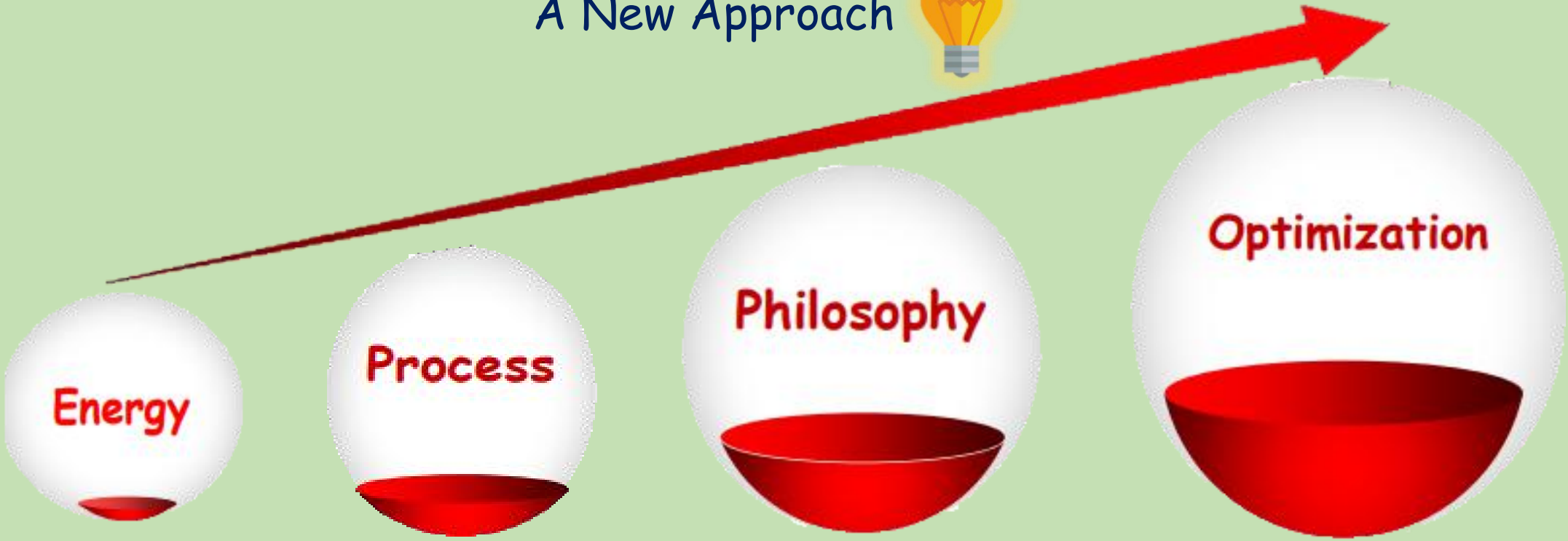
Heta Datain

Energy Optimization

A New Approach



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- Heta Datain provide Energy Optimization Solutions for High Energy Consumers.

- Heta Datain is managed by a team who are specialists in Data logging, Data simulation, Energy analysis, and SCADA / PLC process tweaking. We also have hardware software skill set in IOT's, Dataloggers, Big Data analysis, and software computing skills of MIS reporting.

- I am a Senior Consultant in IT in Power Distribution (including Smart Grid) with REC Power Distribution Company Limited, an ISO 9001:2008, ISO 14001:2004 & OHSAS 18001:2007 Certified Company, a wholly owned subsidiary of REC Ltd., a 'Navratna' CPSE under Ministry of Power, Government of India. I have over 40 years experience in Teaching and Industries, and am a Certified Energy Auditor.

- Heta Datain and its associates are in this field in for the last 20 years,and we have implemented "Electronic National Agriculture Market" network pan for Agriculture Produce, Mumbai Octroi, etc. which shows our strength in handling Big Data in Real Time.

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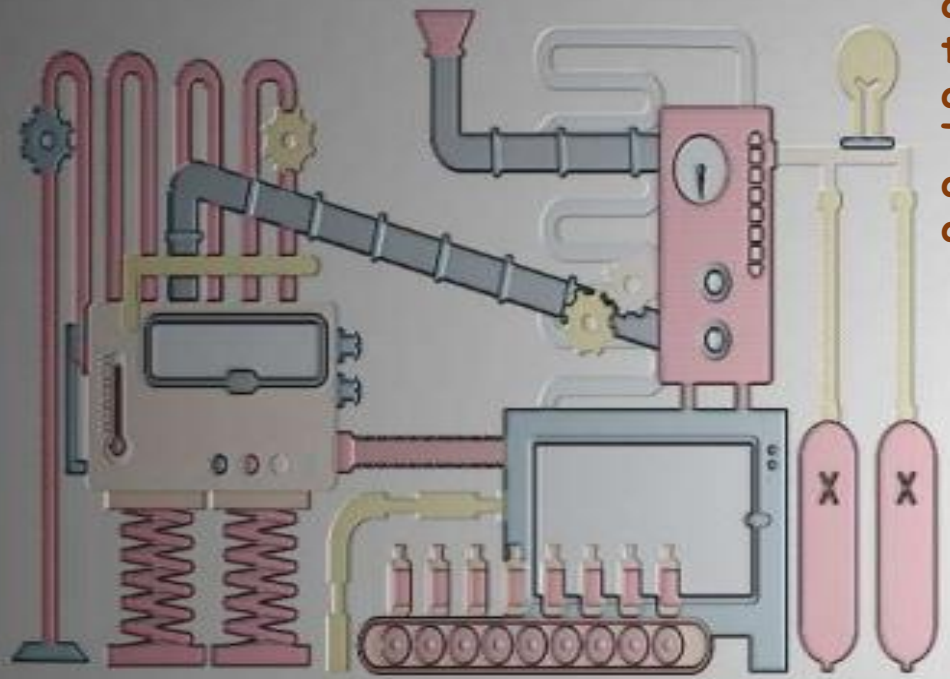
Energy Optimization Philosophy

HETA DATAIN uses this historical SCADA data to analyse the working of the complete plant and simulates the whole working model of the plant on a computer simulation software. This helps in locating the efficiencies of each equipment under various operating conditions.



Earlier the SCADA system was essentially used for running the plant by the operator. Backup data was only retrieve in case of any failure in the plant, for analysis of the time line.

SCADA / BMS OPERATOR

Off Site Simulation

Off Site Energy Auditors

- Energy, Process (including HVAC), Production and other relevant environmental Data is extracted and logged at regular intervals (1 second to 120 seconds) from the system.
- Data retrieval in non-invasive and does not intrude in the running system.
- Data is uploaded to a Cloud, where all calculations are done to compute the Energy Flow and Energy loss in various locations and processes.
- This Energy Flow, Losses, and Value are shown on a web based dashboard to all authorized users, who track the daily variations in Energy usage.
- Based on process pre-defined limits, alarms and notifications are given to relevant users as alerts.
- Business Intelligence (BI) reports can be extracted from the system for Management use.

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- Meanwhile, a team of Offshore Engineers having expertise in Energy Audit, also analyse this data for the last 6 - 12 months to generate the following:
  - Energy requirement:
    - Production/ Usage wise
    - Time wise
    - Location wise
    - Cost wise

  - Establish a Relationship between different processes / parameters with regard to Energy consumption and losses.

  - Generate a Post Mortem report on the past data for the Management comments.

- A divergence report based on Global indices is created, showing the quantum of losses.

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- A team of Offshore Engineers having expertise in Computer Simulation also use this 6-12 month old data to create a Computer Simulated Model of the complete process / plant.

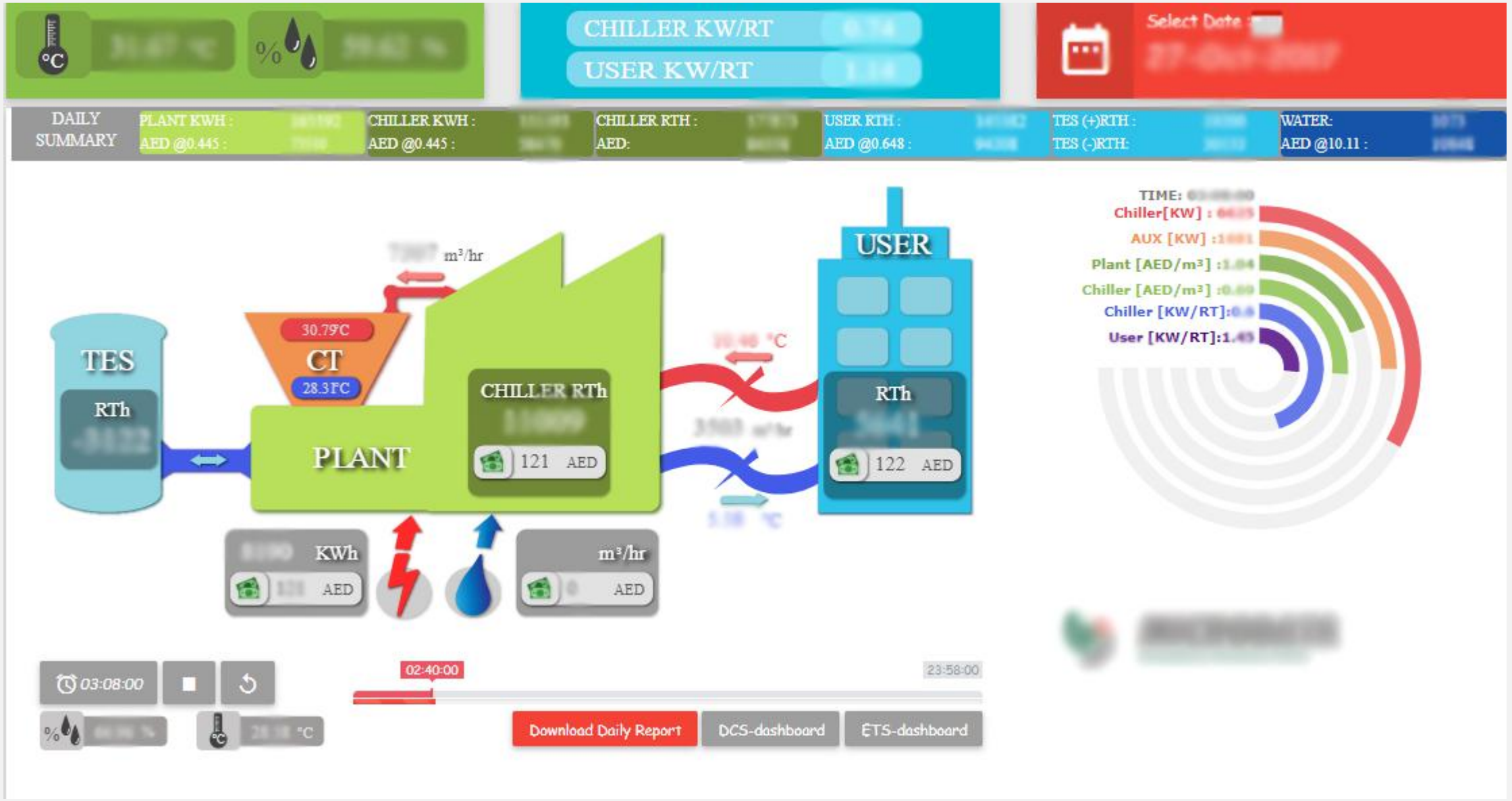
- They use high end Electrical / Mechanical / Chemical Simulation software for modelling. (Typically ETAP, MATLAB, ANYSYS, HYSYS, MITAB etc).

- Based on the simulation, the following reports are generated:

  - Equipment condition, and deviation from the design.
  - Process deviation from the design.
  - "What if" analysis, if any equipment if to be shut or replaced.
  - Notional savings if the equipment / process was as per design.

- Dashboard generated earlier also shows the notional savings for user information.

Plant Dashboard



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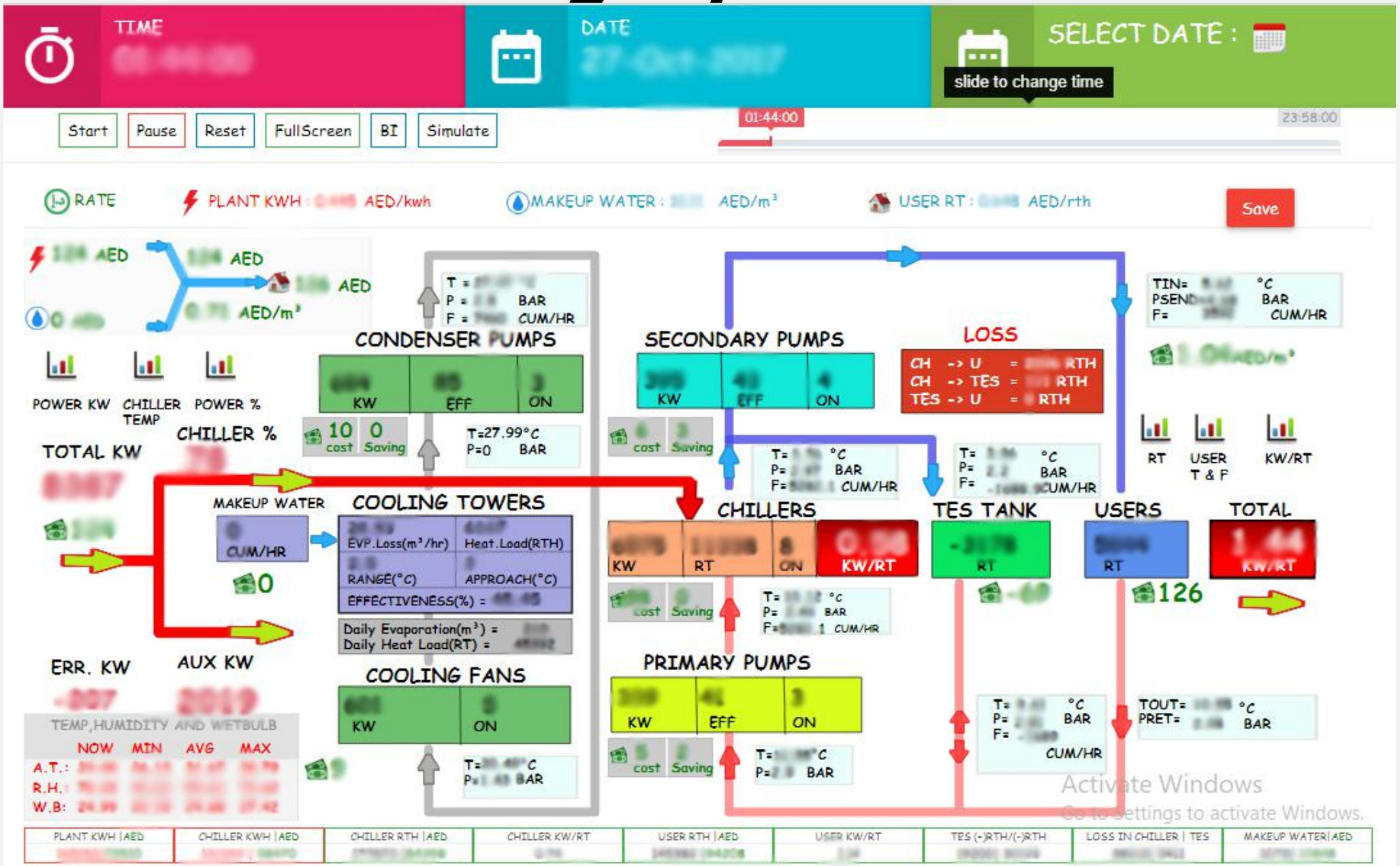
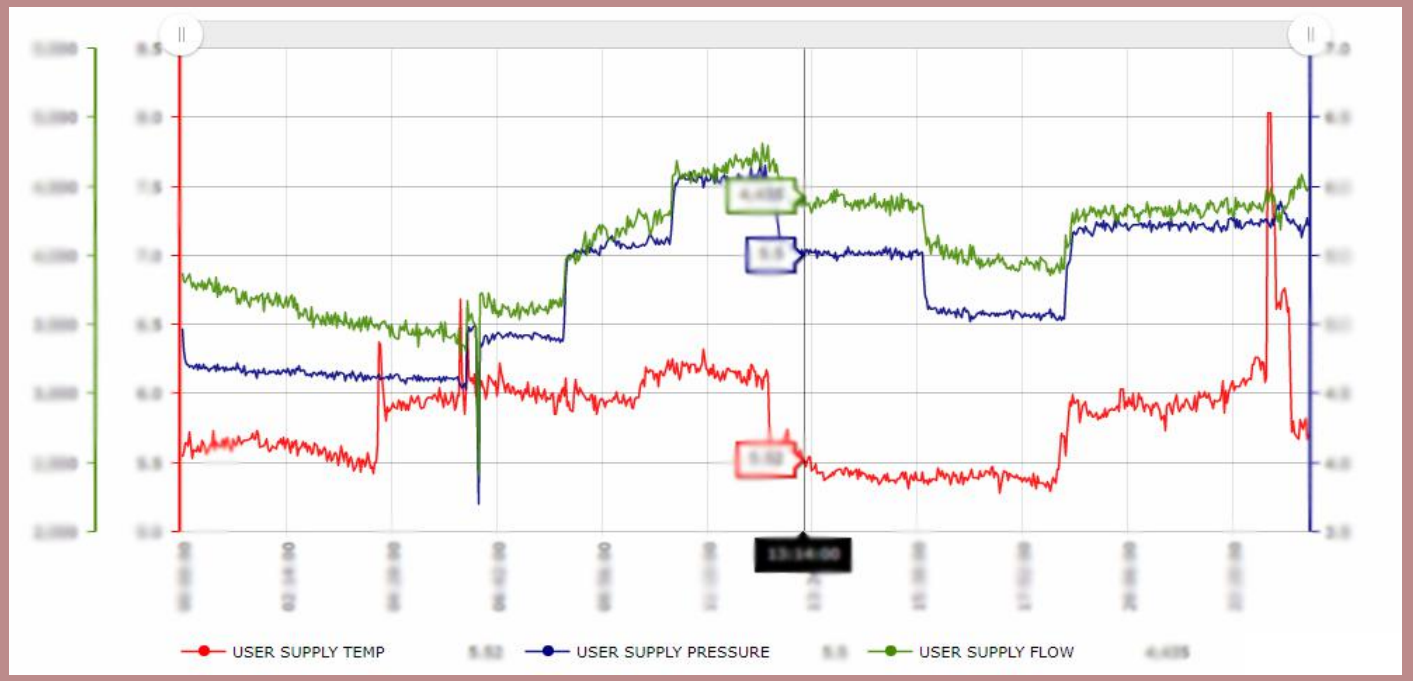
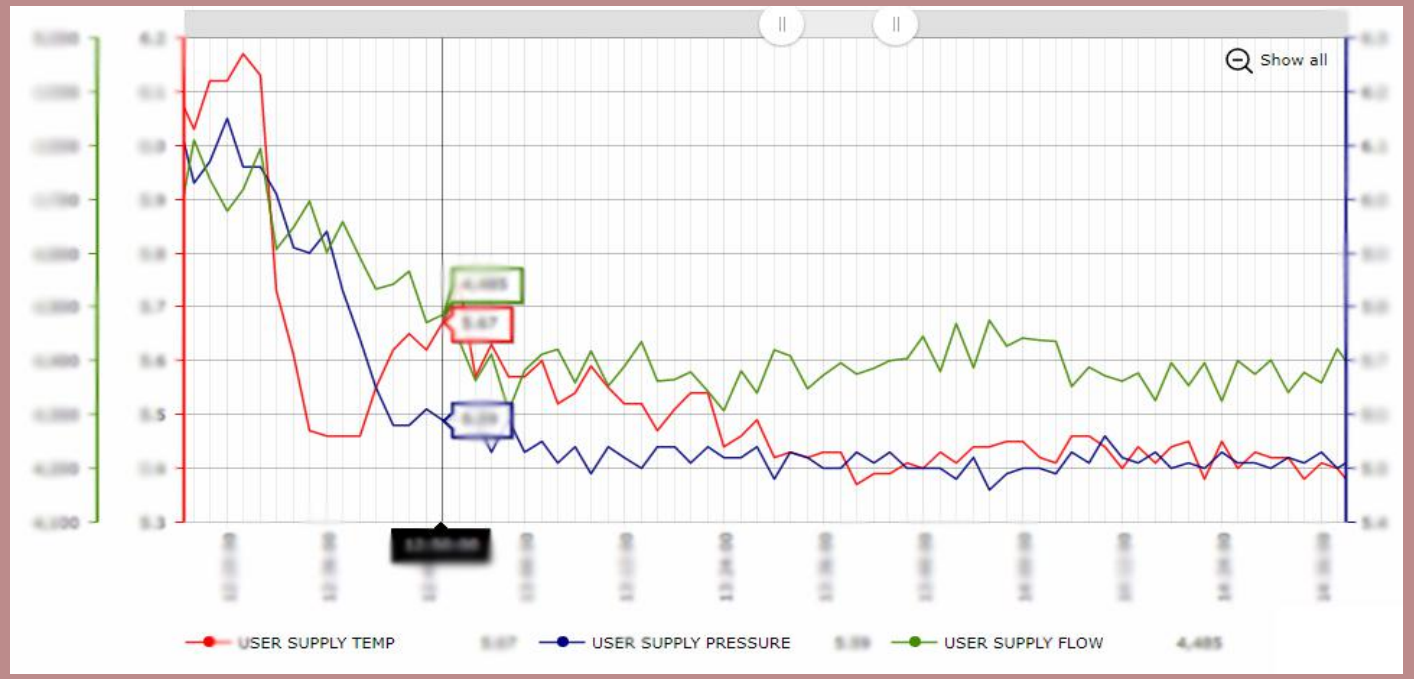
District Cooling System Dashboard





Trend of User Supply Temperature with User Supply Pressure and User Supply Flow.



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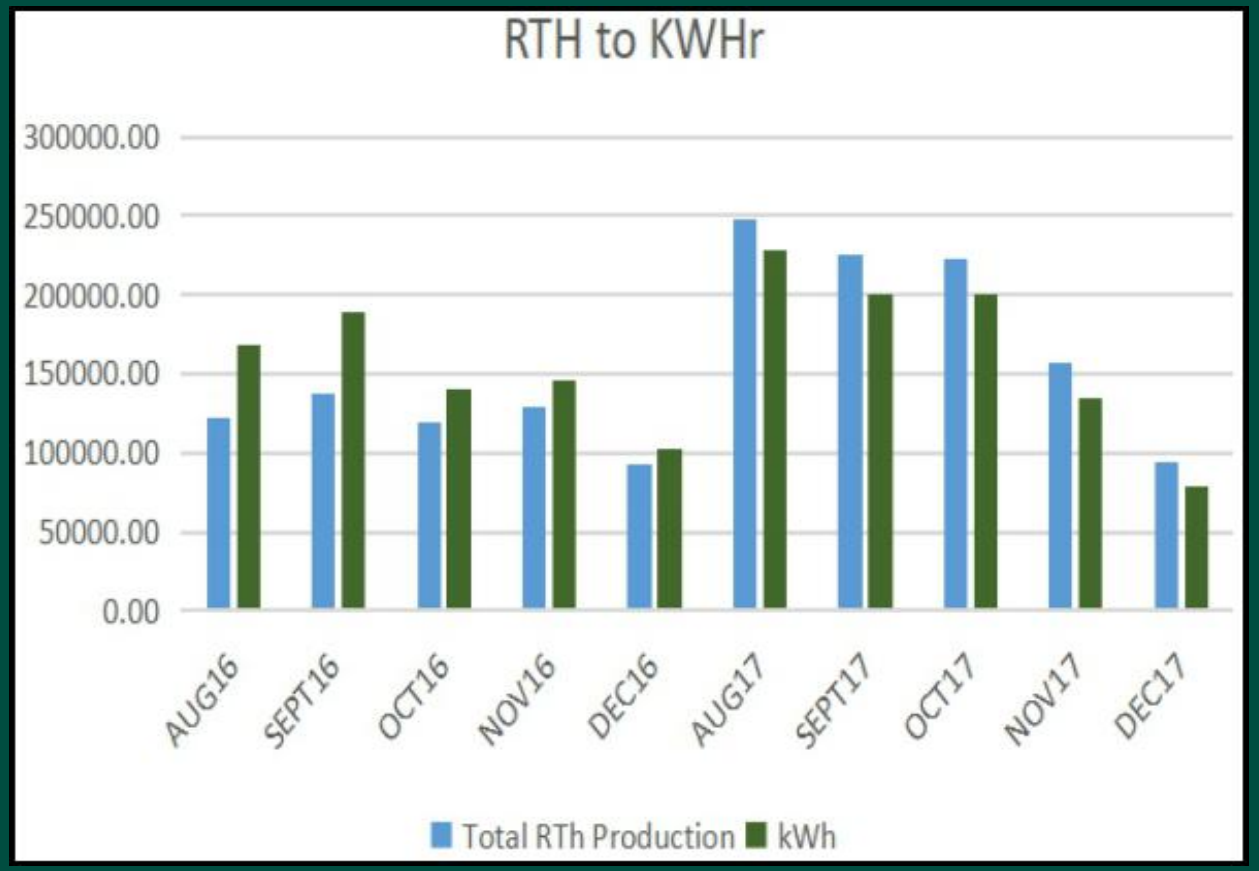
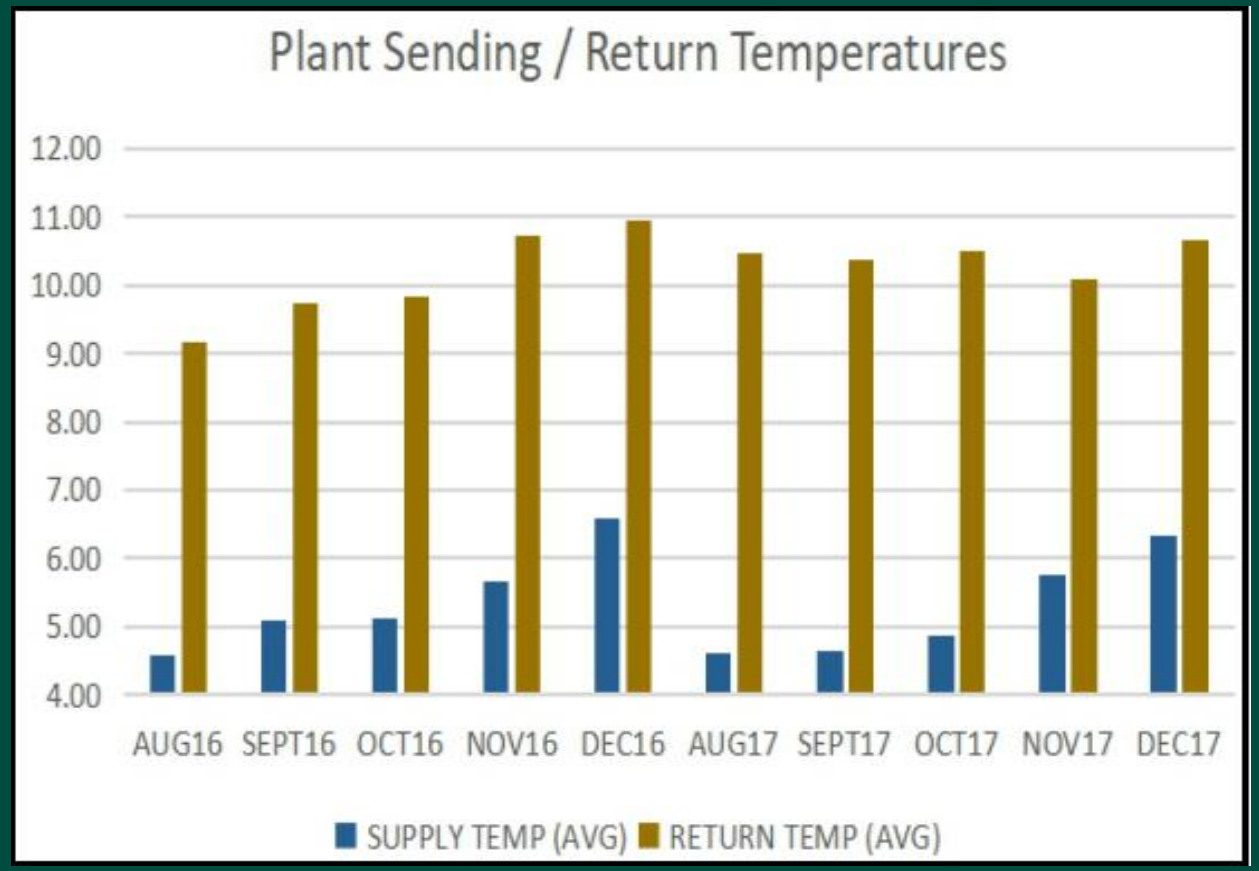
➢ 40000 TR District Cooling Plant with 31 Energy Transfer Stations.





- In District Cooling Plant, earlier KWHr (energy) requirement for cooling was high but now to meet some cooling requirement KWHr is reduced.

- Changed in Temperature received to User in Aug 17 is more as compared to Aug 16, this indicates more RT received to User.

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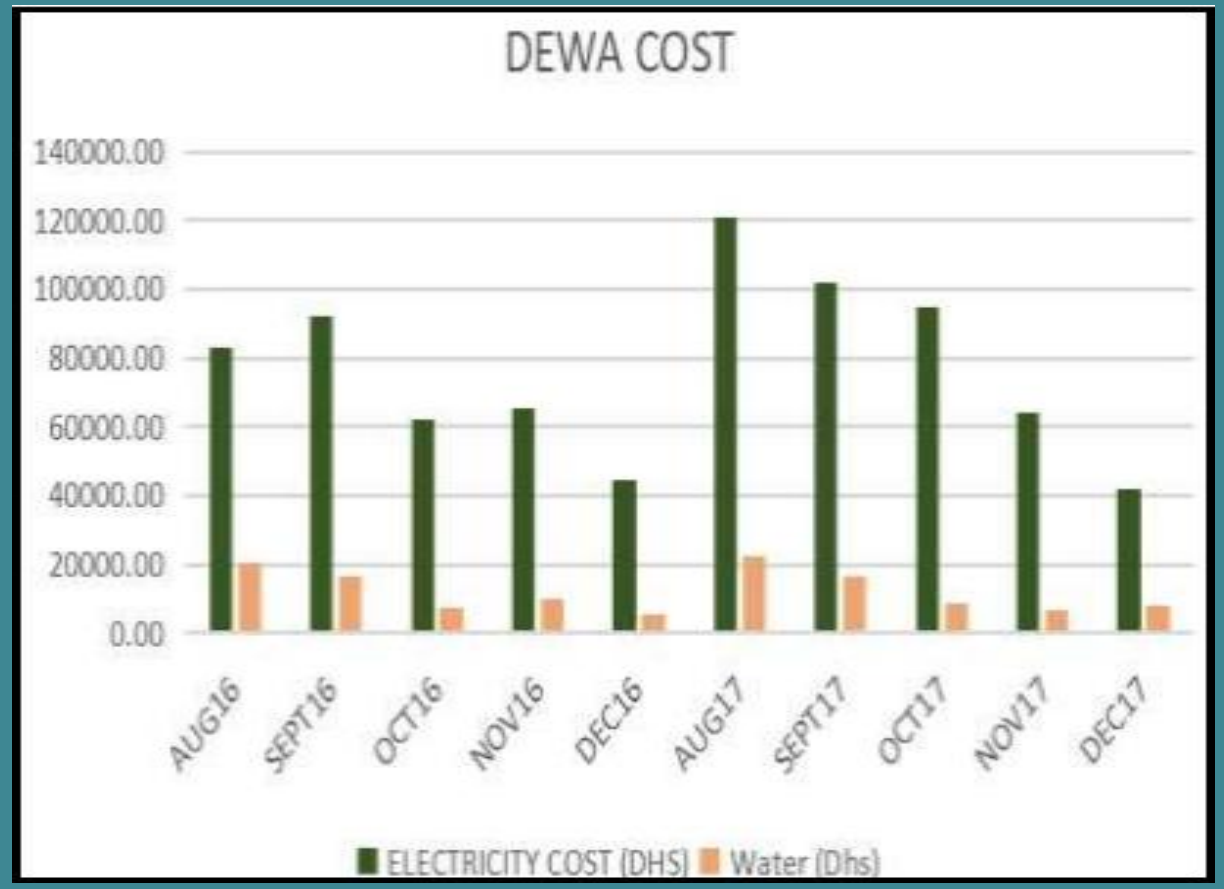

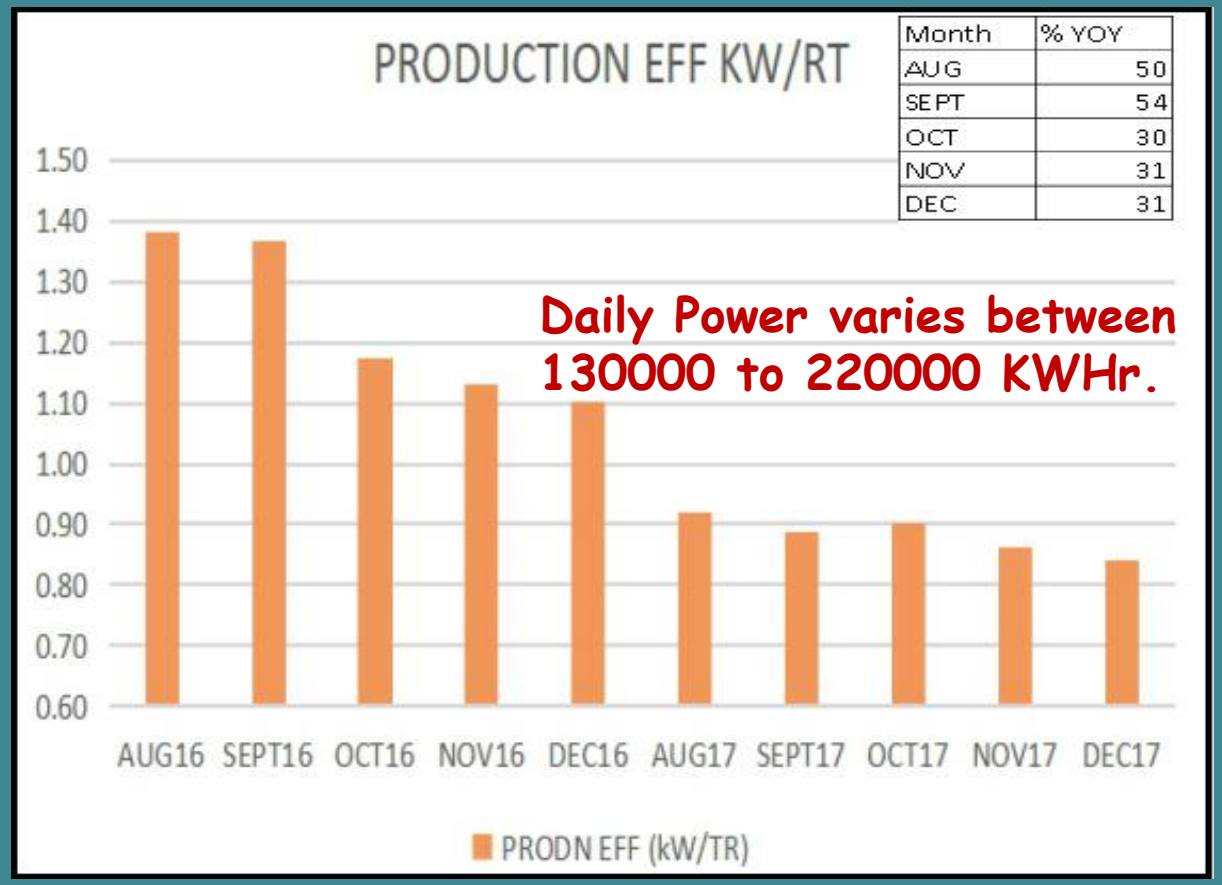

- After applying Energy Optimization Technique Production Efficiency (Plant KW/RT) is improved to 0.90 KW/RT from 1.40 KW/RT.

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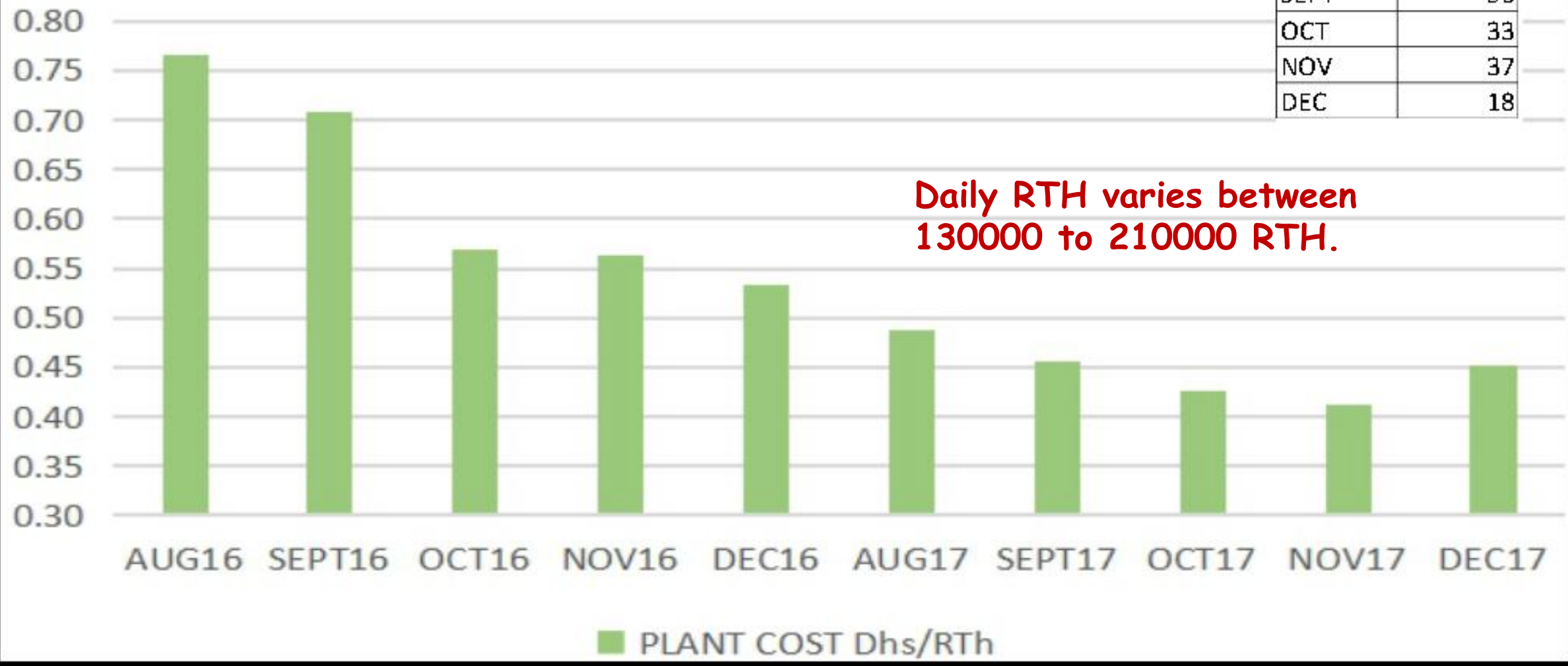
PRODUCTION COST DHS/RTH

Month	% YOY
AUG	57
SEPT	56
OCT	33
NOV	37
DEC	18



Daily RTH varies between 130000 to 210000 RTH.

Production cost (Dirhams) per RTH (cooling) was 0.96 Dirhams in Aug 16, now it is decreased to 0.48 in Aug 17 percentage YOY is 57%.

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- Energy Optimization based on Past Data Trends give more meaningful insights.
- Data analysis by Energy Auditors give a second opinion on the Energy losses and savings.
- Simulating the Process / Equipment gives a non invasive insight to its mechanical condition, process set-points and deviation from Best Efficiency Point.
- Dashboard available to all the Users give a Energy Saving Centric Thought Process in the organization.

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2018

International Hospitals

UAE

Energy Optimization System

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System Description

- Measuring, Logging, Storing, and Analysing Voltage, Current, Power and Energy of 5 Transformers and 35 Feeders every 2 minutes in the Cloud.
- It's like a MRI / CT SCAN of the Electrical Energy flow in the Hospital.
- All Authorized Users can see the status of Electrical Energy consumption in their departments, / floor / OT / Hospital in near Real Time, and earlier trends.
- It's like invisible supervision of the Hospital's equipment working.
- The waveform trends will indicate the nature of load, it's deficiencies, it's working problems, and the likelihood of any equipment failure in near future.
- It's like diagnosis after reading the CT SCAN / MRI report.

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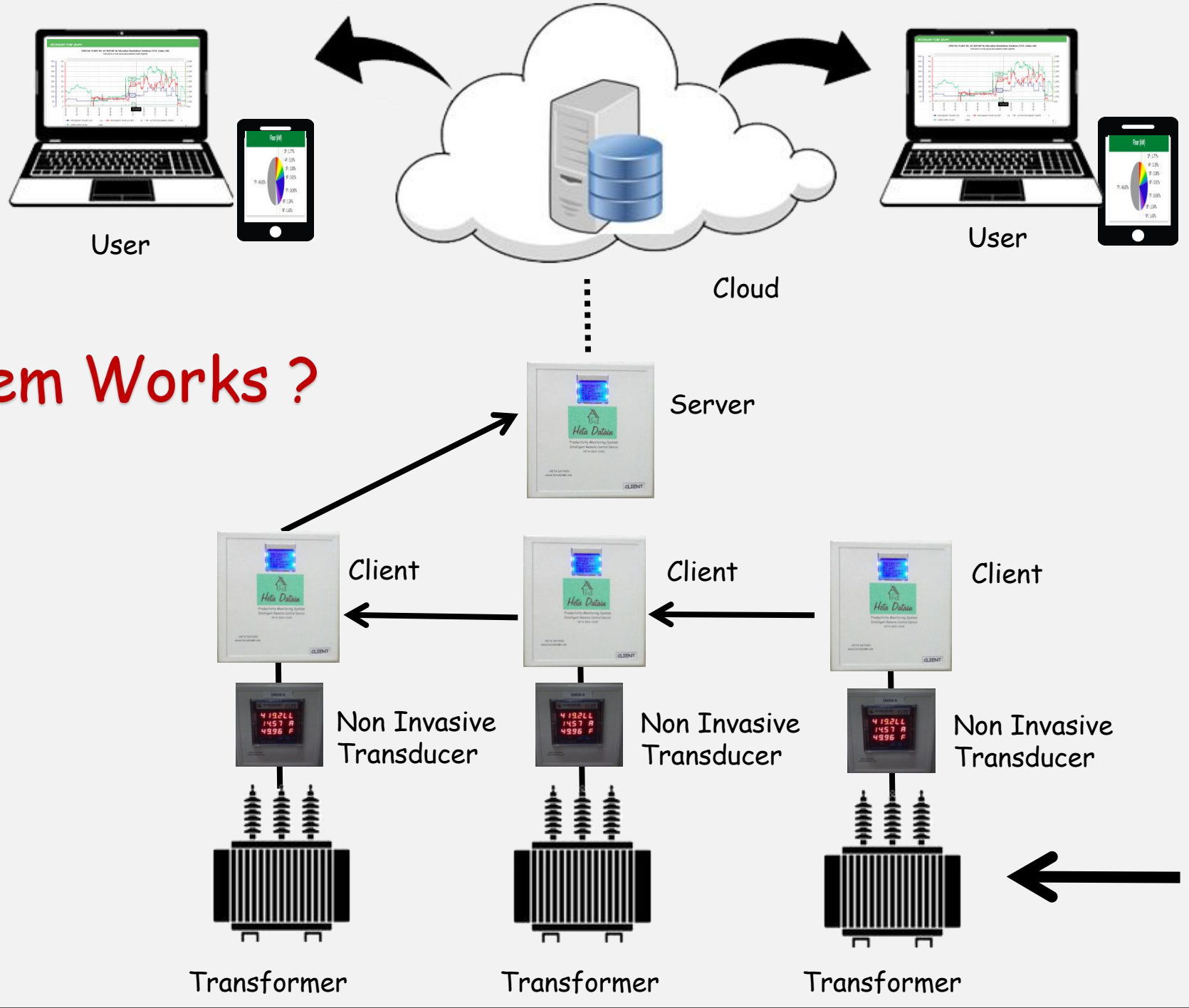
How our system Works ?



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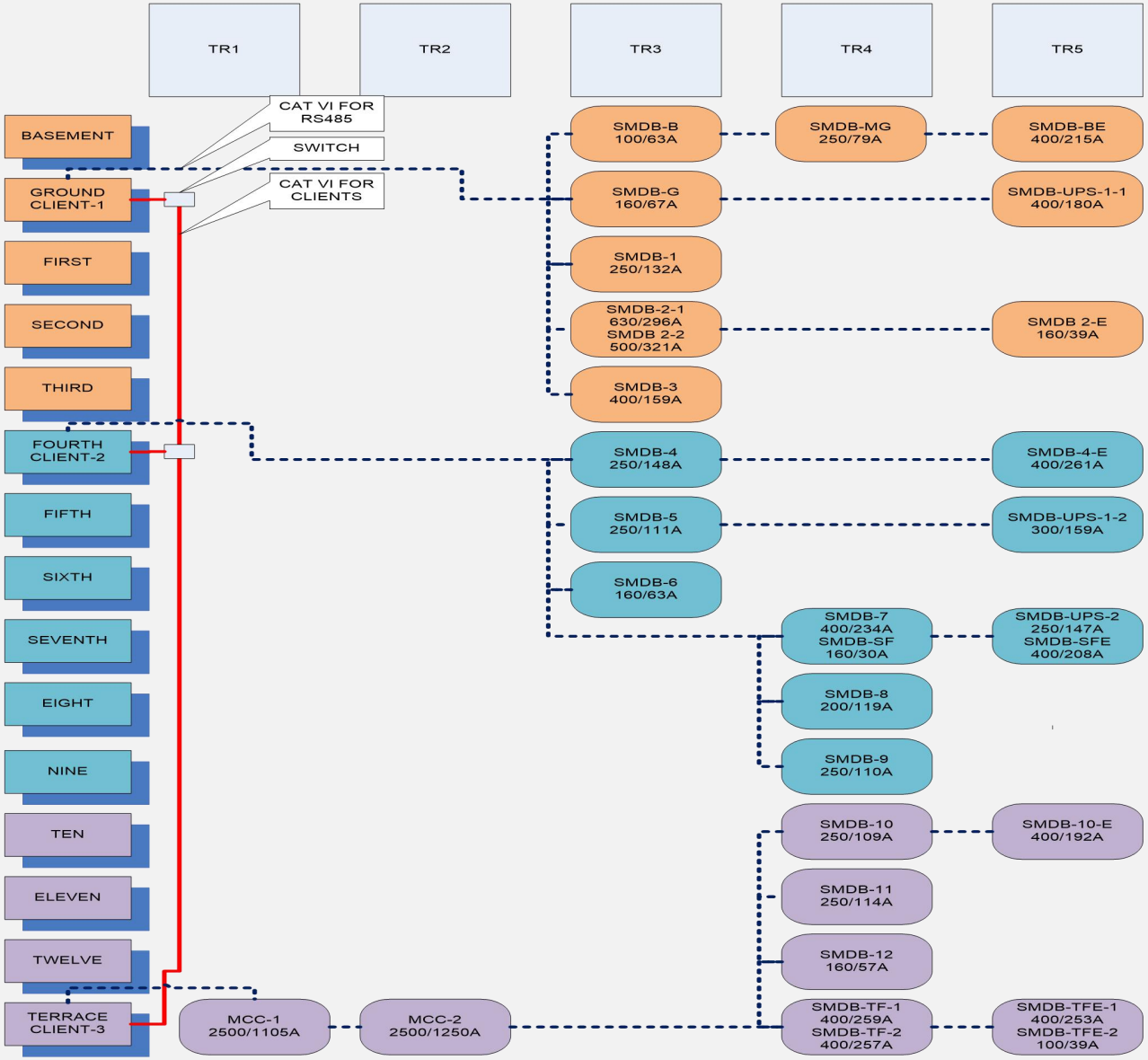
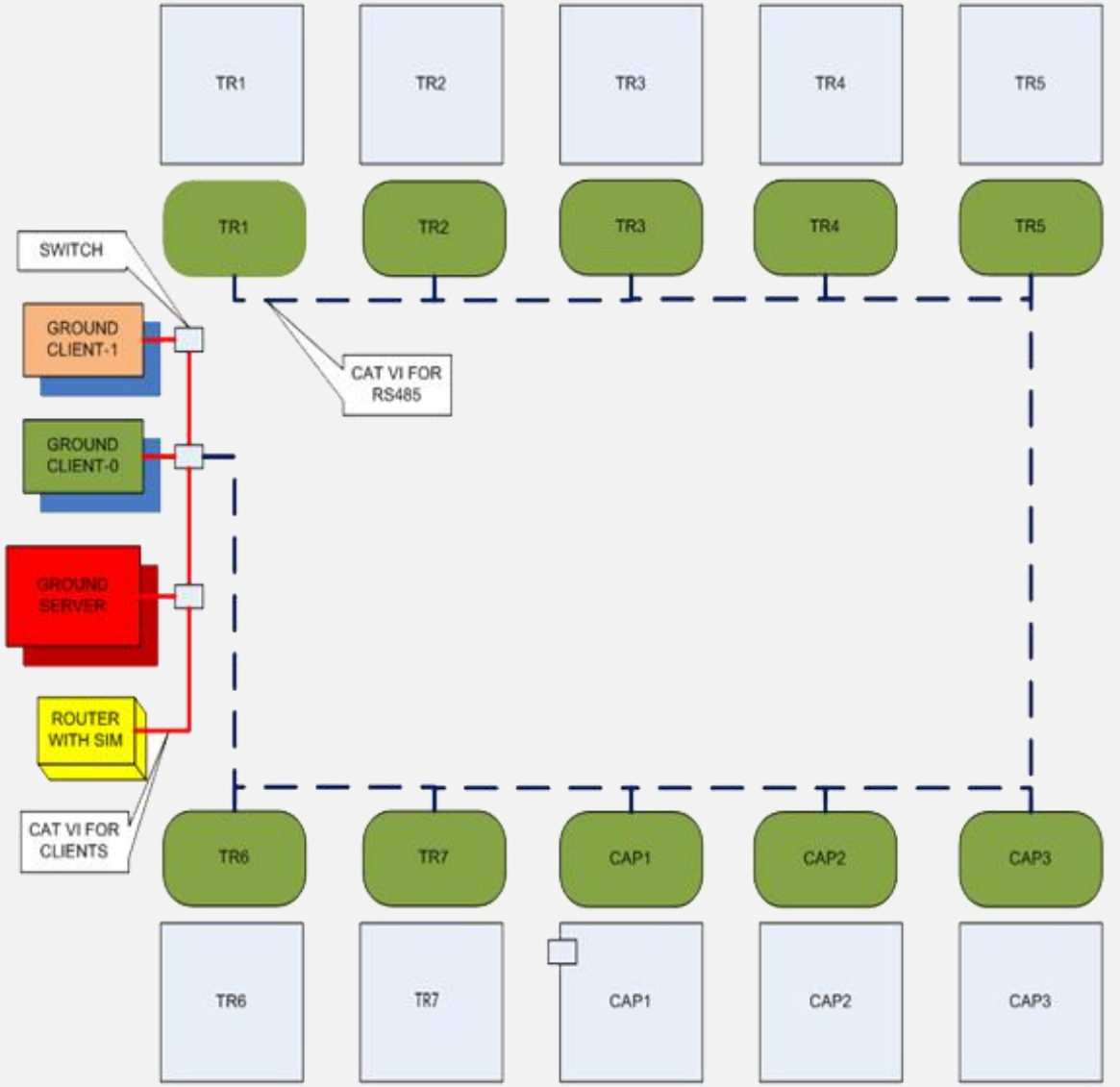
System Setup





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Scans and Reports

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Hospital Dashboard

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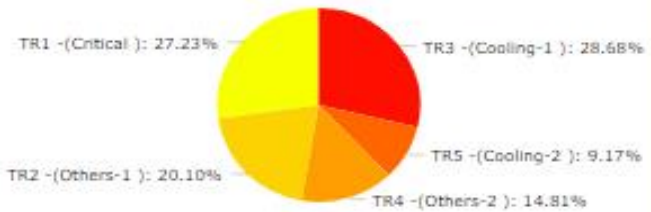
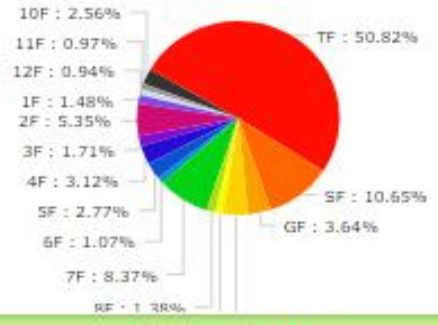
SEWA	Critical	Cooling	Others	Energy (AED)	Temp. & Hum.
894 KW at : 13:58	111 KW at : 13:58	428 KW at : 13:58	306 KW at : 13:58	447 /hr. at : 13:58	32.2 °C
11009 KWh up-to : 13:58	1637 KWh up-to : 13:58	5957 KWh up-to : 13:58	2972 KWh up-to : 13:58	5505 cum. up-to : 13:58	42 %
yesterday : 19789 KWh	yesterday : 2910 KWh	yesterday : 10726 KWh	yesterday : 5384 KWh	yesterday : 9895 AED	CO2: 12 mt

°C
GF 25
5F 24
8F 23

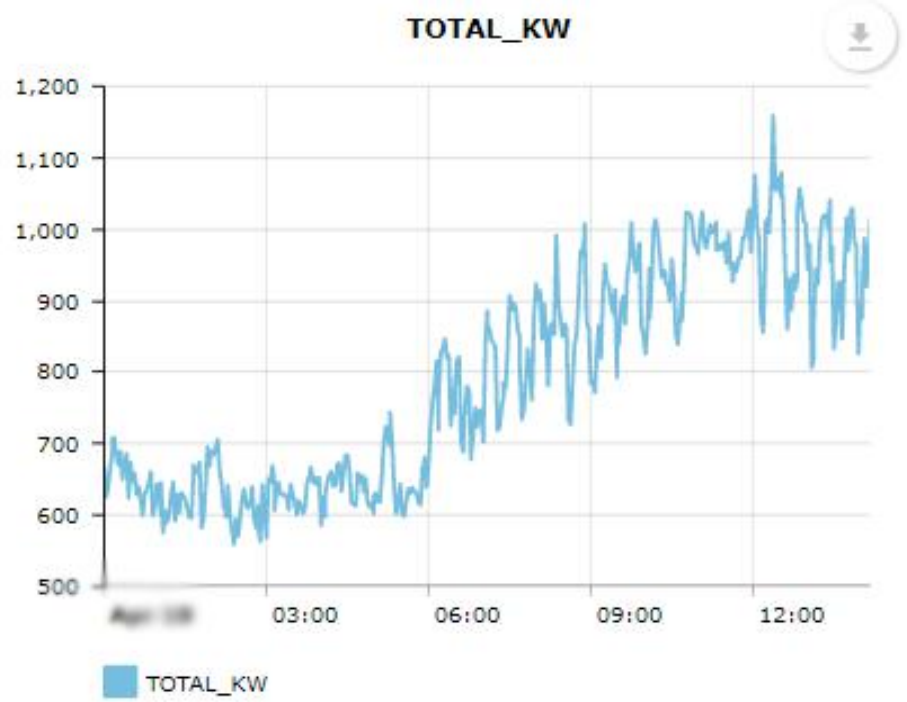
Transformer (kW)



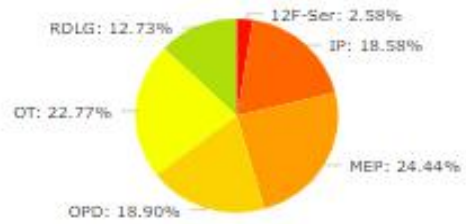
Floor (kW)



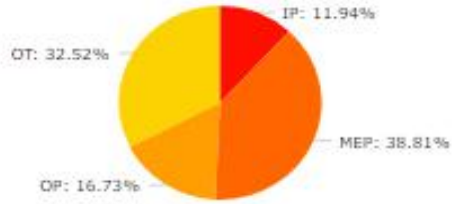
Total KW | select | select



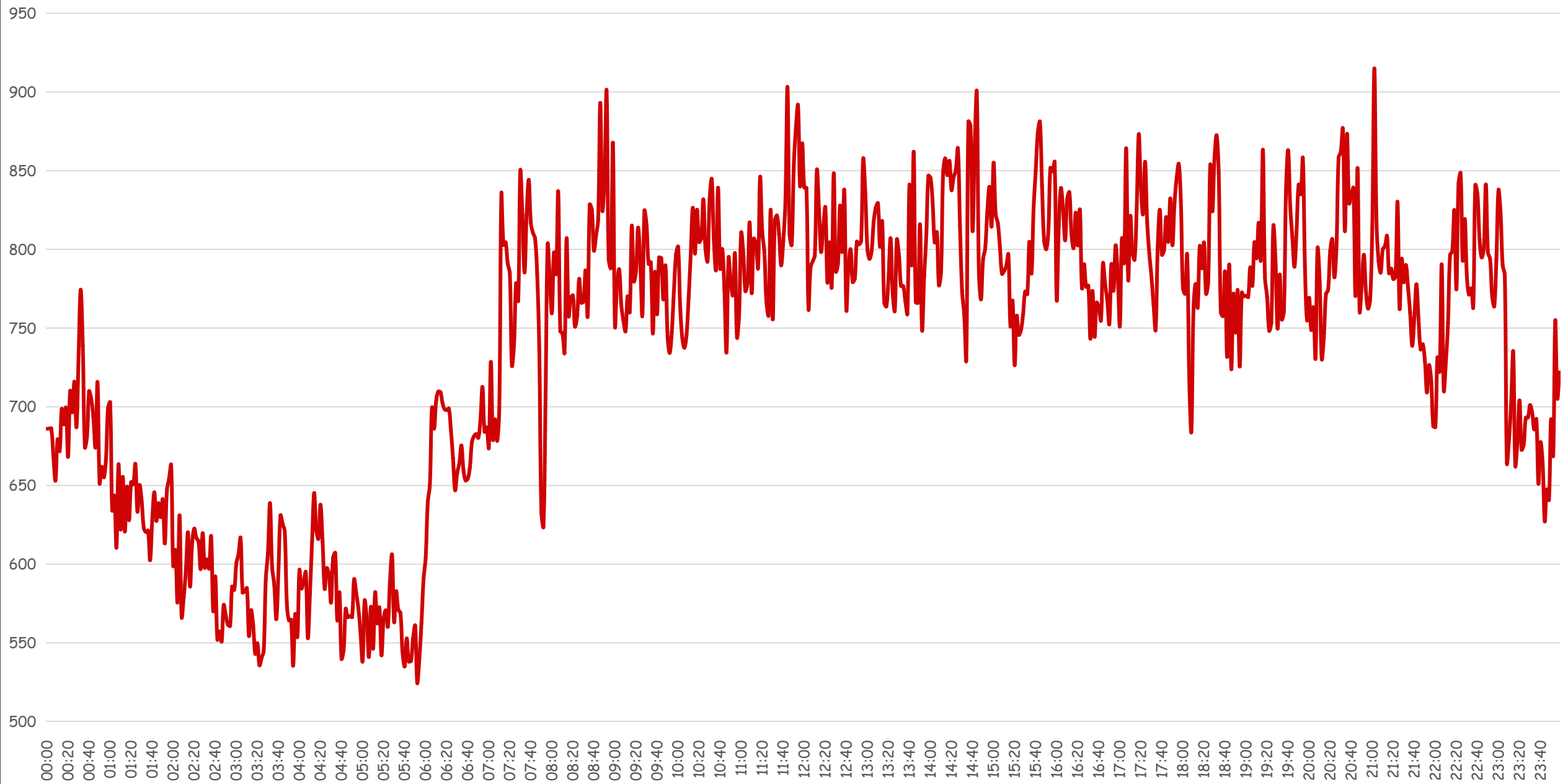
Others (kW)

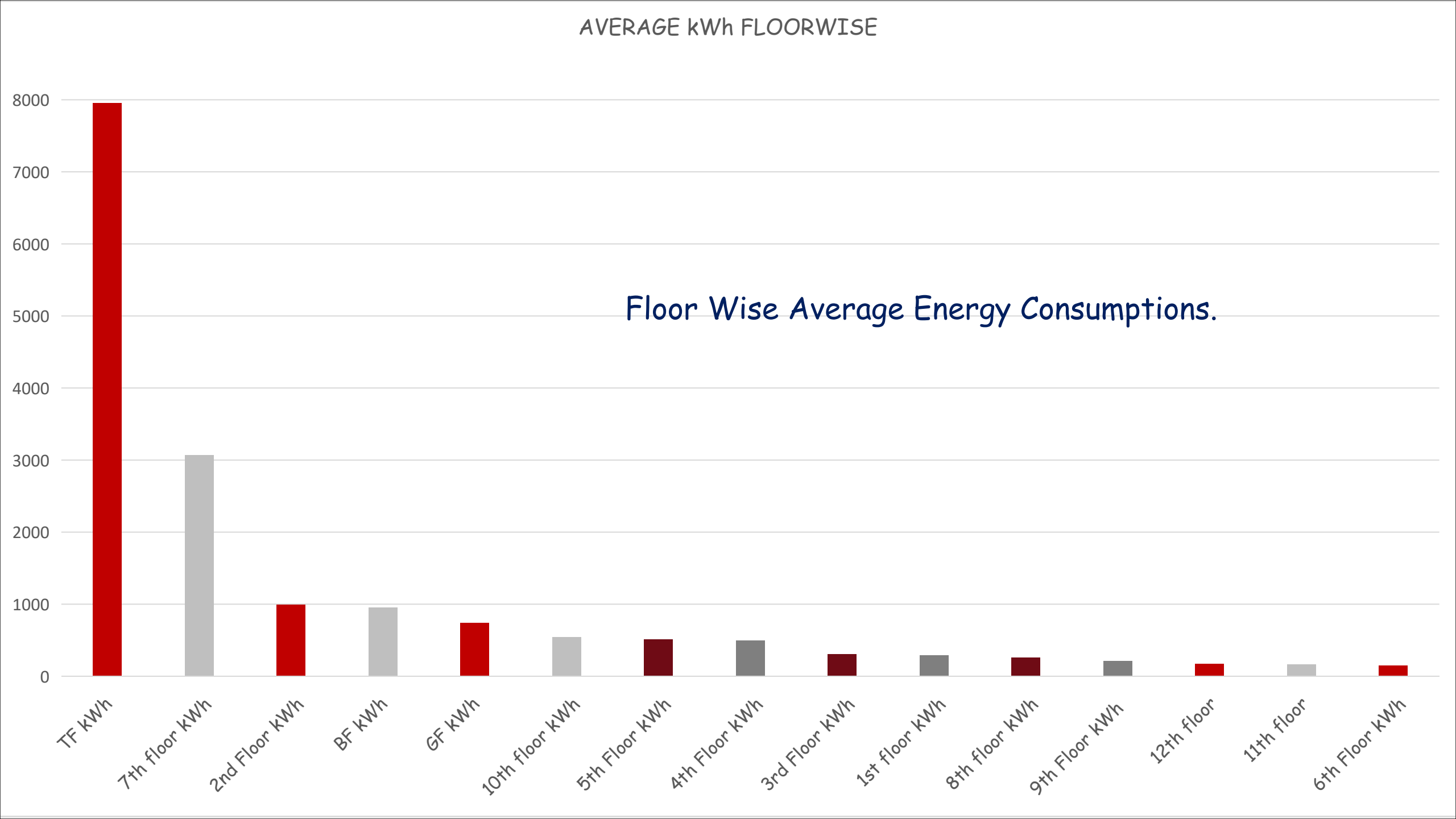


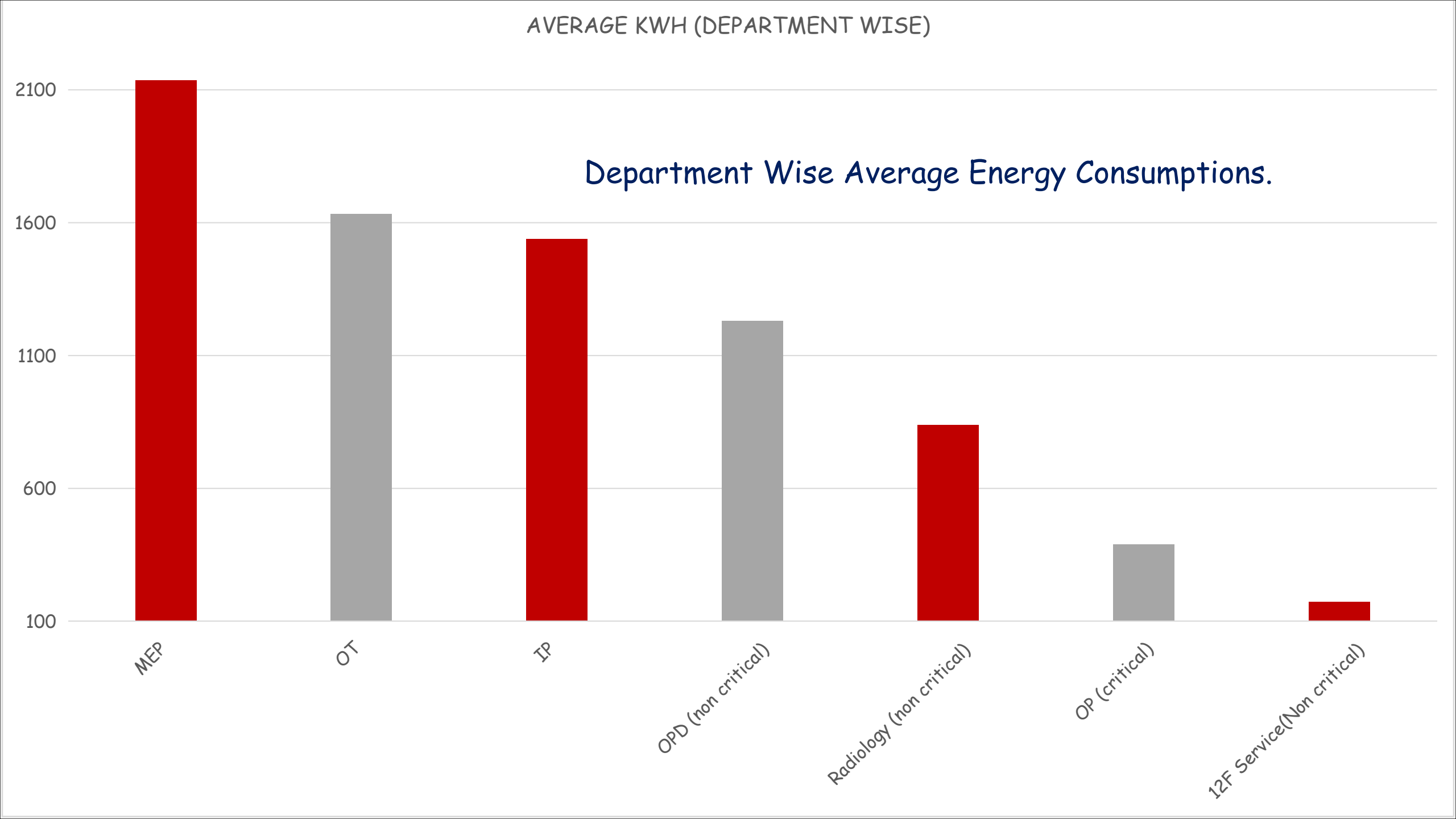
Critical (kW)



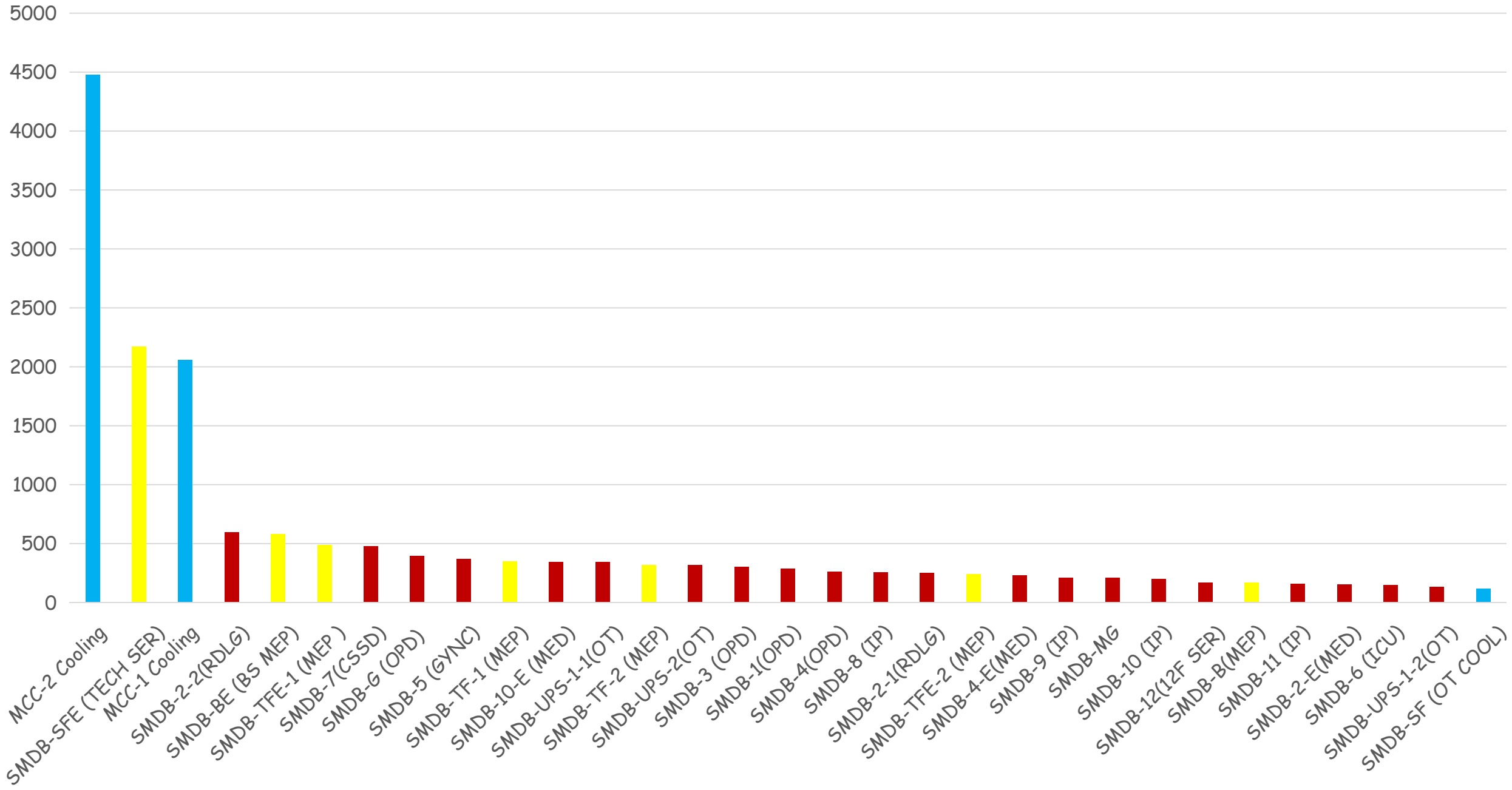
Power trend (KW)

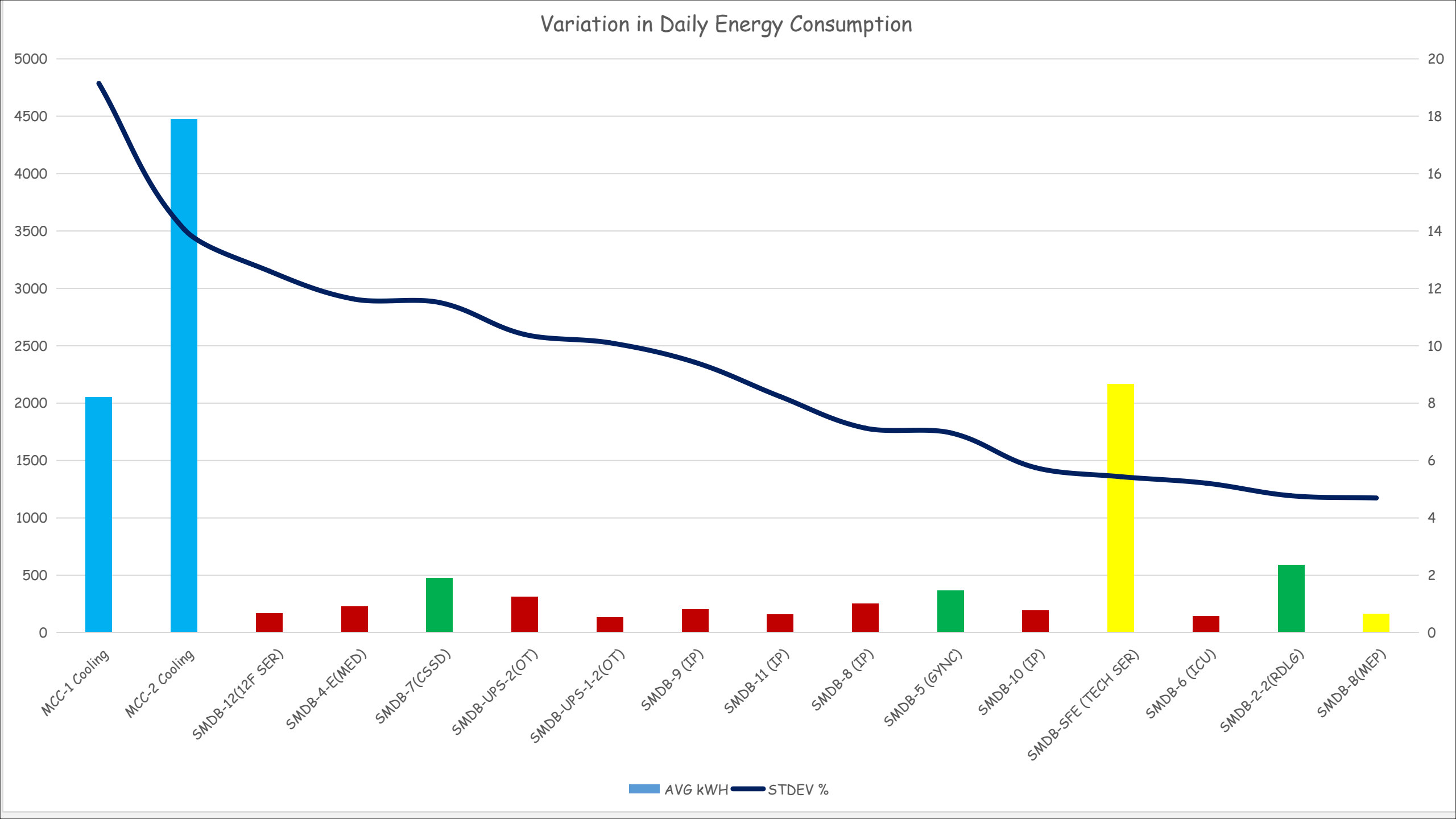


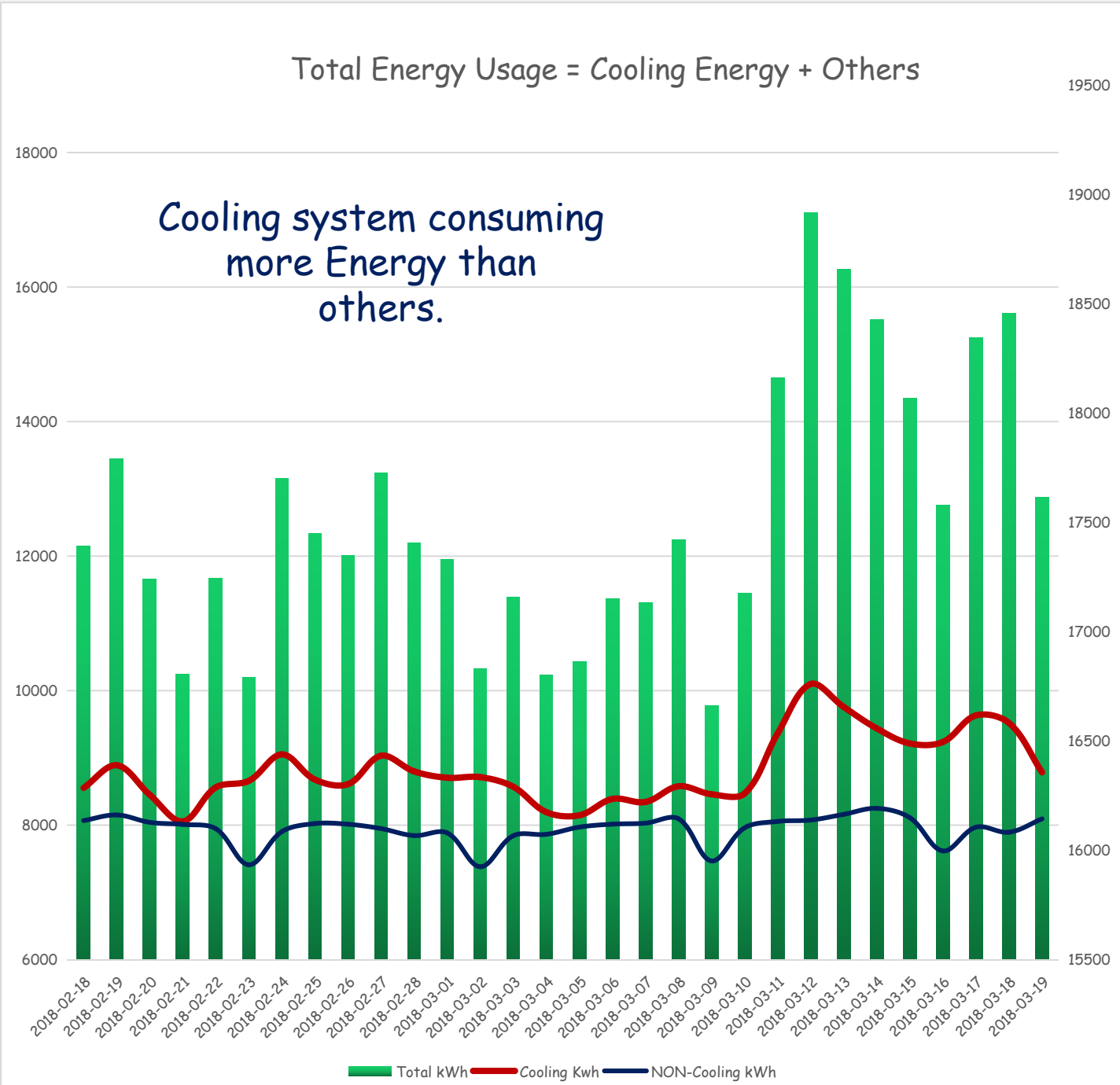

AVERAGE kWh FLOORWISE
Floor Wise Average Energy Consumptions.
8000
7000
6000
5000
4000
3000
2000
1000
0
TF kWh
7th floor kWh
2nd Floor kWh
BF kWh
GF kWh
10th floor kWh
5th Floor kWh
4th Floor kWh
3rd Floor kWh
1st floor kWh
8th floor kWh
9th Floor kWh
12th floor
11th floor
6th Floor kWh

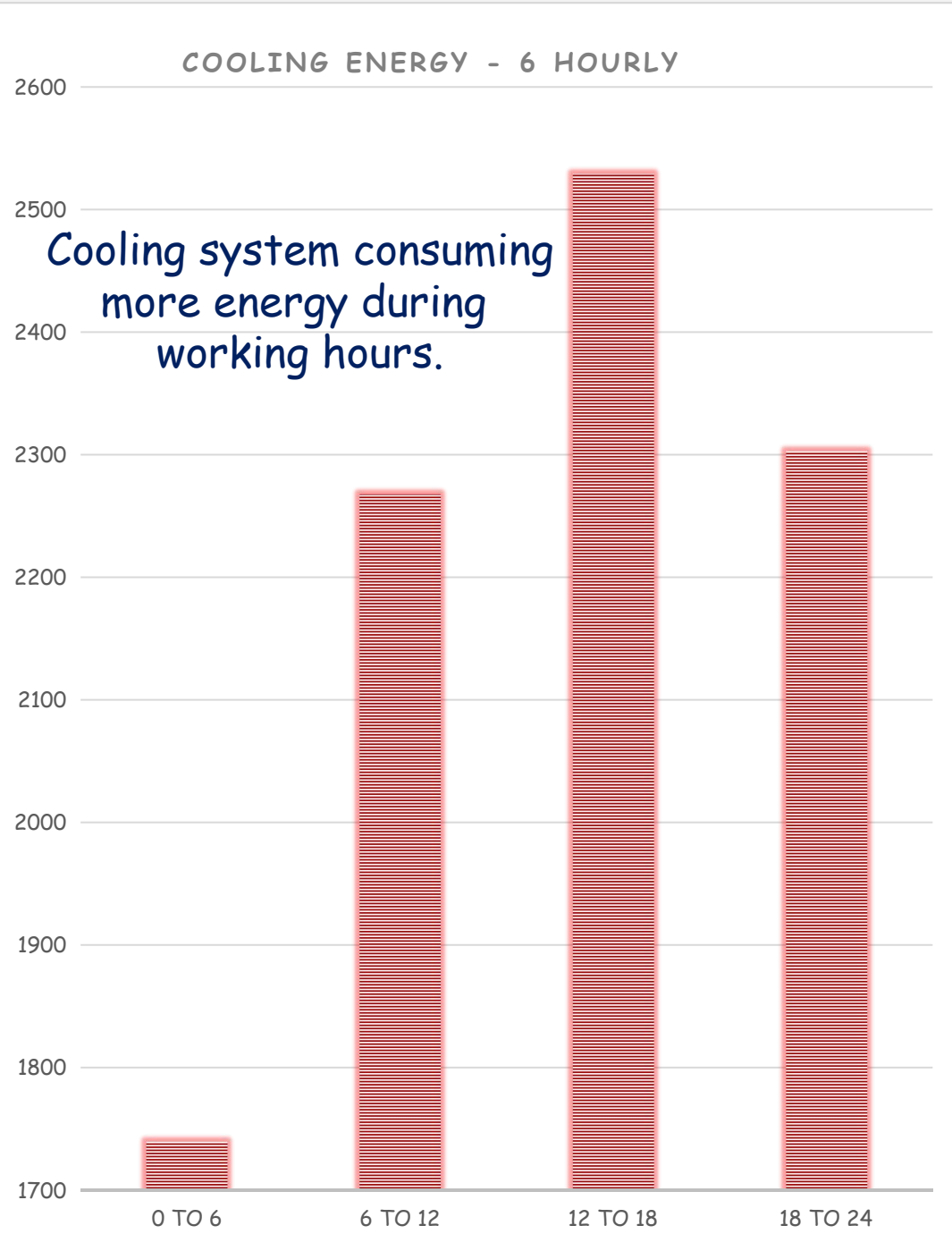

AVERAGE KWH (DEPARTMENT WISE)
Department Wise Average Energy Consumptions.
2100
1600
1100
600
100
MEP
OT
IP
OPD (non critical)
Radiology (non critical)
OP (critical)
12F Service(Non critical)

Feeder wise Average Daily Energy



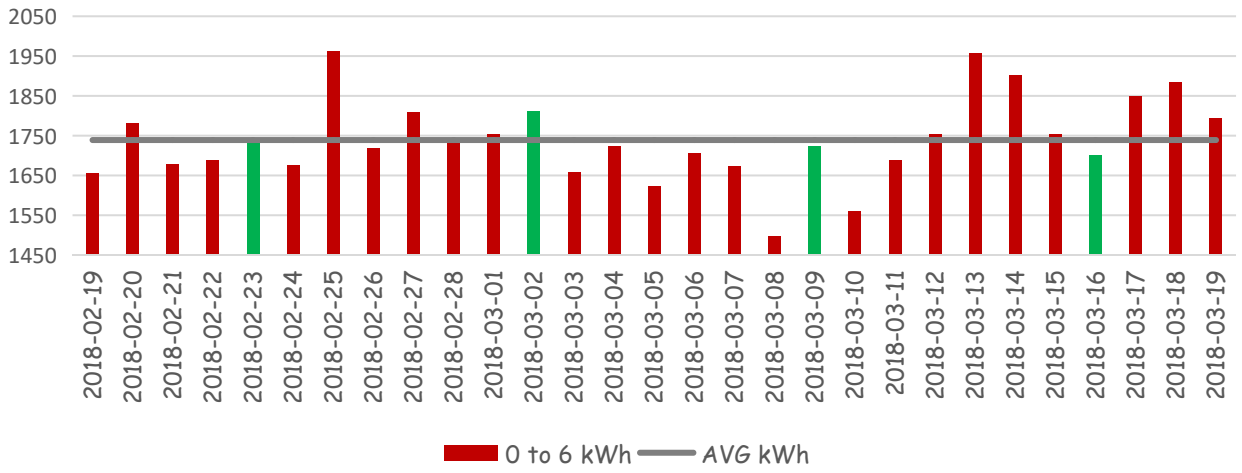

Variation in Daily Energy Consumption
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
20
18
16
14
12
10
8
6
4
2
0
MCC-1 Cooling
MCC-2 Cooling
SMDB-12(12F SER)
SMDB-4-E(MED)
SMDB-7(CSSD)
SMDB-UPS-2(OT)
SMDB-UPS-1-2(OT)
SMDB-9 (IP)
SMDB-11 (IP)
SMDB-8 (IP)
SMDB-5 (GYNC)
SMDB-10 (IP)
SMDB-SFE (TECH SER)
SMDB-6 (ICU)
SMDB-2-2(RDLG)
SMDB-B(MEP)
AVG kWH
STDEV %


Total Energy Usage = Cooling Energy + Others
Cooling system consuming more Energy than others.
18000
16000
14000
12000
10000
8000
6000
19500
19000
18500
18000
17500
17000
16500
16000
15500
2018-02-18
2018-02-19
2018-02-20
2018-02-21
2018-02-22
2018-02-23
2018-02-24
2018-02-25
2018-02-26
2018-02-27
2018-02-28
2018-03-01
2018-03-02
2018-03-03
2018-03-04
2018-03-05
2018-03-06
2018-03-07
2018-03-08
2018-03-09
2018-03-10
2018-03-11
2018-03-12
2018-03-13
2018-03-14
2018-03-15
2018-03-16
2018-03-17
2018-03-18
2018-03-19
Total kWh
Cooling Kwh
NON-Cooling kWh

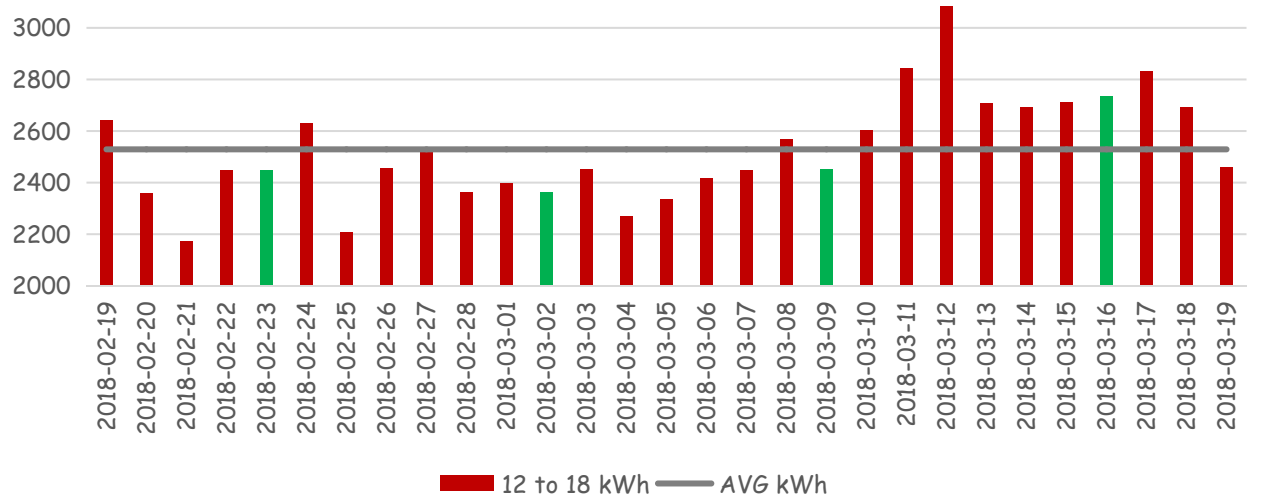

COOLING ENERGY - 6 HOURLY
Cooling system consuming more energy during working hours.
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
0 TO 6
6 TO 12
12 TO 18
18 TO 24

Performance of Shift wise cooling system is in-consistent with respect to average energy demand. Consumption of high Energy during off peak period and low Energy during high peak period.

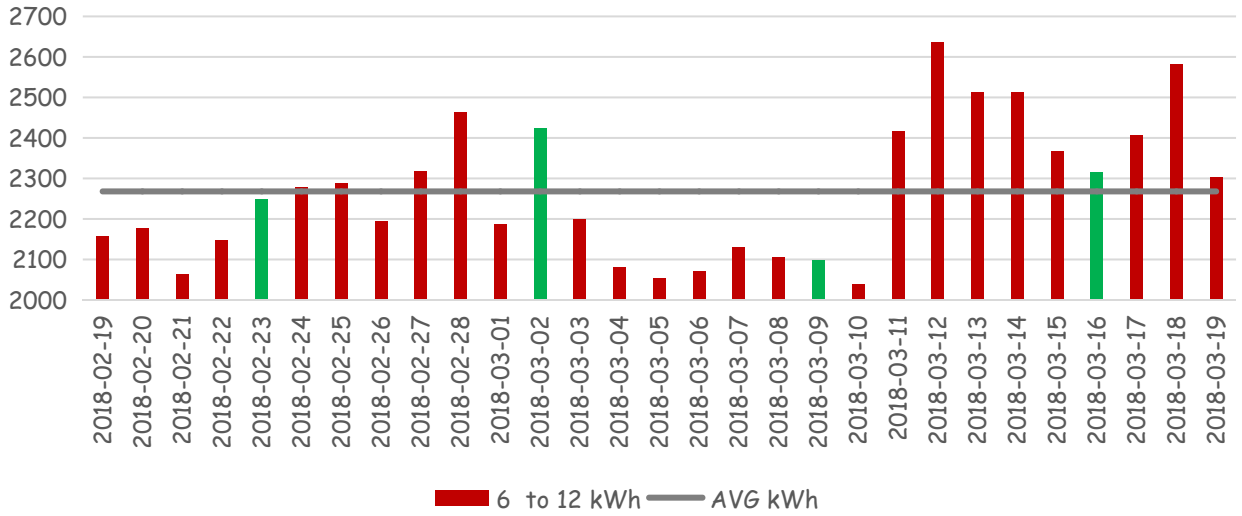
0 to 6 hrs Cooling Energy Vs Average Energy Demand



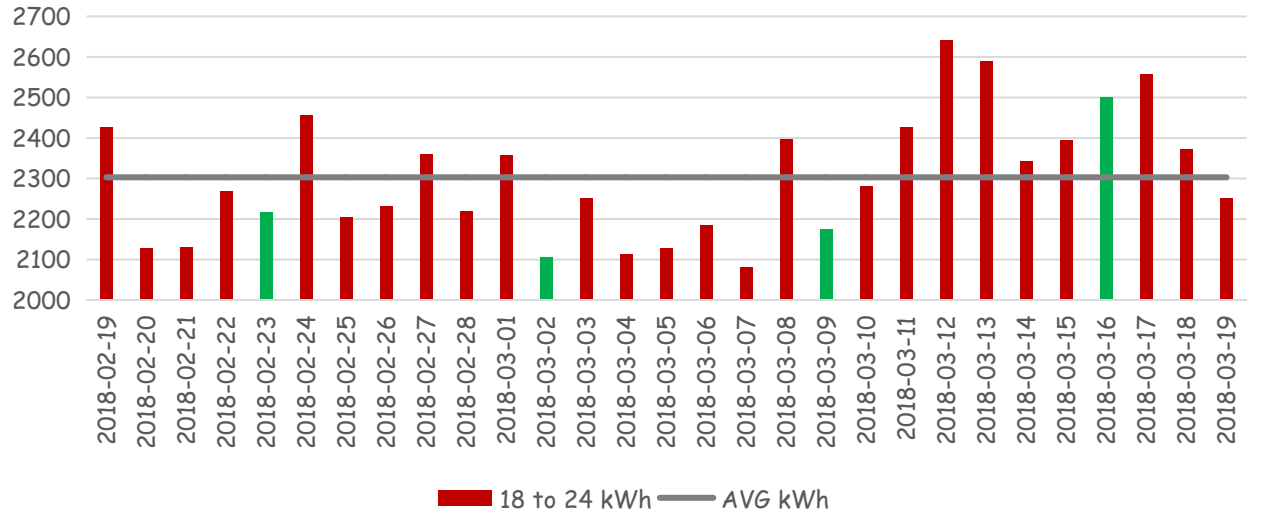
12 to 18 hrs Cooling Energy Vs Average Energy Demand

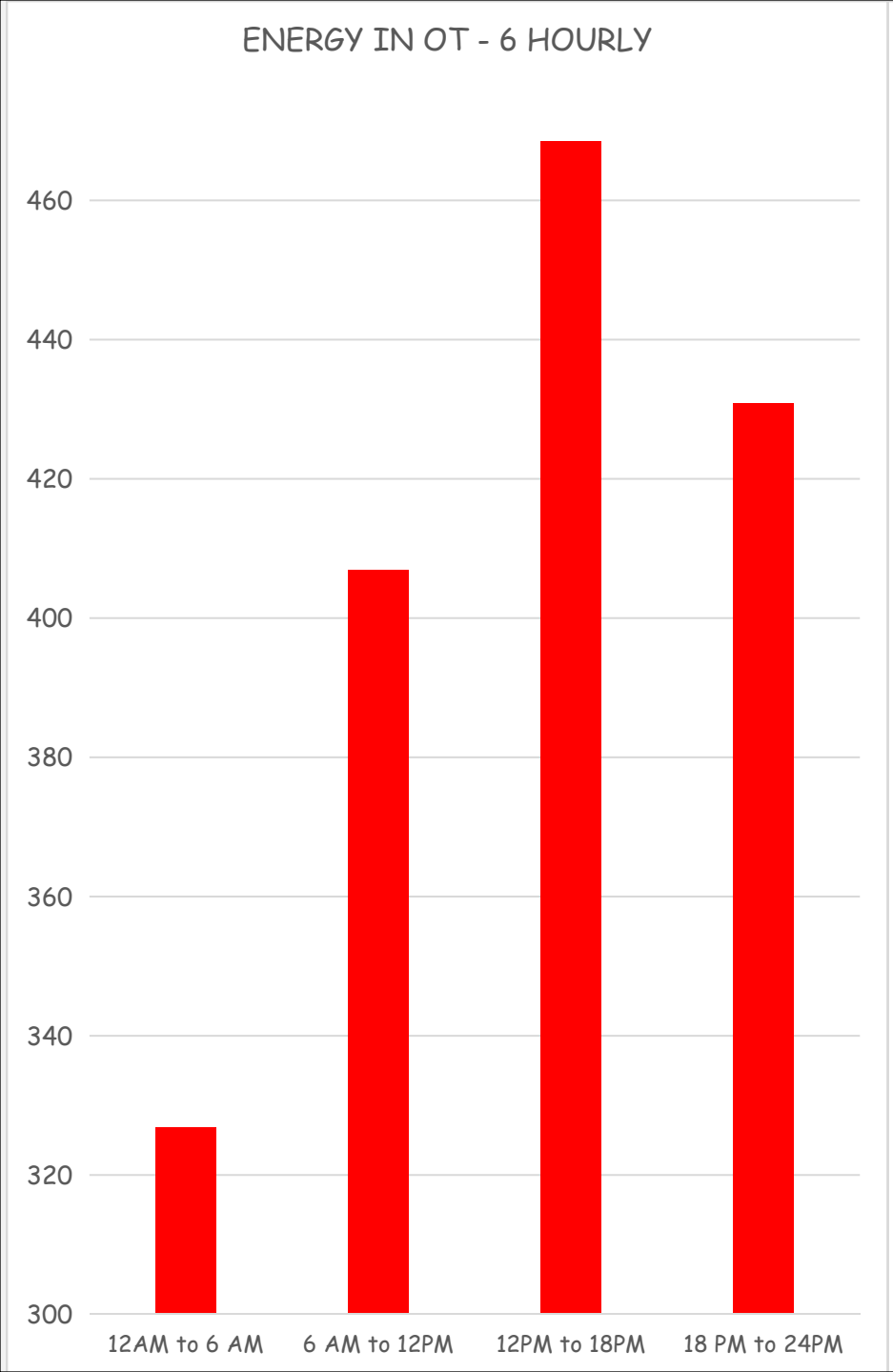


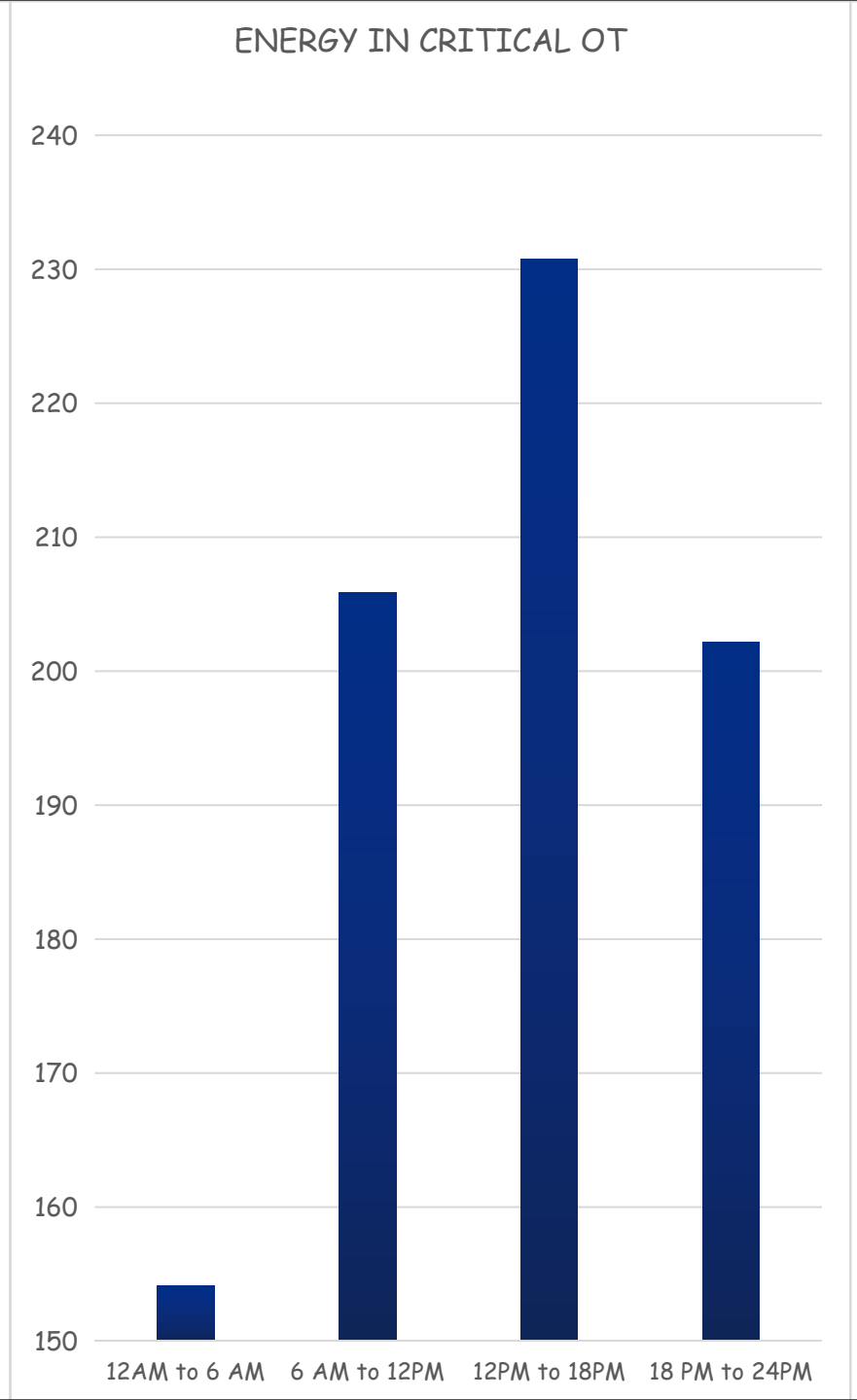
6 to 12 hrs Cooling Energy Vs Average Energy Demand

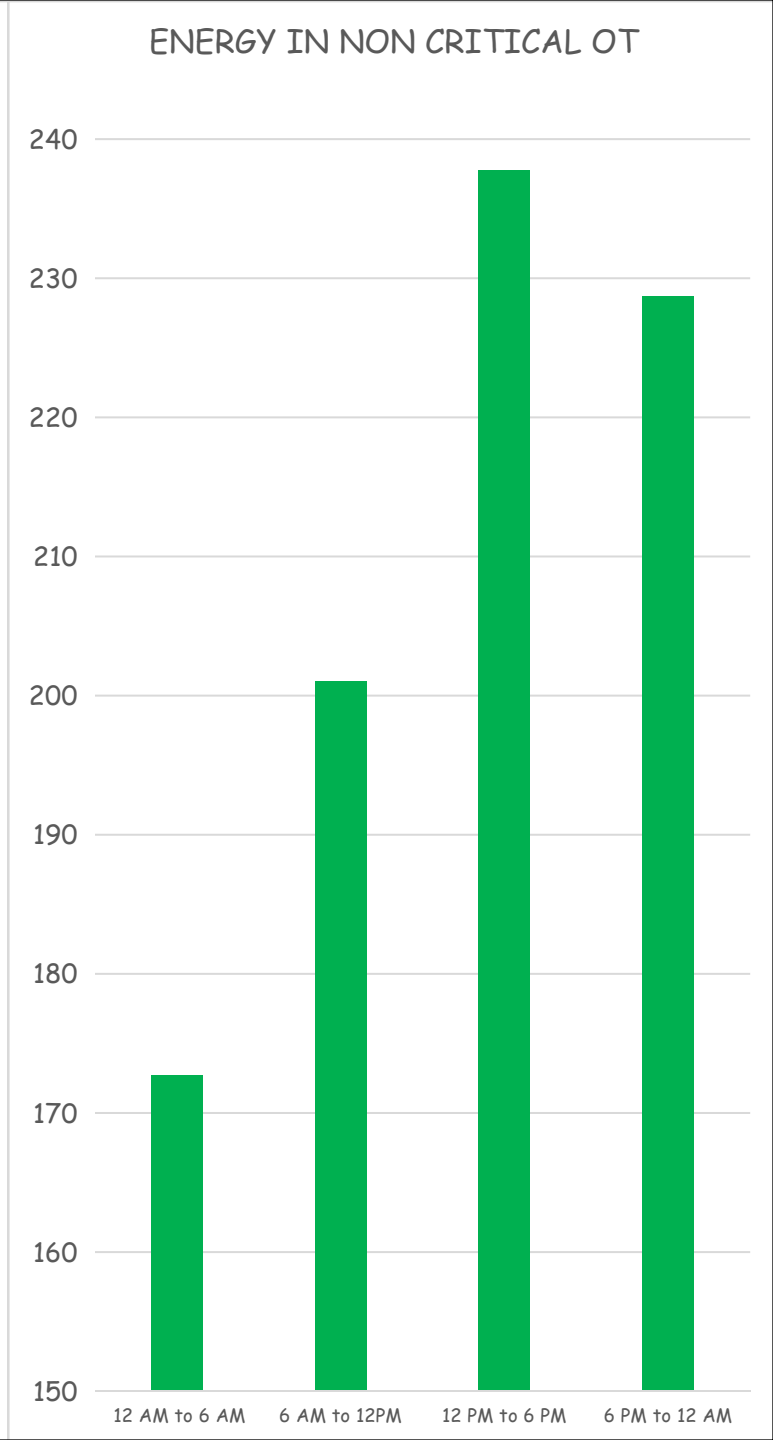


18 to 24 hrs Cooling Energy Vs Average Energy Demand




ENERGY IN OT - 6 HOURLY
460
440
420
400
380
360
340
320
300
12AM to 6 AM
6 AM to 12PM
12PM to 18PM
18 PM to 24PM


ENERGY IN CRITICAL OT
240
230
220
210
200
190
180
170
160
150
12AM to 6 AM
6 AM to 12PM
12PM to 18PM
18 PM to 24PM


ENERGY IN NON CRITICAL OT
240
230
220
210
200
190
180
170
160
150
12 AM to 6 AM
6 AM to 12PM
12 PM to 6 PM
6 PM to 12 AM

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