

Possibly India's most Cost Effective Raw Water Lifting Project

108mld Water Transfer for Hydro Power Generation - functional since 2004

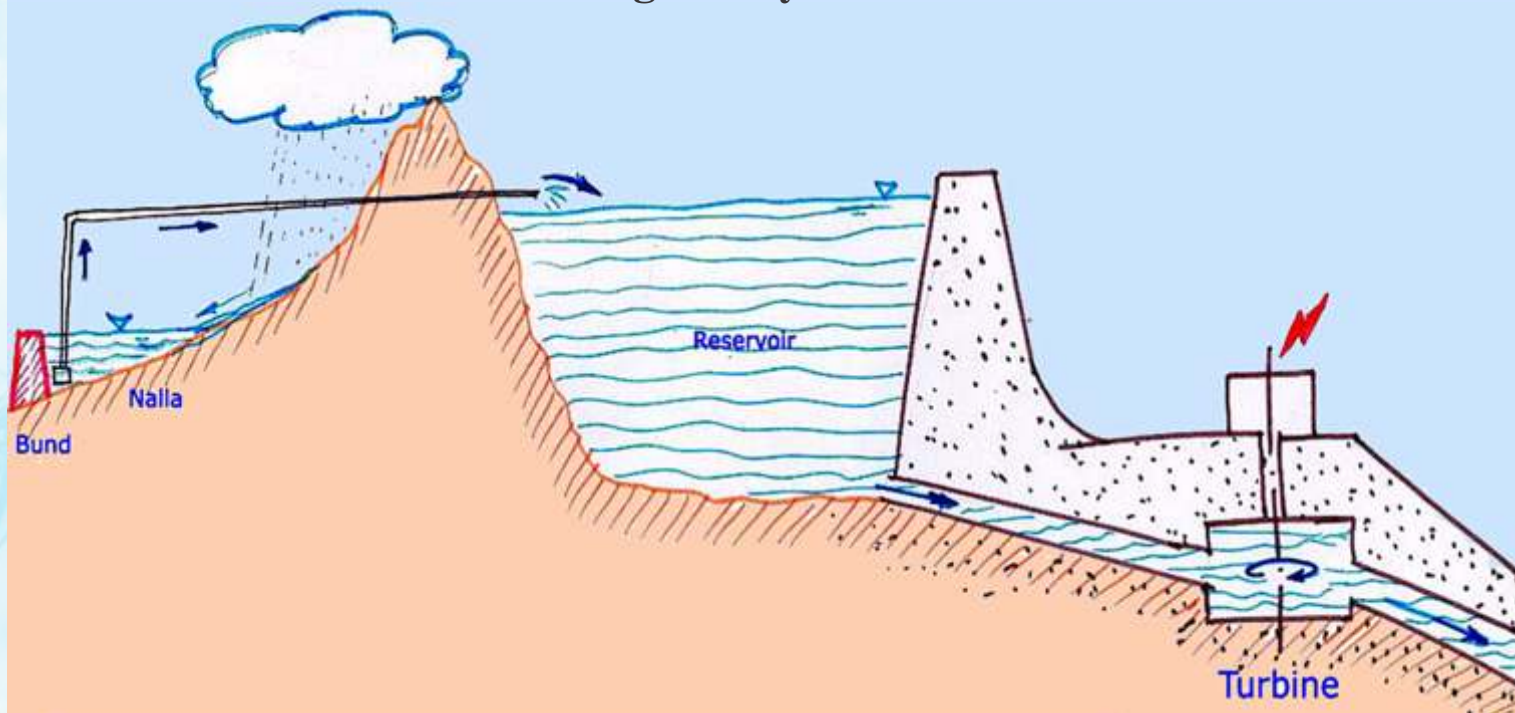


HEP's on non perennial rivers (*especially those with many surrounding yet non - linked water bodies*) can benefit from water harvesting - water from these reservoirs (*which do not feed the turbine*) is pumped to the main reservoir from where it shall feed the turbine thereby resulting in power generation.



During monsoon period from the month of Mid-June to September, there are many streams which drain water into the Arabian sea without serving mankind – TPL identified many such streams & came up with a revolutionary concept to pump lift these waters into the main lake from where it would spin the turbine like naturally precipitated rain water.

Rain Water Harvesting for Hydro Electric Power Station



Bhira Powerhouse commissioned in the year 1927, is the largest Hydro-Electric Generating Station of The Tata Power Co Ltd.

The water for Power generation of main plant is taken from the Mulshi lake in Pune district vide a masonry dam in surkhi lime mortar across the Mula river at the junction of Mula and Neela rivers. Bhira powerhouse consists of 6 machines of 25 mw and one machine of 150 MW.

One of the feasible schemes identified is **NIVE NALLAH** across the **Kundalika rivulet**. The estimated water quantity available was about 8 mcm which can be diverted to the Mulshi dam without effecting the downstream users. The scheme consisted of building a simple cost effective, 3m tall Concrete Bund across the stream to dam up the otherwise fast flowing water for installation of submerged pumps. About 1.5 kms length Mild Steel pipes were laid from this bund to the Mulshi lake.

Tata Power had set up India's first hydroelectric power generating station, in 1915, of 40 MW commissioned at Khopoli, which was subsequently upgraded to 72 MW.

PLANT SIZE
300 MW

LOCATION
BHIRA, MAHARASHTRA

TYPE
HYDRO GENERATION

Completed in **1927**, the hydro plant's maximum output capacity is nominally **300 MW**, generated by six **25 MW** Pelton turbines & a **150 MW** pumped storage generator.

Solution :

Aqua's submerged centrifugal pumps are ideal for raw water intakes as they require no special civil structures, are flood proof & are cavitation free (*being located below the minimum water level*).

They are silt resistant, clog resistant due to extra heavy duty Basket Strainers & require no routine operational maintenance.

They are quick & easy to install & hence can be shifted between multiple sites thereby increasing the returns on their capital cost.

The pumps are rated for 750 m³/hr @60mwc, 270hp & weighing 2MT each & lift 6000 m³/hr of monsoon water to the main reservoir which is ultimately used for hydro power generation.

Due to time bound conditions; Aqua designed, manufactured & commissioned the pumps in just 6 weeks. Tata Power chose Aqua's Submerged Centrifugal pumps over Vertical Turbines &/or Polder Submersibles.

- **Huge Civil Cost & Time Savings**
- **Ultra Low ManPower requirement**
- **Operational benefits :**
 - Requires No Special Pre – Post / Ancillary-Auxillary Operations (*like Valve Opening- Closing, starting - stopping - monitoring Forced Water Lubrication systems operation, etc.*)
 - Requires No Consumables (*like Oil, Grease, Gland Ropes, Bush, Pins, Couplings, Sleeves, etc*)
- **Maintenance benefits :**
 - Requires No Routine Maintenance (*like Oiling, Greasing, Gland Tightening, Gland Rope replacement, Shaft Alignment, Dry Run prevention, etc.*)
 - Zero Maintenance Bearings are Greased for Life (*no need of subsequent re-greasing*)
 - Maintenance Free shaft sealing by means of Two Independent Mechanical Shaft Seals in Buffer Oil Bath



"The Capital Cost & Complexity of such a scheme with conventional Vertical Turbine pumps (which require Large Intake Wells & Forebay); would adversely impact the Benefit/Cost ratio (BCR) of the scheme - but Aqua's Submerged Centrifugal pumpsets require simple, cost effective Civil works thereby improving the BCR dramatically without compromising on reliability or wasting energy (like Polder or Submersible pumpsets)."

- Ganesh Deshmukh; Head - Bhira



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AQUA - Performance Certificate

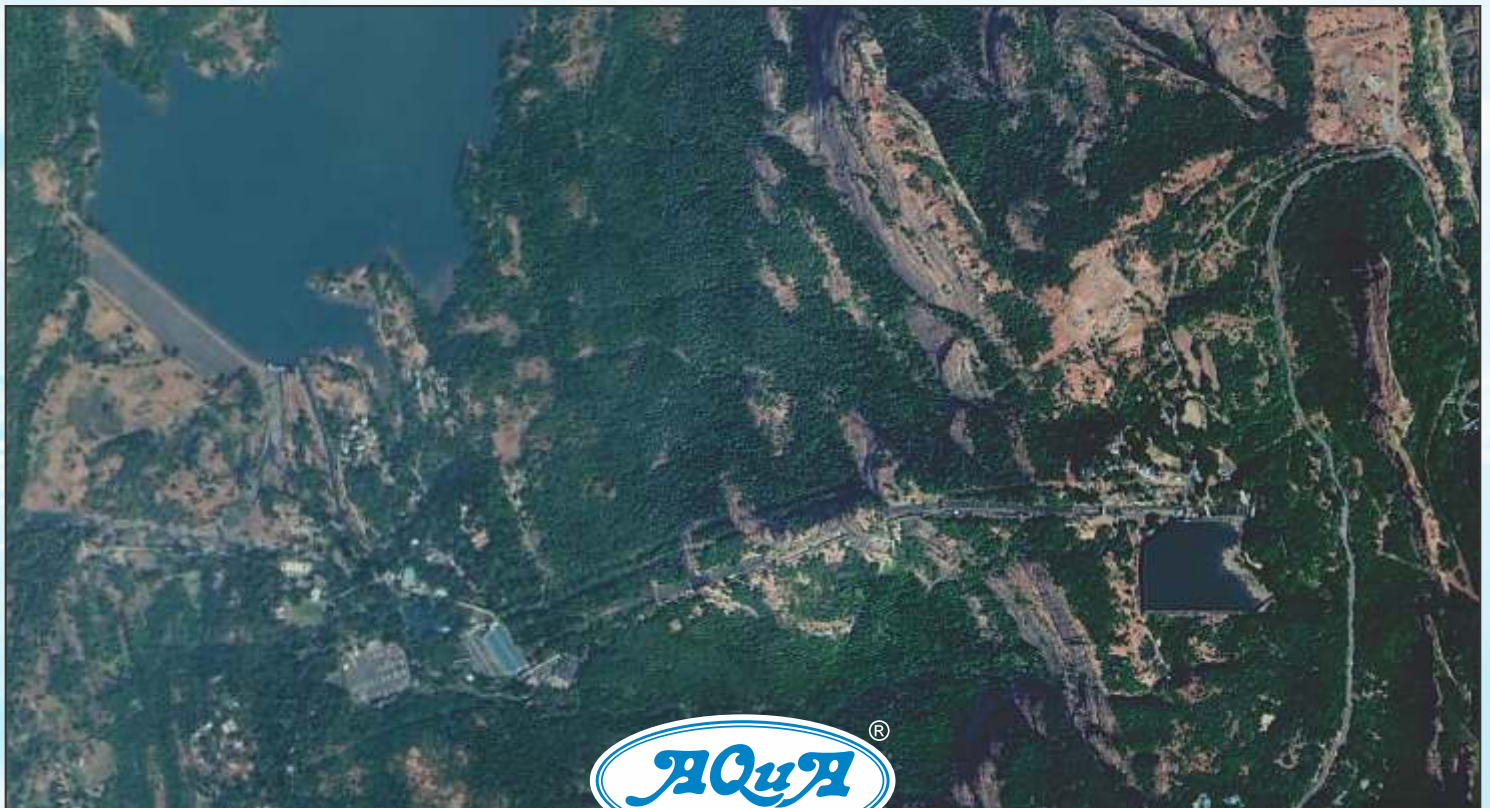
This is to certify that since June 2004, we are using 6 Nos of Aqua make submerged pump sets at our Bhira Hydro Power Station each of 750 m³/hr x 60m and equipped with Dry type Submerged (IP 68 enclosure) motor rated for 270hp.

The pump set's performance has been excellent over the years & based on our experience we recommend the use of Aqua make Submerged pump sets.



Ganesh Deshmukh
Head - Bhira

At Aqua, we don't just make great pumps – we also help engineer simple, robust & cost effective pumping solutions.



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