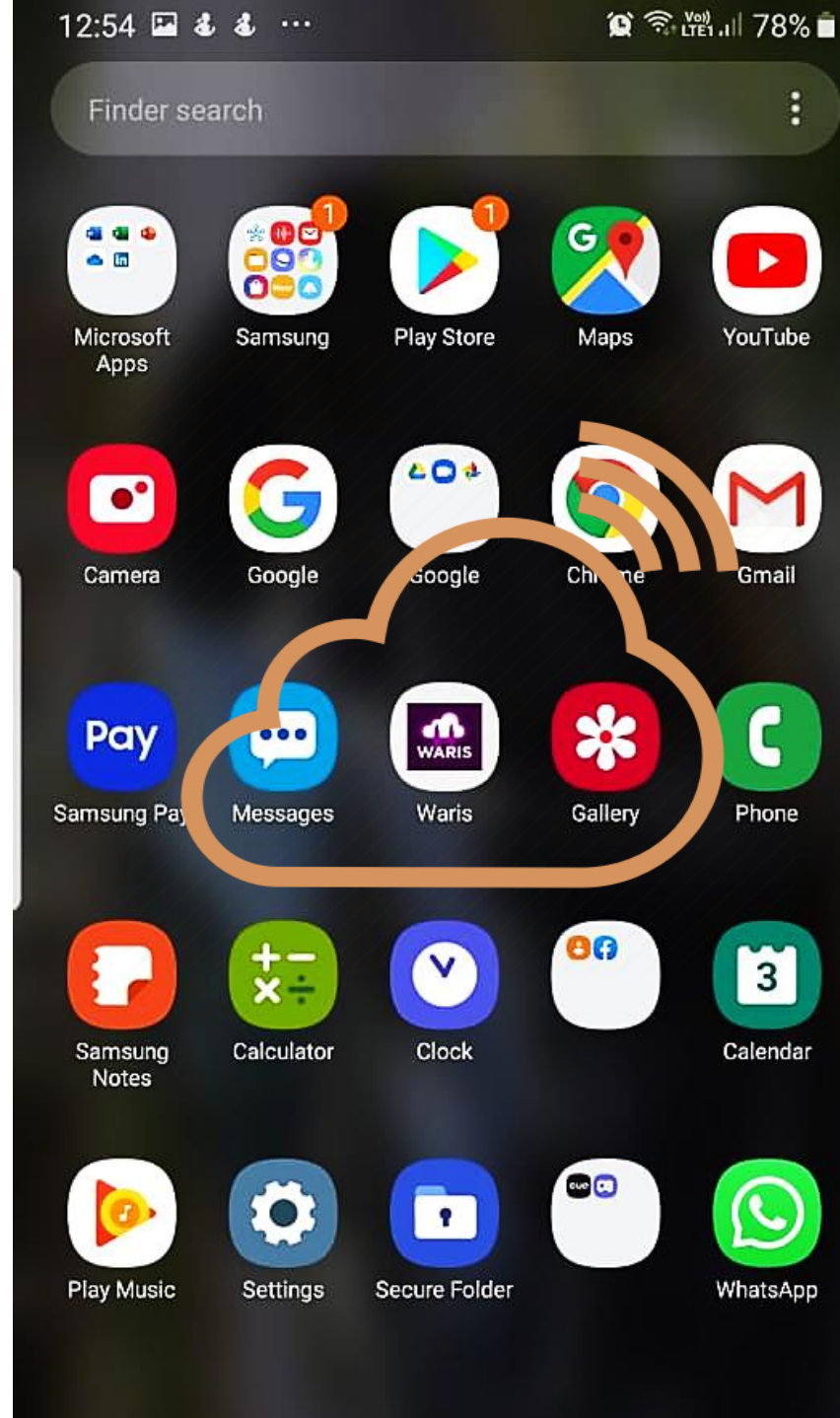


Unlock the full potential of IoT in the FM Industry

20 August 2019

Presentation by



Speaker's Profile



Baharinshah Hussain

- Chief Operating Officer
Chulia Facilities Management Sdn Bhd
- Board Member & General Manager
Al Nabooda Chulia FM Co LLC, Dubai, UAE

Previously served in senior management positions for Multi National Companies.



Speaker's Profile



Fazly Izwan A. Jalil

- General Manager
Chulia Technology Sdn Bhd
- Engineering Council
Al Nabooda Chulia FM Co LLC, Dubai, UAE



2016 Dubai FM Expo



2018 NAFAM Conference



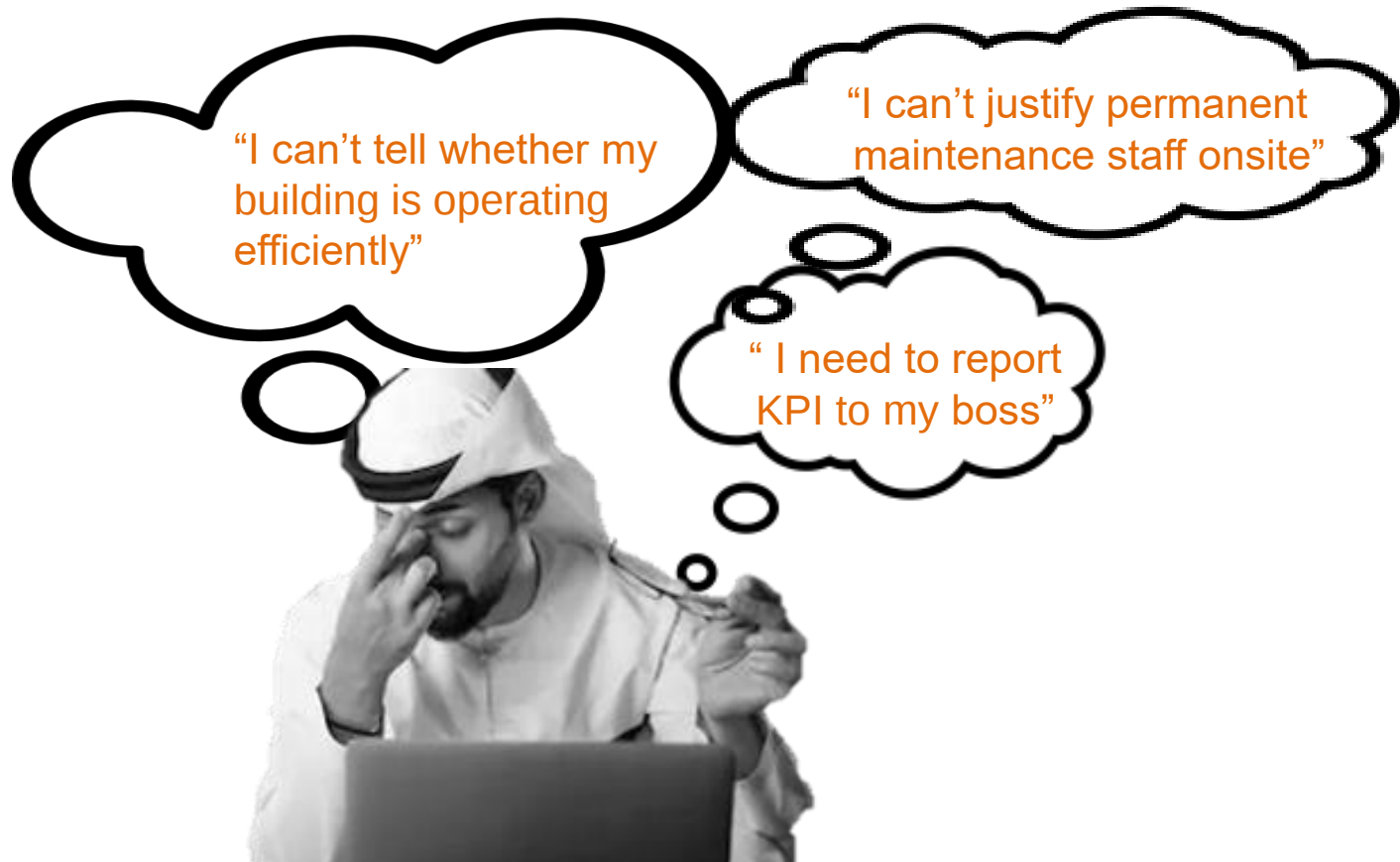
Bridging IoT & AI gap between Clients' expectation and AFM practitioner



The use of technology means :

1. FM companies need to **build or acquire data analytics capabilities** to complement excellence in service delivery.
2. FM companies must **innovate to maintain margins & growth.**

“Mitigating the escalation cost” for Operations & Maintenance



Do any of these statements sound like you ?

“Mitigating the escalation cost” for Operations & Maintenance



 1 FM market maturity & appreciation



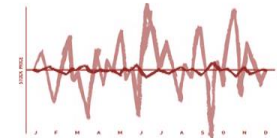
 2 Asset Life Performance Cycle



 3 Market Inflation Rate



 4 Situational (Ad Hoc) budget



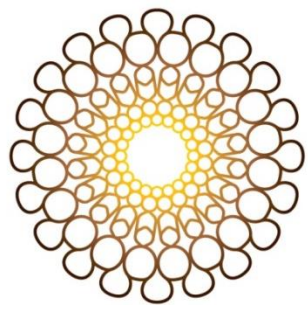
 5 Labor & Material Cost Increase



FM Transformation via internet-of-things

2020-2022





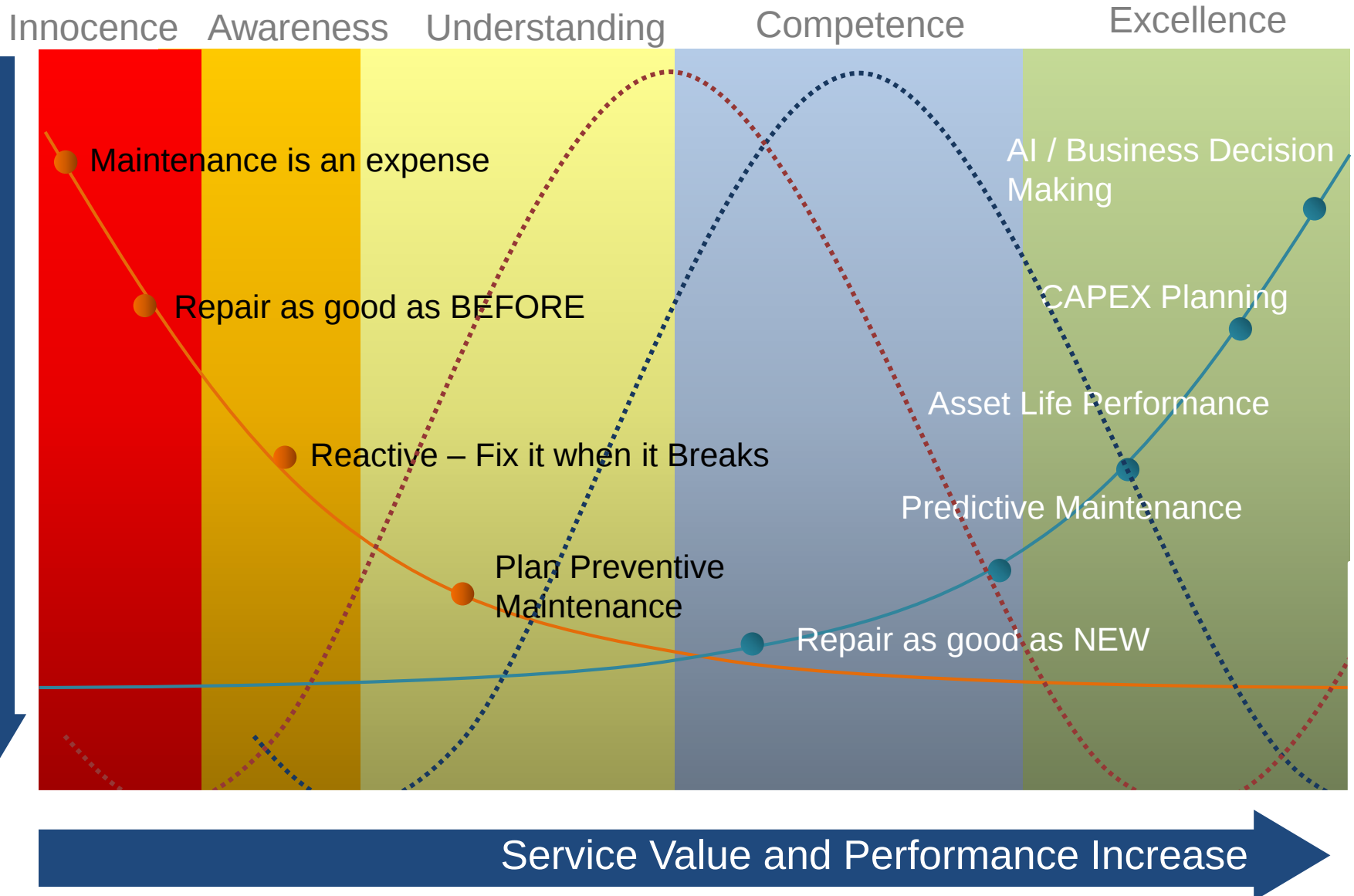
إكسبو 2020
دبي، الإمارات العربية المتحدة
DUBAI, UNITED ARAB EMIRATES

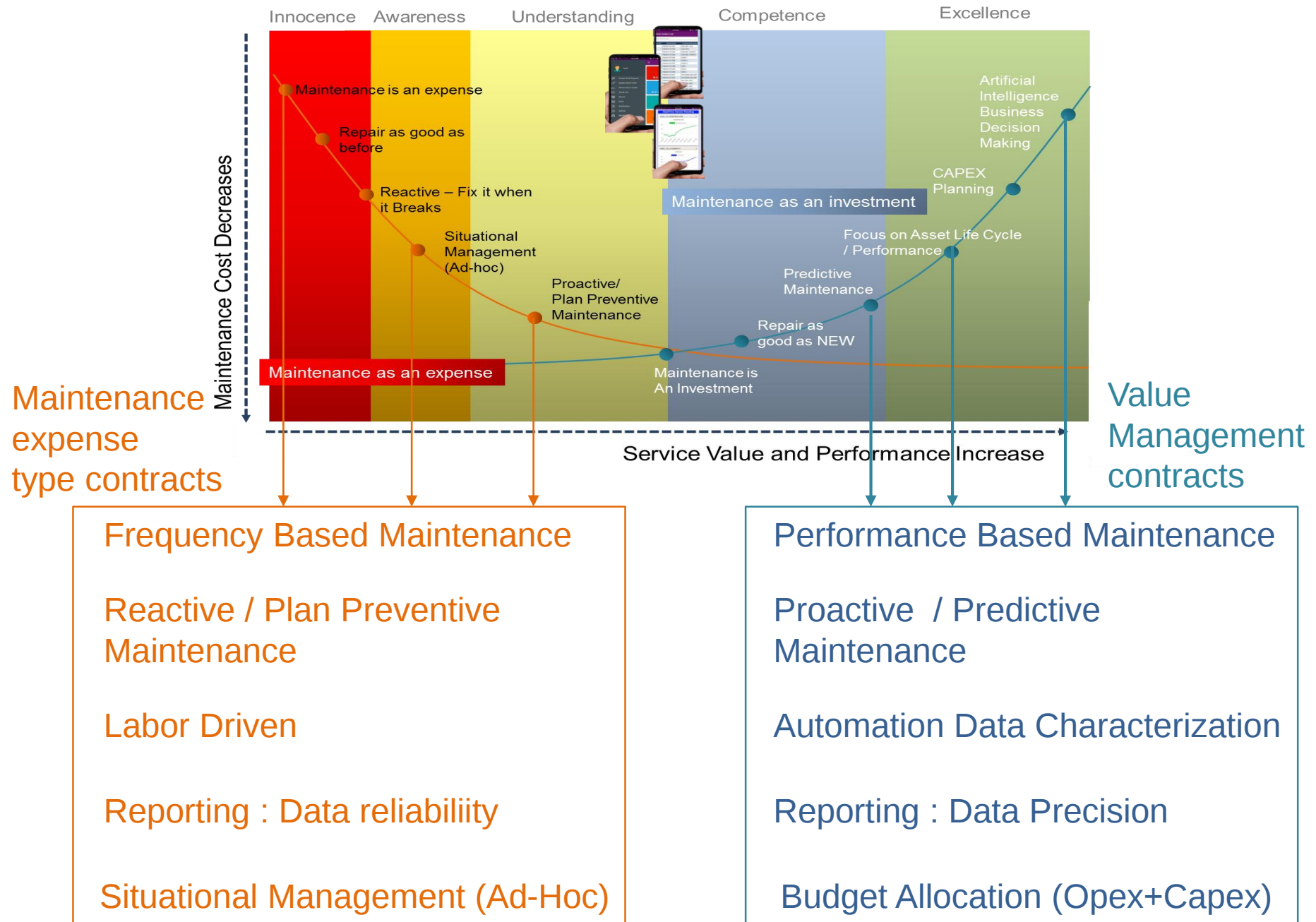


Implementation of Smart
Building Solutions



Where are we in terms of FM appreciation ?







Utility Management

Cleaning & Security Service

Mechanical, Electrical, Plumbing System (MEP)

Air Conditioning System (AC)



CMMS & RMS

Integrate

Real-Time Monitoring & Triggering System

Efficiencies + Asset Life Performance & Energy Conservation

Automate

AI : Asset Behavioral

Predict events that will occur & execute preventive measures accordingly

Analytics

Let's Talk A "Holistic" Integrated FM solution

“Digitizing Facilities Management” - Case Studies

Smart City Pioneer Award - on website



Visual of smart city pioneer award on the urbanise homepage

33,311 page views in Month April
15.8% visitors go to the homepage and were exposed to the Smart City Award Pioneer communication

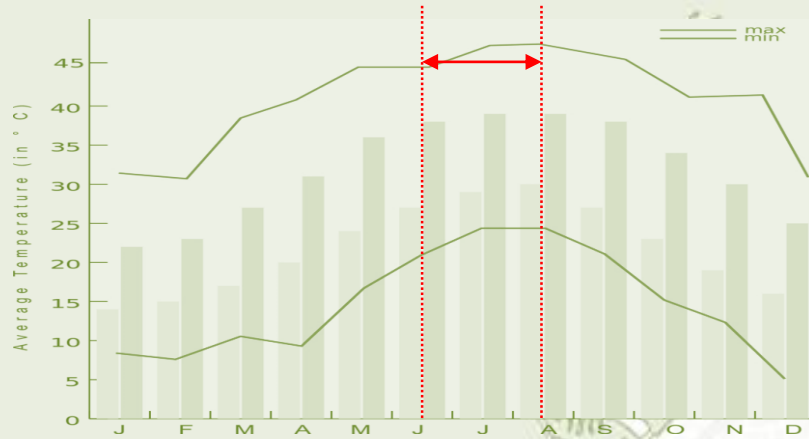
www.urbanise.com





إكسبو 2020

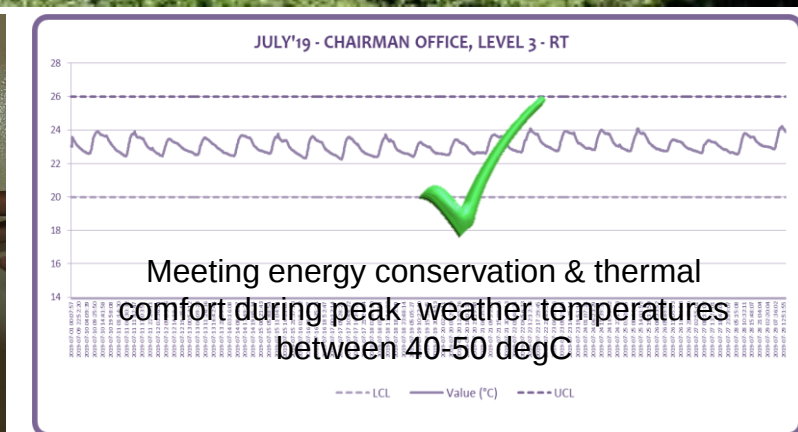
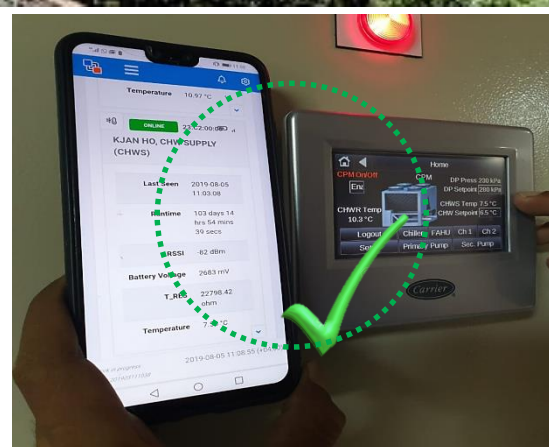
دبي، الإمارات العربية المتحدة
DUBAI, UNITED ARAB EMIRATES



45-50DegC



مجموعة شركات خوليا حفاضة المرافق
The Nabooda Group of Companies
Al Nabooda Chulia Facilities Management Co. L.L.C.
Company Profile



From: Jawaher Al Dossari
[mailto:jawaher.aldossari@dfwac.ae]
Sent: Tuesday, 9 July, 2019 10:54 AM
To: baharin@al naboodachulia.com

**Subject: Digitizing FM for Dubai
Foundation for Women & Children**

Dear Mr. Baharin,

It was pleasure meeting you and the team
yesterday.

Thank you for that the efficient services
provided to DFWAC and we assure
you that we value this relationship /
partnership.

Thank you once again.

Jawaher Faisal Al Dossari
Director of Funding
Director of Corporate Support

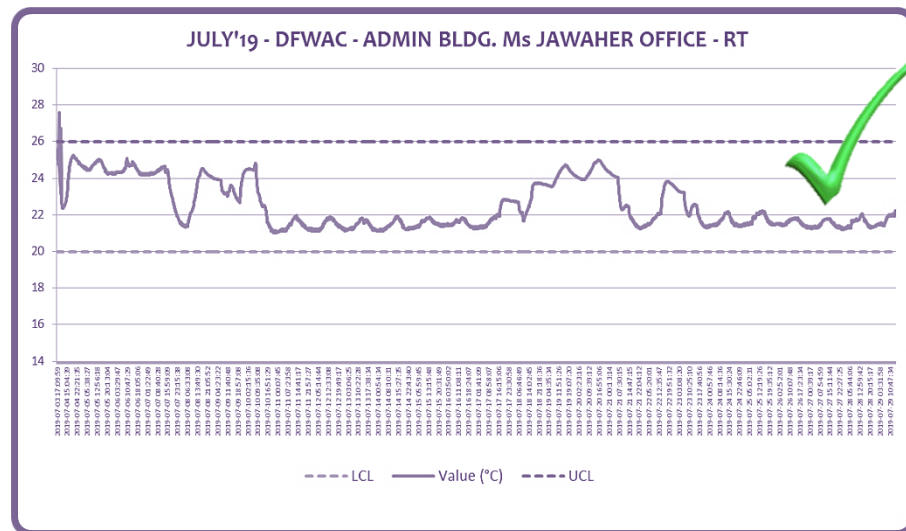
Tel: +97146060375
Fax: +97142871177
P.O.Box: 97727, Dubai, U.A.E
Email:
jawaher.aldossari@dfwac.ae



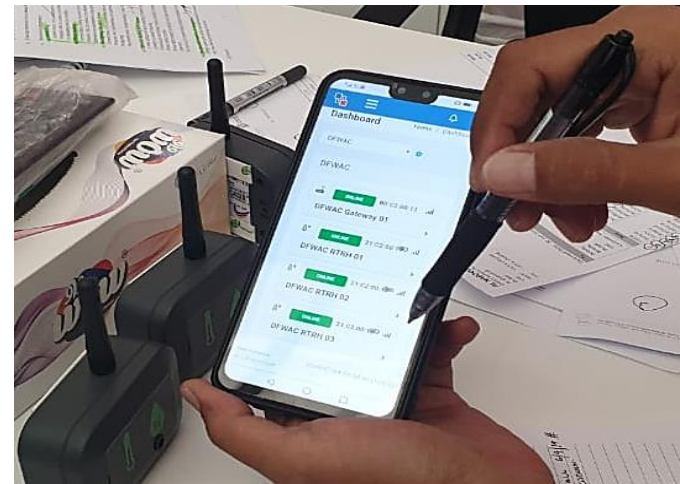
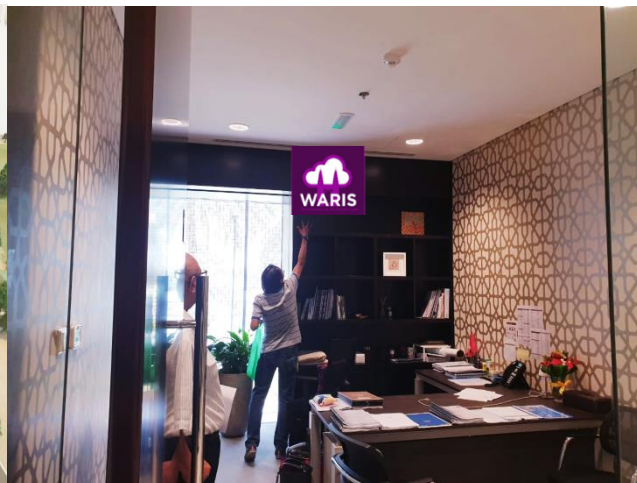
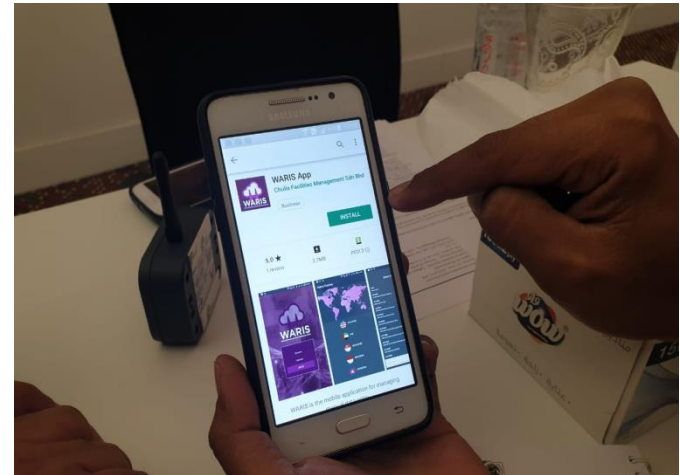
جواهر فيصل الدوسري
مدير إدارة التمويل
مدير إدارة الدعم المؤسسي

الهاتف: +97146060375
الفكس: +97142871177
ص.ب.: 97727، دبي، إ.ع.
البريد الإلكتروني:
jawaher.aldossari@dfwac.ae

Meeting **DFWAC** Energy conservation
program & thermal comfort during peak
weather temperatures between 40-50 degC



Digitizing FM





1

Corporate Affairs Building
Air Balancing & Air Flow
optimization

**Main Admin
Building**

2

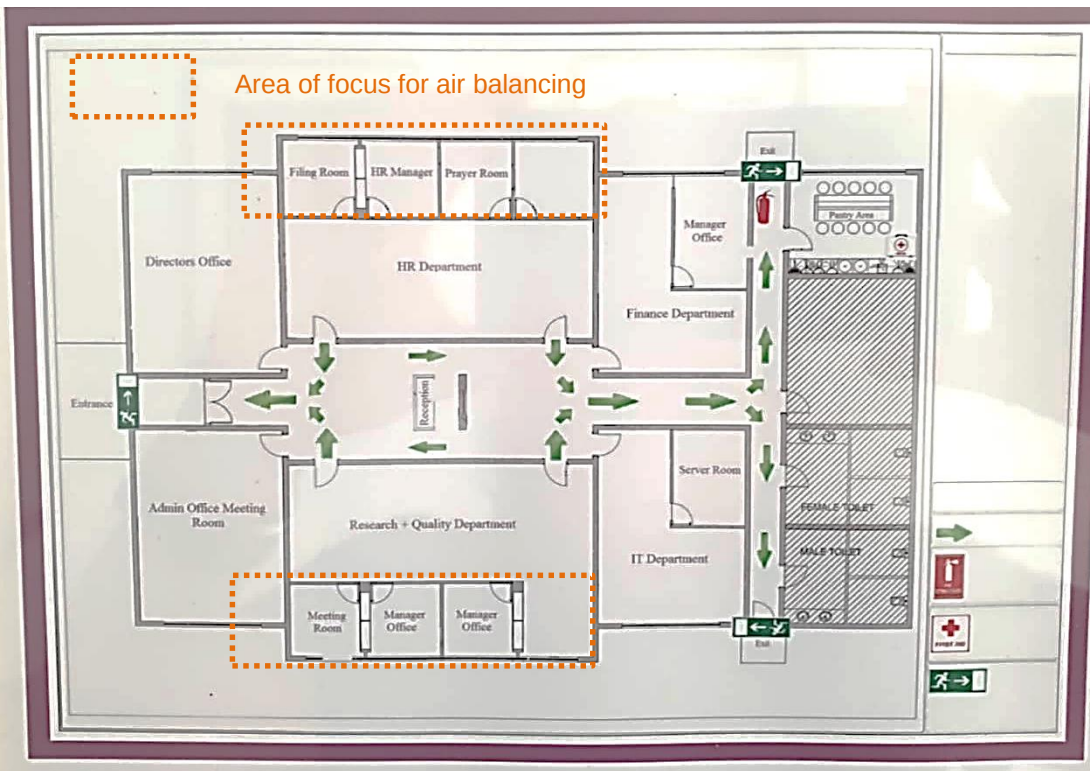
Thermal comfort
Feasibility studies

3

New Hostel
Energy efficiency
program

Corporate Affairs Building

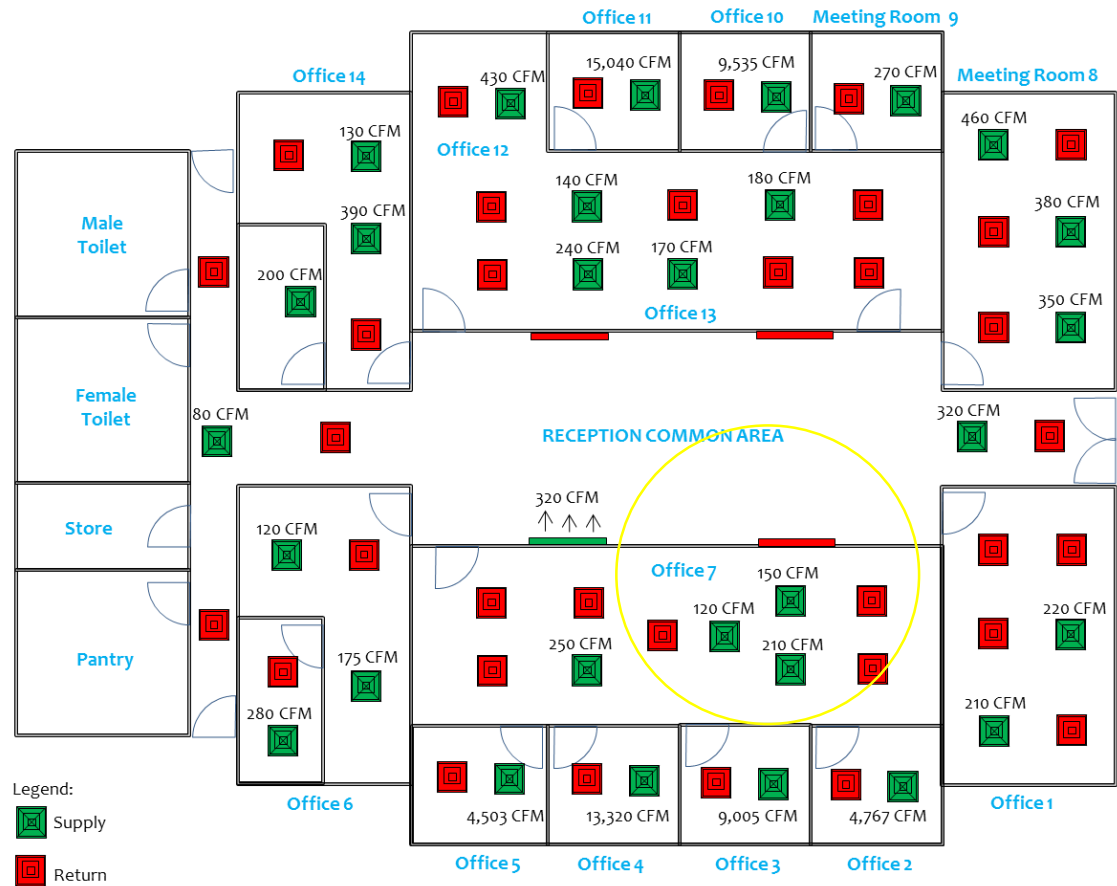
- Air balancing optimization



Air Flow & Air Balancing Exercise

Date : 5th July 2019

Time : 10am – 2.00pm



Remote & real-time monitoring

Air flow balancing as at 21/7/19

FAN

7946 cfm 47c. 8.4c.	9270 cfm 7.5c.	BEFORE
12,830 cfm	12,590 cfm	AFTER
Δ AIRFLOW : +4884 cfm	Δ airflow, +3320 cfm	

- Delta T for air flow improves at 4,000 Cubic Feet per Minute (CFM)
- Supply Grilled Temperature between 8-10degC
- Received positive feedback from 2 of 4 managers representative

AC Cooling Site Inspection Validation : Audi Showroom Sharjah

Sun, 28/07/19, 230pm





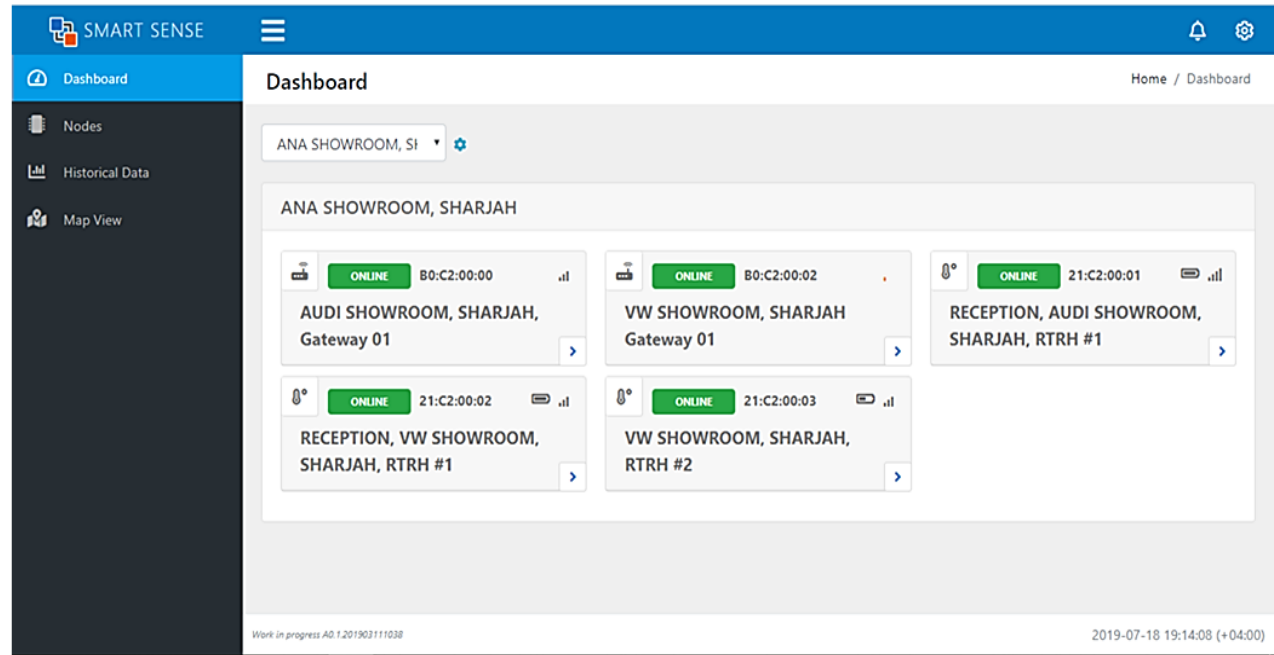
Audi



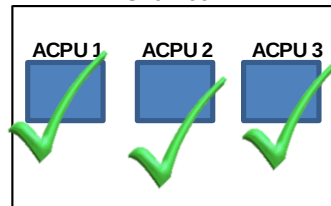
PORSCHE



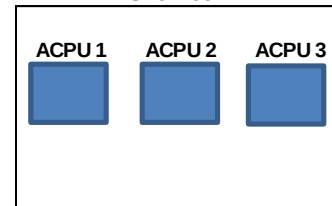
AN.C Remote Monitoring System. Status at : 29/71/19



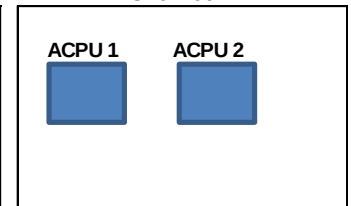
Audi
Showroom



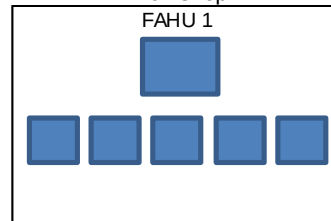
VW
Showroom



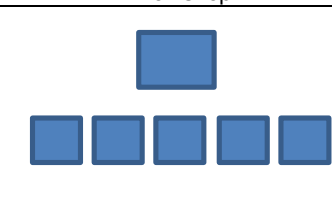
Porsche
Showroom



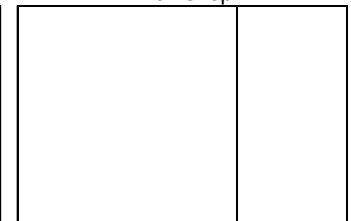
Workshop



Workshop



Workshop





AN.C WARIS RT & RH sensor placement

To remotely monitor Showroom's Reception Area temperature and room humidity data towards PROACTIVE MAINTENANCE effective 25/7/19



Audi Assistant Sales Manager
- Mr. Salah Nasr

Grill Supply temp
19.6DegC
As at 3pm

Al Nabooda Chulia
Smart Facilities Management

AC Cooling Site Inspection Validation : VW Showroom Sharjah

Sun, 28/07/19, 2pm



مجموعة شركات خليفة جمعة النابودة
The Khalifa Juma Al Nabooda Group Of Companies

Prepared by :
Mr. Baharinshah Hussain / Mr. Zafwan Fadzil

Prepared date : 28/7/19

VW Showroom Sharjah ACPU 1, ACPU 2 & ACPU 3 Status at : 29/71/19

ACPU1

Compressor 1	Compressor 2	Compressor 3
Condenser Fan Motor 1	Condenser Fan Motor 2	Condenser Fan Motor 3

ACPU2

Compressor 1	Compressor 2	Compressor 3 (OLS)
Condenser Fan Motor 1	Condenser Fan Motor 2	Condenser Fan Motor 3 (AN.C)

ACPU3

Compressor 1	Compressor 2	Compressor 3 (OLS)
Condenser Fan Motor 1	Condenser Fan Motor 2	Condenser Fan Motor 3 (AN.C)

AN.C Remote Monitoring System. Status at : 29/71/19

النابودة للسيارات



AL NABOODA
AUTOMOBILES



Dashboard
Nodes
Historical Data
Map View

Dashboard

ANA SHOWROOM, SI

ANA SHOWROOM, SHARJAH

ONLINE
B0:C2:00:00

AUDI SHOWROOM, SHARJAH,
Gateway 01

ONLINE
B0:C2:00:02

VW SHOWROOM, SHARJAH
Gateway 01

ONLINE
21:C2:00:01

RECEPTION, AUDI SHOWROOM,
SHARJAH, RTRH #1

ONLINE
21:C2:00:02

RECEPTION, VW SHOWROOM,
SHARJAH, RTRH #1

ONLINE
21:C2:00:03

VW SHOWROOM, SHARJAH,
RTRH #2

Work in progress AQ.1.201903111038

2019-07-18 19:14:08 (+04:00)



مرحباً بكم في فولكس واجن
Welcome to Volkswagen

AN.C WARIS RT & RH sensor placement

To remotely monitor Showroom's
Reception Area temperature and room
humidity data towards PROACTIVE
MAINTENANCE effective 29/7/19

AN.C WARIS RT & RH sensor

To remotely monitor Showroom
temperature & room humidity
data towards PREDICTIVE
MAINTENANCE



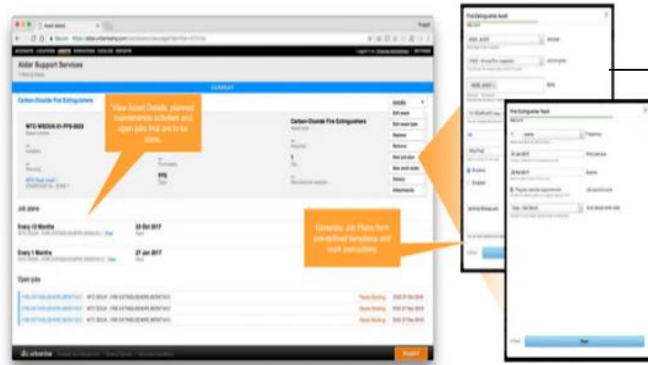
1) Reception Area



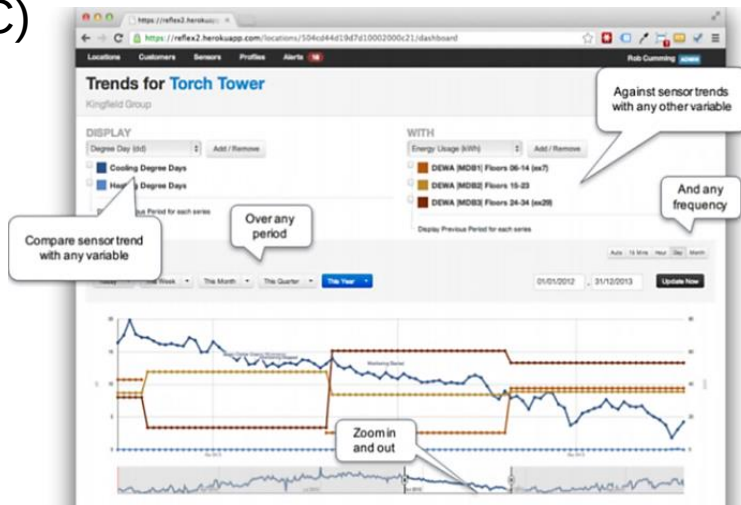
Received feedback Ms Hiba that the reception area cooling situation has improved since the installation of floor standing AC since 14 Jul 2019

Data Analytics

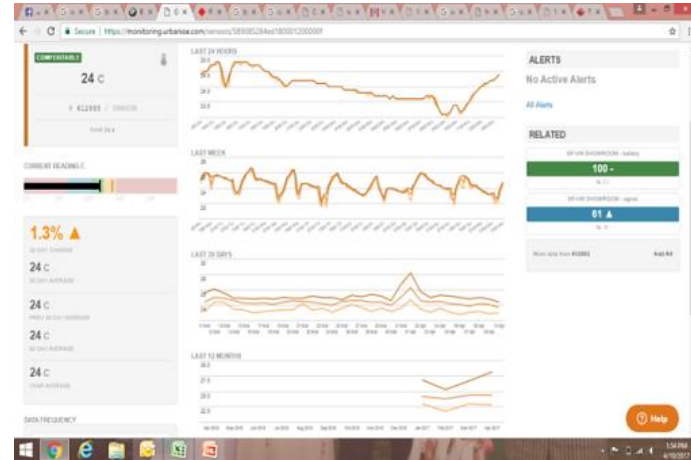
Detail asset View & History



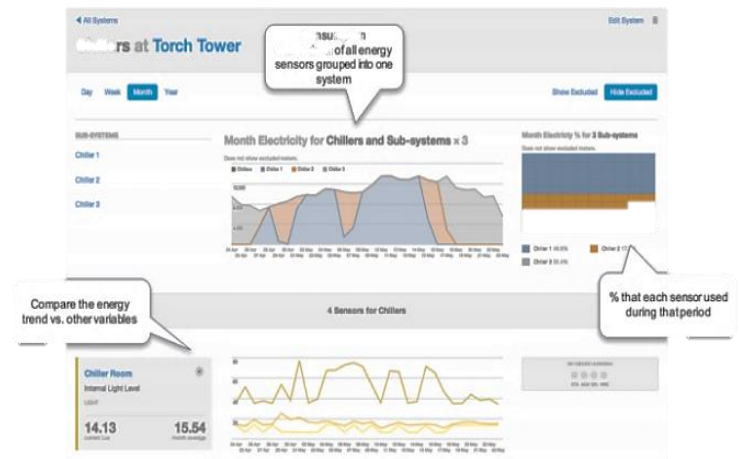
Process Characterization Statistical Process Control (SPC)



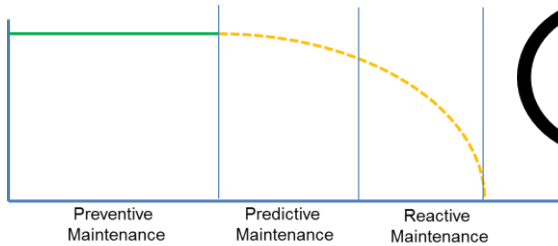
“Hot spot” Management



Mean-Time-To-Repair & Mean-Time-Between-Failure



Building efficiencies And Asset Life Performance Management and Monitoring



Building Efficiency &
Asset Life Performance
analysis

Manpower more productive
Data accuracy via automation

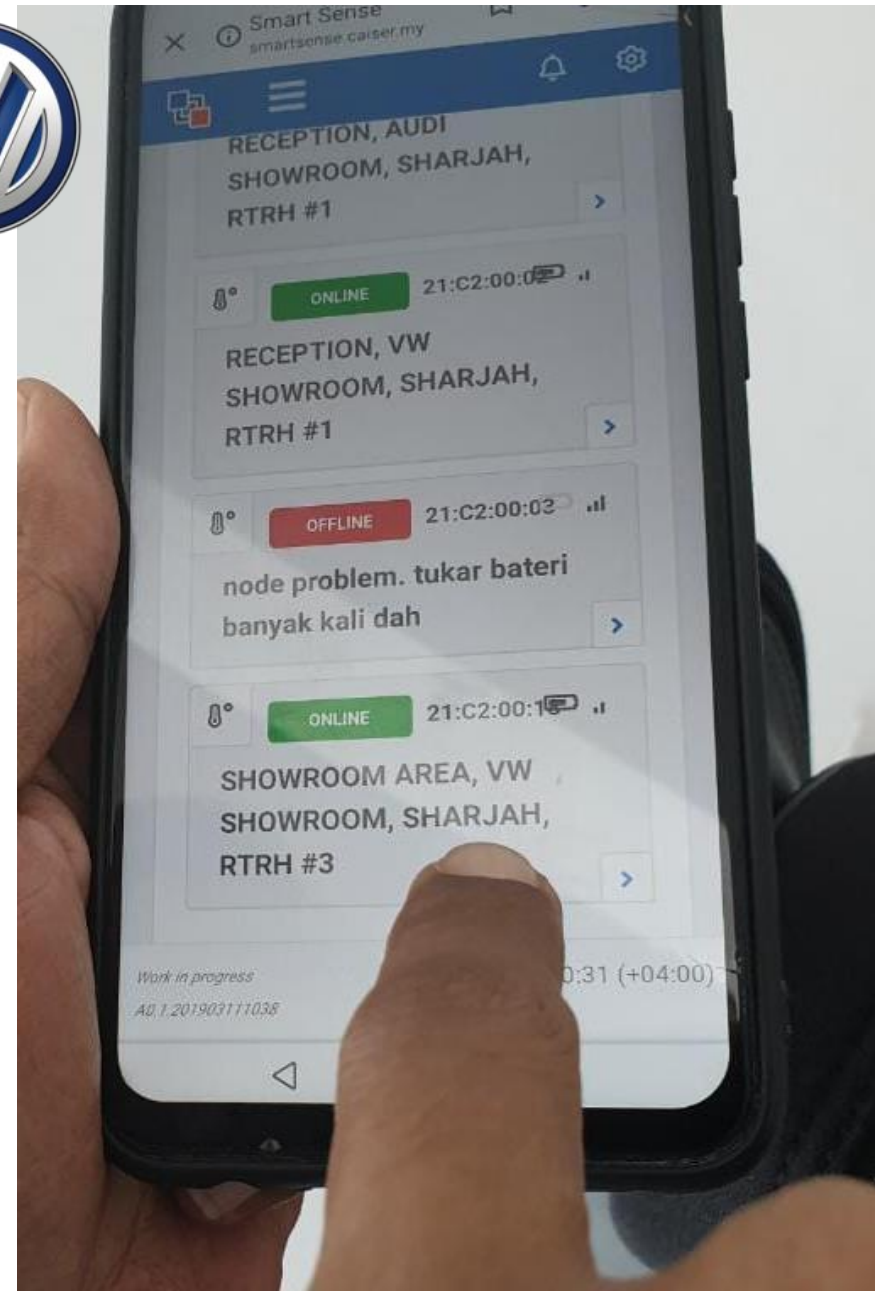
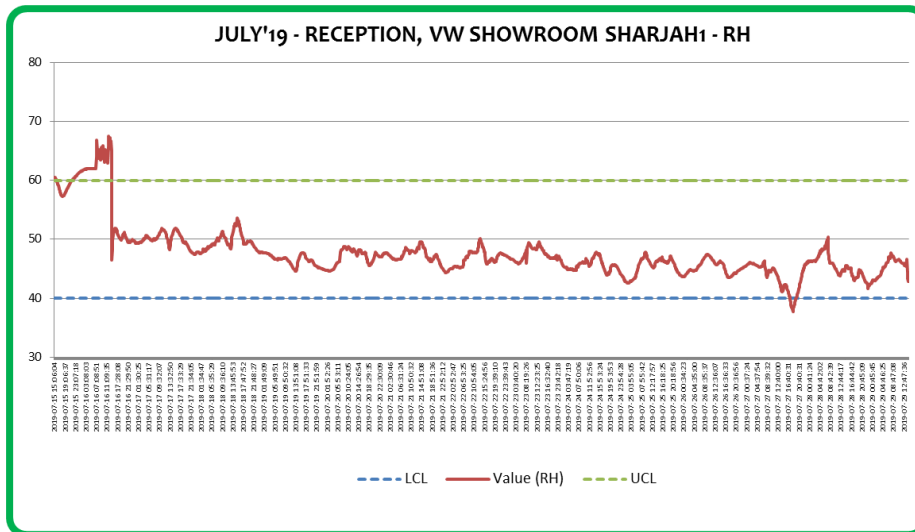
"KPI's are accurate
& readily real-time
via  DASHBOARD



Improved Financial Performance

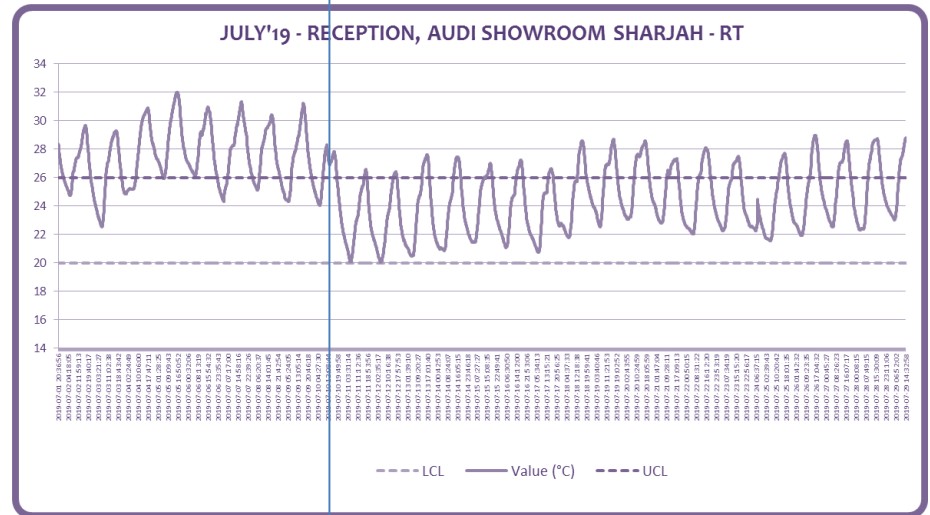


An ecstatic VW National Sales Manager,
Mr. Baha Samir

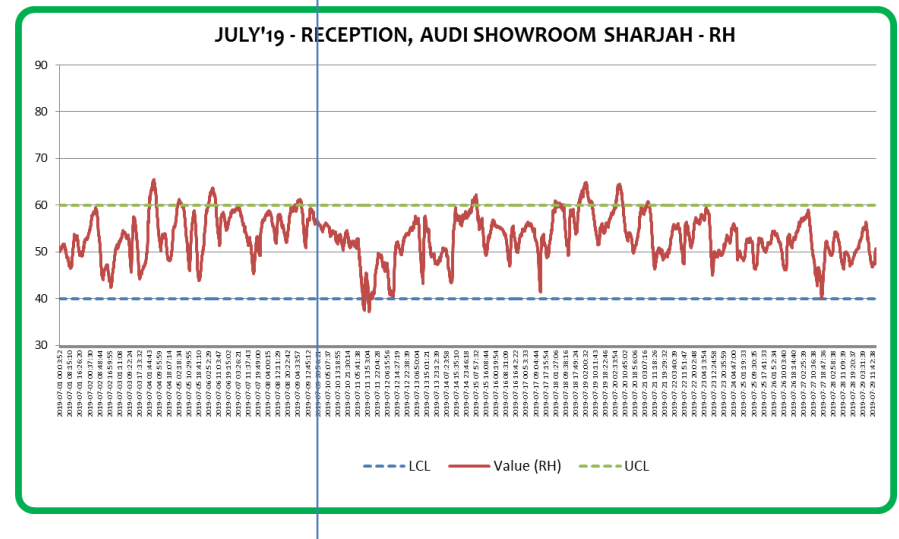




A delighted Porsche National Sales Manager,
Mr. Malik Ahtasham



A satisfied Audi National Sales Manager,
Mr. Salah Nasr



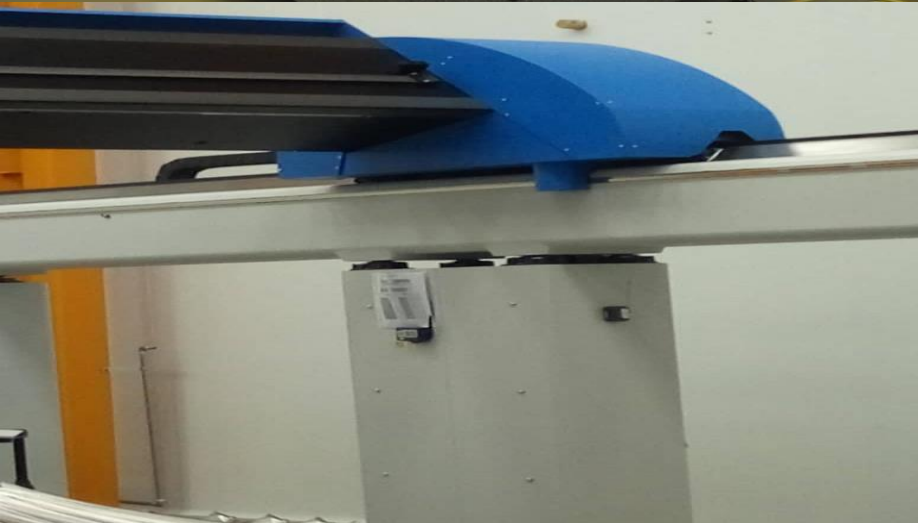


WARIS SMART SENSE

Remote Monitoring Sensor

Use Case Example for Clean Room Environment
at the UMW Aerospace Plant in Serendah





“The Use Case was made in the CMM #3 clean room inside the UMW factory”





Example of data points extracted from WARIS Smart Sense

ENVIRONMENT MONITORING REPORT

MAIN LOCATION : UMWA Serendah
SUB LOCATION : CMM 3

SET UCL	21.0 Cel
SET LCL	19.0 Cel
UCLW	20.55 Cel
LCLW	19.55 Cel

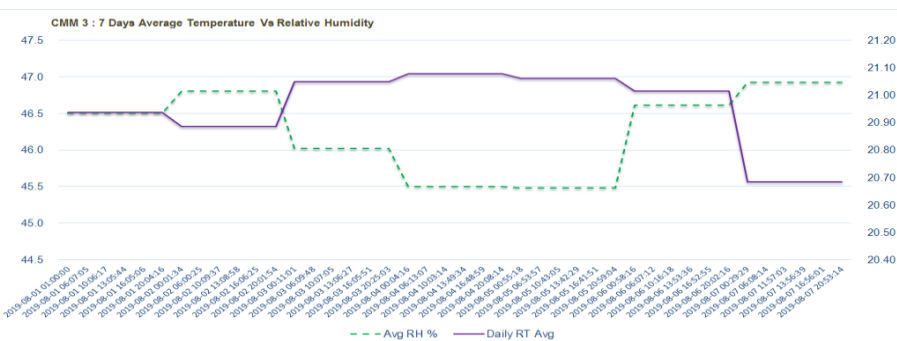
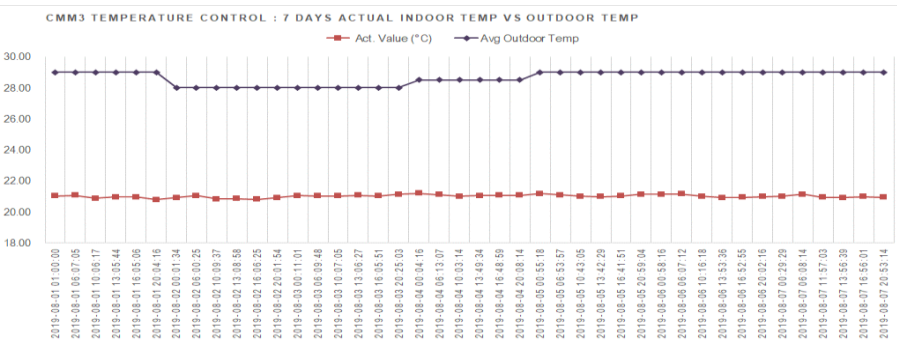
Time Stamp	Daily RT Avg	Act. Value (°C)	UCLW	UCL	LCLW	LCL	Hour Avg	Std Dev.	Avg RH %	Avg Outdoor Temp	Pre Alert Check	Pre Alert Text
2019-08-01 01:00:00	20.94	21.01	20.55	21.00	19.55	19.00	20.22	0.809	46.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-01 06:07:05	20.94	21.06	20.55	21.00	19.55	19.00	20.23	0.820	46.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-01 10:06:17	20.94	20.86	20.55	21.00	19.55	19.00	20.19	0.782	46.5	29.0		
2019-08-01 13:05:44	20.94	20.95	20.55	21.00	19.55	19.00	20.21	0.799	46.5	29.0		
2019-08-01 16:05:06	20.94	20.95	20.55	21.00	19.55	19.00	20.21	0.799	46.5	29.0		
2019-08-01 20:04:16	20.94	20.78	20.55	21.00	19.55	19.00	20.18	0.770	46.5	29.0		
2019-08-02 00:01:34	20.89	20.91	20.55	21.00	19.55	19.00	20.20	0.791	46.8	28.0		
2019-08-02 06:00:25	20.89	21.04	20.55	21.00	19.55	19.00	20.23	0.816	46.8	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-02 10:09:37	20.89	20.81	20.55	21.00	19.55	19.00	20.18	0.775	46.8	28.0		
2019-08-02 13:08:58	20.89	20.85	20.55	21.00	19.55	19.00	20.19	0.780	46.8	28.0		
2019-08-02 16:06:25	20.89	20.80	20.55	21.00	19.55	19.00	20.18	0.773	46.8	28.0		
2019-08-02 20:01:54	20.89	20.90	20.55	21.00	19.55	19.00	20.20	0.789	46.8	28.0		
2019-08-03 00:11:01	21.05	21.04	20.55	21.00	19.55	19.00	20.23	0.816	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-03 06:09:48	21.05	21.01	20.55	21.00	19.55	19.00	20.22	0.809	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-03 10:07:05	21.05	21.03	20.55	21.00	19.55	19.00	20.23	0.814	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-03 13:06:27	21.05	21.07	20.55	21.00	19.55	19.00	20.23	0.822	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-03 16:05:51	21.05	21.01	20.55	21.00	19.55	19.00	20.22	0.809	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-03 20:25:03	21.05	21.14	20.55	21.00	19.55	19.00	20.25	0.836	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-04 00:04:16	21.08	21.19	20.55	21.00	19.55	19.00	20.26	0.847	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-04 06:13:07	21.08	21.11	20.55	21.00	19.55	19.00	20.24	0.831	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-04 10:03:14	21.08	21.00	20.55	21.00	19.55	19.00	20.22	0.807	45.5	28.5		
2019-08-04 13:49:34	21.08	21.04	20.55	21.00	19.55	19.00	20.23	0.816	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-04 16:48:59	21.08	21.06	20.55	21.00	19.55	19.00	20.23	0.820	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-04 20:08:14	21.08	21.06	20.55	21.00	19.55	19.00	20.23	0.820	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-05 00:55:18	21.06	21.17	20.55	21.00	19.55	19.00	20.25	0.842	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-05 06:53:57	21.06	21.08	20.55	21.00	19.55	19.00	20.24	0.824	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-05 10:43:05	21.06	21.00	20.55	21.00	19.55	19.00	20.22	0.807	45.5	29.0		
2019-08-05 13:42:29	21.06	20.96	20.55	21.00	19.55	19.00	20.21	0.801	45.5	29.0		
2019-08-05 16:41:51	21.06	21.02	20.55	21.00	19.55	19.00	20.22	0.811	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-05 20:59:04	21.06	21.13	20.55	21.00	19.55	19.00	20.25	0.833	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-06 00:58:16	21.01	21.14	20.55	21.00	19.55	19.00	20.25	0.836	46.6	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-06 06:07:12	21.01	21.16	20.55	21.00	19.55	19.00	20.25	0.840	46.6	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-06 10:16:18	21.01	20.99	20.55	21.00	19.55	19.00	20.22	0.805	46.6	29.0		
2019-08-06 13:53:36	21.01	20.90	20.55	21.00	19.55	19.00	20.20	0.789	46.6	29.0		
2019-08-06 16:52:55	21.01	20.93	20.55	21.00	19.55	19.00	20.21	0.795	46.6	29.0		
2019-08-06 20:02:16	21.01	20.96	20.55	21.00	19.55	19.00	20.21	0.801	46.6	29.0		
2019-08-07 00:29:29	20.68	21.00	20.55	21.00	19.55	19.00	20.22	0.807	46.9	29.0		
2019-08-07 06:08:14	20.68	21.13	20.55	21.00	19.55	19.00	20.25	0.833	46.9	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP :
2019-08-07 11:57:03	20.68	20.92	20.55	21.00	19.55	19.00	20.20	0.793	46.9	29.0		
2019-08-07 13:56:39	20.68	20.91	20.55	21.00	19.55	19.00	20.20	0.791	46.9	29.0		
2019-08-07 16:56:01	20.68	20.98	20.55	21.00	19.55	19.00	20.22	0.803	46.9	29.0		
2019-08-07 20:53:14	20.68	20.92	20.55	21.00	19.55	19.00	20.20	0.793	46.9	29.0		
2019-08-07 20:03:25	20.68	20.35	20.55	21.00	19.55	19.00	20.09	0.719	46.9	28.0		
2019-08-07 21:03:12	20.68	20.28	20.55	21.00	19.55	19.00	20.08	0.715	46.9	28.0		
2019-08-07 22:03:00	20.68	20.21	20.55	21.00	19.55	19.00	20.06	0.711	46.9	28.0		
2019-08-07 23:02:47	20.68	20.14	20.55	21.00	19.55	19.00	20.05	0.709	46.9	28.0		
2019-08-08 00:00:43	20.06	20.16	20.55	21.00	19.55	19.00	20.05	0.710	46.2	28.5		
2019-08-08 01:00:29	20.06	20.18	20.55	21.00	19.55	19.00	20.06	0.710	46.2	28.5		
2019-08-08 02:00:19	20.06	20.20	20.55	21.00	19.55	19.00	20.06	0.711	46.2	28.5		
2019-08-08 03:00:08	20.06	20.14	20.55	21.00	19.55	19.00	20.05	0.709	46.2	28.5		
2019-08-08 04:09:51	20.06	20.08	20.55	21.00	19.55	19.00	20.04	0.708	46.2	28.5		
2019-08-08 05:09:37	20.06	20.02	20.55	21.00	19.55	19.00	20.02	0.707	46.2	28.5		
2019-08-08 06:07:32	20.06	19.96	20.55	21.00	19.55	19.00	20.01	0.708	46.2	28.5		
2019-08-08 07:07:22	20.06	19.90	20.55	21.00	19.55	19.00	20.00	0.709	46.2	28.5		
2019-08-08 08:07:08	20.06	19.84	20.55	21.00	19.55	19.00	19.99	0.711	46.2	28.5		
2019-08-08 09:06:56	20.06	19.93	20.55	21.00	19.55	19.00	20.01	0.708	46.2	28.5		
2019-08-08 10:26:37	20.06	20.02	20.55	21.00	19.55	19.00	20.02	0.707	46.2	28.5		
2019-08-08 11:06:30	20.06	20.11	20.55	21.00	19.55	19.00	20.04	0.708	46.2	28.5		
2019-08-08 12:36:10	20.06	20.20	20.55	21.00	19.55	19.00	20.06	0.711	46.2	28.5		

ENVIRONMENTAL MONITORING REPORT

MAIN LOCATION: UMWA Serendah
SUB LOCATION: CMM 3

SET UCL: 21.0 Cel
SET LCL: 19.0 Cel
UCLW: 20.55 Cel
LCLW: 19.55 Cel

Time Stamp	Daily RT Avg	Act. Value (°C)	UCLW	UCL	LCLW	LCL	Hour Avg	Std Dev.	Avg RH %	Avg Pre Alert Check Outdoor Temp	Pre Alert Check	Pre Alert Text
2019-08-01 01:00:00	20.94	21.01	20.55	21.00	19.55	19.00	20.22	0.809	46.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-01 06:07:05	20.94	21.06	20.55	21.00	19.55	19.00	20.23	0.820	46.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-01 10:06:17	20.94	20.86	20.55	21.00	19.55	19.00	20.19	0.782	46.5	29.0		
2019-08-01 13:05:44	20.94	20.95	20.55	21.00	19.55	19.00	20.21	0.799	46.5	29.0		
2019-08-01 16:05:06	20.94	20.95	20.55	21.00	19.55	19.00	20.21	0.799	46.5	29.0		
2019-08-01 20:04:16	20.94	20.78	20.55	21.00	19.55	19.00	20.18	0.770	46.5	29.0		
2019-08-02 00:01:34	20.89	20.91	20.55	21.00	19.55	19.00	20.20	0.791	46.8	28.0		
2019-08-02 06:00:25	20.89	21.04	20.55	21.00	19.55	19.00	20.23	0.816	46.8	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-02 10:09:37	20.89	20.81	20.55	21.00	19.55	19.00	20.18	0.775	46.8	28.0		
2019-08-02 13:08:58	20.89	20.85	20.55	21.00	19.55	19.00	20.19	0.780	46.8	28.0		
2019-08-02 16:06:25	20.89	20.80	20.55	21.00	19.55	19.00	20.18	0.773	46.8	28.0		
2019-08-02 20:01:54	20.89	20.90	20.55	21.00	19.55	19.00	20.20	0.789	46.8	28.0		
2019-08-03 00:11:01	21.05	21.04	20.55	21.00	19.55	19.00	20.23	0.816	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-03 06:09:48	21.05	21.01	20.55	21.00	19.55	19.00	20.22	0.809	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-03 10:07:05	21.05	21.03	20.55	21.00	19.55	19.00	20.23	0.814	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-03 13:06:27	21.05	21.07	20.55	21.00	19.55	19.00	20.23	0.822	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-03 16:05:51	21.05	21.01	20.55	21.00	19.55	19.00	20.22	0.809	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-03 20:05:03	21.05	21.14	20.55	21.00	19.55	19.00	20.25	0.836	46.0	28.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-04 00:04:16	21.08	21.19	20.55	21.00	19.55	19.00	20.26	0.847	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-04 06:13:07	21.08	21.11	20.55	21.00	19.55	19.00	20.24	0.831	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-04 10:03:14	21.08	21.00	20.55	21.00	19.55	19.00	20.22	0.807	45.5	28.5		
2019-08-04 13:49:34	21.08	21.04	20.55	21.00	19.55	19.00	20.23	0.816	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-04 16:48:59	21.08	21.06	20.55	21.00	19.55	19.00	20.23	0.820	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-04 20:08:14	21.08	21.06	20.55	21.00	19.55	19.00	20.23	0.820	45.5	28.5	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-05 00:55:18	21.06	21.17	20.55	21.00	19.55	19.00	20.25	0.842	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-05 06:53:57	21.06	21.08	20.55	21.00	19.55	19.00	20.24	0.824	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-05 10:43:05	21.06	21.00	20.55	21.00	19.55	19.00	20.22	0.807	45.5	29.0		
2019-08-05 13:42:29	21.06	20.96	20.55	21.00	19.55	19.00	20.21	0.801	45.5	29.0		
2019-08-05 16:41:51	21.06	21.02	20.55	21.00	19.55	19.00	20.22	0.811	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-05 20:59:04	21.06	21.13	20.55	21.00	19.55	19.00	20.25	0.833	45.5	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-06 00:06:12	21.01	21.14	20.55	21.00	19.55	19.00	20.25	0.836	46.0	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP
2019-08-06 06:07:18	21.01	21.16	20.55	21.00	19.55	19.00	20.25	0.840	46.0	29.0	ACTIVE	UMWA - Serendah CMM3 UCL WARNING! HIGH TEMP

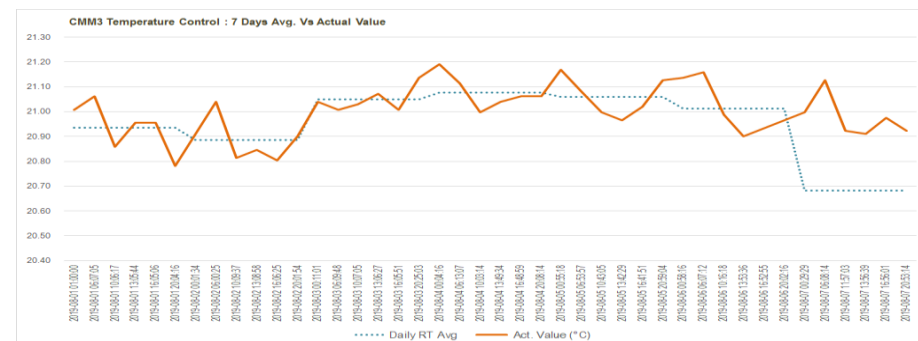
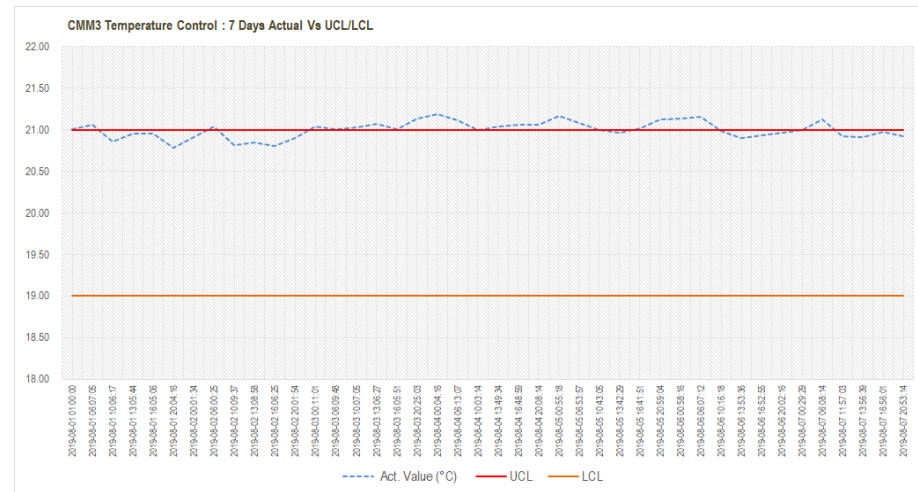


How We Perform the Condition Based Maintenance??

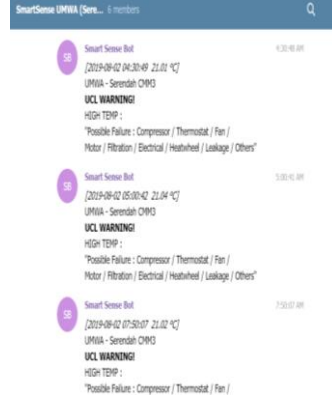
Maintenance Strategy and Analysis Upon Alert Activation include;

- ✓ Collection of data log
- ✓ 24 hours monitoring of room temperature and HVAC system
- ✓ Perform troubleshooting of HVAC system using '5 Why'

Concept

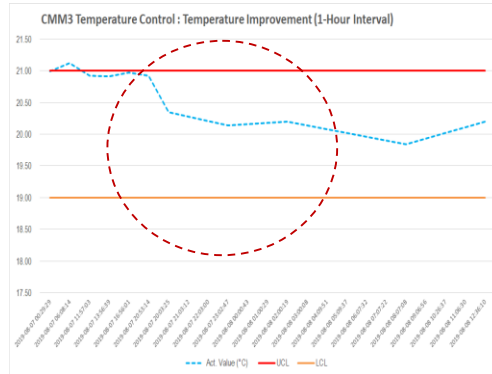


1



Waris Sensor BOT Text includes “Failure Mode” feature

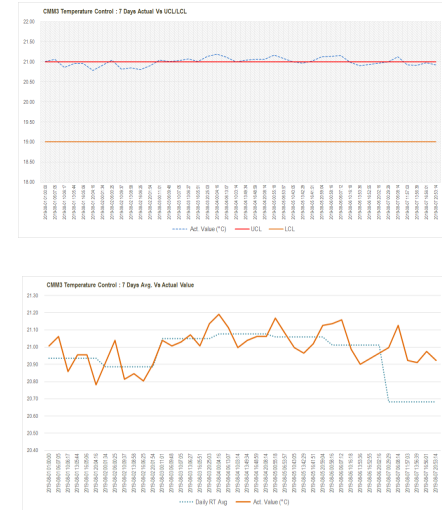
4



- Based on data analysis and tell tale signed from the AHU system, it was found out that the temperature drop was caused by the primary filtration system
- Test was conduct by replacing to new primary filters
- Immediately the temperature drops as within the setpoint mark. Constant monitoring was made at an hour interval to ensure effectiveness of filter
- As a result of constant cooling per requirement, loss of product quality has been avoided (which could have potentially resulted in thousands of ringgit in value)

2

Time Stamp	Daily RT	Act. Val.	UCLW	UCL	LCWL	LCL	Hour Std. Dev.	Avg RH	% Outdoor	Temp
2018-08-01 01:00:00	20.94	21.01	20.55	21.00	19.55	19.00	20.22	8.809	46.5	29.1
2018-08-01 06:07:05	20.94	21.06	20.55	21.00	19.55	19.00	20.23	8.820	46.5	29.1
2018-08-01 10:16:17	20.94	20.86	20.55	21.00	19.55	19.00	20.19	8.762	46.5	29.1
2018-08-01 13:05:44	20.94	20.95	20.55	21.00	19.55	19.00	20.21	8.799	46.5	29.1
2018-08-01 16:05:06	20.94	20.95	20.55	21.00	19.55	19.00	20.21	8.799	46.5	29.1
2018-08-01 20:04:16	20.94	20.78	20.55	21.00	19.55	19.00	20.18	8.770	46.5	29.1
2018-08-02 00:01:34	20.89	20.91	20.55	21.00	19.55	19.00	20.20	8.791	46.8	28.8
2018-08-02 06:00:25	20.89	21.04	20.55	21.00	19.55	19.00	20.23	8.816	46.8	28.8
2018-08-02 10:19:37	20.89	20.81	20.55	21.00	19.55	19.00	20.18	8.775	46.8	28.8
2018-08-02 13:08:58	20.89	20.85	20.55	21.00	19.55	19.00	20.19	8.780	46.8	28.8
2018-08-02 16:06:25	20.89	20.80	20.55	21.00	19.55	19.00	20.18	8.773	46.8	28.8
2018-08-02 20:01:54	20.89	20.90	20.55	21.00	19.55	19.00	20.20	8.789	46.8	28.8
2018-08-03 00:11:01	21.05	21.04	20.55	21.00	19.55	19.00	20.23	8.816	46.0	28.8
2018-08-03 06:08:48	21.05	21.01	20.55	21.00	19.55	19.00	20.22	8.809	46.0	28.8
2018-08-03 10:10:05	21.05	21.03	20.55	21.00	19.55	19.00	20.23	8.814	46.0	28.8
2018-08-03 13:06:27	21.05	21.07	20.55	21.00	19.55	19.00	20.23	8.822	46.0	28.8
2018-08-03 16:05:51	21.05	21.01	20.55	21.00	19.55	19.00	20.22	8.809	46.0	28.8
2018-08-03 20:05:23	21.05	21.04	20.55	21.00	19.55	19.00	20.25	8.836	46.0	28.8
2018-08-04 00:04:16	21.08	21.19	20.55	21.00	19.55	19.00	20.26	8.847	45.5	29.1
2018-08-04 06:13:07	21.08	21.11	20.55	21.00	19.55	19.00	20.24	8.831	45.5	29.1
2018-08-04 10:13:14	21.08	21.00	20.55	21.00	19.55	19.00	20.22	8.807	45.5	29.1
2018-08-04 13:49:34	21.08	21.04	20.55	21.00	19.55	19.00	20.23	8.816	45.5	29.1
2018-08-04 16:45:49	21.08	21.06	20.55	21.00	19.55	19.00	20.23	8.820	45.5	29.1
2018-08-04 20:08:14	21.08	21.06	20.55	21.00	19.55	19.00	20.23	8.820	45.5	29.1
2018-08-05 00:55:18	21.06	21.17	20.55	21.00	19.55	19.00	20.25	8.842	45.5	29.1
2018-08-05 03:53:57	21.06	21.08	20.55	21.00	19.55	19.00	20.24	8.824	45.5	29.1
2018-08-05 16:00:45	21.06	21.00	20.55	21.00	19.55	19.00	20.22	8.807	45.5	29.1



3

WARIS BOT Texting “Possible Failure” :

- Compressor ??
- Thermostat ??
- Fan ??
- Motor ??
- Filtration ??

SB Smart Sense Bot 5:00:41 AM
[2019-08-02 05:00:42 21.04 °C]
UMWA - Serendah CMM3
UCL WARNING!
HIGH TEMP :
"Possible Failure : Compressor / Thermostat / Fan /
Motor / Filtration / Electrical / Heatwheel / Leakage / Others"

