The Gruppo CAP Case Study
Gruppo CAP
is the operator of the water integrated system for the METROPOLITAN CITY OF MILAN and other cities of the province of MONZA-BRIANZA, VARESE and COMO.

No. Municipalities served

- **154** Aqueducts
- **133** Sewers
- **133** Water treatments
2,2 million inhabitants served
(higher if you add the people who travel to work daily in one of the most industrialized and productive areas of Italy)

868 employees

over 6,500 kilometers of sewerage

over 750 wells

about 200 million m³ of water supplied

40 wastewater treatments plants

approximately 6,500 kilometers of water network

about 170 water houses
Sustainability in CAP
OUR SUSTAINABILITY STRATEGY

• The Group’s first strategic Sustainability Plan inspired by the international best practices in the sector.

• A strategy resulting from the integration of sustainability objectives in the business activities which identifies the corporate changes and provides innovative tools able to respond to the challenges of the sector.

• A strategy built around 3 priority action lines and 9 ambitious targets to achieve by 2033 with the aim to anticipate the main social, environmental and economic challenges and trends of the sector.
Sustainability Plan

To people’s needs, to increase the well-being and trust of increasingly aware and demanding communities.

Resilient

In assets, governance and management to protect an essential asset for life.

The evolution of consumption and production systems will lead to increased use of resources, both to ensure the long-term consumption and efficient production and use of resources in the economy. These actions will result in increased productivity, better utilization of natural resources, and reduced waste. EU policies have been growing in emphasis on increased energy and resource efficiency, as well as the reduction of emissions and pollution. A new approach to water management will ensure frequent and effective data on flooding and drought.

August 1

Earth Day is celebrated on Earth Day, 2019, to highlight how we can live in balance with a planet in crisis.

10.4 million

People affected by natural disasters with the United States experiencing severe flooding and drought.

5,000

People affected by the 10 largest disasters worldwide.

In the market, anticipating the role and finding our ability to network.

Technological and industrial developments are creating strong pressures on the building and management of the market. The increasing competition between countries and regions places pressure on the markets and institutions.

3-6 trillion

Billions the economic impact of the crisis on global economy.

35 billion

Policies are aimed at increasing the economic impact of the crisis on global economy.

10 billion

Investments in infrastructure, with the data to be taken online in 2025.

Innovative

A digital company

Closing the Circle

Percentage of CO2 emitted, corresponding to the impact of cap and trade activities

2012 2013 2014 2015

0% 50% 60% 100%

Protecting the Resource

Percentage of water that is fit for human consumption

2012 2013 2014

0% 25% 50% 100%

Resilient Cities

Resilience of cities is critical for sustainability and resilience.

2012 2013 2014

0% 25% 50% 100%

Use Less Use Better

Easy as drinking a glass of water

3% 183 180

186 liters of water consumed per day per capita

Increasingly close to the needs of communities

2012 2013 2014

0% 25% 60% 80%
Projects and Activities
Gruppo CAP provides municipal water and wastewater services to over 2 million inhabitants, producing in 61 waste-water treatment plants where almost 90,000 ton/year dewatered sludge is produced.

In such a scenario Gruppo CAP can and wants to deliver a circular economy approach. To this aim Gruppo CAP has defined a territorial Master Plan to implement eco-innovative and energy-efficient solutions to
- renovate and innovate existing wastewater treatment plants
- close the circular value chain by applying low-carbon techniques to recover materials that are otherwise lost.

The existing municipal wastewater treatment plants can be renovated and integrated to become multi-purpose urban biorefineries that serve the citizens to treat and valorize municipal waste streams, such as wastewaters and organic waste, towards a coherent urban strategy.

In order to include leading edge sustainable solutions, the Master Plan (50 M€ budget) considers synergic interaction with large ongoing European Horizon2020 innovation actions, such as the “SMART-Plant” and the “Digital Water Cities” projects.

Existing anaerobic digesters will be valorized towards the best exploitation of the existing reaction volumes, industrial symbiosis opportunities will be explored in order to provide better and cheaper services to our customers.
Vision and strategy

PerFORM WATER 2030 will create a living lab of strategic importance for the public water management sector. Innovative technologies and practices will promote a more efficient and sustainable future for the Integrated urban water management. The project aims to support water utility managers, so that they can act as key players and promoters of innovation in the water sector.

The project will take place in various wastewater treatment plants managed by CAP Group in the Metropolitan City of Milan and it will focus on 4 main thematic areas, whose research activities will be supported by transversal implementation and dissemination actions (or further information, please refer to the specific web-page dedicated to project activities of PerFORM WATER 2030).

**Water**
This thematic area includes drinking water quality and its network optimization, monitoring and removal of emerging contaminants, monitoring and reduction of gaseous emissions into atmosphere and wastewater treatment processes optimization.

**Biosolid valorization**
The planning and activation of measures to reduce the quantity of sludge produced during the purification phase is envisaged. This line of action also includes an action aimed at thermally exploiting the sludge, recovering energy and raw materials from purification activities.

**Recovery of energy and materials**
This thematic area is addressed to the recovery of materials and energy in wastewater treatment plants, the upgrade of biogas to biomethane and the optimization of anaerobic digestion.

**Economic and social issues**
An extensive assessment of the economic and social acceptance of new technologies is carried out by involving stakeholders and by an advanced analysis of costs and pricing strategies for the water service.
Sludge management strategies

- **Anaerobic digestion (65% of the total sludge production)**
- **Aerobic stabilisation**
- **Sludge production – 90,000 ton/y**
- **Dewatering**
- **Biomethane Electricity**
- **Drying Up to 20,000 ton/year in 2022**
- **Fertilizers**
- **Biopiattaforma (65,000 yon/year)**
1. The biomethane production plant at the Bresso- Niguarda wastewater treatment plant was started up in April 2019. It is the first plant in Italy to feed SNAM biomethane from sewage wastewater into the network. All biomethane is sold for automotive purposes to a shipping company that manages several distributors in the Milan area.

2. CAP also obtained biomethane sustainability certification under UNI/TS11567 from RINA. Total production of biomethane meeting all national and international standards in 2019 amounted to 325,339 Smc.

3. In order to maximise production, CAP, in collaboration with Kyoto Club, has carried out simulations to make the treatment processes of organic materials (FORSU, agro-food waste, mowings) to be used in the production of biomethane more efficient.
Nutrients, chemicals and material recovery

TARGET  Within 2033:
90% reduction of waste production
13,000 tonnes of green products made from waste

CAP launched several projects:
• sulphur recovery at the Bresso WWTP from April 2019;
• fermentation sludge with VFA production (volatile fatty acids) at the Sesto San Giovanni WWTP since September 2019.
• Sand recovery in Robecco (end of waste)

In addition, other fertilizers production plant have been implemented:
• compost, obtained with the sludge of the WWTP of Rozzano;
• Biosulfate at Peschiera Borromeo and San Giuliano Est WWTP
Biopiattaforma Sesto – The Idea
The BIOPIATTAFORMA Project

OBJECTIVE

Transforming the existing municipal waste incineration plant into a biorefinery for sludge (65,000 ton/y) and OFMSW (30,000 ton/y) treatment and for nutrients/energy recovery

34,5 M€ Sludge line + 12,5 M€ OFMSW Line

47 employees kept their jobs

New 547 new jobs induced
The BIOPIATTAFORMA Project
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- DEWATERED SLUDGE 80,000 ton/y
- ORGANIC WASTE 30,000 ton/y
- WASTEWATER 8,400,000 m³/y
- FERTILIZER 15,000 ton/y

**SLUDGE THERMAL TREATMENT**
- 65,000 ton/y
- 12,700 MWh/y

**ANAEROBIC DIGESTION**
- 30,000 ton/y
- 2,000,000 Sm³/y

**WWTP**
- 8,400,000 m³/y
- 12,700 MWh/y
- 6,200 ton/y

**THERMAL ENERGY**
- 12,700 MWh/y
- 6,200 ton/y

**ASHES FOR P RECOVERY**
- 12,700 MWh/y
- 6,200 ton/y

**BIOMETHANE**
- 2,000,000 Sm³/y
- 7,200 ton/y

**DIGESTATE TO COMPOST**
- 2,000,000 Sm³/y

**WATER REUSE**
An opportunity for P-recovery – sludge stream?

- **62,000 t/year dewatered sludges (24% TS)**
- **3,000 t/year dried sludges (90% TS)**

**Drier + Fluidised bed reactor**

**ASHES**
- (6,800 ton/y)
- 500 ton P/year?

**Phosphorus recovery technologies still to be assessed**

**Value Chain Still to Be Defined**

- **Raw materials**
  - Need for centralized treatment plants (sludge mono-incineration and WWTP+OFMSW still to be developed in Italy)
  - Real productivity to be assessed through pilots

- **Legislation and other initiatives**
  - STRUBIAS
  - Organic fertilizers regulation
  - European Phosphorus Platform
  - Italian Phosphorus platform

- **Treatment and extraction**
  - Is our project «big» enough to ensure profitability?
  - Which is the most suitable technical solution for the CAP case?
  - Which is the best business model?
  - Decentralized P-extraction plants?
  - One unique regional platform?
  - Export of ashes?

- **End use**
  - End-users still to be involved in Italy
Time schedule

We believe in Citizens participation

http://www.biopiattaformalab.it/

RESIDENTIAL ADVISORY BOARD https://www.rab-biopiattaforma.it/
THANK YOU