ENGINEERING
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iSave 21 Plus ERDs: Big **energy savings** for small **SWRO** plants

> *"Because of its cost efficiency, high energy efficiency, reliability, and space-saving design, the **iSave 21 Plus** continues to exceed our expectations. We can confidently recommend it to others due to its practicality and performance benefits."*
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> **MOHANAD ALKASEM, Project Engineer**
> ***CELAR Water Equipment, UA***

Energy recovery devices (ERDs) play a pivotal role in seawater reverse osmosis (SWRO) systems by transferring energy from the high-pressure brine stream to the low-pressure feed water. These devices significantly boost the energy efficiency of the high-pressure loop.

Isobaric ERDs, the industry benchmark for efficiency and reliability, enhance SWRO plant energy efficiency by up to 60%. This slashes operating costs and lowers carbon emissions accordingly, making these devices essential for financially and environmentally responsible desalination and other high-pressure membrane processes.

With the introduction of the Danfoss iSave range in 2008, small SWRO plants gained the ability to achieve substantial energy savings, making small-scale desalination more cost-effective and environmentally friendly. Over the past 10-15 years, growing decarbonization efforts and the adoption of total cost of ownership approaches have further emphasized the importance of energy efficiency in SWRO plants of all sizes.

The iSave 21 Plus is the **smallest isobaric ERD** on the market – and also one of the **most efficient** and **robust**

With a water capacity of 110 to 350 m^3 per day, the iSave 21 Plus has been a game-changer for small SWRO plants due to its impressive energy efficiency, compactness, and reliability.

- **Energy efficiency:** The iSave 21 Plus is 93% energy efficient, meaning it recovers 93% of the high-pressure energy that would otherwise be wasted. This results in up to 60% energy savings for plant operators, which directly translates into lower operating costs and reduced environmental impact.
- **Compact 3-in-1 design:** The iSave 21 Plus is unique in the market with its integrated design that combines a pressure exchanger, booster pump, and motor. This not only significantly reduces the footprint of the ERD but also simplifies overall system design.
- **Reliability:** With a proven track record of long service intervals and robust performance in challenging environments, the iSave 21 Plus ensures that even the most remote or under-resourced operations can maintain reliable fresh water production. As many of these plants are located in remote areas far from large urban centers, this reliability is crucial for smaller plants with limited access to maintenance services. Compared to the first iSave 21, the iSave 21 Plus iteration introduced in 2017 features a reinforced internal coupling so it can handle a delta pressure up to 5 bar and a vane pump that handles 5 bar instead of 3 bar – both innovations that make this workhorse even more robust.
- **Application versatility:** With its small footprint, the iSave 21 Plus is ideal anywhere space is at a premium. This includes containerized solutions, as mentioned below, but also marine SWRO applications for cruise ships and wellboats.

Water treatment specialists agree: the iSave 21 Plus is a **reliable workhorse** that **saves space**, **OPEX**, and **emissions**

Customers worldwide rely on the iSave 21 Plus for a wide variety of onshore and offshore RO applications.

According to Mohanad Alkasem, Project Engineer at the UAE-based water treatment plant CELAR Water Equipment, "We have specified the iSave 21 Plus for SWRO projects on barges, smaller ships, and skid-mounted plants in Oman, the Maldives, and UAE. Because of its cost efficiency, high energy efficiency, reliability, and space-saving design, the iSave 21 Plus continues to exceed our expectations. We can confidently recommend it to others due to its practicality and performance benefits."

Terri Thompson, proposals engineering specialist at Salt Separation Services in the UK, agrees. "These compact, straightforward energy saving devices offer our customers consistent and reliable performance, optimizing water recovery effortlessly and minimizing SWRO's environmental impact. And they do it all within a neat, space-saving design. In recent years, for example, we have found great success in using the Danfoss iSave 21 Plus in some of our plants in the cruise industry.

Danfoss iSave's are our preferred option, and have been for the last decade or so, because these energy saving devices are cost effective, simple, compact and OPEX friendly."

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> **TERRI THOMPSON, Proposals Engineering Specialist**
> ***Salt Separation Services, UK***

The combined **energy savings** of many **smaller SWRO plants** add up to something big

The Danfoss iSave 21 Plus ERD is more than just a technical innovation—it is a catalyst for making small-scale SWRO plants more viable, both economically and environmentally.

By dramatically reducing energy consumption and simplifying system design for the thousands of small SWRO plants expected to come online in the coming decades, the iSave 21 Plus enables small SWRO plants to deliver fresh water more efficiently and sustainably. Similarly, retrofitting the thousands of smaller plants not currently enjoying the benefits of isobaric ERDs would also result in far-reaching financial and environmental benefits.

Today, the iSave 21 Plus is a cornerstone in Danfoss's portfolio, inspiring the development of solutions for medium and large plants, such as the iSave 40, 50, and 70, as well as the MPE 70. As Danfoss continues to push the boundaries of energy efficiency and product innovation, the iSave 21 Plus will remain a key player in the evolution of desalination technology.

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