Council of Enviro Excellence

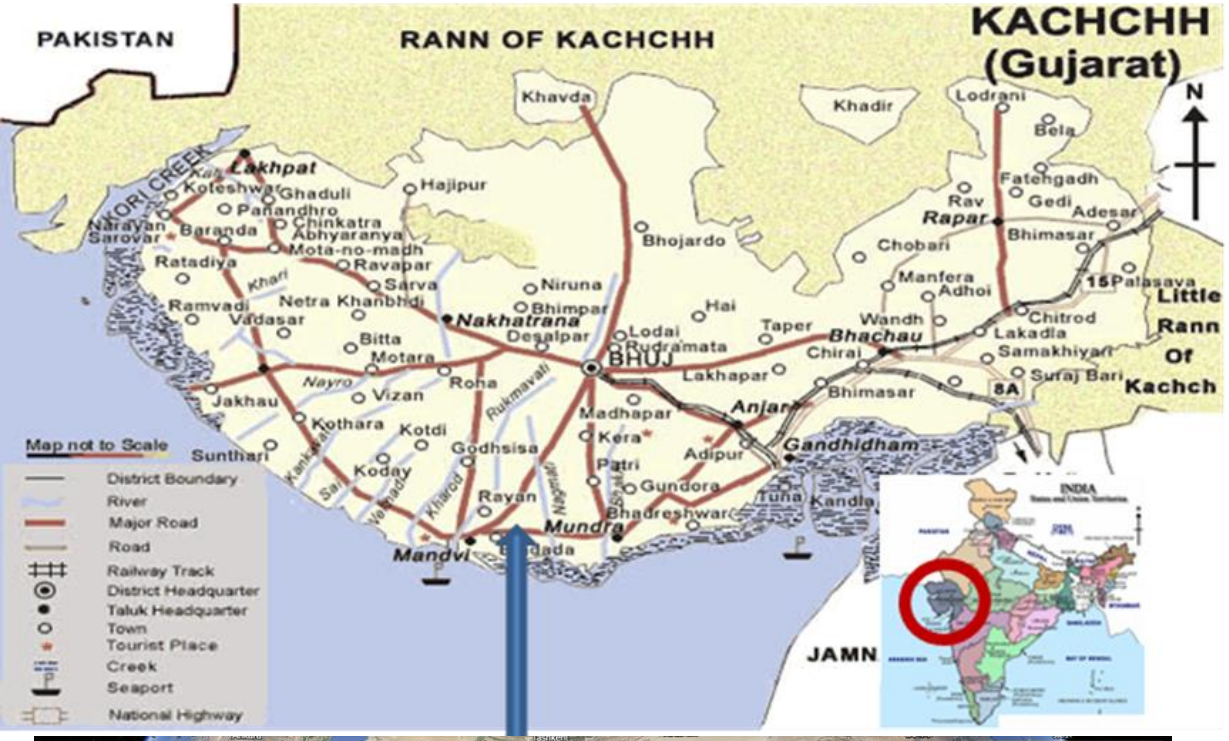
The CEE 3rd National Power-Gen Water Management Awards 2025

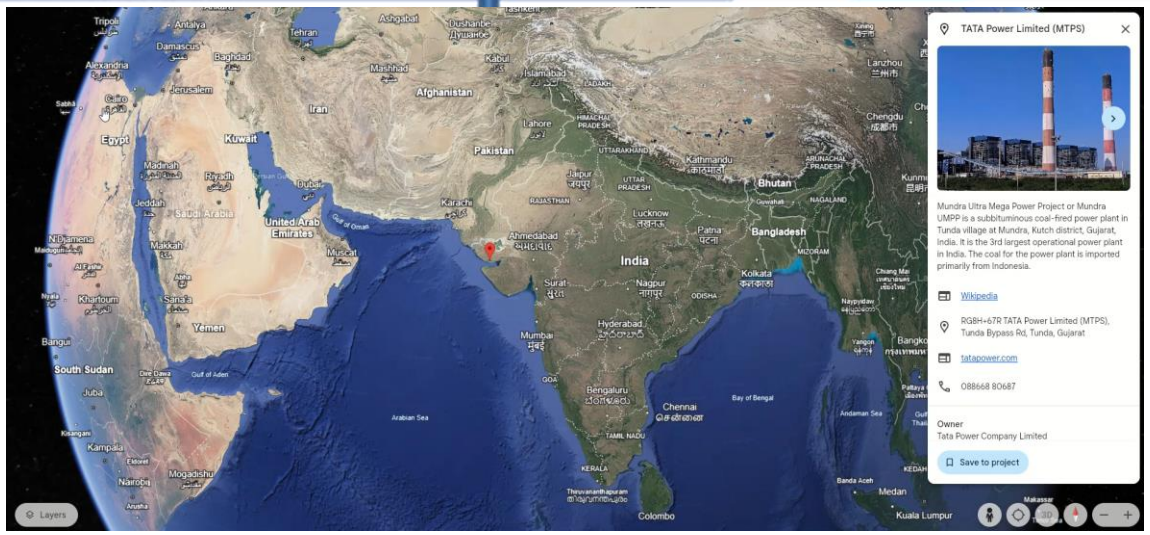
MTPS, TATA Power Company Limited, Mundra

(Formerly Known as Coastal Gujarat Power Limited)

CASE STUDY:

Reduction in service water consumption using IOT based water management SCADA





Product	Electricity	
Type of organisation	Large Business Organisation (LBO)	
Location	Tunda village at Mundra, Kutch district, in Gujarat, India	
Capacity	4150 MW (5x830)	
Technology	Supercritical	
Area	1300 Hectare	
Coal source	Imported coal	
Water source	Sea water	
COD	All 5 units during March 2012 to March 2013.	
Beneficiaries	Gujarat	1805
	Maharashtra	760
	Punjab	475
	Haryana	380
	Rajasthan	380

IMS Certification & NABL Accreditation

IRCLASS SYSTEMS AND SOLUTIONS PRIVATE LIMITED

CERTIFICATE OF APPROVAL

Issued by Indian Register Quality Systems
(A Division of IRCLASS Systems and Solutions Private Limited)

This is to certify that the Occupational Health & Safety Management Systems of

Organisation: The Tata Power Company Limited

Address: Mundra Thermal Power Station,
Ultra Mega Power Plant,
Tunda - Vandh Road,
Tunda Village, Mundra,
Kutch - 370435, Gujarat, India

has been assessed and found conforming to the following requirement

Standard: ISO 45001:2018

Scope: Generation and Supply of Electricity through Operation and Maintenance of Coal based Ultra Mega Power Plant

Certificate No.: IRQS/230400792

Initial Certification Date : 04/07/2014 (OHSAS)

Current Date of Granting : 01/07/2023

Expiry Date : 01/07/2026

Shashi Nath Mishra
Head IRQS

This approval is subject to continued satisfactory maintenance of the Occupational Health and Safety Management Systems of the organization to the above standard which will be monitored by IRQS. The use of the Accreditation Mark indicates accreditation with respect to activities covered by the certificate with accreditation no. CO71. Condition Overleaf

Head Office: 52A, Adi Shankaracharya Marg, Opp.Powai Lake, Powai, Mumbai - 400 072, India.

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Kutch - 370435, Gujarat, India

has been assessed and found conforming to the following requirement

Standard: ISO 9001:2015

Scope: Generation and Supply of Electricity through Operation and Maintenance of Coal based Ultra Mega Power Plant

Certificate No.: IRQS/230100790

Initial Certification Date : 04/07/2014

Current Date of Granting : 01/07/2023

Expiry Date : 01/07/2026

Shashi Nath Mishra
Head IRQS

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IRCLASS SYSTEMS AND SOLUTIONS PRIVATE LIMITED

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Organisation: The Tata Power Company Limited

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Tunda Village, Mundra,
Kutch - 370435, Gujarat, India

has been assessed and found conforming to the following requirement

Standard: ISO 14001:2015

Scope: Generation and Supply of Electricity through Operation and Maintenance of Coal based Ultra Mega Power Plant

Certificate No.: IRQS/230300791

Initial Certification Date : 04/07/2014

Current Date of Granting : 01/07/2023

Expiry Date : 01/07/2026

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Head Office: 52A, Adi Shankaracharya Marg, Opp.Powai Lake, Powai, Mumbai - 400 072, India.

National Accreditation Board for Testing and Calibration Laboratories

NABL

CERTIFICATE OF ACCREDITATION

CHEMICAL LABORATORY - MUNDRA THERMAL POWER STATION, THE TATA POWER COMPANY LIMITED

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

CGPL PLANT, UMPP MUNDRA, TUNDA, MUNDRA, KACHCHH, GUJARAT, INDIA

in the field of

TESTING

Certificate Number: TC-11544

Issue Date: 10/11/2024 Valid Until: 09/11/2028

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of thislaboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: THE TATA POWER COMPANY LIMITED

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

NABL ACCREDITED

TATA POWER

Description of Improvement

TATA

Background

Mundra thermal power station (MTPS), Tata Power is first supercritical plant in India operating with 100% sea water application. It consumes service water for various purposes including fire water for fire fighting. It also uses DM water for steam generation. Both service water and DM water are derived from sea water. Service water used at MTPS contains high chlorides approx. 500 PPM. However, at design stage no protective layer has been considered for inner surface of pipelines.

Due to above design limitation, MTPS was experiencing daily consumption of up to 13,000 m3 per day due to various leakages both in service water and fire water system. Due to above leakages, MTPS taken frequent complete shutdown of service and fire water system to attend the leakages.

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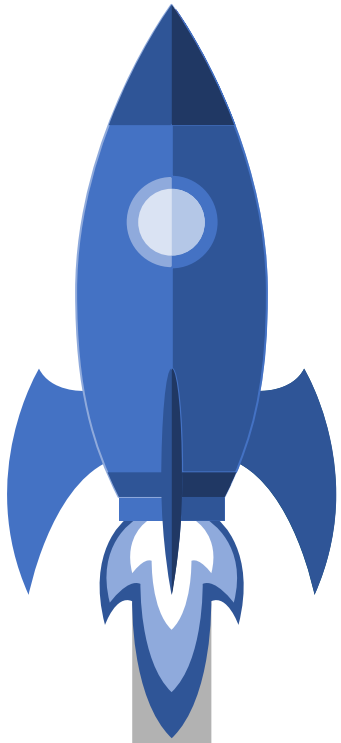


10000m³/Day

Replacement Of Entire Fire and Service Water System Pipelines

Capex Provision = Rs 45 cr
Entire service water network cover 32 KM
Fire water network cover 19.88 KM

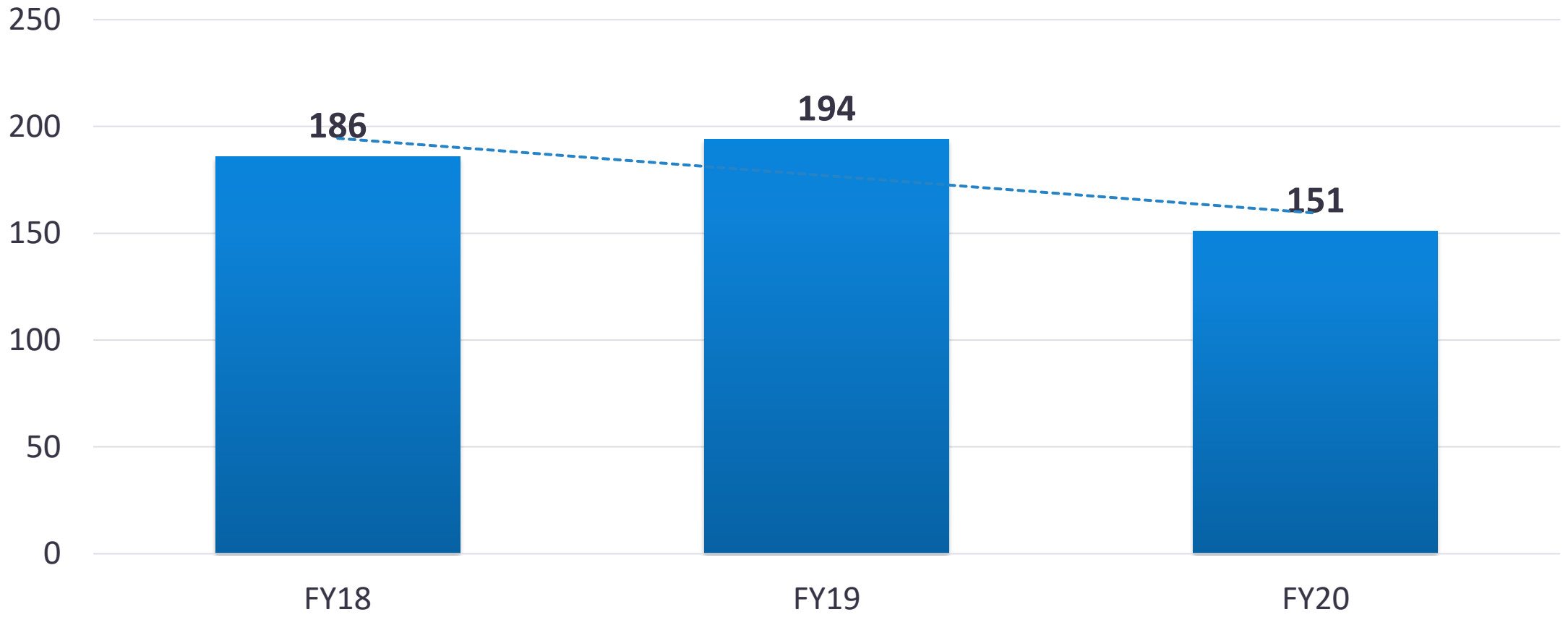
Change of Material

Internal Coro-coating and material of construction change from mild steel to carbon steel,

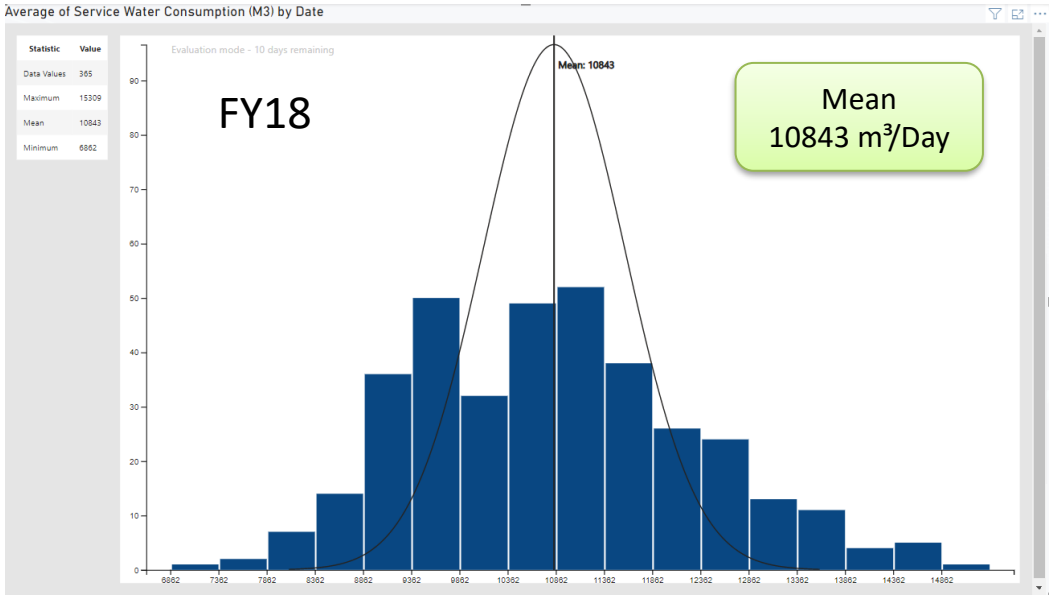
Relocation

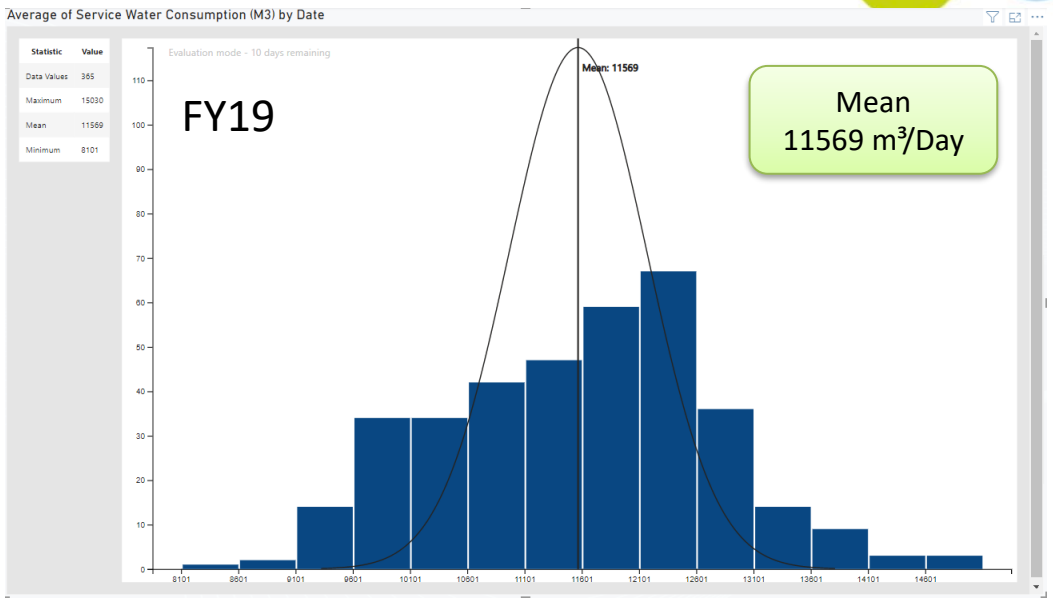
Modified service water and fire water from underground to above ground and provided sectional isolation valves for early detection of leakage and immediate maintenance work without complete shutdown of fire and service water system

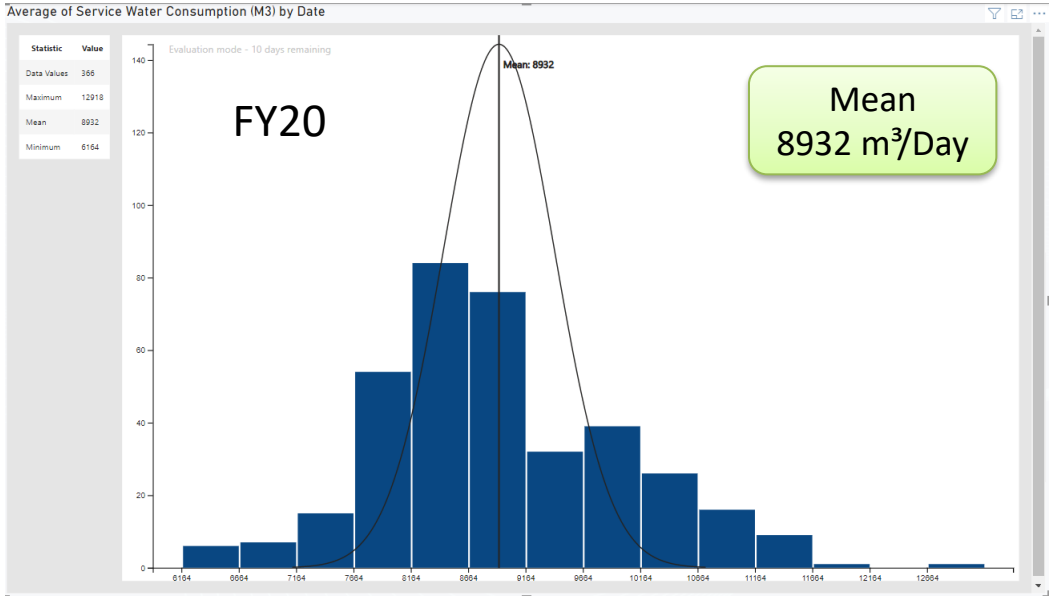
Notification in FW & SW System (Before SCADA)- YoY

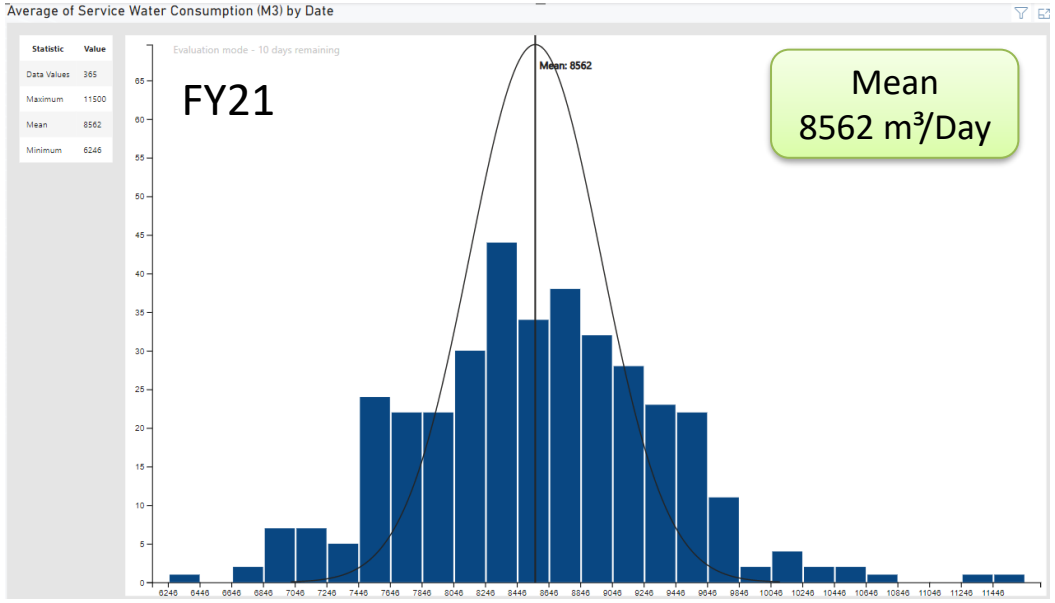


SW Consumption (Before SCADA)







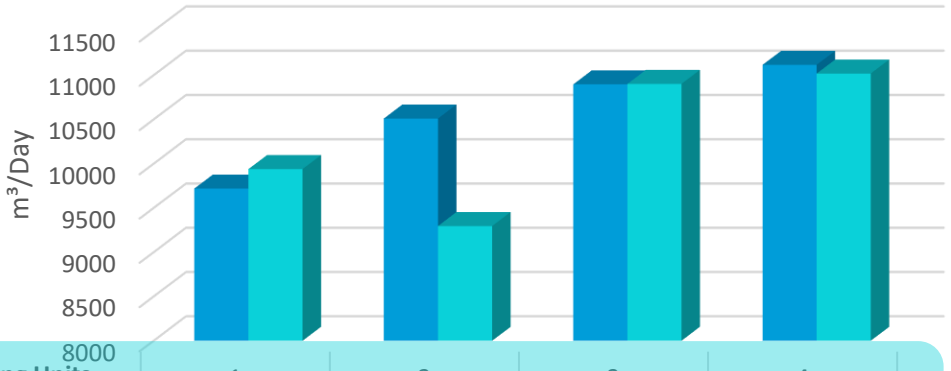


SW Consumption- Target Setting

TATA POWER

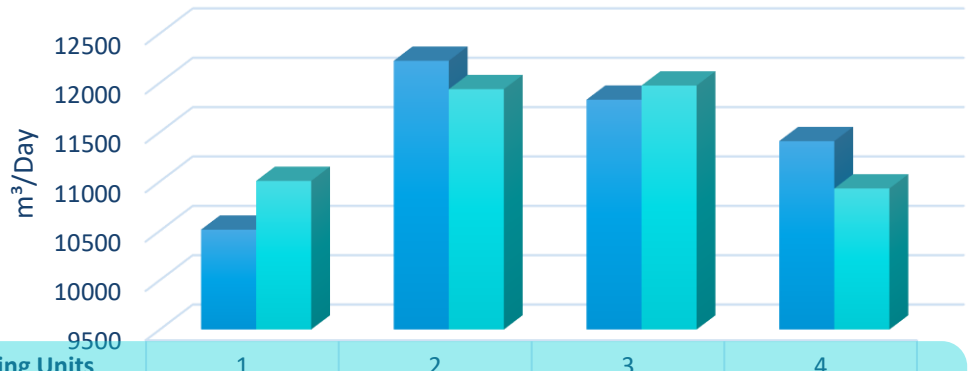
TATA

FY 17-18



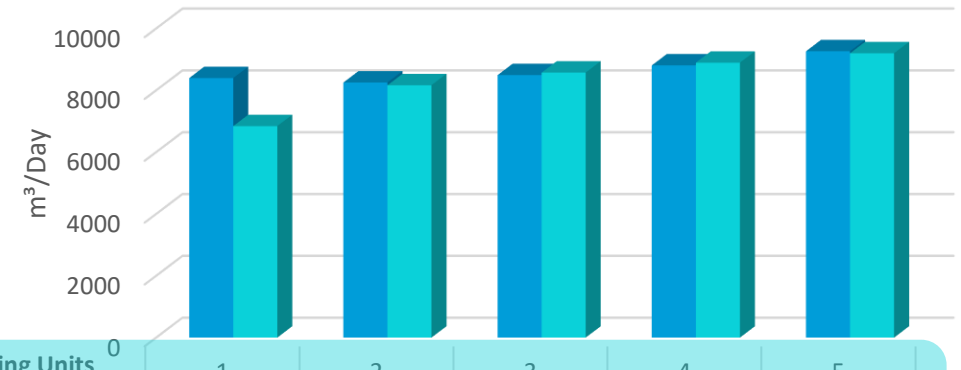
Total Running Units	1	2	3	4
Average Production	9719	10510	10897	11116.7428
Average Consumption	9939	9296	10902	11018.37

FY 18-19



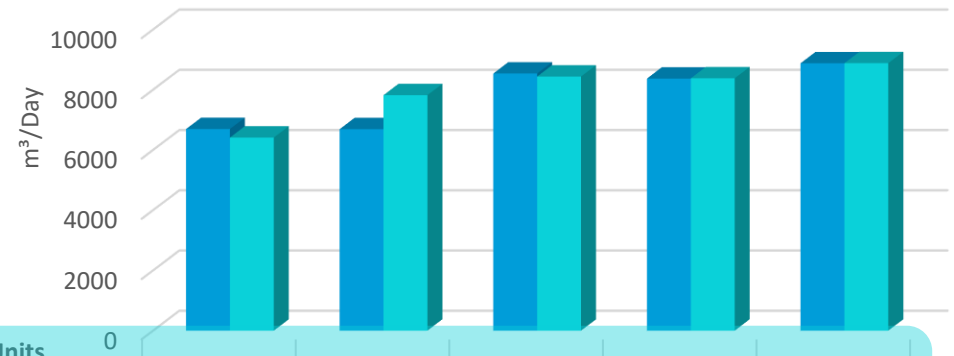
Total Running Units	1	2	3	4
Average Production	10512	12223	11828	11409
Average Consumption	11006	11935	11972	10929

FY 19 - 20



Total Running Units	1	2	3	4	5
Average Production	8397	8254	8493	8808	9265
Average Consumption	6843.2	8165.87	8574	8895	9200

FY 20 - 21



Total Runnig Units	1	2	3	4	5
Average Production	6693	6691	8538	8369	8877
Average Consumption	6411	7819	8438	8379	8881

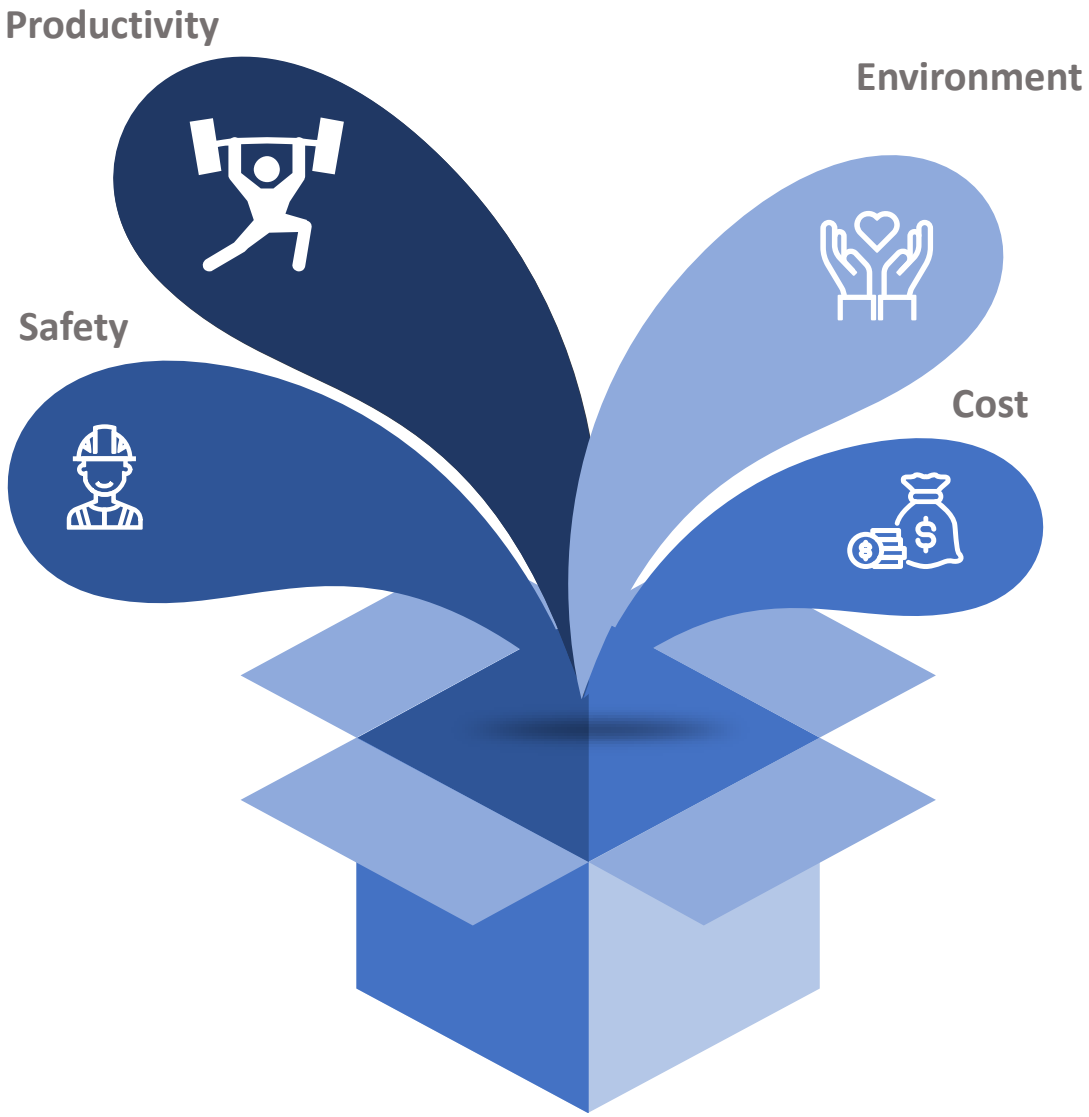
MTPS, Tata Power has taken a target to reduce Service water consumption to

8000m^3/day

when 5 units are in service.

TATA POWER

Charter Details



Improvement Category

Base level

Average Station Service water Consumption = 8500m³

Target level

Average Station Service water Consumption = 8000m³

Actual Saving

Average Station Service water Consumption < 7000m³

Trigger for Improvement

- Department Targets
- KPI Improvement

Methodology of Improvement

- Brainstorming
- Structured Process Review

EPM

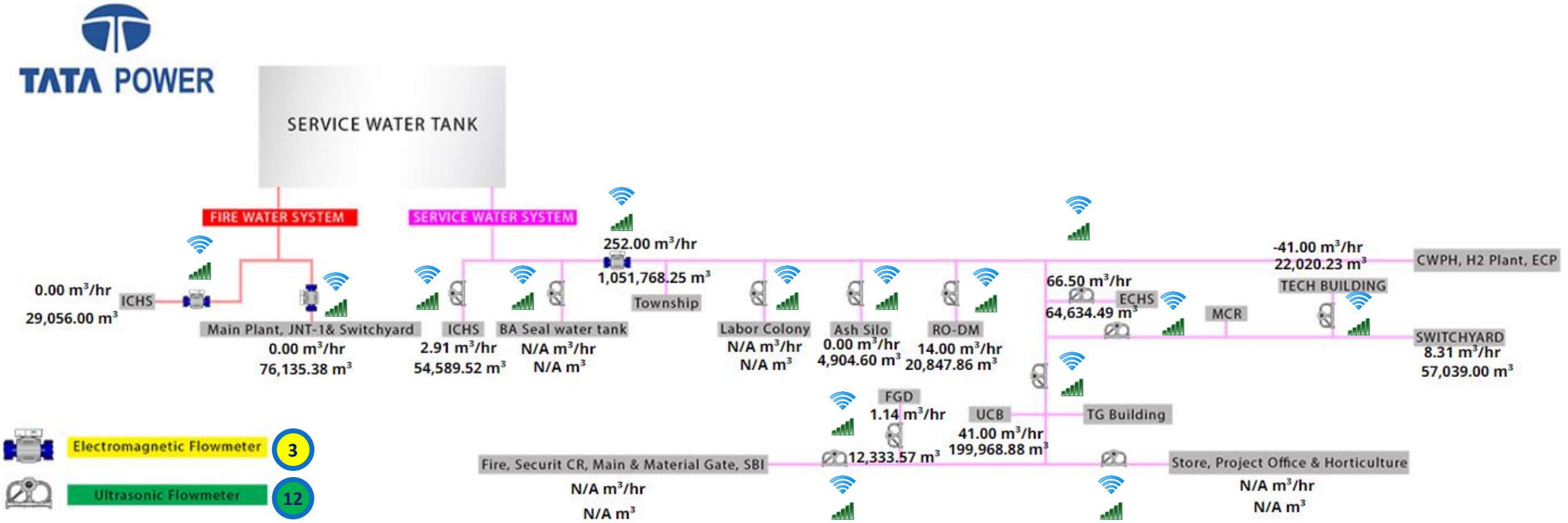
07.11.01
Thermal Power Plant Operation

Project/Task Start date : 5-Feb-22

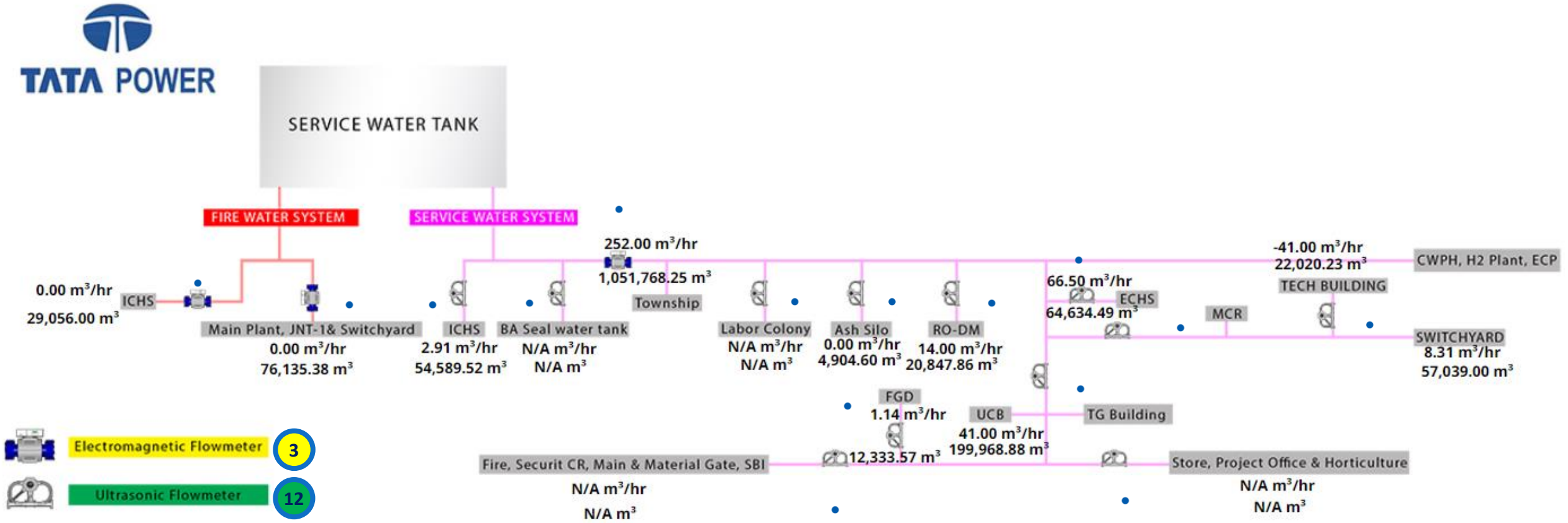
Project/ Task Finish date : 31-Mar-22


1 Main Control Building
2 Technical Building
3 Boiler Unit 10-50
4 TG Hall Unit 10-50
5 Transformer Yard Unit 10-50
6 400KV Switchyard
7 Cooling Water Outfall Channel
8 Hydrogen Plant
9 Fly Ash handling System
10 Electro Chlorination Plant (ECP)
11 Compressor House
12 Cooling water Pump House (CWPH)
13 Cooling water Intake channel
14 Fuel Oil Pump House (FOPH)
15 Ash Handling Plant
16 Internal Coal Handling System (ICHS)
17 RO & DM Plant
18 Project Office
33 km
of Service water
Pipeline
1300-hectare Land

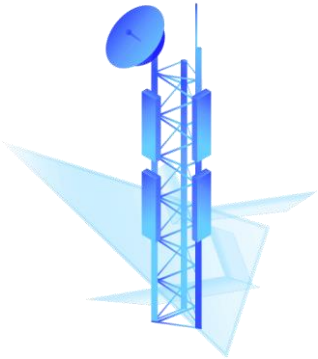
Water Management SCADA



Water Management SCADA



Water Management SCADA



TATA POWER

SERVICE WATER TANK

FIRE WATER SYSTEM

SERVICE WATER SYSTEM

252.00 m³/hr
1,051,768.25 m³
Township

0.00 m³/hr
29,056.00 m³
ICHS

Main Plant, JNT-1& Switchyard
0.00 m³/hr
76,135.38 m³

ICHS
2.91 m³/hr
54,589.52 m³

BA Seal water tank
N/A m³/hr
N/A m³

Labor Colony
N/A m³/hr
N/A m³

Ash Silo
0.00 m³/hr
4,904.60 m³

RO-DM
14.00 m³/hr
20,847.86 m³

66.50 m³/hr
ECHS
64,634.49 m³

-41.00 m³/hr
22,020.23 m³
CWPH, H2 Plant, ECP

TECH BUILDING

MCR

SWITCHYARD
8.31 m³/hr
57,039.00 m³

FGD
1.14 m³/hr
12,333.57 m³

UCB
41.00 m³/hr
199,968.88 m³

TG Building

Fire, Securit CR, Main & Material Gate, SBI
N/A m³/hr
N/A m³

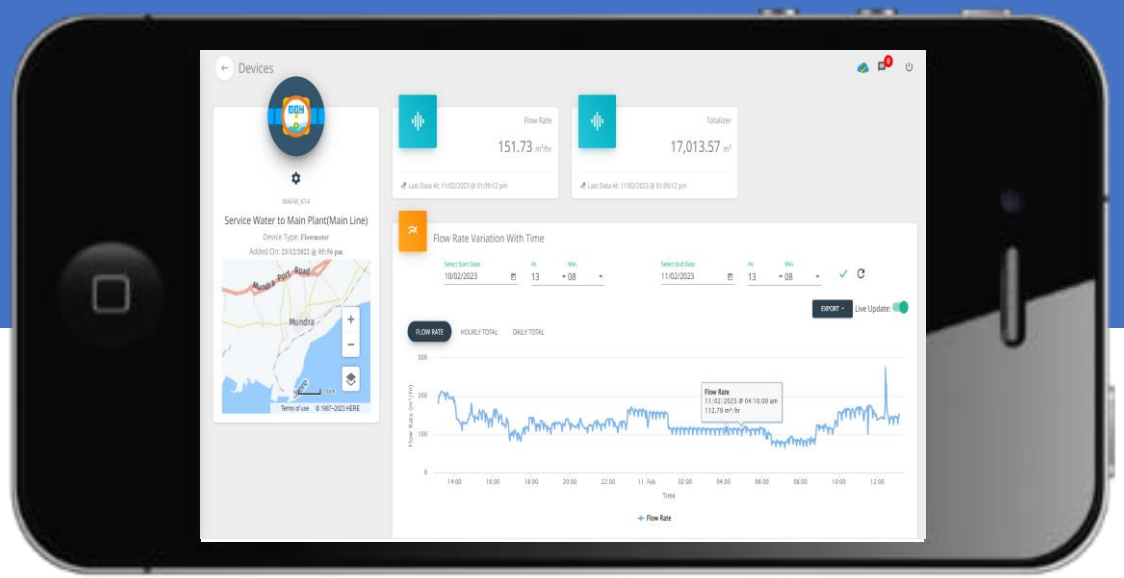
Store, Project Office & Horticulture
N/A m³/hr
N/A m³

Electromagnetic Flowmeter 3

Ultrasonic Flowmeter 12

Water Management SCADA

Realtime Monitoring from anywhere Everywhere



Measure

"Zone wise water Consumption Measurement"

Monitor

"Monitoring all Transmitter in one place"

Control

"Real time alert for high consumption. Take action to reduce consumption."

"If you can't measure it, you can't manage it"

Water Management SCADA- Features

Alarm Configuration

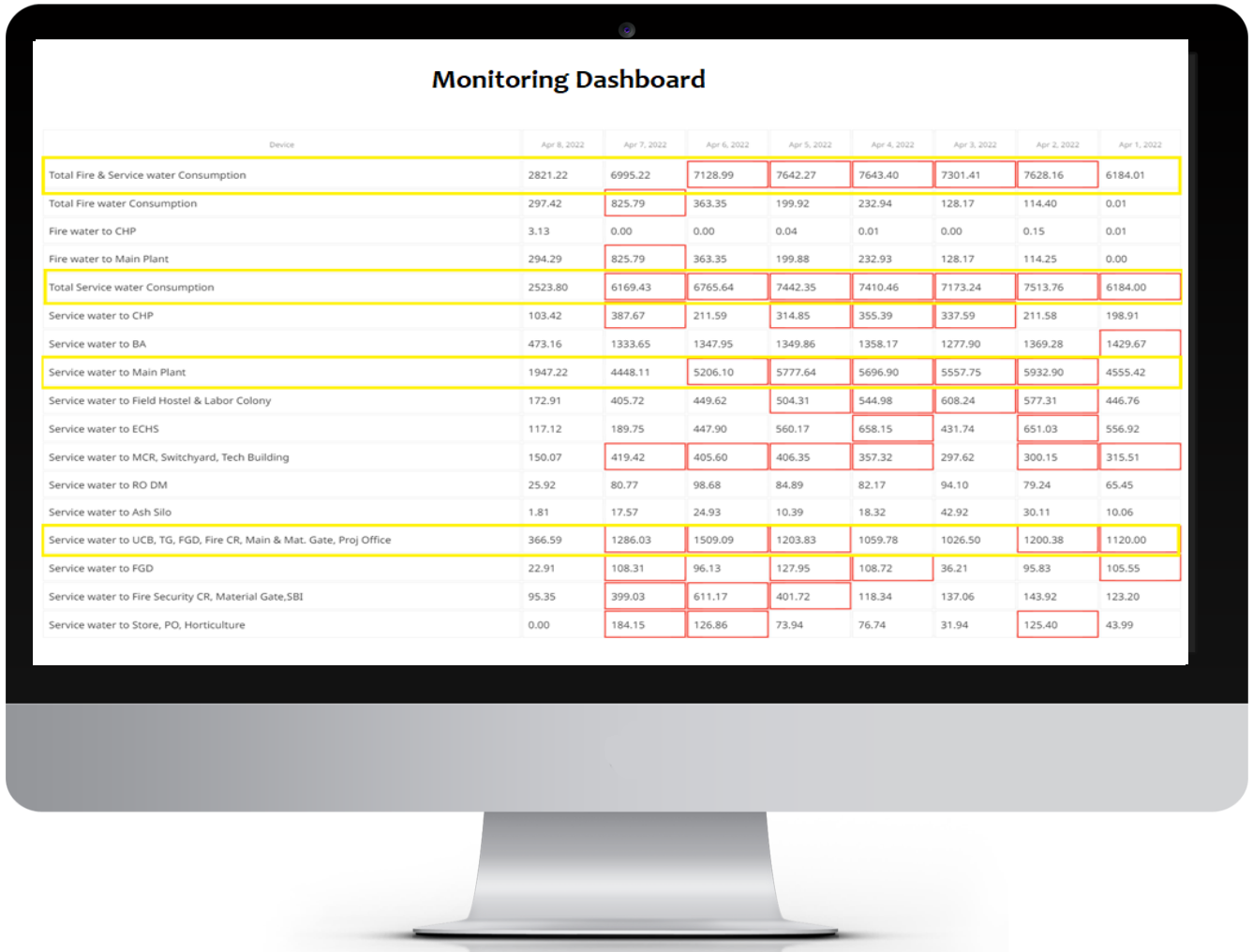
Alarms are configured in all flow meters at predefined values

Deviation analysis

Analysis of individual flow meters consumption can be done through charts/graphs, Daily Weekly Automated Reports

Electromagnetic & ultrasonic flowmeters

3 Electromagnetic & 12 ultrasonic flow meters with high accuracy are installed for more accurate readings



Device	Apr 8, 2022	Apr 7, 2022	Apr 6, 2022	Apr 5, 2022	Apr 4, 2022	Apr 3, 2022	Apr 2, 2022	Apr 1, 2022
Total Fire & Service water Consumption	2821.22	6995.22	7128.99	7642.27	7643.40	7301.41	7628.16	6184.01
Total Fire water Consumption	297.42	825.79	363.35	199.92	232.94	128.17	114.40	0.01
Fire water to CHP	3.13	0.00	0.00	0.04	0.01	0.00	0.15	0.01
Fire water to Main Plant	294.29	825.79	363.35	199.88	232.93	128.17	114.25	0.00
Total Service water Consumption	2523.80	6169.43	6765.64	7442.35	7410.46	7173.24	7513.76	6184.00
Service water to CHP	103.42	387.67	211.59	314.85	355.39	337.59	211.58	198.91
Service water to BA	473.16	1333.65	1347.95	1349.86	1358.17	1277.90	1369.28	1429.67
Service water to Main Plant	1947.22	4448.11	5206.10	5777.64	5696.90	5557.75	5932.90	4555.42
Service water to Field Hostel & Labor Colony	172.91	405.72	449.62	504.31	544.98	608.24	577.31	446.76
Service water to ECHS	117.12	189.75	447.90	560.17	658.15	431.74	651.03	556.92
Service water to MCR, Switchyard, Tech Building	150.07	419.42	405.60	406.35	357.32	297.62	300.15	315.51
Service water to RO DM	25.92	80.77	98.68	84.89	82.17	94.10	79.24	65.45
Service water to Ash Silo	1.81	17.57	24.93	10.39	18.32	42.92	30.11	10.06
Service water to UCB, TG, FGD, Fire CR, Main & Mat. Gate, Proj Office	366.59	1286.03	1509.09	1203.83	1059.78	1026.50	1200.38	1120.00
Service water to FGD	22.91	108.31	96.13	127.95	108.72	36.21	95.83	105.55
Service water to Fire Security CR, Material Gate,SBI	95.35	399.03	611.17	401.72	118.34	137.06	143.92	123.20
Service water to Store, PO, Horticulture	0.00	184.15	126.86	73.94	76.74	31.94	125.40	43.99

Water SCADA Dashboard

Dashboard facilitates day wise comparison of flow meter deviation

Triggering of message alarm

Automated message to area owners gets triggered when consumption is more than alarm limit

Cloud server

It is working on independent cloud server

https://mirrantcloud.com/devices

Alarm System Development

Automated Trigger of alarms

Service water to Main Plant

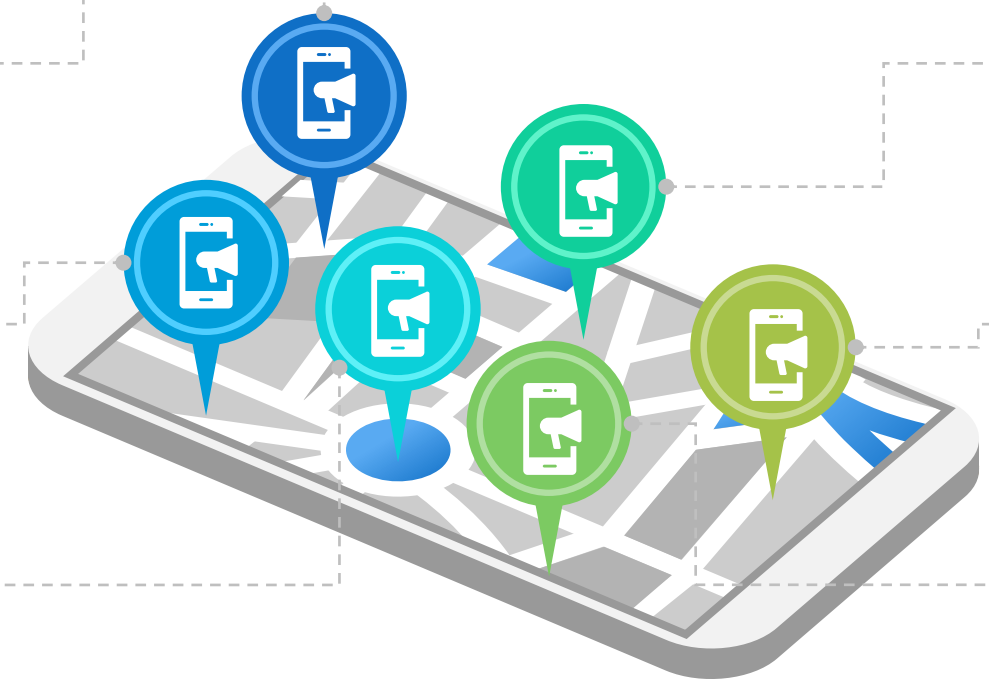
1 person

Service water & Fire water to CHP

1 person

Project Office, Main & material Gate

A 1 person



Total Fire water

1 Person

Service water to AHP

1 Person

Service water to Field Hostel & Labor colony

1 Person

Daily Fire & Service water usage report mail

All SCE & HOD

Measures taken to reduce water consumption

Use of Data Analysis in water management SCADA

All flow Meter values are analyzed , Consumption Data are compared with previous day values, Erratic & High-water consumption zones were easily identified & Suitable steps taken to reduce water consumption

05 Fire water consumption monitoring done.

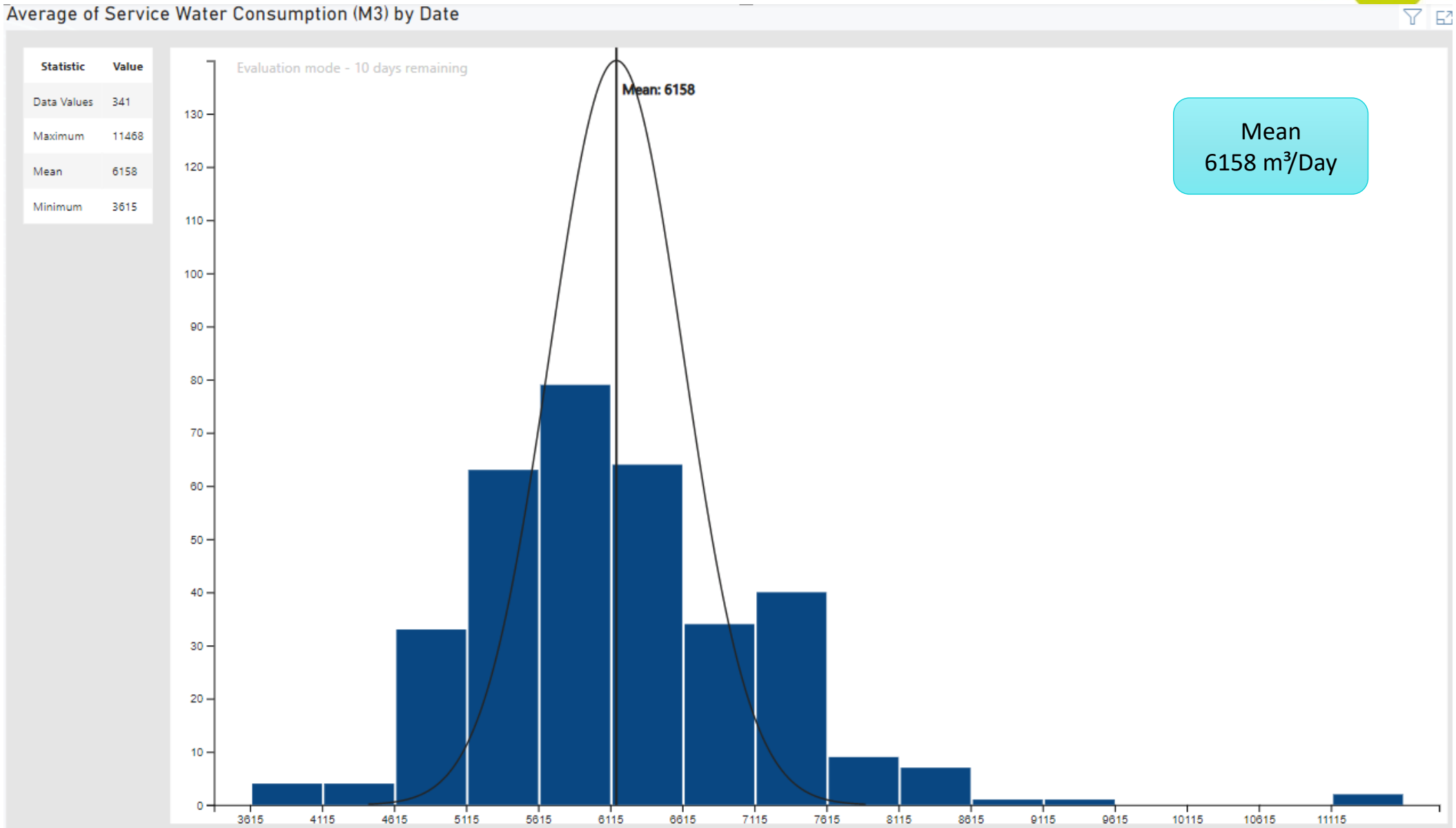
04 UCB, MCR HVAC CT Basin make up optimized to reduce draining from same.

03 Project office, Material gate, Fire & Security CR, SBI service water flow optimized by throttling water supply valve.

02 Field Hostel & Labor colony service water flow optimized by throttling water supply valve.

01 Running unit FT 4 temperature set point increased to reduce service water consumption

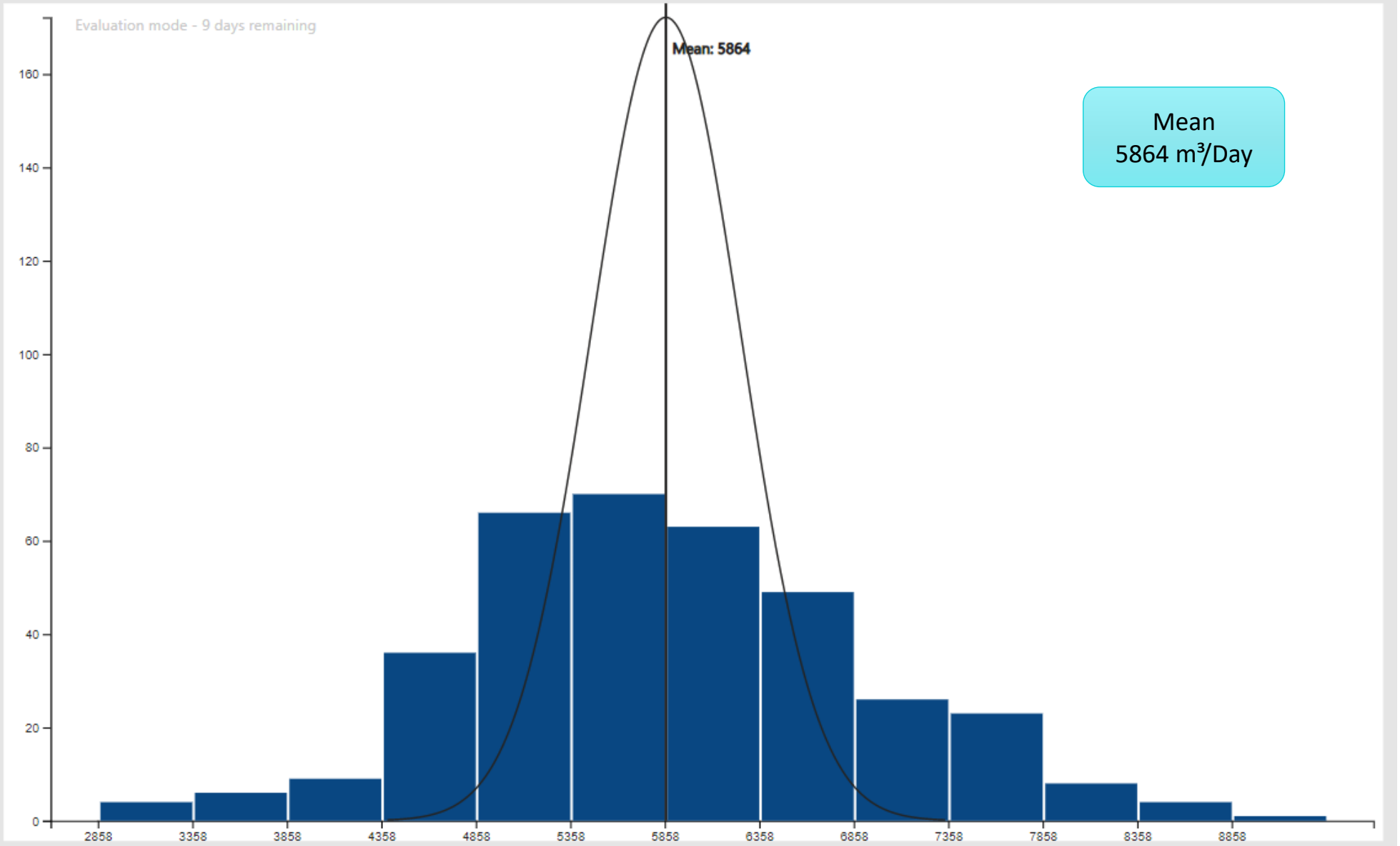
SW Consumption (After SCADA)-FY22



Mean
6158 m³/Day

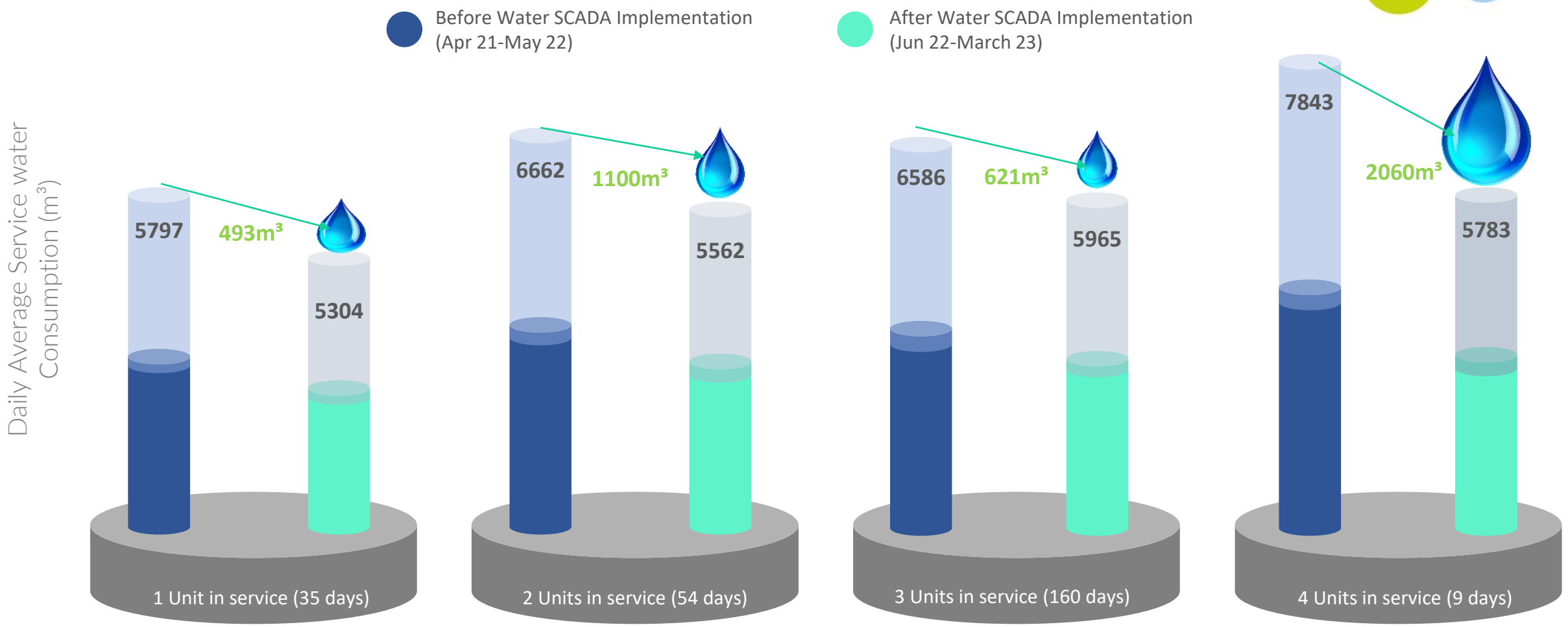
SW Consumption (After SCADA)-FY23

Statistic	Value
Data Values	365
Maximum	8980
Mean	5864
Minimum	2858



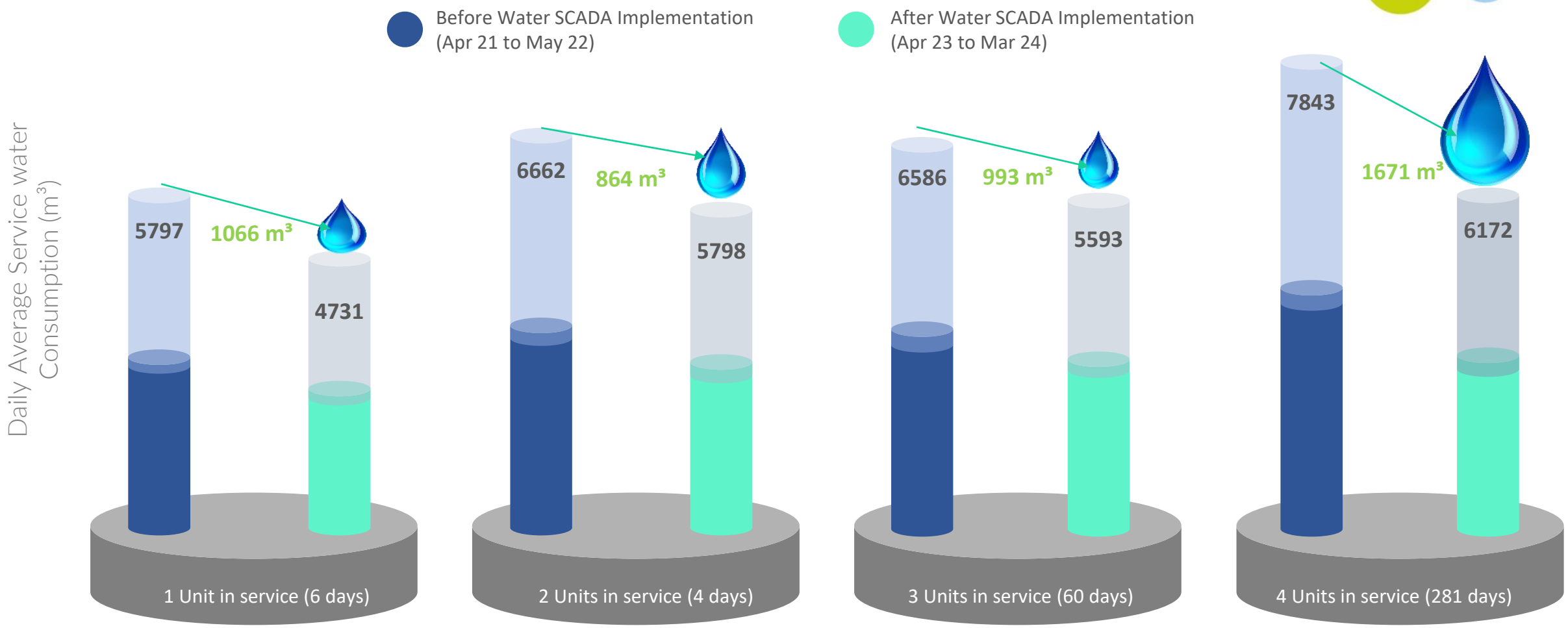
Mean
5864 m³/Day

Water Management SCADA- Savings FY-23 (June-22 to March-23)



Total Saving in FY-23 after Implementation of water management SCADA is Rs 68 lakh (in 258 Days)

Water Management SCADA-
Savings FY-24 (1 Apr-23 to 31 March-24)



Total Saving in FY-24 after Implementation of water management SCADA is Rs 1.88 Cr (in 351 Days)

Total costing incurred for implementation of water management SCADA at MTPS is Rs 25.49 lakhs.

Water Management SCADA

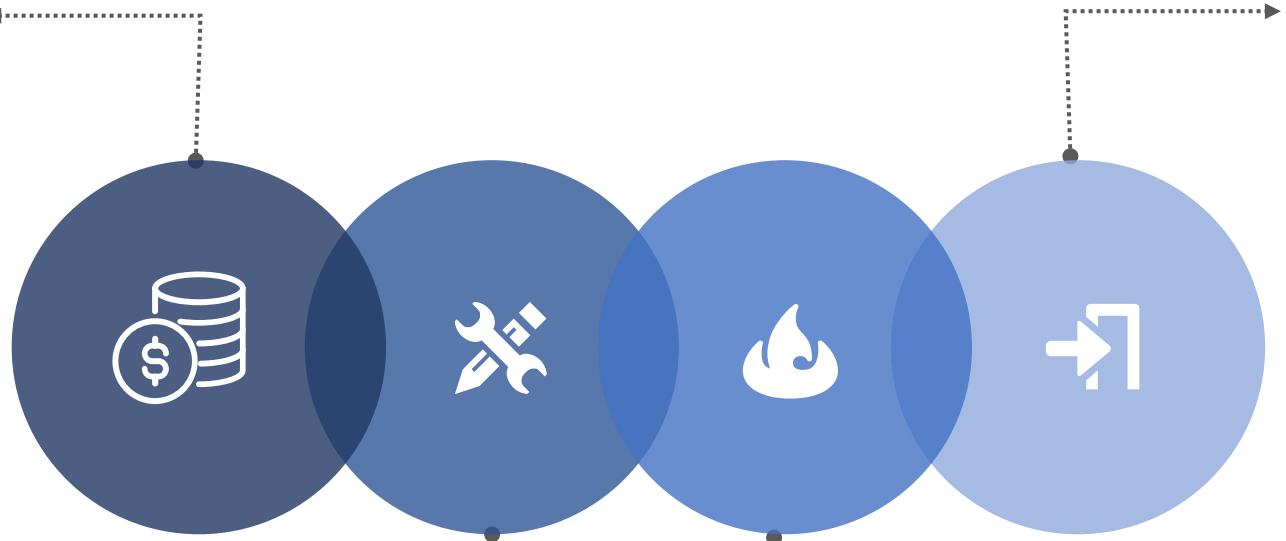
Measurement, Analyze, Report, Correction,

APC Reduction

30 KW APC reduction per day which is equivalent to 7.74 MW power saving in FY23 since implementation of Water management SCADA at MTPS.

Sustainable development goal SDG 6 & SDG 12

Under SDG 6 Clean Water & Sanitation & SDG 12 saving natural resources by reducing service water consumption.



Reduction of Specific Power Consumption of RO & DM Plant

Reduction in specific power consumption from 3.87 KWH/m^3 to 3.85 KWH/m^3.

System Availability

Frequent isolation of fire and service water system is avoided leading to increased availability of system

Tangible

Intangible

Thank You!

Website: www.tatapower.com

Email Id: navendu.padhy@tatapower.com

Contact: 9227856226