

# Metering Logic In Sustaining Energy

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# Introduction

- ▶ Meter Data Management System
- ▶ Managing 60,000+ meters
- ▶ Go smart by **M-A-N** logic
- ▶ Detects failure
- ▶ Maintaining healthy meters
- ▶ Better energy saving

# Objectives

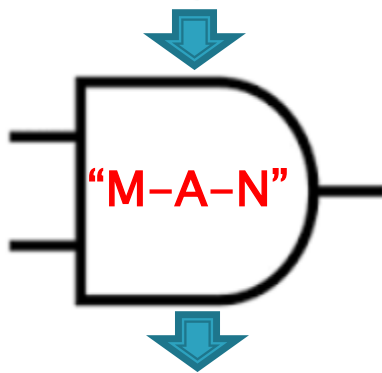


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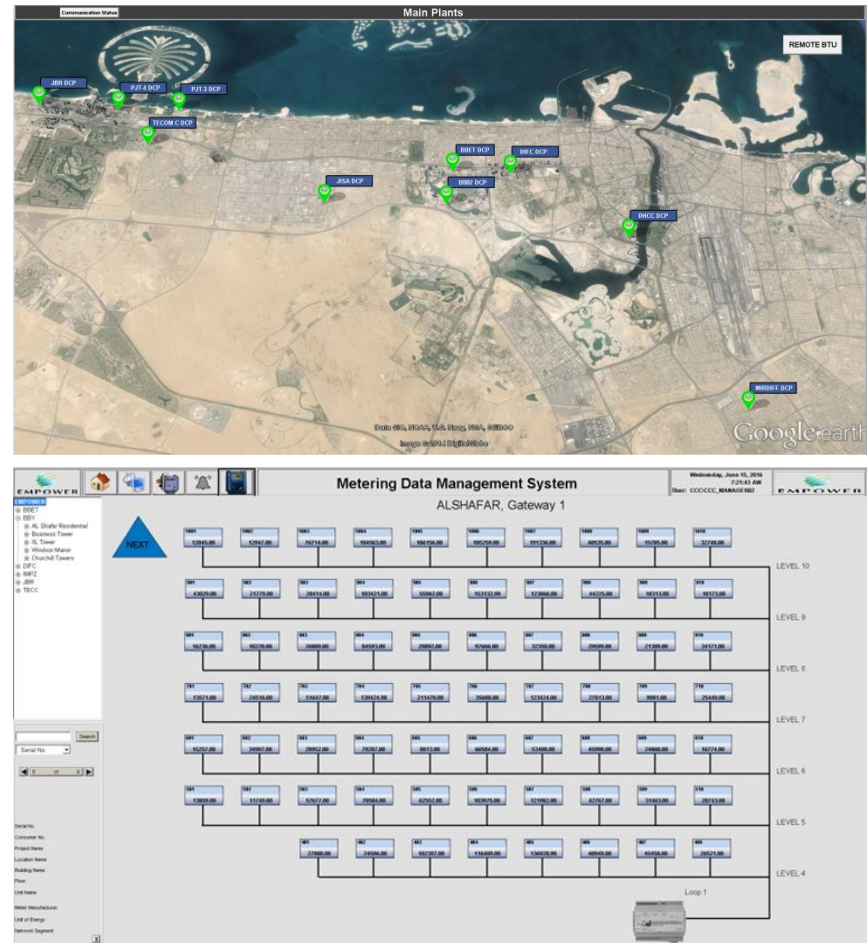


# What is MDMS?

Metering Data  
Management  
System connecting  
60,000+ meters

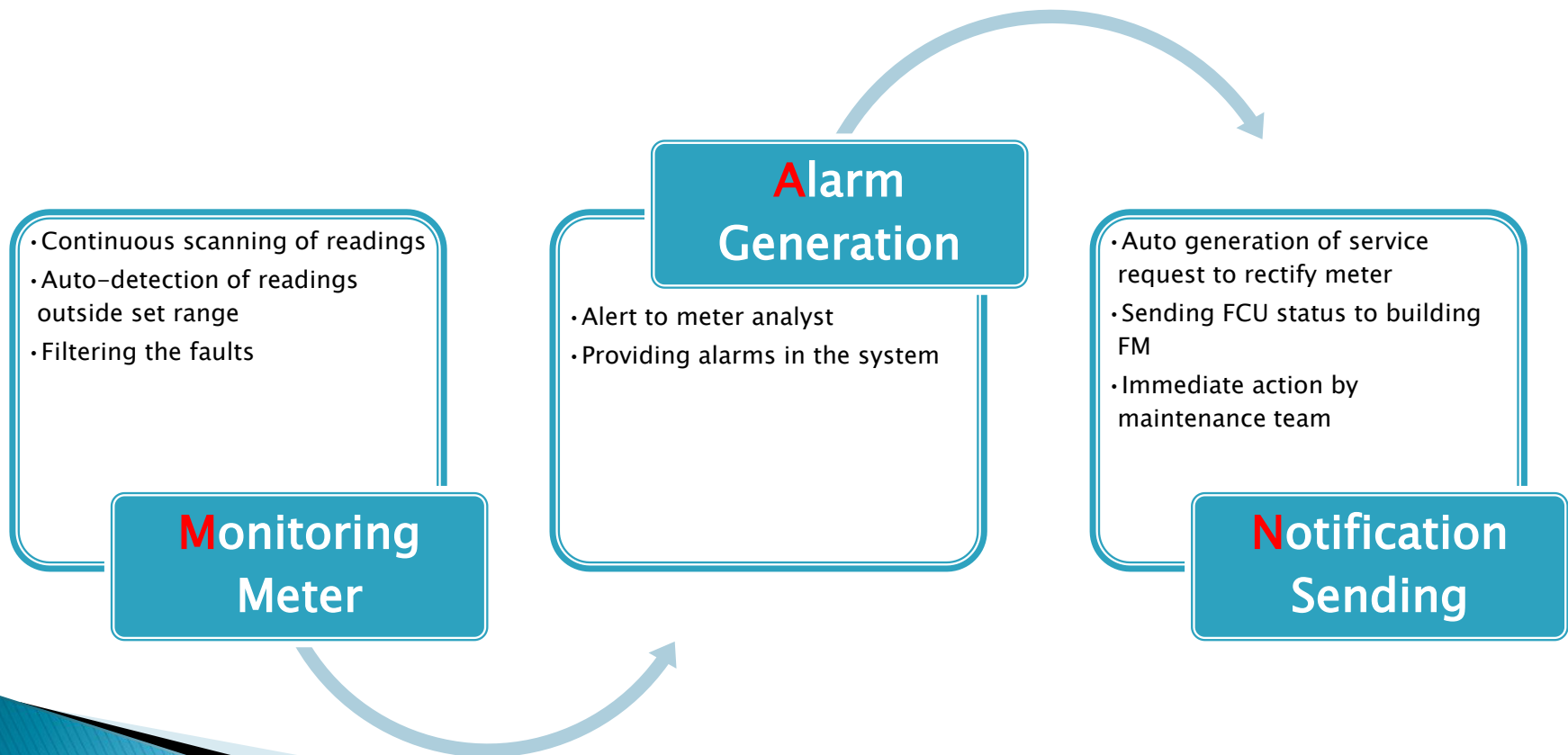


- Eliminating manual reads on-site
- Less manpower requirement
- Improved efficiency
- Eliminate human error
- Detecting meter faults



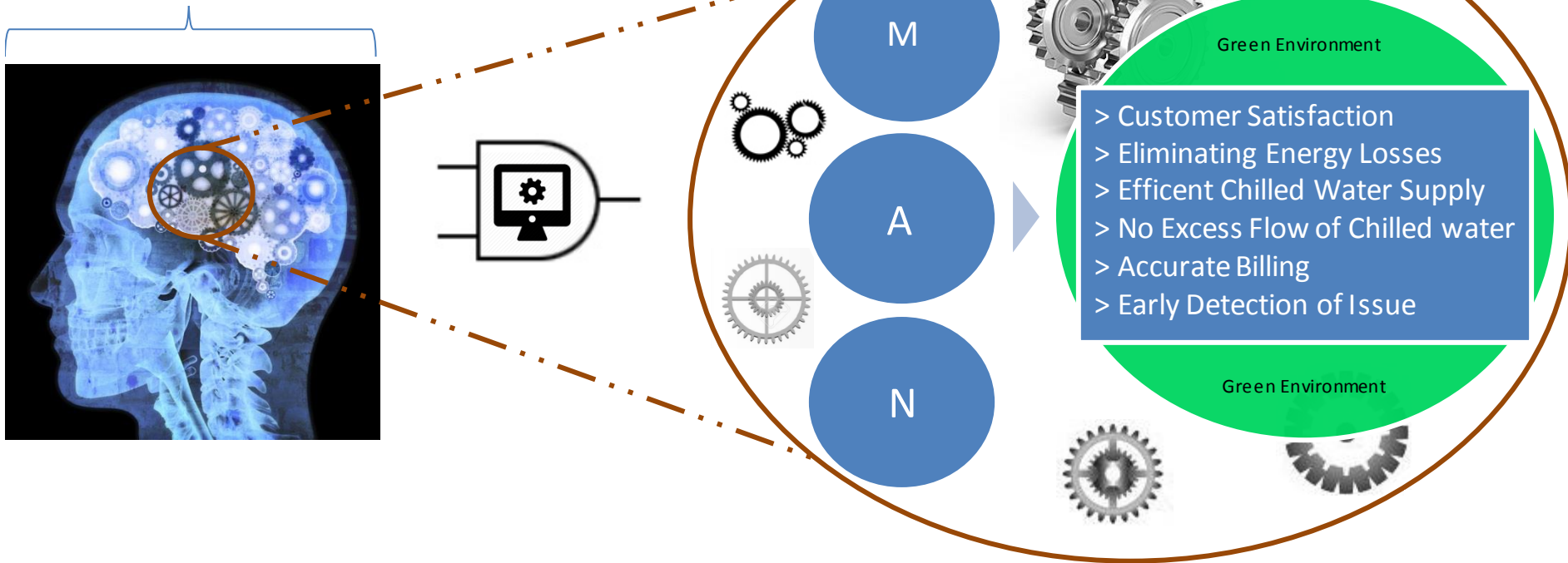
# Go Smart by **M-A-N** Logic

## ► What is **M-A-N**

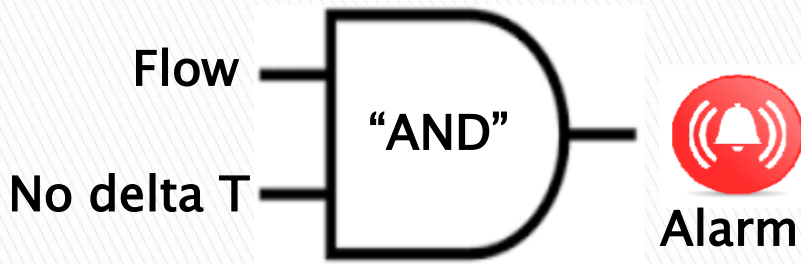


# M-A-N Logic Overview

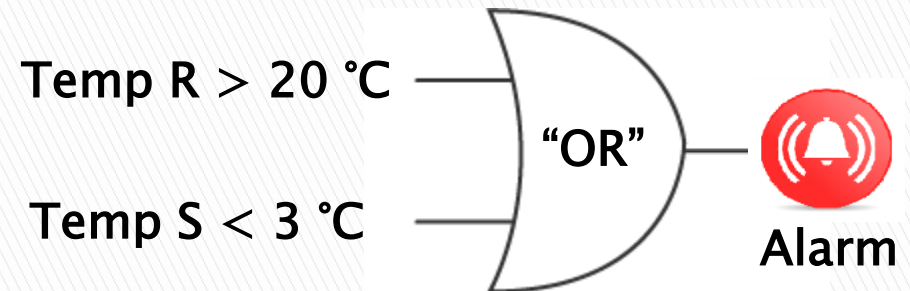
Metering Database  
Management System



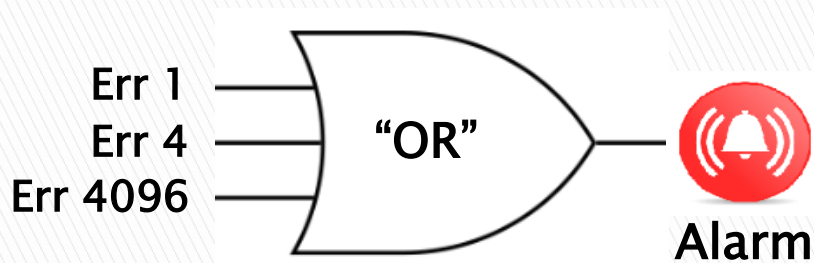
# M-A-N Logics



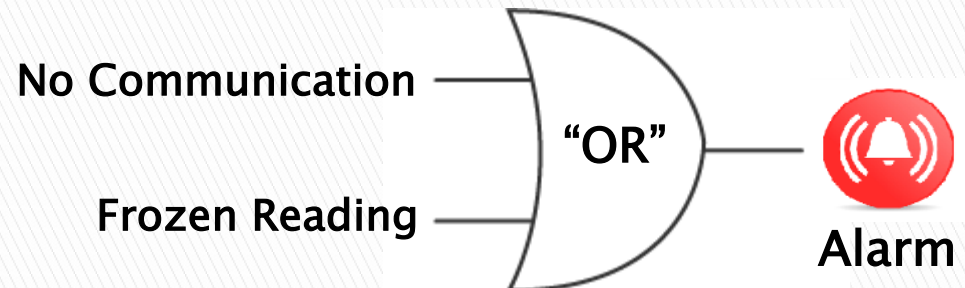
## 1. Flow and Delta T Correlation



## 2. Parameters Outside the Set Window

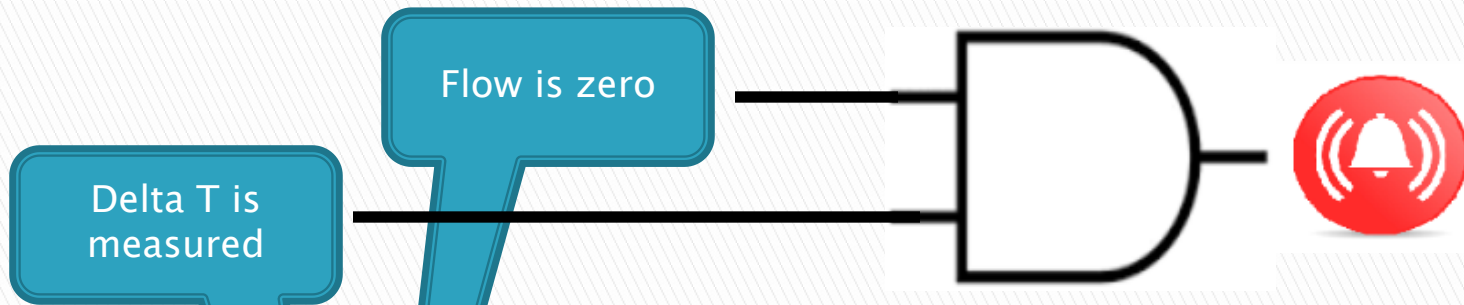


## 3. Meter Error Code Detection



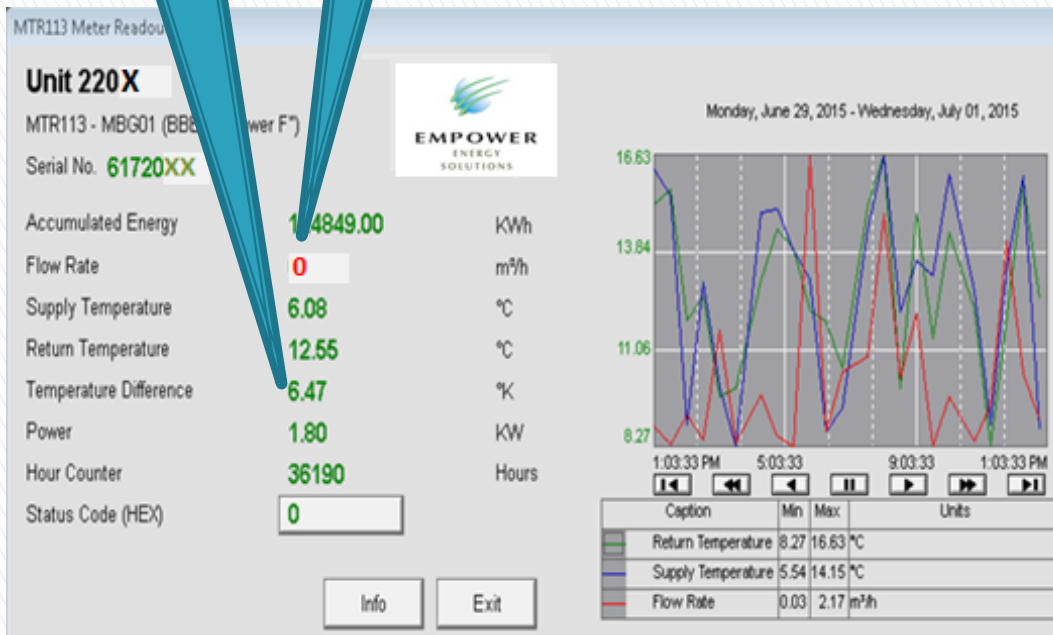
## 4. Reporting Communication Hang-up

# Logic 1 – Flow and Delta T Correlation



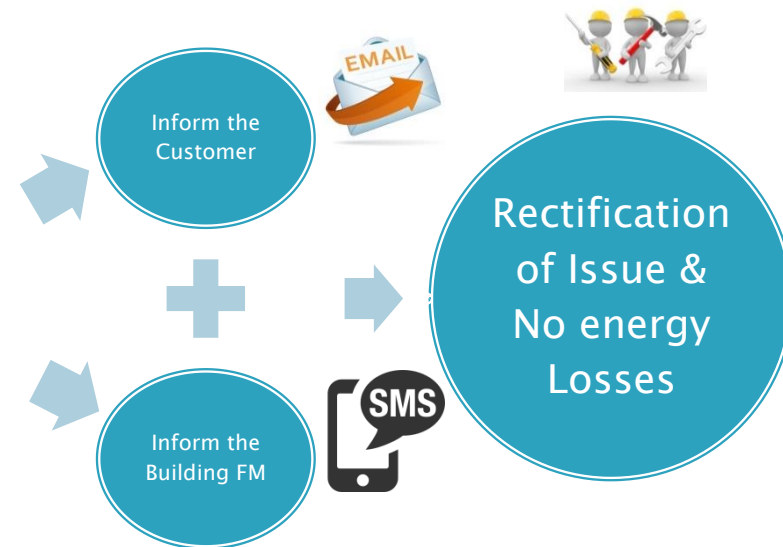
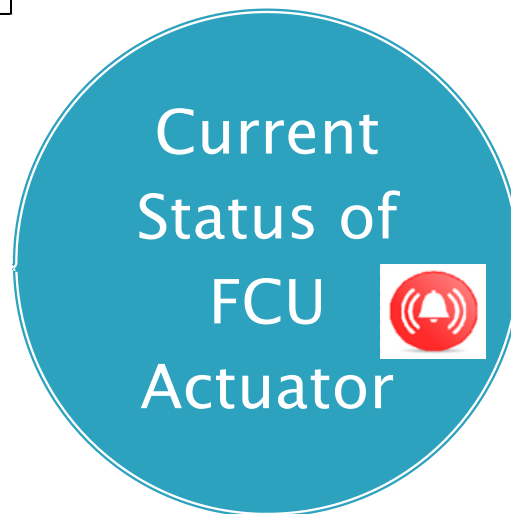
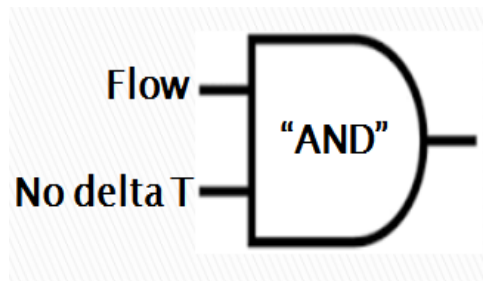
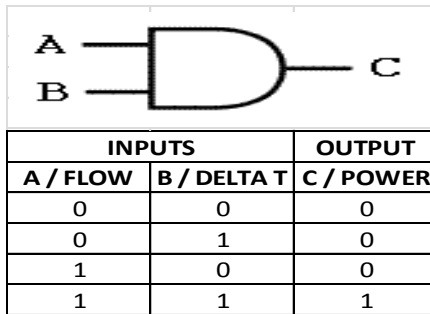
Flow is = 0 m<sup>3</sup>/hr  
and there is delta T.

Therefore, alarm for  
faulty flow sensor  
will be generated.



# Detecting FCU Faults

- ▶ Energy = Flow x Delta T



**M**onitoring

**A**larm

**N**otify

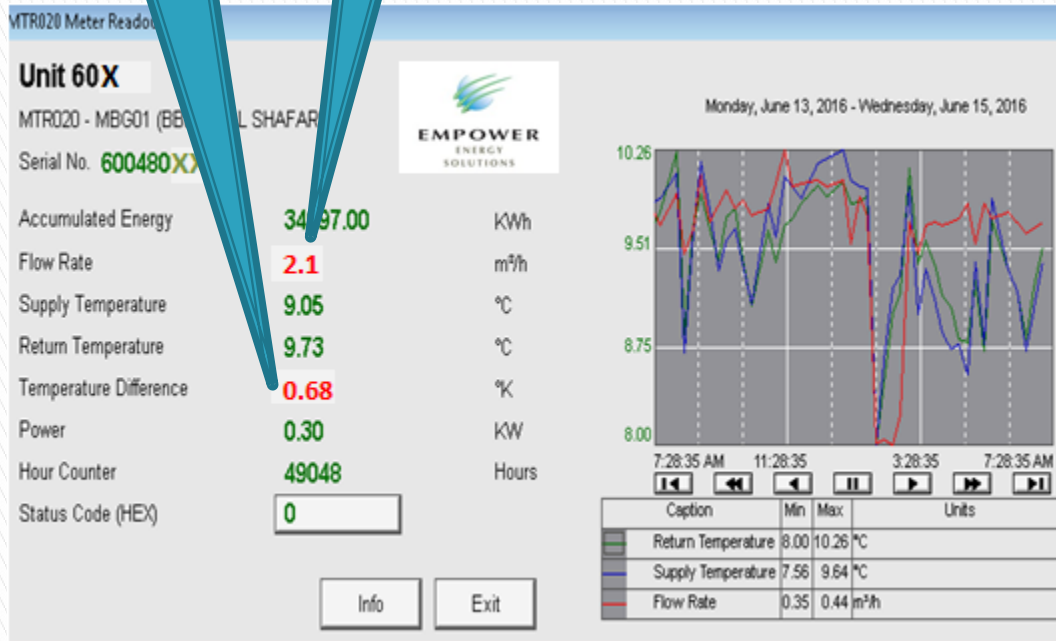


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# Example – Detecting FCU Faults

No delta T

Flow is  
available



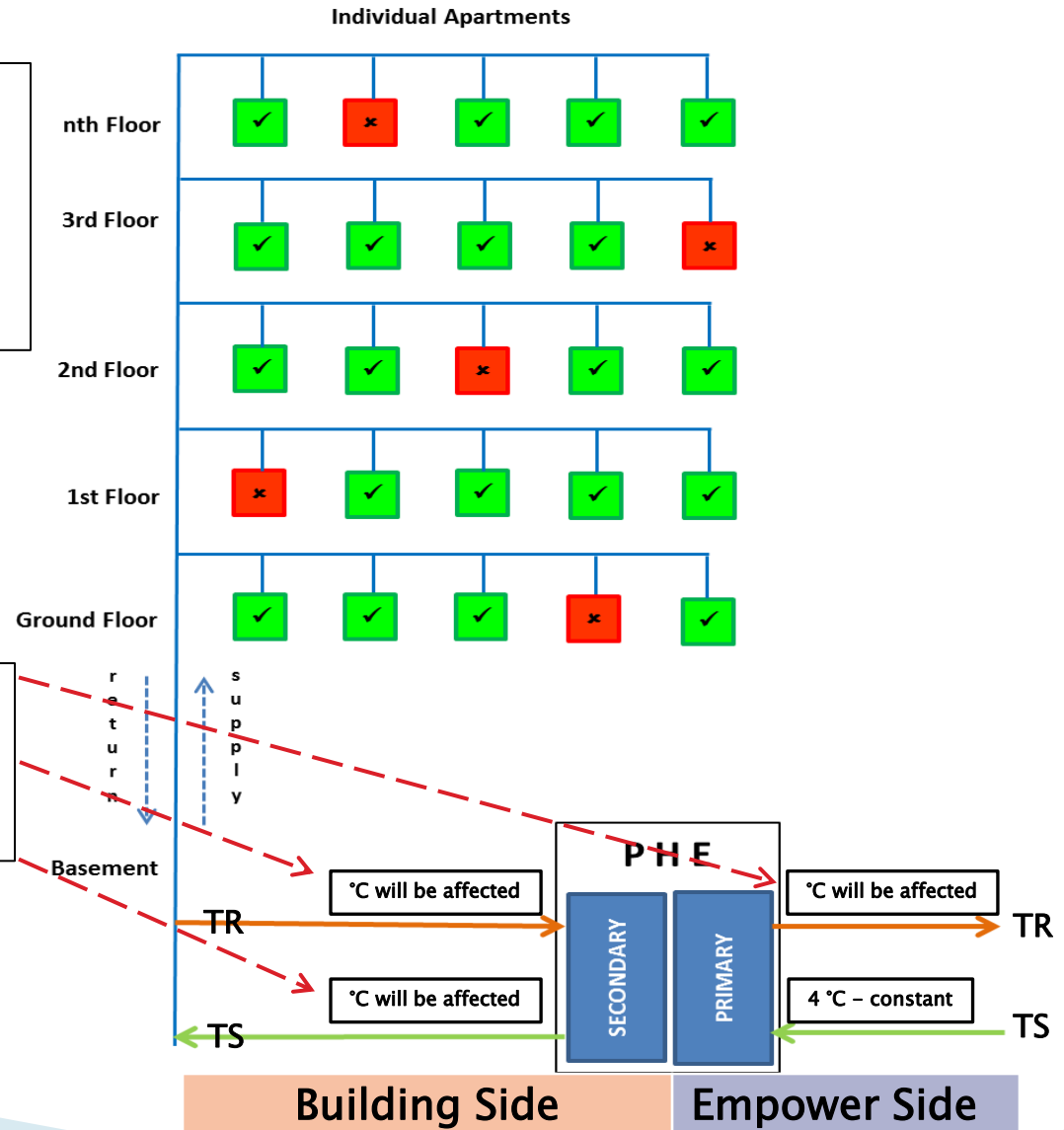
Flow is = 2.1 m³/hr  
and there is no  
delta T.

Therefore, alarm for  
FCU having passing  
actuator will be  
generated.



# M-A-N Logic to Solve Delta T

- Passing actuator valve will be rectified
- Building FM will be notified for those cases
- Will result to better flow balancing and improving delta T.



Since there are some passing FCU actuators, the flow balancing will be affected resulting in low delta T issue.

# Example – Effect of Passing FCU on Energy Losses



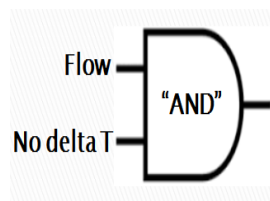
Business Bay  
residential  
building



273 sub-meter

Metering Data Management System  
ALSHAFAR, Gateway 1

1004 104563.00	1005 106156.00	1006 105259.00	1007 191336.00	1008 405
904 103424.00	905 55062.00	906 153132.00	907 123866.00	908 442
804 84503.00	805 20892.00	806 97666.00	807 32350.00	808 295
704 130424.00	705 211470.00	706 35688.00	707 123424.00	708 270



**FAULT**

20 cases –  
passing FCU  
valves.



**M**onitoring

**A**larm

**N**otify



# M-A-N Energy Saving

- ▶ Table shows detection of excess flow
- ▶ Detection of excess flow =  $12 \text{ m}^3/\text{hr}$
- ▶ Saved energy is enough for 35 RT cooling demand

**OBJECTIVE**



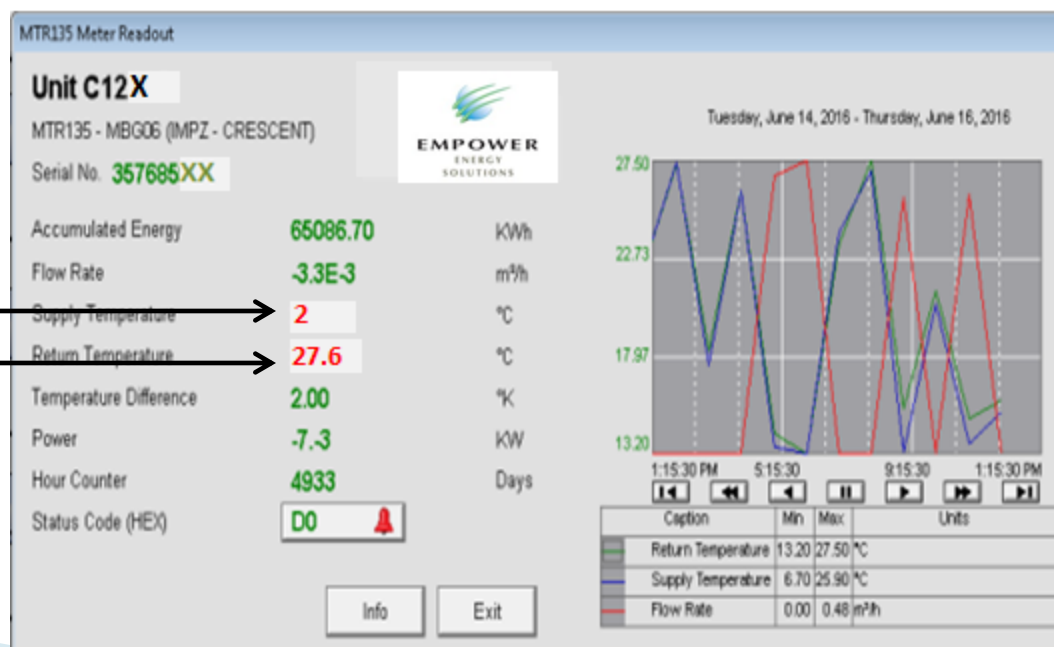
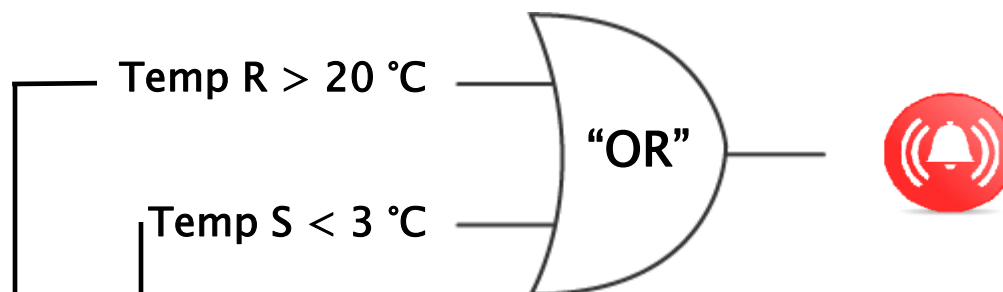
FCU off



ZERO FLOW

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

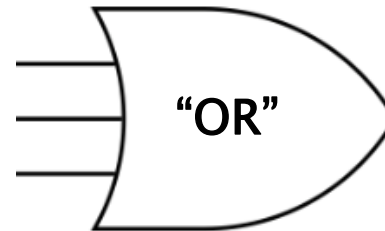
# Logic 2 – Parameters Outside Set Window



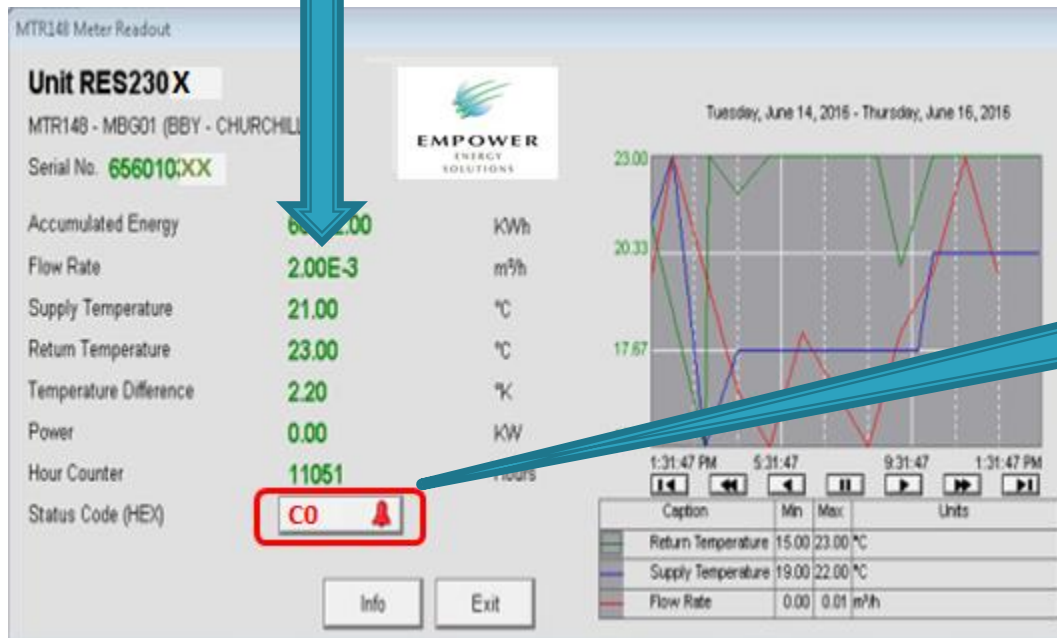
# Logic 3 – Meter Error Code Detection

Faulty  
flow rate

Err 1  
Err 4  
Err 4096

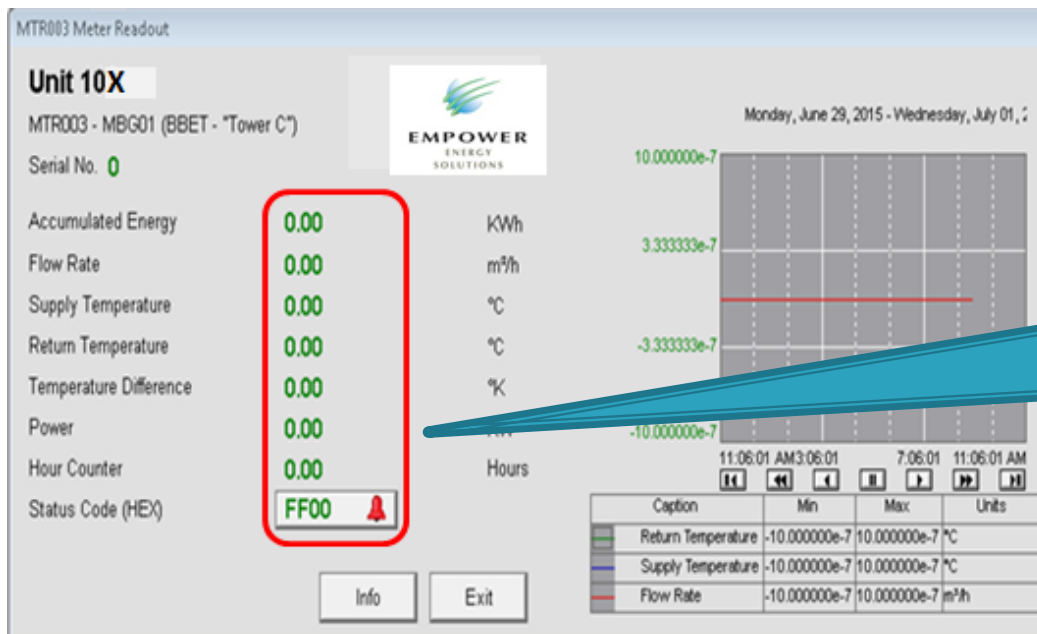
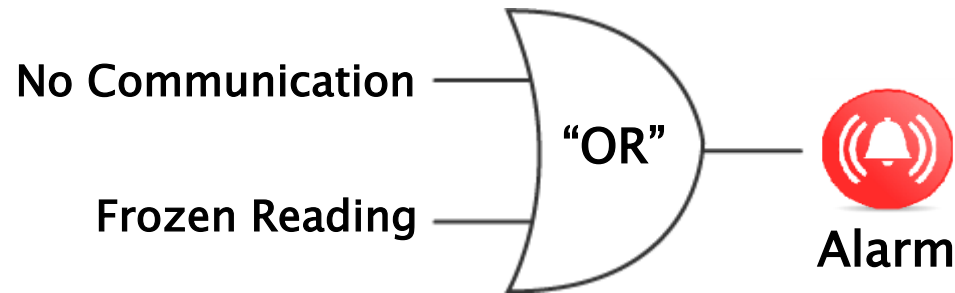


Alarm



Alarm is  
generated

# Logic 4 – Communication Hang-up



All the parameters are showing zero - no communication

# Smart Logic Implementation



MDMS –  
Traditional vs.  
Smart

MDMS Without M - A - N

Data



Manual Analysis

Faults



Rectification



- BEFORE**
- > Time consuming in doing analysis
  - > More resources needed
  - > More energy losses
  - > Longer rectification time

Data



System Auto  
Analysis with  
Auto Alarm

Faults



Rectification

Data Analysis



- AFTER**
- > Fast and smart Auto analysis
  - > Faster rectification response
  - > More efficient
  - > Less resources



# Conclusion

- ▶ Easier management of meters using MDMS
- ▶ Early detection for meter faults
- ▶ Delivered excellent and efficient service
- ▶ Supporting building side for proper flow balancing and better delta T
- ▶ Recover energy loss
- ▶ Better commitment for sustainability

# Future Action Plans



- ▶ Conduct awareness program to customers
- ▶ Implement system generated Enable SMS alerts up customer level
- ▶ Remote/smart DCRC operations

The screenshot shows the EMPOWER Alarms View interface. At the top, there is a toolbar with icons for a house, a satellite, a server, a bell, and a mobile phone. Below the toolbar is a 'Simulate SMS' button, which is highlighted with a red starburst. The main area is titled 'Alarms View' and contains a table of active alarms.

!	Severity	In Alarm Time	Acknowledge Time	Area	Message
822	822	4/19/2016 7:08:...		/TECC/AlarmS...	C003023 BTU is Frozen
822	822	4/19/2016 7:08:...		/JISA/AlarmSe...	ETS 113 BTU is Frozen
831	831	4/19/2016 7:00:...	4/19/2016 7:06:53 AM	/BBET/AlarmS...	3D Trasar is Comm Fail
831	831	4/19/2016 6:55:...	4/19/2016 7:06:54 AM	/JISA/AlarmSe...	TP2 YXA006 Blowdown meter is Comm
831	831	4/19/2016 6:49:...	4/19/2016 7:06:54 AM	/JISA/AlarmSe...	TP1 YD002 Blowdown meter is Comm
831	831	4/19/2016 6:47:...	4/19/2016 7:06:56 AM	/DHCC/AlarmS...	CP55 BTU is Comm Fail



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

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