

Study H

Collect water when heat and cooling are limited

Can a controller that accounts for uncertain forecasts and stored moisture avoid wasted regeneration while delivering more qualifying water than a tuned adaptive controller under the same resource limits?

Candidate constrained-control contribution; novelty unresolved. This is a proposed study; no result or novelty is established.

What earlier work establishes

Weather adaptation, condenser control, forecast-assisted energy management and battery-constrained water generation already appear in research and patents. Adding a forecast or heat budget alone is not a defensible novelty claim.

The proposed difference

A prespecified moisture-inventory and uncertainty-aware run/wait/stop rule is compared on equal hardware and forecast access.

A fair comparison

C0: tuned fixed timing

C1: competent weather/condenser-aware, forecast-assisted feasible schedule

T: C1 plus the registered inventory/uncertainty rule

The decision

Qualifying collected liquid over complete 24-hour periods at identical heat, electricity and cooling limits.

Planned scope

Nine independent beds and 54 chamber bed-days; six paired field units over two 14-day windows, totaling 168 unit-days; 222 principal water panels.

Before confirmation

An actual sorbent and usable heat grade, climate/resource profiles, a strong adaptive baseline and an unresolved forecast/error decision are required.

Funding basis

18 funded months. Preliminary standalone estimate: lower \$1,777,151, base \$2,065,165, higher \$2,649,102. 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](#)

N25: Almassad et al., Environmentally adaptive MOF-based device enables continuous self-optimizing atmospheric water harvesting

N26: WO2023007524A1: An atmospheric water generating device and a method of active or adaptive atmospheric water generation

N27: AU2022204740A1: Systems and methods for water extraction control

N35: Innovative energy management using time-series forecasting for atmospheric water harvesting in a semi-arid climate, combining a hybrid cascade cycle and AI

N36: Pavel Soucek, Atmospheric water generator optimization