



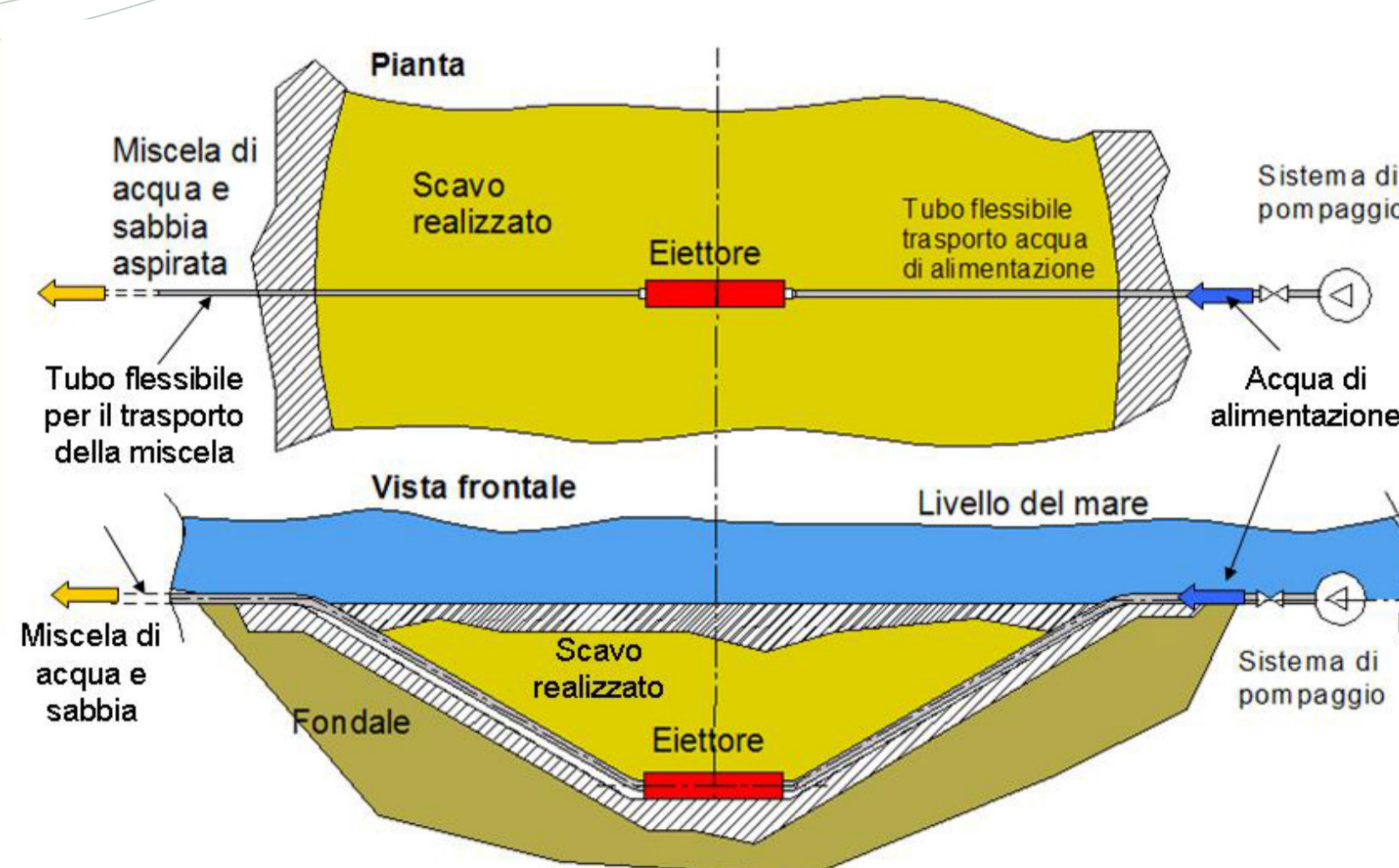
# Technology | Life 15 | Marina Plan Plus

Reliable and innovative technology for the realization of a sustainable **MARINE** And coastal seabed management **PLAN**

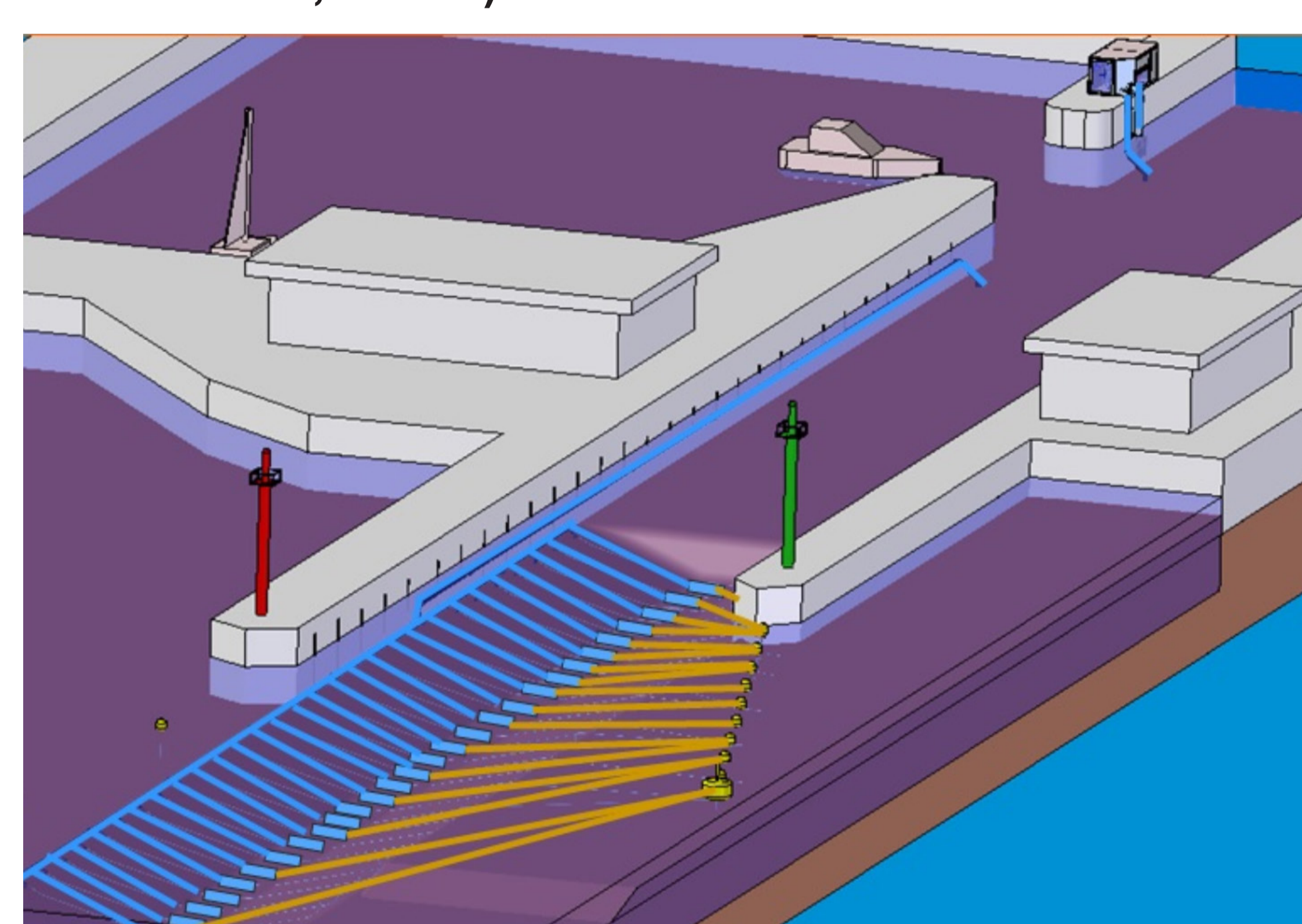
The innovative plant for **seabed re-modelling** consists of a set of devices, called ejectors, which constantly remove the sediments delivered to their operating area by transferring them to a nearby area where they do not impair navigation.

The withdrawal and subsequent transport of materials to be displaced takes place with no submersed moving equipment but with suitably oriented water jets that temporarily keep sediments suspended and convey them to the transportation and discharge pipeline. Ejectors are fixed to the seabed and **do not impair navigation**.

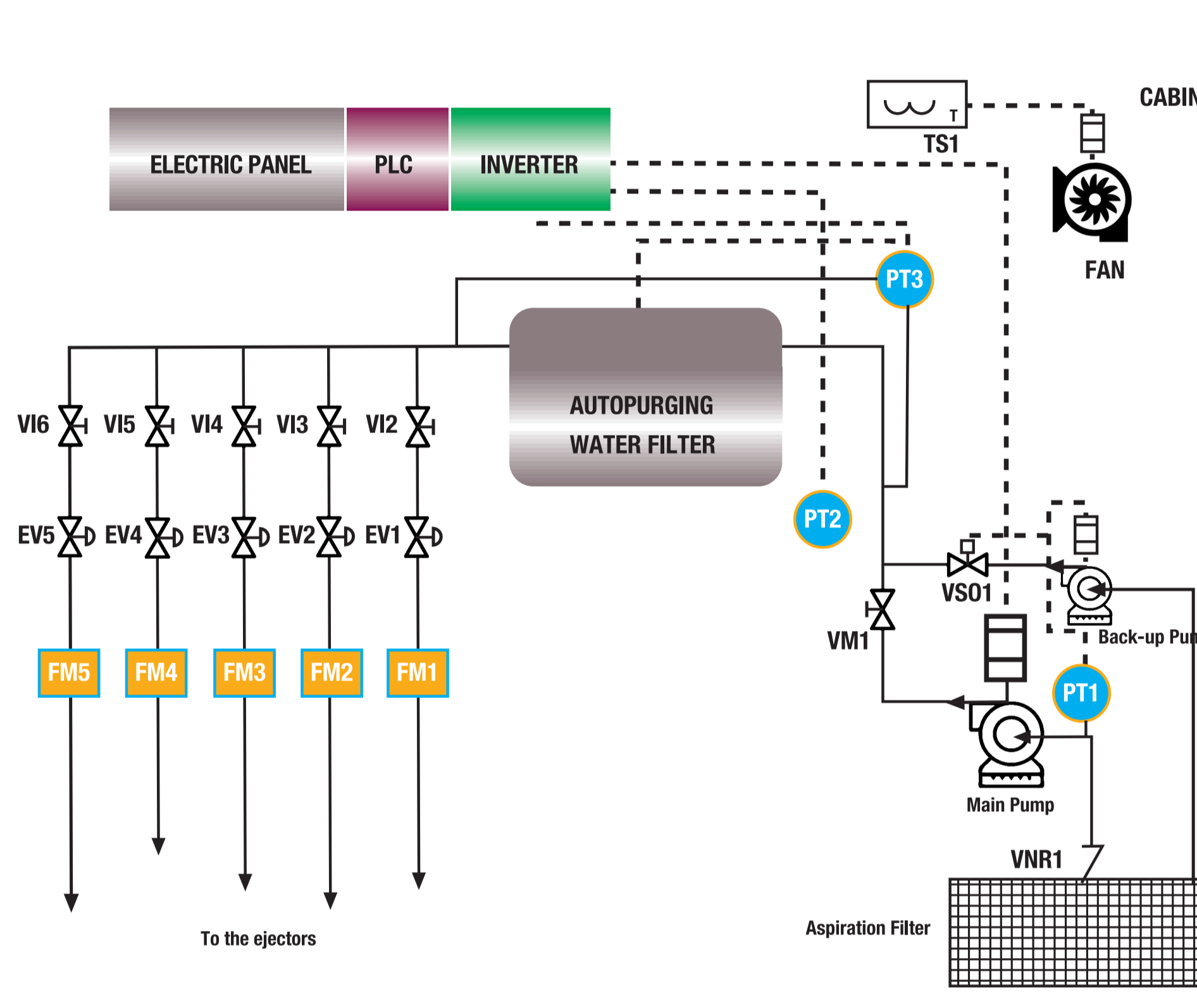
Hence, the whole plant is made up of : 1) a water pumping station which is used to feed ejectors with water pressure; 2) feed and discharge pipelines, 3) adjustment and control devices (valves, instruments, etc....)



Views of the seabed re-modelling plant



Installation example (Riccione plant)



5 ejectors pumping plant - P&I

By means of one or more grids of ejectors, it is possible to operate on the areas affected by silting phenomena, thus carrying out a continuous removal (24/7) of the materials transported by currents and keeping the seabed at a set constant level.

The plant's dimensioning and the choice of ejectors depend on the type of specific application and, in particular, on:

- The size of the area affected by silting phenomena (*it does affect the number of ejectors*)
- The type of sediments (*it affects the area where each single ejector operates*)
- The length of the discharge pipeline (*it determines the ejectors' minimum feeding rate*)

## History

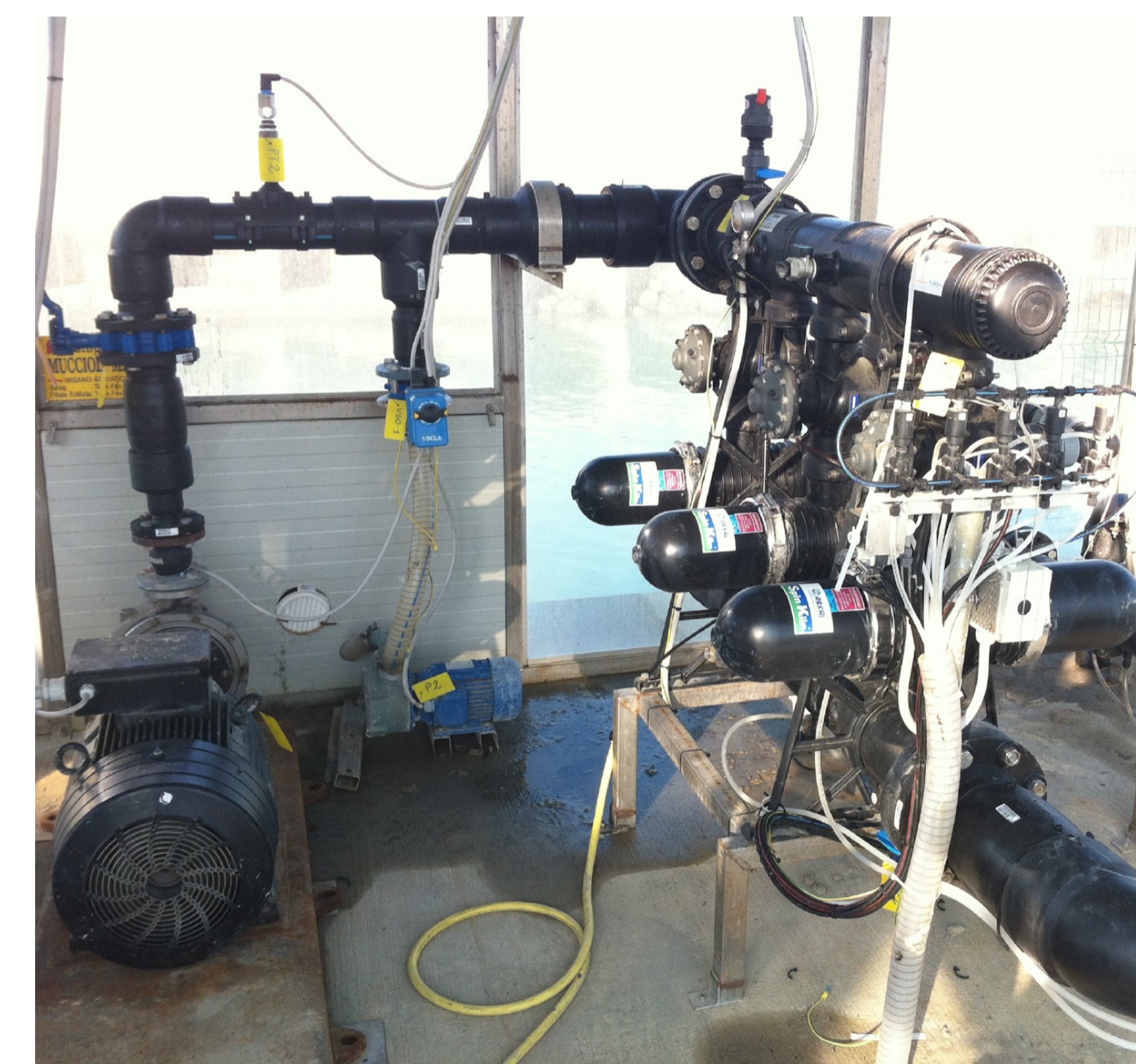
The ejectors' technology was first devised through laboratory trials in 2002 and, eventually, **two experimental plants were developed**, both of them receiving POR-FESR funding from **Emilia Romagna**.

The first plant was set up at **Riccione's canal harbour**; it started operating at the end of July 2005 and was kept running until November 2005. During that period, the plant allowed easy entry into the port, since the seabed was kept at a minimum level, from 3,5 to 5 metres.

The second plant was set up at **Portoverde Dock in Misano Adriatico**; it started operating, in its latest version, at the beginning of June 2012 and the experimental activities were completed in April 2014



Portoverde pumping station



Portoverde filtration system

## Distinctive Features

The plant's strong points are:

- Actions exerted on the seabed comply with the definition of "re-modelling" stated in DM. 173 of 2016; hence they are not regarded as dredging actions but, rather, as sediment management operations within the same basin.
- Reduced environmental impact: while sediments are managed, no turbidity or re-suspension of materials is detected; the only plant emissions are linked to the pumping station's electric energy consumption
- It can be automatically operated and a remote control can be used
- Certainty of seabed maintenance costs: the adoption of the plant allows for a precise planning of seabed maintenance costs, solely linked to the plant's operating costs, regarding dredging activities as extraordinary – and not ordinary! - maintenance interventions.

