

Coolsure UTS-36W

High Efficiency AC/DC Telecom Cooling Solution

TESHIE, GREATER ACCRA REGION, GHANA

In 2017, a trial was conducted at a Tower Co's typical BTS site located in Teshie, Ghana to compare the energy consumption and performance of the Coolsure UTS-36W High Efficiency AC/DC Telecom Split Air Conditioners with the air conditioners currently used.

The main goal of the trial was to quantify the energy savings which can be achieved by upgrading the existing low efficiency air conditioners to Coolsure High Efficiency Air Conditioners, while maintaining the same indoor temperature at the site.

A secondary goal of the trial was to demonstrate the DC Mode backup cooling capabilities of the Coolsure AC/DC air conditioners and the further reduction in cooling power consumption due to the dual AC / DC temperature setpoints provided by the Coolsure units.

COOLSURE COOLING SOLUTION

Replacing existing low efficiency air conditioners at end of life with Coolsure's High Efficiency air conditioners provides an excellent business case, with payback period based on savings in electricity bills usually less than 1 year.

For indoor sites with frequent/long AC power outages, Coolsure High Efficiency AC/DC air conditioners can provide backup cooling while powered from the batteries, allowing the genset start to be delayed and reducing the genset runtime. For completely off-grid indoor BTS sites, Coolsure High Efficiency AC/DC air conditioners facilitate alternative powering solutions, such as solar or hybrid.



SUMMARY

- ◆ Coolsure UTS-36W incorporates variable compressor speed DC Inverter technology and Coolsure's patented load-sharing system. These features allow two or more air conditioning units to provide a redundant cooling system configuration, while reducing the overall cooling power consumption, by operating all units simultaneously at a low compressor speed.
- ◆ Over a period of 1 month, the existing air conditioning system was measured to consume an average of **2,066W**, while maintaining an average indoor temperature of **24.9°C**. When subsequently installed in the same BTS site, the Coolsure UTS-36W system was measured to consume an average of **592W** while maintaining an average indoor temperature of **24.4°C** – a **71%** reduction in cooling system power consumption.
- ◆ Based on these comparative measurements, annual energy savings of **12,912kWh** were predicted for this BTS site, resulting in a **US\$ 5,823** reduction in annual electricity bills
- ◆ DC mode operation of the Coolsure system was demonstrated by simulating an extended AC power failure. DC cooling power consumption was measured with DC Mode temperature setpoints of 25°C and 30°C.
- ◆ Average DC power consumption was measured to be **586W (10.9A @ 54V)** with a DC Mode setpoint of **25°C** and **254W (4.7A @ 54V)** at **30°C**, demonstrating the further reduced cooling power draw which can be achieved by utilizing a higher DC Mode temperature setpoint for backup cooling.

SETUP



Baseline Air Conditioner (Daikin)

Coolsure logging equipment (indoor/outdoor temperature sensors and energy meters) were installed along with the CCG-01 remote monitoring device. Coolsure Sentinel web-based remote monitoring system was used to log the results of the baseline units, followed by similar logging of Coolsure units.



Coolsure UTS-36W Air Conditioner with BCU4818

BASILINE VS COOLSURE UTS-36W

The table below summarizes the performance of the existing air conditioners and the Coolsure UTS-36W High Efficiency AC/DC air conditioners.



Coolsure Controller

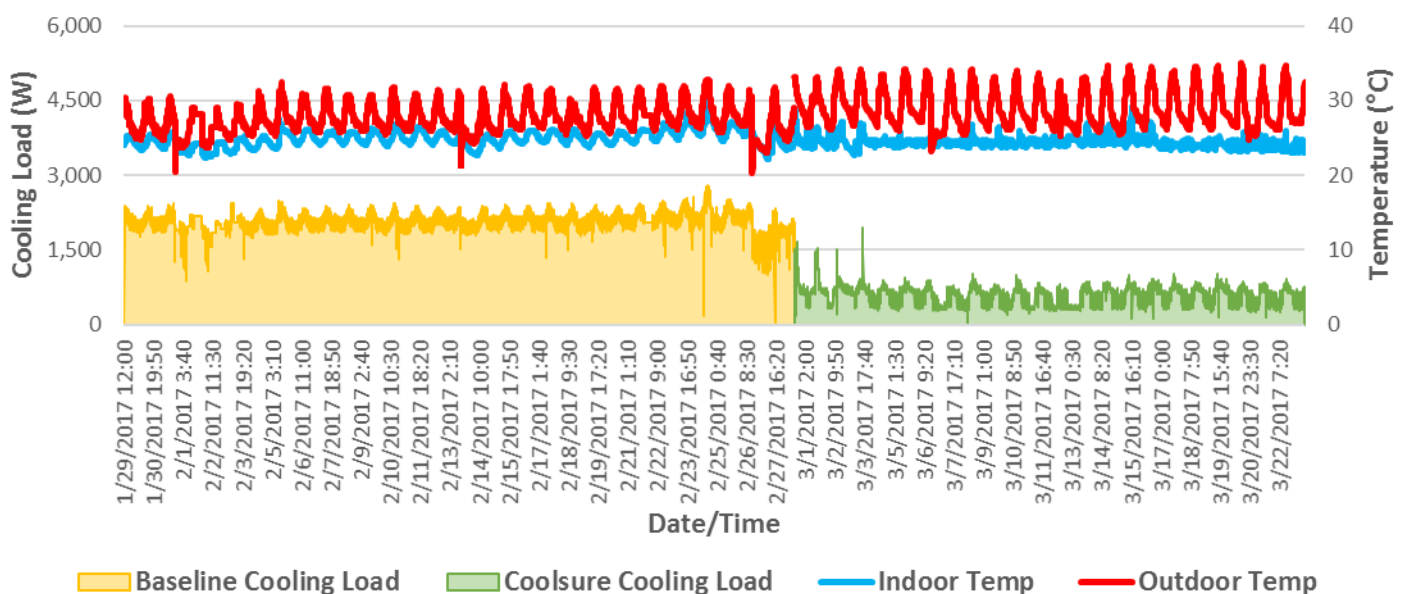
	Baseline Units	Coolsure UTS-36W Units
Evaluation Start Date	29-Jan-2017	28-Feb-2017
Evaluation End Date	28-Feb-2017	23-Mar-2017
No of Days	30 days	23 days
Av Indoor Temperature (°C)	24.9 °C	24.4 °C
Av Outdoor Temperature (°C)	27.6 °C	29.0 °C
Av Cooling Load (W)	2,066 W	592 W
Savings (%)		71%
Annual Savings (W Annual kWh)		1,474 W 12,912kWh
Annual OPEX Savings (@GHS 2.05/kWh)		GHS 26,470
Annual OPEX Savings (@USD 0.22/GHS)		USD 5,823



Sentinel Remote Monitoring Web Dashboard

The Coolsure UTS-36W High Efficiency AC/DC system demonstrated a reduction from **2,066W** to **592W**, resulting in **71%** saving (**1,474W** absolute saving) on average air conditioning power consumption when compared to Baseline units. The reduction in air conditioning power consumption will result in predicted saving on the electricity bills for the BTS site of around **GHS 26,470** per year (equivalent to **USD 5,823** per year) and a payback period of a few months.

(Ghana Trial) Cooling Profile - Baseline vs Coolsure Comparison



COOLSURE UTS-36W BACKUP FUNCTIONALITY

Coolsure UTS High Efficiency AC/DC models are designed for applications where uninterrupted cooling is required. For sites in regions where extended power outages are common or for off-grid hybrid sites with diesel generator and Battery backup, Coolsure UTS can provide further OPEX savings in fuel consumption and CAPEX savings in generator sizing as low inrush current will allow for smaller sized generator.

Coolsure UTS provides uninterrupted cooling with automatic switch-over to DC Backup Supply when AC Supply is lost. Coolsure UTS can be configured with dual setpoints, allowing different setpoints for different modes of operation (AC Normal Mode or DC Backup Mode).

DC BACKUP PERFORMANCE

An AC mains failure was simulated to demonstrate the DC Backup feature of Coolsure UTS-36W and measure the performance at different temperature setpoints. Initially the DC Backup mode setpoint was set to 30°C, and later changed to 25°C to demonstrate the impact of temperature setpoint on power consumption.

The table below summarizes the performance of Coolsure UTS-36W air conditioners in AC Normal mode vs DC Backup mode (at two different DC Mode setpoints).

	AC Normal Mode	DC Backup Mode	
	AC Setpoint = 25°C	DC Setpoint = 30°C	DC Setpoint = 25°C
Evaluation Start Date/Time	25-Mar-2017	29-Mar-2017	31-Mar-2017
Evaluation End Date/Time	29-Mar-2017	30-Mar-2017	05-Apr-2017
No of Days	4	1	5
Av Indoor Temperature (°C)	23.9 °C	28.8 °C	24.0 °C
Av Outdoor Temperature (°C)	29.7 °C	30.4 °C	28.8 °C
Total Cooling Load (W)	571 W	254 W	586 W
Cooling DC Load (ADC) @ 54VDC		4.7 A (DC)	10.9 A (DC)

