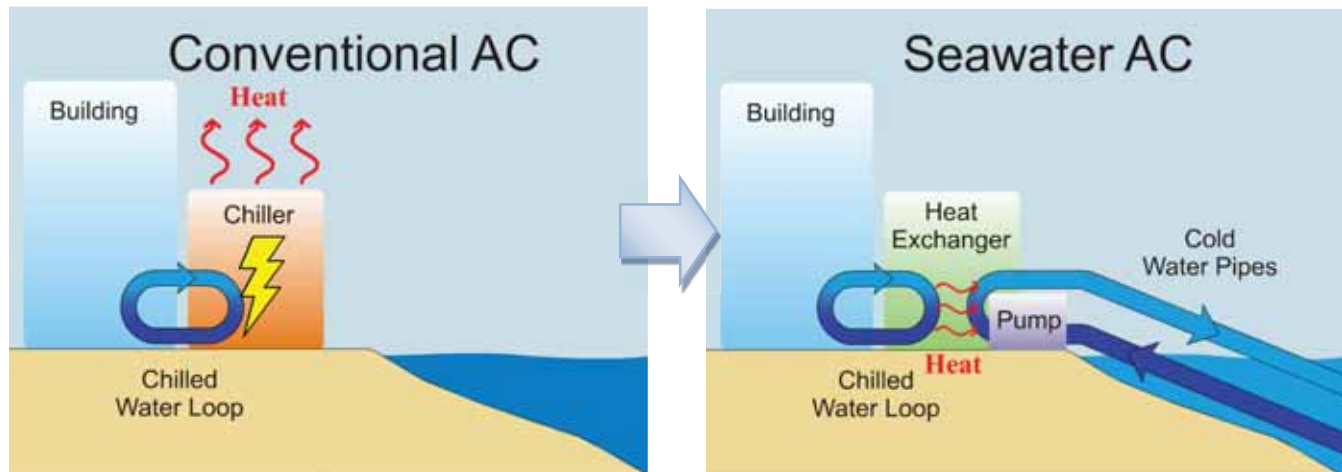


## Seawater Air Conditioning (SWAC) – An Introduction



### *What is Seawater Air Conditioning (SWAC)?*

A naturally occurring, cold water reservoir is used for air conditioning in buildings. Cold water is drawn from a lake or ocean through a deep water intake pipe to a cooling station, where it absorbs heat from the buildings by way of a chilled fresh water loop. The lake or ocean water never enters the buildings and never mixes with the chilled fresh water. The slightly-warmed ocean or lake water is then returned into the ocean or lake, usually at a shallower depth.

### *What are the main components of a SWAC system?*

- **Cold water supply and return pipes:** These pipes are designed specifically for your site.
- **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 chilled water and ocean or lake water don't mix. This transfer of heat is spontaneous and natural, and requires no input of electricity. No seawater enters the buildings.
- **Chilled freshwater loop:** A standard component in a centralized chilled water 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 **90%** on energy costs
- **Low, stable electricity costs:** SWAC users are insulated from energy price volatility
- **Short economic payback period:** The initial capital costs for a good SWAC system can be recouped in 3 – 10 years.
- **Predictable, freely available renewable energy:** Reduce fuel consumption & CO2 emissions, and **GO GREEN.**

### *What factors make a good SWAC system?*

The more you answer "Yes" to these questions, the more likely you are to have a good candidate for a SWAC system. Does your development have:

- Close access to **deep cold water**?
- A site close to shore, and a **tight grouping of buildings**?
- **Large size** or cooling loads, greater than 1000 refrigeration tons or 3500 KW?
- High *cooling usage* throughout the year?
- High *electrical rates*?

*Where in the world is SWAC being used or studied?*

**Operational SWAC facilities:**

- Toronto, Canada
- Cornell University, Ithaca, NY, USA (top right)
- NELHA, Kona, Hawaii, USA (bottom right)
- Stockholm, Sweden

**Under development:**

- Port Louis, Mauritius
- Honolulu, Hawaii, USA
- Bahamas
- La Reunion

**Sites Makai has studied:**

- *Pacific Ocean:* Hawaii, Guam, Saipan, Kwajalein, Tahiti, New Caledonia, Cabo San Lucas, Panama, Philippines.
- *Indian Ocean:* Maldives, Mauritius, Oman, La Reunion, Diego Garcia, Seychelles, Bali, Comoros.
- *Caribbean:* Jamaica, Dominican Republic, Guadeloupe, Martinique, Bahamas, Puerto Rico, Bermuda, Grand Cayman, USVI, Curacao.
- *Atlantic:* Gibraltar, Brazil, Portugal.
- And more than a dozen other locations...

*What types of facilities can typically 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



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

Makai provides initial opinions of SWAC viability free of charge. If the site looks promising, Makai will propose a **feasibility study** to provide 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 these first steps if conditions are favorable for SWAC development. To correspond directly with one of our engineers about your site's potential, please email [swac@makai.com](mailto:swac@makai.com), or visit [www.makai.com](http://www.makai.com) for more information.

Please watch this brief informational video:

 [https://youtu.be/\\_iFaTYpGYM8](https://youtu.be/_iFaTYpGYM8)

