

Study G

Test the full cooling and water balance

When do source interruption, hot sinks and real demand make heat-assisted recovery better or worse than conventional cooling plus water treatment?

Equal-service integration validation with a conditional control question. This is a proposed study; no result or novelty is established.

What earlier work establishes

Data-center heat-driven desalination, telemetry scheduling, RO preheating and seawater cooling have precedents. Building an isolated coupling is a validation task, not a first-invention claim.

The proposed difference

Map failure and benefit boundaries at equal cooling reliability and accepted-water service; advance a new controller only if an explicit difference survives existing scheduling prior art.

A fair comparison

B0: best feasible conventional cooling plus treatment

B1: simpler recovered-heat use, including qualified RO preheating

T: isolated MD with a prespecified bypass/dispatch rule

The decision

Freshwater consumption and auxiliary electricity at equal cooling and delivered-water service, including downtime.

Planned scope

54 six-hour trajectory runs and three paired seven-day campaigns; 288 principal panels across 324 platform hours and 42 configuration-days.

Before confirmation

Actual source/sink and demand traces, feasible host cooling alternatives and an absolute freshwater-saving opportunity are required.

Funding basis

15 funded months. Preliminary standalone estimate: lower \$1,631,277, base \$1,917,872, higher \$2,476,228. All studies use the same rates and cost rules, including founder coordination, scientific staff, analyses, equipment, institutional costs and reserve. These are unquoted planning estimates; shared execution requires an itemized combined scope.

Methods and source review

[Complete methods and reading limits](#) · [Editable unified budget](#)

N13: [US20190233305A1: Using waste heat from a data center cooling system to facilitate low-temperature desalination](#)

N14: [Chen et al., Experimental study of a membrane distillation desalination system based on CPU waste heat](#)

N15: Malaguti et al., Waste heat won't make membrane distillation cool: Thermodynamic analysis of cooling and pumping burdens

N24: Alfa Laval AQUA fresh-water generator, operating principle and installation

S09: Waste heat won't make membrane distillation cool: Thermodynamic analysis of cooling and pumping burdens

S20: Pioneering minimum liquid discharge desalination: A pilot study in Lampedusa Island

S22: Analysis of energy, water, land and cost implications of zero and minimal liquid discharge desalination technologies