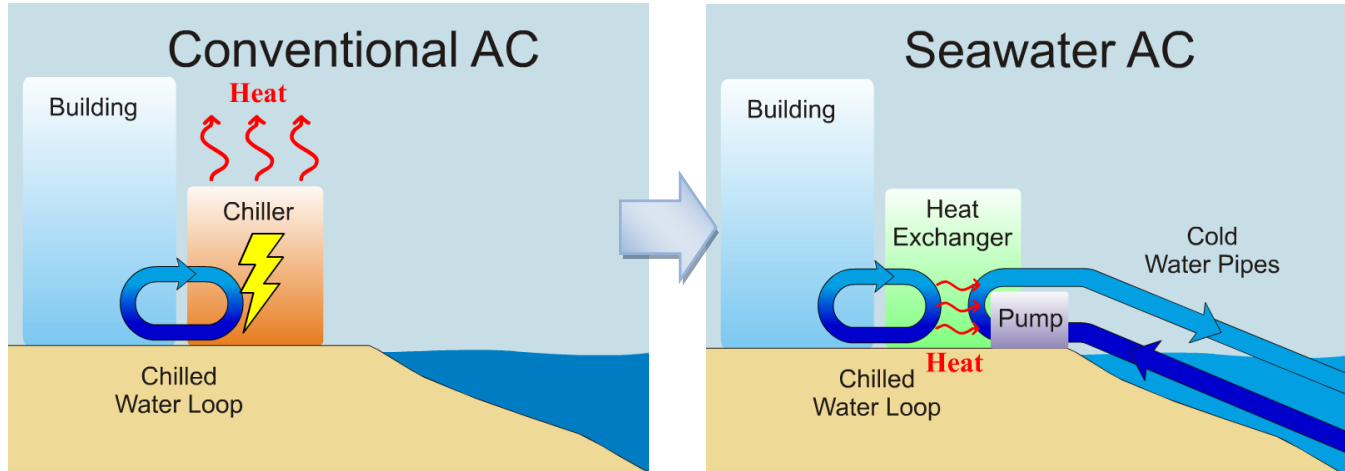


Seawater Air Conditioning (SWAC) – An Introduction



What is Seawater Air Conditioning (SWAC)?

A naturally occurring, deep, cold water reservoir is used for air conditioning. Cold water is drawn from a lake or ocean through a deep water intake pipe to a cooling station, where it goes through a heat exchanger and absorbs heat transferred from the buildings by way of a chilled fresh water loop without ever mixing with the ocean or lake water. The slightly-warmed ocean or lake water is then discharged back into the ocean or lake, usually at a shallower depth.

What are main components involved in a SWAC system?

- **Cold water supply and return pipes:** This is the primary cost driver.
- **Pump & heat exchanger systems:** The only electrical component in the system is the pump. Heat exchangers allow heat from the buildings to be transferred to the cold water and ensure that the fresh and seawater don't mix. This transfer of heat is spontaneous and natural, and requires no input of electricity.
- **Chilled freshwater loop:** A standard component in a conventional AC system. Pre-existing chilled water loops can be used.

Why would I choose a SWAC system over a conventional AC system?

- **Long-term savings** of up to **85%** on operational costs
- **Low, stable electrical costs:** SWAC systems require very little electricity
- **Short economic payback period:** The initial capital expenditure for a good SWAC system can be recouped in 5 – 10 years.
- **Predictable free renewable energy:** Reduce fuel needs, reduce CO2 emissions and potentially improve LEED certification status.

What factors make a site a good candidate for a SWAC system?

Not all of these factors need to be favorable, but the more you answer "Yes" to these questions, the greater the savings. Does your site have:

- Good access to **deep cold water**?
- Close proximity to shore, and a small distribution network?
- **Large size** or cooling loads (>1000 tons or 3500 KW)?
- High *cooling usage* throughout the year?
- High *electrical rates*?

Where in the world is SWAC being studied or used?

Operational SWAC facilities:

- Toronto, Canada
- Bora Bora, French Polynesia (pictured top right)
- Kona, Hawaii, USA (pictured bottom right)
- Cornell University, Ithaca, NY, USA
- Stockholm, Sweden

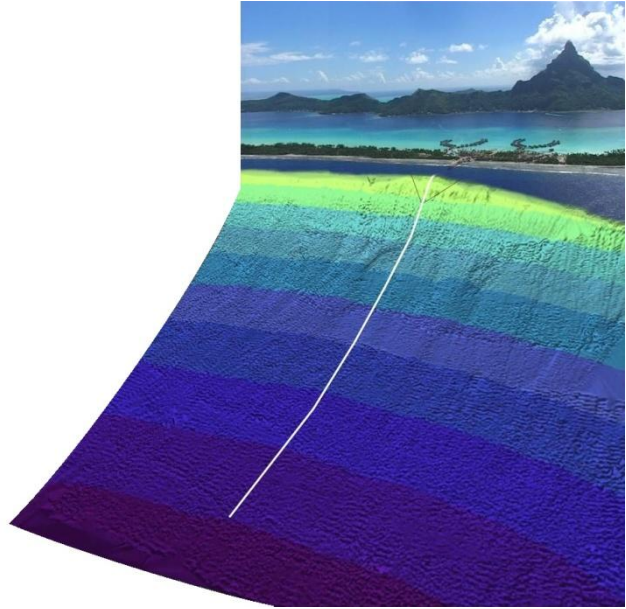
Under Development:

- Curacao, Netherlands (Caribbean)
- Honolulu, Hawaii, USA

Studied:

- Guam, USA

Over one dozen other locations...



- Studied
- Operational
- Under Development

How can I determine if my facility might be a good location for SWAC?

A **feasibility study** provides a quick look at the cost/benefit analysis for a SWAC system versus a conventional AC system. More detailed engineering and design work will be initiated after this first step if conditions look favorable for SWAC development. To correspond directly with one of our engineers about your facility's potential for a SWAC system, please email swac@makai.com, or visit www.makai.com for more information.

What types of facilities commonly use SWAC?

- Airports
- Data Centers
- District Energy / District Cooling Projects
- Government / Military facilities
- Hotels & Resorts
- Industrial / Manufacturing Facilities
- Large Office or Commercial Buildings
- Power Plants
- Shopping Malls / Department Stores
- Universities

