New

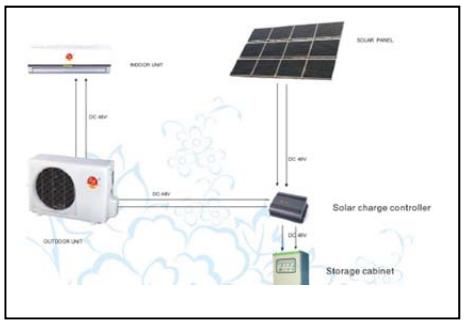
Biosirus

Intelligent Cooling

Ultra Efficient Split A/C Systems

9000 / 12,000 / 18,000 / 24,000 BTUs

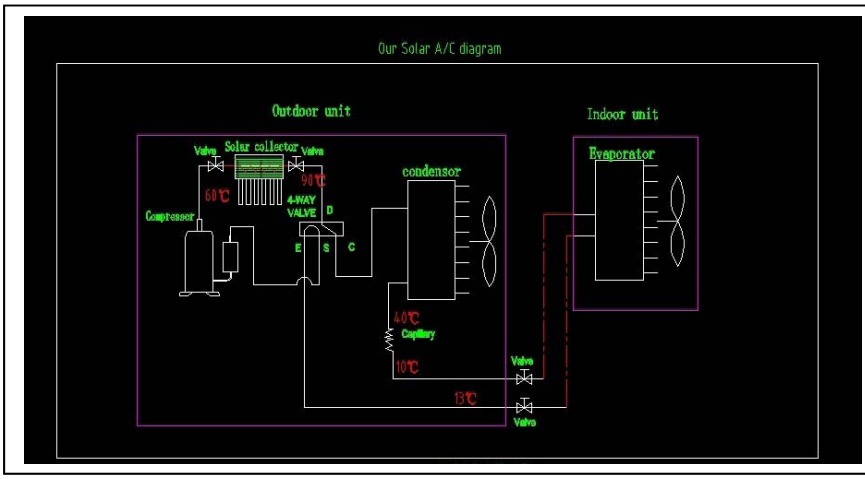
- **Application:**
  - Residential & Small Commercial
  - Apartments & Condos
  - Homes, Villas and Townhouses
  - Small Stores/Offices in Plazas
  - Smaller Classrooms
- **A/C System Combinations:**
  - **Indoor Unit** (Wall Mount, Floor Standing, Cassette)
  - **Outdoor Unit**
    - With Solar PV
    - With Solar Thermal (cooling process efficiency)
  - **Grid Tied (AC) or Off-Grid (DC)**
  - **Cooling only or Cooling/Heating**
- **Sizes/Capacity**:
  - **Grid Tied with Solar PV - 9000/12,000/18,000/24,000 BTUs**
  - **Grid Tied with Solar Thermal - 9000/11,500/12,000/18,000/20,000/24,000 BTUs**
  - **Off-Grid with Solar PV & Batteries - 9000/12,000/15,000/18,000/24,000 BTUs**
- **How Does it Work:**
  - Ultra efficient DC Compressor
  - Solar PV improves electrical input efficiency
  - Solar Thermal improves cooling efficiency
- **Energy Savings:**
  - Typical Energy Savings of 35% or more
    - Through efficient compressor operation time and efficient cooling process
    - Larger volumes of cooling refrigerant
  - Compressors consume 75%-90% of energy – so less equates to more savings
- **Warranty:**
  - 5 year Compressor Warranty / Extended Warranty Options
  - Financing Available
- **Energy Efficiency Ratio (EER):**
  - **>14.0 (BTU/h/Watt)**
  - **>5.0 (Watt/Watt)**



Tech Talk: *Intelligent Cooling based on solar-thermal optimization and efficient DC compressor.*

- Solar-PV units get additional PV power thus improving its energy efficiency

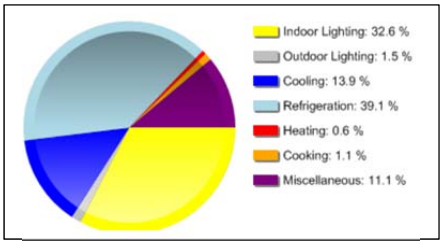
- Solar-thermal units utilize an additional solar heat source, to drive the cooling process. This reduces the electrical power needed to run the compressor. The system is similar to a regular A/C in that the refrigeration takes place by evaporating liquid with a very low boiling point. ***The difference is how the gas is changed back into a liquid.*** A regular A/C uses a compressor to pressurize the gas, forcing it to become a liquid through the use of the condenser coil. The change of state starts to take place *approximately 2/3rd's of the way down the condenser*. The Solar A/C uses the solar heat to superheat the refrigerant from roughly 75 °C to 85°C which enables the refrigerant to begin changing state *at the top 2/3rd's of the condenser coil.* ***By this, it reduces the compression power required as well as utilizes more of the condenser cooling face.*** The Solar A/C allows more of the refrigerant to change state back into a liquid (faster as well) thus allowing more liquid into the capillary device (evaporator). **The superheated refrigerant largely improves the cooling effect when cooling exothermically into a liquid in the condenser.**



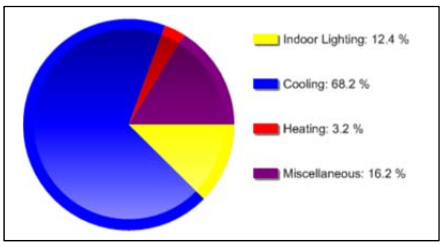
Typical Electricity Consumption

(Source: US DOE)

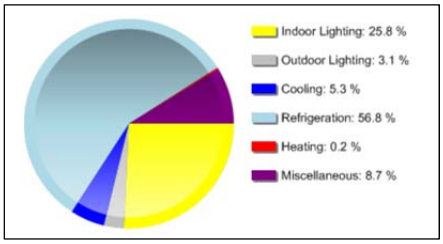
Grocery Store (60,000 sq. ft.):



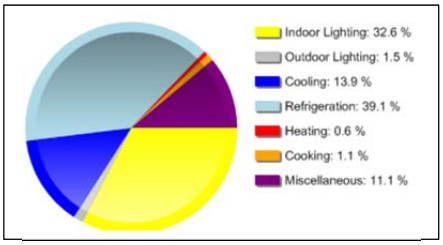
Data Centers (10,000 sq. ft.):



Convenience/Pharma Store (5,000 sq. ft.):



Restaurant (10,000 sq. ft.):



And Savings Too:

Compressors consume 75%-90% of A/C power. The savings lie in:

- **A DC operated compressor motor (lower demand & energy)**
- **Efficient solar-thermal optimization process (lower energy)**
- **A high EER (>14 (BTU/h/W)/ 5.0 (W/W)) with >35% energy savings**

Best Value Applications:

- (1) high-ambient temperature/sunshine, (2) cooling gradient,
- (3) Hours of operation per day, (4) electricity tariff rate, and
- (5) Demand charges (if levied)

Parameters	Platinum Savings	Gold Savings	Silver Savings	Bronze Savings
Ambient Temp. (Deg. C/ F)	30+/ 86+	25-30/77-86	20-25/68-77	15-20/59-77
Cooling Gradient (Deg. C / F)	20-30+/68-86	10-20/50-77	10-20/50-77	10-20/50-77
Hours of operation per day	15+	10-15	6-8	6-8
Electricity Tariff (US$/kWh)	0.15+	0.17+	0.17+	0.20+
Demand Charges (US$/kW)	varies	varies	varies	varies
Typical Pay back (simple ROI)	1-2 year	2-3 Years	3.5 Years	4 Years

Do the math for number of units in each facility – the savings are huge.

Biosirus Inc.

21 Amber Street, Unit 3, Markham, Ontario, Canada L3R 4Z3; Tel./Fax: 416-410-4782

email: info@biosirus.com www.biosirus.com

Call us for any details or a trial project

Biosirus Brochure AC-1: Nov 2014