

Milano



Comune
di Milano



AGENZIA
MOBILITÀ
AMBIENTE
TERRITORIO

Milan's decarbonisation through digitalisation and citizens engagement

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17 June 2022 – ICC 5° City Lab – Mentor Led Thematic Session

Milan's outline

1.4 million
inhabitants

7,518
Inh./km²

800,000
Commuters/day

6,8 millions
Tourists in 2018 (ISTAT)

Source: Flickr Ale Desiderio

– Milan's international commitments



Covenant of Mayors
for Climate and Energy



C40 Cities



Eurocities



Resilient Cities
Network



Urban Agenda for the
EU



Cities Coalition for
Digital Rights



EU-funded projects

– Milan changing while climate is changing

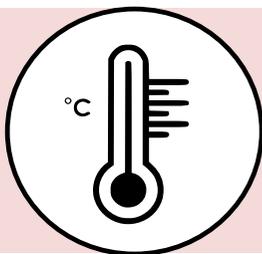


High concentrations of **NO₂, PM10, PM2.5**
(Annual average concentrations (2020) NO₂ 48 ug/m³, PM10 34 ug/m³)

High emissions levels of **CO₂**
(5,5 million ton/year)

Increase in **extreme meteorological events**

Raising of the **underground water layer**



Increase in **temperature**

Increase in **heatwaves and drought**

— Milan objectives



City Master Plan

-4%

Reduction in soil consumption index compared to the plan in force (from 74 to 70%)

20 new parks (> 10.000 sqm)

3,250,000 sqm

new planned rural areas

1,515,000 sqm extension of the Southern Rural Park



Air and Climate Plan

- 45%

Reduction in CO₂ emissions by 2030 compared to 2005

Carbon Neutral Milan
by 2050

< 2°C

Limit the increase in urban temperature



CIRCULAR ECONOMY

>75% segregated waste collection by 2028

>65% material sent to recovery by 2028

>95% waste sent to material or energy recovery by 2028



Sustainable Urban Mobility Plan

+55%

+68 km

increase in subways and light railways network in Milan metropolitan area
from 127 km in 2020 to 195 km by 2030

— Air Quality and Climate Plan

An integrated plan to improve Air Quality, mitigate and adapt to Climate Change

Improvement of **AIR QUALITY**

Reduction of concentration of
Nox, PMx and Ozone

Cliamate Change **MITIGATION**

Decarbonization
CO2 Storage

ADAPTING to Climate Change

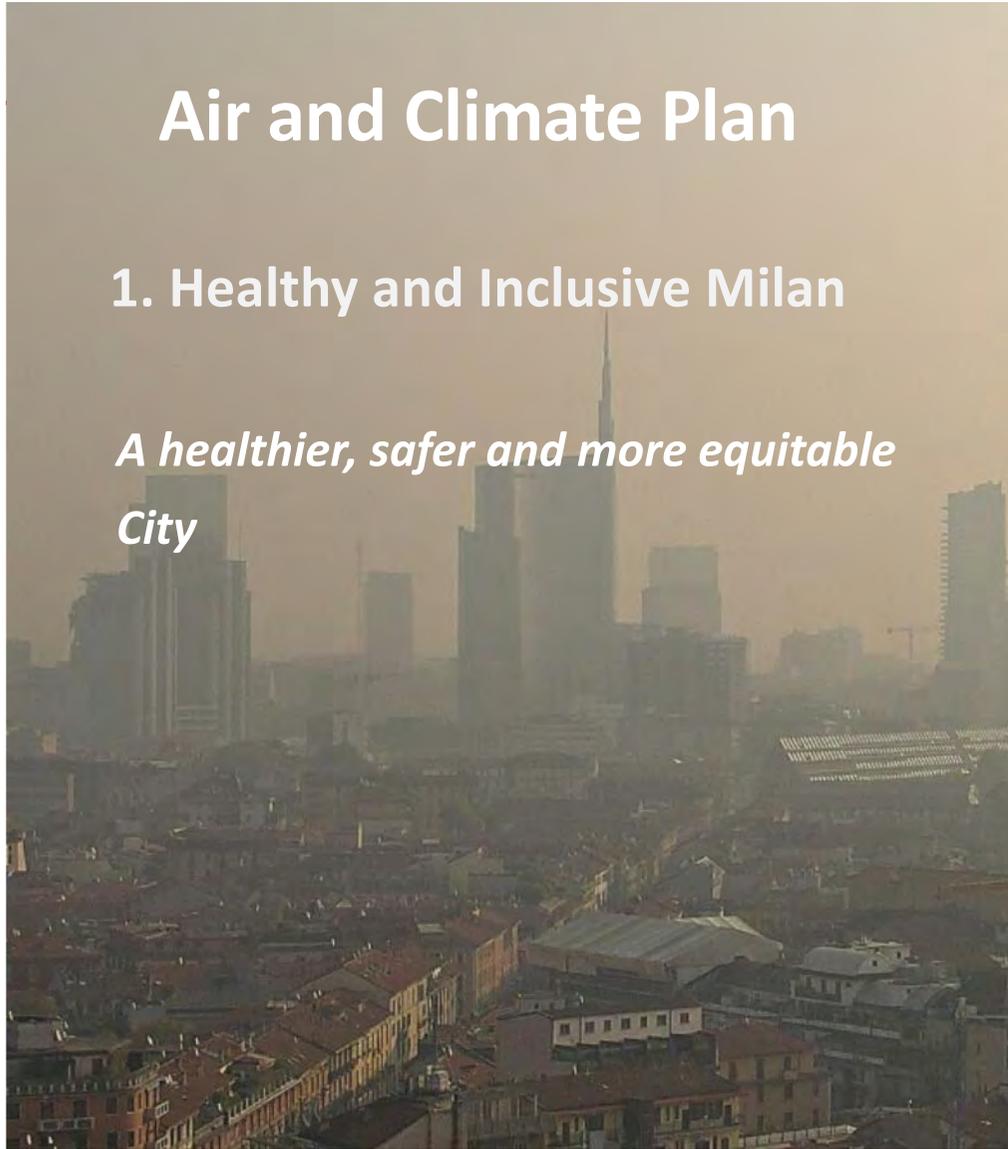
Flooding
Extreme Heat



Air and Climate Plan

1. Healthy and Inclusive Milan

A healthier, safer and more equitable City



Air and Climate Plan

2. Connected and highly accessible Milan

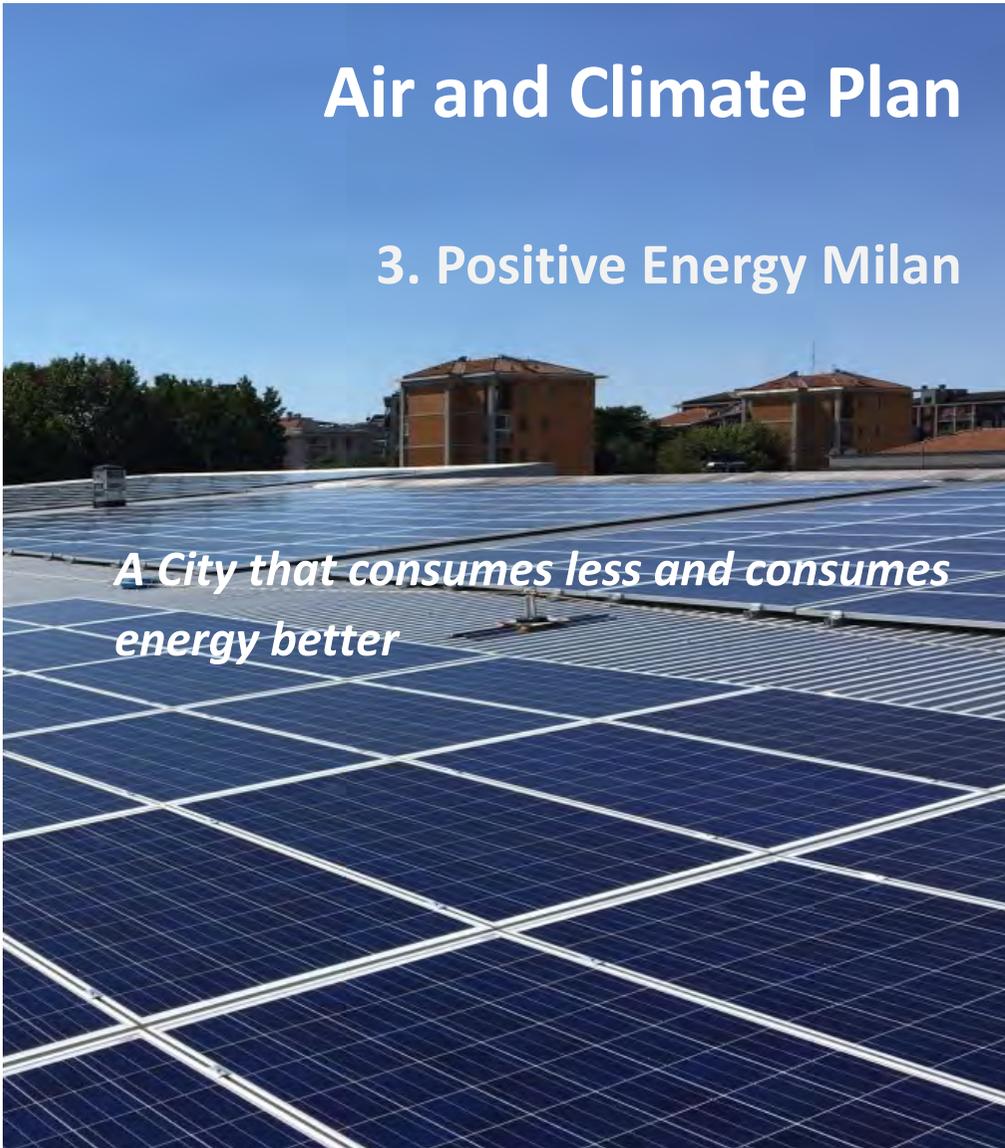
A well connected and flexible City with smooth and sustainable movements.



Air and Climate Plan

3. Positive Energy Milan

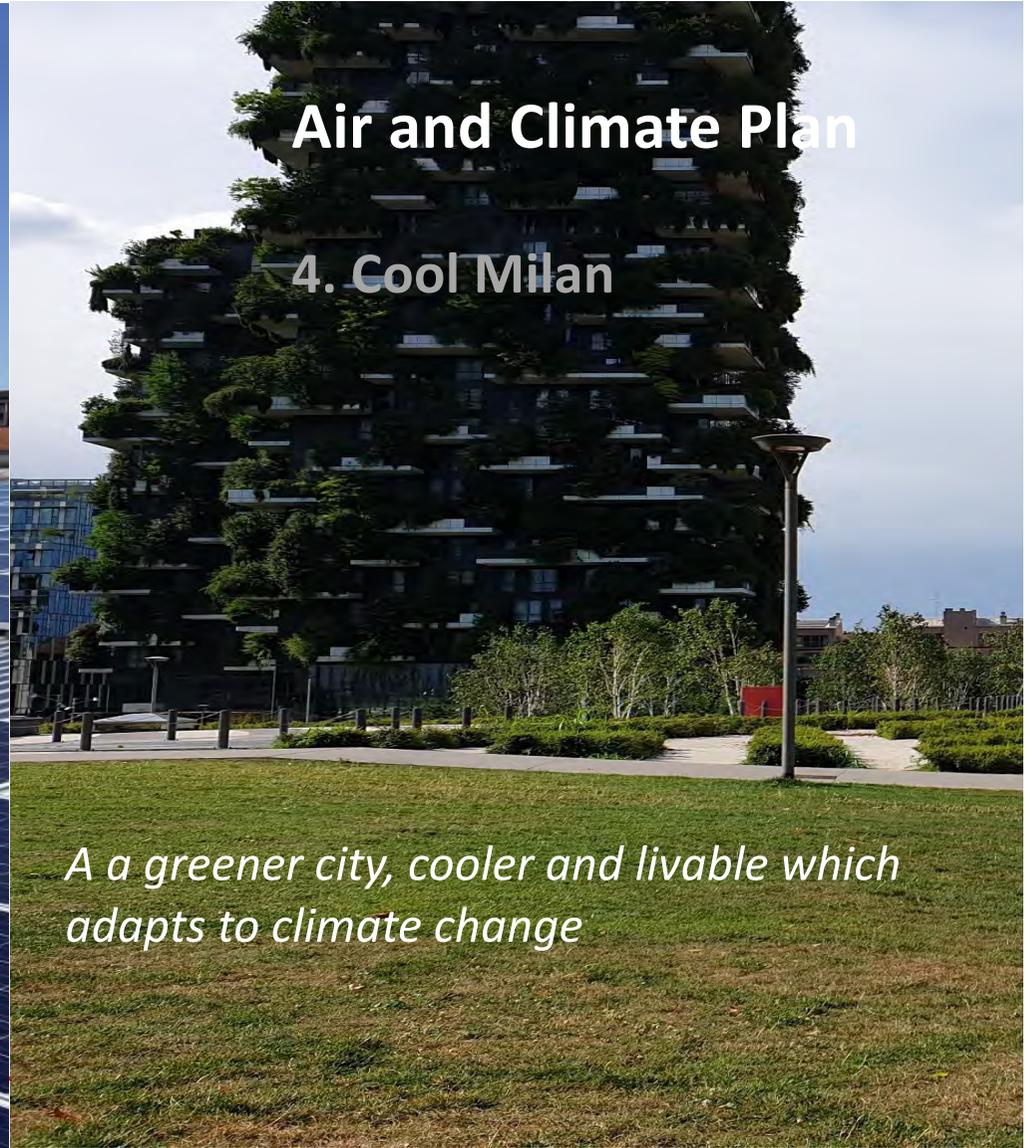
A City that consumes less and consumes energy better



Air and Climate Plan

4. Cool Milan

A a greener city, cooler and livable which adapts to climate change



Air and Climate Plan

5. Aware Citizens

With the goal of reducing pro-capita carbon emissions, induce citizens to adopt aware lifestyles.

Sharing from the beginning the mission of the Air and Climate plan, in order to reach in **2030** complete awareness and willingness from citizens and business to reduce their carbon emissions

a City that adopts an aware and sustainable lifestyle



— Energy: a City that consumes less and better

Vision to 2050: Creation of a Carbon Neutral City

Goal to 2030:

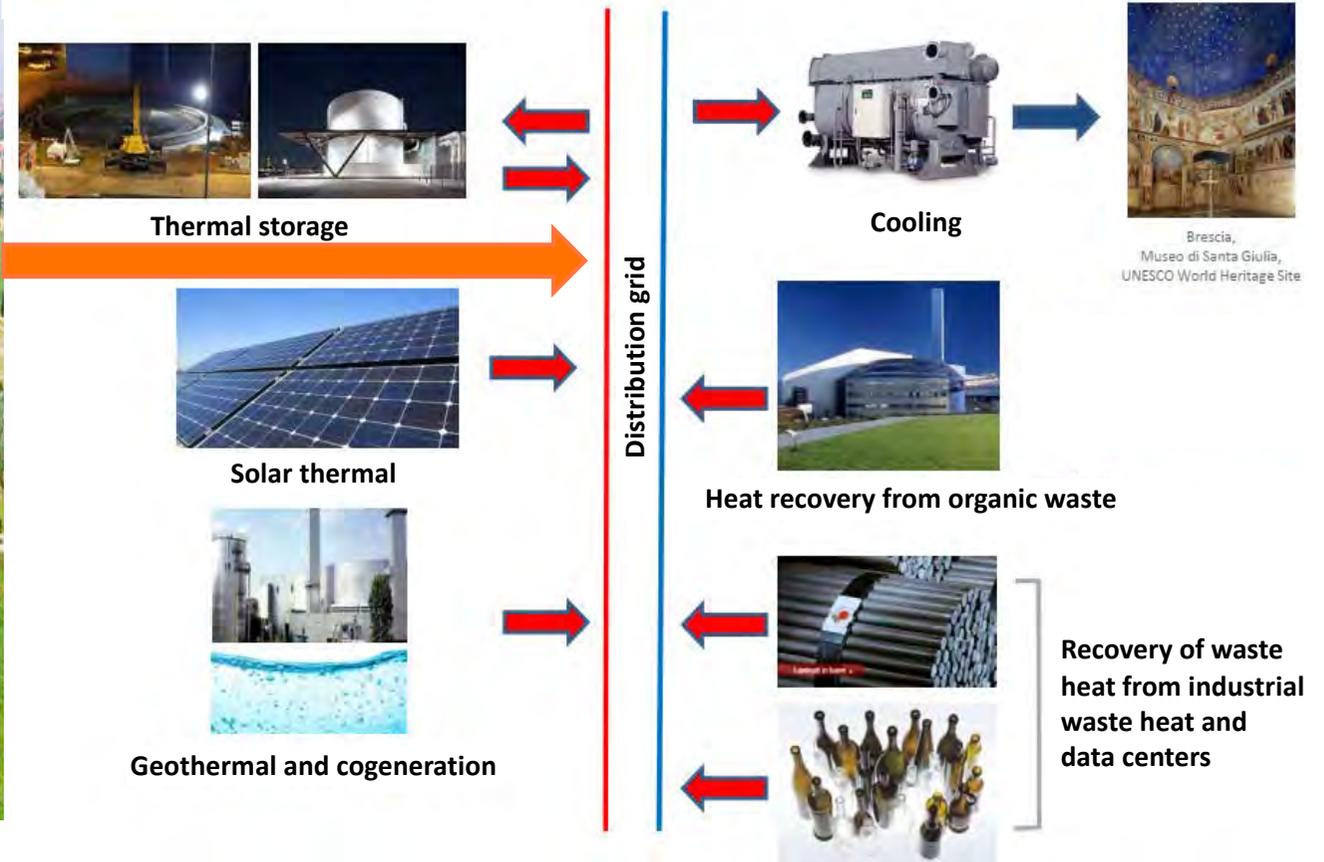
1. Reduction of 50% CO₂ emissions by 2030 related to public buildings
2. Carbon Neutral Urban Regeneration projects
3. Accelerate private **buildings deep energy renovation**
4. Set a strategy for a new **thermal energy** production and an efficient **district heating system**
5. Advance use of renewable sources on behalf of Energy Communities
6. Set a strategy for the efficiency of electrical uses in the tertiary sector
7. ...





Waste heat recovery from
Waste water treatment plant

Energy supply: a circular and integrated district heating system





Scalo Greco Breda | L'Innesto

1st Carbon neutral development in Milan

Team representative

InvestirRE sgr

Design team

Barreca & LA Varra

Environmental experts

ARUP Italia Srl

Energy for summer air conditioning and winter heating from renewable sources

100%

Thermal energy produced from renewable sources on site

64%

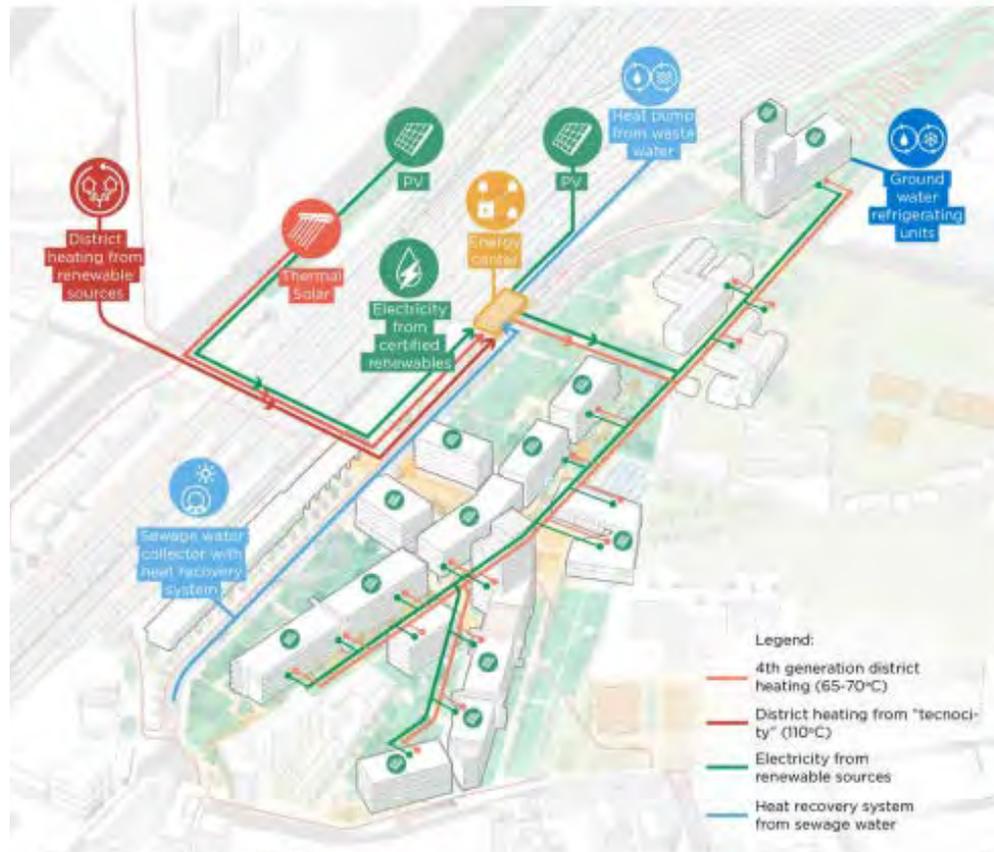
Electricity for common use produced by renewable sources on site

100%

Reduction in CO₂e emissions, compared to BAU

720 t/year

Reinventing Cities



various strategies planned to serve the city

Strategies:

- containment of winter and summer energy demands by adjusting the heat insulation of buildings and by protecting them from solar radiation;
- construction of a low temperature, 4th generation district heating (4GDH) network that allows to use renewable energy sources in the network; installation of a heat pump system with thermal recovery from urban waste (developed by a partnership with A2A Calore & Servizi and MM), as well as a solar thermal plant;
- Furthermore, the construction of a photovoltaic plant that covers a considerable portion of self-consumption; residual energy not provided by 4GDH will be received from the District Heating that conveys waste thermal energy from the industrial process (renewable energy certified by A2A Calore e Servizi from Vetreria Vetrobalsamo);
- ...

Flagship projects: EUGUGLE and SATO

- **Energy saving in public building:** high priority for the Municipality
- **Partnership with Politecnico** since Autumn 2011 and still ongoing
- **Office for Energy Efficiency** established within the Technical Dept. as a lesson learned from these projects



- **Municipal strategy for a smart district** in Porta Romana – Vetrabbia



Horizon 2020
European Union Funding
for Research & Innovation

Flagship projects: EUGUGLE



- 2013 – 2019: last existing FP7 project
- Showcases of **cost-efficient urban Zero Carbon Building Renovation models** in 6 partner cities plus 3 associated cities
- **23** total partners per **26M** budget (**15M** contribution from EU)
- **Interdisciplinary** approach, **innovative and cost efficient** mix of actions, set of **sustainability oriented** solutions
- Over **180.000 square meters of living space renovated** across Europe, a **role model** for other cities interested in resilient urban planning

— Flagship projects: EUGUGLE, what was done



Via Feltrinelli 16: energy retrofit of a building with 153 apartments, approx. 500 inhabitants of 37 different nationalities

First step: envelop renovation and removal of asbestos

Second step: installazion of heat recovery system, heat pump and FV panels



Flagship projects: SATO



- **October 2020 – June 2024** (9 month extension recently granted)
- SATO platform integrates **all energy consuming equipment and devices** in a building
- **Self-assessment framework (SAF)** that uses data analysis and machine learning to report energy performance, building behaviour, occupancy and equipment faults
- **BIM-based interface** for aggregated and disaggregated analysis and visualization of the assessments in the various applicable scales and defining locations and specifications of energy consuming equipment
- **16 total partners per 7M budget (5.8M contribution from EU)**



— Flagship projects: SATO, what is planned



Via San Bernardo 29: Residential Multi Apartment, Public Housing 2 buildings, 66 apartments
Work closely with POLIMI and other partners to conduct a **residential multi-apartment pilot**



— Flagship projects: NRG2PEERS fostering REC in Europe

NRG2peers-Towards a New Generation of EU Peer-To-Peer Energy Communities Facilitated by a Gamified Platform and Empowered by User-Centred Energy Trading Mechanisms and Business Models”

The NRG2peers platform aims to support the uptake and multiplication of attractive, financially, legally and technically viable, user-centred residential energy communities in three concrete ways:

- By assessing the communities readiness to become a peer- to – peer, peer-to-community and peer-to-market energy community
- By providing smart mechanisms to optimize energy consumption and peak demand at the community level.
- Stimulating and enabling the co-creation, strengthening and widespread implementation of the new generation of peer-to-peer energy communities the EU.



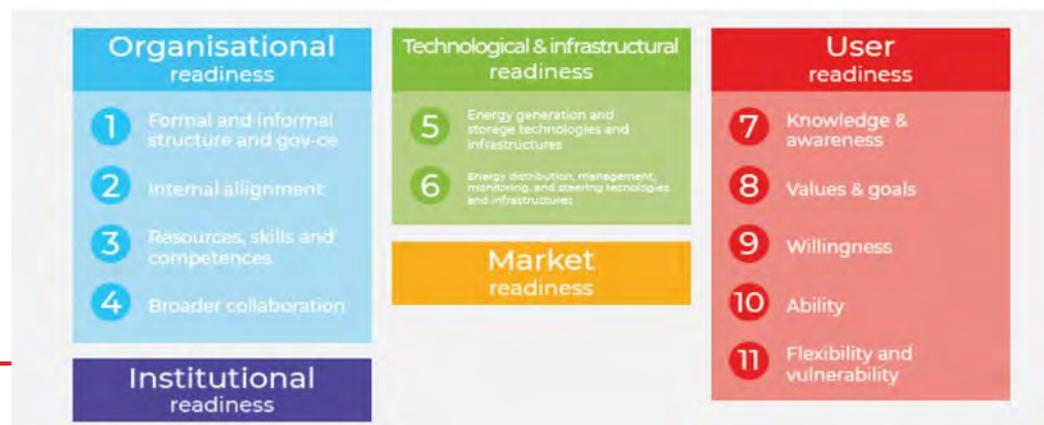
Flagship projects: NRG2PEERS Readiness level indicator

Online Tools allowing the identification of the areas where more work is needed. To be used to mobilize investments or make legislative proposals to strengthen the transition.



References:

- project website: www.nrg2peers.com
- energy community hub: <https://www.housingevolutions.eu/energy-communities-hub/>



Flagship projects: NRG2PEERS Chiaravalle Pilot case

Two REC Models: Top Down and Bottom Up

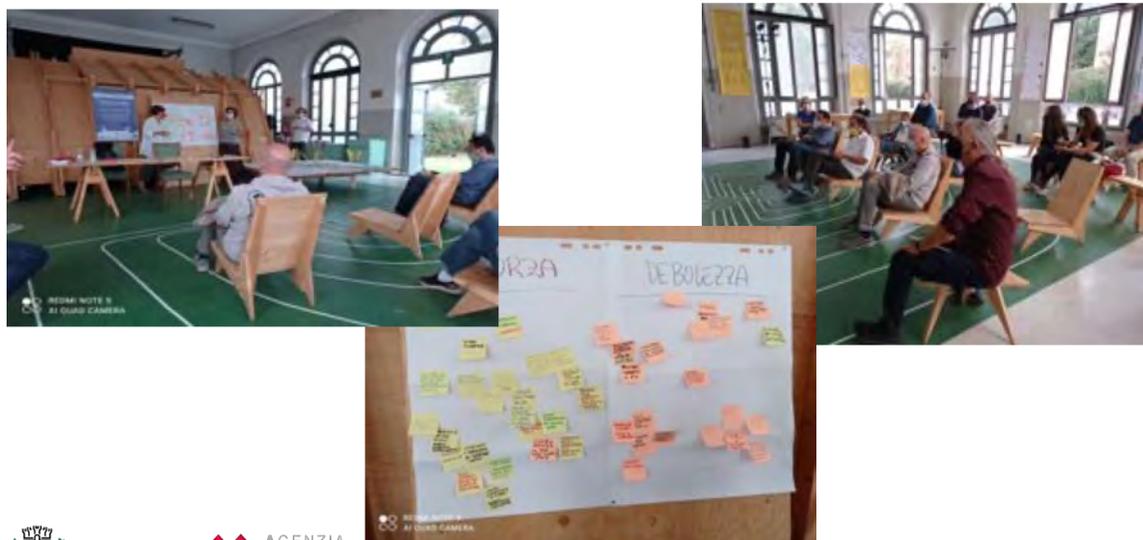
- Reasons for a top-down model:
- Several buildings of the municipality in need of solar panels application (ACP dedicated Action),
- Complexities for the municipality in entering citizens-driven REC,
- Citizens not always informed about REC
- REC seen also an occasion of urban regeneration and social cohesion



Chiaravalle Pilot Case

A triple meaning approach

- 1) design and favor the engagement/entrance of the Chiaravalle residents within the REC --> **mobilize the suburb, create the REC Residents shares**
- 2) create a model on how to engage citizens in potential REC, to be used in future REC promoted by the Municipality --> **Process Modelisation,**
- 3) Support the Municipality Staff in reproducing the Model in future REC --> **Capacity Building, Replicability**



– Air Quality and Climate Plan: Conscious and resilient citizens



1 > **Awareness & Sensitization plan;** online and offline promotional communicational campaigns.

2 > **Campaigns for behavioral change of citizens**
App to track behavioral changes in citizens and to reward virtuous behaviors

3 > **Citizens participation projects in trials and local practices** related to the achievement of carbon neutrality.
Mapping of fragilities and territorial priorities.
Inclusion of these prioritizations in local fast track designs.

Ref. Spectrum 2-1-1- Engagement to ownership

– Air Quality and Climate Plan: Conscious and resilient citizens



- 3 > **Training activities** on the topics of the Air and Climate Plan for citizens, schools and volunteers.
- 4 > **Collection, sharing and reuse of data** related to the Air and Climate Plan, aimed at the development of the territory
- 5 > **Permanent body of representation of citizens.** Register of active citizens for the environment.

Key messages

- City decarbonisation is a huge effort encompassing each components of society, it requires the **overcoming of a silos approach** between organisations and within each organisation
- Necessity to keep a living **quintuple helix framework** (university, industry, government, public, environment) fostering innovation at every level
- **A portfolio approach** of innovative projects can support the acceleration of decarbonisation measures
- Sustainable **renovation models** need research, technological development and demonstration first
- **Costs** related to innovative models, are high and scaling up is needed to create the supply chain and make overall costs affordable by every city
- **Early public funding is required** to support pilot cases
- Citizens and Stakeholder engagement is compulsory **to foster and increase impacts and to sustain** the required changes

— A broad view of carbon neutrality at city level



Links for additional material

Milan Air Quality and Climate Plan <https://www.comune.milano.it/piano-aria-clima>

SHARING CITIES project: <https://www.sharingcities.eu> ; <https://www.sharingcities.eu/sharingcities/city-profiles/milan>

EUGUGLE project: <https://eu-gugle.eu>

AMAT website: <https://www.amat-mi.it>

SATO project: www.sato-project.eu

NRG2PEERS project www.nrg2peers.com

If you are interested to be in contact with us after this session, please feel free to send an e-mail to:

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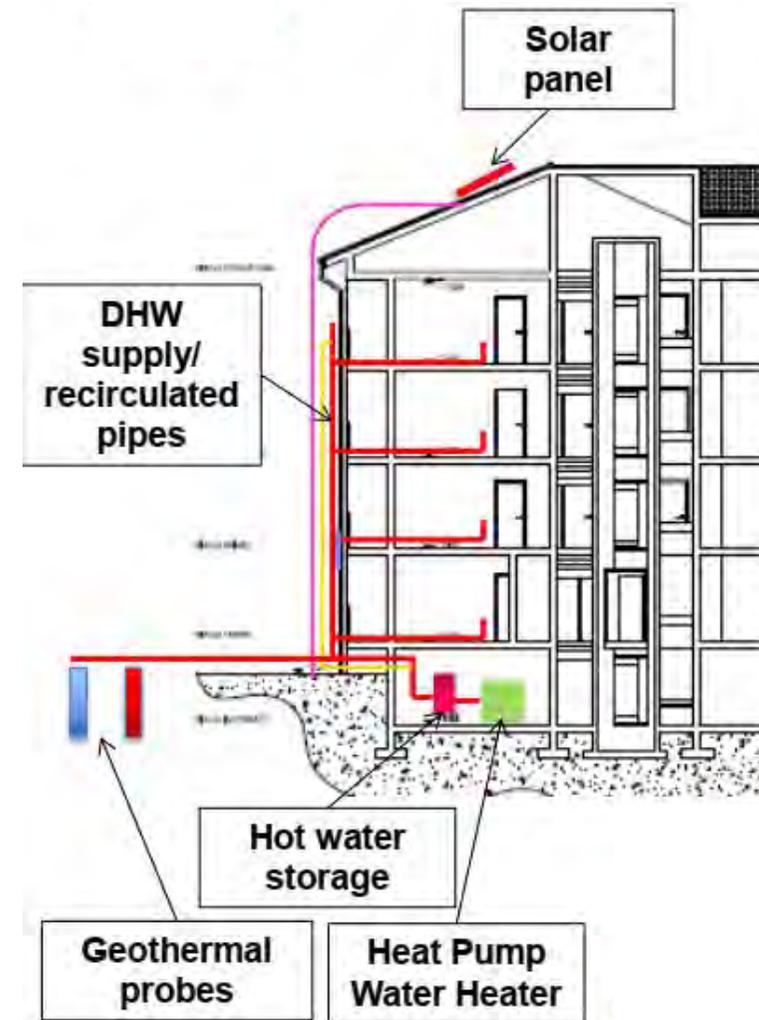
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Thank you from Milan

Source: Flickr Ale Desiderio

— Flagship projects: in progress

Energy retrofit and renewable electricity in social housing



— Energy retrofit: public call for private buildings

Bando BE2: 2019-20

- Carry out the interventions without investing capital in advance
- Benefit from immediate savings
- Before: eligibility check
- After commissioning: grant received

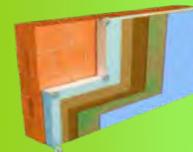
«EASY» FUNDING

CONTRIBUTION BY THE MUNICIPALITY

(22 M EUR/ year)

ENERGY RETROFIT

MANDATORY



INSULATION
minimum 40%
of the building
envelop



Gas heaters
micro-cogeneratoris
Connection to district heating



HEAT PUMPS

Building Automation



**FOTOVOLTAIC/
SOLAR PANELS**



**GREEN ROOFS and
EXTERNAL WALLS (min 100m2)**

