



Milano Integrated Water Service

Ing. Marco Blazina



MM SpA

July 1955

Engineering

MM SpA was founded by the Milan municipality for the design and implementation of the underground network of the city. In the following years MM was also commissioned with works of public interest, infrastructures, transport, urban mobility and urban development (i.e. Expo 2015, M4, etc.).

June 2003

Integrated Water Service

MM SpA becomes the operator of drinking water production and distribution, sewage collection and wastewater treatment services for the City of Milan, serving more than 2 million people.

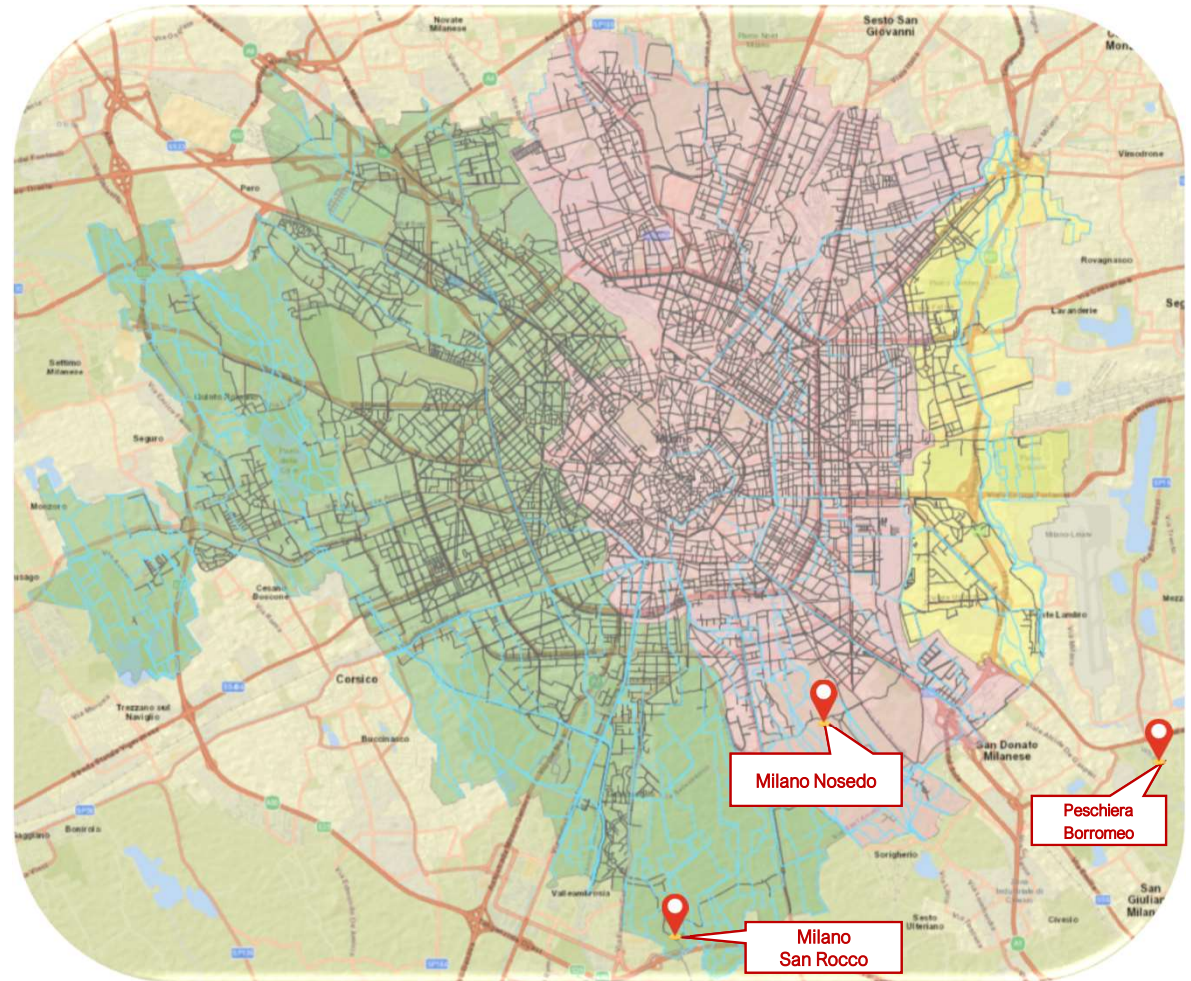
December 2014

Public Housing

MM SpA starts managing the real estate property of the Municipality of Milan, with facility management, including ordinary and extraordinary maintenance of the apartments rented as public housing.

Wastewater basins

- 3 basins
- West basin – San Rocco – 1.036.000 PE
– 4 to 12 m³/s inlet flowrate – up to 4 m³/s treated for direct reuse in agriculture as EU A class
- Central-East basin – Nosedo – 1.250.000 PE – 5 to 15 m³/s inlet flowrate – up to 11 m³/s treated for direct reuse in agriculture as EU A class
- Eastern basin – Peschiera – 250.000 PE – managed by another operator



Wastewater treatment plants

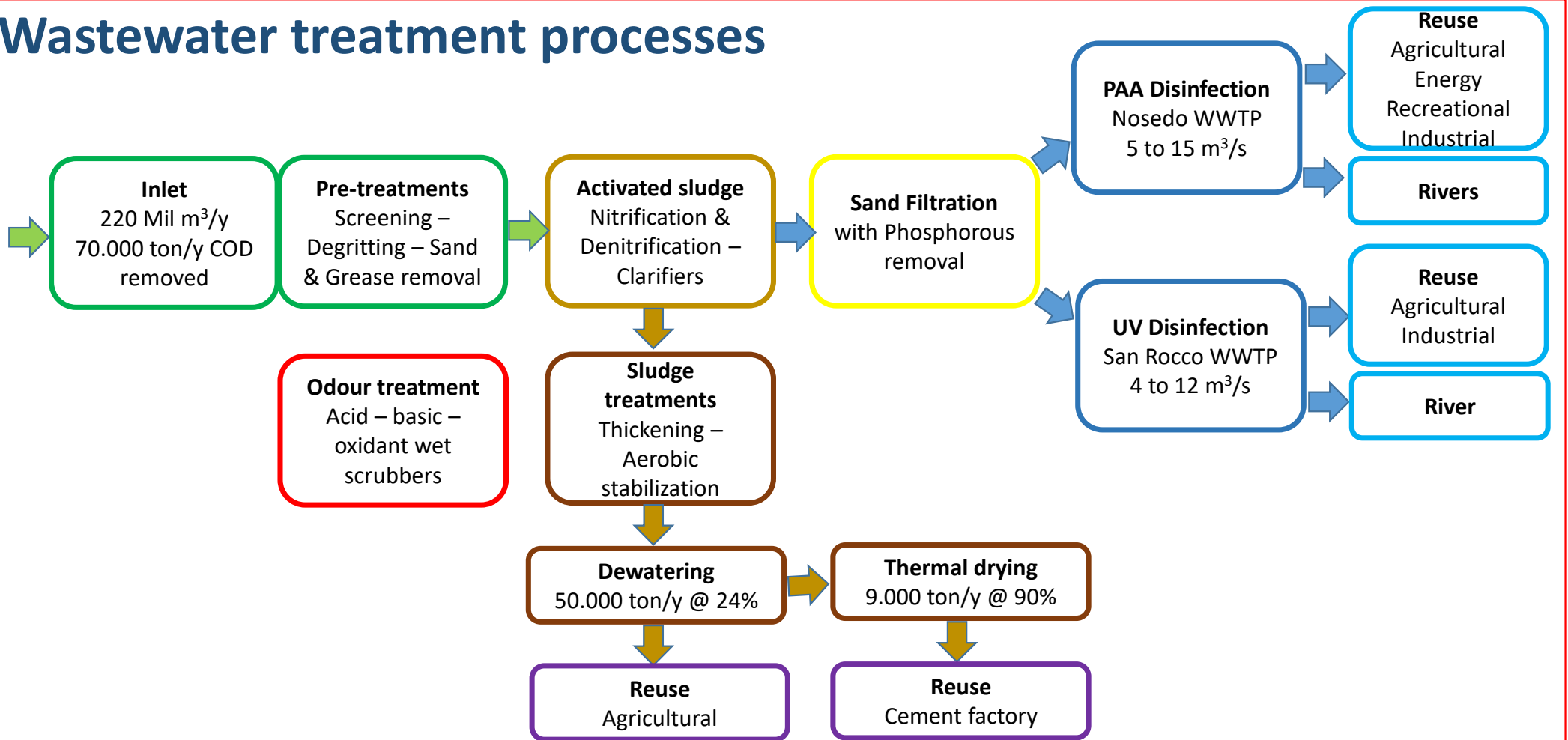
WWTP MILANO NOSEDO



WWTP MILANO SAN ROCCO



Wastewater treatment processes

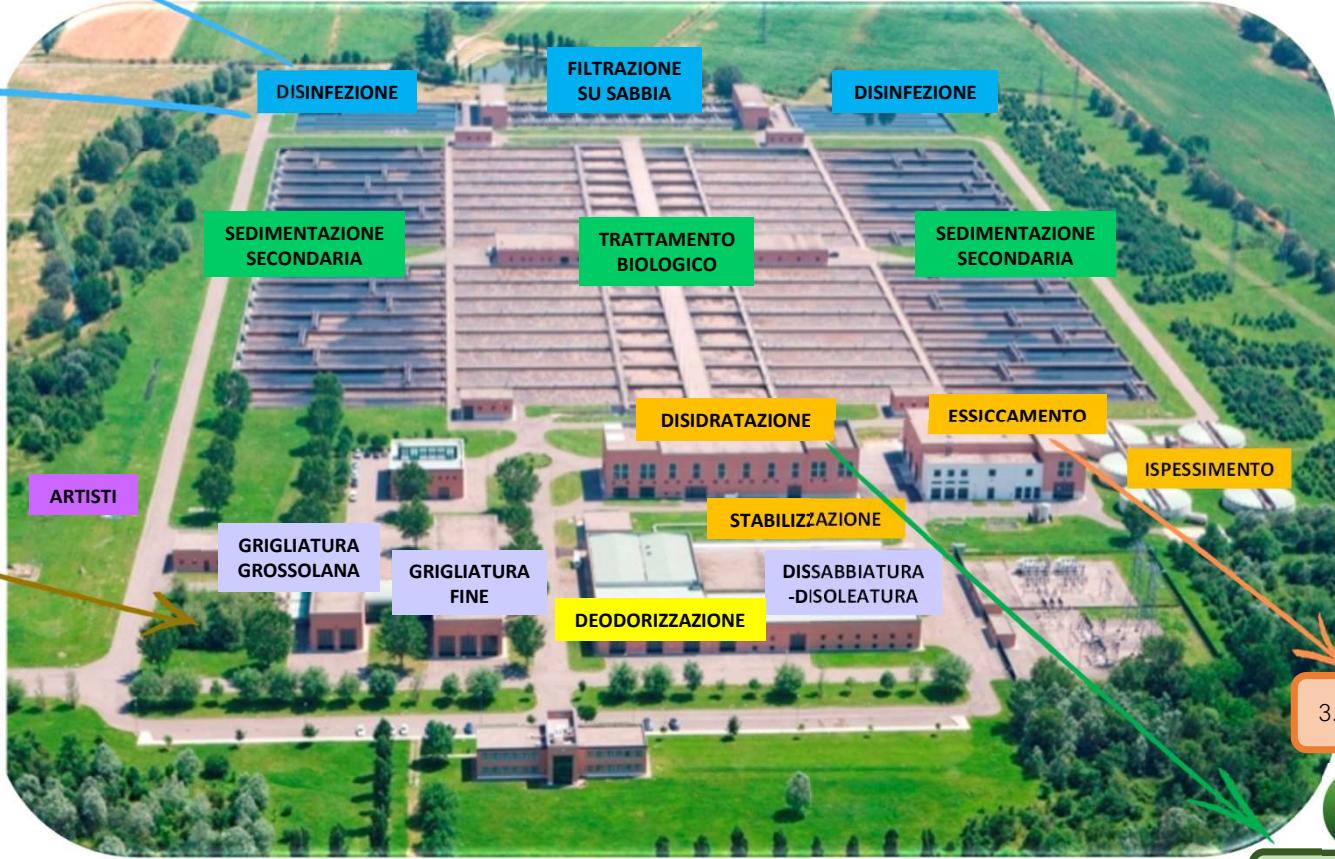


Nosedo WWTP



Water reuse in agriculture up to 11 m³/s

130 Mil m³/y
40.000 ton/y COD removed

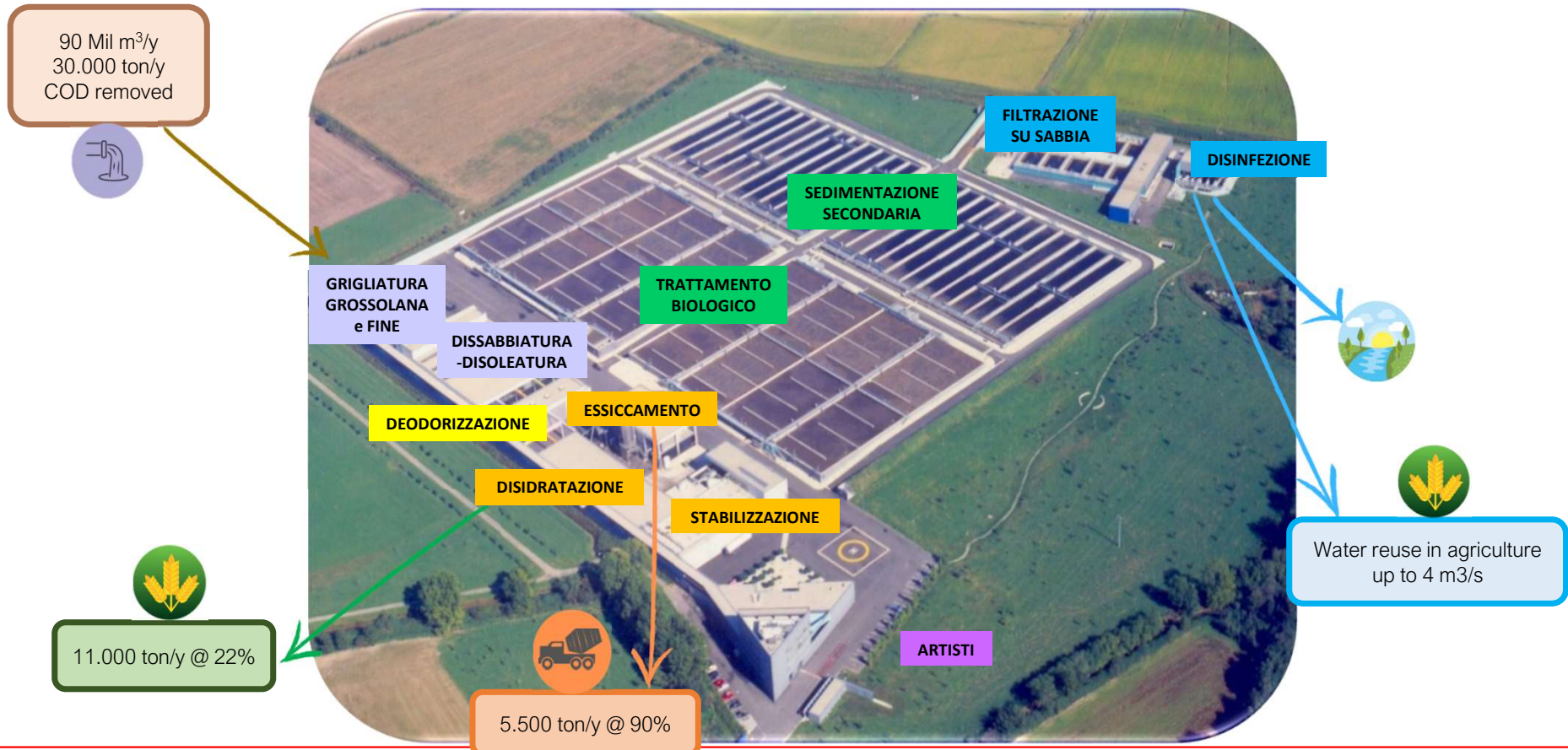


3.300 ton/y @ 90%



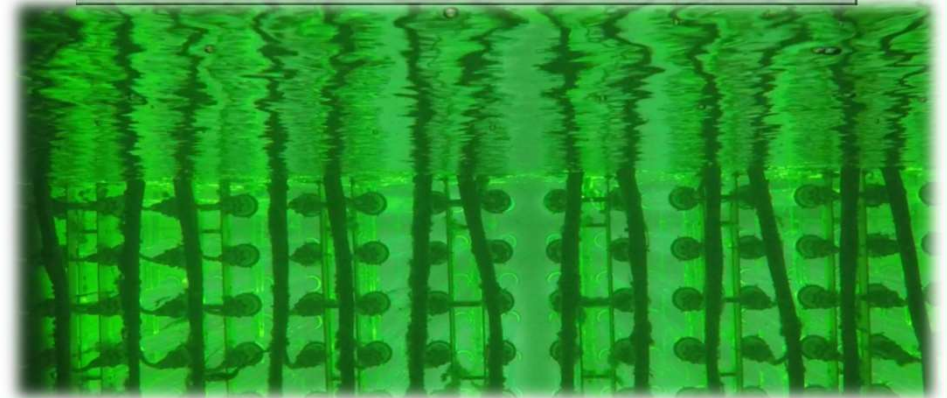
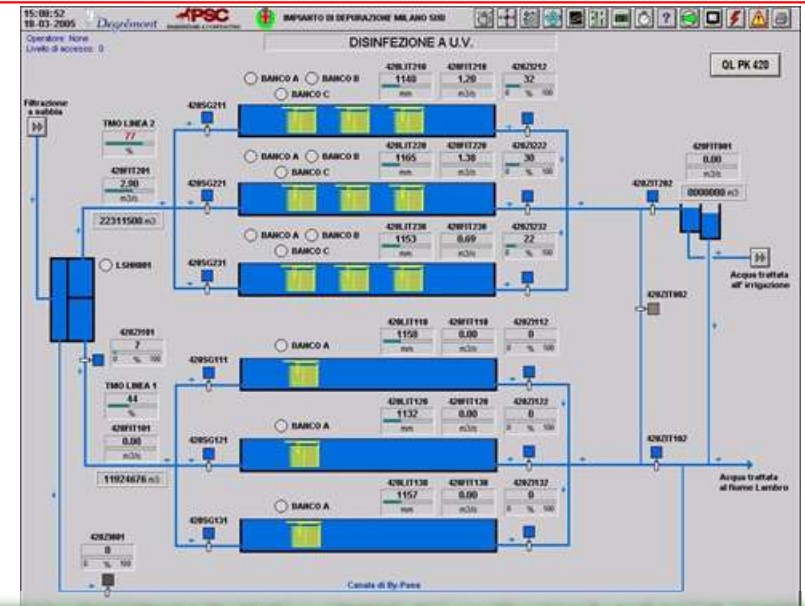
37.000 ton/y @ 23%

San Rocco WWTP



UV Disinfection in San Rocco

- The Municipality, MM and the Consortium (Est-Ticino Villorezi) have an agreement for providing treated water for agricultural reuse
- Farmers ask the amount of water needed
- Agricultural season: from May to August
- Avg 10 Mil m³/y – 10 to 15% of treated water in the season up to 70% on daily base
- Total dry weather inlet flowrate can be treated to get A class reuse quality water
- Farmers only pay for the electrical energy and maintenance of the final pumping station to the canals



PAA Disinfection in Nosedo



- The Municipality, MM and the Consortium (Roggia Vettabbia) have an agreement for providing treated water for agricultural reuse
- Farmers ask the amount of water needed
- Agricultural season: from April to September
- Avg 50 Mil m³/y – 85 to 95% of treated water in the season
- Total dry weather inlet flowrate can be treated to get A class reuse quality water
- Free of charge for the Consortium



PAA Disinfection in Nosedo

- 2 lines – tot basins volume 17.200 mc
- Average 1 ppm PAA dosage (15% w/w) – Average 0,2 ppm PAA residual
- Flow proportional dosage
- Rapid degradation in the environment and low residual aquatic toxicity
- Contact time: 26 – 57 min. (Qmax – Qavg)
- Mixer 2,2 kW – 710 rpm
- Quality check on product delivered
- 40 mc storage tank – Inox 316 L molybdenum treated – 3 m internal diameter
- Fans for air recirculation with activated carbon filters



Discharge limits

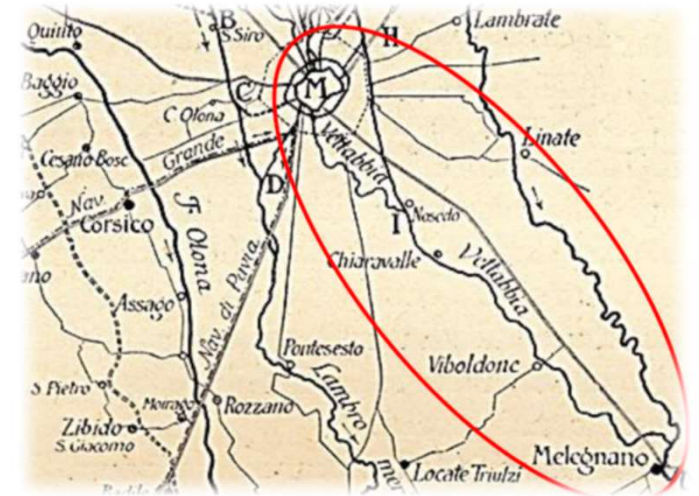
- DM 185/03 + D.Lgs. 152/06 + RR 06/19 + Authorization (discharge permit)
- EU regulation 2020/741
- 12 discharge points: 8 canals for agricultural reuse, 2 for recreational reuse, 2 surface water bodies
- Real time microbiological and quality monitoring systems
- Advanced process controller software
- Daily based samples and lab analysis



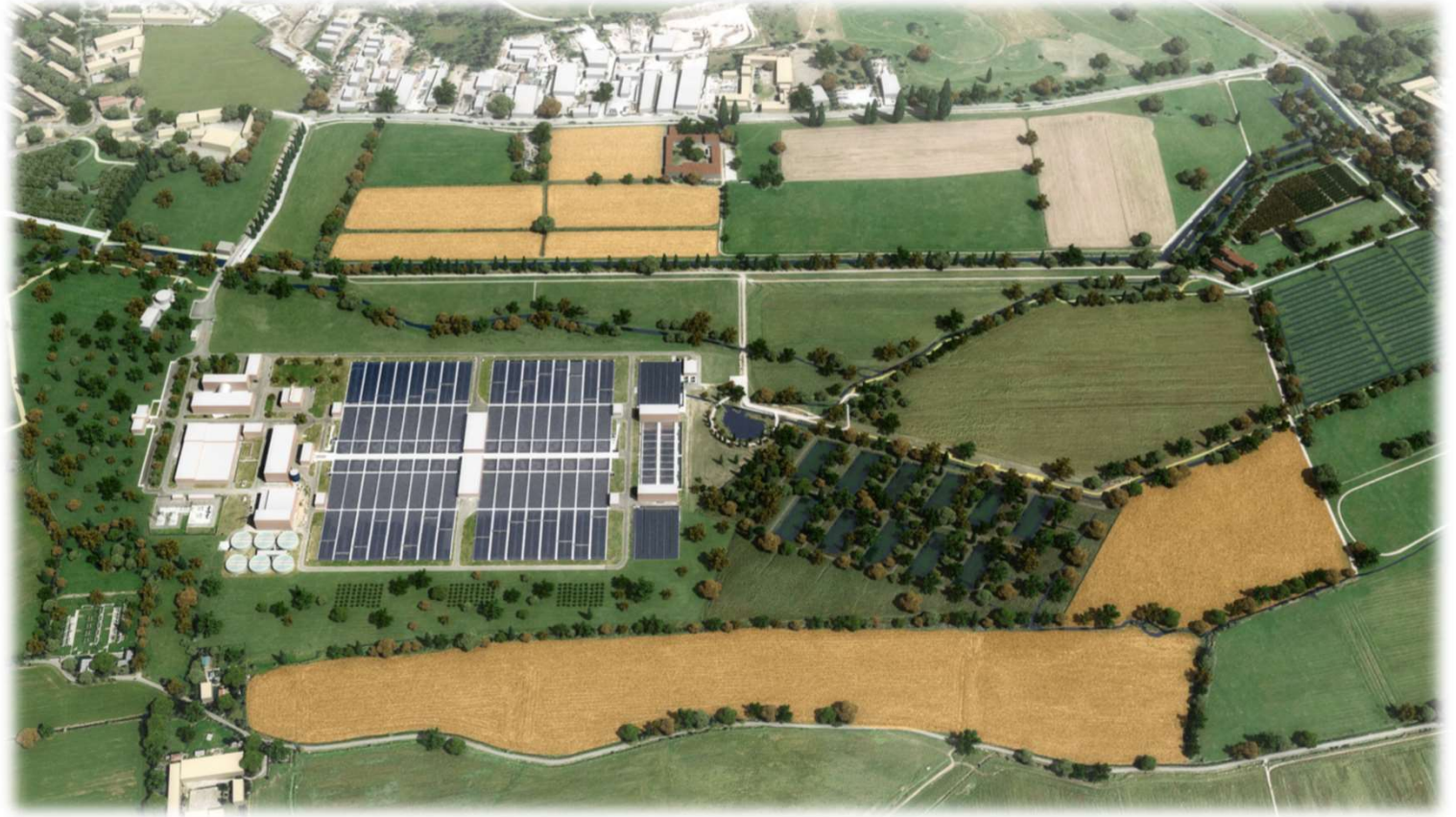
Parameters	DM 185/03	OUT	Removal Efficiency
BOD5 (mg/l)	20	< 5	99%
COD (mg/l)	100	<10 - 20	> 95%
SST (mg/l)	10	1 - 4	99%
Ntot (mg/l)	15	3 - 6	80 - 90%
Ptot (mg/l)	2	0,5 - 1	75 - 80%
E. Coli (UFC/100ml)	100 (10 nel 80%)	0 - 10	nd

Wastewater reuse - past and present

- In the Middle Ages wastewater was collected by Roggia Vettabbia
- Between Milan and Melegnano, the Vettabbia water was used for agricultural meadows in order to biologically remove organic pollutants and as soil fertilizing, boosting cattle breeding
- Monks from Chiaravalle and Viboldone Abbeys are thought to be the founders of agricultural reuse of Vettabbia waters since 1200 AD
- Now called the “Monks Valley Trail”
- 10 discharge points for reuse, most irrigation canals
- Today over 10.000 ha are irrigated with Milan WWTP treated water
- Corn – Rice – Cereals – Forage



Wetlands and meadows reuse



Wetlands and Nature based solutions

- 30.000 new trees and 100 ha
- Small rivers and canals rebuilt
- 55.000 mq wet woodland
- Cycling paths
- Restored meadow
- Ancient fruit trees courtyard



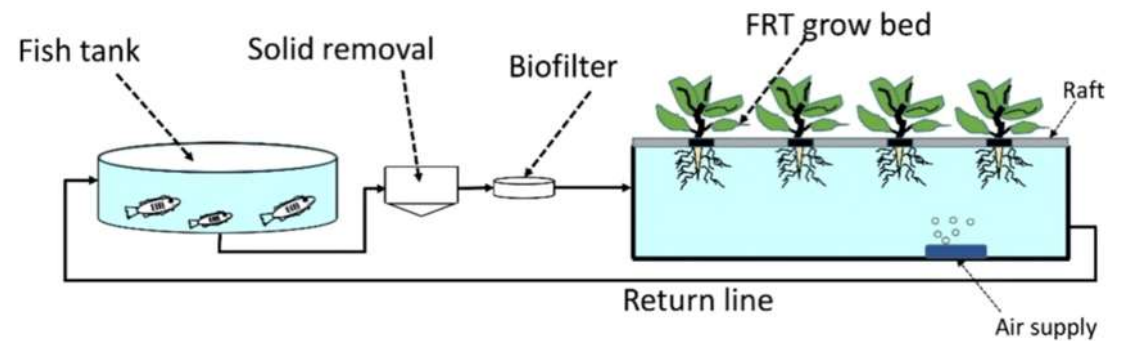
Recreational reuse

- Circular economy
- Ancient abbey mill restored
- Treated wastewater through mill



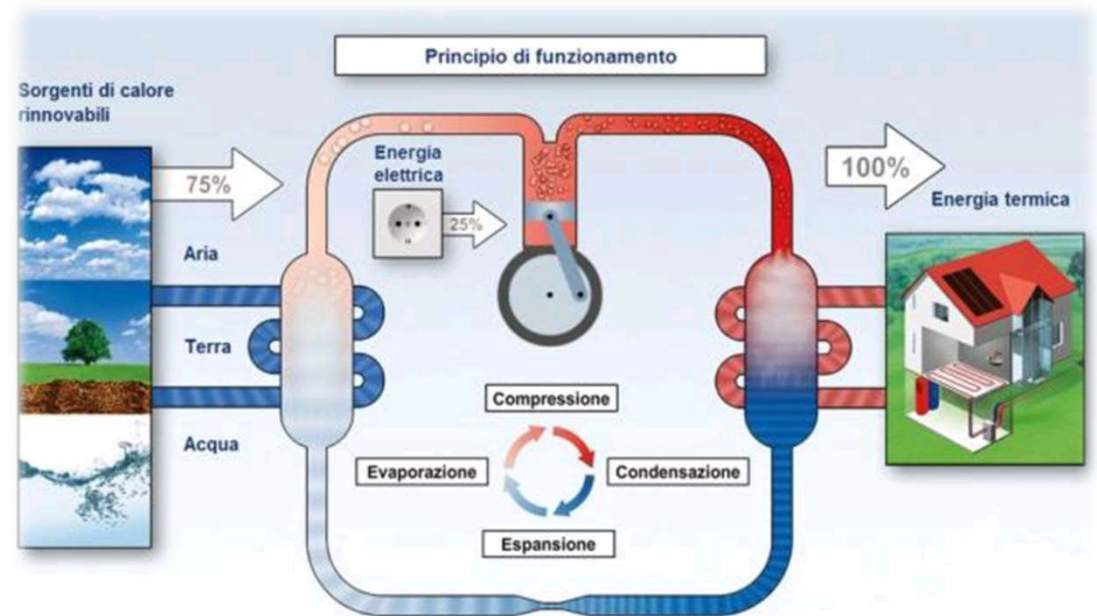
Aquaponic at wwtp

- Circular economy
- 500 square meters
- Agriculture inside the city - 0 km
- Smaller footprint
- Less water
- Less nutrients
- Space available for reforestation or recreational purposes



Heating pumps reuse

- Treated water between 15 to 25 °C
- Easily and continuously available
- Full winter and summer offices climatization
- Upscaling to district heating coupled with co-generation turbo-gas engines



Conclusions

- Treated wastewater is already re-used for several purposes (high quality, safe and weather independent)
- WWTPs are a circular economy innovation hub (water-biosolid-waste-energy)
- WWTPs are improving the neighborhood and environmental quality
- Natural habitat recreated for wildlife
- Recreational areas for citizens
- Agricultural activities maintained

We can make a difference in so many ways...



GRAZIE

m.blazina@mmspa.eu

www.mmspa.eu