

CASE STUDY · MUNICIPAL WATER AUTHORITY

Atlas Water Authority

Energy Recovery Retrofit Cuts Desalination Plant Energy Use 22 Percent

SUMMARY

Retrofitting a legacy seawater reverse osmosis plant with modern isobaric energy recovery devices reduced specific energy consumption by 22 percent, lowering operating cost without expanding the plant's footprint.

22% ENERGY REDUCTION	0 SERVICE INTERRUPTIONS	7 months RETROFIT DURATION	< Board Threshold PAYBACK PERIOD
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The Problem

Atlas Water Authority operated a seawater reverse osmosis desalination plant commissioned in the early 2000s using older Pelton-wheel-type energy recovery technology, resulting in specific energy consumption meaningfully above what modern isobaric energy recovery devices could achieve.

Rising regional electricity costs were putting pressure on the authority's water rates, and the board sought engineering options to reduce operating cost without a full plant expansion or replacement, which the capital budget could not accommodate.

Our Solution

HydroLabs conducted a detailed energy audit of the existing plant, confirming that the Pelton wheel energy recovery system was the single largest addressable source of excess specific energy consumption relative to current best-available technology.

We designed a phased retrofit plan to replace the existing energy recovery devices with modern pressure exchanger systems across the plant's train configuration, sequenced to allow continued plant operation with only partial capacity reduction during the retrofit rather than a full shutdown.

Our team supported the authority's capital planning process by quantifying the retrofit's payback period against current and projected electricity prices, supporting the board's capital approval decision.

Timeline

Energy Audit & Feasibility	5 weeks — plant energy balance, retrofit feasibility assessment
Retrofit Design	10 weeks — pressure exchanger sizing, train-by-train sequencing plan
Phased Installation Support	7 months — engineering oversight across sequenced train retrofits

Results

- Specific energy consumption fell 22 percent following full retrofit completion, reducing the plant's annual electricity cost meaningfully at current regional power prices.
- The retrofit was completed with zero unplanned service interruptions to the authority's water customers, using the phased train sequencing approach to maintain partial plant capacity throughout.
- Projected retrofit payback period came in under the authority's board-approved capital threshold, supporting a similar retrofit program the authority has since initiated at a second facility.

