

Moving Towards Climate Resilient WASH services through Energy Audit and Solar Infrastructure

A. Mansuri*, A. Bharmal**, O. Kane***, B. Tawlare****

*Ahmedabad, India, aasim.mansuri@cept.ac.in,

**Pune, India, awa.bharmal@cept.ac.in,

***Pune, India, omkar.kane@cept.ac.in

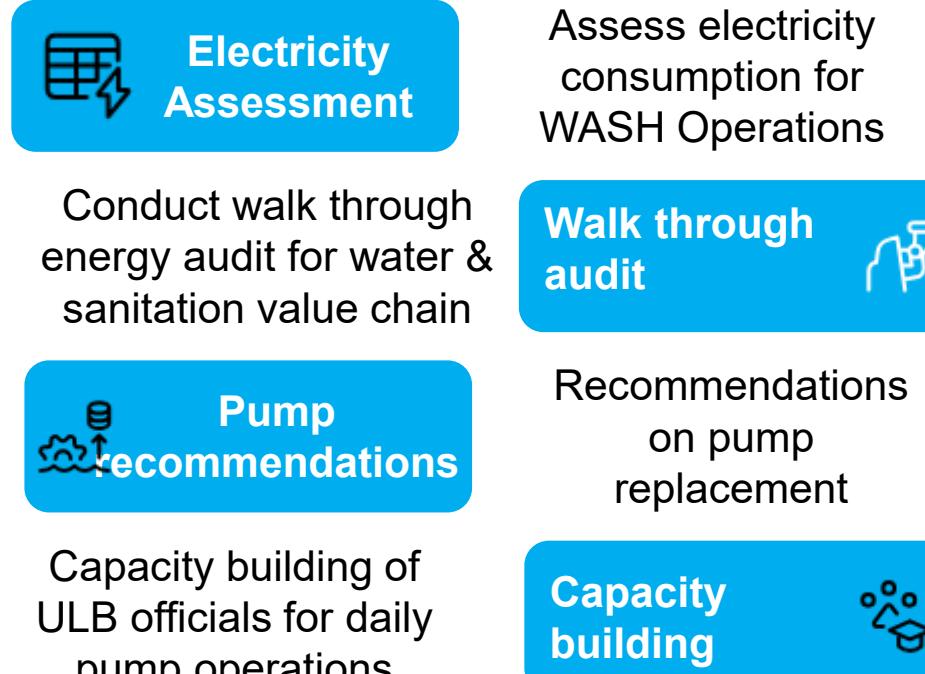
**** Ichalkaranji, India, bhushan.tawlare@cept.ac.in

BACKGROUND

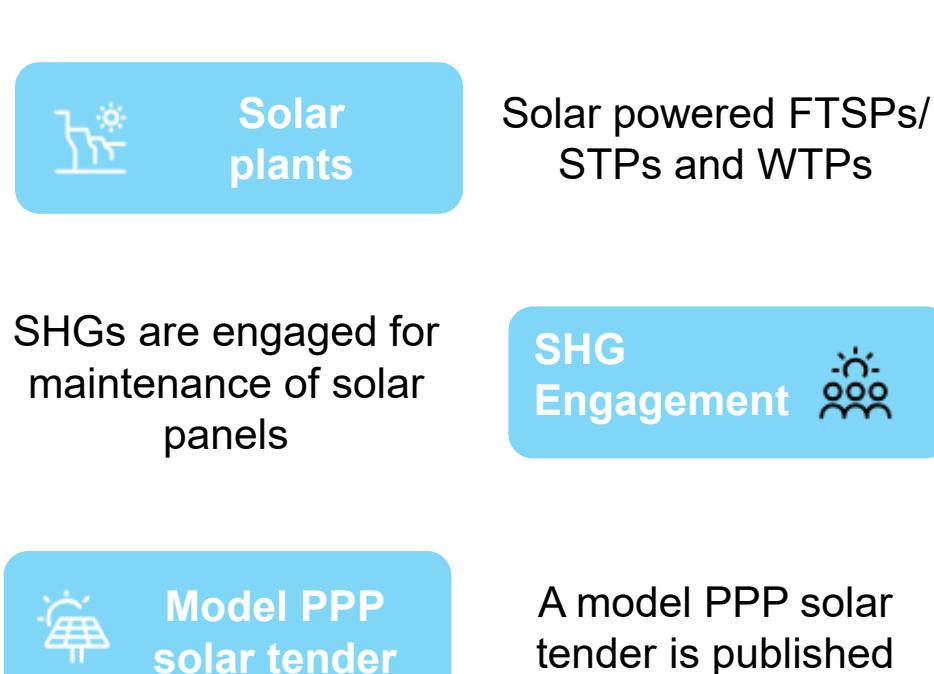


Small and Medium towns of Maharashtra ranging from **40,000 to 4 lakh** population acting as "**Urban laboratories**" for building climate responsive WASH services. The 6 project cities are located in **different climate conditions** facing drought as well as flood situations. National and State mission programs on WASH and climate change have given impetus to the project.

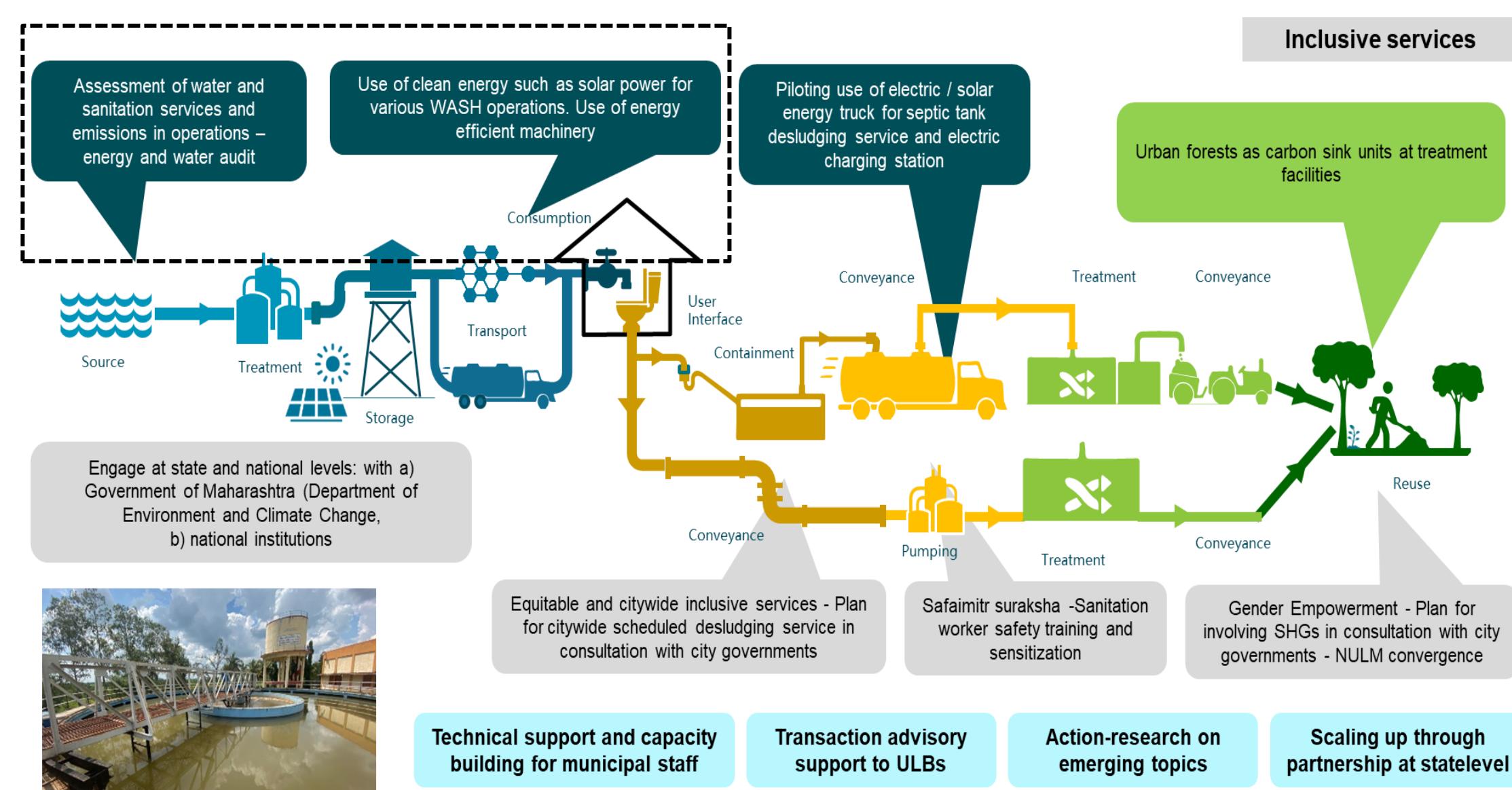
Energy Audit for WASH Operations



Solar powered WASH infrastructure

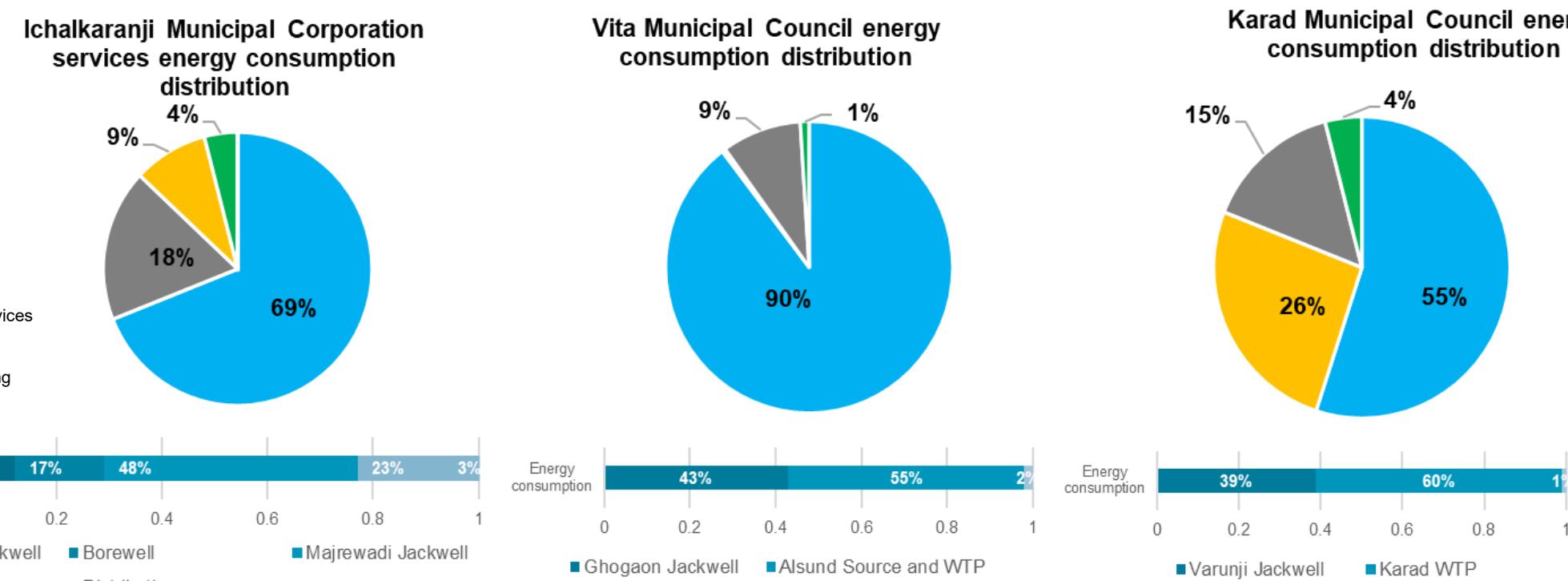


Energy Transition efforts broadly focused on Energy audit and use of Solar power for WASH operations



ENERGY AUDIT FOR WASH OPERATIONS

Assessment of Energy Consumption for Municipal Service Delivery



Learnings: Enhancing pump efficiency - cost and savings analysis

Vita	Karad	Ichalkaranji
6 pumps replacement and install APFC Panel at the water supply source	13 pumps replacement across water & sanitation chain	6 pumps replacement across water & sanitation chain & APFC Panel installation
Cost of Pump Replacement and APFC panel 70,000 USD	Cost of Pump Replacement 500,000 USD	Cost of Pump Replacement 315,000 USD
Estimated energy saving per year 54,000 USD	Estimated energy saving per year 14,70,000 USD	Estimated energy saving per year 225,000 USD
At end of 10+ years		

Vita's higher head and distance raise energy demand, making APFC panels ideal. In Karad, lower head and distance make pump replacement more cost-effective.

Water supply and sanitation systems are major users compared to energy usage by other municipal facilities. The reasons for having high energy consumption are

Distance of water sources

Poor electrical units (pumps) efficiency

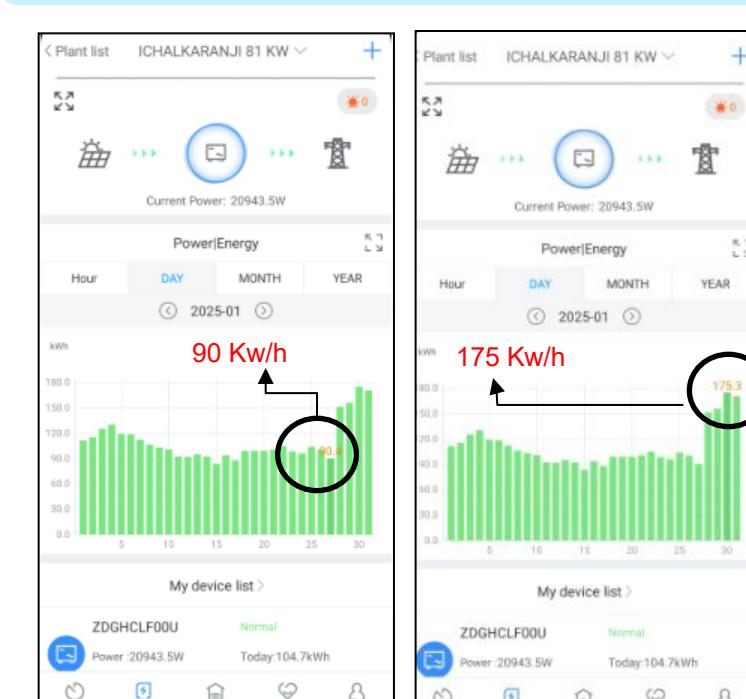
Higher NRW and water losses

ENERGY TRANSITION THROUGH SOLAR POWERED STPS / FSTPS AND WTPS



- Solar panels have been installed at the **WASH and SWM treatment sites**
- Panels are placed on the **existing available infrastructure**.
- In some pilots, solar power **fully meets plant energy needs**, with surplus fed to the grid.

Learnings: Proper maintenance and online monitoring crucial to ensure efficiency of solar panels



- Online net metering** systems track solar power generation in real time through a monitoring app, enabling continuous performance tracking and energy optimization.
- Regular cleaning and easy access** are essential to maintain solar panel efficiency, as **dust and debris** can reduce power output. Ensure a reliable water source for cleaning.
- SHG engagement** for solar panel maintenance

IMPACT & SCALING UP PRACTICE AND CONTRIBUTING THE NATIONAL GOAL

Leverage in 3 cities by ULB: 1.3 MW

Ichalkaranji: **550 kW** solar plant at WTP through PPP
Karad: **280 kW** solar at STP; proposed **80 kW** for Town Hall and **400 kW** at WTP.
Vita: **10 kW** at Pump house

Total Solar Capacity Installed in 6 cities

280 kW

As on October 2025

50,000 USD

Carbon Emissions reduction

+440 tons

Projections for 2050

5574 MWh

Would be Generated

5,00,000 USD

Savings

3990 tons

Carbon emission reduction



6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



13 CLIMATE ACTION

