

LENNTECH

WATER TREATMENT SOLUTIONS



**Water Treatment in
Oil and Gas Industry**



Production of oil and gas is usually accompanied by the usage and production of large volumes of water in several applications. The industry recognizes its dependency on water and is focused on minimizing its use, enhancing reuse and recycling opportunities, and improving treatment technologies and disposal options.

Lenntech provides sustainable complete solutions for water and waste water treatment in oil and gas industry considering a wide range of technologies and strategies.

APPLICATIONS

- Water injection for enhanced oil recovery (EOR)
- Offshore/Onshore produced water
- Recycling and reuse

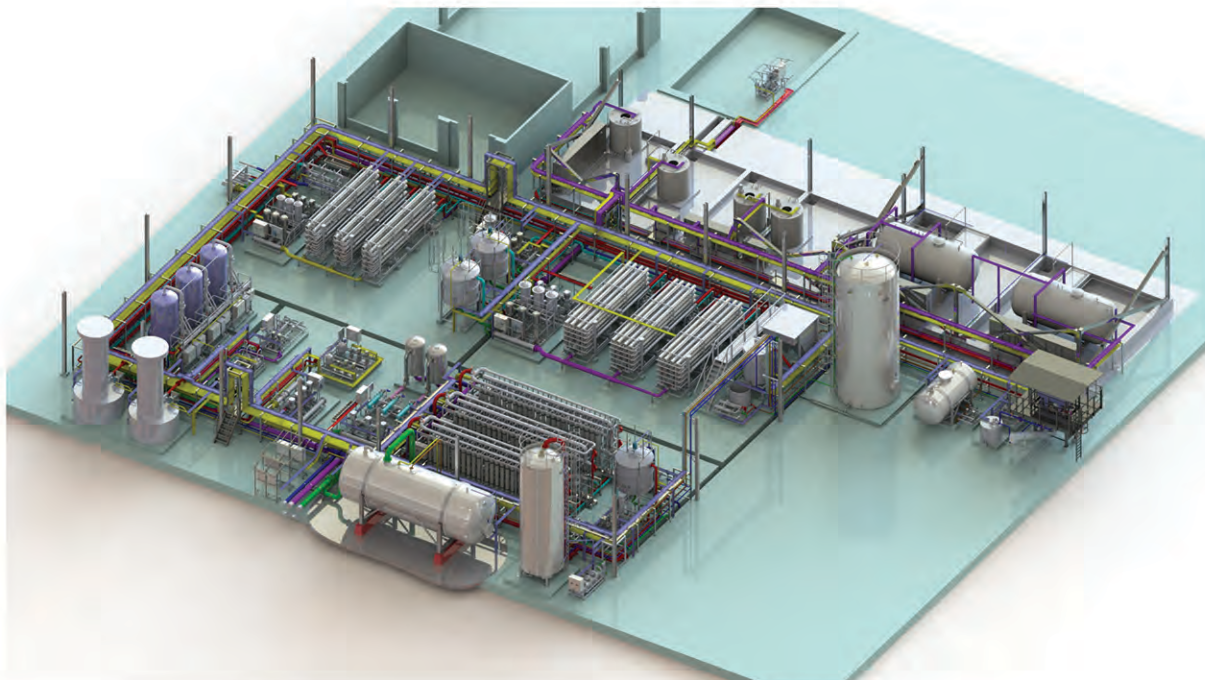
OUR SOLUTIONS

- Sulfate removal from sea water
- Sea water desalination
- Brine neutralization
- Zero Liquid Discharge (Evaporation/Crystallization)
- Coarse and fine filtration
- Hydrocarbons removal
- Oil/water separation and solids removal



OUR ADVANTAGES

- Engineered and custom designed solutions for unique water and equipment needs
- Turn-key solutions including design, engineering, manufacturing, automation, installation, maintenance and training
- State-of-art technologies for effective water and wastewater reuse
- Full team of engineers for best on-line assistance and on-site service and support
- Worldwide operation and assistance with all language capabilities to support local projects



OUR TECHNOLOGIES

Water injection for EOR

The preferred source of water for injection in offshore oil & gas platforms is seawater. When seawater containing high sulfate amounts is injected into reservoirs that have formation water containing barium and strontium, super saturation of barium and strontium sulfate and consequent precipitation and scale can occur. By removing sulfates, the potential of scale formation and constriction is prevented as well as there is sour control.

Lenntech **Sulphate removal units** are designed to selectively remove sulfates and hardness from the seawater through **nanofiltration (NF) membrane** technology, with low rejection of monovalent ions, ideal for maintaining the seawater composition and preventing the leaching of minerals from the rocks that the oil adheres to. Sulfate removal units require pre-treatment of the seawater for removal of suspended solids prior to the feed of the nanofiltration membrane system. Typical pre-treatment technologies include **multimedia filtration** and **cartridge filters** or alternatively, **ultrafiltration** technology that provides a very high product quality, reducing operation costs in the treatment placed downstream.

In order to prevent corrosion and bacterial growth in the tubing, **de-oxygenation tower** and **oxygen scavenger chemicals** are provided to reach oxygen low oxygen levels.

Sulfate removal units can be also equipped with small **reverse osmosis** units for fresh water production to be used in utilities and rinsing and clean of the nanofiltration membrane system.



Offshore/Onshore produced water

Produced water from oil and gas extraction processes has historically been considered a waste product, but it can be turned into useable water, through several treatment processes. Primarily solid and oil particles are bonded together through the usage of **coagulant injection**. Agglomerated solids and oil particles are then separated from water through **oil & water separation** equipment. Fine particles can be removed through a **multimedia filter** or **ultrafiltration** technology. Dissolved hydrocarbons can be then extracted through an **adsorbent filter** for recovery. When the water is free of particles and oil, desalination technologies can be applied, such as, **softener, nanofiltration, reverse osmosis, ion exchange**, where dissolved ions and other contaminants are separated from the water.

Lenntech solution technologies will allow the **recovery up to 80-90%** of the produced water, producing a clean water stream with high quality standards that can be re-used in other processes or safely discharged in the environment.

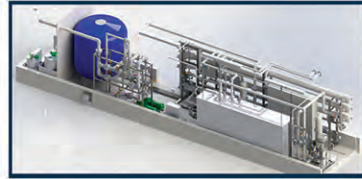
Recycling and reuse

When feasible, oil and gas operators recycle and reuse wastewater to replace or supplement the usage of natural sources of water in their process, reducing discharges, minimize underground injection of waste water and conserve water resources.

Conventional technologies can be used, such as **coagulation/flocculation** with sedimentation and **multimedia filtration** for particles removal. The dissolved ions can be then removed through **reverse osmosis** or **ion exchange**. The reverse osmosis brine can be ultimately treated with **evaporation/crystallization**, allowing total usage of the waste water and providing a **zero liquid discharge** solution for the operators. The fresh produced water can be re-used in the operator's processes.

OUR SERVICES

Design



Engineering



Automation



Manufacturing



Transport



Commissioning



Maintenance



Training





Lenntech is currently active in more than 130 countries worldwide, providing ultimate water treatment solutions for all sorts of applications, from domestic equipment to industrial turnkey plants.

Lenntech Water Treatment Solutions

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Lenntech performs as an organization that strains itself at all time to secure quality, business continuity, continuous improvement, sustainability, satisfied clients, safe working conditions and prevention of pollution. All according to legislation and regulations. Lenntech works on management system of continuous improvement in the field of quality, safety, health and environment. In addition this management system meets the ISO 9001:2008, the ISO 14001:2004, the OHSAS 18001:2007 and VCA* 5.1 requirements so that the implementation of the system can be verified and confirmed by independent parties

