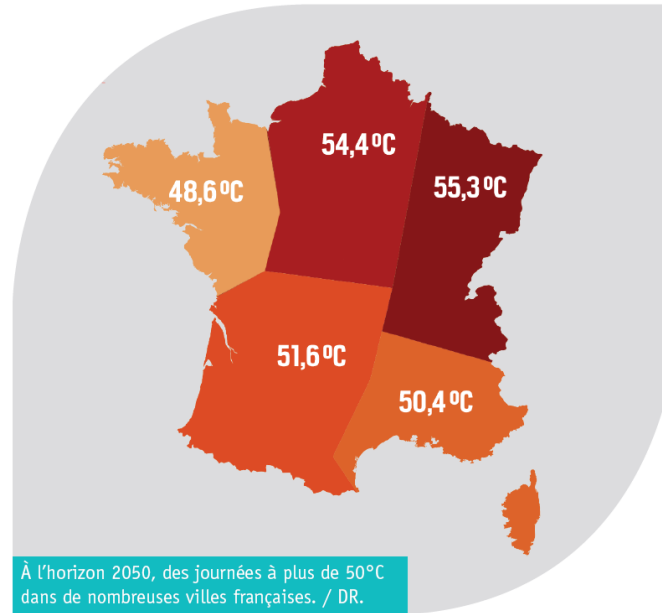
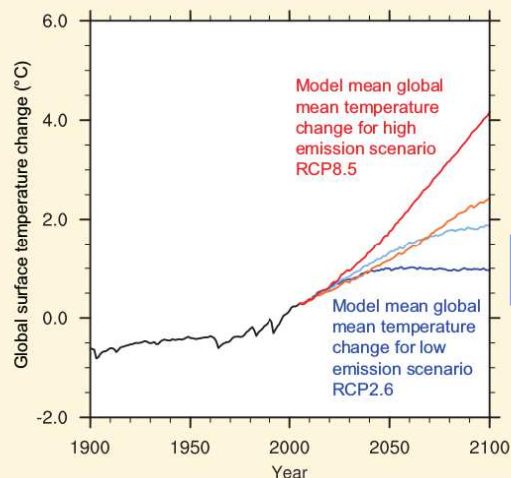
The rediscovery of « services » provided by trees

The « Nature Based Solutions »



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The climate change challenges



The main vulnerabilities of Lyon Metropole

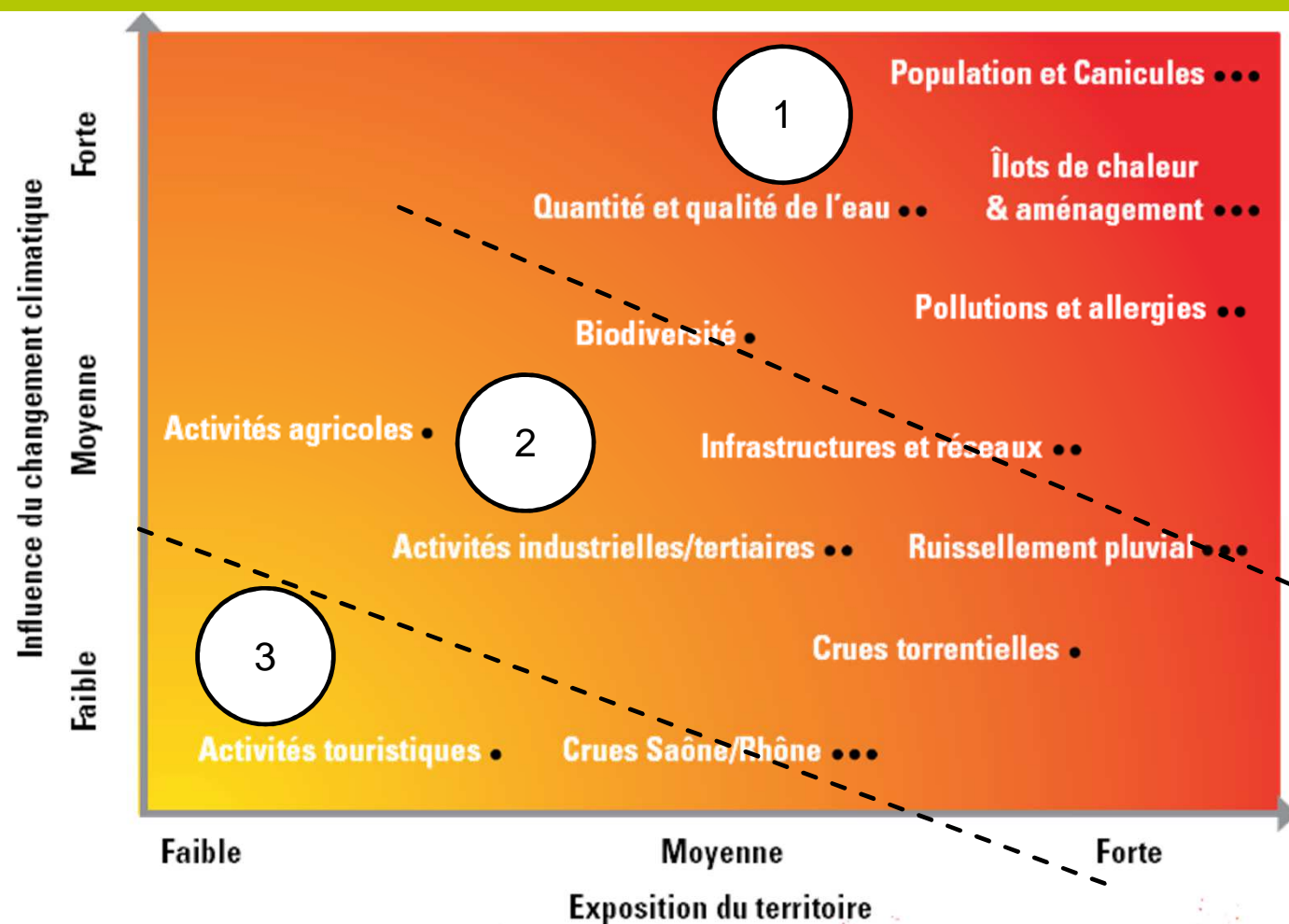
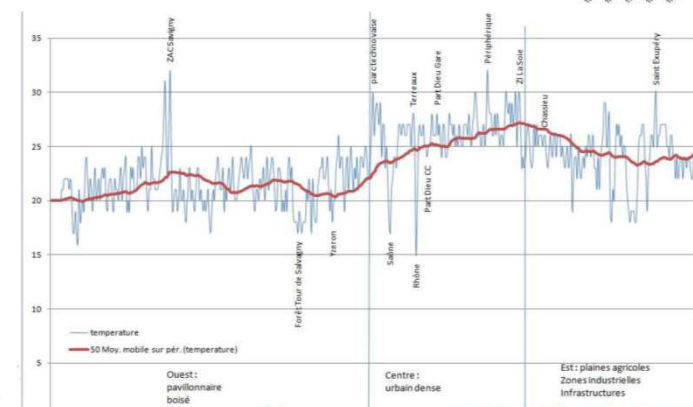
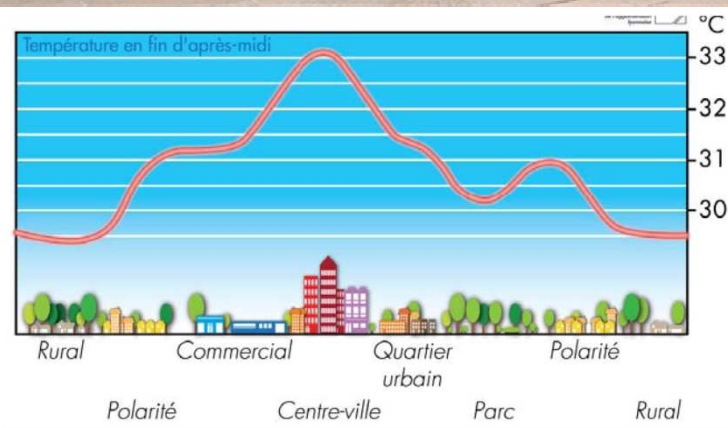
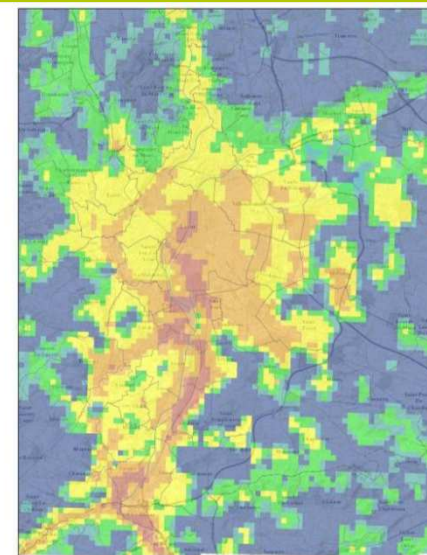
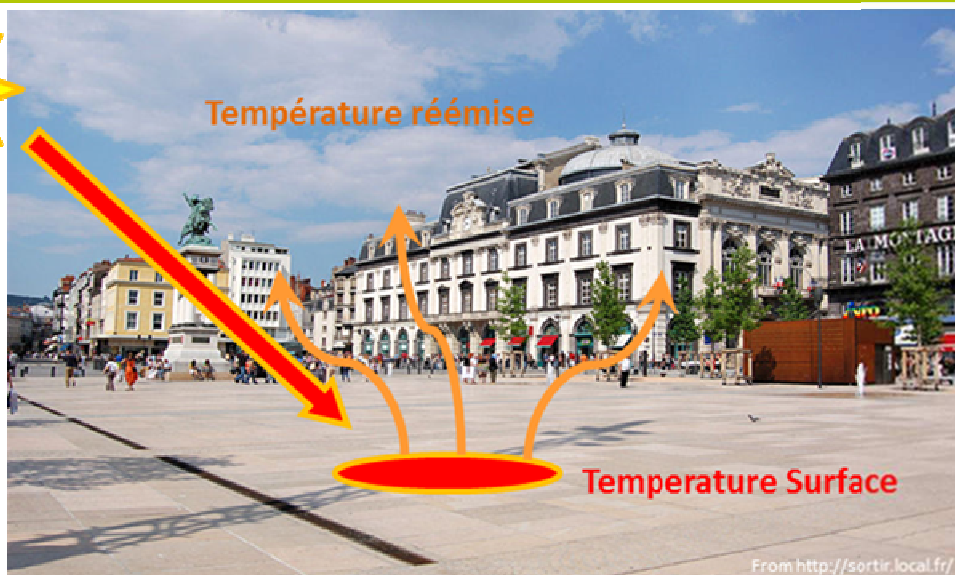


Figure 29 :
synthèse des
vulnérabilités
du territoire
du Grand Lyon
aux impacts
du changement
climatique.
Source : eQuiNeo,
2014.

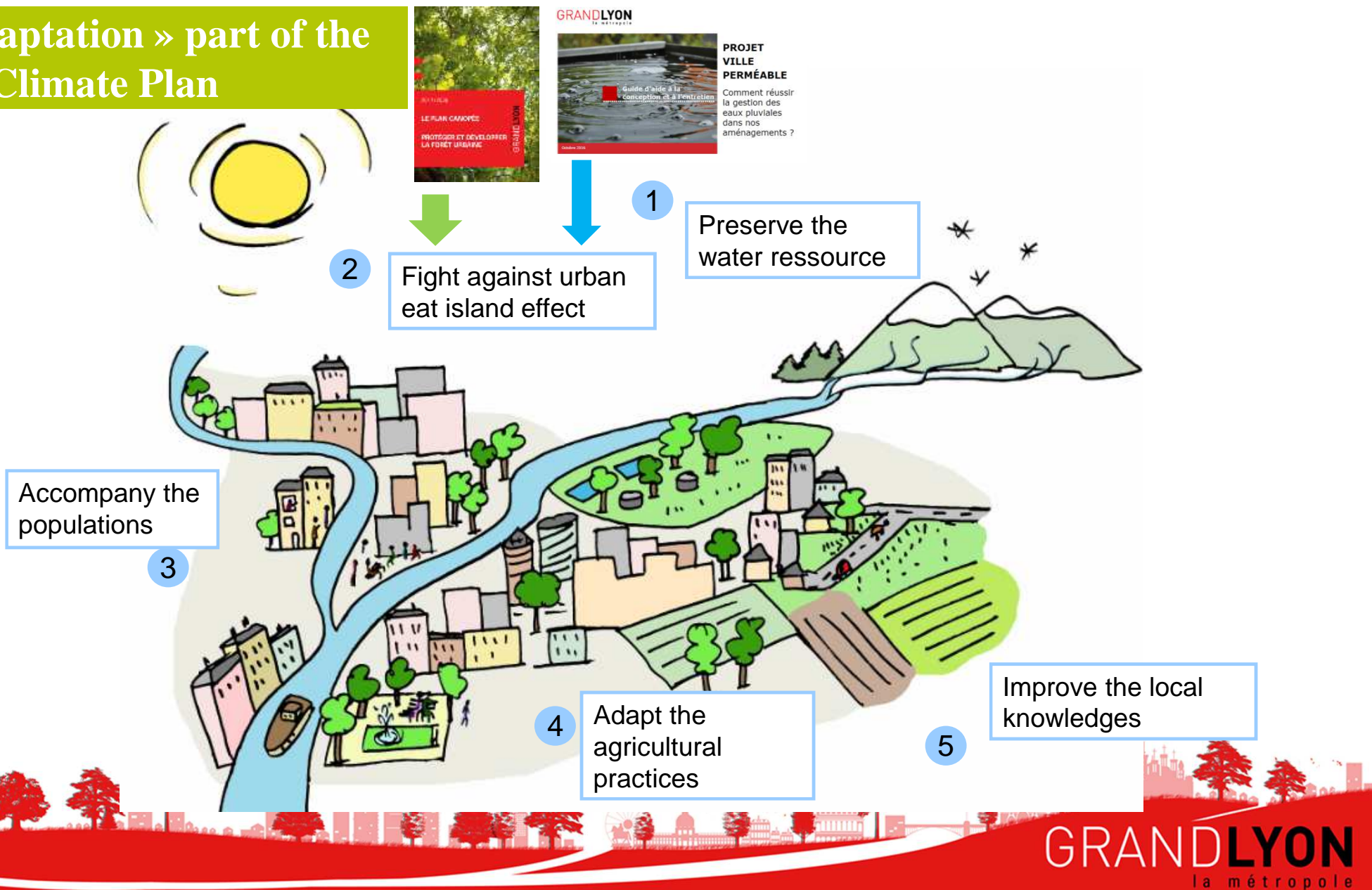
Expertise
scientifique et
connaissances
climatiques locales

- Faible
- Diffuse
- Importante

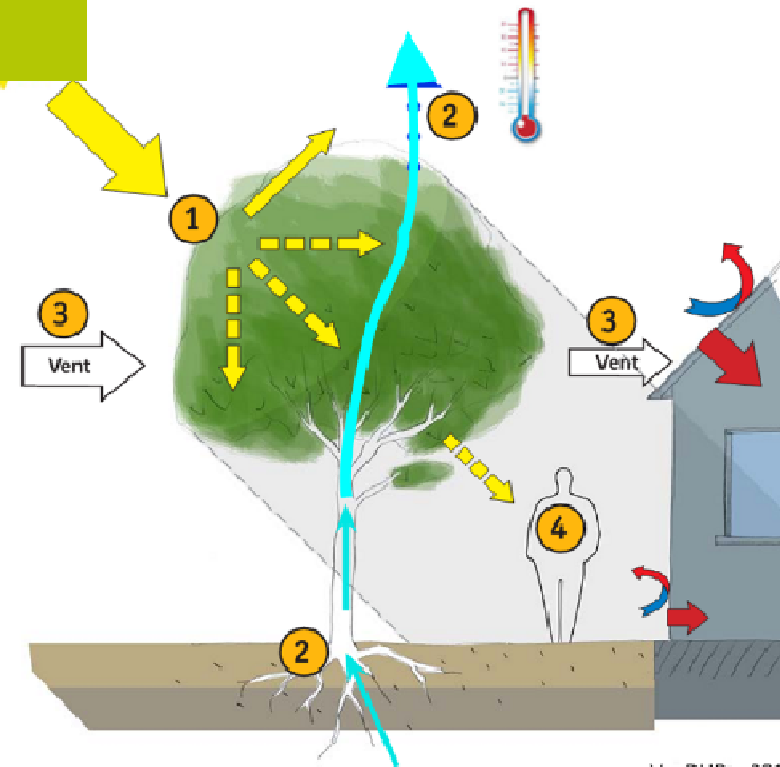
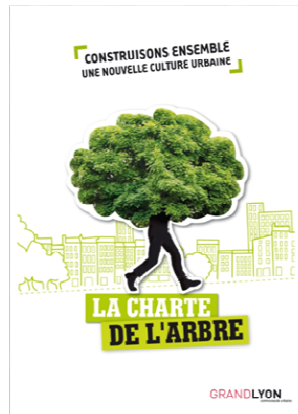
Heatwaves and « heat island effect »



The « Adaptation » part of the Climate Plan



The effects of trees on the local climate



- Shading effect
- Reduction of solar radiations on mineral surfaces
- Change in air flow
- Evapotranspiration

➤ Link with the rainwater management :

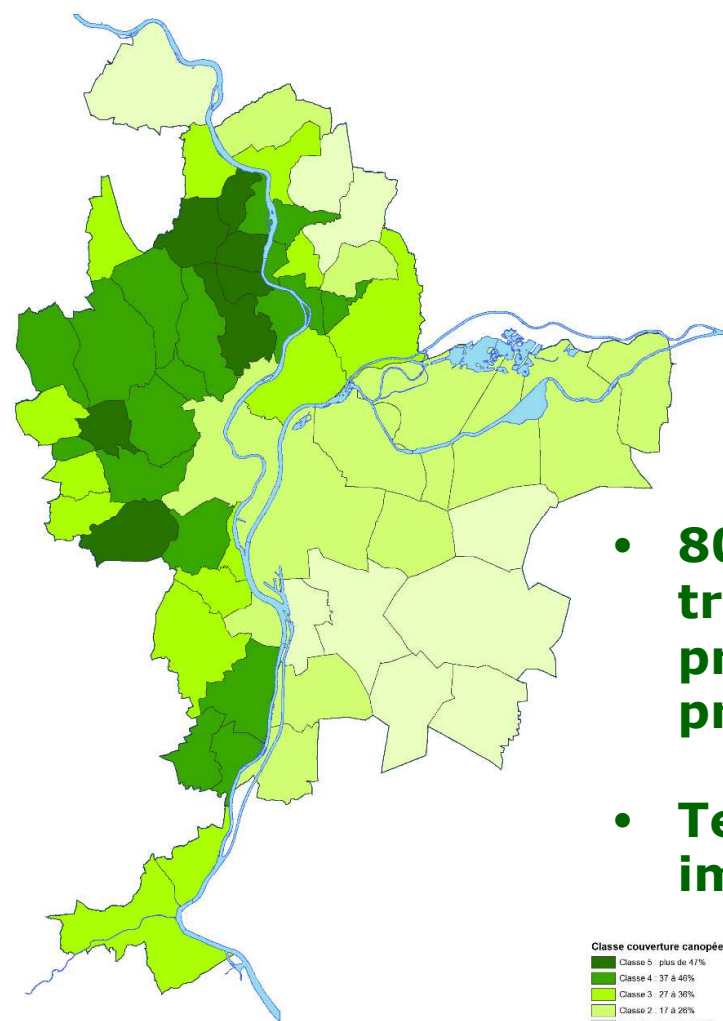
Water is a resource : promote the plants evapotranspiration



The study of the canopy (base 2009)

Canopy cover of Lyon Metropole :

27% of the territory
14 500 Ha
3 millions trees



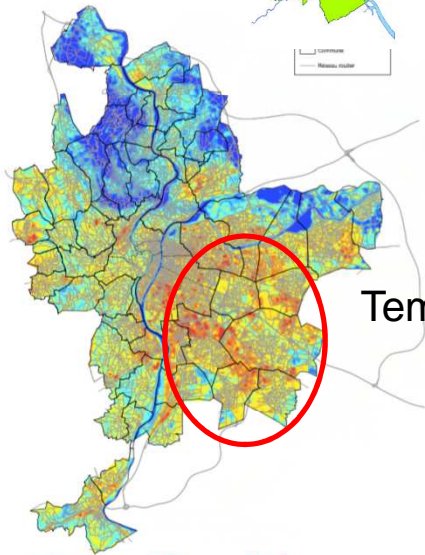
- **80% of trees on private properties**
- **Territorial imbalance**

Classe couverture canopée

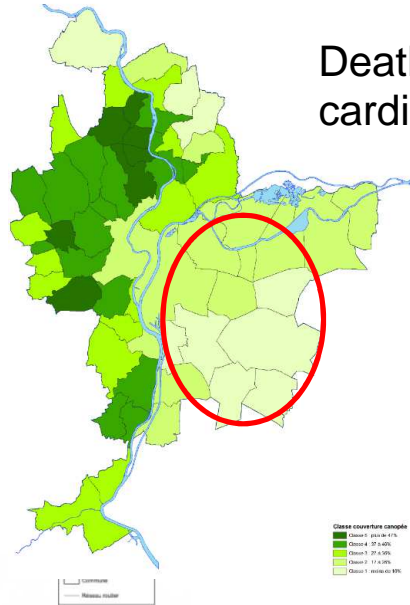
■	Classe 5 : plus de 41%
■	Classe 4 : 37 à 40%
■	Classe 3 : 27 à 36%
■	Classe 2 : 17 à 26%
■	Classe 1 : moins de 10%

Relational loops

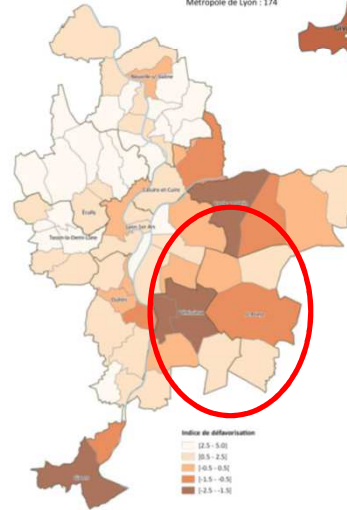
Canopy cover



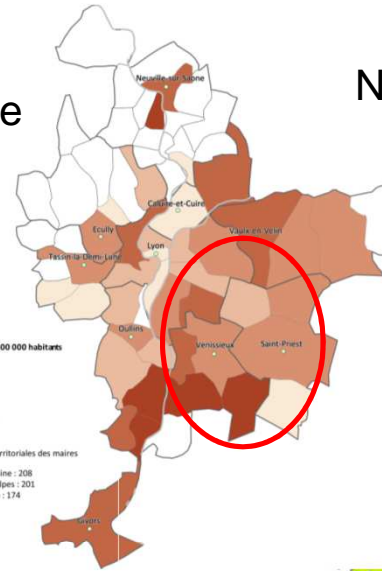
Temperatures



Death rate from cardiovascular disease



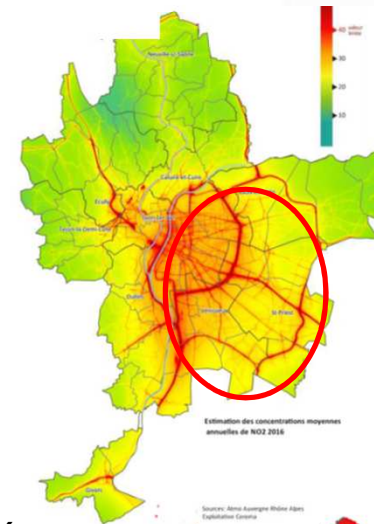
Social disadvantage index



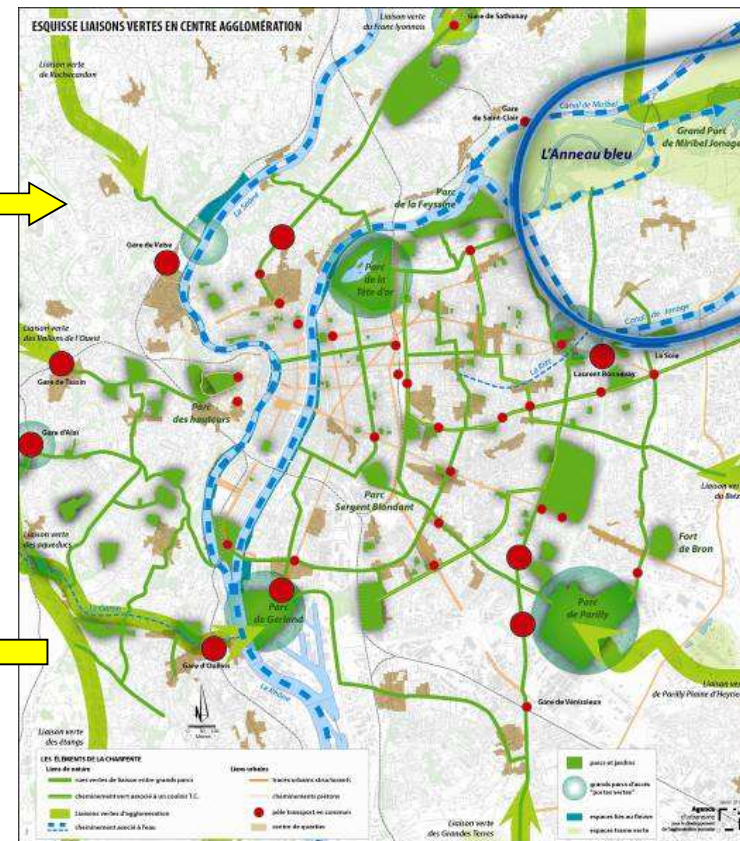
Noise map



NO2 pollution map

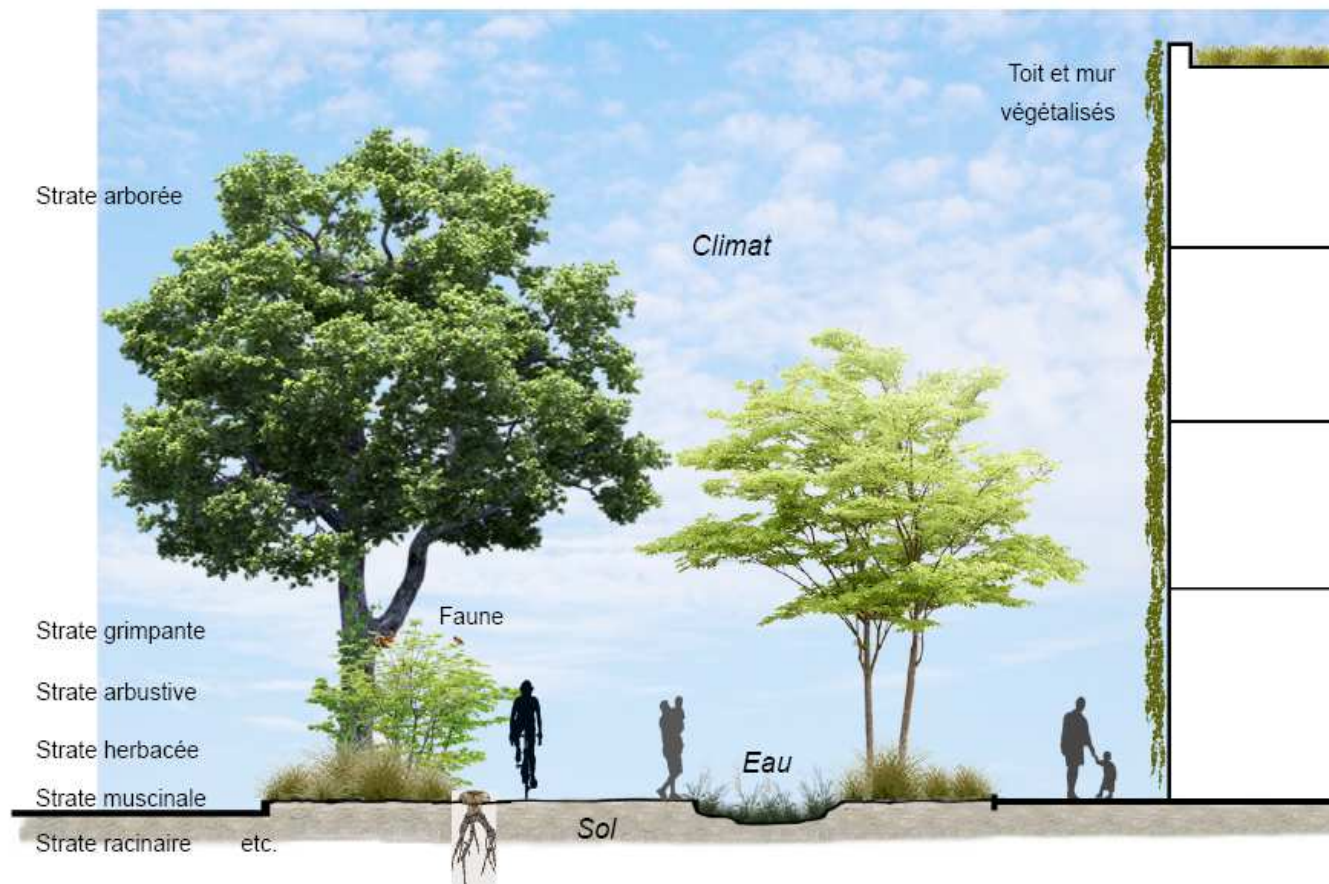


A detailed illustration of two leaves. The top leaf is a vibrant red maple leaf with prominent veins. Below it is a white oak leaf with a distinctively lobed or scalloped edge. Both leaves are set against a light pink background.



What canopy concern ? Links between climate and biodiversity issues

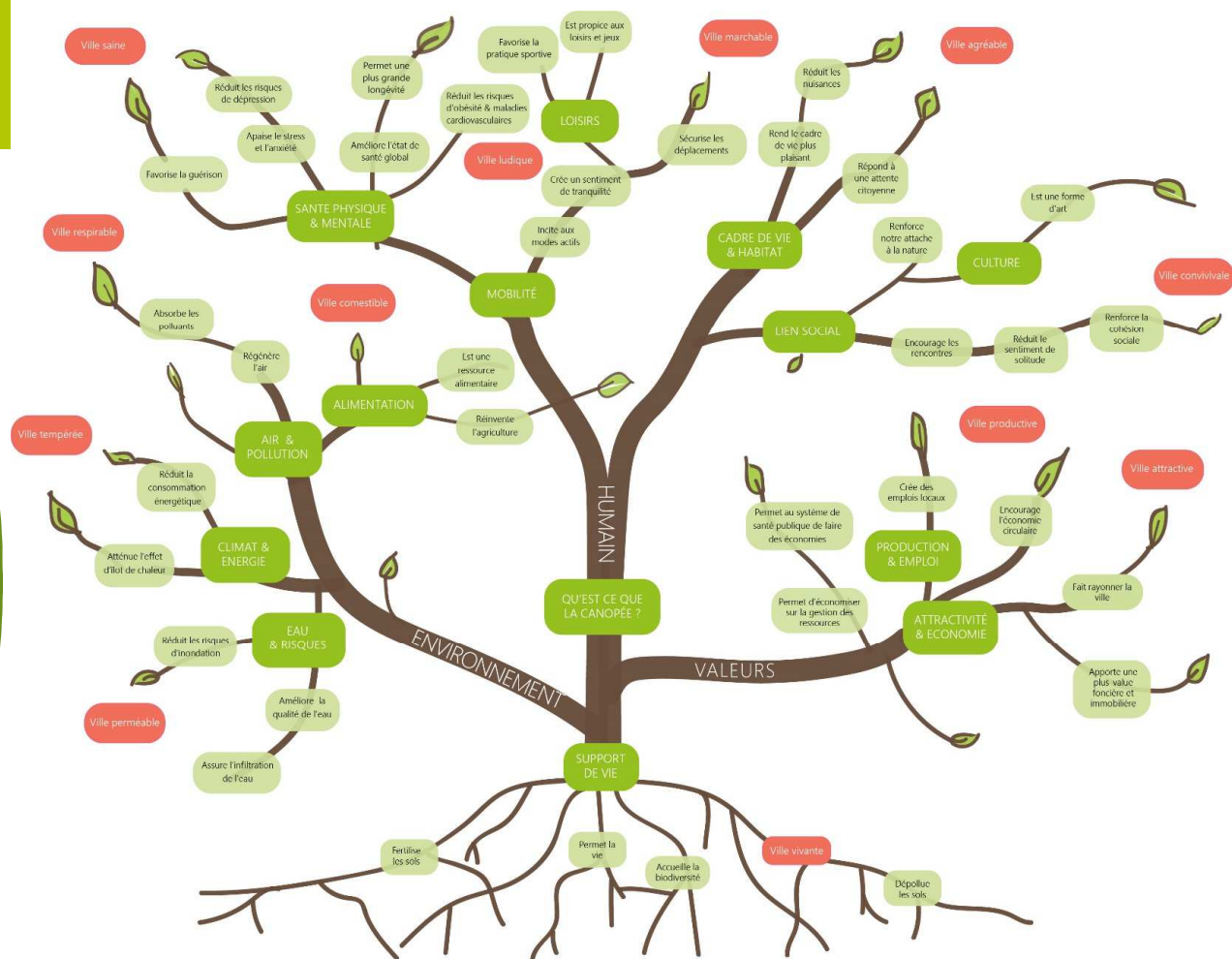
➤ Beyond the single tree a complete and complex natural system



Canopy and nature based solutions

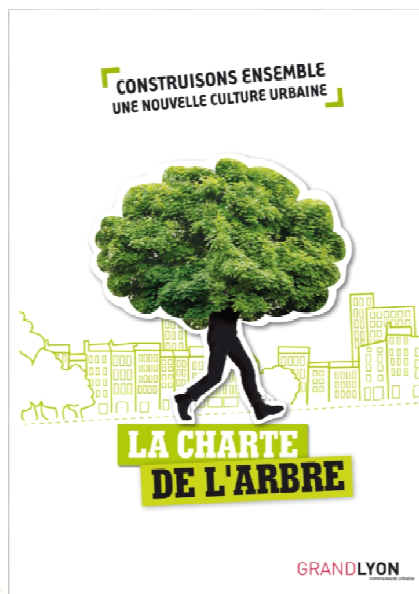
A transdisciplinary logic

- Nature and biodiversity
- living environment quality
- Economic attractiveness
- Food and ressources
- Social link
- Hobbies
- Health
- Physical activity and sport
- Active travel mode
- Air quality
- Thermal confort
- Water cycle management
- Risk reduction
- Soil fertility...



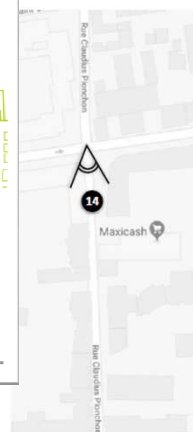
Who are the stakeholders ?

- Many people to coordinate and encourage,
- Necessary partnerships between public and private sectors



Plantation d'arbres organisée par Friends of Trees, Portland © City of Portland

14 15 rue Claudius Pionchon, alignement à créer entre le trottoir et la résidence (actuellement, espace enherbé)



Extrait du repérage de potentiel de plantation conseil de quartier Villette Paul Bert

The objectives of the Canopy Plan

Objective 30 / 30

Moving from 27% to **30%** of canopy cover by **2030**

- **Maintain existing urban forest (protection in town planning rules)**
- **Organize the planting of at least 300 000 trees on the Lyon Metropole by 2030**



The three main areas of research and experimentation

3. Canopy and climate change



1. Canopy and soil fertility



2. Canopy and Water cycle



I. The fertility challenge of urban soils...



New needs of fertile soils of urban development

Berge du Rhône

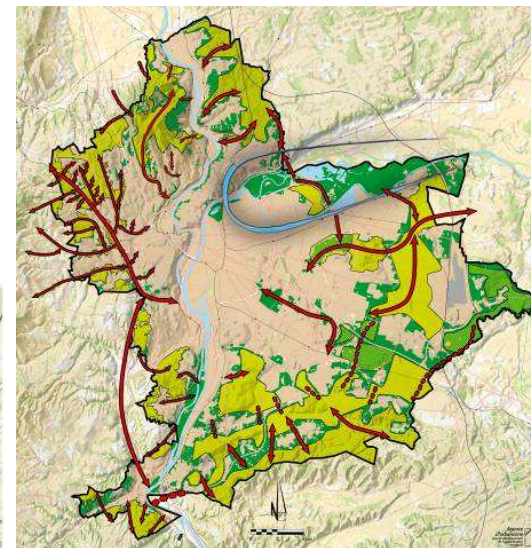
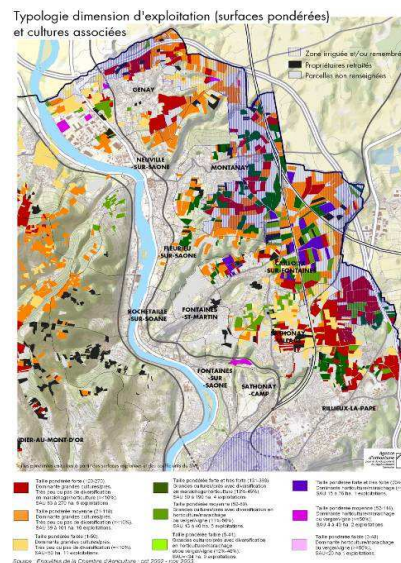
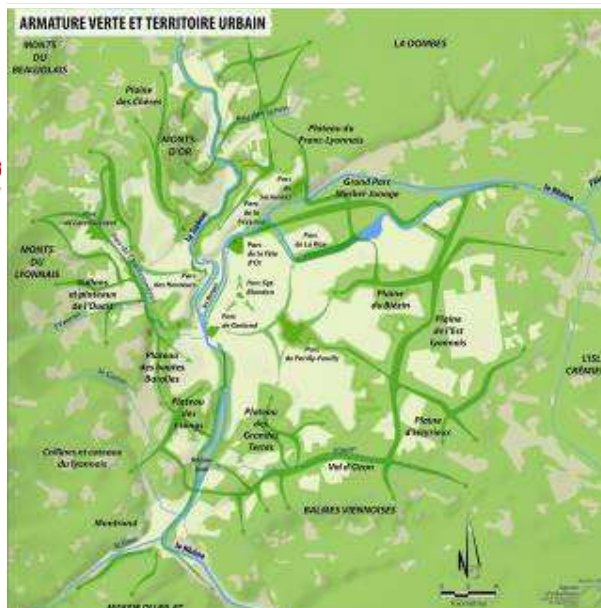


ZAC des Girondins





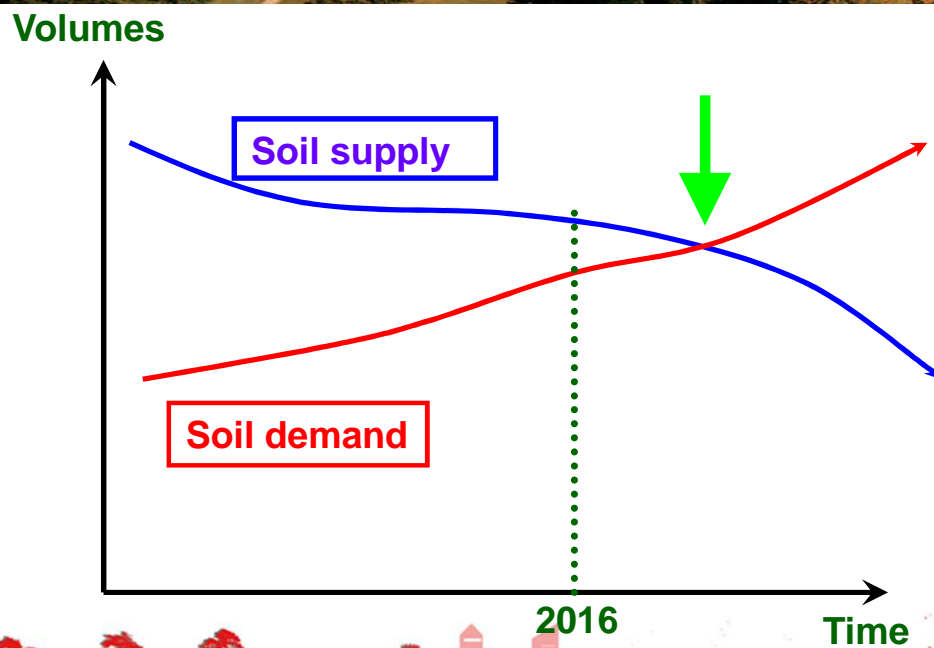
Policies for the sanctuarization of natural and agricultural areas



National policy to stop artificialisation of soils

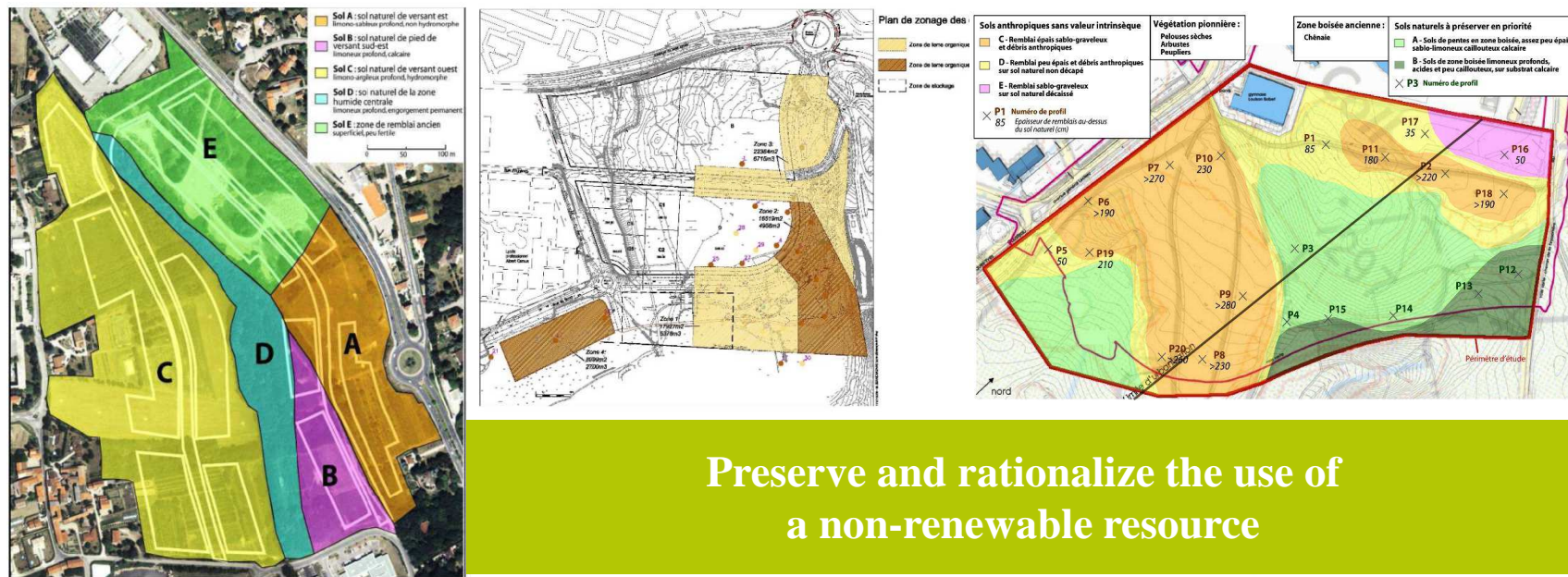


Fertile soils : the programmed inversion of the supply/demand ratio



1. Improve soil knowledge to value fertile materials

- Perform soil diagnosis in place
 - Integrate soil conservation into project objectives
 - Organize recovery and storage
 - Develop re-use strategies
- + Adapt the earthworks and the choice of trees and plants**



Meyzieu Panettes's green car park development



Excess fertile soils



Recovery and storage on a deficit operation (ZAC Tase Vaulx en Velin)



2. Create a “stock exchange” for fertile materials throughout the Greater Lyon

Mutualize urban projects

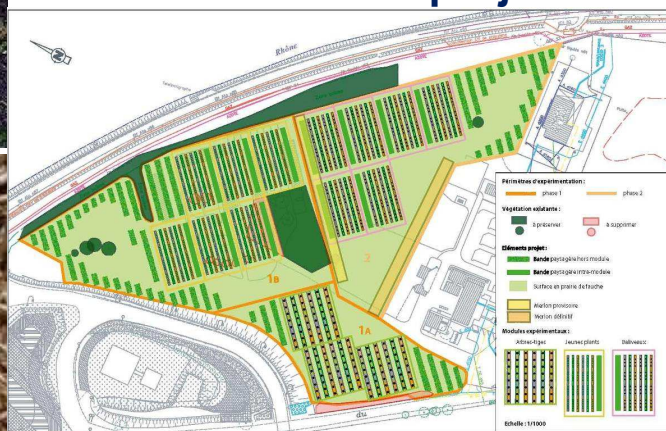


- Nature of materials
- Mobilizable volumes
- Location of the sites
- Timing of achievements

3. Develop techniques for reconstituting fertile substrates



Vallée de la Chimie :
Terre Fertile 2.0 project



Plante&Cité
Ingénierie de la nature en ville

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4. Develop existing soils improvement techniques



Lône de Pierre
Bénite :

Vallée de la
Chimie

1. Improve soil knowledge to value fertile materials

- Perform soil diagnosis in place
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combined approach for projects

Meyzieu Panettes's green car park development



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Mutualize urban projects



- Nature of materials
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4. Develop existing soils improvement techniques



II. Canopy and water cycle

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PROJET VILLE PERMÉABLE

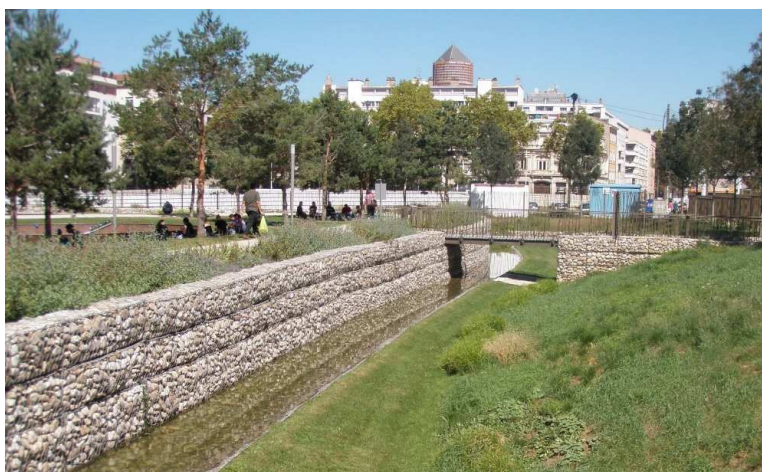
Comment réussir
la gestion des
eaux pluviales
dans nos
aménagements ?



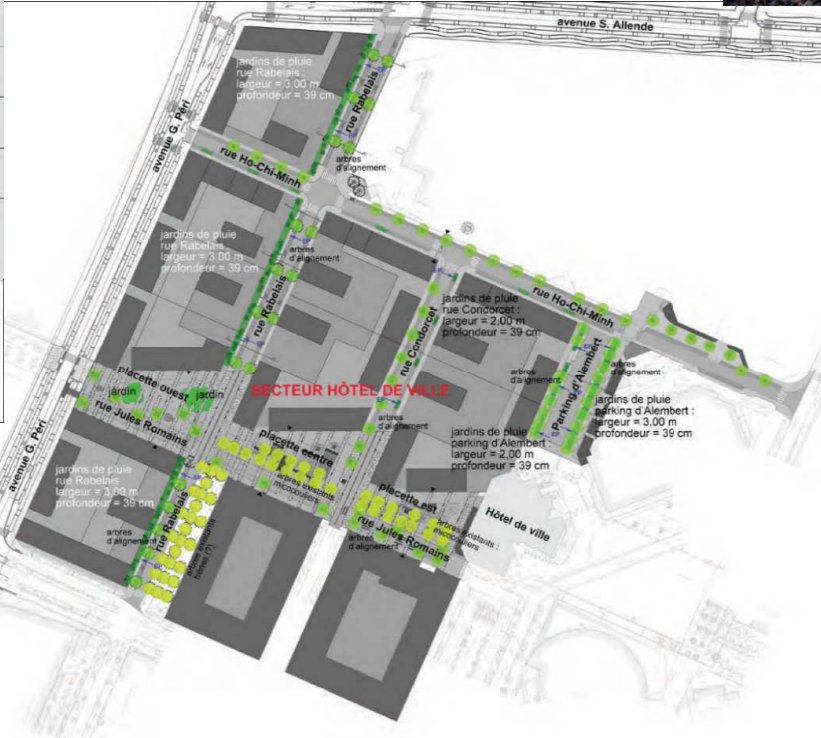
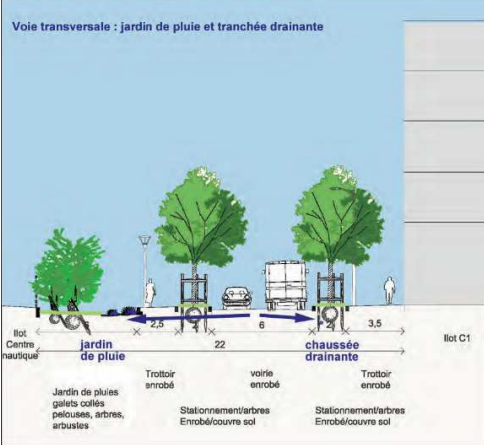
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Water as a ressource

- Towards a pooling of spaces for different functions and uses
- Towards improving plant health and biodiversity.
- Towards a landscape valorization
- Towards a urban refreshment



The urban projetc as an opportunity for experimentation





Place de Francfort Lyon 3

Nov 2018

**Tree planting in a
continuous fertile
soil (stockholm
Method) under a
paved public
square**



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III Canopy and climate change

Garibaldi street development project



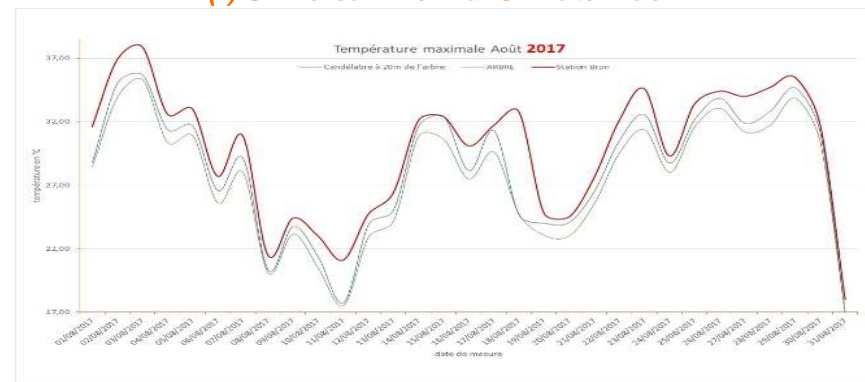
Research on the cooling effect of canopy

2016 and 2017 : measures of the vegetation effect on temperatures

Gain Thermique par rapport à la présence d'arbre				
Ecart en °C/Tmax près de l'arbre	Gain moyen		Gain maximum	
	08/2016	08/2017	08/2016	08/2017
CANDELABRE	1,08	0,81	1,90	1,80
STATION BRON	1,78	2,33	3,20	8,09



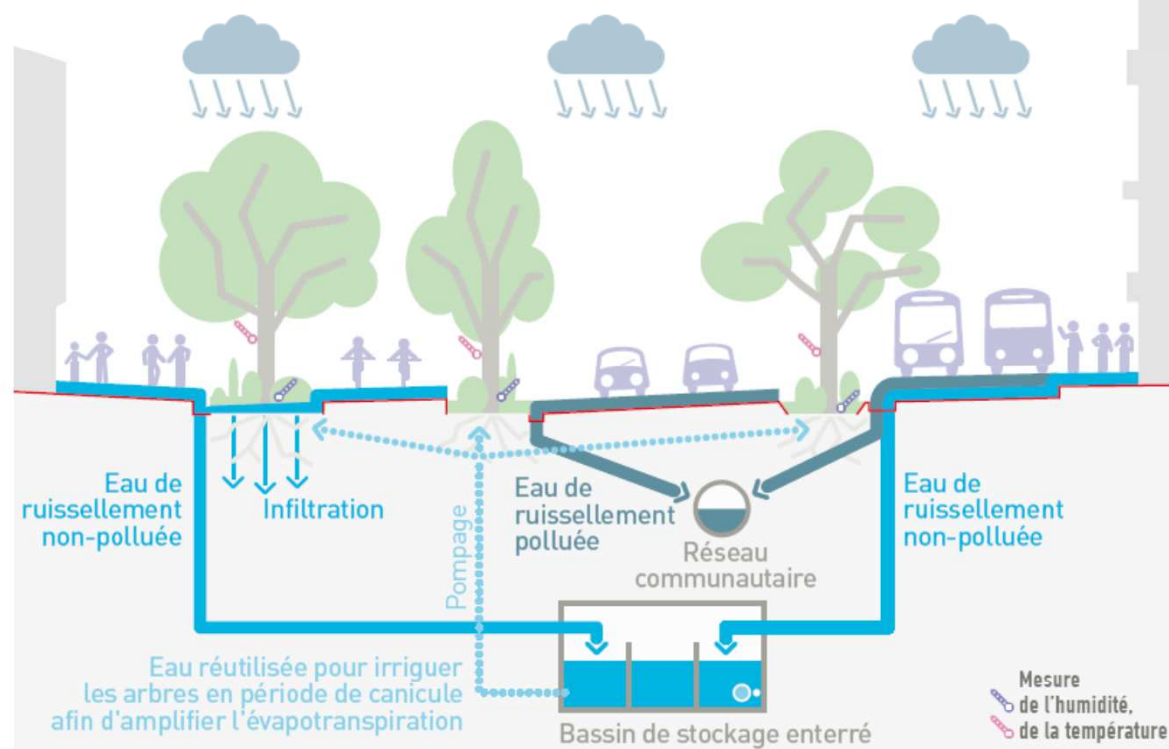
(*) Universal Thermal Climate Index



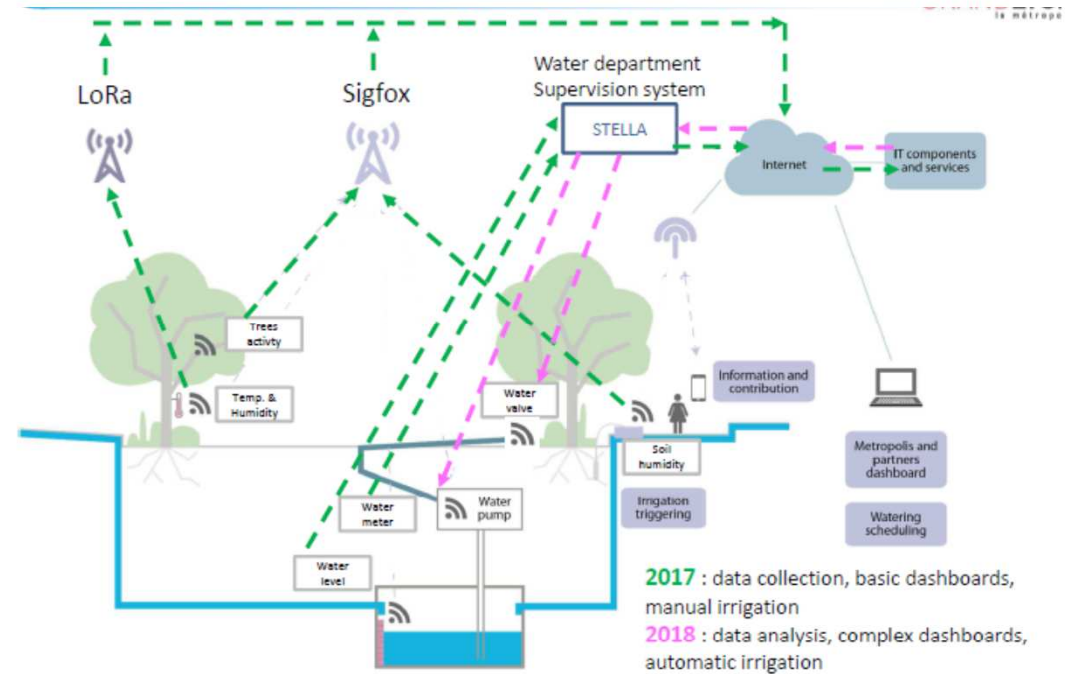
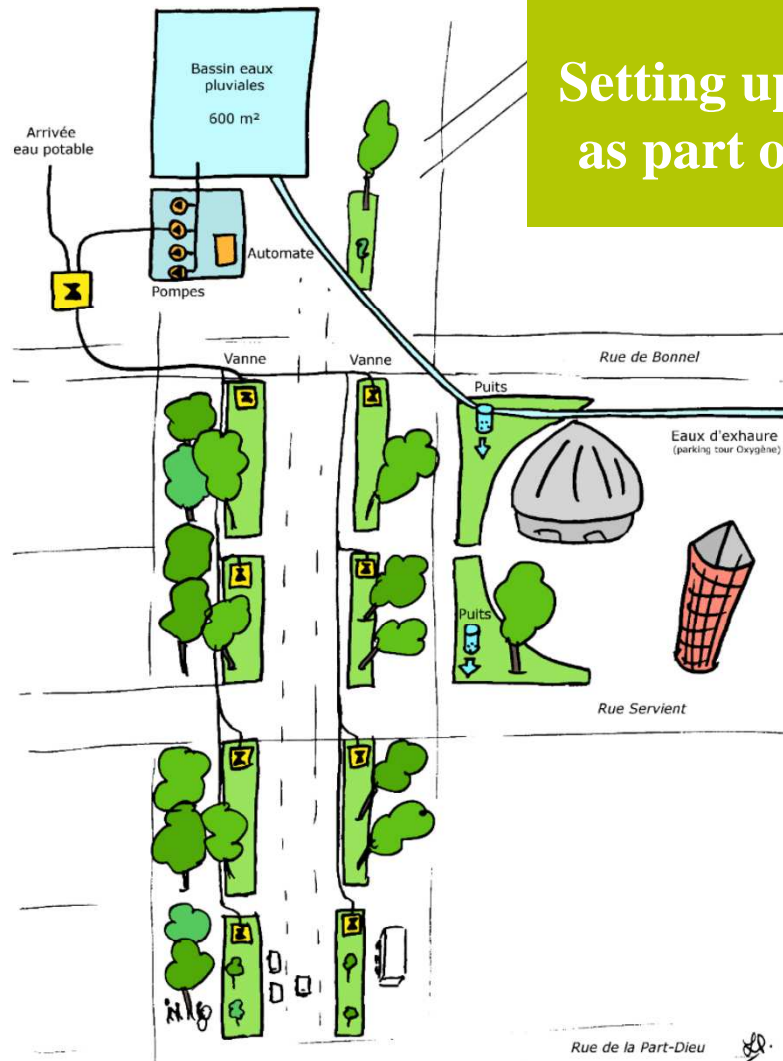
The presence of trees lowers the ambient temperature (in absolute average from 1,78°C in august 2016 to 2,33°C in 2017) and improves the thermal comfort index (UTCI = -9°).

Transformation of an old tunnel into water reserve

DANS LE CADRE DU RÉAMÉNAGEMENT DE LA RUE GARIBALDI,
UNE EXPÉRIENCE PILOTE DE RAFFRAÎCHISSEMENT D'AIR DE LA VILLE EST MENÉE.



Setting up a network of connected sensors as part of the european bIOTope project

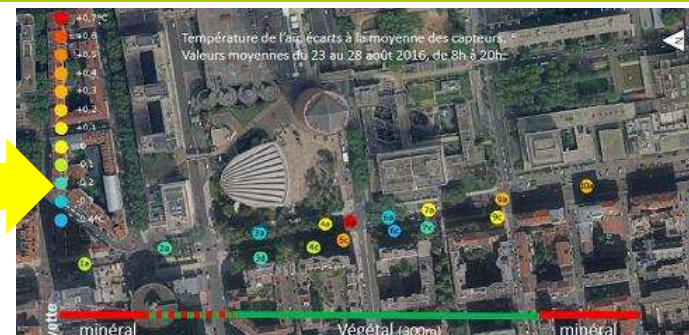


Research on the cooling effect of canopy



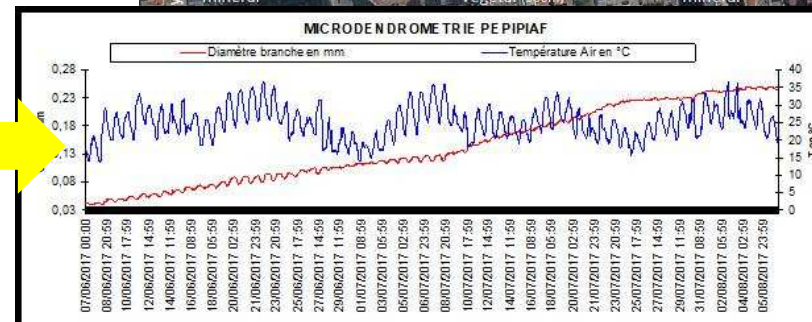
Effect on temperatures

Thermal attenuation



Growth gain

Refreching power

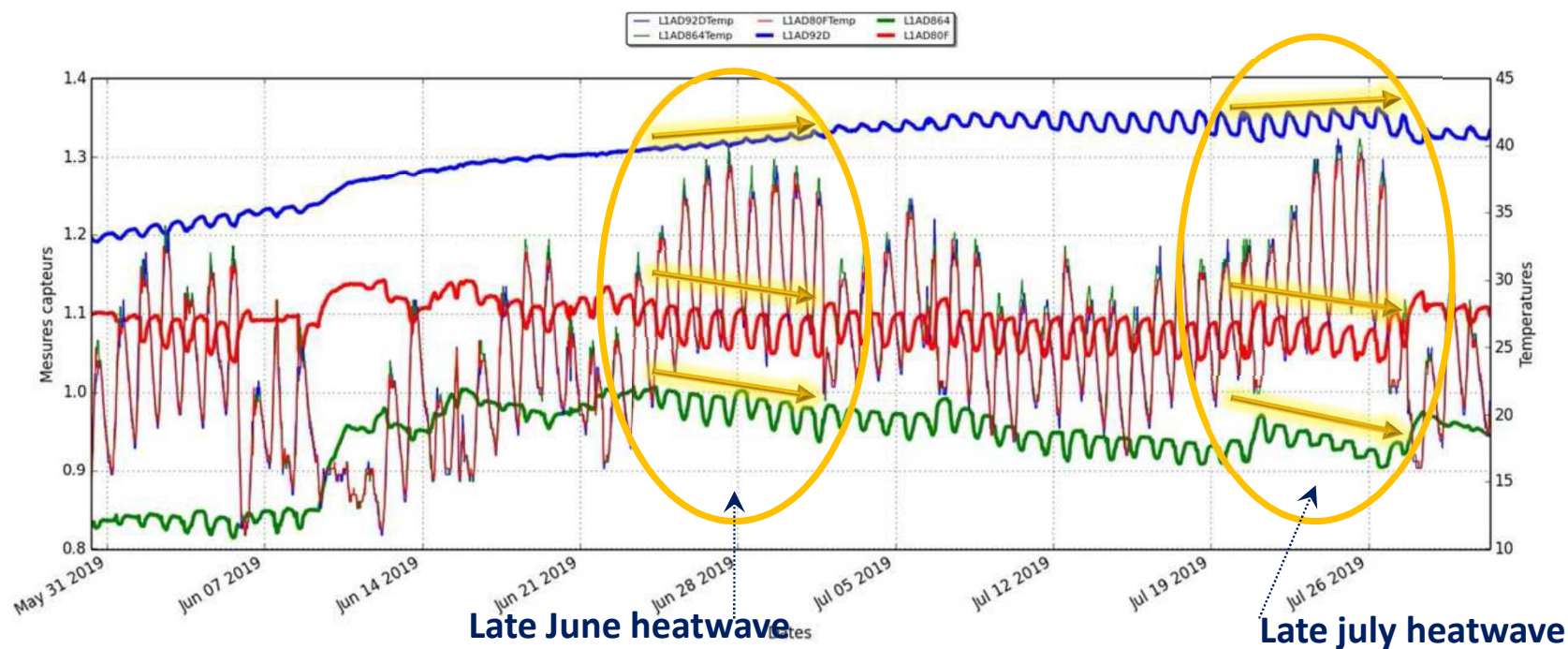


Water confort of soil

Root activity



Effect of soil irrigation during summer heatwaves 2019



Watered tree
during heatwaves

Unwatered trees
during Heatwaves

The watered trees continue to grow
Fall in growth of unwatered trees
Temperature drop : -0,5 à -1°C

Thank you for attention !



The Tree Charter and Canopy Plan documents are available on the blog :

<http://blogs.grandlyon.com/developpementdurable>

Heading « actions/charte de l'arbre »

Frédéric SEGUR

La Métropole de Lyon

Délégation au développement urbain
et au Cadre de Vie

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