



# Pioneer Valley Renewables, LLC

Amherst, MA

## Purchasing an Underwater Turbine

Dear Customer,

Pioneer Valley Renewables (**PVR**) is an emerging renewable energy company, based in the United States, with the very best hydrokinetic (also called *run of river* or *tidal*) technology, to provide you with the best available Return on Investment (ROI). After successful simulations with the US Navy and at Tel Aviv University School of Engineering, a live demonstration was conducted in the canal system of the Connecticut River under the supervision of, and data collection by, Holyoke Gas and Electric. The results showed an efficiency improvement of well over 100% over current technology.

We do this by unique applications of the science of *Computational Fluid Dynamics*. The first patent is already granted in four countries, the second so far in the US, with more to come.

Your ROI depends on a few factors aside from the cost of turbines and installation:

1. Dimensions of the project in length and cross-section.
2. How conditions vary seasonally.
3. Speed of the water flow.
4. Value of the electricity, including carbon or renewable energy credits.

With that information, we can calculate your specific ROI using the following table:

**Anticipated Underwater Power (kWh)** by water speed and blade diameter for post-demonstration electricity generation of **PVR** hydrokinetic turbines versus current state-of-the-art technology. Performed at Tel Aviv University School of Engineering

Speed (m/s)	Kilowatts/hour (kWh)					
	SPT	PVR	SPT	PVR	SPT	PVR
	10m Diameter		5m Diameter		1m Diameter	
0.5	1,7	3.6	0.4	1.3	0	0.1
1	14	29	3.4	10	0.1	0.4
1.5	46	98	12	34	0.5	1.5
2	110	232	27	81	1.1	3.5
2.5	215	452	54	158	2.1	6.8
3	371	781	93	273	3.7	12
3.5	579	1241	147	433	5.9	19
4	880	1852	220	547	8.8	28

SPT=Standard Propeller Turbine

PVR=Shrouded PVR Hydrokinetic Turbine

**Example:** A 5-meter diameter **PVR** hydrokinetic turbine placed in water with speed of 1m/s will produce 10 kWh versus 3.4 kWh for a standard propeller turbine.

The cost of the turbines can be initially estimated at \$2,000 per kilowatt of capacity for larger projects, but depends on the conditions of the specific project and size and quantity ordered. That cost, due to the high density of water, can provide a better ROI than that of large wind turbines, which cost around \$1,500 per kilowatt. When we know the details of your project, we can make a specific quote and include an installation infrastructure.

Here is an artist's conception of what the installation might look like. The turbines are actually underwater and not visible.



Financial backing is available for those situations where the customer does not wish to purchase the turbines or invest anything, but rather to allow us to use their facilities to sell to the grid and pay a percentage as rent.

**For more information:**

Contact your representative first, then

Dr. Daniel Farb, CEO, [dfarb@pioneervalleyrenewables.com](mailto:dfarb@pioneervalleyrenewables.com)

Visit [www.pioneervalleyrenewables.com](http://www.pioneervalleyrenewables.com)

See the presentation of the live testing in the Connecticut River canals with a selection of the data collected at <http://youtu.be/gJZOFpg7XP0>