

News Release

FOR IMMEDIATE RELEASE

Energy-Saving, Low Environmental Impact Seawater Desalination System Starts its Demonstration Operation in Republic of South Africa

Planning for at least 30% Energy Saving, Reduced Marine Environmental Impact, and a Stable Production of 6,250 Tons per day of Desalinated Water



The demonstration site at the waste water treatment plant in central Durban (The situation as of the end of November, 2019)



The seawater desalination and water reuse integrated system (Reverse Osmosis (RO) membrane)

Tokyo, March 4, 2020— New Energy and Industrial Technology Development Organization (“NEDO”) and Hitachi, Ltd. (TSE:6501, “Hitachi”) are engaged in a demonstration project for a seawater desalination and water reuse integrated system in the eThekweni Metropolitan Municipality, known as City of Durban, Republic of South Africa (“South Africa”), and have recently started demonstration operation of the system at the demonstration site of a waste water treatment plant in the eThekweni Metropolitan Municipality.

This demonstration project uses a system developed during a demonstration project by NEDO in Japan, and construct demonstration facilities aiming for desalinating 6,250 tons⁽¹⁾ of drinking water from seawater and treated and discharged waste water every day, while saving 30% more energy⁽²⁾ compared to conventional seawater desalination systems⁽³⁾ and reducing the impact on the nearby marine environment. In the future, we plan to introduce this technology in Republic of South Africa and to other regions with serious water shortages, thus contributing to the development of water infrastructure and industry.

【Background】

Republic of South Africa not only suffers from a serious water shortage due to large-scale droughts and other factors, but also has a power shortage that forces them to frequently conduct load shedding.

Against this background, NEDO engaged in a seawater desalination and water reuse integrated system demonstration project to solve the country’s water shortage issue and to

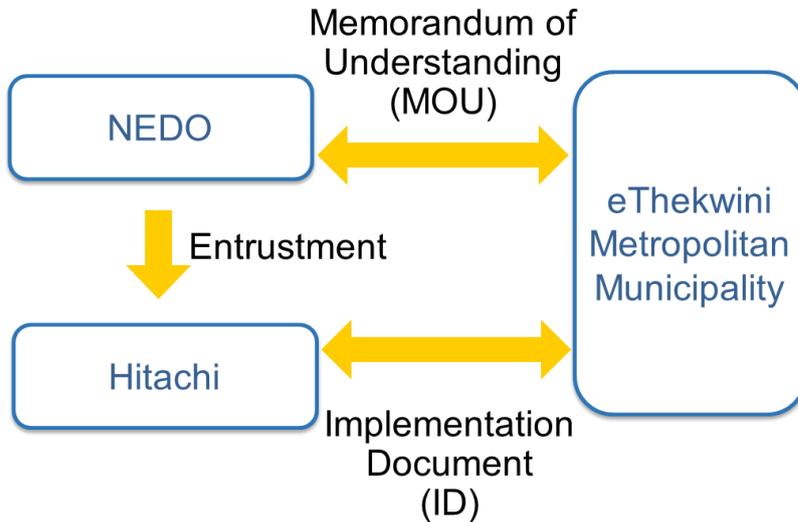
promote the introduction of energy-saving water production technology. To demonstrate the energy-saving seawater desalination and water reuse integrated system developed during NEDO's demonstration project in Japan, a Memorandum of Understanding (MOU) was concluded with eThekweni Metropolitan Municipality, South Africa on November 17, 2016⁽⁴⁾. Furthermore, the implementing agent Hitachi concluded an Implementation Document (ID) with eThekweni Metropolitan Municipality, the owner of the waste water treatment plant where the demonstration plant located.

And recently, NEDO and Hitachi have completed construction, equipment installation, and commissioning of the demonstration facilities, and have commenced demonstration operation of the system.

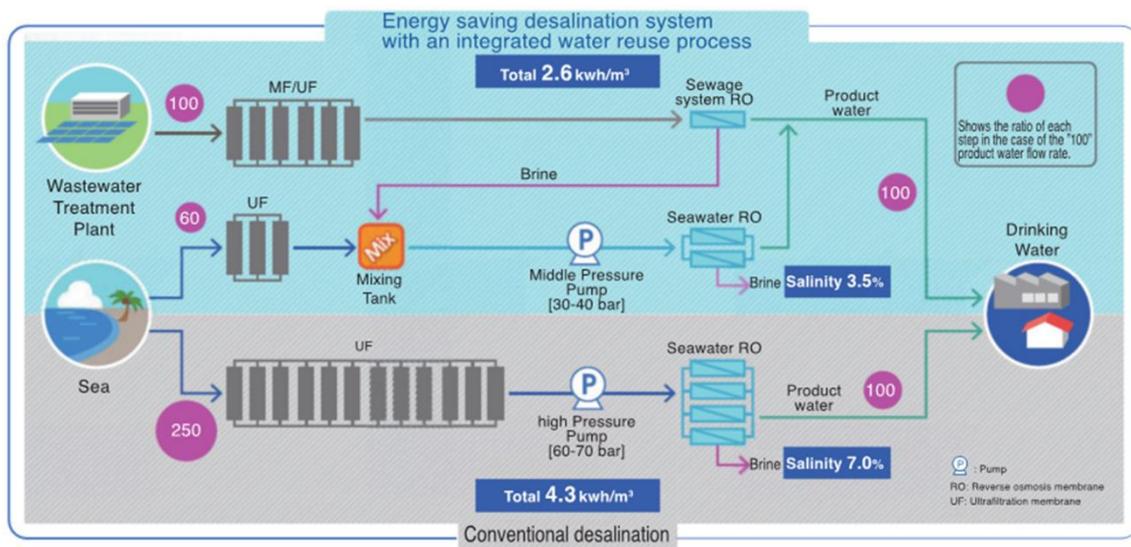
In this demonstration project, the system "RemixWater" ⁽⁵⁾, which was developed in a demonstration project by NEDO in Japan, replaces the high-pressure pumps (6–7MPa(60-70 bar)) needed by conventional seawater desalination systems with medium-pressure pumps (3–4MPa(30-40 bar)) by using brine water (water separated in the process to treat waste water for reuse) to dilute the salinity of the seawater. The aim is to implement demonstration facilities capable of producing 6,250 tons of drinking water per day, and cut power consumption by at least 30%. Moreover, in regards to the desalinating seawater, it is considered to be an issue that the discharge of desalination process which has high salinity is discharged to the sea and has impact on the nearby marine environment, but with the system to be demonstrated in this project, the discharged water's salinity becomes the same level as the seawater as raw water is diluted with the brine water of wastewater, which reduces the impact on the marine environment.

- (1) 6,250 tons: This corresponds to a water supply population of about 25,000.
- (2) Saving 30% more energy: Hitachi estimates for "RemixWater" in case of converting 100,000m³/day at 3.5% seawater salinity.
- (3) Conventional seawater desalination systems: It is a system that desalinates by filtering seawater only through a Reverse Osmosis (RO) membrane. High pressure is needed to permeate through the RO membrane and this causes high energy consumption.
- (4) A Memorandum of Understanding (MOU) was concluded with eThekweni Metropolitan Municipality, South Africa on November 17, 2016: Reference news release:
"NEDO Launches an Energy Saving Seawater Desalination Technology Demonstration Project in the Republic of South Africa" (November 18, 2016) https://www.nedo.go.jp/english/news/AA5en_100152.html
"Commencement of the Demonstration Project for "RemixWater", Seawater Desalination and Water Reuse Integrated System in the Republic of South Africa" (November 18, 2016)
<https://www.hitachi.com/New/cnews/month/2016/11/161118a.html>
- (5) RemixWater: This system was researched empirically and developed in "Water Plaza Kitakyushu" (Kitakyushu, Fukuoka) by the Global Water Recycling and Reuse Solution Technology Research Association (GWSTA) as part of NEDO's "Water Saving and Environment Friendly Water Recycle Project." During a period of three years starting in April 2011, 1,400m³ of water was stably produced per day. Subsequently, Hitachi, Ltd. developed "RemixWater," a new energy-saving and low environmental impact type of water production system for industrial and wastewater (drinking water level), based on the system developed by GWSTA. ("RemixWater" is a registered trademark of Hitachi in Japan.)

■ Implementation structure



■ System overview



【Details of the demonstration operation】

(1) Energy saving

Conventional seawater desalination systems have had the issue of high energy consumption due to the use of high-pressure pumps (6–7MPa) in the desalination through RO (Reverse Osmosis) membranes. This system uses water drained during waste water reuse to dilute the seawater and lower the salinity. This makes it possible to use medium-pressure pumps (3–4MPa) and cut power consumption by at least 30%.

During the demonstration operation, Hitachi will demonstrate that the power needed to desalinate 1 ton of water was at least 30% less than for conventional methods.

(2) Reducing the impact of the marine environment

Conventional seawater desalination systems have to discharge high salinity water into the nearby sea following seawater treatment, which raise concerns of impacting the marine environment. The system demonstrated in this project uses brine water from the waste water reuse to dilute the seawater before desalination, which makes the salinity of the discharged brine same as the seawater, thereby minimizing the impact on the marine environment.

During the demonstration operation, Hitachi will demonstrate that the salinity of the drainage water from the system had the same level as the seawater.

(3) Stable water production

During the demonstration operation, Hitachi will demonstrate that stable water production of the designed volume (6,250 tons per day) will be achieved as well as that the quality of the water produced met the South African National Standards for drinking water.

【Future Plans】

Making this demonstration project the first foothold in Africa, NEDO is aiming to introduce Japanese technology broadly to South Africa and other regions with serious water shortages, and contributing to the development of water infrastructure and the industries in those regions. Hitachi is using the opportunity of this demonstration project to propose this system and other water environment solutions to countries and regions with water resource shortages, as well as continue to engage in water infrastructure development and challenges. Moreover, through initiatives such as this, Hitachi will contribute to realize the SDGs (Sustainable Development Goals) established by the United Nations as international targets for achieving a sustainable world.

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, is focusing on Social Innovation Business combining its operational technology, information technology and products. The company's consolidated revenues for fiscal 2018 (ended March 31, 2019) totaled 9,480.6 billion yen (\$85.4 billion), and the company has approximately 296,000 employees worldwide. Hitachi delivers digital solutions utilizing Lumada in five sectors including Mobility, Smart Life, Industry, Energy and IT, to increase our customer's social, environmental and economic value. For more information on Hitachi, please visit the company's website at <https://www.hitachi.com>.

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