Hydrokinetic Projects on the Mississippi River

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BUILDING STRONG®

What are Hydrokinetic Projects?

Hydrokinetic hydropower projects convert the kinetic energy of flowing water into electrical energy.

Applications are where adequate velocity of flowing water to generate electricity exists.

This can be from tidal currents, wave energy, or in our case…the flowing water of the Mississippi River.

Three Interests have obtained FERC Permits to develop hydrokinetic facilities on the Mississippi River. They are:

- Free Flow Power Corporation (generators mounted on poles placed in the river bottom)
- Hydro Green Energy (barge mounted generators)
- MarMC Enterprises (generators submerged in the river, anchored by cables)

Hyro Green Energy Installed the First Hydrokinetic Project in the Mississippi River at Hastings, MN

This brief will focus on Free Flow Power's Hydrokinetic Projects since Free Flow Power is following the FERC licensing process for 71 sites on the Mississippi River and 17 sites on the Atchafalaya River.

Developing Hydrokinetics in Rivers

- Free Flow Power (FFP) is working to deploy hydrokinetic generators in Mississippi River Basin with FERC, USACE, and other approvals
  - 71 sites on Mississippi River
  - 17 sites on Atchafalaya River

- FFP has 3 "Clusters" or "Batches" of Projects:
  I. 46 on Lower Mississippi River (2007)
  II. 25 on Lower Mississippi River (2009)
  III. 17 on Atchafalaya River (2009)

I. 46 Initial Mississippi Projects; (5 "Lead")

2008

- 57 Preliminary Permits Granted in January
- Outreach in prep of Pre-Application Documents (PAD)

2009

- Filed PAD on 55 Sites (7 ILP = "Lead Sites") in January
- Public Scoping & Study Negotiation Process throughout 2009

2010

- FERC Study Determination (Jan, 2010) = 11 Studies (below)
- FFP Surrendered 9 Sites in Middle Mississippi River
- Filed 1st Quarterly Study Report with FERC on April 30, 2010
- Fish Entrainment Technical Conference on July 14, 2010

11 Studies

In-Situ Deployment 4 Units

Ongoing Consultation

FERC License App

1. Infrastructure Siting Study
2. Hydraulic Study
3. Navigation Study
4. Damaged Turbine Recovery Study
5. Fish Entrainment, Population Sampling, Habitat Use, & Movement (**technical conf to be held on July 14*)
6. Acoustic Energy Study
7. Electromagnetic Field Study
8. Vegetation, Wildlife Habitat, & Noxious Weeds Inventory
9. Rare, Threatened, and Endangered Species Study
10. Commercial Fishing and Recreation Study
11. Archaeological and Historical Resource Investigation

I. In-Situ Deployment of Turbines on Pilings

FFP is in Pre-Application Consultation with USACE MVN for In-Situ Deployment

FFP's Proposed Project Scope = 8 Stages:

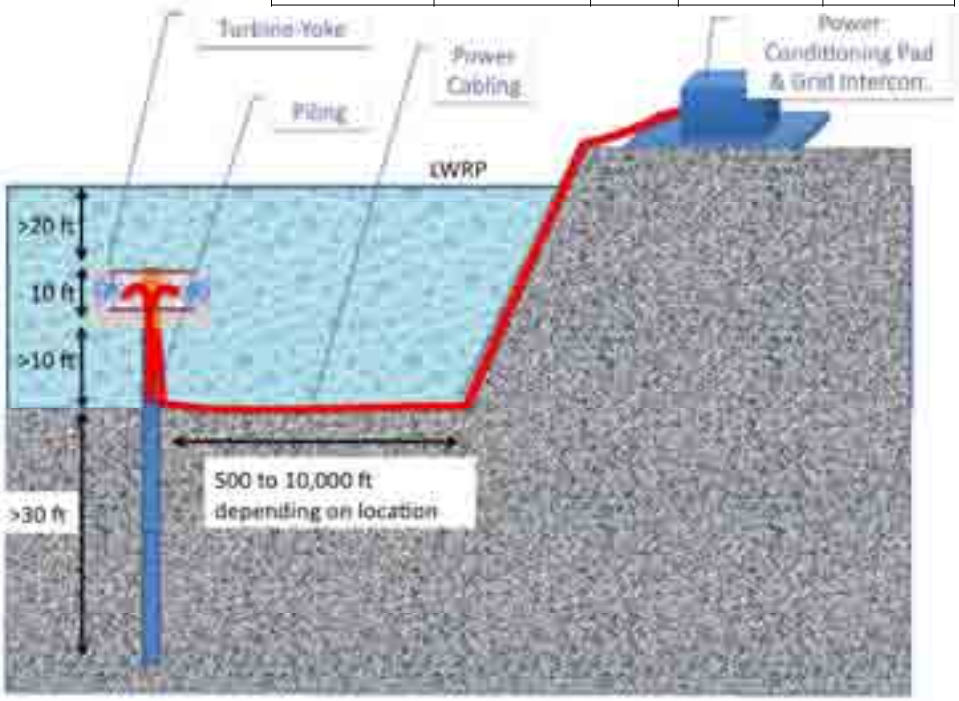
1. Planning

"FFP is engaging with USACE, electric utility, and other stakeholders to obtain necessary permits and agreements, perform site surveys, and finalize locations of equipment in-river and on-shore. FFP will quote all equipment and construction, and obtain necessary vendor permits and insurance. Set construction and installation schedule to coincide with low water months (July to November 2011)."

2. Pre-Construction
3. Piling Construction
4. Turbine-Yoke Installation
5. Electrical Cable Installation
6. Grid-Interactive Shore Power Station Installation
7. Commissioning
8. Monitoring

In New Orleans District, Shallow-Draft @ ~RM 234

FFP Project Site Priority Order	Deployment Location	River Mile	Latitude	Longitude
Scotlandville Bend	1 100 Piling	~234	30°30'11.11"N	91°11'46.27"W
	Shore Cable Access		30°30'28.08"N	91°11'36.70"W
Scotlandville Bend	Piling	~234.5	30°30'44.88"N	91°11'47.57"W
	Shore Cable Access		30°30'45.06"N	91°11'46.24"W



I. Timeline and Milestones for Initial 46

- 2010 - 2011
- Advanced Site Study, Flow Analysis, Civil Engineering
- Install SmarTurbine™ on Pylon(s)/Floating Mount; Conduct Studies

- 2007 – 2013
- Obtain FERC Hydropower Licenses and USACE permits
- Secure Financing for Utility-Scale Project from Private Sector
- Must complete FERC study plan mandate

- 2014
- Install Full Arrays, Begin Generating on Commercial Scale
- Up to 1,000 Jobs in Manufacturing Turbine Systems
- Up to 3,200 Jobs in Construction, Operations & Maintenance

Confidential Information of Free Flow Power Corporation
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II. 25 Projects on Lower Mississippi River

2009

- FFP filed for Preliminary Permits in June
- Permits Granted in September
- FFP initiated stakeholder outreach and consultation in preparation of Pre-Application Documents (PAD)

2010

- Ongoing consultation with stakeholders
- Pre-Application Document and Notice of Intent to be filed in June
- FFP expected to file for TLP waivers with FERC on all 25 Sites

III. 17 Projects on Atchafalaya River

2009

- FFP filed for Preliminary Permits in June

2010

- FERC Granted Permits in May
- FFP beginning consultation and outreach immediately

FFP's SmarTurbine™ Generator

Three-meter SmarTurbine™
- 10 kW in 2.25 m/s flow
- 40 kW in 3 m/s flow

Cost-effective design with single moving part

"Smart" computer electronics for efficiency and maintenance

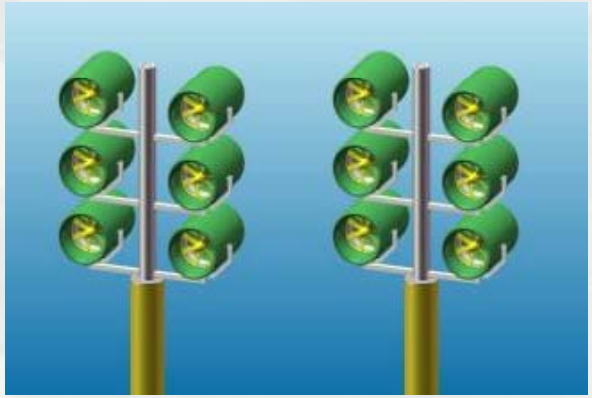
One-meter SmarTurbine™
- 10 kW in 3 m/s flow

FFP's SmarTurbine™ Generator

FFP's SmarTurbine™ Generator

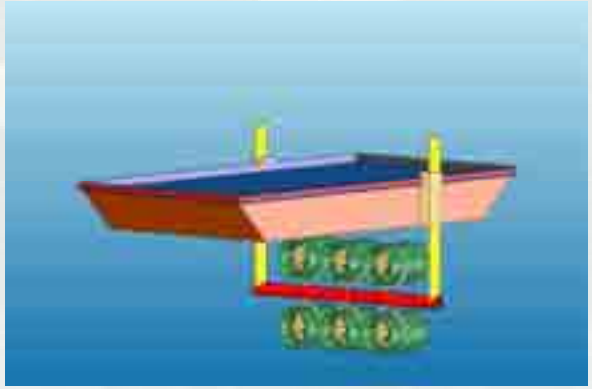
FFP's SmarTurbine™ Generator

Flexible Deployment Options

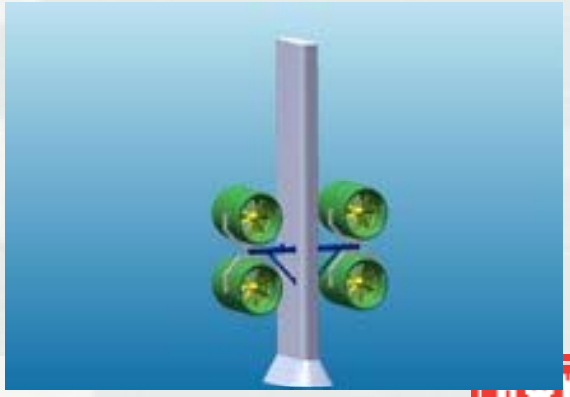


Attached to Pylons

Suspended Between Pylons



Suspended from the Surface



Attached to Existing Structures

Hydrokinetics = Triple Win

#1 Manufacturing

- New industry serving global demand for SmarTurbines™, distributed through ports

#2 Job Creation - Servicing the Turbines

- Regional operation and maintenance builds on preexisting talent in maritime service industry

#3 Build Domestic Energy Economy

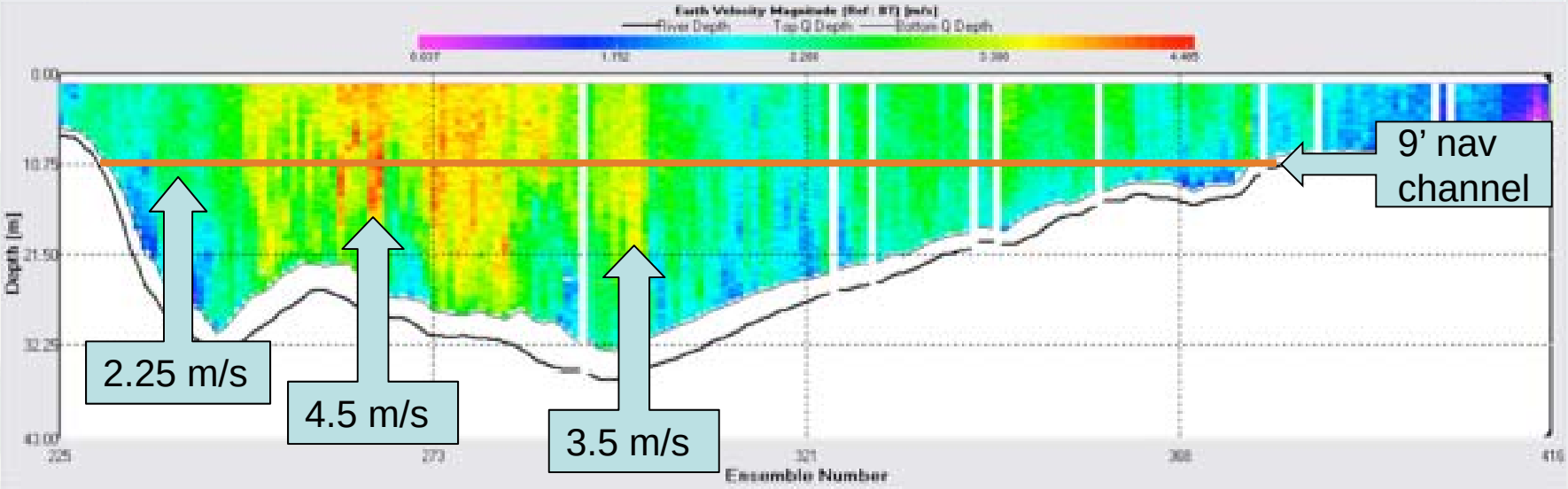
- Increase energy independence while controlling cost of electricity

Site Detail – Velocity Profile

Target flow = 2.25 m/s, 75% of time

Flows accelerate around outside of bends

Deeper, no dredging in areas of fast flow

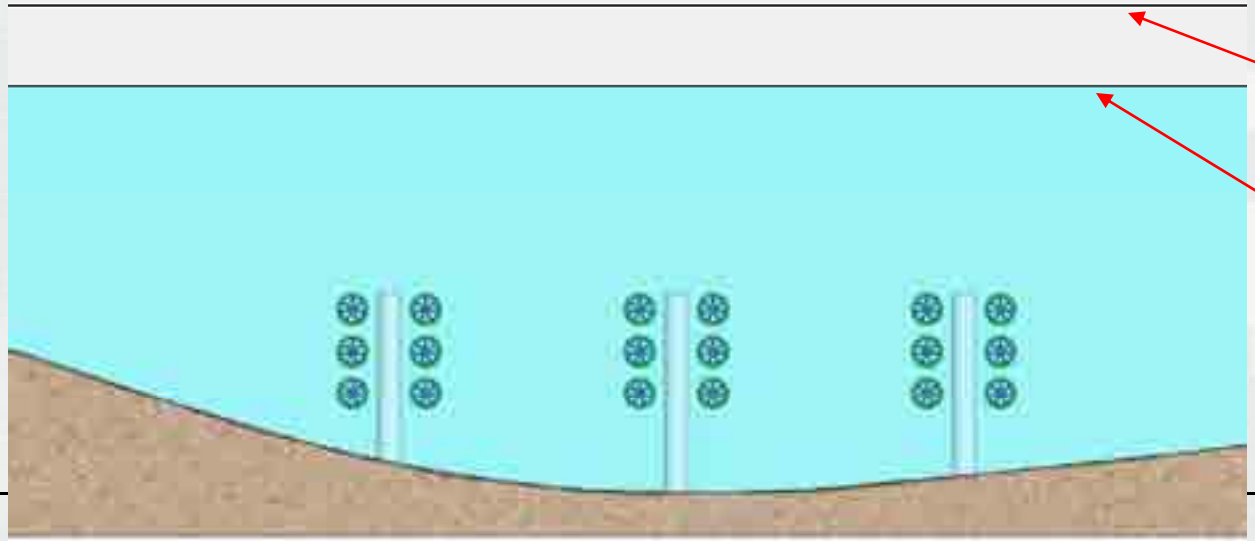


Site near Vicksburg, MS

Scale of Turbine Deployment

- Cross Section, Site 8
  - 2485’ Wide at LWRP

- Zoom of turbines
  - 65’ below LWRP



Concerns:

- Impacts to Navigation
- Impacts to Channel Maintenance (dredging, dredge material disposal, revetment)
- Impacts to River Hydraulics (sediment transport, river stages, flood risk management)
- Environmental Concerns (endangered species, fish mortality)

Questions?