VFH Turbine™
website

A Technical, Cradle-to-Grave 12-year Pictorial History That Began in 2010

GREEN POWER TECHNOLOGIES
PUERTO RICO

EXECUTIVE OVERVIEW

In 2010, the VFH Turbine™ technology was developed by Pat McKay, founder of Green Power Technologies Puerto Rico, LLC. (GPTPR), and is uniquely designed to be more environmentally sustainable than traditional hydropower systems. It is based on clean energy alternatives that are efficient, meaning that they can generate more electricity with less water, and high-performing, therefore, they can operate more reliably and consistently. By using these innovative designs with advanced monitoring, the VFH Turbine™ can minimize the negative environmental impact of energy production while still providing a reliable source of electricity.

In addition to the proven benefits of the VFH Turbine™, our proprietary small-hydro system is made in the USA, and offers unique advantages. Its advanced design allows for higher energy efficiency, monitoring and output, meaning that it can generate more electricity from the same amount of water flow. Additionally, its compact size and modular design make it easy to install and operate, even in more remote or challenging locations. These features have made the VFH Turbine™ a standout technology, earning it the "Technology of the Year" award for Latin America in 2012.

GPTPR has partnered with Consolidated Asset Management Services (CAMS) to bring a complete solution globally to seamlessly execute our business models. CAMS manages over 40,000 MWHs of traditional fossil and renewable energy for private equity clients either through O&M Services or Asset Management. CAMS also has the breadth to offer Remote Monitoring, Project Management, Accounting, and Finance services to support the full project life cycle.

DESIGN AND CASTING PHASE (2011)

A VFH starts with proprietary designs and drawings, specifically engineered for each site and application. VFH systems vary to include: Kaplan, Francis, Pelton or Open-flume designs. The concept began in 2010.

Once the design is approved, hand-made patterns are created for the casting process. We currently have over 20+ unique patterns ready to go.

After identifying the flow, head, site and design:

Step 1: Our patterns determine the mold's shape.
Step 2: We then make the hand-carved mold.
Step 3: The application determines the metallic alloy.
Step 4: Melt the alloy.
Step 5: Pour the molten metal into the VFH mold.
Step 6: Remove the casting from the cooled mold.
Step 7: Finish the VFH Turbine body.

FABRICATION PHASE (2011)

MADE IN GEORGIA

Once the casts were finished, the assembly process began and the VFH takes shape.

During fabrication, our engineers created a control panel with proprietary software that remotely operates, monitors and maintains the VFH system.

Final finishes to the VFH Turbine were made before heading for paint and wiring.

DELIVERY PHASE (2011)

The VFH parts were delivered by flatbed truck to our hydro site on Snapping Shoals Creek in Covington, Georgia.

The VFH system arrived in individual parts and was reassembled on-site. Since the civil work was completed ahead of time, the actual installation of our VFH Turbine is under 4 days.

The VFH platform stabilizes the entire turbine and draft tube. For this application, the platform measured 9’ x 16’ (144 sq. ft.). Depending on design, flow and head, our compact systems can generate up to 5 MW’s or 35,000,000 kWh’s annually.

SITE PREP (2011)

Site selection is critical. Flows were diverted from the creek.

Infrastructure was upgraded to accommodate the project.

The 10’ x 18’ x 10” pad was required to support this entire system.

A splitter box is necessary for this site to handle the draft tube.

The platform design is offset and positioned on the splitter box.

The turbine and runner was staged for placement on the platform.

INSTALLATION STAGES (2011)

Once the platform has been placed, VFH assembly is 2 days.

The penstock connections are typically performed last.

The pad, splitter box and platform support this entire system.

The screened flow from the creek is delivered by penstock .

The system was officially operational and producing kW.

The turbine is complete and ready for the tour decking.

INSTALLATION STAGE CONTINUED (2011)

The observation deck was designed to accommodate tours.

The decking and platform comply with OSHA and local regulations.

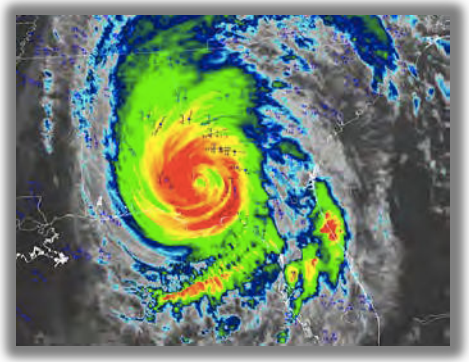
Key benefits and advantages to our proprietary draft tube include: Remote Monitoring, Sensing, Reporting, Metering, Management, Archiving and Security.

The deck is ready for self-guided tours, clients, regulators and students.

The entire process from design to generating power took <10 months .

ENGINEERED TO WITHSTAND MOTHER NATURE (2019)

The VFH Turbine™ is built, engineered and designed to withstand hurricanes, tornadoes and flooding. While the non-essential wooden observation deck sustained some minor damage, the hydro system experienced only a cracked generator rain cover, but no structural harm. The turbine cosmetic repair was $583 and the system was fully operational in less than 48 hrs.



Tornado and flooding hit our Georgia site in 2019.

VFH Turbine™ and observation deck before flooding.

For 3 hours, the VFH was 18ft. under water but operational within 48 hrs.

River rose over 30 ft. and left debris and logs everywhere.

Chainsaws and boom trucks were busy clearing debris.

Ounce the water receded and logs removed, power was quickly back on.

After 12 years of reliable power generation with virtually no maintenance or operating issues, this VFH unit was recently decommissioned, as we prepare its new home in Puerto Rico.

Snapping Shoals Creek (Georgia)
2011 - 2023

CONTACTS

Pat McKay, *Founder / Chairman*
pmckay@VFHturbine.com
c: (415) 760-9449

Josh Collins, *CEO*
josh@VFHturbine.com
c: (423) 785-7005

Sam Talman, *Director of Energy Services*
SamTalman@VFHturbine.com
c: (865) 964-9957

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