

OFFSHORE SEAWATER DESALINATION

MARITIME SYSTEMS FOR DRINKING WATER EXTRACTION

DESALINATION VESSELS - JACKUPS - BARGES - WATER FERRIES

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To protect natural drinking water reserves from stressing and exploiting, maritime seawater desalination systems manage inexhaustible sources sustainably by extracting fresh water from oceans in offshore operation.

- no land consumption
- mobile and flexible systems
- self-sufficient and carbon neutral energy supply
- solution independent of pipe-line networks



TOPICS

- offshore seawater desalination
- floating desalination vessel types
- desalination of water by reverse osmosis
- prospects of maritime systems
- world`s drinking water situation

Maritime Seawater Desalination

Due to socio-economic developments of a growing world population, demand of clean drinking and fresh water for municipal, industrial and agricultural use is increasing by 1% annually. But in many regions water demand cannot be covered sustainably from natural sources without stressing or even exploiting them.



Desalination of seawater by reverse osmosis is state of the art technology to prevent water scarcity. However, land based desalination plants require huge area near the coastline, infrastructures regarding power supply, intake and discharge systems and related buildings and facilities. The selective local withdrawal of large amounts of feed water and the return of concentrated brine may cause negative impacts on aquifers and coastal ecosystems. The lack of suitable locations is limiting factor for the expansion of land-based seawater desalination.

"...maritime desalination systems are crewed water supply facilities with self-sufficient energy supply floating on ocean for offshore fresh water extraction..."



Maritime desalination systems avoid problems of land-based units. Shifting production facilities to the ocean opens new and unconventional opportunities of fresh water supply. Advantages of self-propelled and crewed offshore desalination are no land consumption, self-sufficient energy supply and an integrated vessel design with all reverse osmosis equipment and necessary infrastructures on-board. Freshwater quality meets WHO drinking water standards.

Systems are built as vessel, barge, jack-up or water ferry. Vessels and barges may serve several coastal areas with fresh water regularly, periodically or on demand. Jack-Up units are connected by pipelines to onshore water networks. Water ferries unload water lorries and containers in harbour for further distribution to local and more remote locations. Maritime desalination units are flexible and variable systems, which adapt optimally also to fluctuating water demands.

In terms of climate neutrality, vessel engines are LNG-powered and may be turned to carbon neutral e-fuels or carbon-free hydrogen drives perspectivevely.

Desalination Vessel Types

Based on standard vessel types, maritime desalination systems are tailored to the application's specific requirements. In regular service, vessels deliver fresh water to distinguished landing points or water hubs for further distribution to points of use.

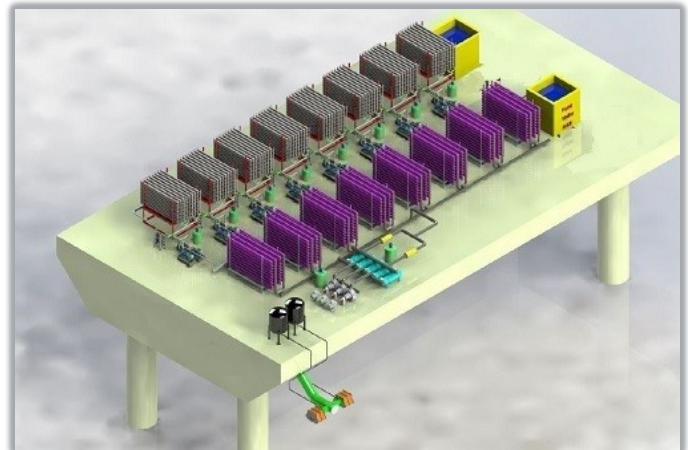
Ferry

RoRo-Ferries, equipped with desalination plant and filling station to feed trailers and mobile containers while sailing, unload batches of fresh water in harbour and pick up empty units. Onshore water is distributed to any point of use. Such water satellites may service reliably areas with no or ailing pipeline systems and remote places as well. At point of use containers are delivered or water is pumped over to local storage tanks.



Barge

Barges are designed to provide small settlements near the coast with fresh drinking water, which is pumped from the barge to a suitable storage tank.



Jack-up

Moving to the desired position, Jack-Up fixes its legs on sea floor and lifts the platform for operation. Jack-up is the ideal offshore system for regular local fresh water supply if coastline either is not suitable for land-based desalination or shall be protected from industrial use. A Jack-Up-system provides modern accommodation layout for the operating crew and can be fully customized to the owner's requirements. The modular building-block design of desalination racks is redundant system. For maintenance or during times of low water consumption single trains can be taken out of operation without need to shut down the entire installation. Fresh water is supplied by pipeline to onshore water hubs. Such design guarantees high availability and reliability even in rough seas. As an option, feeder vessels can moor at the Jack-Up, loading fresh water to deliver it to harbours and remote coastal areas.

Vessel

Vessels for various capacities produce large drinking water volumes offshore. In a harbour drinking water is unloaded to sufficient storage tanks and drinking water distribution systems.

MARITIME DESALINATION SYSTEMS

Offshore drinking water projects are designed and calculated according to the requirements of the application. With our team of experienced technical experts, we advise interested parties and support them professionally in the development of promising projects.

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Prospects

Offshore drinking water extraction is aimed to municipalities and industries with water need, potential project developers, operators of maritime desalination systems and prospective customers of desalinated fresh water.

PROSPECTIVE FRESH WATER APPLICATIONS

- FRESH AND DRINKING WATER SHUTTLE SERVICE
- SUPPORTING PEAK OR SEASONAL DEMANDS
- WATER BOTTLING
- WATER FERRIES AND WATER SATELLITES
- EMERGENCY WATER SUPPLY IN CASE OF CATASTROPHES AND NATURAL DISASTERS
- AGRICULTURE AND IRRIGATION PROJECTS
- FEED WATER SUPPLY FOR GREEN HYDROGEN PRODUCTION

Maritime seawater desalination vessels are self-contained fresh water production sites with defined hand-over points. Systems are run and maintained by trained and experienced operation crews. Crew members provide all nautical skills and technical competences to manage offshore desalination vessels and high pressure reverse osmosis installations as well.

Design basis for desalination vessels, jack-up units and water ferries is proven ship, plant and related machinery equipment which will be combined and adapted according to the project's and owner's requirements.

Driving factors for sustained increasing water consumption in world are population growth, socio-economic developments and changing consumption patterns.