

Green Solutions Starting from Customers' Door Steps



Malalla Al Ali
Empower Energy Solutions
Dubai, UAE

SMART SUSTAINABLE CITY



Sustainable District Cooling by

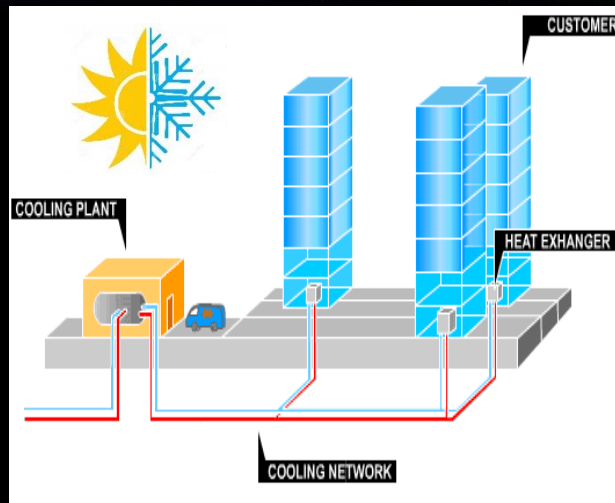
- Smart Cooling Plant
- Smart/Intelligent Metering
- Smart FM/Building
- Smart Customer



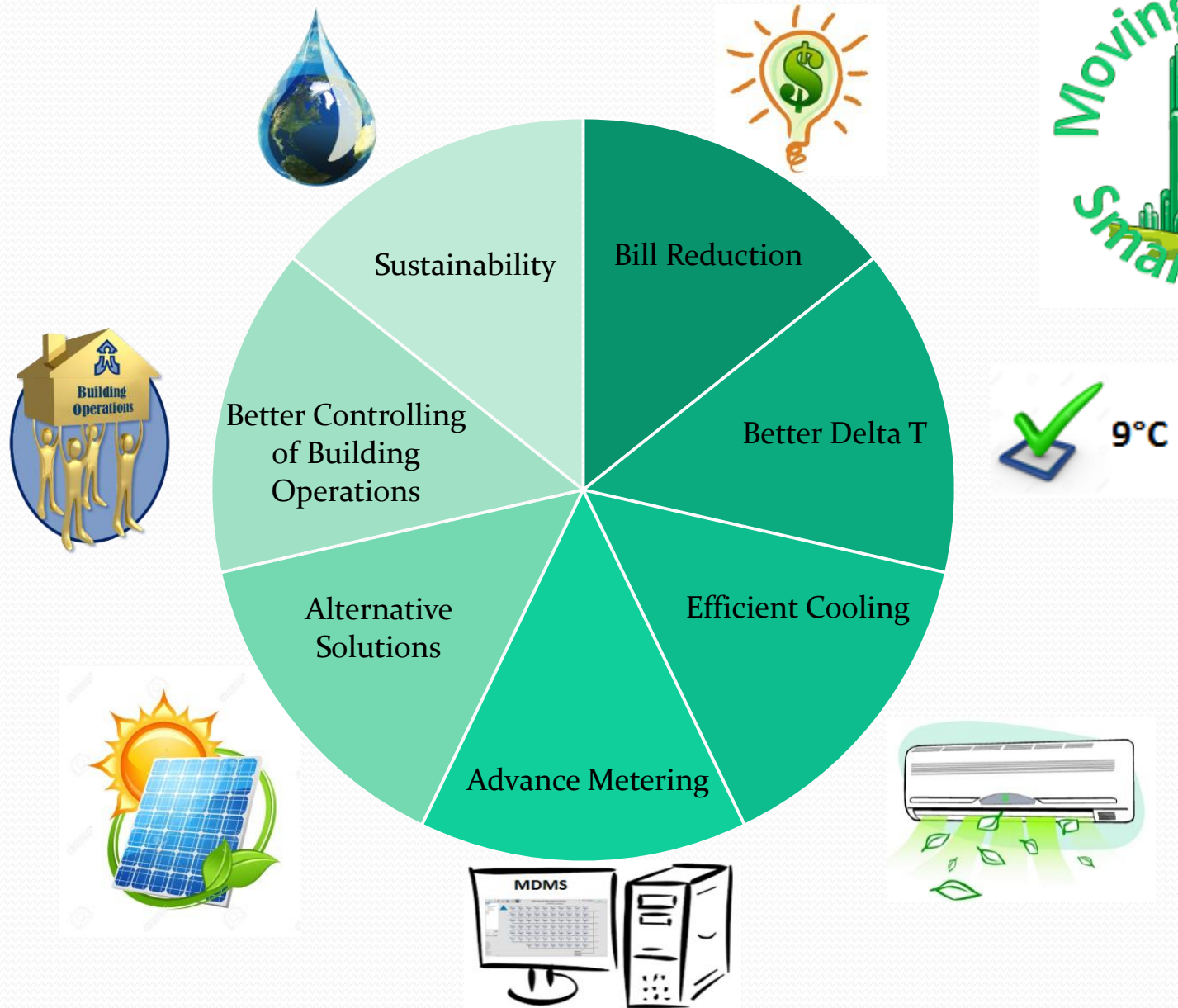
Empower is contributing towards Dubai sustainability motive

Dubai is the hub for achieving sustainability by going smart

WILL WE BE AS SMART AS OUR CITY?



SMART OBJECTIVES



ENERGY UTILIZATION - CONVENTIONAL VS DISTRICT COOLING

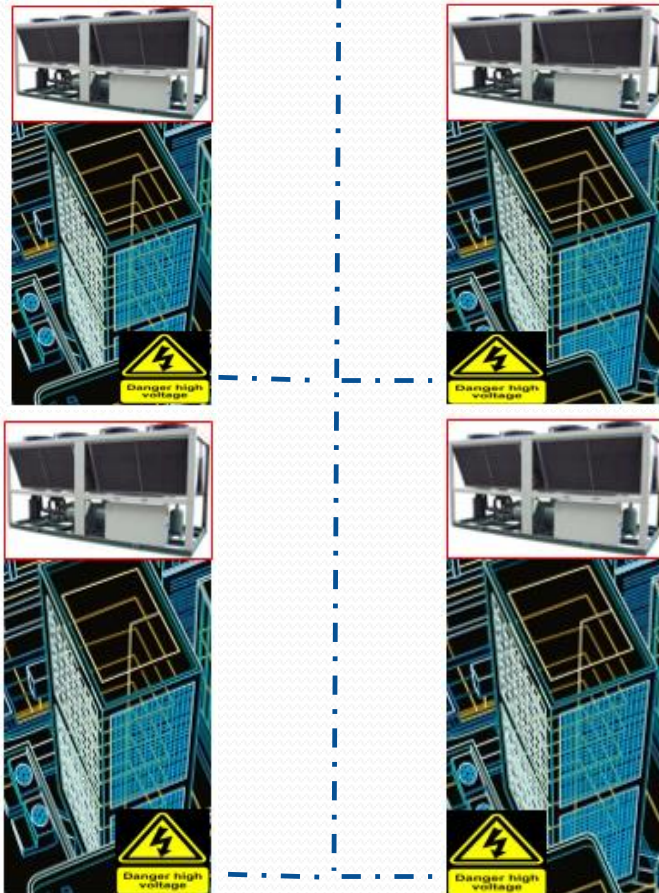


70% utility consumption

30% utility consumption

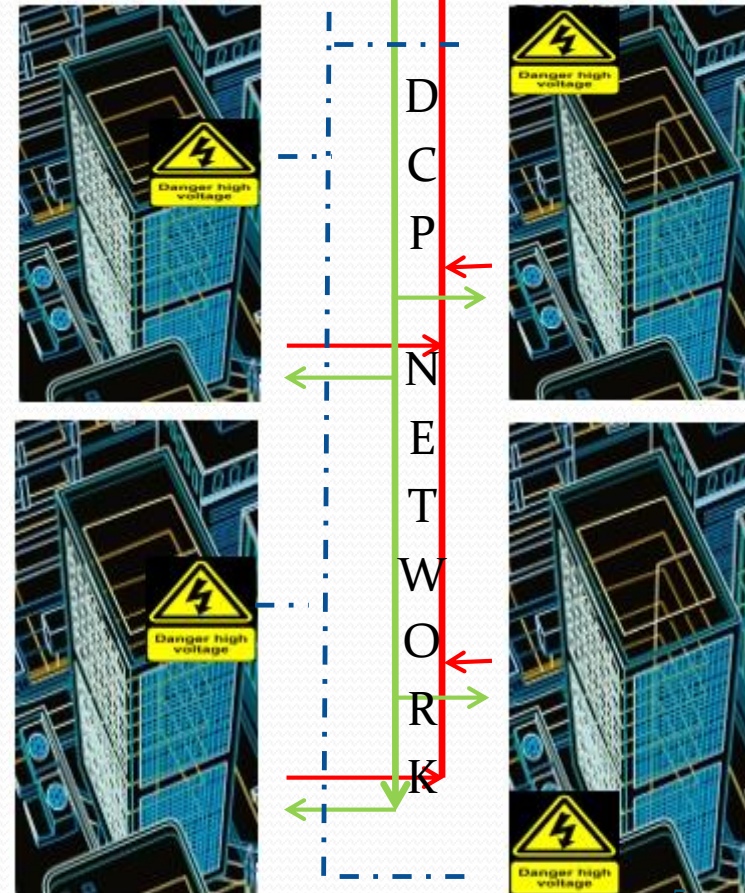
C
O
N
V
E
N
T
I
O
N
A
L

C
O
O
L
I
N
G



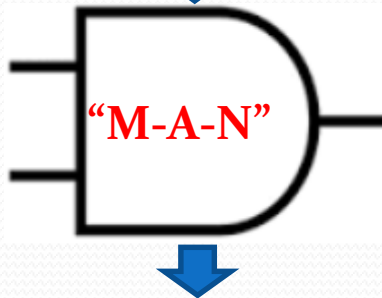
D
I
S
T
R
I
C
T

C
O
O
L
I
N
G

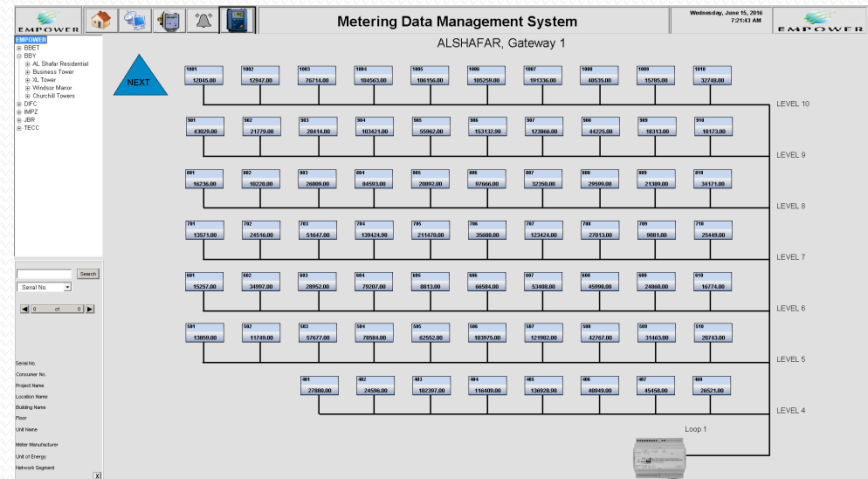


INTELLIGENT SUB-METERING FOR INTELLIGENT CUSTOMERS

Metering Data Management System
connecting 60,000+
meters

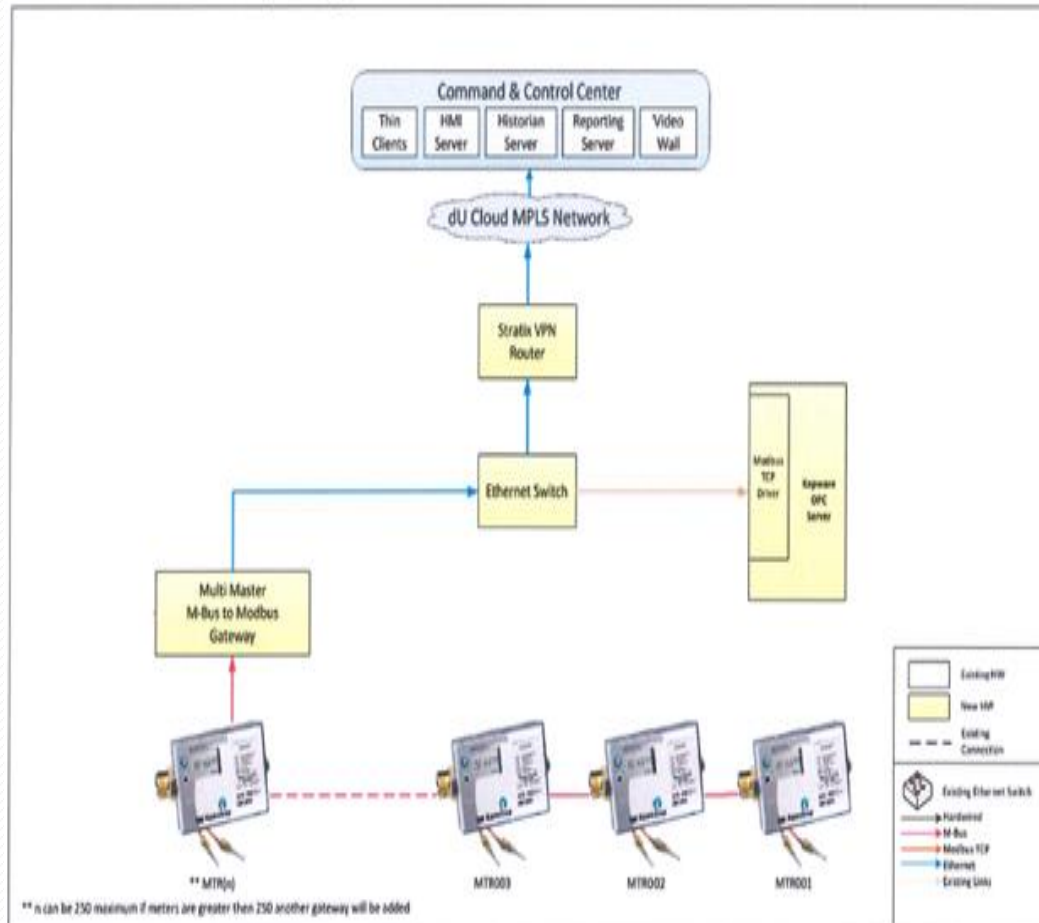


- Eliminating manual reads on-site
- Less manpower requirement
- Improved efficiency
- Eliminate human error
- Detecting meter faults

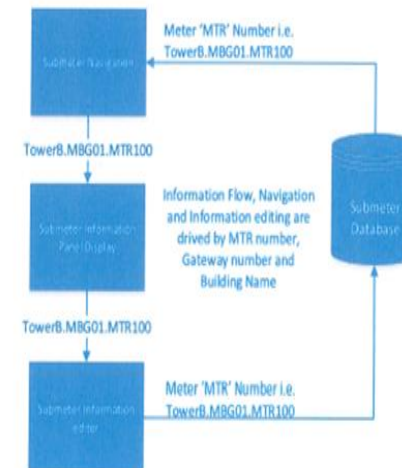
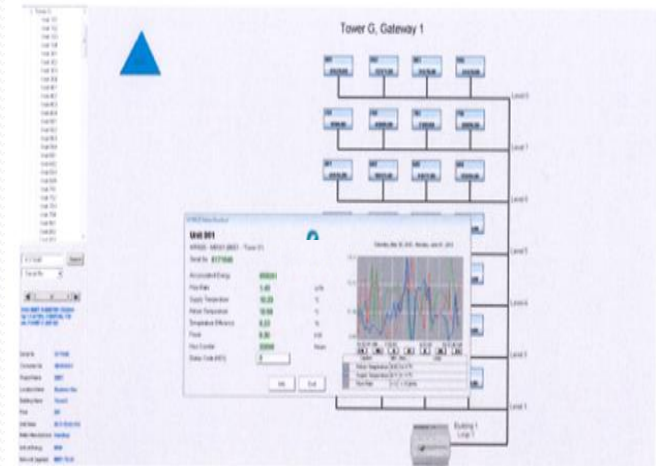


CONNECTING SUB-METERS STRUCTURE AND ITS NAVIGATION

Meter Connectivity



Navigation Pane



Sub meter navigation and all related functions are indexed on unique MTR number assigned in a specific M-Bus Gateway in each building. For details on Naming convention please see section.

Metering Database schema is discussed in section 5.

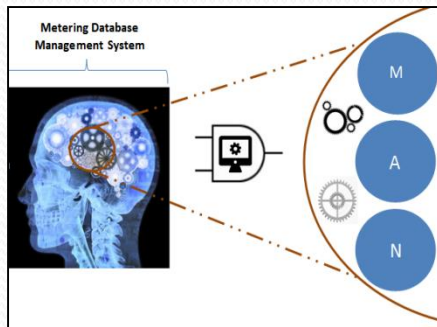
OVER-ALL BENEFITS OF MDMS



Efficient Plant Production



Sustainable Supply



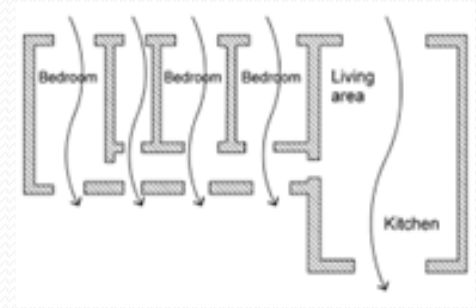
Effective building cooling



Managed delta T by FM



Better secondary side flow balancing



Reduced Bill



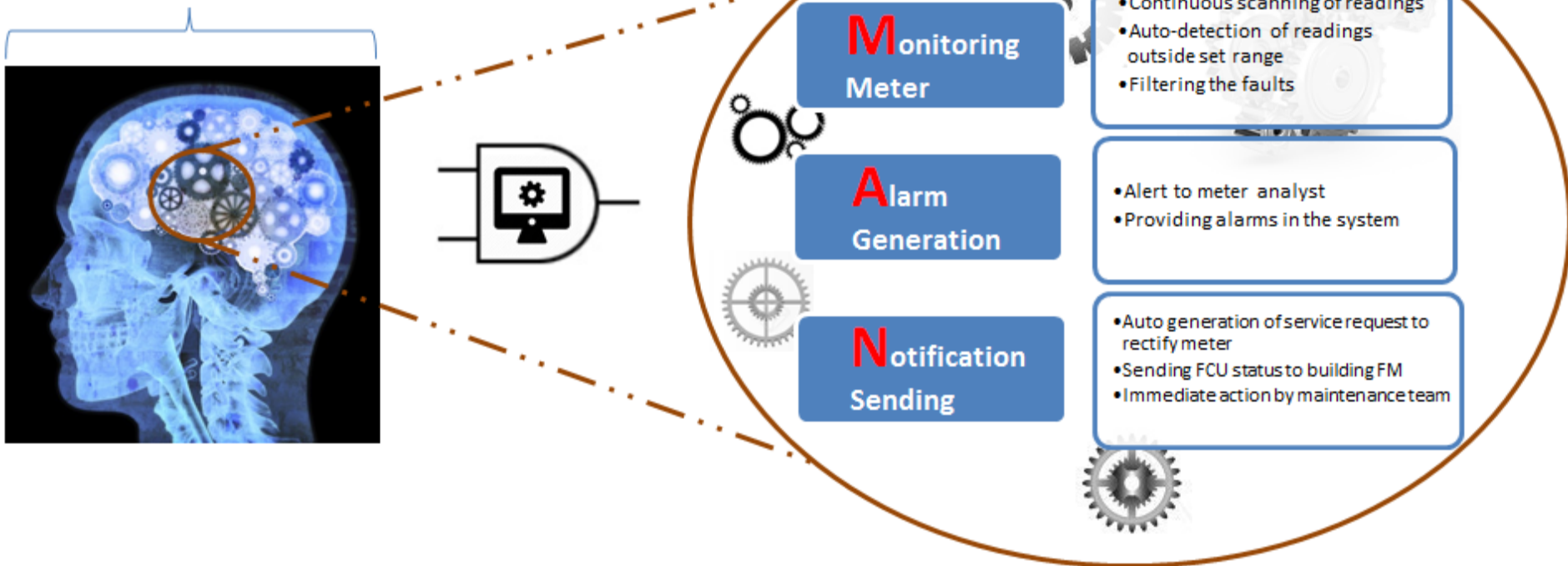
Early Fault Detection



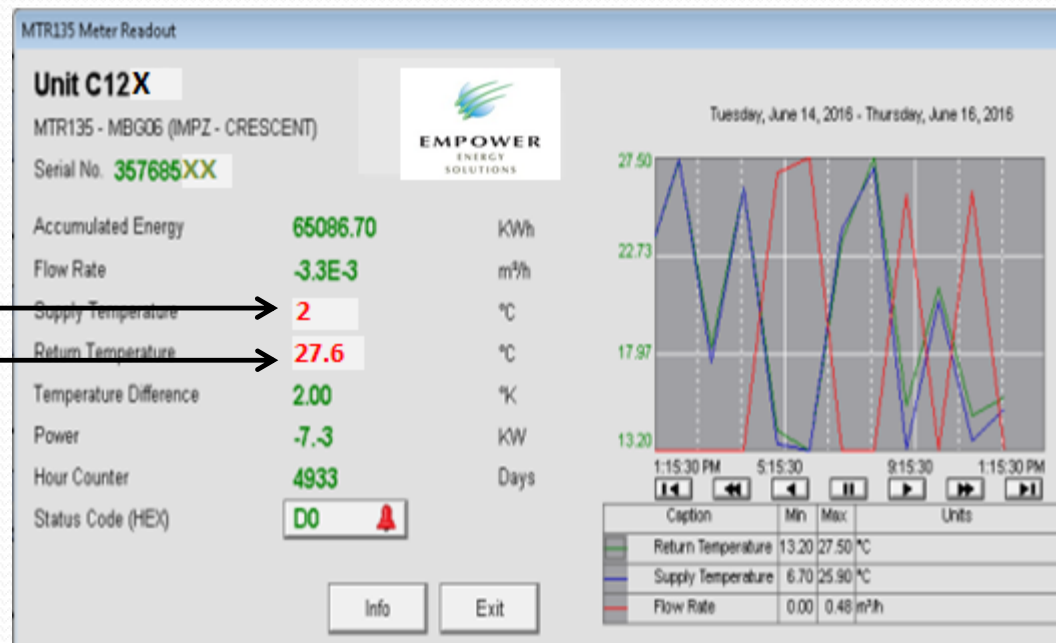
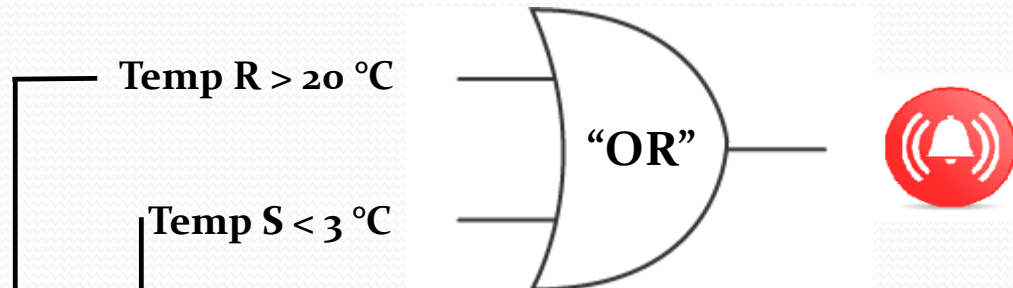
Eliminating passing flow

MDMS LOGIC AND OPERATIONS

Metering Database Management System



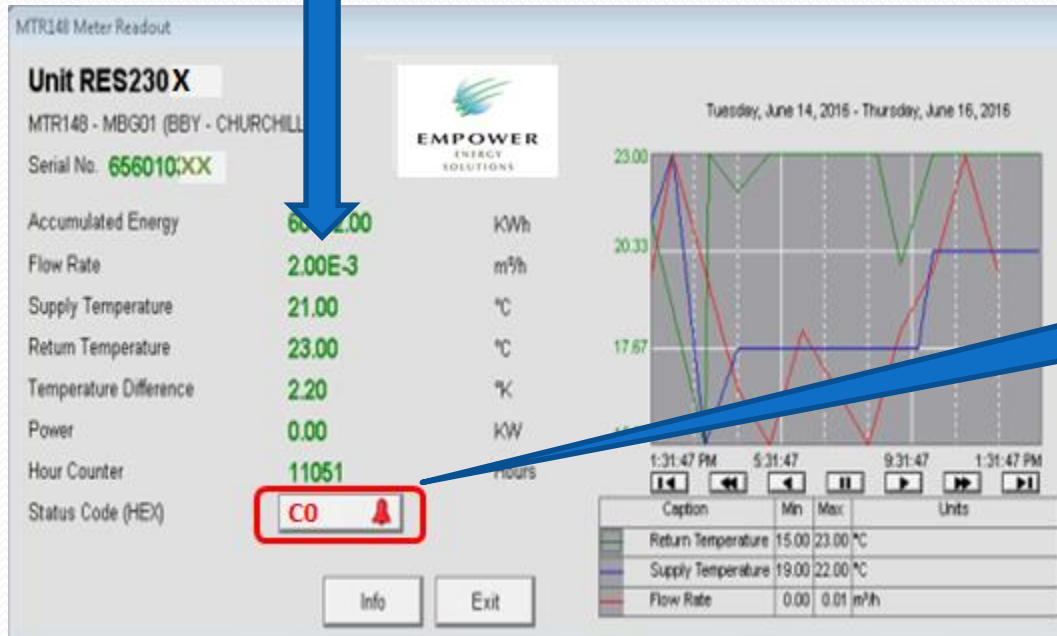
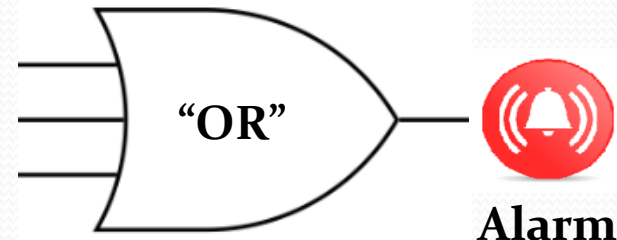
LOGIC 1 - PARAMETERS OUTSIDE THE SET WINDOW



LOGIC 2 - METER ERROR CODE DETECTION

Faulty
flow rate

Err 1
Err 4
Err 4096



Alarm is
generated

LOGIC 3 – COMMUNICATION HANG-UP

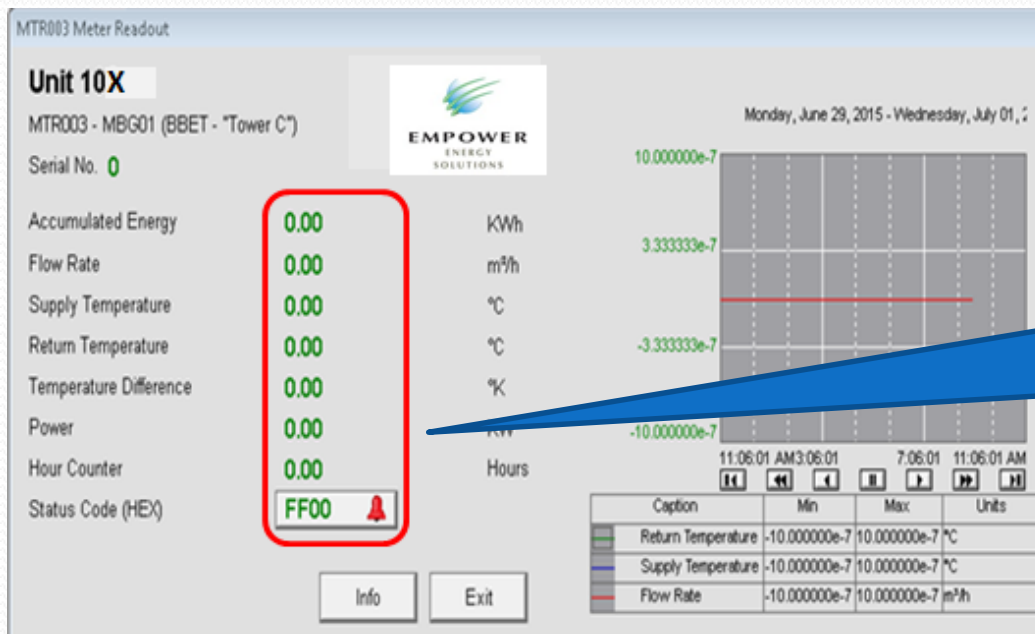
No Communication

Frozen Reading

“OR”



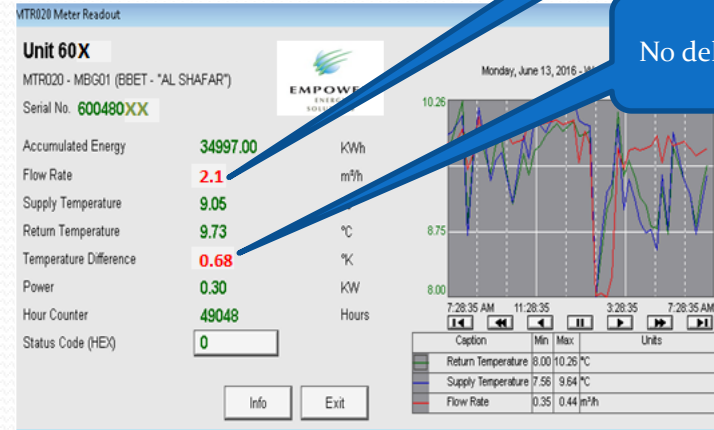
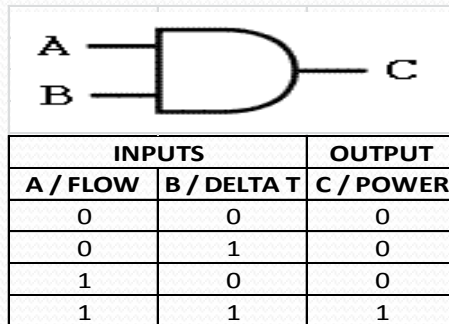
Alarm



All the parameters are showing zero – no communication

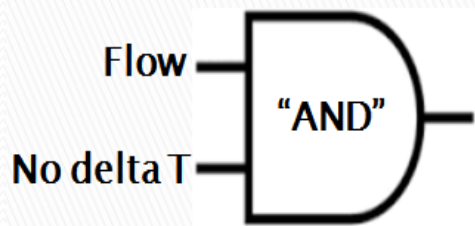
LOGIC 4 - DETECTING FCU FAULTS USING MDMS LOGIC

- Energy = Flow x Delta T



Flow is available

No delta T



Current Status of FCU Actuator

Inform the Customer



Inform the Building FM



Rectification of Issue & No energy Losses



Monitoring

Alarm

Notify

GO GREEN WITH MDMS

BEFORE MDMS



- More Manpower
- More vehicle Requirement
- Manual Readings
- More CO2 Emission



AFTER MDMS



- Less Manpower Requirements
- Reduced Fuel Consumption
 - Less Paper Work
 - Less Road Traffics
 - Remote Reading
- Environment Friendly

IMPACT TO ENVIRONMENT



**REDUCED
ENERGY
CONSUMPTION**

Reduced electricity consumption

- No extra running chillers
- Less Secondary side Pumping

Reduced carbon dioxide emission

- Less use of Vehicle
- Less Pollution Emissions



SMART METERING PRACTICES IN PLANT PRODUCTION

Maintaining plant-meters



Meter



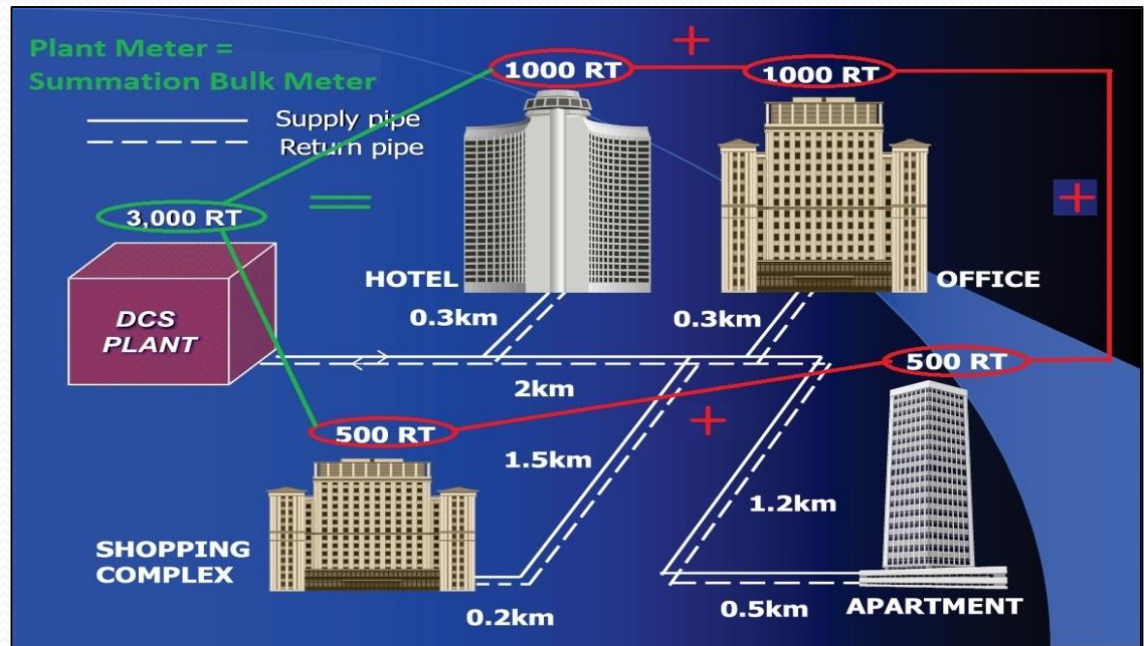
Preventive Maintenance



If,
Plant Production

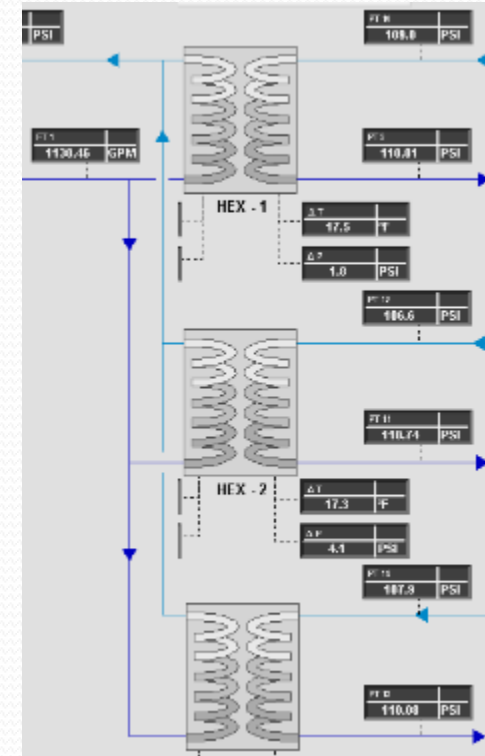
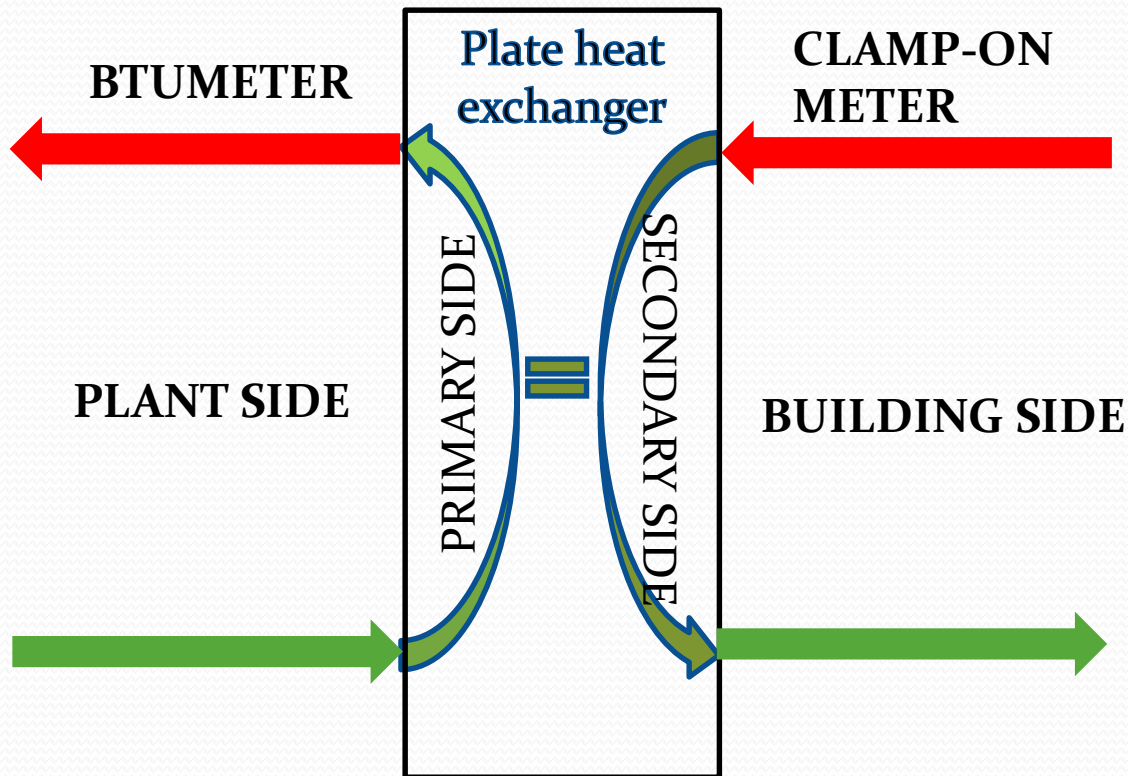
Σ =
Building
Consumption

Zero Losses



BUILDING SIDE FLOW BALANCING

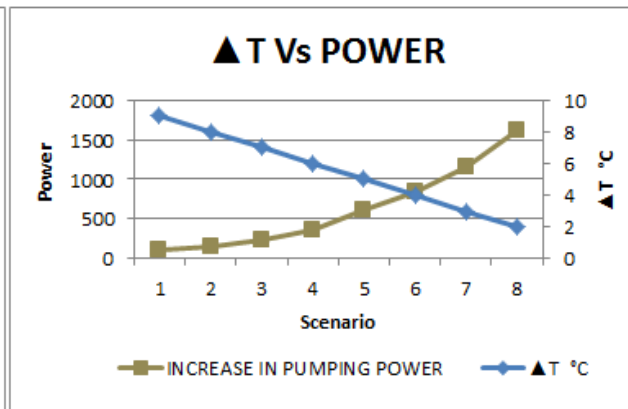
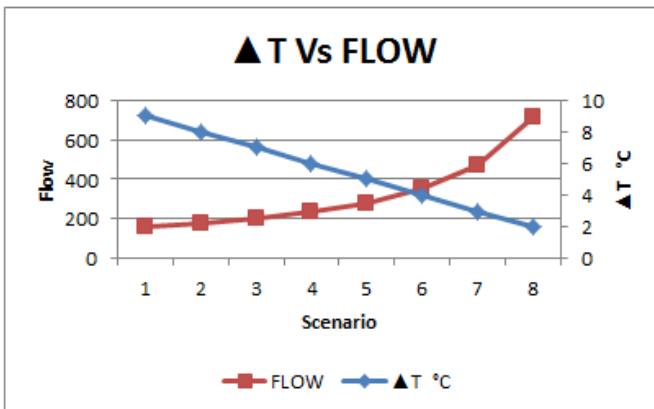
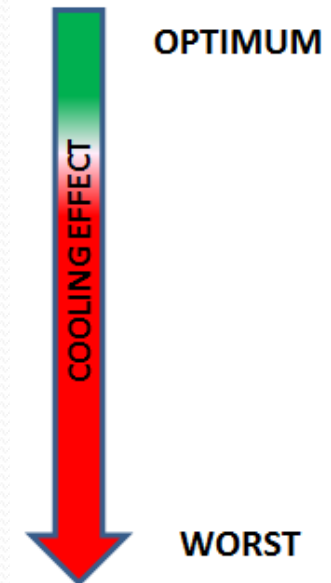
FLOW BALANCING GOAL → FLOW RATE
PRIMARY = FLOW RATE SECONDARY



BUILDING SIDE DELTA T

- Maintaining delta T from the building side:

SUPPLY TEMP °C	RETURN TEMP °C	▲ T °C	FLOW	INCREASE IN PUMPING POWER
5	14	9	160	115
6	14	8	178	155
7	14	7	203	228
8	14	6	236	357
9	14	5	282	611
10	14	4	352	835
11	14	3	470	1155
12	14	2	712.6	1625

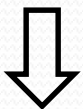
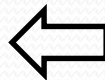


REACHING OUT TO CUSTOMERS DOOR STEP

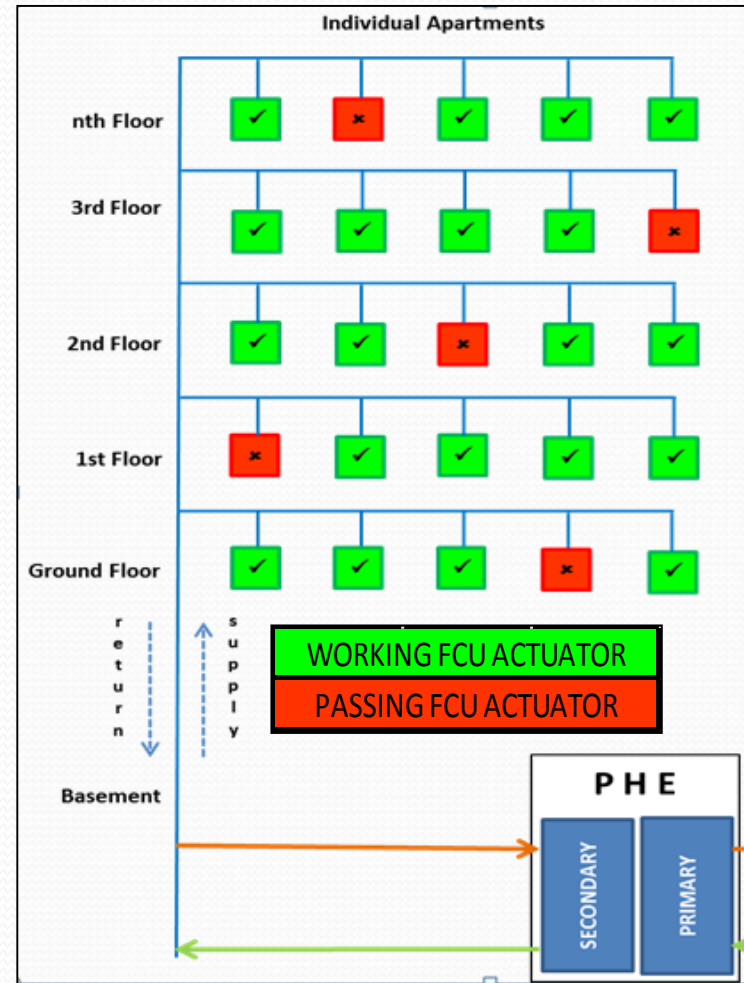
OBJECTIVE

FCU OFF

ZERO FLOW

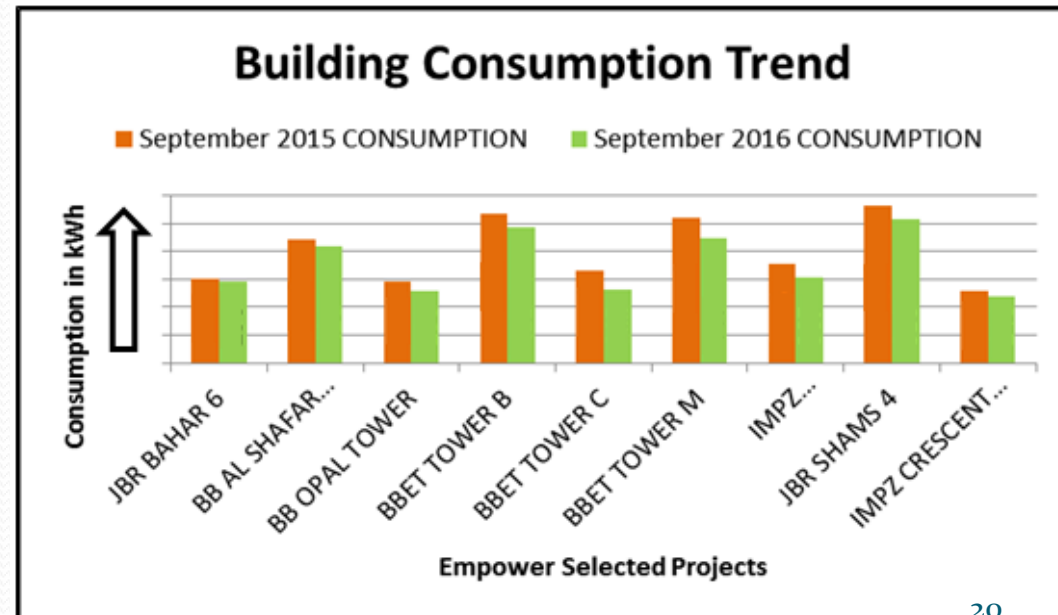


Rectify FCU Issue



CUSTOMER AWARENESS PROGRAMS

- Promoting 24°C campaign thru workshops, emails, brochures, etc.
- Outcome of 24°C campaign showed optimum consumption and improved billing (Y2Y comparison)



CONSERVED ENERGY FROM CUSTOMER SIDE

Premise	FlowRate	Supply	Return	TOWER	UNIT
991045599	0.83	6.48	6.31	AL SHAFAR RESIDENTIAL	2804
991044770	0.367	5.48	6.61	AL SHAFAR RESIDENTIAL	2002
991044282	0.561	7.47	7.93	AL SHAFAR RESIDENTIAL	1503
991045483	0.412	6.03	5.85	AL SHAFAR RESIDENTIAL	2703
991044975	0.205	7.75	7.65	AL SHAFAR RESIDENTIAL	2202
991043111	2.203	6.24	6.82	AL SHAFAR RESIDENTIAL	RETAIL 7
991044185	0.501	6.38	7.65	AL SHAFAR RESIDENTIAL	1403
991044584	0.891	5.54	5.82	AL SHAFAR RESIDENTIAL	1803
991045181	0.417	6.14	8.11	AL SHAFAR RESIDENTIAL	2403
991044843	0.448	5.69	6.74	AL SHAFAR RESIDENTIAL	2009
991044762	0.377	5.45	6.53	AL SHAFAR RESIDENTIAL	2001
991044657	0.506	5.91	6.41	AL SHAFAR RESIDENTIAL	1810
991045548	0.291	5.84	6.55	AL SHAFAR RESIDENTIAL	2709
991043561	0.232	8.18	7.52	AL SHAFAR RESIDENTIAL	801
991044495	0.173	7.57	7.22	AL SHAFAR RESIDENTIAL	1704
991043731	0.527	5.79	6.68	AL SHAFAR RESIDENTIAL	908
991044622	0.547	6.06	6.15	AL SHAFAR RESIDENTIAL	1807
991045645	0.692	5.96	6.86	AL SHAFAR RESIDENTIAL	2809
991044991	1.046	6.64	5.37	AL SHAFAR RESIDENTIAL	2204
991043537	0.451	7.07	7.49	AL SHAFAR RESIDENTIAL	708

OBJECTIVE

FCU off



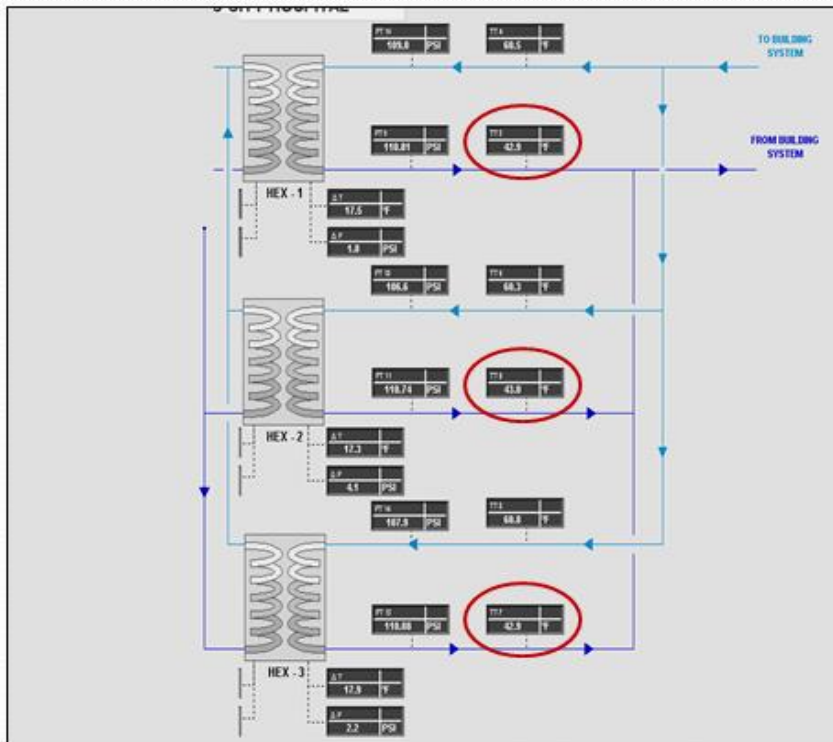
ZERO FLOW

- Detection of passing flow
- Eliminate losses of almost 12 m³/hr
- Saved energy = 35 RT

CASE STUDIES

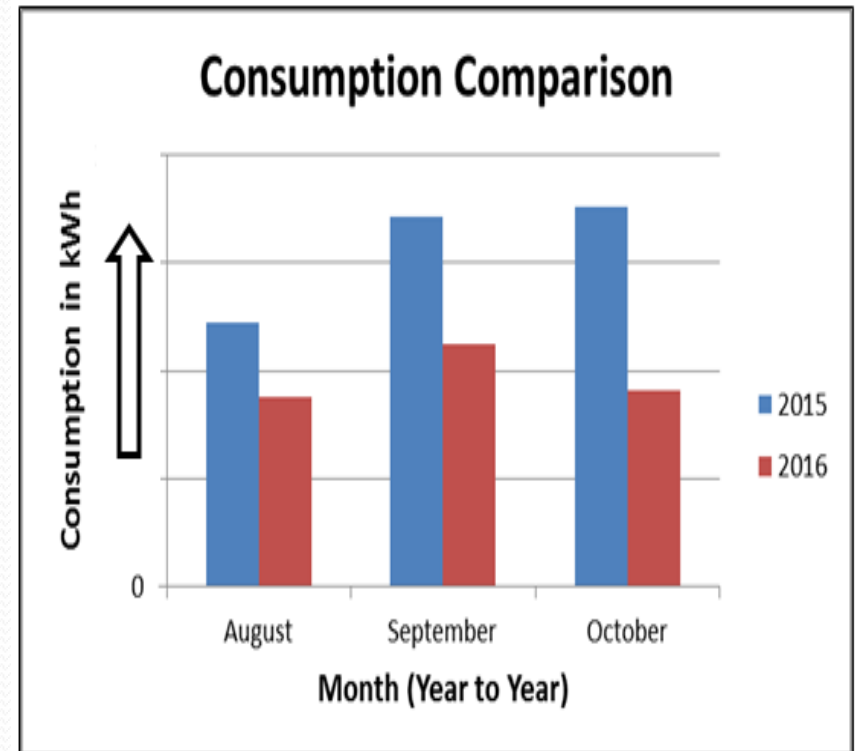
BUILDING

Efficient secondary side chilled water supply with proper flow balancing and maintaining delta T



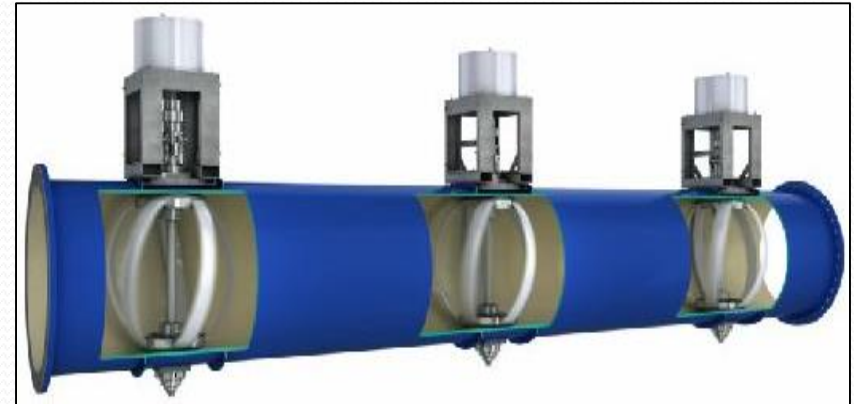
APARTMENT

Sub-metered unit consumption trend before and after rectification of faulty FCU actuator



FUTURE BEST PRACTICES FOR BETTER SUSTAINABILITY

Clean Energy From Water Pipes



Solar Powered Ultrasonic Flow meter with Remote Flow Measurement:



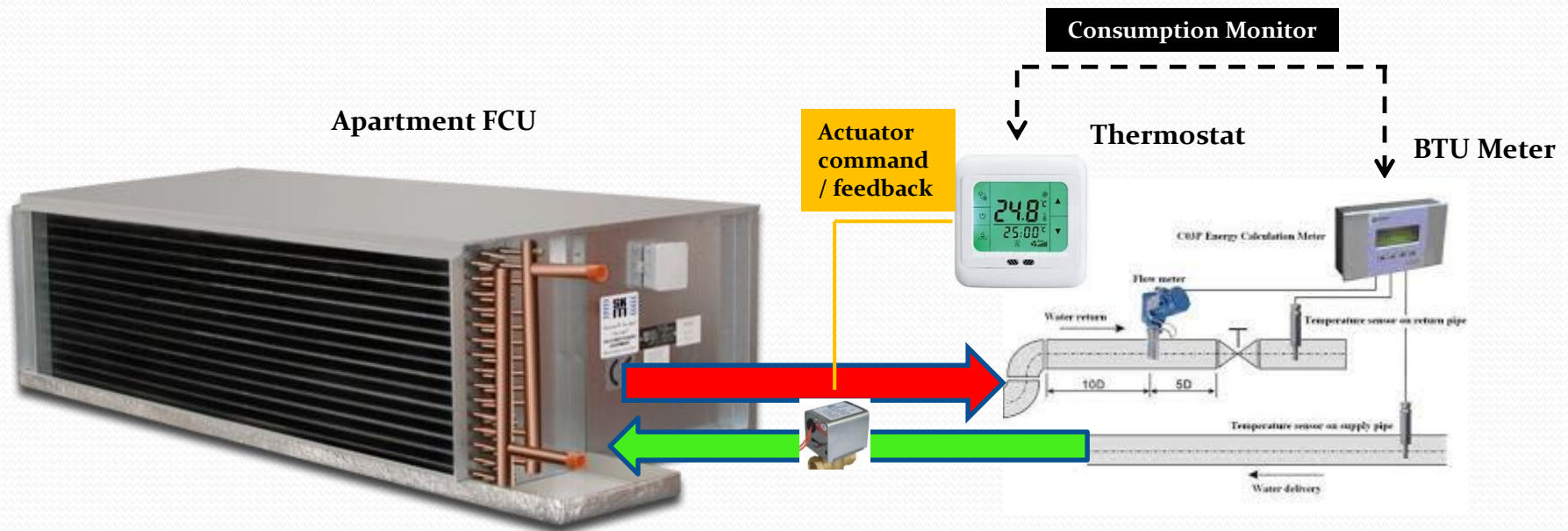
FUTURE BEST PRACTICES FOR IMPROVING SUSTAINABILITY

Smart valve ready for Remote DCRC



FUTURE BEST PRACTICES FOR IMPROVING SUSTAINABILITY

- Enhanced Consumption Monitoring By Integrating BTU Meter to Apartment FCU Thermostat Controller



CHILLED WATER LINE LEGEND

SUPPLY

RETURN



Thank You

Kindly don't hesitate to contact me for sharing experience related to the same subject.

Email: malalla.alali@empower.ae

Tel: 0097143755166