

Paryaavarneer Engineers & Consultants Private Limited

IoTreat®
**IIoT based automatic & remote
treatment plant operation
system**

1 About Paryaavarneer

2 *IoTreat*® basics

3 Benefits of *IoTreat*®

4 *IoTreat*® Packages

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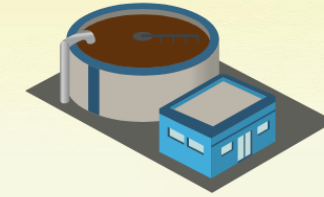
PEC - Organization in gist



More than
12,000 m³ of wastewater
being recycled per day by
PEC operations



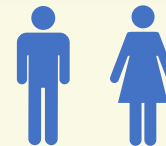
More than
17,000 m³ of drinking
water is being treated
per day by PEC
operations



More than
25 water and
wastewater treatment
projects executed



Team of **10**
Environmental Engineers
and environmental experts



Workforce of more
than **120 people**
across Karnataka



40+
delighted customers
across various sectors

Vision

Providing **One Stop Solution** for all Industrial Environmental needs **and to be the most desired company** for all stakeholders



Mission

To be the **Best in Town** in every single market that we serve by providing **tailor-made solutions** to each problem



Core Values

- ✓ Passion for Work
- ✓ Strategic thinking
- ✓ Ownership
- ✓ Deep Dive
- ✓ Dynamism

Our Value Proposition



End to end solution for environmental needs with holistic approach



Tailor made solutions for specific environmental issues



Striving for customer delight through **quality and timely service**



Team of experts in varied sectors including Steel, Power, Automobile, and auto parts.



Dedicated pool of **Environmental engineers**



Digitalized communication with the customers on the project progress.

Our Core Team

Our Core team is a pool of Environmental Engineers and industry veterans

<p>Mr. Arjun R Chairman & Managing Director B.E. in Environmental Engineering Advanced Diploma in Industrial Automation</p> <p>Key Specialized Areas</p> <ul style="list-style-type: none"> • Water & wastewater engineering • Project planning & Management • Environmental Compliance • Solid Waste management • Management System implementation 	<p>Mr. Ravitej Hegde CEO B.E. in Environmental Engineering</p> <p>Key Specialized Areas</p> <ul style="list-style-type: none"> • Water & wastewater engineering • Corporate Sustainability & reporting • Climate Change Advisory • Environment Quality Monitoring • Management System Implementation 	<p>Mr. Raghu H Director B.Sc Chemistry</p> <p>Key Specialized Areas</p> <ul style="list-style-type: none"> • Water & wastewater chemistry • Solid Waste Management • Project planning and management 	<p>Mrs. Gayathri Manager - Legal Compliance B.E. in Environmental Engineering</p> <p>Key Specialized Areas</p> <ul style="list-style-type: none"> • Legal Compliance Management • Sustainability & Climate Change advisory • Project planning and management 	<p>Mr. SMR Prasad Advisor M Tech in Chemical Engineering</p> <p>Key Specialized Areas</p> <ul style="list-style-type: none"> • Water & wastewater engineering • CEMS • Waste to wealth • Sustainability & Climate Change advisory
<p>Experience: 10 years</p>	<p>Experience: 10 years</p>	<p>Experience: 30 years</p>	<p>Experience: 10 years</p>	<p>Experience: 45 years</p>
<p>PARYAAVARNEER ENGINEERS & CONSULTANTS PRIVATE LIMITED</p>				

Water & Wastewater Solutions

- **Automation with IoT** of water and wastewater treatment plants
- **Supply, installation & commissioning** of ETPs, STPs and WTPs
- **O & M** of water & wastewater treatment units
- **Water Audits**

Legal Compliance Management

- **Environmental permits-** CFE, CFO, authorizations etc.
- **Establishing Compliance Management system**
- **Legal Audits**
- **Environmental legal updates & training**

Sustainability & Climate Change

- **Sustainability reporting-** GRI, IIRC, TCFD, BRR and SDG.
- **Stakeholder engagement & Materiality assessment**
- **Internal Carbon pricing** and TCFD consultants
- **GHG inventorization & reduction**

Management System implementation

- **Quality Management System (ISO 9001:2015)**
- **Environment Management System (ISO 14001:2015)**
- **Laboratory Management System**
- **Safety Management System**

Other Services

- **Waste Management advisory and audits**
- **Environmental trainings**
- **Supply chain Sustainability**
- **Air pollution control**

Few of our Esteemed Clients



PEC is recognized by
Ministry of Commerce &
Industry as a **startup** for its
IoTreat[®] product

IoTreat[®] integrates the
ideal operational practices
of the STP derived from
**Environmental
Engineering principles**
with IIoT platform to
enable the efficient, remote
operation of the STPs

PARYAAVARNEER
ENGINEERS & CONSULTANTS PRIVATE LIMITED

CERTIFICATE NO:
DIPP99639



Government of India
Ministry of Commerce & Industry
Department for Promotion of Industry and Internal Trade

#startupindia

CERTIFICATE OF RECOGNITION

This is to certify that PARYAAVARNEER ENGINEERS & CONSULTANTS PRIVATE LIMITED incorporated as a Private Limited Company on 15-01-2020, is recognized as a startup by the Department for Promotion of Industry and Internal Trade. The startup is working in 'Green Technology' Industry and 'Others' sector as self-certified by them.

This certificate shall only be valid for the Entity up to Ten years from the date of its incorporation only if its turnover for any of the financial years has not extended ₹ 100 Cr.

25-04-2022
DATE OF ISSUE

14-01-2030
VALID UPTO

Recognised as
Top 50 Start-up
in VentuRISE
Global start-up
challenge



**Second Prize
Winner of Start-
up Pitch Contest
at TiE Hubli**



PARYAAVARNEER
ENGINEERS & CONSULTANTS PRIVATE LIMITED

Awards & Recognitions

Awarded as
**Innovative Water
Management
Initiative** in CII SR
Industrial Water
Management
competition

Awarded as
**Best CleanTech
Innovator** at
**Times Business
Awards 2023**



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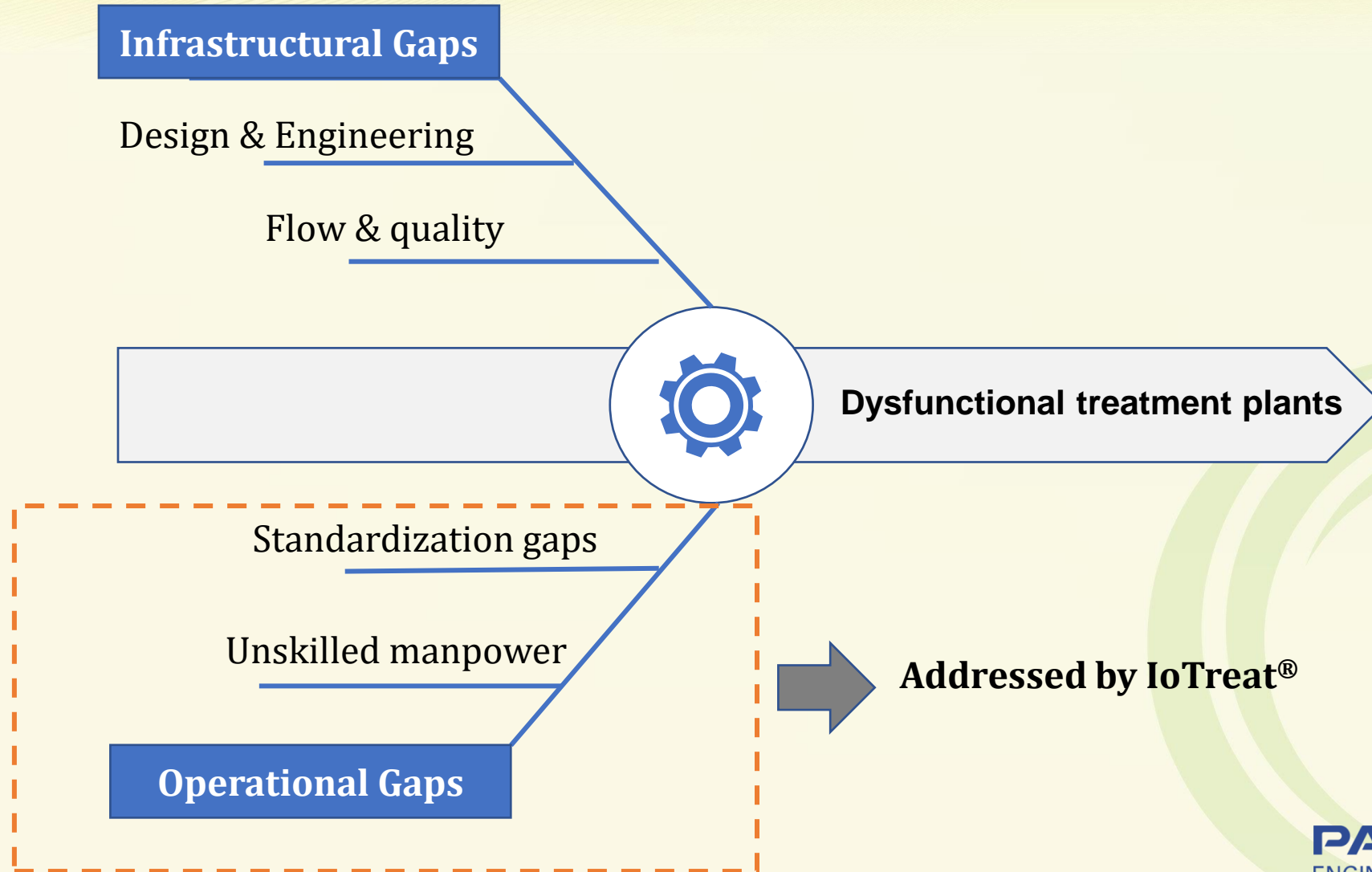
4 *IoTreat*® Packages

A short video about IoTreat™

<https://youtu.be/30BvkKs0No4>

Please click on the above link to watch the video

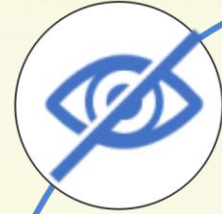
Non-working of treatment plants



Manual operation

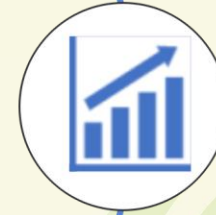
Human Intervention leading to frequent **quality deviations**

No possibility for **Real Time Monitoring** leading to lesser control



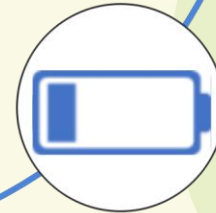
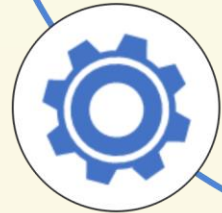
Higher operational cost (close to 80% of operational cost is from manpower cost)

Possibilities of **occupational health and safety risks** for operators

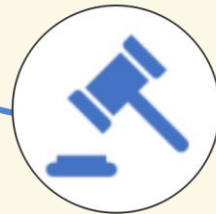


Lesser data availability for operational analysis

No possibility for predictive maintenance of equipment as real time equipment health is not monitored



Higher power consumption

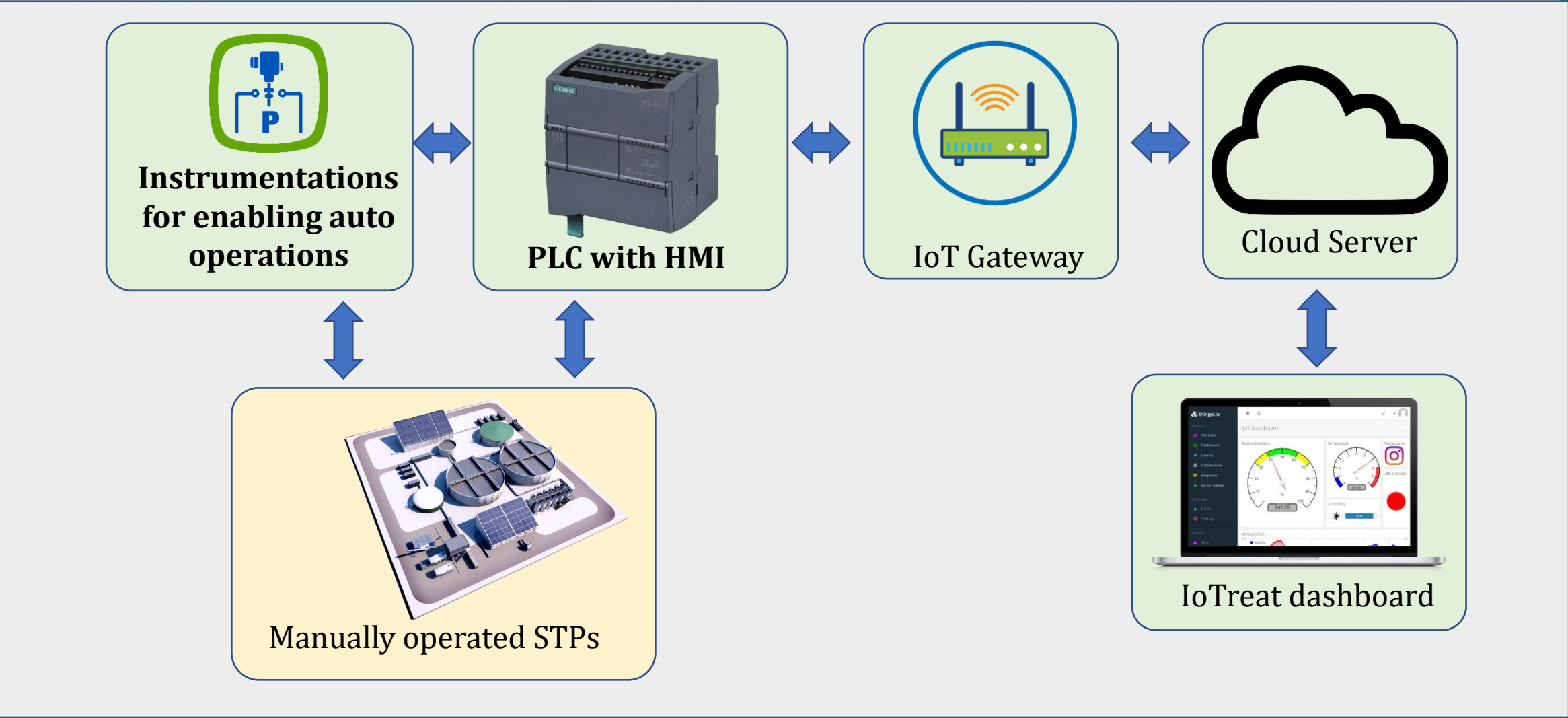


Uncertainties related to labour regulations

SBR STP - Operation Principle

STP Units/ equipment					
Operator inputs for activities	<ul style="list-style-type: none"> Level of the eq.tank and SBR tank 	<ul style="list-style-type: none"> Time of each stage of operation Tank levels 	<ul style="list-style-type: none"> Tank levels in decant tank and treated water tank 	<ul style="list-style-type: none"> Duration of filter operation Tank levels in decant and treated water tanks 	<ul style="list-style-type: none"> Level of water in decant tank and overhead tank
Instrumental options	<ul style="list-style-type: none"> Level Sensors 	<ul style="list-style-type: none"> Level Sensors Timer Autovalves 	<ul style="list-style-type: none"> Level Sensors 	<ul style="list-style-type: none"> Auto-multiport valves Timer 	<ul style="list-style-type: none"> Level Sensors

General Architecture - IoTreat™



Existing Infrastructure

Retrofits

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Benefits of *IoTreat*TM

<u>Aspects</u>	<u>Manual Operation</u>	<u>IoTreat</u>
Cost of operation	Higher operational cost due to full time manpower requirement	Reduction by 30-50% compared to manual operation
Quality of treated water	May vary due to errors in operation	Consistent quality of treated water due to no errors
Manpower Dependency	Operator has to be at site full time when plant is in operation	No full time operator is required
Power Consumption	Higher as blower operation is not optimized	Lower as blower operations are optimized
Operational data availability & accessibility	Limited data as hard copies of logbooks are maintained	Data will be available in digital form & can be accessed anywhere
Emergencies at non-working times	Possibilities of unaddressed emergencies	Interlocks and automation logics ensure that no emergency arise

Benefits of *IoTreat*TM

<u>Aspects</u>	<u>Manual Operation</u>	<u>IoTreat</u>
Human Errors	Entire operation is dependent on skill, awareness of operators	No human errors arises as operation happens without human intervention
Predictive Maintenance	Preventive maintenance based on running hrs is not possible	Preventive maintenance can be done using the data
Breakdown	Chances of breakdown is high due to error in operation	Breakdown can be prevented by real time equipment health data



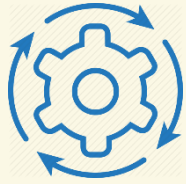
IoTreat[®] value proposition



Team of Environmental Engineers



Dedicated service team based out in Karnataka



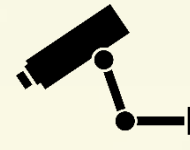
Inhouse expertise on automation



Experienced team of operators



Vast experience in manual operation of STPs



IIoT and CCTV surveillance from backend



Operational data digitalization and analysis



Alarms and reports tracking through mail & WhatsApp



Equipment health tracking



Integration with BMS

Electricity Consumption - Contribution by equipment



50-70% of overall electricity consumption occurs from **blower operations**

■ Air blower ■ Pumps ■ Others

Power Saving – Law of affinity

$$\text{Power} \propto (\text{RPM})^3$$

Which means if the RPM is reduced by 10%, power will be reduced by 27%

- VFD is used to control the speed of blowers
- Hence by reducing the speed of blower, we will be able to achieve significant reduction in power consumption.

In most of the plants, blowers installed are of higher capacity due to which extra air is being given to aeration and equalization causing higher power consumption

Power Saving by IoTreat® (Plant Capacity : 50 KLD)

Blower capacity	110	m³/hr
Blower rating	3.7	kW
Efficiency	91	%
Considering eq tank at 50% always		
Air required for eq tank	27.5	m ³ /hr
Air required for SBR tank at no feed	30	m ³ /hr
Total air required	57.5	m ³ /hr
Power consumption with IoTreat	2.13	kW
Additonal runnings hrs	8	
Power consumption in addtnl hrs	17.00	kW
Power consumption if no automation	29.6	kW
Power savings	12.60	kW/day
Cost savings	3401	per month
Current actual power consumption	61	kW/day
Power savings minimum	20.7	%

**Minimum Power Saving
of 20% from current
consumption**



**Minimum Cost
saving of Rs.
40,800 per year**



**Minimum CO₂
reduction of 3770
kgs/year**

Result Parameters

<u>Parameter</u>	<u>Legal requirement</u>	<u>With IoTreat**</u>	<u>Options for online monitoring</u>
pH	6.5 to 8.5	6.5 to 8.5	Online pH meter
Biochemical Oxygen Demand (BOD) in mg/L	<10	<10	Online BOD COD analyzer
Chemical Oxygen Demand (COD) in mg/L	<50	<30	Online BOD COD analyzer
Total Suspended Solids (TSS) in mg/L	<20	<20	Online TSS analyzer
Total nitrogen in mg/L	<10	<10	Online total nitrogen analyzer
Ammonical Nitrogen	<5	<5	Online Ammonical Nitrogen analyzer
Fecal Coliform (FC) MPN /100mL	<100	<50	-

**Considering that plant design is as per the standard requirement

Online Turbidity meter can be installed alternatively which will indicate the clarity of water and gives an indication of BOD and COD as well. However, same is not a legal requirement

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IoTreat[®] packages

FEATURES	BASIC	REGULAR	PREMIUM
Auto operation of the plant excluding sludge management	✓	✓	✓
Auto operation of the plant including sludge management			✓
Dynamic level tracking for all tanks			✓
Dynamic level tracking for selected tanks	✓	✓	
Optimization of air blower outflow	✓	✓	✓
Remote Operational Control		✓	✓
HMI – Local display of the operational status		✓	✓
Equipment Health Tracker for breakdown prevention			✓
IIoT dashboard for remote tracking with report fetching	✓	✓	✓

IoTreat® packages

FEATURES	BASIC	REGULAR	PREMIUM
Daily operation report through mail			☑
Alarm through mail for one mail id	1 mail id	3 mail ids	3 mail ids
Alarm through SMS			☑
24x7 CCTV Surveillance	☑	☑	☑



IoTreat[®] AMC scope

AMC Activities	PEC	Client
Operation supervision	✓	
Operator/supervisor visit	✓	
Maintenance of new instruments mentioned	✓	
Maintenance of PLC, HMI and IoT dashboard	✓	
Sludge dewatering as per requirement	✓	
Subscription charges for server	✓	
Monthly analysis of treated water	✓	
Pumping of treated water to OHT		✓
Equipment maintenance and repair including electrical and mechanical		✓
Spares for equipment and instrument *		✓

IoTreat[®] AMC scope

AMC Activities	PEC	Client
Consumables such as sodium hypochlorite, oil and grease, V-belt etc *		<input checked="" type="checkbox"/>
Tank cleaning		<input checked="" type="checkbox"/>
Tools required for maintenance		<input checked="" type="checkbox"/>
Housekeeping of the plant		<input checked="" type="checkbox"/>
Dewatered sludge disposal		<input checked="" type="checkbox"/>

* Can be supplied by PEC at actuals



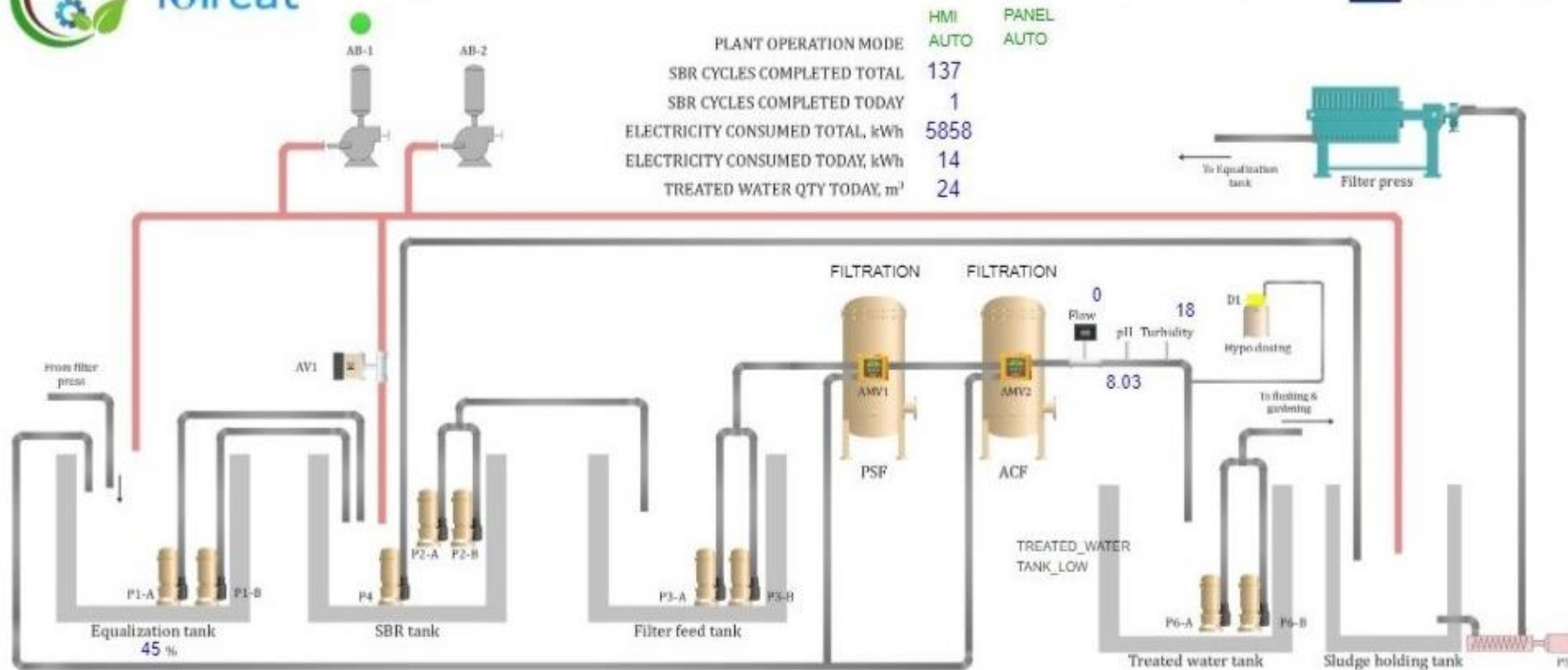
IoTreat[®] dashboard sample

Location :

Save Studio Mode



PLANT OPERATION MODE	HMI	PANEL
SBR CYCLES COMPLETED TOTAL	AUTO	AUTO
SBR CYCLES COMPLETED TODAY	137	
ELECTRICITY CONSUMED TOTAL, kWh	1	
ELECTRICITY CONSUMED TODAY, kWh	5858	
TREATED WATER QTY TODAY, m ³	14	
	24	



● INDICATES EQUIPMENT IS ON

FEED_YET_TO_START_AS_BGT_LEVEL<80%



Save Studio Mode



OPERATIONS SUMMARY

TIME REMAINING FOR AERATION COMPLETE IN MINUTES	270
TIME REMAINING FOR SETTLING COMPLETE IN MINUTES	90
TIME REMAINING FOR AMV-1&2 BACKWASH IN MINUTES	321

	TOTAL	TODAY
NUMBER OF SBR CYCLES COMPLETED	137	1
NUMBER OF PARTIAL SBR CYCLES COMPLETED	5	0
NUMBER OF BACKWASH COMPLETED	31	1

PROCESS	HRS	MIN	SEC
FEED START TIME	18	15	47
FEED STOP TIME	19	8	10
AERATION START TIME	18	25	47
AERATION STOP (SETTLING START) TIME	23	39	11
SETTLING STOP (DECANT START) TIME	1	9	31
DECANT STOP TIME	3	20	13
BACKWASH COMPLETED ON TIME & DATE	2 / 13	43 / 7	22 / 23

EQUIPMENT	TOTAL			TODAY		
	HRS	MIN	SEC	HRS	MIN	SEC
AIR BLOWER-1	481	45	15	ON	59	58
AIR BLOWER-2	475	12	49	0	0	0
SBR FEED PUMP-1	50	4	14	0	0	0
SBR FEED PUMP-2	61	47	37	0	0	0
DECANT PUMP-1	155	31	35	0	14	36
DECANT PUMP-2	182	25	41	1	56	5
FILTER FEED PUMP-1	122	35	45	2	35	30
FILTER FEED PUMP-2	140	5	52	0	54	15
SLUDGE TRANSFER PUMP-1	0	11	2	0	0	0
SCREW PUMP	OFF	2	24	0	0	0
HYPO DOSING PUMP	235	13	32	2	39	49





PERFORMANCE DASHBOARD

TOTAL ENERGY SAVINGS ACHIEVED IN kW

1833.9

TOTAL CO₂ EMISSION REDUCED IN kg

1503.8

TOTAL QUANTITY OF TREATED WATER IN m³

2043

	TODAY	YESTERDAY	MONTH TILL DATE
Quantity of treated water in m ³	24	32	306
Electricity consumption in kW	14	64	659
MLSS	0	0	0
No. of SBR cycles completed	1	2	20
No. of backwash completed	1	0	4
Sodium hypochlorite consumed in kg	0	0	0
pH of treated water (Avg)	8	7.66	7.87
Turbidity of treated water (Avg)			
Quantity of treated water in m ³ /day (Avg)			25
Electricity consumption in kW (Avg)			53
Electricity consumption / m ³ of treated water			2.2



IoTreat[®] dashboard sample

Location :



Auto
Yes



VFD 50%
Yes




VFD 100%
No



AV1 OPEN
Close

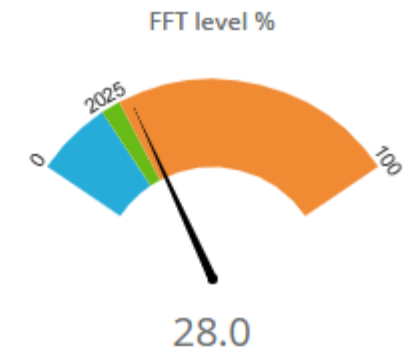
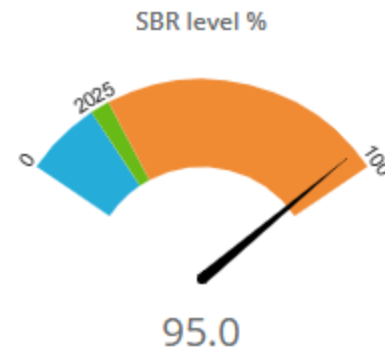
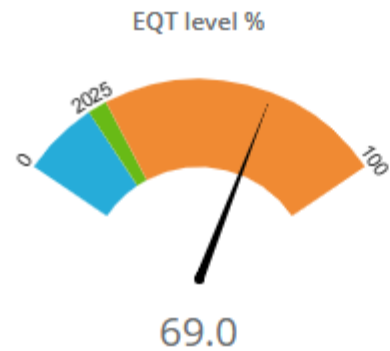


PSF
BACKWASH
No



ACF
BACKWASH
No

Select :



IoTreat[®] mail notification sample

Alert from www cloudtesla , Device : [REDACTED] - FFT level < 45% - Sat, 24 Dec 2022 09:27 , Status : Closed - Arjun R - Outlook - Google Chrome

about:blank

Delete Archive Report Reply Reply all Forward Read / Unread Categorize Flag / Unflag Assign policy Print

Alert from www cloudtesla , Device : [REDACTED] - FFT level < 45% - Sat, 24 Dec 2022 09:27 , Status : Closed

notifications@untangleds.com
To: notifications@untangleds.com

Sat 24-12-2022 12:19

Hi,

Alert Information

Gateway MAC ID : 70B3D52530AC
Gateway Differentiator : W-70B3D52530AC
Date : Sat, 24 Dec 2022 09:27
Device Name : PRV_VJS_HSP_01
Display Label : [REDACTED]
Status : **Closed**
Parameter : PRYVRN_STP_RP44
Severity : Major
Triggered Value : 50
Alert Text : *FFT level < 45%*
Closed Value : 49 PRYVRN_STP_RP44>45

Description	Latest value	Incident value
PRYVRN_STP_RP44	49	50

Created Date : Sat Dec 24 2022 09:33



Thank You !!