The Gruppo CAP Case Study
Gruppo CAP
Who we are 1/2

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** Water treatments
- **133** Sewers
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 Plan and 2033 Agenda

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.
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)
  - Biomethane
  - Electricity
- Sludge production – 90,000 ton/y
- Aerobic stabilisation
- Dewatering
- Fertilizers
- Biopiattaforma (65,000 yon/year)
- Drying
  - Up to 20,000 ton/year in 2022
Biomethane Production

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.
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 plants have been implemented:

- Compost, obtained with the sludge of the WWTP of Rozzano;
- Biosulfate at Peschiera Borromeo and San Giuliano Est WWTP

TARGET

Within 2033:

- 90% reduction of waste production
- 13,000 tonnes of green products made from waste
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
The BIOPIATTAFORMA Project

- **DEWATERED SLUDGE**: 80,000 ton/y
- **ORGANIC WASTE**: 30,000 ton/y
- **WASTEWATER**: 8,400,000 m³/y

**ANAEROBIC DIGESTION**
- **SLUDGE THERMAL TREATMENT**
  - 65,000 ton/y
  - 12,700 MWh/y
  - 6.200 ton/y
  - 2,000,000 Sm³/y

**WWTP**
- 30,000 ton/y
- 8,400,000 m³/y
- 6.200 ton/y
- 7,200 ton/y
- 2,000,000 Sm³/y

**PRODUCTS**
- **FERTILIZER**: 15,000 ton/y
- **BIOMETHANE**: 2,000,000 Sm³/y
- **ASHES FOR P RECOVERY**: 6,200 ton/y
- **DIGESTATE TO COMPOST**: 7,200 ton/y
- **THERMAL ENERGY**: 12,700 MWh/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 tonP/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

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