

Gearing up to meet Africa's
rising power and water demand



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**AFRICAN
UTILITY
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**CLEAN POWER
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Energy Saving and Environmentally Friendly Desalination

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1. Background

- Desalination can be described as a process of removing salts and minerals from water to make it suitable for human consumption or fit for industrial use.[3]
- Currently about 1% of world population is dependent on desalination as treatment technology for drinking water, however by 2025 it will be about 14%.[1]
- To date, more than 17 000 plants are installed globally. The market size of desalination plants has increased by 157% in the past five years

1.1 Introduction

- The energy saving desalination operations started in December 2010 at Kita Kyushu, Japan.
- The current plant capacity is about 1,4MLD
- It completed 3years of operation in 2013, it is currently being upgraded.
- It currently supplies process water to Kyushu Electric Power Company in Japan.

1.2.Current Plant Location



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- Kita Kyushu is located in Fukuoka prefecture, on Kyushu Island in Japan.
- It is a city of approximately 1 Million people.
- It is a city famous for the alloy smelting industry in Japan

2. Eco-Friendly Seawater Desalination System

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Integrated system of the seawater desalination with sewage treatment



ENERGY SAVING
DESALINATION

Reuse of the sewage discharged water to the desalination plant

Sewage treatment plant

ENERGY SAVING
DESALINATION

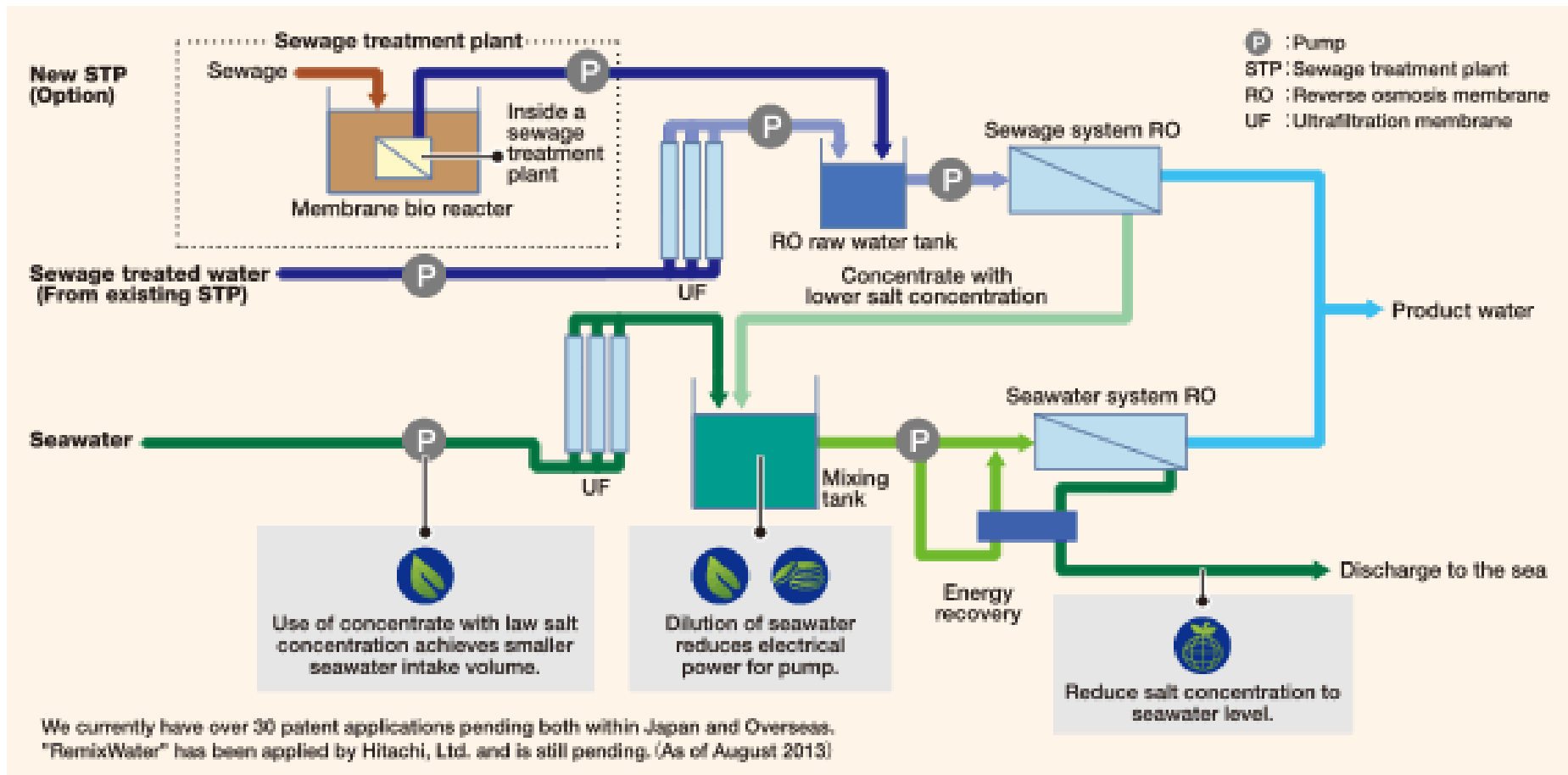
Drainage

Seawater intake

Sea

Quality standard for industry water, agriculture, irrigation, drinking etc.

2.1 Overview of the Process **HITACHI** Inspire the Next



2.2 Process advantages

- Utilizing this system allows pump energy efficiency to be maximized by reducing the amount of sewage treatment water and salt concentration in the SWRO raw water.
- Using a membrane process allows for a continuous supply of stable water quality. Although this process has been developed fairly recently, the ability to continuously operate this system for over 2 years has been verified.
- This is an energy-saving, low-cost and minimal environmental impact seawater desalination system integrating sewage treatment processes.
- It is a suitable method for building a water recycling system in cities with water shortages and industrial parks.

3. Comparison of Energy-saving desalination vs. Conventional desalination

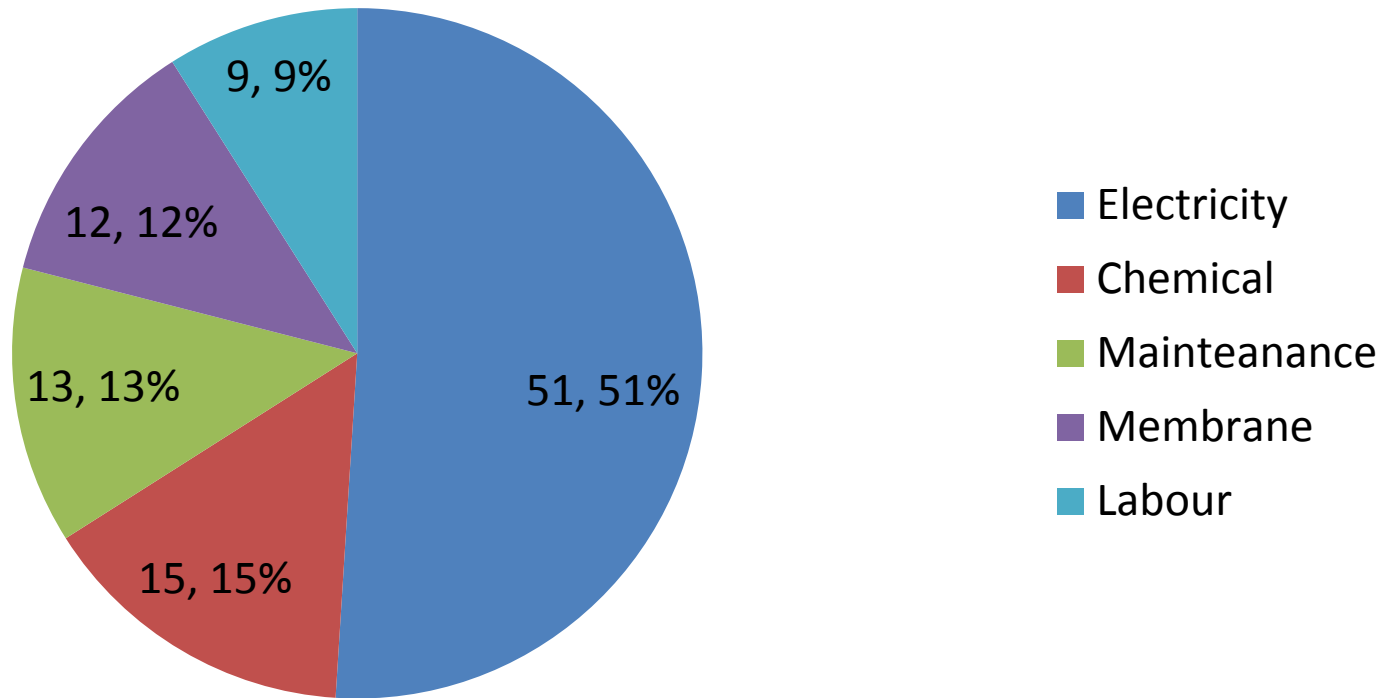
- (1) “Energy Saving desalination” is the combination of sewage reuse process and seawater RO (Reverse osmosis) desalination process.
- (2) Desalination systems are widely used for sea water treatment for industrial use and human consumption.

However, it has the following two major challenges.

- The high operation cost due to the high electricity consumption. The research by “Global Water Recycling and Reuse Solution Technology Research Association” showed that 46 % of the operation cost is electricity.
- The negative environmental impact caused by the approx. 7.0 % salinity of brine from seawater RO desalination, twice the average level of sea water.

3.1 Conventional desalination OPEX

OPEX



4. Product Water Quality



Water properties	Unit	Product Water	Japan Tap Water Std.	SANS 241
Turbidity	NTU	< 2	< 2	< 1
pH	Unit	5,8 – 8,6	5,8 – 8.6	5,0 – 9,5
Total Hardness	mg/l	< 5	< 300	
TOC	mg/l	< 2	< 3	
TDS	mg/l	< 200	< 500	<1000
Cl ⁻	mg/l	< 80	< 200	< 200

4.1 Current Work

1.	Test for pharmaceuticals in treated Water
2.	Full water quality test to ensure compliance with drinking standard
3.	Engaging various laboratories to sample product water
4.	Strategy for socio acceptance of DPR water globally

5. Hitachi reuse and desalination reference

- Water Plaza-Kita Kyushu, Japan
- Hi-star water-Burj Khalifa- Dubai, UAE
- Male Water and Sewerage Co. Maldives

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Thank you

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