Innovation for Change

Young Talents | Real Challenges | New Tech

SenseBrain

Microalgae Farm
Challenge: Seawater desalination for industry
Proposed by: ENEL spa

Members of the team:
Paride Letizia, MBA fellow
Antonio Tizzani, MBA fellow
Giulia Santoro, PhD researcher
Andrea Buffa, MBA fellow
Francesca Chiniello, MBA fellow
Ahmed Elsayed, PhD researcher

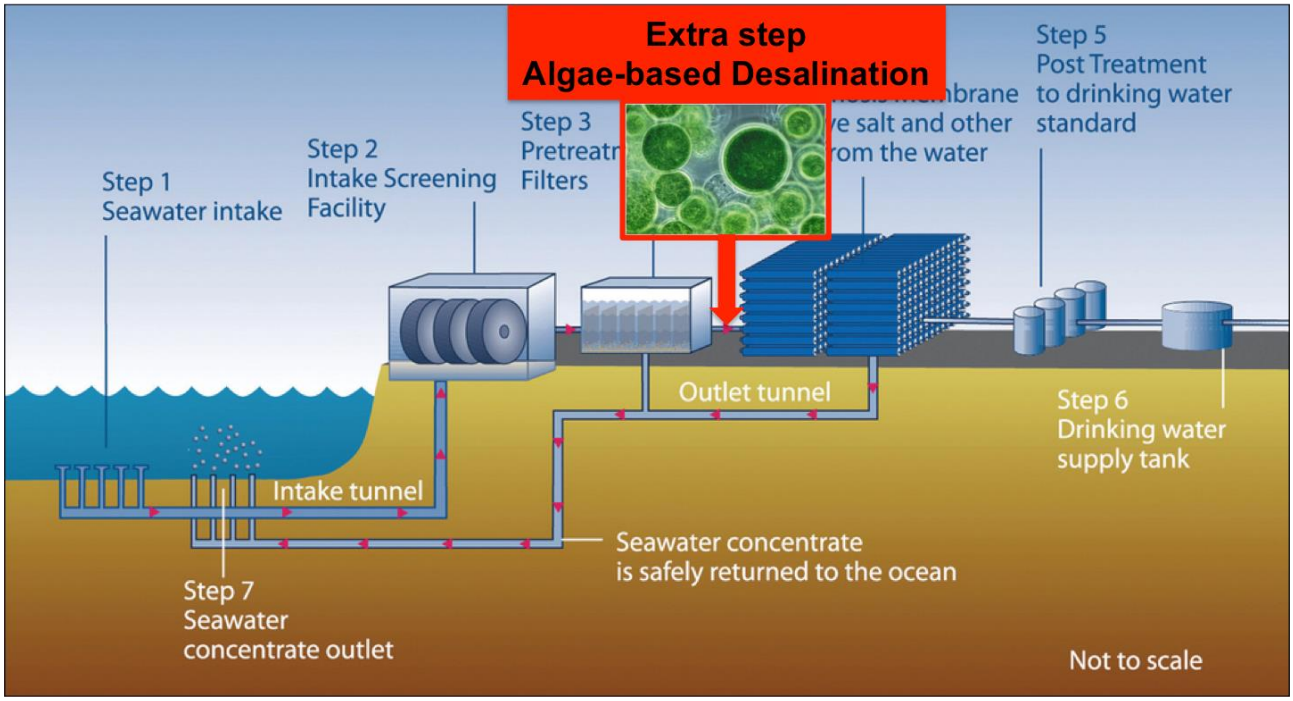
- **Problem Statement and Solution proposed** (max 300 words - suggested):
  We are facing the seawater desalination in power plant, especially in those power plants that are placed in dry lands. These kinds of plants need freshwater for several reasons, for example for cooling system.
  So far the best way to produce freshwater using seawater is represented by RO (Reverse Osmosis), which use a set of membranes to catch salt from water and provide freshwater.

Since the maintenance cost of the RO system is expensive for a power plant (both in term of cost and energetic), we had in mind to develop a process using an algae system that is able to reduce two of the major factors that affect the membranes lifecycle:

- Fouling process (derived from)
- ....

We are focused on working in the pretreatment step, before the RO system (when the seawater is collected and prepared for RO), using a pool in which seawater and algae could live together. The use of algae and seawater in the pool is to reduce the effort of RO to produce freshwater from salty water because algae are able to absorb some pollutant agents that are involved in RO process. With this system we could both to extend the membrane lifecycle (with a money saving by power plants) and to reduce the pressure at which the water is exposed during the RO.
Our business will be to treat and sell the algae used in the depollution process in:

- Biological hydrogen production.
- Biomass production.



[Main to do before June 20th]: Buy a simple kit of algae, dive them in salty water and measure the effective absorbability by the algae of pollutant agent.

[Action plan for next 20 months]: Partnership with ENEL in the construction of a pool with algae and production of:

- Depolluted water in input to RO system
- Treatment of algae used in the depollution process

[Vision for the future: 20 years ahead]: Because the most expensive aspect of this process is the separation between water and algae (remember that the algae are not plant, but solution mixed with salty water), nowadays the most common use to separate water and algae is represented by a centrifuge that is very costly in terms of money and energy consumption. Our effort should be to enforce the R&D department to develop new way to separate water and algae.