



U.S. DEPARTMENT OF ENERGY

# Groundbreaking Hydro Prize

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Guru Rathod, CEO / CTO  
Aeonture Corporation

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## Project Description:

Hydro Plants can be constructed and operated as plug and play infrastructure at any location in live streaming water, in shorted period. All components are detachable and can be replaced while the plant is in operation, in case they rust or degrade over the time with little effort. Plant can be retired with no traces left behind, so local ecosystem can be restored to original condition.

## 90 Seconds Video Pitch:

[Modular Plug and Play Hydro-Plant Presentation](#)

## Key Project Members:

Team Lead Name: *[Guru, Rathod]*

# Technical Summary:

Pre fabricated panels or piles can be used side by side (with extra support on both sides using a truss for additional safety factor) to construct the dam with same or more strength or safety factor. The reason behind this is Water force acts per unit area and not on total area unlike solid material and it increases as depth increases. Force from one vertical section to another vertical section is not transferred because of water property. Water pressure or force always increases vertically and is never propagated horizontally. This fact can be verified by using pressure measuring device in a large container or in sea. At the particular level, you will have same pressure irrespective of how big the container or reservoir is, considering the density is same.

When we use multiple panels side by side, then the gap in between the two panels can be filled using the elastic or sponge type material, which always pushes each other and helps prevent the water leakage through the gap and not transfer the force from one section to another section as they are not physically connected. This kind of Rubber or elastic support is already being used in all sluice gates in dam and is proven technology.

If this divide and conquer methodology is adapted then dam can be built in very less time with off the shelf components. Or they can be manufactured on site easily. Pre engineered panels or piles or beams or truss can be treated /coated with ant- corroding materials like plastic or epoxy resins or other alternatives. Additional layer of support using truss structure can be implemented. Or multiple truss members can be used same way as we used the I beam and covered with Waterproof fabric made with strong material which can withstand against the water force as well as natural elements including aquatic lives. Note that fabric kind of covering also doesn't transmit force from one member to another. It only acts as waterproof barrier.

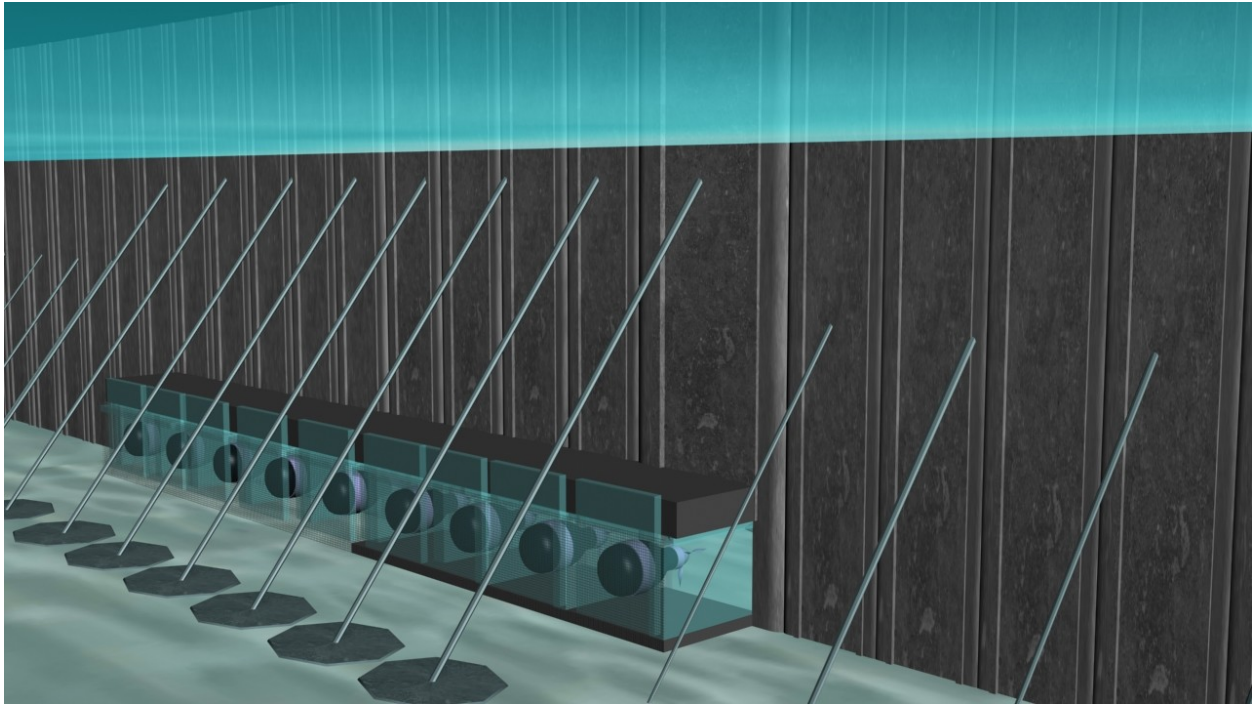
Traditionally all Dams are built based on method in which foundation should be strong enough to build a dam on and withstand against the load and moment imparted by Water and sediments. However proposed method eliminates the need of foundation all together. A dam can be constructed using pre fabricated piles or columns, which are inserted in the river floor deep enough and supported on either side using either cables or bars using ground support.

The main advantage of this approach is, we don't need to create a separate tunnel/channel for water while construction is progressing. The installation work can be performed in live stream or water. Also when we retire the plant, all components can be removed and river resets to original condition. Side tunnel can be provided if required using similar approach of using Piles.

Quick representation of how Panels can be used side by side to construct a dam. The panels are inserted into River bed deep enough so they can support the load. Additional bars or

cables can be used to support these panels which can be anchored in river bed or suitable place.

Also this method can be used to control flood, build tidal plant, direct and store water where required.



## Supplementary Information

NARRATIVE WORD COUNT: 538 TOTAL WORDS