

## What is Solar Cooling?

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A long time ago, humans lived under the Sun in the most natural way. At that time, air-conditioning, TV or even a refrigerator (which is a must in every household today) were beyond our imagination. Today, we are so used to shopping in an air-conditioned mall, and watching a 32" LCD TV with surround sound system, etc. However, do we as engineers notice that we are consuming the most resources in the history of mankind?

With the limited crude oil and natural gas reserves, it is important for us to plan and use the depleted resources diligently and practice energy conservation whenever possible. One of the possible ways to reduce our dependency on oil and gas is by using solar energy.

Continuous research has proven that solar energy can be used to generate electricity and power various appliances, amongst others, the air-conditioning system. As Malaysia is a tropical country, power consumption in air-conditioning can be substantial.

Among a variety of options, solar energy can be harvested via Evacuated Tube Collectors into thermal energy or via photovoltaic cells into electrical energy. High temperature water can be fed into an absorption chiller to produce chilled

water, whereas electricity can be used to power compressor type chillers.

Conversion rate of solar energy into thermal or electricity can vary according to location, tilt angle of the solar panel, system configuration, etc. Today, various solar thermal simulation software packages are available to enhance the design of a solar thermal system with reliable yield forecast.

As a solar cooling system is 'sunshine' dependent, night time, cloudy or rainy days will affect energy generation. Therefore, it is important for engineers to assess the design of the system and its application from various fundamental perspectives, including heat load estimation. The establishment of the solar heat gain and constant heat load fraction has suggested the feasibility of a hybrid cooling system.

Solar cooling is slowly being accepted today. Support from the Government, such as an incentive of 100% investment tax allowance for corporations that use solar cooling systems has further encouraged corporations to consider switching to solar cooling.

It is sensible to switch to renewable energy now before another round of unpredictable energy crisis occurs. Let us preserve the Earth.

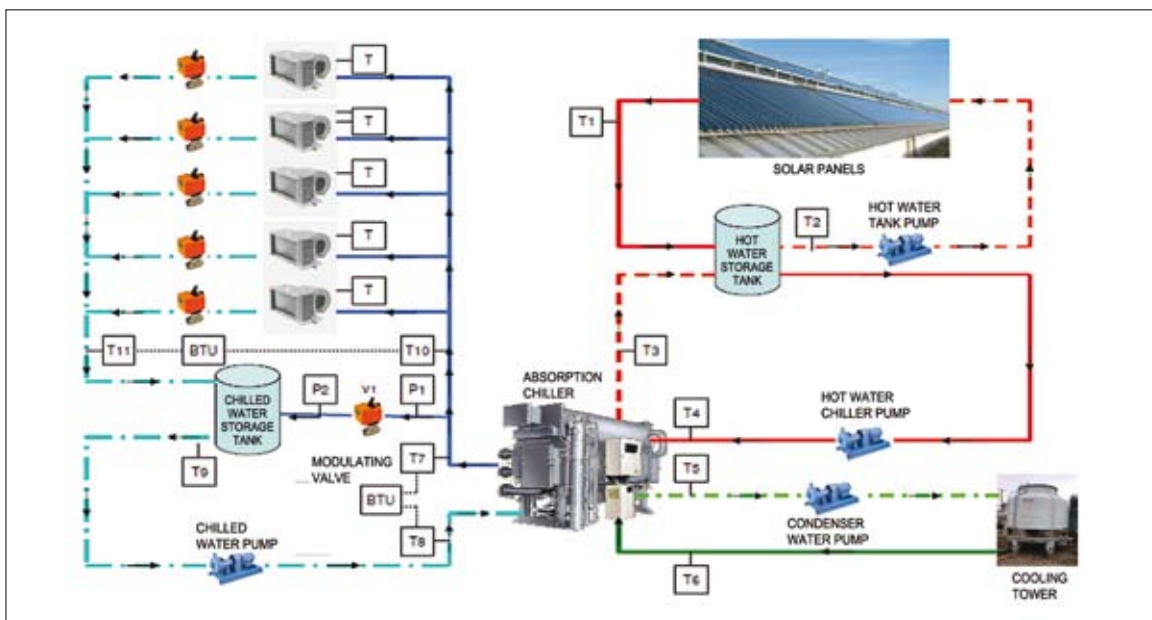


Figure 1: System Configuration of Absorption Chiller with Evacuated Tube Collectors

Heat Load		Energy Source	
Constant Load	Human, Lights, Machine	Natural Gas	Utility Grid
Variable Load	Solar Heat Gain via Wall, Window, Roof, Door, Skylight	Solar Energy	

Figure 2: System design in accordance to the requirement