

Innovation Pill No. 1- Desalination

Desalination definition is "removal of salts from water". It can be seawater or brackish water that is found in ground water arid areas. The result of the process is potable water that can be used to all purposes. Hotels in arid areas or in remote places might need desalination in order to supply enough potable water and in high quality to their guests.

When we talk about desalination, we can divide it on two dimensions:

1. The scale of the plant-large desalination plant for the central water systems, or small-scale systems for local or specific plant (like hotel).
2. The technology that is used- the main ones are-
 - a. **Reverse Osmosis (RO)**, based on a membrane through which only the water (H₂O) molecules can pass but not the salt molecules, which are larger. It needs high water pressure to force the water to pass through the membrane and therefore it needs energy to increase the water pressure (for sea water- 70 bars are needed).
 - b. **Thermal desalination based on evaporation the water** (only the water is evaporated without the salts) and then condense the water vapors back into liquid- and you receive pure water. This technology is very effective where you have residual heat from another facility like power plant and alike.

We will focus on small-scale plants using RO technology, since it is more flexible to small size even if there is "Economy of Scale" in this technology too. Cost per 1m³ can vary between more than 1 € for small scale plant and 0.5 € for a large plant. Examples of small desalination devices:

