

WORLD WATER SUMMIT 2019

WASTE WATER MANAGEMENT, RECYCLE & REUSE

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PRESENT WATER SCENARIO

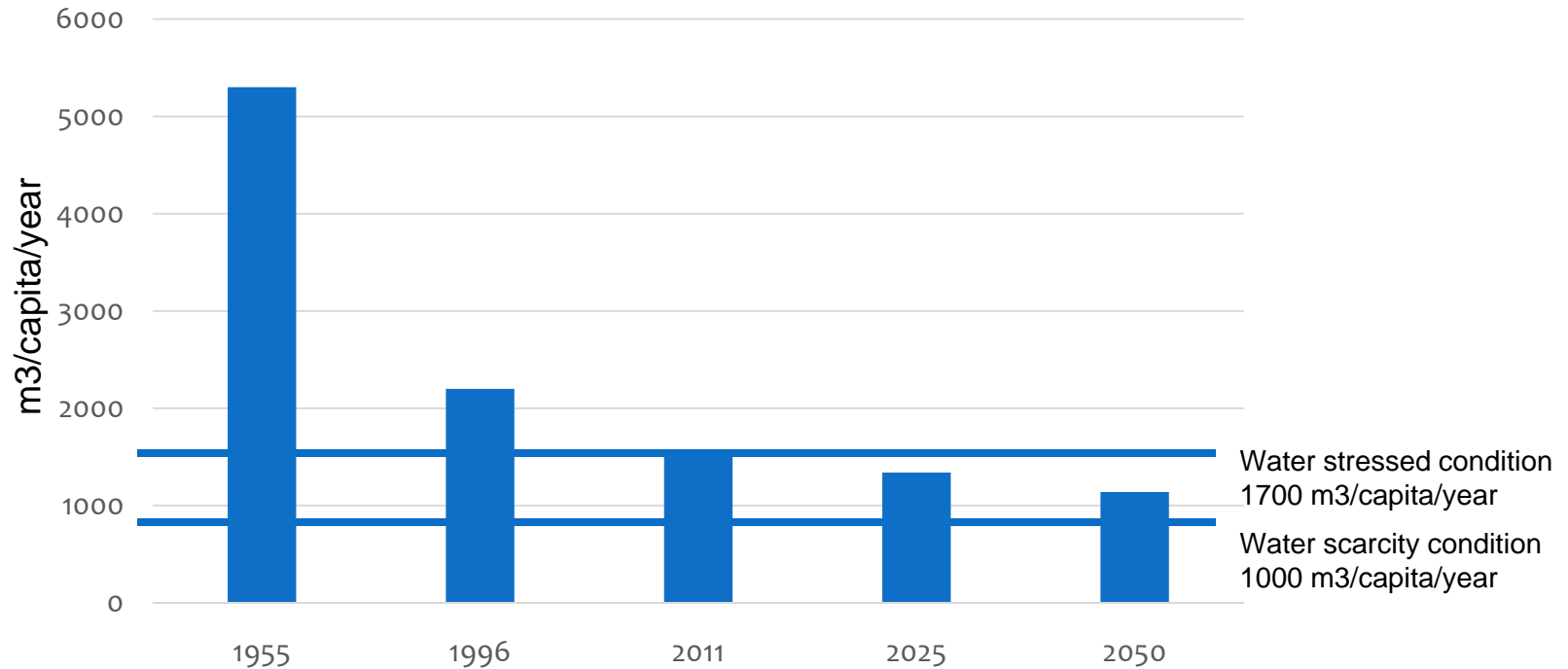
- India has only 4% of world water with nearly 18% of its population*
- Per capita availability of water is reduced from 5300 m³/year in 1955 to 2200 m³/year in 1996*
- As per 2011 census, per capita availability of water is 1545 m³/year** which is below minimum limit of 1700 m³/year*

*United Nations web site

** Press Information Bureau, Govt. of India

PRESENT SCENARIO OF WATER

- India has only 4% of world water with 18% of its population*

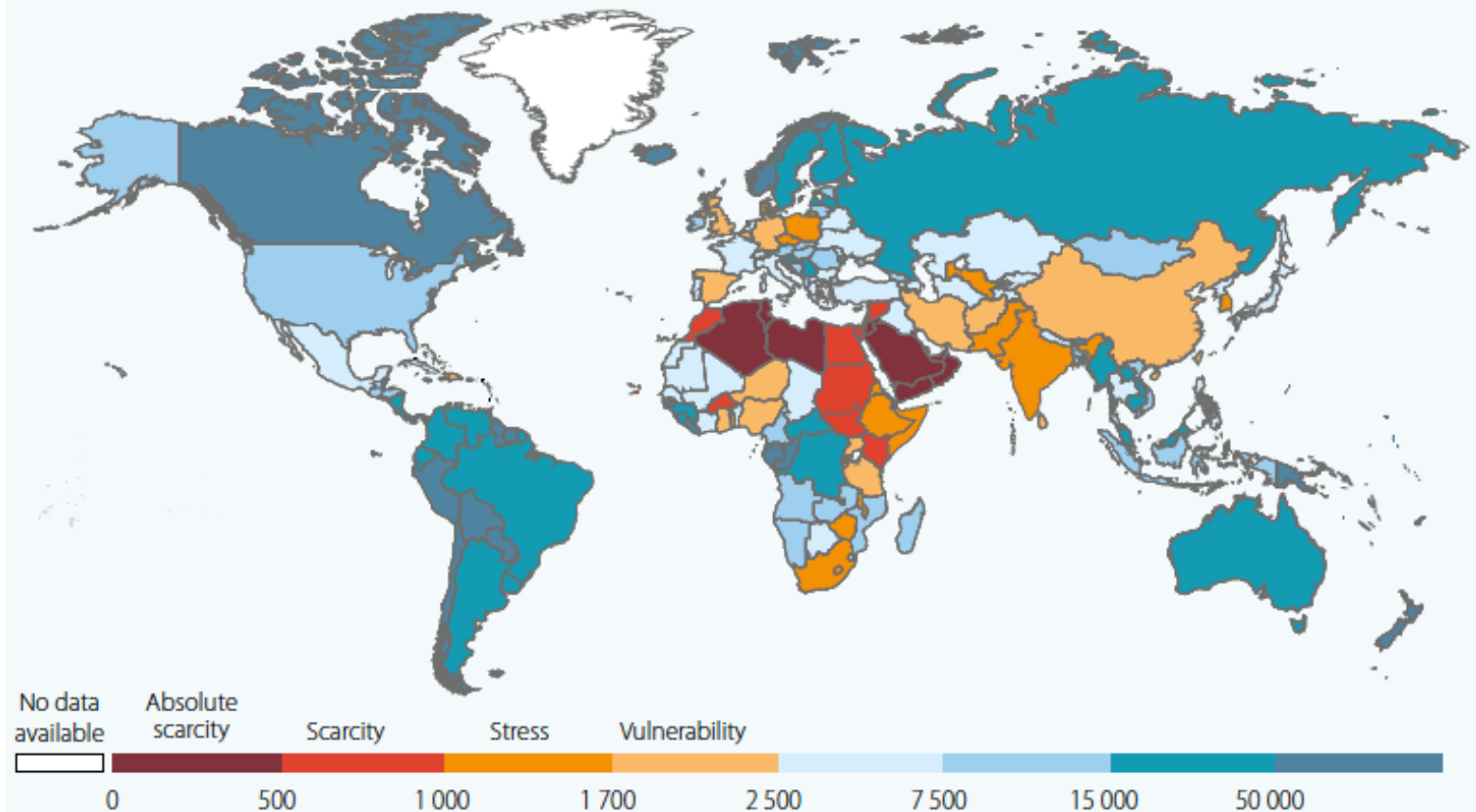


*The economic impact of inadequate sanitation in India, Water & Sanitation Program, World Bank, 2011

** Water in India: Situation & prospects, UNICEF report, 2013

PRESENT WATER SCENARIO

Total renewable water resources per capita (2013)

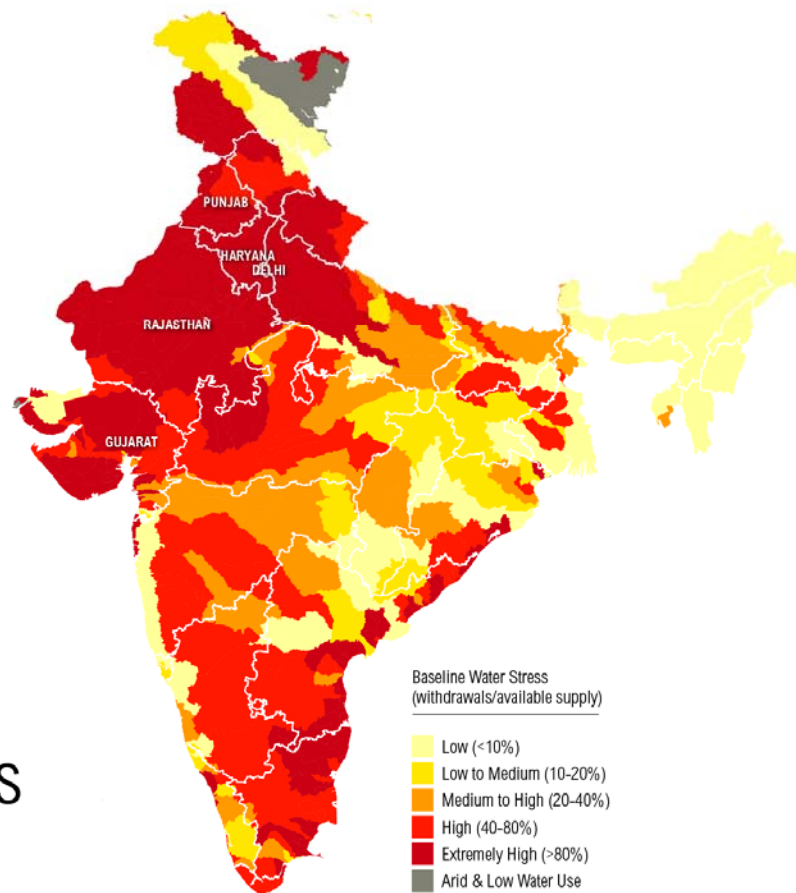


Note: The figures indicate total renewable water resources per capita in m³.

Source: WWAP, with data from the FAO AQUASTAT database. (<http://www.fao.org/nr/water/aquastat/main/index.stm>) (aggregate data for all countries except Andorra and Serbia, external data), and using UN-Water category thresholds.

PRESENT WATER SCENARIO

54%
of India
Faces
**High to
Extremely
High**
Water Stress





What is the solution for water scarcity?

ALTERNATIVE SOURCES OF WATER

- Sea water



Expensive & Energy intensive

- Industrial effluents



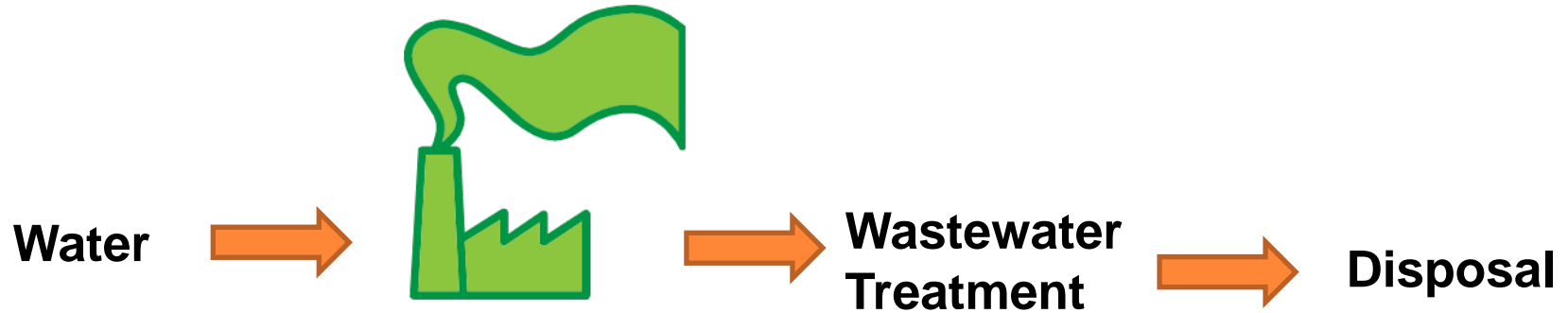
Complex & expensive

- Sewage

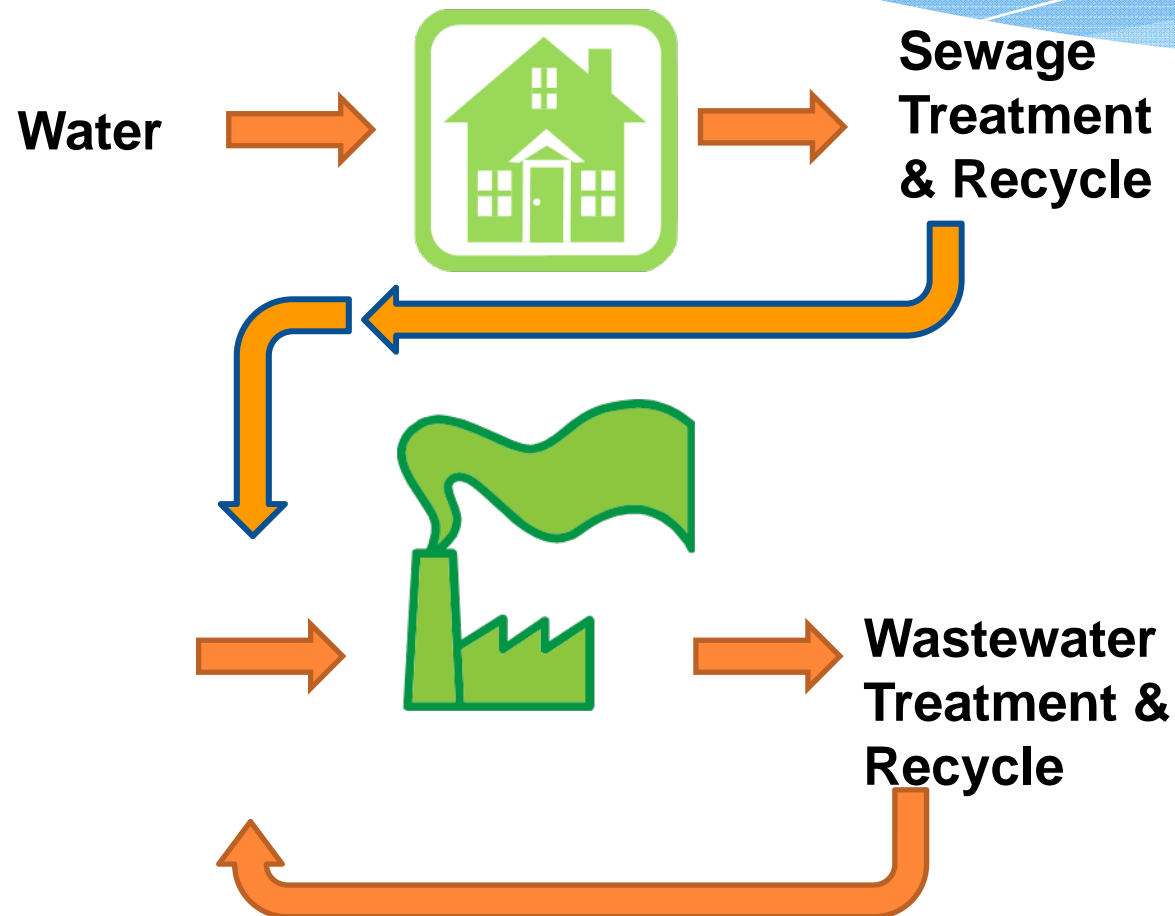


Simple, Reliable & Affordable

WASTEWATER TREATMENT TODAY



SEWAGE TREATMENT & RECYCLE



SEWAGE TREATMENT & RECYCLE

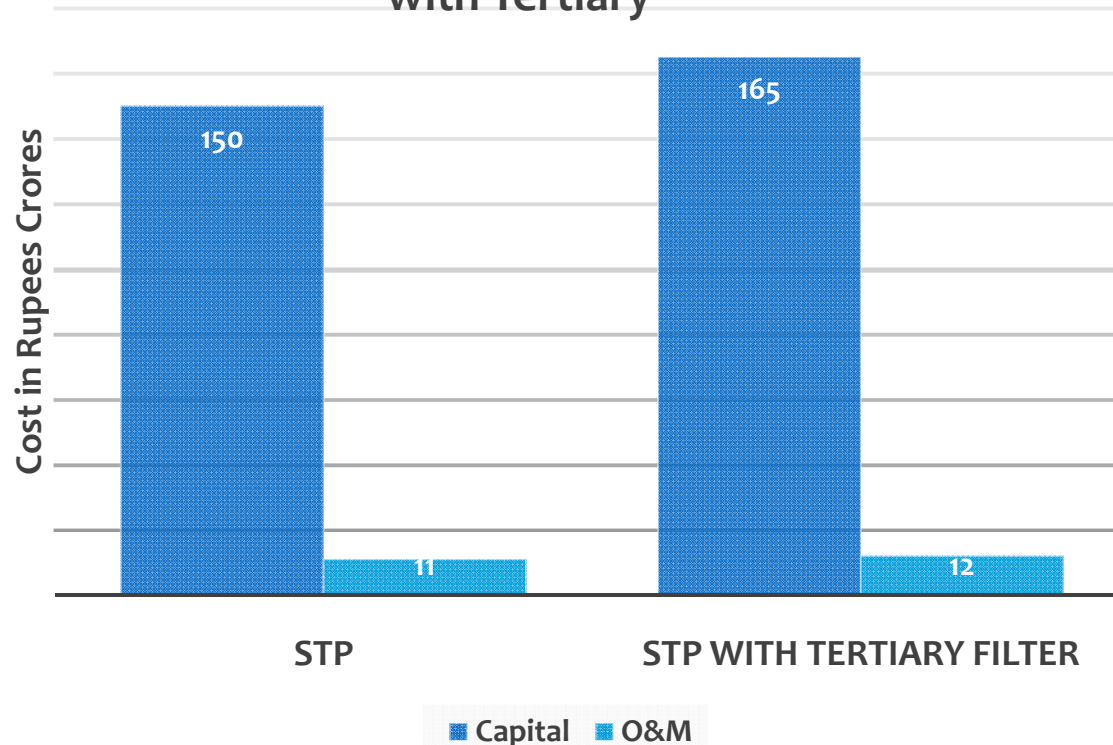
Sewage Generation in Class I & II cities in India : 33212 MLD*

Sewage Treatment Capacity in Class I & II cities in India : 7933 MLD*

If all the sewage generated from Urban India can be treated and recycled, it can serve a population of 24.6 Cr for their daily water needs.

SEWAGE TREATMENT & RECYCLE

Cost comparison of 100 MLD STP and STP with Tertiary



With little increase in capital & operating cost, STPs can be made "Water Recycle" plants

- Note:
1. STP is designed to achieve 10/10 standards with nutrient removal
 2. Tertiary filter is either gravity sand filter or disc filter

SEWAGE TREATMENT & RECYCLE

Recycling of sewage helps in keeping STPs in good conditions

- Treated water quality cannot be compromised as user may reject and fine the supplier
- Plant operator will not bypass untreated water as every litre of sewage fetches him money
- Operator will operate STPs more efficiently as every extra rupee spent is loss to him
- As sewage is treated completely, pollution is reduced and hence health risks

SEWAGE TREATMENT & RECYCLE

If Sewage Treatment Plants are made as recycle plants, treated sewage water is made available to them in case of drought conditions.

**It improves water security of big cities like
Mumbai/Delhi/Chennai/Hyderabad/Bengaluru**

WHY SEWAGE RECYCLE IS A BETTER CHOICE

Sewage is

- **> 99% water**
- **< 1% pollutants**

If sewage from all urban areas are treated, water of 33,212 MLD* can be recovered.

If all sewage from Mumbai can be recycled, it will be around 2800 MLD**

*Sewage generation from Class I & II cities as per CPCB web site

**At water supply of 3500 MLD and sewage generation of 805 of water supply

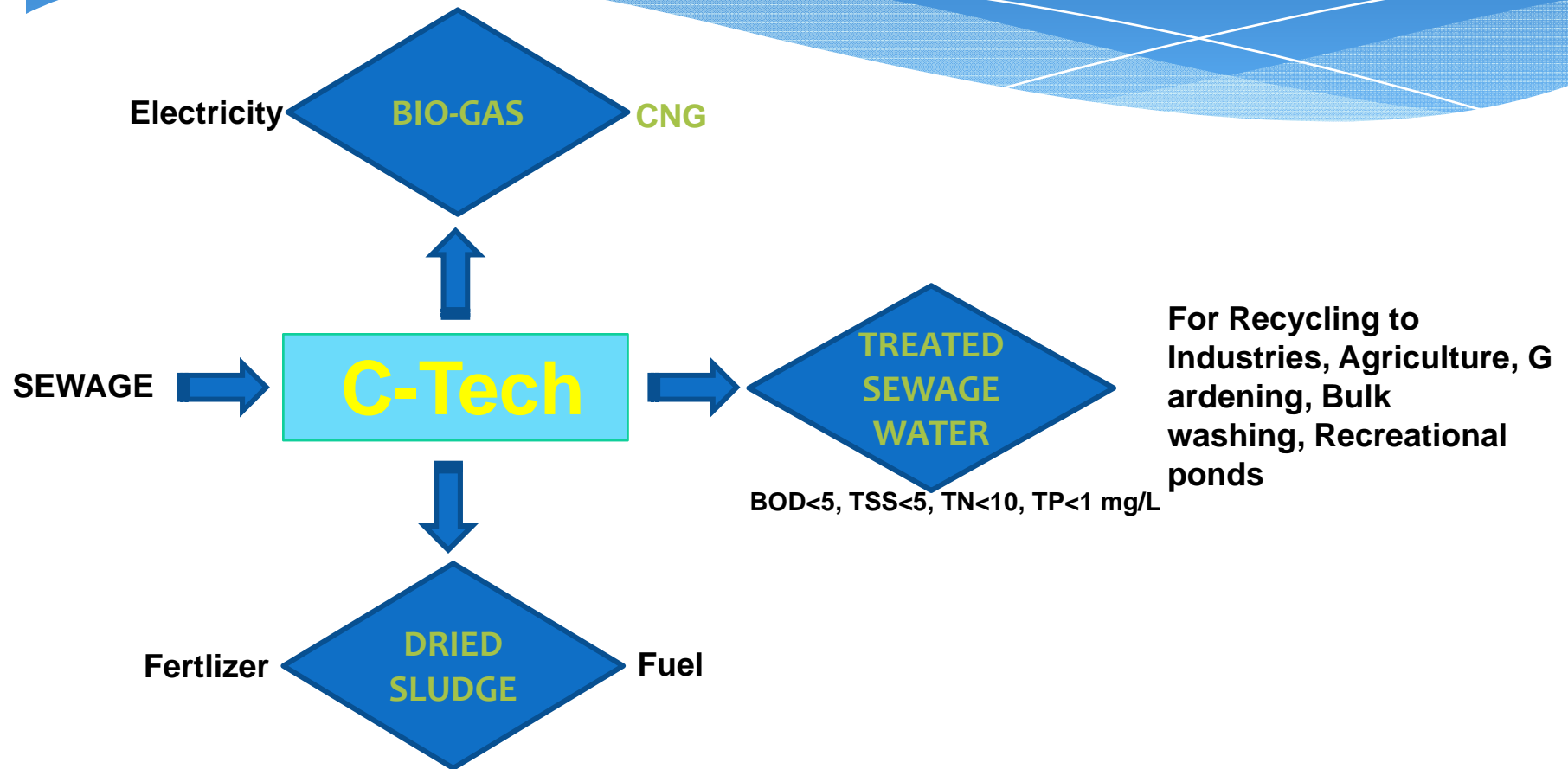
WHY SEWAGE RECYCLE IS A BETTER CHOICE

- It is a perennial source
- It is available right at the centre of city or near point of use
- It has low dissolved solids
- Its cost of treatment is low
- Proven technologies are available to treat sewage to recyclable quality
- **We need to change our mindset about a STP. We should start looking at it as a Dam/River which is a perennial source of water rather than limiting it to treating Pollution.**

ISSUES & CHALLENGES IN SEWAGE TREATMENT

- Performance of plant in terms of pollution reduction
- Capital Cost
- Operation & Maintenance cost in terms of
 - ✓ Power
 - ✓ Chemicals
 - ✓ Manpower
 - ✓ Maintenance
- Operational ease (Automation/Simplicity in scheme/Ease of monitoring/etc.)
- Area requirement

CHANGING DYNAMICS OF SEWAGE TREATMENT FROM COST CENTER TO PROFIT CENTER



COMMONLY USED TECHNOLOGIES FOR SEWAGE RECYCLE

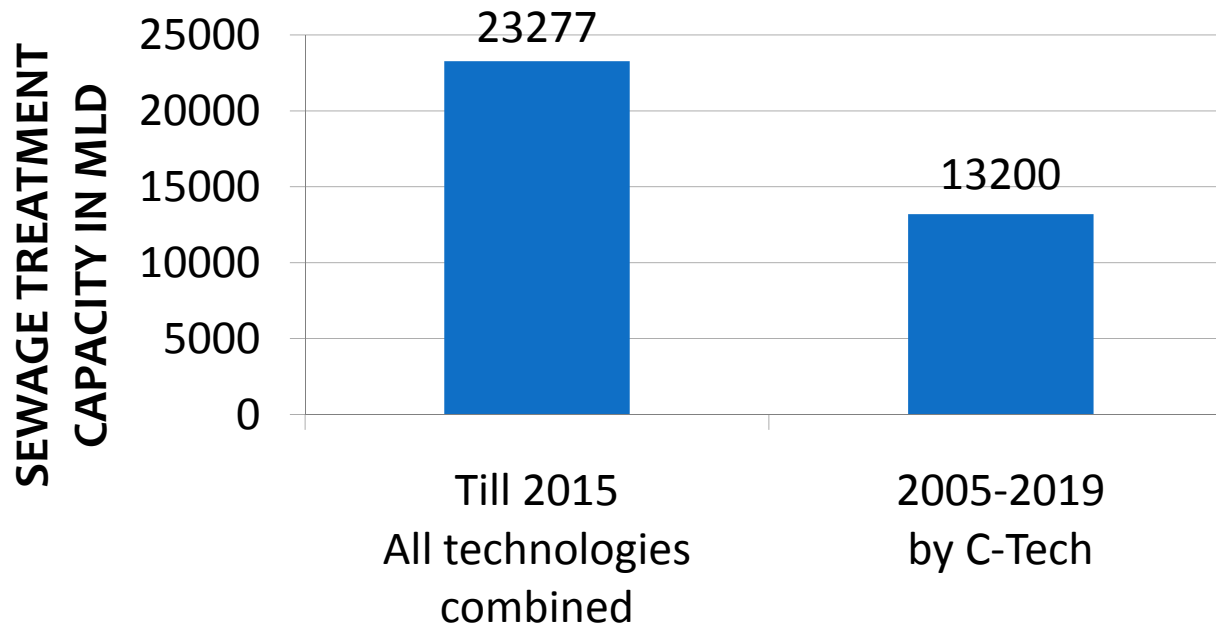
- C-Tech
- SBR
- MBR
- A2O
- Conventional ASP with Tertiary Treatment

WHY C-TECH FOR RECYCLE

- Proven Technology in 750 plants since 2006 in India alone.
- Lowest life cycle cost for getting recycle quality
- Less area requirement
- Low maintenance cost
- Easy to operate
- Fully automatic
- In-built Nitrogen & Phosphorous removal
- Modular and easy to expand capacity

C-TECH - A PROVEN TECHNOLOGY

Largest Sewage Treatment Capacity in India on C-Tech technology since independence.



C-TECH - A PROVEN TECHNOLOGY



- **More than 750 plants till July 2019**
- **Around 13,200 MLD treatment capacity**
- **Capacities from 0.5 MLD to 245 MLD**

C-TECH TECHNOLOGY IS THE KEY FOR SUCCESS

Treating raw sewage...



... into clear water for recycle

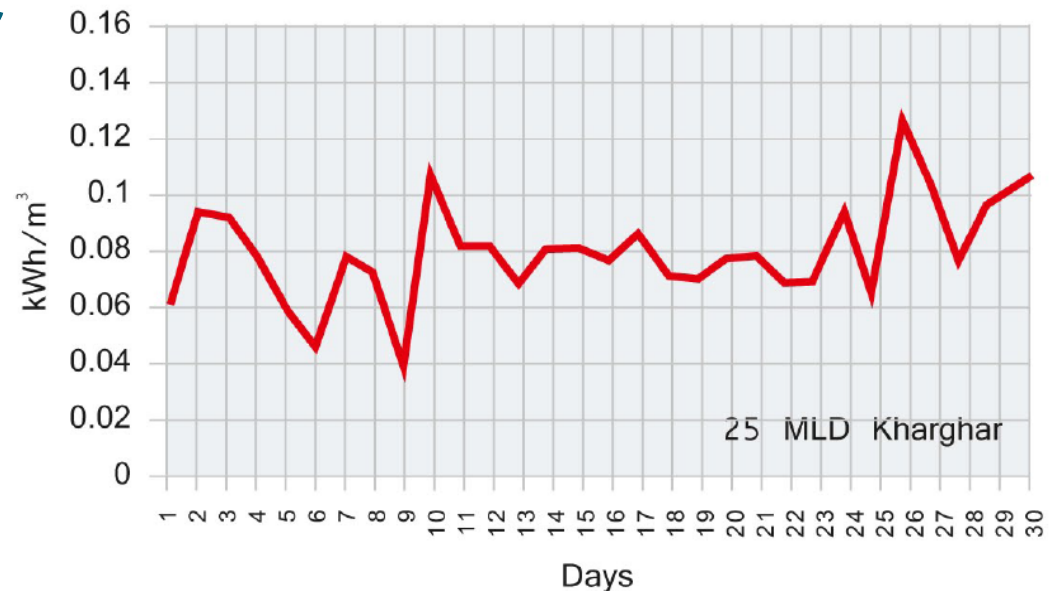


	Inlet	Outlet
BOD, mg/L	250	< 5
TSS, mg/L	300	< 5
TKN, mg/L	45	< 5
TN, mg/L	-	< 10
TP, mg/L	8	< 0.5

C-TECH TECHNOLOGY IS THE KEY FOR SUCCESS

Power savings

Requires only 50% of power compared to conventional technologies. Another 50% Power Saving is possible with Turbo Blowers from SFC



C-TECH TECHNOLOGY IS THE KEY FOR SUCCESS

Power generation

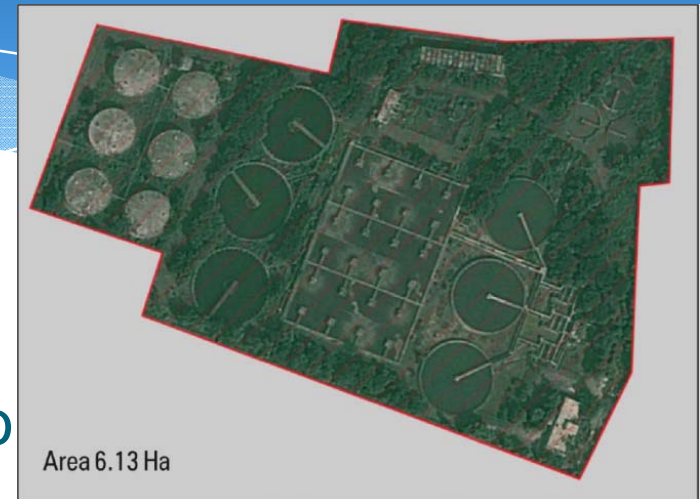
Generates biogas from Sewage which can be used for power generation or for fueling public transportation



C-TECH TECHNOLOGY IS THE KEY FOR SUCCESS

Reduced Land Requirement

Saved more than 50% land compared to other technologies. This eased land acquisition problems.



Area 6.13 Ha

100 MLD STP based on Activated Sludge Process at Nagpur



Area 2.20 Ha

100 MLD STP based on C-Tech at Nerul, Navi Mumbai

C-TECH TECHNOLOGY IS THE KEY FOR SUCCESS

Lowest operating cost

Introduced life cycle cost principle of Sewage Treatment in India. C-Tech offers lowest life cycle cost by saving on Land cost, maintenance cost, operating cost, etc. and generating valuable products in the form of Recyclable quality treated sewage, Biogas & Manure.

C-TECH TECHNOLOGY IS THE KEY FOR SUCCESS

Automation for efficient process control

Introduced complete automation and SCADA based monitoring for better and optimum process control of Sewage Treatment



PLC & SCADA System at 100 MLD Nerul, Navi Mumbai

C-TECH TECHNOLOGY IS THE KEY FOR SUCCESS

Plant Aesthetics

Made most modern STPs with appealing aesthetics to attract citizens and create awareness on Sewage Treatment and Recycle



C-TECH RECYCLE CASE STUDY



A Success Story At Mahagenco, Nagpur

INITIATIVE OF MAHAGENCO AT NAGPUR

Raw
sewage
from
Nagpur city



Sewage
Treatment
and
Recycle
Plant



Thermal Power
Plant

INLET & OUTLET LIMITS





Table 1: Raw Sewage Characteristics for Sewage Treatment & Reuse plant for Mahagenco

S. No.	PARAMETER	UNIT	VALUE
1	Design flow	MLD	130
2	pH		6.8 – 7.8
3	Total Suspended Solids	mg/l	300
4	Total BOD5 @ 20 °C	mg/l	250
5	Total COD	mg/l	500
6	Total Kjeldahl Nitrogen	mg/l	45
7	Total Phosphorous	mg/l	8
8	Total Alkalinity	mg/l	220
9	Total Dissolved Solids	mg/l	735
10	Volatile Suspended Solids	mg/l	240
11	Chlorides	mg/l	130
12	Total Coliform	MPN/100ml	>16,00,000
13	Faecal Coliform	MPN/100ml	>16,00,000

Table 2: Treated Sewage Characteristics for Sewage Treatment & Reuse plant for Mahagenco

S. No.	PARAMETER	UNIT	VALUE
1	pH		6.8 – 7.8
2	BOD5	mg/l	< 5
3	Total Suspended Solids	mg/l	< 5
4	Turbidity	NTU	< 2
5	Total Nitrogen (as N)	mg/l	< 10
6	Total phosphorus (with coagulant addition)	mg/l	< 0.5
7	Total Coliform	MPN/100ml	< 2
8	Dissolved Oxygen	mg/l	> 2
9	Residual Chlorine at STP outlet	mg/l	0.3 to 0.5

MAHAGENCO'S SELECTED RECYCLE SCHEME

Primary treatment		Screens/ Grit removal/ Primary clarifiers
Biological treatment		Cyclic Activated Sludge process (C-Tech)
Tertiary treatment		Gravity sand filters
Biogas generation		Anaerobic sludge digesters

TREATMENT SCHEME

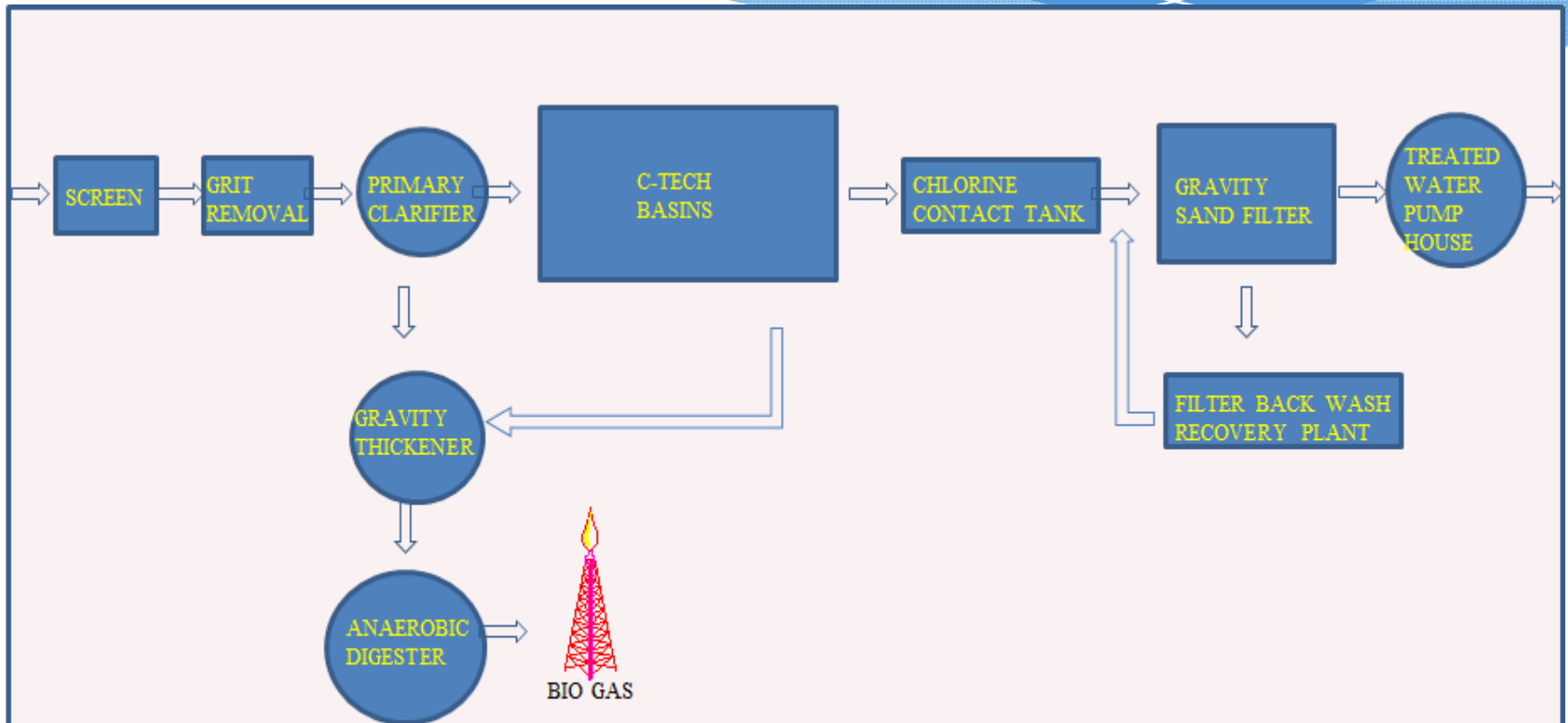


FIGURE 1: TREATMENT SCHEME FOR 130 MLD SEWAGE REUSE PLANT FOR MAHAGENCO

130 MLD C-TECH RECYCLE PLANT AT MAHAGENCO



130 MLD C-TECH RECYCLE PLANT AT MAHAGENCO



130 MLD C-TECH RECYCLE PLANT AT MAHAGENCO

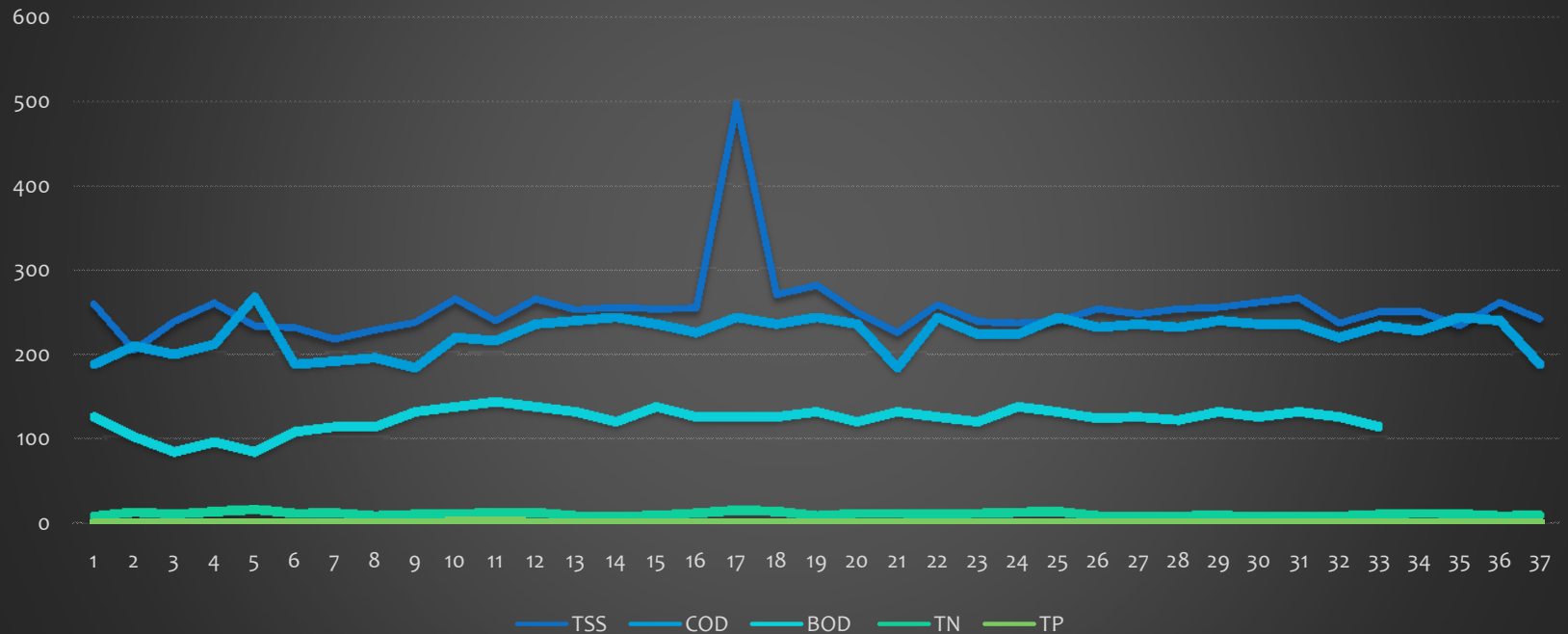


130 MLD C-TECH RECYCLE PLANT AT MAHAGENCO



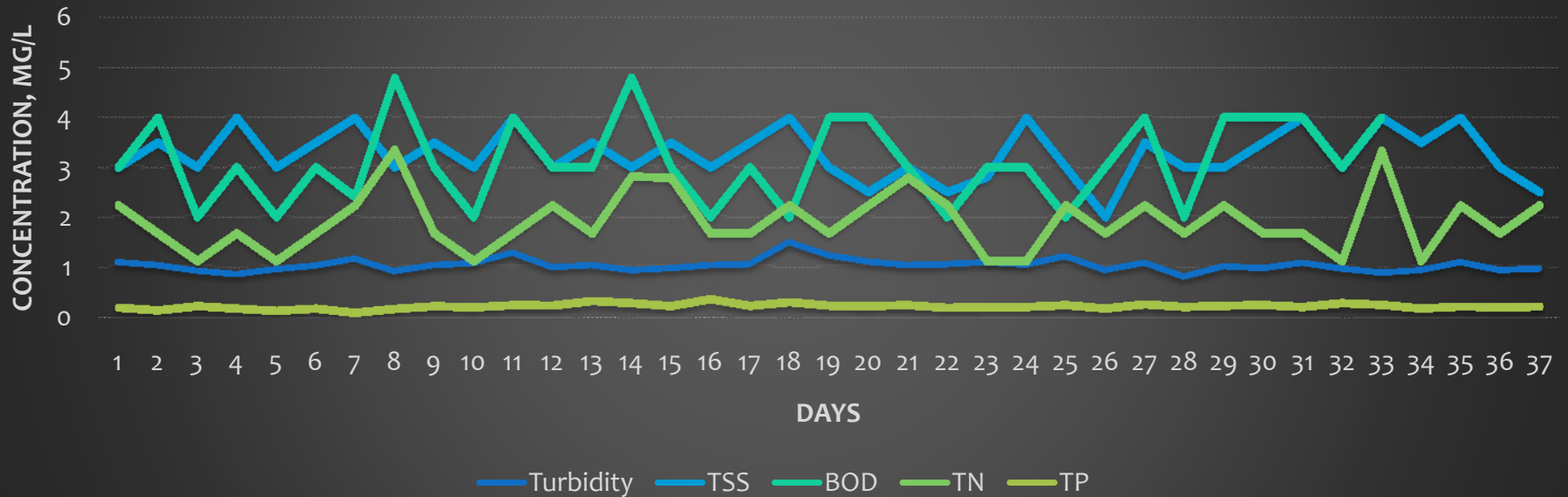
PERFORMANCE OF C-TECH RECYCLE PLANT AT MAHAGENCO

130 MLD C-Tech based STP in Nagpur
Inlet Parameters



PERFORMANCE OF C-TECH RECYCLE PLANT AT MAHAGENCO

130 MLD C-Tech based STP in Nagpur
Outlet Parameters



BENEFITS OF C-TECH RECYCLE PLANT AT MAHAGENCO

BENEFITS TO MAHAGENCO:

- Availability of 130 MLD of treated water for power plant in draught prone region of Vidarbha
- Independent and reliable water supply source for expansion of power generation plant
- Possibility of generation of 875 kW of power from biogas
- Potential to generate organic sludge of 21,000 kg/day for use as manure or fuel with calorific value around 3000 Kcal/kg when dried to 15% moisture content

BENEFITS OF C-TECH RECYCLE PLANT AT MAHAGENCO

BENEFITS TO NAGPUR MUNICIPAL CORPORATION (NMC):

- Revenue of Rs. 15 Cr per annum
- Relief from burden of setting up and operating 130 MLD STP which is a cost center to NMC
- Availability of 130 MLD of raw water for city supply which otherwise would have been supplied to Mahagenco.

BENEFITS OF C-TECH RECYCLE PLANT AT MAHAGENCO

BENEFITS TO CITIZENS OF NAGPUR CITY:

- Availability of more water for household use
- Reduced water pollution as the sewage is not discharged into river or lake.
- Better civic facilities with the additional income generated to NMC

BENEFITS OF C-TECH RECYCLE PLANT AT MAHAGENCO

**A Recycle Technology Is
Sustainable Only If It Benefits All
Stake Holders**



Some more C-Tech Initiatives for Recycle

SOME MORE C-TECH INITIATIVES FOR RECYCLE

200 MLD of Treated Sewage from C-Tech plant will be supplied to NTPC in, Maharashtra.

Another 150 MLD C-Tech Plant is planned to recycled Sewage Mahagenco in Nagpur.



SOME MORE C-TECH INITIATIVES FOR RECYCLE

NMMC is undertaking two projects of 20 MLD each with ultrafiltration plant after C-Tech for providing treated sewage for supply to Industries & Commercial establishments.



SOME MORE C-TECH INITIATIVES FOR RECYCLE



30 MLD water from
120 MLD C-Tech
plant Gurgaon,
Haryana is being
recycled for
Horticulture purposes

SOME MORE C-TECH INITIATIVES FOR RECYCLE

Kharghar, Navi Mumbai is using treated sewage from 25 MLD C-Tech plant for watering Central park



SOME MORE C-TECH INITIATIVES FOR RECYCLE

Jindal is using treated sewage from C-Tech plant Bhilwara town in Rajasthan to generate water for use in their mineral processing unit.



SOME MORE C-TECH INITIATIVES FOR RECYCLE

15 MLD of Treated
Sewage from 33
MLD C-Tech plant is
recycled for
Construction
Applications at
Noida, Uttar Pradesh



SOME MORE C-TECH INITIATIVES FOR RECYCLE

48 MLD of refinery effluents treated through C-Tech are being recycled for internal process applications





Thank You