



**Città  
metropolitana  
di Milano**



# The Metropolitan City of Milan (MCM) and its Metropolitan Territorial Plan (PTM)

Politecnico di Milano – Piacenza Campus  
ARCHITECTURAL DESIGN STUDIO 1

Sustainable Architecture + Multi-criteria Analysis and Project Appraisal  
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## Metropolitan City of Milan : territory

The Metropolitan City of Milan (MCM) **is among the most densely populated urban areas** (2.000 inhabitants / km<sup>2</sup>) in Europe. With a resident population of over three million, it is the third most populated area in Europe after London and Paris. 22% of population is over than 64 years old.

Its territory is about **1600 Km<sup>2</sup>** distributed over **133 Municipalities**, including the city of Milan, and is about **41%** formed by **build-up areas** and **infrastructures**, **50%** formed by **agricultural areas** and only **8%** formed by **woodlands**. The metropolitan territory is mainly flat and contains a **system of regional parks** protected for their high natural-ecological value. The main of them (**61 municipalities**) covers an area of about **47.000 ha**.

Actually the whole **Metropolitan Area of Milan is prone to flood risk** due both to the increased peak flow of rivers **and to the runoff** generated by the compact, not permeable urban fabric. Other critical issues are increased mean temperatures, frequency and intensity of summery heat waves generating **urban heat-islands**, increased energy demand, sudden and heavy rainfalls, **ozone levels exceeding**.

## Metropolitan City of Milan : institution

The **MCM is a medium level local public authority established in 2014** and governs the vastest metropolitan urban area in Italy.

The MCM **implements and coordinates activities of strategic and territorial planning, sustainable mobility** and urban public transports, including greening issues, digital agenda and **has responsibility in environmental field** especially for quarries, land reclamations and waste dumps.

The **MCM plays a crucial role in the adaptation process**, just like all Metropolitan cities authorities. Its role is fundamental in setting a comprehensive strategy for its wide and whole territory, **enhancing the mainstreaming of adaption measures at all the local levels** and coordinating all the different planning and operative tools.

## Metropolitan City of Milan : territorial context in numbers

<p>Municipalities in the Metropolitan City of Milan</p> <p><b>133</b></p> <p>(municipalities)</p>	<p>Built –up volume per inhabitant of the Metropolitan City of Milan</p> <p><b>241</b></p> <p>(square meters for inhabitant)</p>	<p>Total area of the Metropolitan City of Milan</p> <p><b>157.500</b></p> <p>(hectares)</p>
<p>Residential built-up area per inhabitant of the Metropolitan City of Milan</p> <p><b>21,3</b></p> <p>(square meters for inhabitant)</p>	<p>Total built-up area of the Metropolitan City of Milan</p> <p><b>12.680</b></p> <p>(hectares)</p>	<p>Total number of buildings in the Metropolitan City of Milan</p> <p><b>270.200</b></p> <p>(buildings)</p>
<p>Green areas surfaces per inhabitant of the Metropolitan City of Milan</p> <p><b>58,3</b></p> <p>(cubic meters for inhabitant)</p>	<p>Total population of the Metropolitan City of Milan</p> <p><b>3,2 M</b></p> <p>(inhabitants)</p>	<p>Population density for the Metropolitan City of Milan</p> <p><b>2.038</b></p> <p>(inhabitants per square kilometer)</p>

# Metropolitan City of Milan: 133 Municipalities





# The Metropolitan Territorial Plan (PTM)

The **PTM is the overall territorial plan of the Metropolitan City of Milan** and **introduces rules and measures for the entire territory** concerned regarding the **environment, landscape, infrastructure, services, settlement development, and territorial regeneration**. The plan faces the structural transformations brought by the pandemic and the new challenges in the use of the territory.

The Metropolitan Territorial Plan (PTM) **was approved** by the Metropolitan Council during their meeting held **on 11 May 2021**, with Resolution No. 16/2021 and **has been in force since 6 October 2021** with the publication of the final approval notice in the Official Bulletin of the Lombardy Region.

The PTM introduces **4 founding general principles and 10 objectives** that are **in line with the 2030 Sustainable Development Goals (SDGs)** and with the national commitment to sustainable development.



Tutela delle risorse non rinnovabili (suolo, acqua, aria, energia da fonti fossili)



Tutela e valorizzazione del patrimonio paesaggistico-ambientale



Equità territoriale



Semplificazione delle procedure, digitalizzazione degli elaborati



Coerenzare le azioni del piano rispetto ai contenuti e ai tempi degli accordi internazionali sull'ambiente



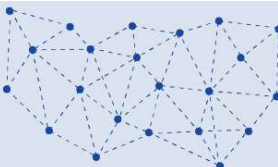
Migliorare la compatibilità paesistico-ambientale delle trasformazioni



Migliorare i servizi per la mobilità pubblica e la coerenza con il sistema insediativo



Favorire in via prioritaria la localizzazione degli interventi insediativi su aree dismesse e tessuto consolidato



Favorire l'organizzazione policentrica del territorio metropolitano



Potenziare la rete ecologica



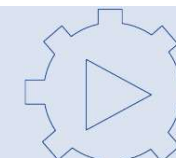
Sviluppare la rete verde metropolitana



Rafforzare gli strumenti per la gestione del ciclo delle acque

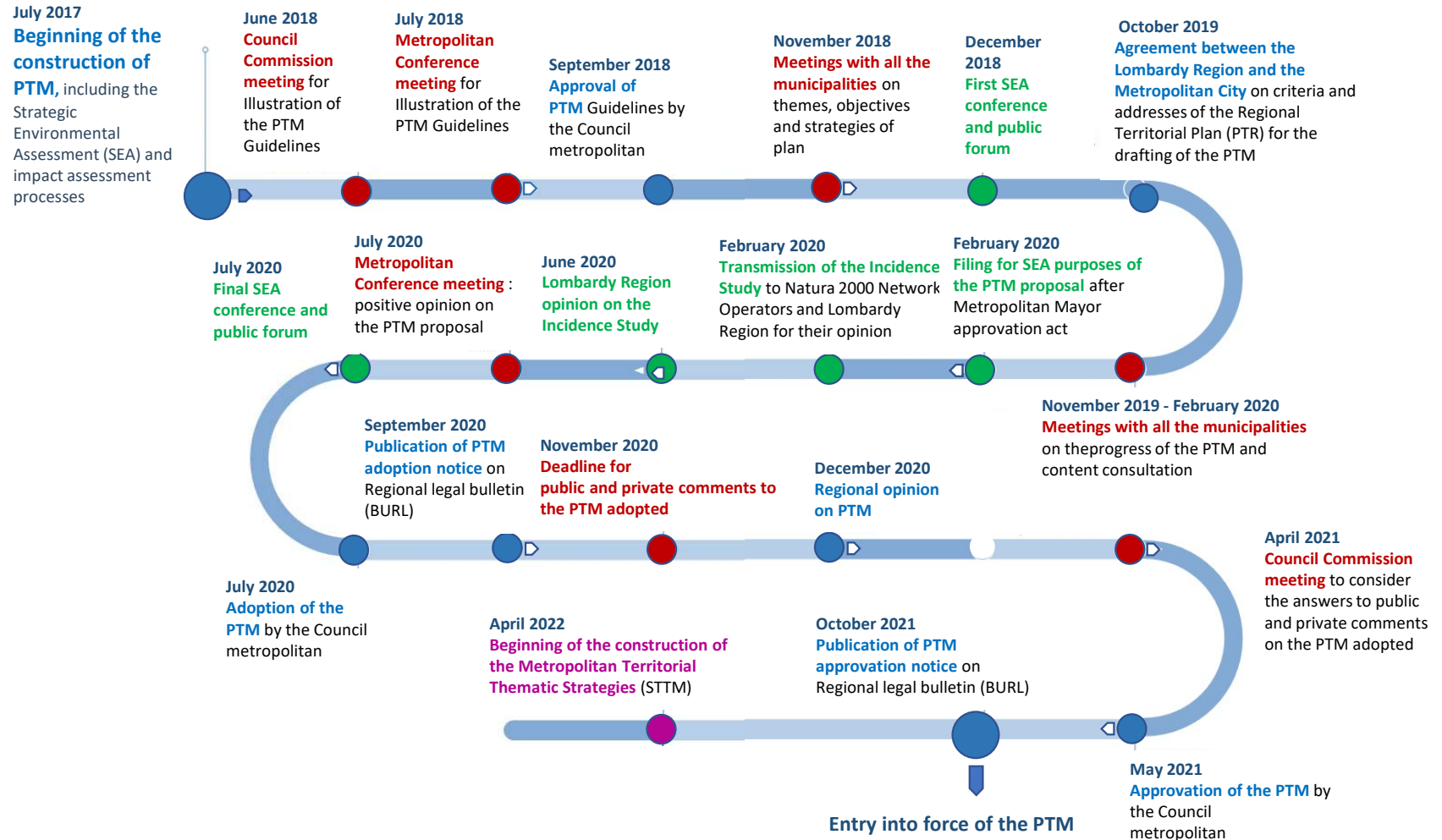


Tutelare e diversificare la produzione agricola



Potenziare gli strumenti per l'attuazione e gestione del piano

# Metropolitan Territorial Plan - Timeline



## Strategic priorities, confrontation with the territories and new

Starting from its founding principles and objectives, and from the indications of the **Metropolitan Strategic Plan**, the intervention priorities of the PTM were defined through a **broad and articulated comparison** with:

- the **Municipalities** and their aggregations in the homogeneous zones
- the **Metropolitan Table**, place of permanent consultation of the Metropolitan Strategic Plan
- the **stakeholders** who have expressed themselves with the Observations to PTM adopted

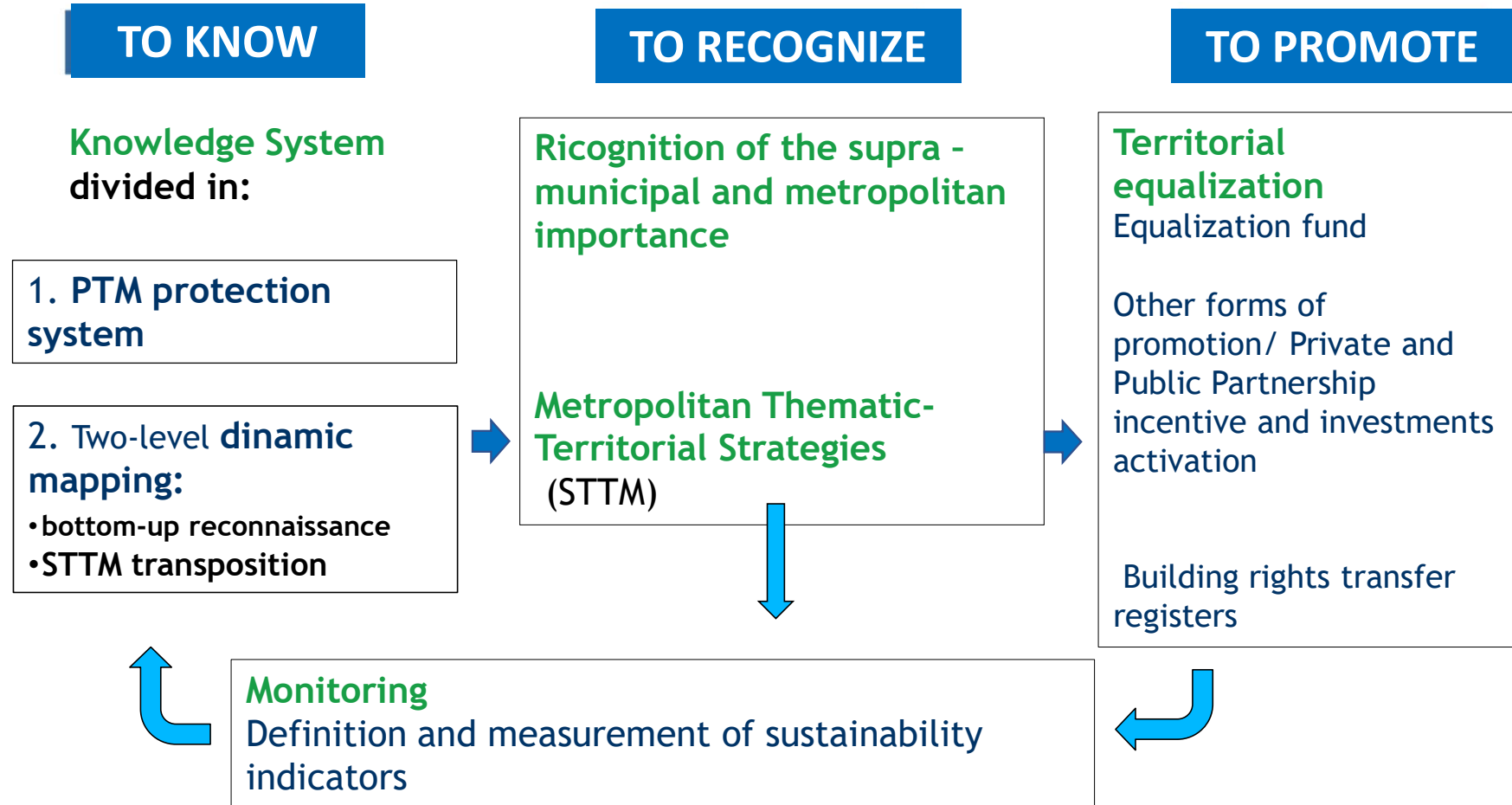
Thanks to this comparison, a profound reflection was made, starting from how the pandemic has generated **new challenges** that have found contingent and spontaneous responses with respect to which planning is called to confront:

- **New necessities** (*smartworking and new home – work relations*)
- **Unprecedented transformations** in the methods of use of the territory (*logistic and distribution, decentralization and return to peripheral areas, flexion of the real estate markets*)
- **Review of the priorities**

With the **PNRR** we are witnessing an **unprecedented and massive public intervention in investment support**, which must not be wasted on fragmented initiatives



# A new approach to planning



## Supra-municipal and metropolitan relevance recognition

TO RECOGNIZE

The forecasts of municipal urban planning instruments have **supra-municipal relevance** when they generate effects, both positive and negative, which even partially fall **within the territory of other municipalities, including non-neighboring ones**.

Supra-municipal externalities also have **metropolitan relevance** when they affect essential components for the **functioning of the metropolitan system** and for the role that the metropolitan city plays in the regional, national and international context.

The **criteria for assessing the supra-municipal or metropolitan relevance** of municipal planning proposals are illustrated in the PTM regulations.

When a municipal urban planning tool contains planning proposals with potential supra-municipal or metropolitan effects, their relevance is assessed on the basis of a **balance of territorial diffusivity** drawn up by the Municipality with the aim of highlighting the type and extent of the effects that can be generated by the implementation of the proposal and of derivable resources to be used in the territory according to the principle of territorial equity.

Metropolitan city recognizes the importance, identifies the municipalities potentially affected by externalities and **convenes a consultative conference** with the municipalities involved **to promote the conditions of a territorial equalization agreement**. The conference examines the **balance of territorial diffusivity** and **identifies the possible solutions of equal allocation of the resources** deriving from each intervention in proportion to the pressures which are expected to be invested in the various municipal territories.

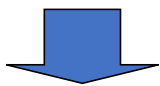
## Implementation - Metropolitan Thematic-Territorial Strategies

**TO RECOGNIZE**

**Metropolitan  
Thematic-Territorial  
Strategies**



tools for **in-depth analysis and implementation** of the PTM: they identify forms of territorial management that are strongly integrated on issues of supra-municipal and metropolitan importance according to the principles and general objectives of the PTM.



Open and **incremental** tools built with the **active involvement** of:

- **Municipalities**
- **other administrations**
- **territorial and socio-economic actors** directly concerned

All contribute to the construction of the cognitive apparatus and the definition of the contents of the STTM.



aimed at an **equitable distribution of the advantages** and resources available with the activation of the **equalization and compensation tools provided for by the PTM**, in particular the equalization funds, and forms of **Public Private Partnership (PPP)** for the optimization of investments.



The **strategic contents are taken up by the Municipalities in their urban planning tool** and are implemented through tools and actions detailed therein.

# Begining of the Metropolitan Thematic-Territorial Strategies

**TO RECOGNIZE**

**April 2022:** drafting of the first 3 STTMs of the PTM started

Metropolitan Thematic-Territorial Strategies **for sustainability, environmental emergencies and territorial regeneration**



Implementation of the Metropolitan Green Network - definition of the PTM monitoring system - territorial and urban regeneration

Metropolitan Thematic-Territorial Strategies **for social cohesion, supra-municipal and metropolitan services**



Functions and services compatible and synergistic with the role of modal interchange for mobility in LUM (Urban places for Mobility)

Metropolitan Thematic-Territorial Strategies **for the innovation of production, service and distribution spaces**



Production poles of supra-municipal importance and territorial and environmental compatibility for new settlements for logistics

**May 2022:** Kick off meeting of the 3 STTMs with over 60 experts and sector operators, representing institutions, universities and associations and **in the coming months the Municipalities will be directly involved** for the sharing of contents and tools and for the common construction of the STTM.

## Implementation - Territorial equalization

TO PROMOTE

To guarantee the principle of territorial equity, the **Metropolitan City promotes coordination actions and adopts forms of equalization and compensation to distribute among the common advantages and disadvantages** deriving from the construction of settlements and infrastructures with repercussions and supra-municipal effects.

The PTM provides for the establishment of **funds** financed with economic resources of the Municipalities or with income deriving from contributions related to the transformations as well as with **real estate assets or through the transfer of real estate assets**. promote the finding of additional resources from regional, national and European programs.

The metropolitan fund, to be regulated by means of a specific **regulation**, may only allocate its resources to the **realization of works, interventions and development of public utility services**.

**Equalization and offsetting** are also promoted in the presence of actions aimed at:

- promotion of **territorial regeneration** interventions
- raising the levels of **sustainability and resilience** of environmental systems and the metropolitan landscape
- improve the functioning of **networks and services for mobility**

## Main contents of the PTM

- **Protection of non-renewable resources** (soil, water, energy, air quality) and mitigation and **adaptation to climate change** in line with the contents of international agreements on the environment and the 2030 Agenda
- Articulation of **land use** thresholds and promotion of **urban and territorial regeneration**
- **Green Metropolitan Network** (RVM) as a general strategy of adaptation to climate change and qualification of the entire non-urbanized territory for the ecosystem rebalancing of the metropolitan area
- **Polycentric organization of services** and settlements and services of **supra-municipal importance**
- **Supra-municipal production centers** with high sustainability and environmental compatibility and definition of dimensional and localization criteria in line with the characteristics of the territory and the **environment for logistics systems**
- Localization of functions and services compatible with the role of modal interchange for mobility around the stops of the **Local Public Transport of strategic importance** (Urban Places for Mobility - LUM)
- Identification of areas intended for **agricultural activity of strategic interest**
- Protection and enhancement of the **landscape and recognition of the areas of degradation** in table format and linked to a geographic viewer
- **Metropolitan ecological network** for the protection and development of ecosystems
- **Soil protection - Integration** with **recognition of the contents** of the 2019 Floods Directive and **in-depth analysis on the protection of the drinking water resource**

## PTM ACT : PART II - Environmental emergencies

For the **first time in Italy**, a **large area territorial plan** provides in legislation a part **dedicated to the protection of non-renewable resources, climate change and resilience** containing **guidelines and directives for municipal plans** aimed at inserting parameters and rules in them specific for the promotion of sustainable development.

### Title Act I – Protection of non-renewable natural resources

- art. 16 Sustainability criteria and limits
- art. 17 Reduction of energy consumption and atmospheric emissions

} **Mitigation measures**



### Title Act II – Soil consumption and urban regeneration

- art. 18 Implementation of Regional Territorial Plan land use reduction targets
- art. 19 Territorial and urban regeneration
- art. 20 Recovery of disused areas

### Title Act III – Climate change

- art. 21 Water plumbing invariance
- art. 22 Containment of potable water consumption
- art. 23 Climate and heat-islands

} **Adaptation measures**



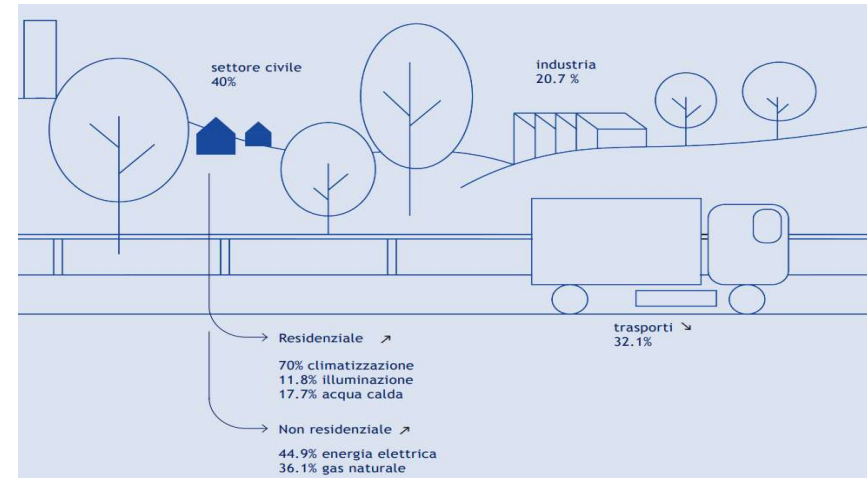
## Environmental emergencies

The protection of non-renewable natural resources of the PTM pays particular attention to energy consumption from **non-renewable sources**, **polluting emissions into the atmosphere** and **drinking water consumption**.

For the measures and interventions to be implemented for the three contents, the **PTM subdivides the components**:

- on which the **planning tools (PTM and PGT)** can act directly
- to be developed in the **municipal building regulations** or in specific dedicated regulations

In application of the **principle of invariance of the consumption** of non-renewable resources, the PTM requires the Municipalities to prepare specific forecast budgets that estimate **consumption and savings obtainable with specific actions introduced for this purpose by PGTs**.





## Protection of non-renewable natural resources

In territorial planning and governance policies to reduce the impact of climate change in the medium and long term, it is important to jointly **apply interventions for mitigation and adaptation**.

The PTM integrates adaptation measures and mitigation measures aimed at intervening on the causes of climate change, in particular energy consumption from non-renewable sources, atmospheric emissions and drinking water consumption, and on the effects through measures implemented to reduce the phenomenon of heat islands and water lamination.

The integrated use of adaptation and mitigation measures allows diversification of the various levels of management, involves a plurality of actors and differentiates the areas of intervention.

### Mitigation



interventions and measures that act on the causes of change trying to reduce or contain greenhouse gas emissions and promoting a greater share of renewable energy  
( [PTM Act : Title I -Protection of non-renewable natural resources](#) )

### Adaptation



preventive strategies and actions that make it possible to respond adequately to the effects generated by climate change (such as more intense rains and heat waves), minimizing damage  
( [PTM Act : Title III – Climate change](#) )

## Map of thermal anomalies and measures at the municipal level

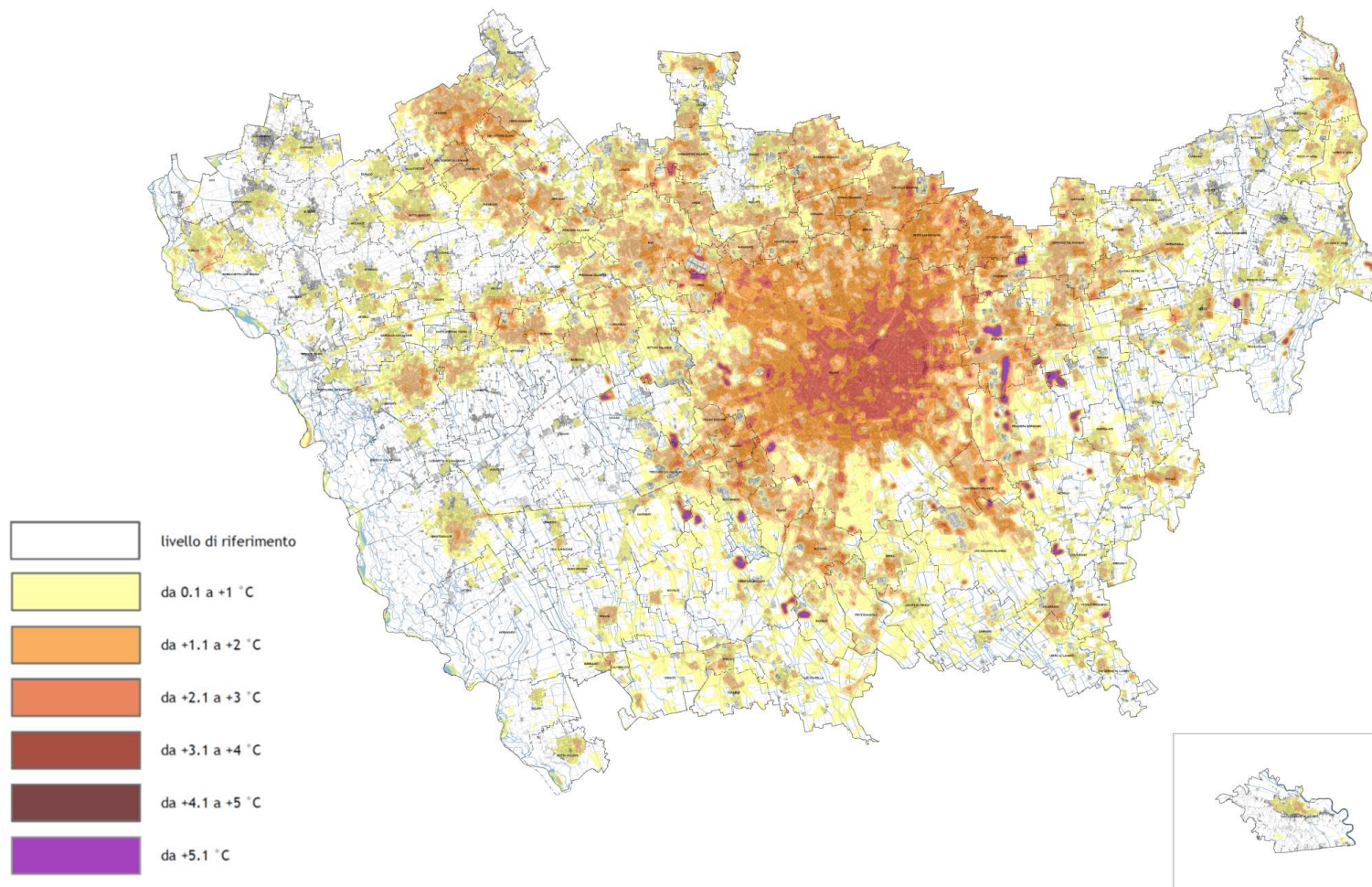
In the European Life METRO ADAPT project “**Strategies and measures for adaptation to climate change in the Metropolitan City of Milan**”, of which the Metropolitan City of Milan was the lead partner, a typical situation was developed that is representative of the night heat island in the summer period using thermal satellite images taken during prolonged heat waves and on cloudless days, for the 2015-2018 observation period.

From this processing, a **map of thermal anomalies** was produced, reported in the PTM, between urban and rural areas, which are cooler. The map represents the hazard and the difference was calculated between night temperatures in the urban area and a minimum reference night temperature measured in the surrounding rural areas and was classified into 0.5 ° C wide classes.

Municipalities that have areas with night values that exceed by at least 3 ° C the reference value considered on the basis of the **map of thermal anomalies** integrate the Plan Document with a study that defines the mitigation measures and the adaptation strategies to be applied **to contain the anomaly below 3 ° C and to minimize the effects generated by climate change**.

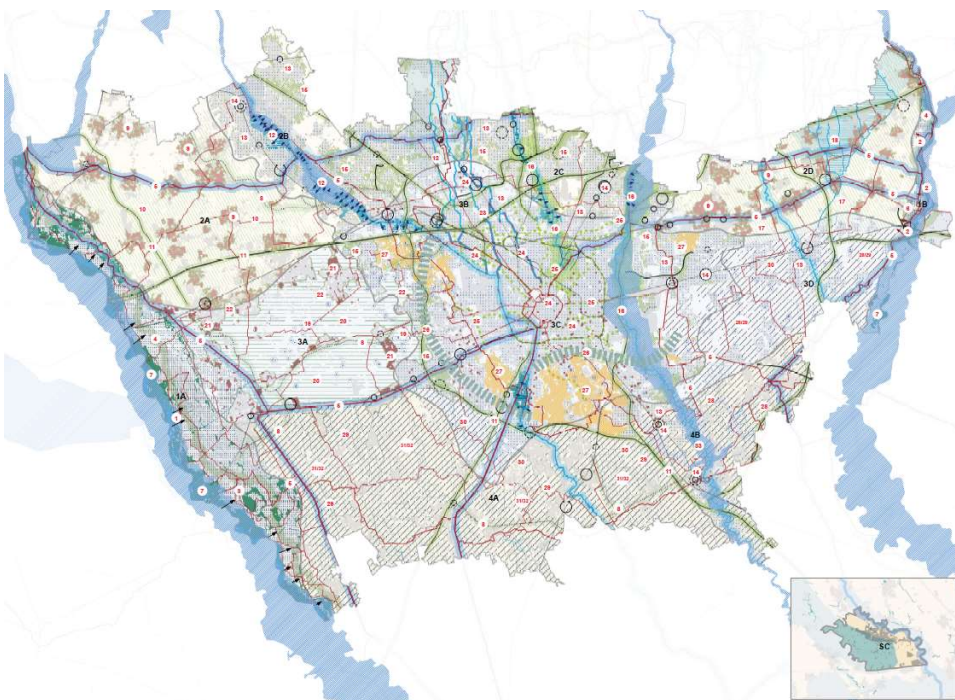
For the same areas, the **PTM provides indications on the types of intervention** to mitigate the anomalies of daytime heat to be integrated in the documents of the PGT, in the municipal building regulations and in the sector plans / programs (Green Plan, Urban Traffic Plan, Urban Plan of Mobility, etc.) to increase resilience to daytime thermal anomalies since the Municipality, by its own competences and scale of action, is the local authority most responsible for project intervention on the subject.

## PTM – Map of thermal anomalies - Hazard



## GOAL no. 7: Develop the Metropolitan Green Network (RVM)

A **Metropolitan Green Network** project was drawn up in the PTM as the **general climate change adaptation strategy**, with particular reference to meteoric water management and heat island mitigation and as **a supporting element for the qualification of non-urbanised territory**.



The Metropolitan Green Network project is based on the intrinsic characteristics of the different metropolitan landscapes, their structure and functions, subdividing the whole territory into **Landscape Unit Environment (UPA)** defined on the basis of overlapping analysis and synthesis evaluations.

Specific **planning priorities are then defined for each UPA**. The planning priorities are articulated in actions to be implemented with the **priority use of Nature based solutions** selected according to the different territorial characteristics.

### B.5 TRINCEE FILTRANTI



riferimento: pag.81-85

DEFINIZIONE: Scavi riempiti da materiale ghiaioso e sabbioso, o con elementi plastici, con lo scopo di far infiltrare l'acqua nel suolo.

SCALA DI RICADUTA:  
Locale

GRADO DI TRASFORMAZIONE  
DELLE SPAZIO:  
Basso

### B.6 SUPERFCI PERMEABILI




riferimento: pag.86-91

DEFINIZIONE: Pavimenti permeabili, adibiti alla filtrazione dell'acqua piovana.

SCALA DI RICADUTA:  
Metropolitana

GRADO DI TRASFORMAZIONE  
DELLE SPAZIO:  
Medio

## Reduction of land consumption

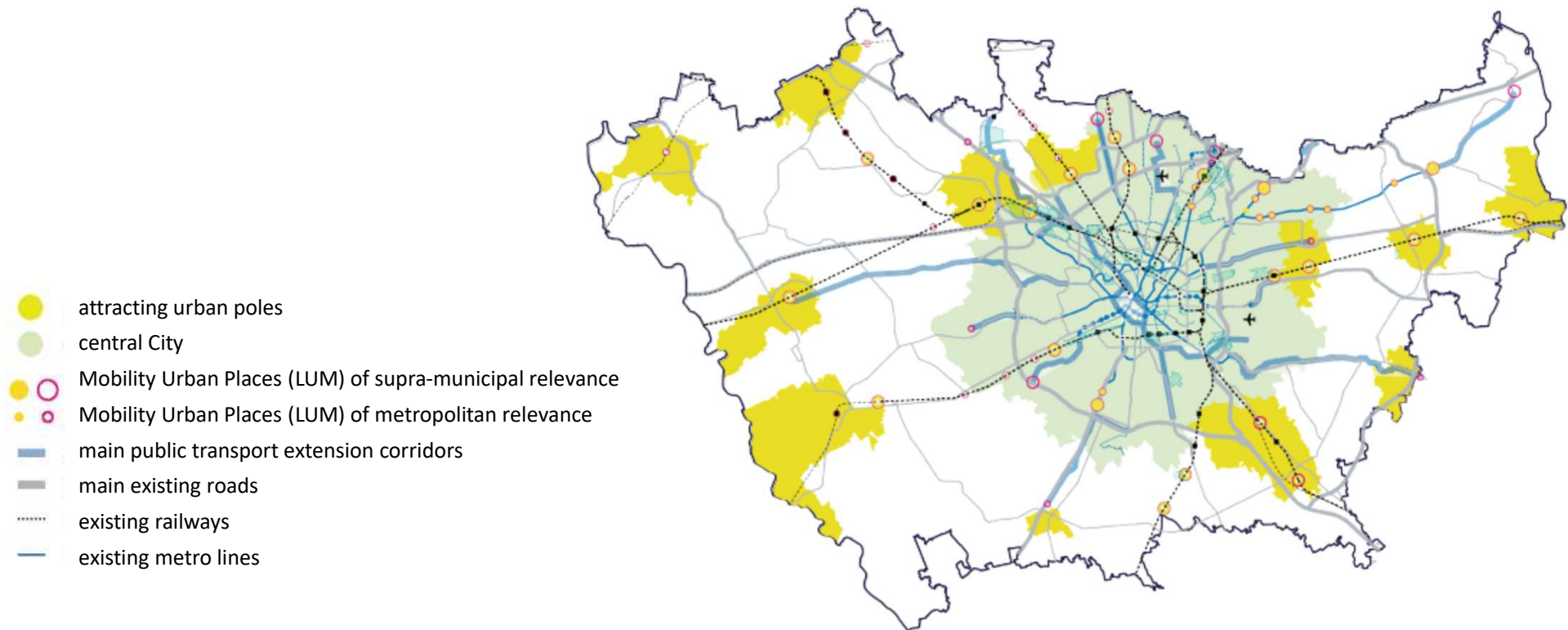
- Target set by the European Union: **zero land consumption by 2050**
- Objectives assigned by the Regional Territorial Plan referring to the forecasts of the municipal urban plans as of December 2014:
- **- 45%** residence to **2025**  
 Mid-terms Objective **- 25/30%** to **2020**
- **- 20%** other functions to **2020**

The PTM **has articulated** the percentage of **reduction of the CdS for each municipality and using the principle of indifference with respect to functions**. The choice was made for greater attention to the specific local characteristics and history of each municipality and to allow greater flexibility in the choice of forecasts to be canceled or resized.

Municipalities with limited settlement provisions not implemented **are exempt from the reduction**; the **reduction is more consistent** for municipalities with high urbanization and / or forecasts of settlement not implemented of significant size and **is more contained** for municipalities with large area services (attraction poles and TPL stops) or affected by large green areas or regional parks.

## GOAL no. 5: Promote the polycentric organization of the metropolitan territory

Develop **criteria for evaluating and identifying areas suitable for creating settlements and services in the wider metropolitan area**. Distribute regional services among the most popular urban centers in order to **encourage the decongestion of the city center**. Coordinate the supply of regional services with neighboring counties, their capitals, and the main urban areas in the wider regional metropolitan system.



## Polycentric organization of the metropolitan territory

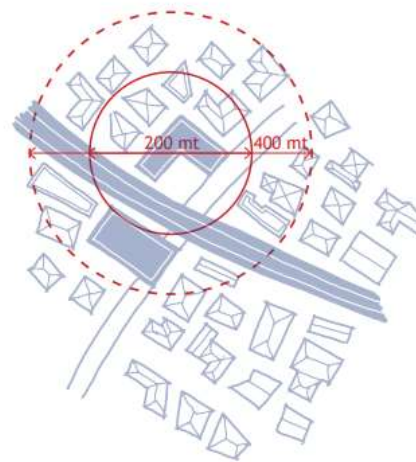
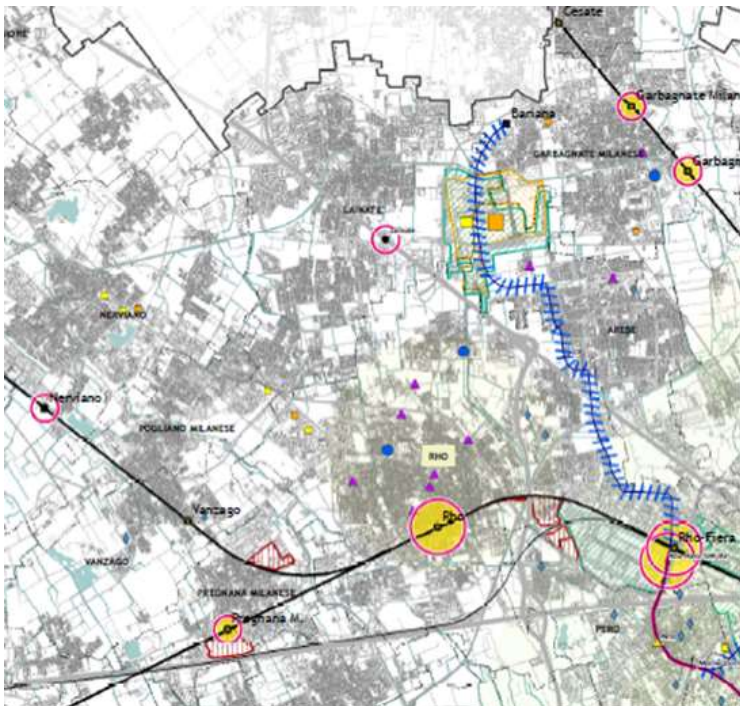
The **Central City** is made up of Milan and 24 other municipalities of the metropolitan belt. It locates the new metropolitan functions and services of regional and supraregional significance.

In the **attractive urban centers** of metropolitan or supra-municipal importance, services and productive or commercial activities are located that respectively affect more homogeneous areas or territories of neighboring municipalities

In the **Urban Places for Mobility** (LUM), in correspondence with the stops of the metropolitan and supra-municipal public transport, the strengthening services of the catchment areas of the stops are located.

## GOAL no. 3: Improve public mobility services and make sure that they are in line with the settlement structure

Prioritize the suburban railway network in metropolitan mobility plans: **services should be enhanced and suburban railways should be connected with other forms of public transit**, including shared parking lots and accessibility for bikes and pedestrians. **Ensure that the entire metropolitan area has equal access to the rail network** and organize stops on the transport network for this purpose. Plan the dimensions of new settlements taking into account the capacity of the mobility network.



The PTM identifies as **Mobility Urban Places (Luoghi Urbani della Mobilità – LUM)** the areas within a distance of 400 meters from the most important suburban railways stops (Metropolitan LUM) and 200 meters from the other suburban railways stops (Supra-municipal LUM).



## Urban Places for Mobility (LUM)

The LUMs identified by the PTM **perform a modal interchange function and are classified according to their strategic importance in Metro, Supra-municipal, Local.**

The municipalities that host at least the LUM introduce provisions in the municipal planning tool to organize compatible and **synergistic functions and services around the stop with the role of modal interchange for mobility:**

- the services and infrastructures necessary to enhance the **interchange function**
- such as car and bicycle parking, access roads, cycle paths and routes
- pedestrian protected;
- urban functions and services for individuals and businesses compatible with the role
- interchange of the stop, and aimed at **improving safety and livability**
- **of the area**, also referring to the basin of at least three municipalities in the territory of
- stop reference



The **residential function** must be placed as a priority outside the LUM and be adequately connected to the stop with protected pedestrian paths. The residence is allowed within the LUM **only for the contribution it can provide to improve the living conditions and safety of the interchange areas.**

# Thank you for your attention



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<https://www.cittametropolitana.mi.it/PTM/index.html>

[https://www.cittametropolitana.mi.it/pianificazione\\_territoriale/index.html](https://www.cittametropolitana.mi.it/pianificazione_territoriale/index.html)

[https://www.cittametropolitana.mi.it/welfare\\_metropolitano/index.html](https://www.cittametropolitana.mi.it/welfare_metropolitano/index.html)

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