

*WELCOME*

**MAHAGENCO- NAGPUR MUNICIPAL CORPORATION  
WASTE WATER REUSE PROJECT  
AT NAGPUR**

**WATER SUPPLY FOR (3X660 MW) KORADI TPS**

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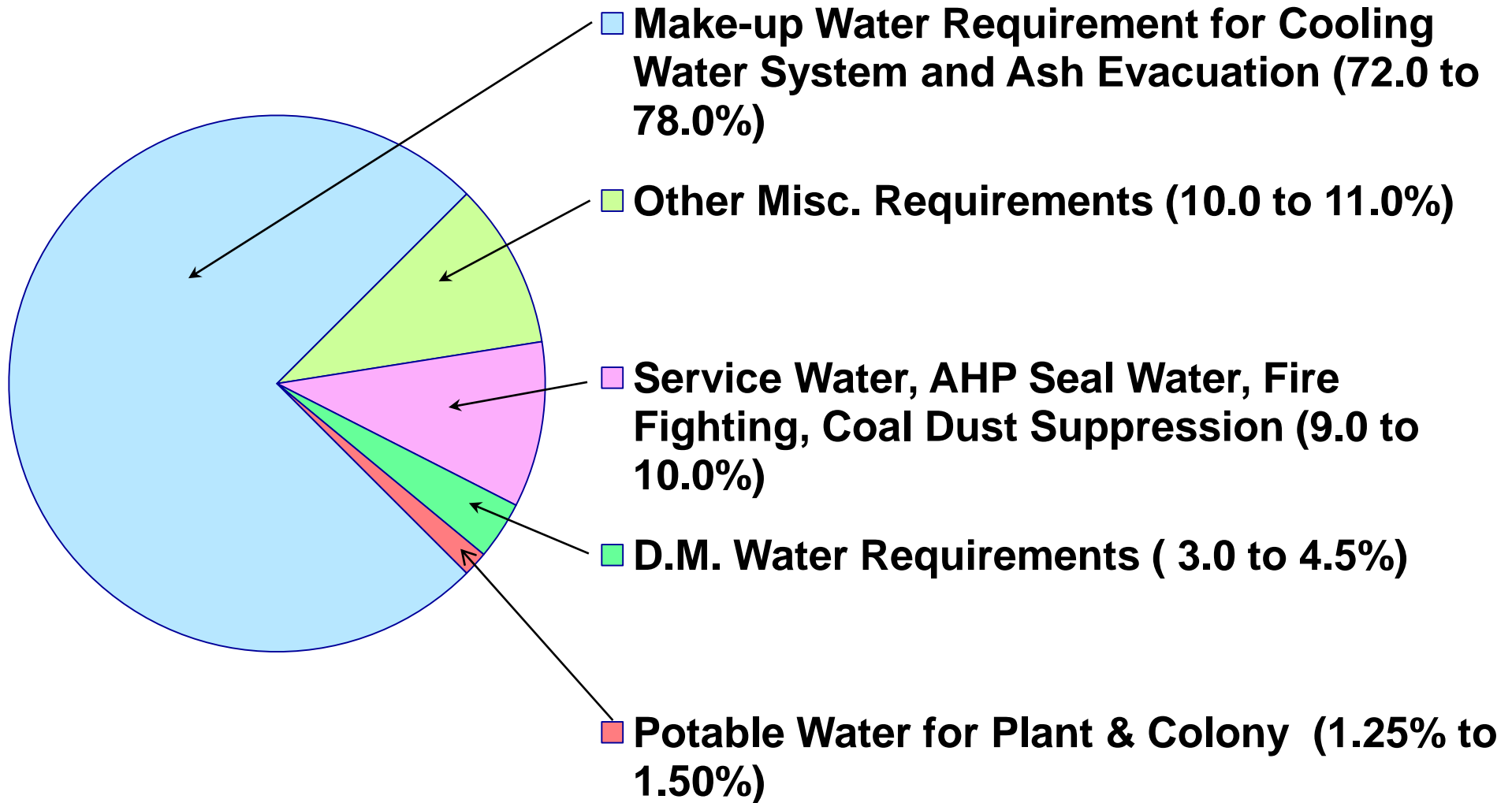


# **WATER USAGE IN THERMAL POWER PLANTS**

- **Electricity generation consumes over 50% of all water used in the industries.**
- **4.0 to 4.5 Ltrs/kwh**
- **WATER REQUIREMENT FOR A POWER PLANT:**

<b>POWER PLANT (MW)</b>	<b>WATER REQUIREMENT (MLD)</b>	<b>POPULATION EQUIVALENT (IN LAKHS)</b>
<b>250</b>	<b>24</b>	<b>2.4</b>
<b>500</b>	<b>42</b>	<b>4.2</b>
<b>660</b>	<b>55</b>	<b>5.5</b>

# WATER CONSUMPTION FOR A TYPICAL POWER PLANT



# TYPICAL WATER SUPPLY SOURCES FOR TPS

- **Fresh water from rivers, canals, etc.**
- **For power plants located in coastal areas water for cooling of condenser and auxiliaries is drawn from sea or a creek in an open cycle.**
- **For coastal plants, requirement of water for other auxiliaries is met from an alternative source or it is generated from sea water by installing a desalination plant.**

# **WATER REQUIREMENT FOR EXISTING MAHAGENCO POWER PLANTS IN VIDARBHA REGION**

<b>Power station</b>	<b>Installed Capacity (MW)</b>	<b>Water Requirement (MLD)</b>	<b>Water Source</b>
<b>Koradi</b>	<b>620</b>	<b>72</b>	<b>Kamptee-Khairy Pench project</b>
<b>Khaparkheda</b>	<b>1340</b>	<b>146</b>	<b>Kamptee-Khairy Pench project</b>
<b>Paras</b>	<b>562.5</b>	<b>56</b>	<b>Barriage on Mun River</b>
<b>Chandrapur</b>	<b>2340</b>	<b>246</b>	<b>Erai Dam</b>

# **WATER REQUIREMENT FOR FUTURE POWER PROJECTS IN VIDHARBHA REGION**

<b>Power Generating Company</b>	<b>Proposed Capacity (MW)</b>	<b>Water Requirement (MLD)</b>
<b>MAHAGENCO</b>	<b>3230</b>	<b>350</b>
<b>NTPC</b>	<b>2320</b>	<b>240</b>
<b>PRIVATE</b>	<b>9535</b>	<b>1030</b>
<b>TOTAL</b>	<b>13765</b>	<b>1620</b>

**Total Water Requirement for future power projects in Vidharbha Region is over 1620 MLD.**

# **“IMPACT OF POWER STATIONS IN VIDARBHA REGION ON WATER RESOURCES”**

**As per a case study conducted by IIT Delhi and Green Peace in 2011.**

- **Water availability in Wardha and Wainganga Sub-basins shows a declining trend.**
- **Water will not be available for any other purpose like irrigation or urban uses, if it is consumed by power stations.**
- **Availability of water for future thermal power plants or future irrigation will be difficult without creating additional storage capacity.**

## **EXPANSION PROJECT AT KORADI (3x660 MW)**

- **Considering the growing power demand, Mahagenco decided to expand the existing capacity of Koradi Thermal Power Plant in 2008.**
- **Expansion Capacity 1980 MW (3 X 660 MW)**
- **Requirement of water for the expansion project is 130 MLD**
- **No additional water reservation was available from the existing Kamptee Khairee Pench project**



# AVAILABLE OPTIONS ...

Sr. No.	ALTERNATE SOURCES AS SUGGESTED BY WRD	REASONS FOR NON FEASIBILITY
1	<b>Ambora Barrage.</b>	<ul style="list-style-type: none"> <li>- Required construction of new dams and barrages.</li> <li>- Water allocation not easily available.</li> <li>- Most Expensive and Uneconomical.</li> </ul>
2	<b>Kochi Barrage on Kanhan River</b>	
3	<b>Rahri Barrage on Kanhan River</b>	

- **Considering the water scarcity in the Vidharbha Region and huge water demand for upcoming power plants, MAHAGENCO decided to go for a alternate unconventional source.**

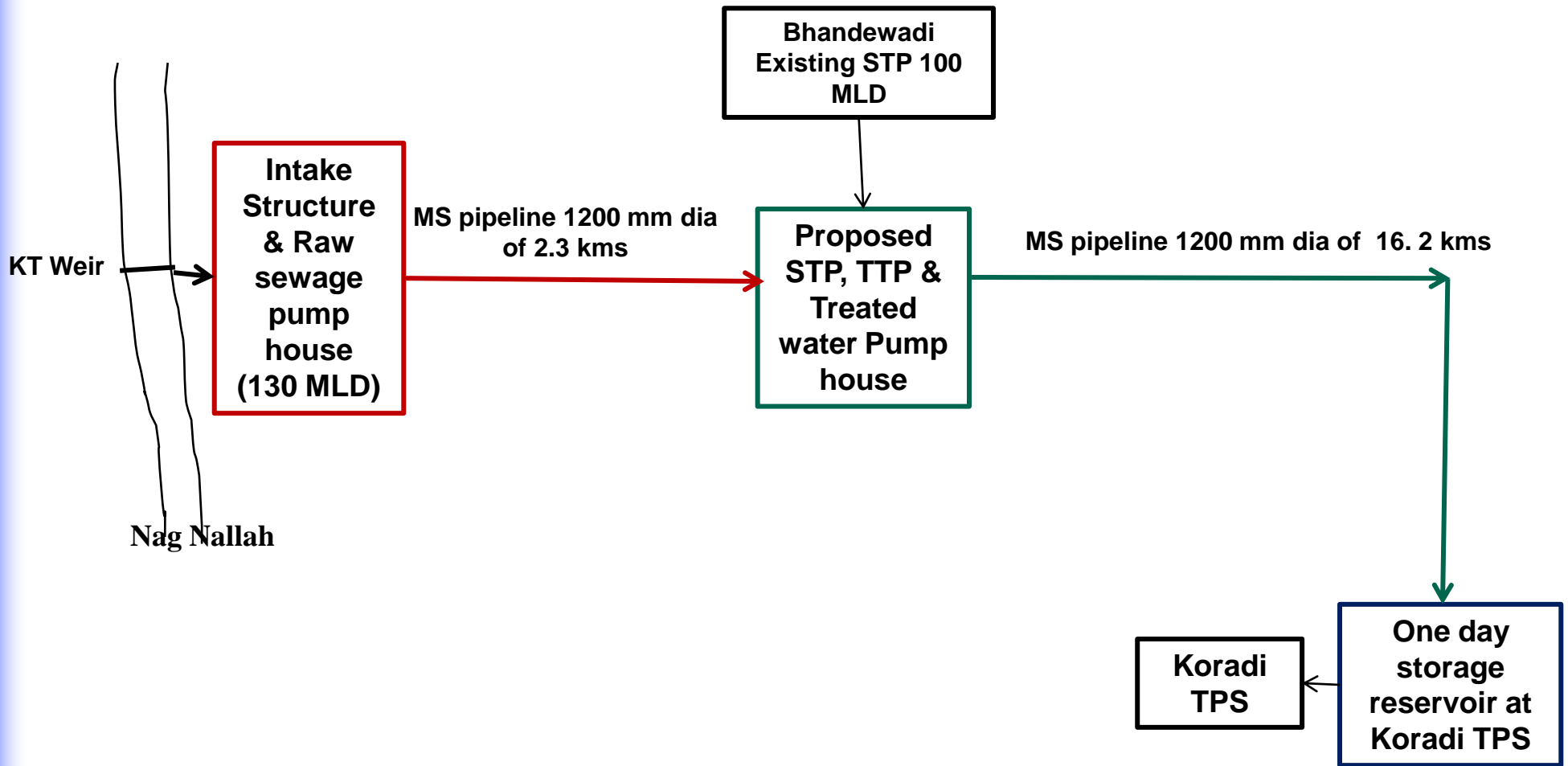
## **AN ALTERNATIVE APPROACH...**

- **USAID conducted a feasibility study for re-use of treated sewage from Nagpur city for its use in a Thermal Power Station.**
- **MAHAGENCO found the proposal feasible and economical.**
- **Nagpur Municipal Corporation (NMC) had already submitted a proposal of 110 MLD STP under JnNURM.**
- **MoU signed between NMC and MAHAGENCO for “Construction and Operating Agreement of Treatment and Transmission Facilities for Reclaimed Water Usage”.**

## PROJECT DETAILS...

- **STP along with secondary and tertiary treatment to be constructed, operated and maintained by MAHAGENCO as per their requirements.**
- **Grant of Rs. 90 Cr received from JnNURM by NMC shall be passed on to MAHAGENCO towards construction.**
- **Land required for the project shall be provided by NMC.**
- **NMC shall supply 110 MLD (  $\pm 10\%$  ) sewage to MAHAGENCO @ Rs 15 Crs./ year.**

# PROJECT LAYOUT



# TREATMENT PROCESS ADOPTED

- 1) **Module A** : Intake Works, KT Weir, Raw Sewage Pumping Station at Nag Nallah & M.S. Transmission Pipe Line (1200mm dia, 2.3 Km.)  
From Nag Nallah to proposed STP at Bhandewadi
- 2) **Module B** : Sewage Treatment Plant at Bhandewadi:
  - i) Primary treatment : Parshall Flume & Primary Clarifiers
  - ii) Secondary treatment (Biological Treatment) : Sequential Batch Reactor
- 3) **Module C** : Tertiary Treatment Plant at Bhandewadi :  
Deep Bed Multi-Media Filters, Chlorination, Sludge Handling System
- 4) **Module E** : Treated water Pumping Station at Bhandewadi.
- 5) **Module D** : M.S. Transmission Pipe line (1200mm dia, 16.2 Km.) from Bhandewadi to one day storage reservoir at Koradi Thermal power station.

# **COST OF DELIVERED WATER**

- 1) Capital Cost of the Project (130MLD) : Rs. 180 Cr**
  - i) JnNURM Grant : Rs. 90 Cr**
  - ii) MAHAGENCO Share : Rs. 90 Cr**
  
- 2) Operation and Maintenance Cost : Rs. 1.50 Cr/Year**
  
- 3) Payment to NMC for raw sewage purchase : Rs. 15 Cr/Year**
  
- 4) Cost of water to MAHAGENCO : Rs. 3.40 per Cum.**
  
- 5) Cost of fresh water from irrigation department : Rs. 1.20 to 9.60 per Cum.**

# RAW AND TREATED SEWAGE CHARACTERISTICS

**Sewage treatment plant followed by tertiary treatment is designed to meet the standards for treated effluent as given below:**

<b>Parameter</b>	<b>Raw Sewage Quality</b>	<b>Outlet Quality after Secondary treatment</b>	<b>Characteristics after tertiary treatment</b>
pH	6.8 – 7.8	6.8 – 7.8	6.8 – 7.8
BOD <sub>5</sub> @ 20 <sup>0</sup> C	250 mg/L	Less than 15 mg/L	Less than 5 mg/L
Total Suspended Solids	300 mg/L	Less than 20 mg/L	Less than 5 mg/L
Total Coli form (MPN/100ml)	>16,00,000	---	Less than 2 MPN / 100 mL

# CHALLENGES OF USING SEWAGE WATER

- 1) **Need Psychological acceptance to use sewage water as an alternative source.**
- 2) **In case of deficiency in quality/quantity of treated sewage water in unavoidable circumstances, the following additional precautionary measures have to be taken:**
  - i) **Side Stream filtration for C.W. System to reduce TSS.**
  - ii) **Additional chlorination in power plant area for disinfection.**
  - iii) **Back-up source of fresh water (30%).**



# PROJECT BENEFITS

- **Saving of fresh water to the extent of 47 MM<sup>3</sup> per annum.**
- **New STP of 130 MLD will improve ecology and environment of surrounding water bodies**
- **Reliable and economical source of water supply for power plant**
- **In future, power generation from STP sludge is also envisaged to make the power requirement of STP self sustainable.**

***THANK YOU***