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ADAPTATION TO CLIMATE CHANGE



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Refreshing the city of Toulouse, France

Agile experimentation based on 30 Actions to adapt to extreme heat (summer 2023)

Greening, shading structures, soil desealing, improved water management, lighter surfaces, and adapting the operation of municipal services contribute to a pleasant and resilient city for the inhabitants of Toulouse.

Key Learnings

- **Addressing heat:** The plan “Toulouse + fraîche” was developed to address the increasing heat island effect (i.e., in summer, the city area can be four to six degrees warmer than the surroundings). It outlines 30 experimental measures to cool the city and enhance the quality of stay during a heat wave. All measures provide short-term and effective solutions to reduce heat stress, while testing provides the basis for a long-term action plan.
- **Choosing the right options:** Experimenting, monitoring using Earth Observation data and other relevant measurement tools and evaluating the different options before applying them widely contributes to choose the most effective option for upscaling. The local circumstances need to be considered, as there is no one-size-fits-all solution.
- **Stakeholder involvement:** The support of citizens is an important factor for the successful implementation of the adaptation actions, to increase the level of acceptance of the measures and encourage the adoption of new behavioural habits.

About the region

Toulouse is located north of the Pyrenees in southern France on an average altitude of 141 meters above sea level. It is the capital of the Haute-Garonne department and the Occitanie region. With 498,003 inhabitants in 2020, it is the fourth most populated city in France. Toulouse is characterized by a subtropical climate with 656 mm of rainfall per year, and high temperatures between May and the end of September (there were 12 heat waves in 2023).

Climate Hazards

Strong wind, extreme temperatures, droughts

Sector

Urban

Key system

Infrastructure

Health and Wellbeing

Ecosystem and Nature-based solutions



Climate Threats

In summer, Toulouse increasingly faces extreme temperatures of up to 40°C in August (record of 42,4°C in August 2023). Few green spaces, a high degree of sealed surfaces, and a lack of shade lead to a significant Urban Heat Island Effect, i.e., the air temperatures in the urban area are considerably higher than in the surrounding suburban and rural areas. Weather stations in Toulouse have measured temperature differences of between four to six degrees. Considering the ongoing climate change challenges, urgent action is needed to cool the city and create a resilient city for the inhabitants.

A comprehensive plan to cool Toulouse

Multiple actions are needed to address the increasing heat in Toulouse. In response to strong political demand from the Mayor, in December 2022, the city created a task force to produce the first experimental comprehensive plan to cool the city, "Toulouse + fraîche".

"This is not a flagship measure that we need, it is a multiplicity of actions. The idea is to go further on greening, to create shades, to accentuate the vegetation, to protect the weakest and to initiate the transformation of the city to face future summers."

Jean-Luc Moudenc, Mayor of Toulouse

The 30 measures were announced in May 2023, and the implementation phase started in the summer of 2023. All actions were evaluated to build the basis for the 2024-2030 action plan.

A Project Officer was appointed to lead and manage the project. To ease the design and implementation phase, the task force brought together officers from several city departments, including the Departments

of Garden and Green Space, Water Management, Roadways, Environment, and Urban Planning, as well as external partners such as Tisséo (urban transport authority), Météo France, (French national meteorological service), and local urban development companies. Around 50 people are involved in the project.

From plan to action

One of the 30 measures developed within the first “Toulouse + fraîche” action plan was to improve the thermal comfort of users by acting on the perceived temperature. This includes the installation of **shading structures** in different public spaces of the city. Among the structures under test are canvas wooden pergolas, temporal shades depending on the season, shade sails, and shade sails and ribbons according to the Andalusian model in other places. A mobile inflatable shade has also been tested. The shading structures of this pilot project will be compared and assessed to choose the most effective for wider deployment in the city.



Figure 1: Shading structures at rue Alsace Lorraine (Image credit: P. Nin)



Figure 2: Shading structures at mbrière pont Saint-Pierre (Image Credit: P. Nin)

Another set of actions centres around **vegetation**, including planting trees, the renaturation of squares and the re-development of green spaces currently rarely visited by residents. Priority areas are chosen based on simulations of re-vegetation needs, and a particular focus was placed on protecting vulnerable social groups by focusing on nurseries, schools, and institutions for the elderly. By the end of 2023, 15,000 new trees will be added to the 35,000 already planted since 2020. The goal is to plant more than 100,000 trees by 2030. A new interactive plan to track the progress of this initiative is being developed.

Moreover, several municipal services in Toulouse have adapted their **operation hours** during a heat wave. This includes extended opening hours of swimming pools, municipal parks and cultural venues. The working arrangements of municipal staff are adjusted, with the implementation of teleworking and staggered schedules, if the nature of the activity allows and on a voluntary basis.

To facilitate access to refreshing spaces, city maps of cool spaces and drinking water points are made available to residents on the municipality's website. In addition, Tisséo, the public transport authority, offers a special ticket at a reduced price on hot days, thus encouraging the use of public transport. Reducing private car rides contributes to counteract urban heat, as cars indirectly affect global warming through greenhouse gas emissions and directly by producing heat through the burning of fossil fuels.

Lastly, a new water playground for children was opened, and several water activities such as kayaking, paddle boarding, and inflatable games are offered at Lac de la Reynerie and the Garonne River. Opening hours of indoor municipal swimming pools are planned to extend to 10 pm in response to the heat.

Difficulties and success factors

A single action cannot solve the challenge of extreme heat, and there is no one-size-fits-all solution. Therefore, different approaches were tested to choose the most effective combination of actions. Potential co-benefits and the local context and limits were also considered. For example, at Place du Capitole, an underground car park prevented tree planting, and the project had to comply with the recommendations of the French institution for heritage preservation since the Capitole is a listed building. Therefore, potted trees were used to cool the area.

The city of Toulouse financed the "Toulouse + fraîche" plan. In 2023, the total deployment budget of the plan is estimated to be close to EUR 10 million, reallocated from different budget lines. The implementation of the plan requires the support and coordination of internal as well as external actors. Therefore, workshops and public consultations were held to raise awareness and ensure the inhabitants' support.

Summary

To face increasing heat, Toulouse developed a comprehensive plan that centres around implementing multiple actions such as revegetation, shading, soil desealing, better water management, lighter surfaces, and adapting public services and activities. It is based on deployment in test areas before rolling out widely. While some actions counteract the Urban Heat Island effect by cooling the area, others focus on decreasing vulnerability and enhancing the quality of life during a heat wave. The plan's success was determined by the support of the citizens involved in a public participation process.

Further information

- Magazine “À Toulouse” available at <https://metropole.toulouse.fr/kiosque/toulouse-97-mai-2023> (in French)
- Interactive map available at <https://carto.toulouse.fr/ZONESFRAICHES/?t=ZONESFRAICHES> (in French)
- Information on the Toulouse Métropole website available at <https://metropole.toulouse.fr/actualites/un-plan-pour-rafraichir-la-ville> (in French)

Contact

Toulouse is eager to share and learn from other cities that have implemented a refreshing action plan and/or other mitigation and adaptation measures:

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