



ENDOCUBE TEST REPORT	DATE: 27 / 05 / 2017
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Company Name:	Hilton Singapore
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HEADLINE RESULTS

FREEZER ROOM:

Reduction in the number of compressor cycles per 24 hours period	Reduction (%)	Energy savings (%)
69 compressor cycles reduced to 31 cycles	53.6 %	12.1 %
ROI : 8.4 Months		

CHILLER ROOM:

Reduction in the number of compressor cycles per 24 hours period	Reduction (%)	Energy savings (%)
30 compressor cycles reduced to 17 cycles	43.3 %	25.4 %
ROI : 10.9 Months		

1. Endocube Product Description

The Endocube consists of a food simulant contained in a skinned enclosure. Once the Endocube is placed on the refrigerator's thermostat sensor, it will use food temperature as the signal to control its refrigeration cycle rather than fluctuating air temperature. The effect is a more efficient refrigeration cycle, where the individual cycle lasts longer but the frequency is reduced by up to 80% which additionally increases the life span of your refrigeration units.

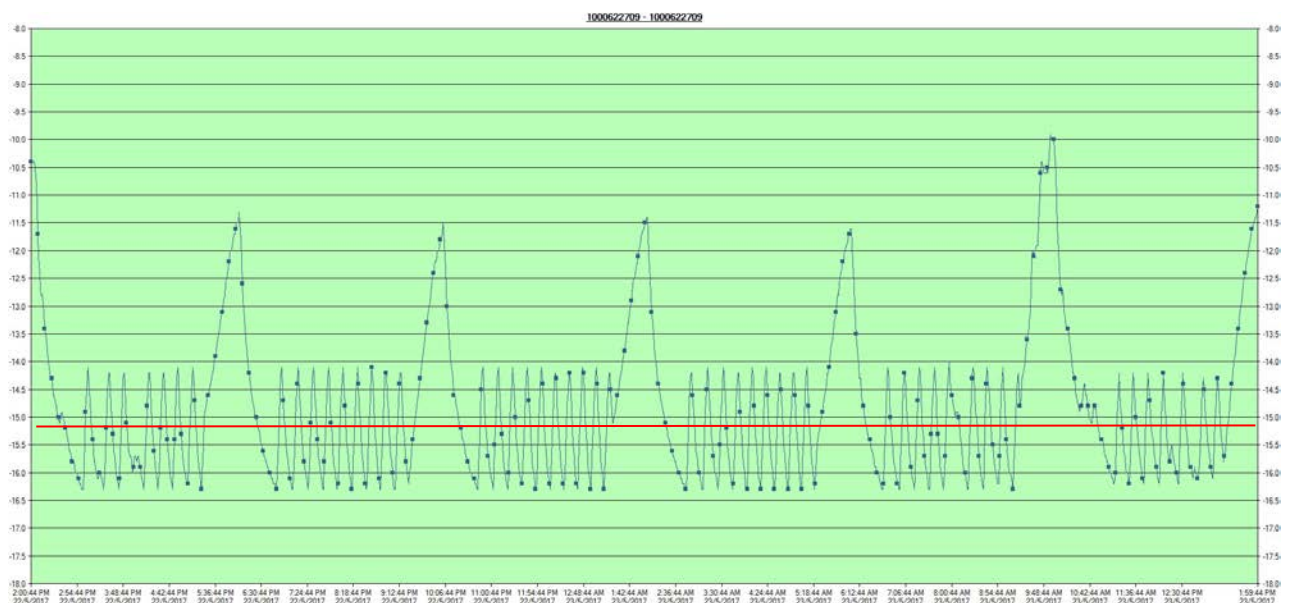
2. Endocube Trial Setup and Testing Procedure

During the trial period from 22nd to 24th May 2017, we installed two power logger measurement devices for one chiller and one freezer walk-in rooms.

From 22nd to 23rd May (24 hours) we recorded your electrical power consumption without the Endocube Device, whereas from 23rd to 24th May (24 hours) we recorded your electrical power consumption with the Endocube Device fitted in.

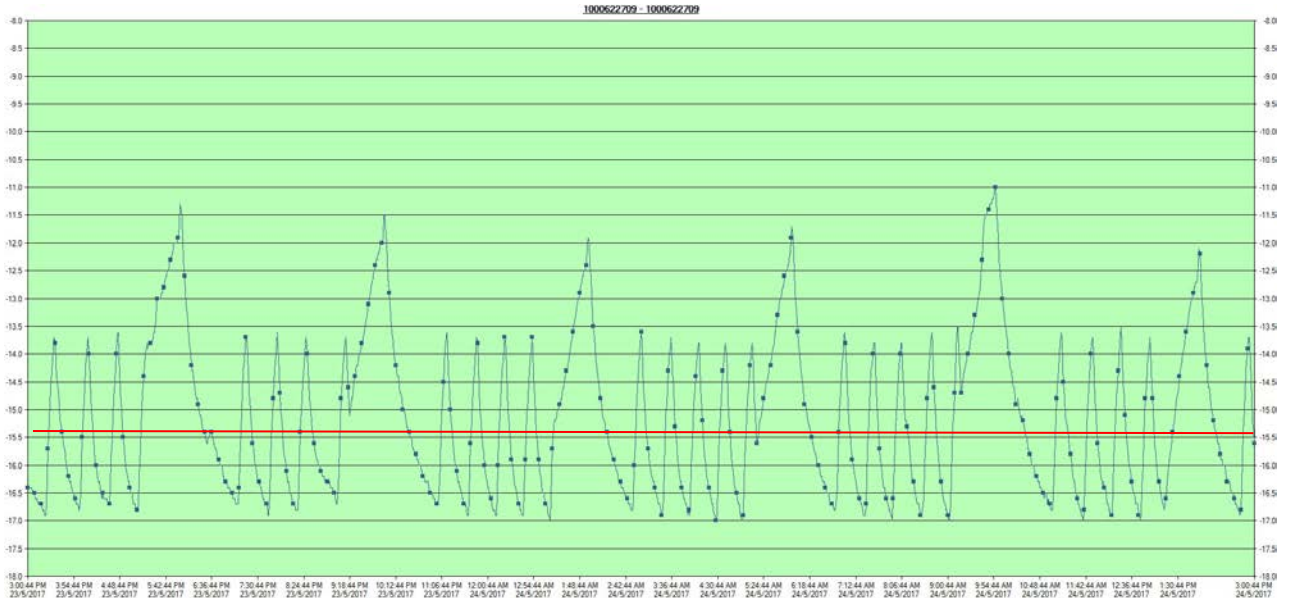
3. Freezer room - Temperature Measurement Results

Air Room Temperature – Without Endocube:

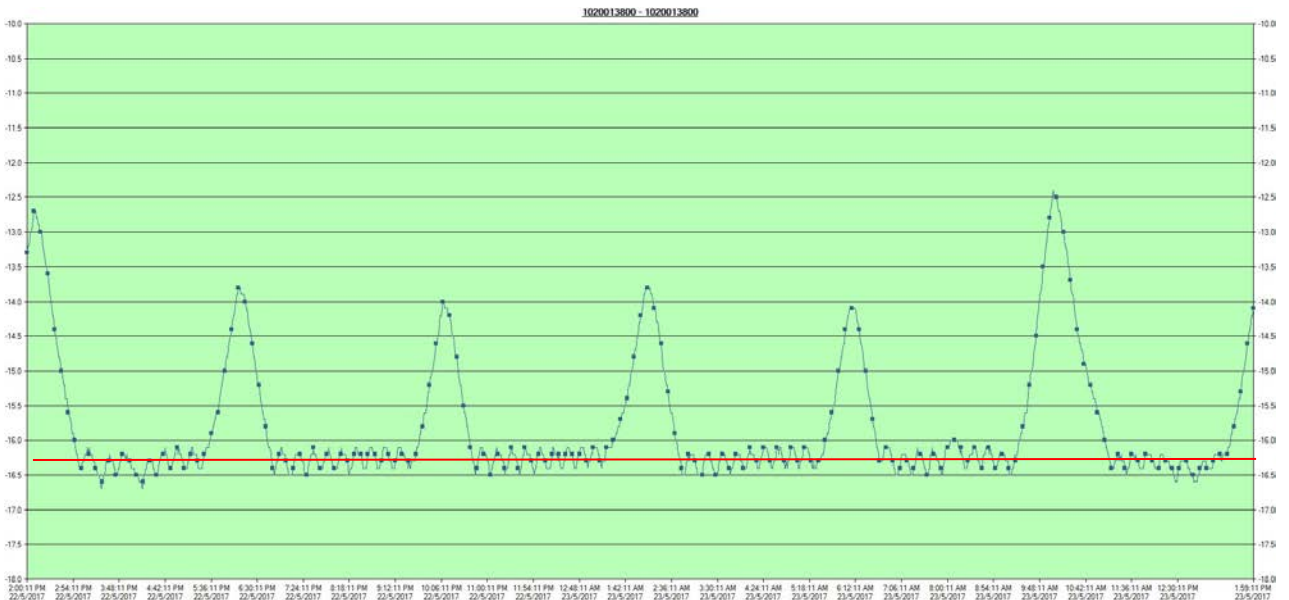




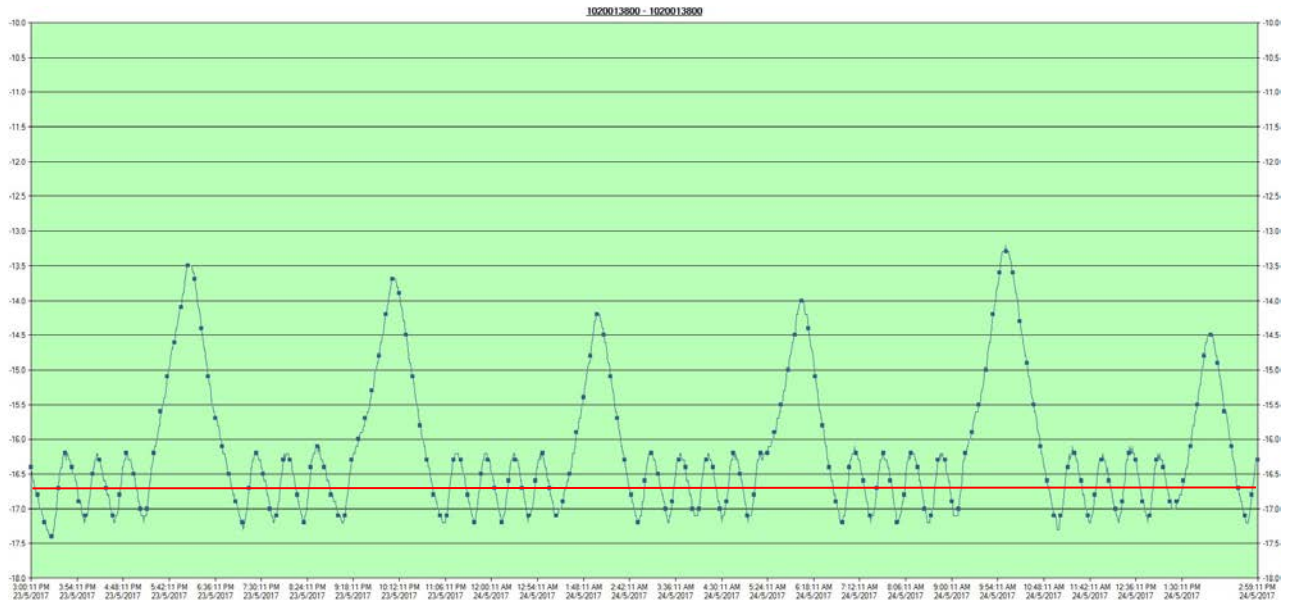
Air Room Temperature – With Endocube:



Food Temperature – Without Endocube:



Food Temperature – With Endocube:



4. Freezer room - Power Measurement Results

Measurement of absorbed power:

This absorbed power measurement only include the compressor(s).

	Freezer room
Voltage (V)	422.7
Amperage (A)	7.93
Power Factor	0.999
Power Input (kW)	5.802

Time of Usage Summary:

	Without Endocube	With Endocube
Data File Name:	Hilton - Freezer - CP without.log	Hilton - Freezer - CP with.log
Logger Serial Number:	CT15110055	CT15110012
Description:	DENT SMART LOGGER	DENT SMART LOGGER
Data Starts:	22/5/2017 11:00:00 AM	23/5/2017 11:00:00 AM
Data Ends:	23/5/2017 11:00:00 AM	23/5/2017 11:00:00 AM
Data Elapsed Time:	24 hrs	24 hrs
Number of Turn Ons:	69	31
Percent On:	68.32 %	60.04 %
Data On-Time:	16.40 hrs	14.41 hrs
Average On-Time:	0.25 hrs	0.48 hrs
Number of Turn Offs:	69	31
Percent Off:	31.68 %	39.96 %
Data Off-Time:	7.60 hrs	9.59 hrs
Average Off-Time:	0.24 hrs	0.21 hrs

5. Freezer Room - Final Report Analysis and Savings

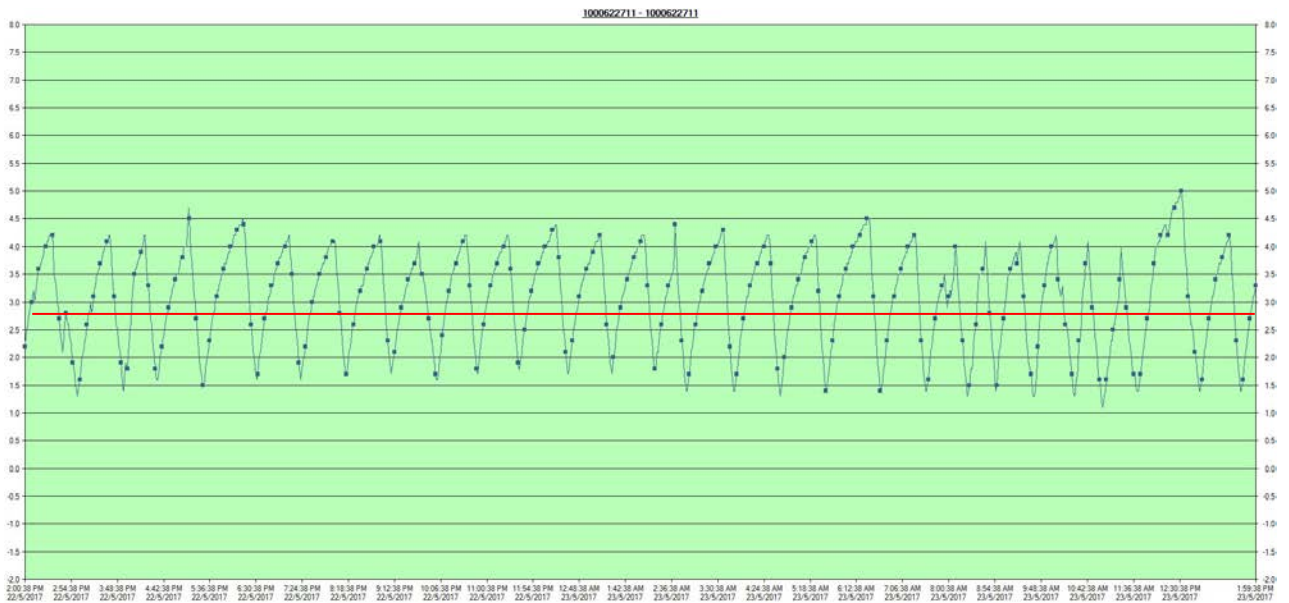
	Without Endocube	With Endocube
Power Consumption per 24 hours:	95.15 kWh	83.6 kWh
Estimated Power Consumption per month	2,855 kWh	2,508 kWh
Power Consumption Savings per month	347 kWh	
Electricity Cost Savings per month (1)	S\$ 41.64	
Return on Investment (2)	8.4 Months	
Power Savings in Percentage	12.1%	
Reduction in Compressor Cycles	53.60%	

(1) Calculation based on 0.12 S\$/kWh

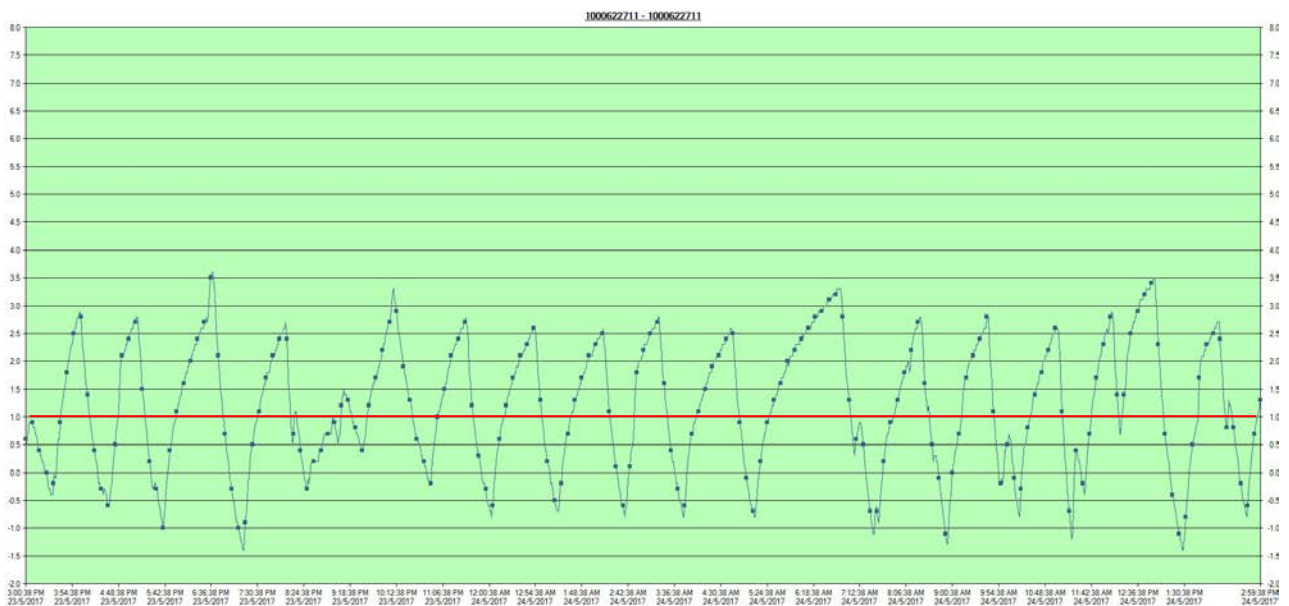
(2) Calculation based on S\$350.00 per Endocube

6. Chiller Room - Temperature Measurement Results

Air Room Temperature – Without Endocube:



Air Room Temperature – With Endocube:





JMM VISION PTE .LTD.

Registration No. 201704239Z

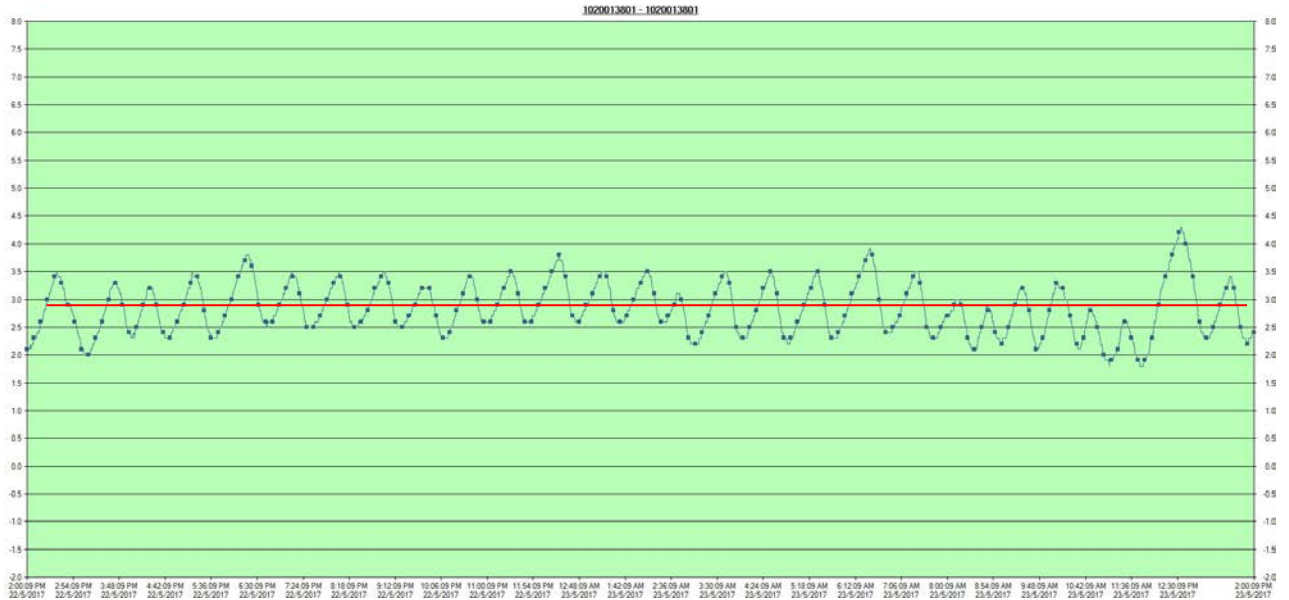
7500A Beach Road, #09-315 The Plaza
Singapore 199591

Tel: (65) 6291 5246

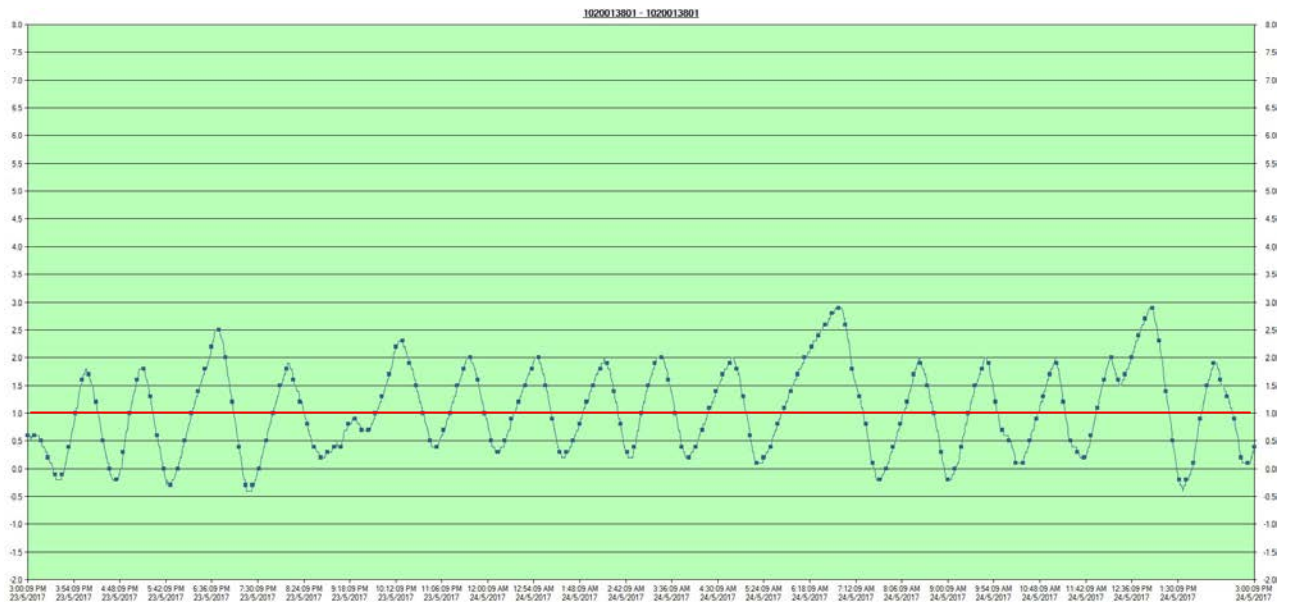
H/P: (65) 8730 7050

Email: enquiries@jmmvision.com

Food Temperature – Without Endocube:



Food Temperature – With Endocube:



7. Chiller room - Power Measurement Results

Measurement of absorbed power:

This absorbed power measurement only include the compressor(s).

	Chiller room
Voltage (V)	422.2
Amperage (A)	3.19
Power Factor	0.966
Power Input (kW)	3.427

Time of Usage Summary:

Without Endocube

With Endocube

	Hilton – Chiller – CP without.log CT15090051 DENT SMART LOGGER	Hilton – Chiller – CP with.log CT15090051 DENT SMART LOGGER
Data File Name:	Hilton – Chiller – CP without.log	Hilton – Chiller – CP with.log
Logger Serial Number:	CT15090051	CT15090051
Description:	DENT SMART LOGGER	DENT SMART LOGGER
Data Starts:	22/5/2017 11:00:00 AM	23/5/2017 11:00:00 AM
Data Ends:	23/5/2017 11:00:00 AM	24/5/2017 11:00:00 AM
Data Elapsed Time:	24 hrs	24 hrs
Number of Turn Ons:	30	16
Percent On:	42.56 %	31.72 %
Data On-Time:	10.21 hrs	7.61 hrs
Average On-Time:	0.6 hrs	0.25 hrs
Number of Turn Offs:	30	17
Percent Off:	57.44 %	68.28 %
Data Off-Time:	13.79 hrs	16.38 hrs
Average Off-Time:	0.77 hrs	0.57 hrs

8. Chiller room - Final Report Analysis and Savings

	Without Endocube	With Endocube
Power Consumption per 24 hours:	35.0 kWh	26.1 kWh
Estimated Power Consumption per month	1,050 kWh	783 kWh
Power Consumption Savings per month	267 kWh	
Electricity Cost Savings per month (1)	S\$ 32.04	
Return on Investment (2)	10.9 Months	
Power Savings in Percentage	25.43%	
Reduction in Compressor Cycles	43.33%	

(1) Calculation based on 0.12 S\$/kWh

(2) Calculation based on S\$350.00 per Endocube