

Case Study

Supermarket Solar Cooling System



Overview: A new Whole Foods Market located in Kailua, HI opened its doors on April 19, 2012. As part of the company's ongoing effort towards saving energy and practicing sustainability, Whole Foods had commissioned Lumen Solar LLC and J&J Mechanical to design a groundbreaking solar cooling system for the new 25,000 sqft market - the first of its kind to be featured in a supermarket in the United States.



The system provides hot water, air conditioning and refrigeration by utilizing Seca Thermal Liquid Desiccant Air Conditioning (LDAC) technology combined with an Apricus solar thermal array consisting of 80 Apricus APSE-30 Collectors, which is the largest solar thermal array in Hawaii. The system works by dehumidifying the outside ventilation air entering the store and uses the LDAC system to greatly reduce energy consumption by the air conditioning and refrigeration systems. The Apricus solar array then provides heat to regenerate the constantly circulating liquid desiccant back through the air conditioning device.

Project Highlights:

Array Size:	80 Apricus AP-30 Collectors
Occupied Roof Area:	3,500 sq ft
Average Daily Output:	3.4 million Btu's
Annual Energy Savings:	45,000kWh
Payback:	Approximately 1 year

With the highest electricity costs in the nation, Whole Foods is pleased to save on the market's most energy-intensive processes, air conditioning and refrigeration. The system produces an average daily output of 3.4 million Btu's and expected to reduce Whole Foods Kailua's air conditioning and refrigeration costs by about 40% paying for itself in approximately one year.



Site Description:

Property Name:	Whole Foods Kailua
Location:	Kailua, HI
Building Use:	25,000 sq ft Supermarket
System Type:	Solar Thermal Liquid Desiccant Air Conditioning (LDAC)
Displaced:	Electricity
Design By:	Lumen Solar LLC and J&J Mechanical Systems
Installation By:	Grand Solar

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“Both as a good corporate citizen and a member of the Hawaii community, one of Whole Foods Market’s core values is to reduce environment footprint whenever and wherever possible. “It is our hope that this [LDAC system] will help light the way for others in the industry to take a look at how we can incorporate new technology into being more environmentally conscious companies.”

~ Tim Talkington, Whole Foods Market Kailua Store Team Leader



Apricus APSE-30:

Physical Specifications:

Dimensions:	2.0m x 2.2m / 78.9” x 86.4”
Aperture Area:	2.98m ² / 32.05ft ²
Gross Area:	4.15m ² / 44.76ft ²
Gross Dry Weight:	95kg / 209lb
Fluid Capacity:	710ml / 24 fl oz
Max Pressure:	800kPa / 116psi

Materials of Construction:

Evacuated Tubes:	Borosilicate 3.3. Glass
Absorber Coating:	Aluminum Nitrate
Heat Pipes:	High Purity Copper
Mounting Frame:	439 Stainless Steel
Manifold Casing:	5005-H16 Anodized Aluminum

Warranty:

Manifold & Frame:	15 years
Tubes & Heat Pipes:	10 years

“The project demonstrates how Apricus solar thermal can work seamlessly with HVAC technologies to provide cost-effective, efficient solutions that reduce the energy footprint of commercial buildings. We see many potential applications for solar cooling in Hawaii and beyond.”

~ Melissa White, Managing Partner of Lumen Solar

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