Micro Hydroelectric Kinetic Powered Desalinator

A hydroelectric power sources traditionally converts the mechanical energy of moving water into electricity. There has been extensive research and development on extracting energy and fresh water from the ocean but a fusion of the two in a closed system has attracted much less attention. A closed system eliminates losses in power from converting and transporting energy which makes for a much simpler, reliable and less expensive design. The demands for fresh water has risen exponentially and in most locations it has or is expected to exceed its supply.

System Level of Requirements:

Develop a desalinator that can

1. Extract and measure the hydropower (tentatively 20 [W] on average) from a water current driven by tides. Log the data. Safe operation set as priority. Maintenance minimized with regards to antifouling, corrosion. The system would be operated in a traffic-free location near Seatech. The system would be operated with human in the loop and should have an emergency shutdown system.
2. Requirement 1 + Autonomously extract fresh water from saltwater using the turbine as a power source. A tentative extraction rate is 0.1 [liter/min]. The water salinity must be monitored and logged locally. The fresh water must be stored in a tank.
3. Requirement 2 + one week maintenance free operation.

Operating Requirements:

- Two-person deployable from a research vessel or dockside
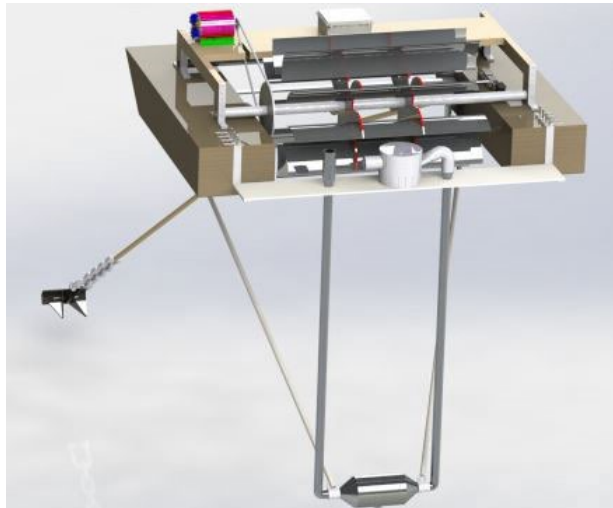- Maximum depth rating: 5 [m]
- Diver-less operations

Figure 1. Micro Hydroelectric Kinetic Powered Desalinator.