

**Desalination for the Environment: Clean Water and Energy**  
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## **On-site demonstration of a robust rotary energy recovery device**

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### **A B S T R A C T**

In designing modern desalination plants, reliability, energy consumption, and system availability are major drivers. This manuscript describes the demonstration of the robustness of seven Flowserve FLEX™ rotary energy recovery devices after 30,000 h of operation in a seawater reverse osmosis desalination plant in Las Palmas 3 – Emalsa, Spain. A robust design with fewer parts and minimal maintenance was considered a critical element to ensure the reliable operation of the energy recovery device. In the world of desalination and water reuse, choosing the right materials for durable systems is crucial for efficiency and long-term performance. This presentation explores material science, spotlighting the Flowserve FLEX™ split configuration and cast Titanium-made casing – an innovative material choice for robust desalination systems – as well as a patented axle positioning rotor configuration for its internal high-purity ceramic core. This presentation offers a unique opportunity to share and discuss the results obtained from the Emalsa plant's operational experience. The focus remains on providing valuable insights into the practical implications and performance benchmarks achieved through sustained operation. Through a detailed examination of operational data and material performance, this presentation aims to contribute to the broader discourse on advancing desalination technologies, fostering sustainable solutions for global water challenges.

*Keywords:* Energy recovery; Reverse osmosis; Pressure exchanger; Reliability; Material innovation

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