

**Jupiter Hydro Inc. Marine Renewable Energy Application  
Public Circulation Document**



**Project Overview**

Jupiter Hydro Inc. ("Jupiter") has applied for a 5 MW demonstration permit adjacent to the FORCE Marine Renewable Energy site, immediately south of Black Rock. The application is made under the amended Marine Renewable Energy Act and is consistent with the policies and objectives in respect to implementation of tidal energy and a reduction in the percentage of energy generated from non-renewable sources.

The location takes advantage of the existing grid connections, environmental and physical studies prepared for FORCE, and has appropriate tidal flows for the project.

The project proposes four phases, with three floating barge type platforms, each using Jupiter's Canadian developed patented technology.

The Jupiter technology utilizes helical turbines presented to the water flow at an angle of 30 degrees to produce low rotational speed, high torque power from the tidal flow. These turbines are anticipated to be marine life safe, durable and low cost relative to competing technologies.

The turbines are mounted to standard barge type hulls in a configuration analogous to an outboard motor. This 'outdrive' configuration is intended to provide a simple, cost effective solution that can be adopted to a wide variety of platforms.

The shape of the turbine, which is unique in the industry, has some practical advantages. The solid screw is very strong and presents as a solid object in the water column, and is more visible by marine life.

An environmental monitoring plan will be implemented and a full suite of sensors is being installed on the platforms to provide remote monitoring of on board systems and the environment.

Jupiter's technology has been developed entirely in Canada with testing taking place at the University of Calgary, open water testing in Vancouver BC and at the Canadian Hydrokinetic Turbine Test Center in Manitoba. Jupiter is a Canadian owned & operated private company engaged in the development of tidal and river turbines.

## Jupiter Hydro Inc. Marine Renewable Energy Application Public Circulation Document

*Figure 1 - Jupiter modular turbine – 500 kW outdrive*



The turbines are inherently robust and debris resistant, and are designed to incorporate a 'kick up' function if they encounter an object in the flow in the same fashion as an outboard motor. They are attached to the side of any suitable hull or mounting bracket in an 'outdrive' configuration providing a large universe of potential applications.

Feathering is achieved by hydraulically changing the angle from its 30° optimum angle with the unit's tilt/trim function.

The platforms will be anchored using a steel pile anchoring system that both maintains them in a centralized position on the site and provides redundancy in the system to minimize risk.

Power will be fed to the grid using a submarine cable and the same connection vault as the FORCE site, minimizing onshore surface disturbance.

The prime project consultant, Hatch, Inc. is a large Canadian engineering company with over 9,000 employees and offices across Canada including local offices in Nova Scotia. Hatch, Inc. is affiliated with Jupiter Hydro Inc.

Hatch, Inc. will be overseeing and reporting on the deployment and operations, including both environmental and technical monitoring.

### **Phase 1 – Twin turbine 300kW / 1MW prototype**

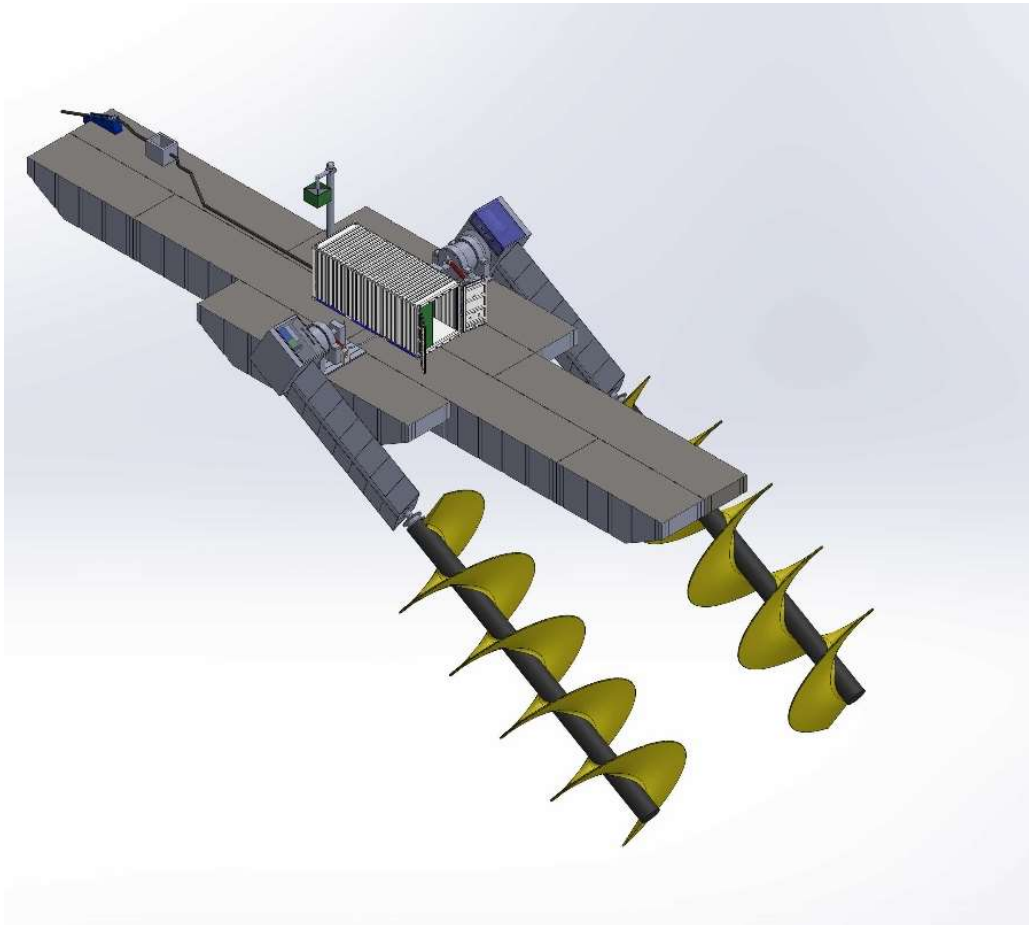
Each phase number designates a platform, the first platform being split into two phases (1A & 1B). Phase 1A utilizes a platform with two outdrives (which counter rotate) and 3.2 M diameter turbines. These will produce approximately 300kW of power and will be used to test the assembly under reduced loads.

In Phase 1B the turbines only will be replaced, utilizing the same hull and outdrive body with two 5.5 M diameter turbines which are anticipated to produce 500 kW each for an aggregate of 1 MW capacity on the platform.

Alternate configurations for the barge itself and the outdrive connections are under consideration with modular barge manufacturers.

# Jupiter Hydro Inc. Marine Renewable Energy Application Public Circulation Document

*Figure 2 Phase 1 – Twin turbine prototype*



## **Phase 2 – Four turbine 2 MW platform prototype**

Phase 2 will incorporate a larger barge and 4 - 500 kW turbines and outdrives (the same size as phase 1B). This prototype will be tested and the information gathered will be used to finalize the commercial production units.

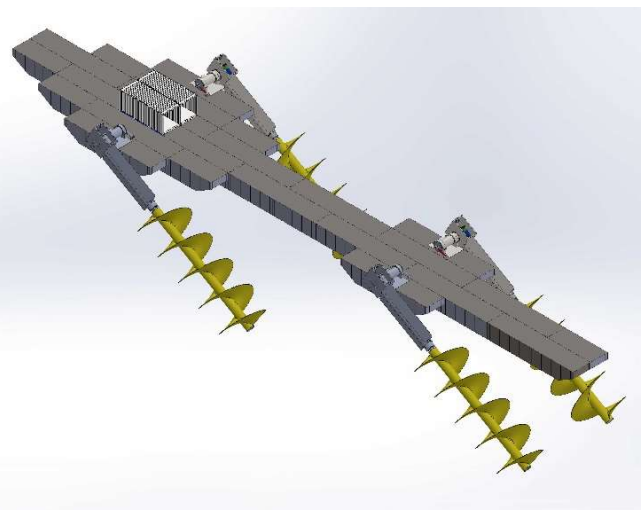
*Figure 3 phase 2/3 - 4 turbine concept*

## **Phase 3 – Four turbine 2 MW production model**

Phase 3 is envisioned as the first 'commercial production' and will incorporate lessons learned in phases 1 & 2. The platform configuration of each phase is likely to undergo substantive changes as we optimize the system for the Bay of Fundy environment,

## **Regional benefits**

As a Canadian developed and sponsored technology, Jupiter intends to locate



## Jupiter Hydro Inc. Marine Renewable Energy Application Public Circulation Document

fabrication in Nova Scotia with the potential for both manufacturing and operational employment.

Jupiter hopes to lever the world class tidal resource of the Bay of Fundy into local employment growth through local manufacturing to support both regional tidal power generation and to service export markets.

We believe there will be significant regional economic spin offs from the manufacture and export of our turbines developing a local industry created to tap the tremendous potential of the Bay of Fundy and further benefit from exporting the technology and expertise to other tidal and river installations world wide.

### Location

Figure 4 – Location map & site plan

