

PMC-EF2a

(2010)

**U.S. DEPARTMENT OF ENERGY  
EERE PROJECT MANAGEMENT CENTER  
NEPA DETERMINATION**



RECIPIENT: Free Flow Power

STATE: MA

**PROJECT TITLE :** Free Flow Power Water to Wire Project

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0000069	EE0002652	GFO-10-179	GOO

**Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:**

**CX, EA, EIS APPENDIX AND NUMBER:**

Description:

- A9** Information gathering (including, but not limited to, literature surveys, inventories, audits), data analysis (including computer modeling), document preparation (such as conceptual design or feasibility studies, analytical energy supply and demand studies), and dissemination (including, but not limited to, document mailings, publication, and distribution; and classroom training and informational programs), but not including site characterization or environmental monitoring.
- B5.1** Actions to conserve energy, demonstrate potential energy conservation, and promote energy-efficiency that do not increase the indoor concentrations of potentially harmful substances. These actions may involve financial and technical assistance to individuals (such as builders, owners, consultants, designers), organizations (such as utilities), and state and local governments. Covered actions include, but are not limited to: programmed lowering of thermostat settings, placement of timers on hot water heaters, installation of solar hot water systems, installation of efficient lighting, improvements in generator efficiency and appliance efficiency ratings, development of energy-efficient manufacturing or industrial practices, and small-scale conservation and renewable energy research and development and pilot projects. The actions could involve building renovations or new structures in commercial, residential, agricultural, or industrial sectors. These actions do not include rulemakings, standard-settings, or proposed DOE legislation.

**Rational for determination:**

The proposed Free Flow Power (FFP) Water-to-Wire project (Project) would consist of the deployment of hydrokinetic turbine generators developed by FFP in a free-flowing river environment. The Project would be located on the Scotlandville Bend of the Mississippi River in West Baton Rouge and East Baton Rouge Parishes, Louisiana; identified as Site 28 of the sites initially under consideration.

The Project would be comprised of two Phases, and would be conducted under a preliminary nationwide permit issued through the Federal Energy Regulatory Commission (FERC). Phase 1 of the Project would initially consist of the deployment of a prototype 3-meter hydrokinetic turbine (SmarTurbine™), affixed to a floating mount, and tethered to a near-shore mooring. The turbine would not be connected to the electrical grid, but to a load bank to measure electrical output. The deployment period would last for as long as two years. At the conclusion of the deployment period the system would be decommissioned and removed from the river. The outcome of Phase 1 will also support the FERC Study Plan Determination for the Mississippi River sites for which FFP possesses preliminary FERC permits.

Phase 2 of the Project would address further potential commercial deployment issues, including turbine mounting systems. The primary commercial turbine deployment mounting plan would utilize river bottom driving monopiles. The depth of placement of the monopoles would likely vary considerably depending on individual site-specific parameters, but typically be in excess of 30 feet in depth below the river floor. The piling system would be designed and manufactured to hold one or more turbines. The piling and singular turbine in Phase 2 would be deployed in-river in a site selected that possesses good flow characteristics, in a location where the system can be mounted, where the system can be monitored and data collected, and where proper permitting can be obtained. The desired outcome would be an in-river installation of a mounting system that is hydraulically representative of the commercial product intent. Neither Phase 1 nor Phase 2 deployments would occur within navigable areas of the waterway.

Engineering design of the turbines would take place in Gloucester, MA, at FFP offices; the facility consisting of desk and computer offices with light assembly and lab rooms. Turbine manufacturing would take place primarily at the subcontractor's facility. Specific subcontractors are to be determined, but would likely include final assembly at Boston Boat Works in East Boston, MA. Field assembly would take place at various sites along the Mississippi River using experienced marine, civil, and electrical subcontractors. These would be outdoor locations involving riverbank assembly, and installation of equipment on-river using a variety of boats and/or barges. Installation of associated electrical equipment would occur both on river and on shore. Electrical generating lines would travel from the Phase 2

turbine to shoreline switchgear vaults, and then interconnect to a control room and interconnection points.

FFP staff from Massachusetts and local contractors in Louisiana would collect physical, environmental, hydraulic and performance data on approximately a bi-weekly basis. Typical data collected would consist of velocity scans using ADCP equipment, identification of debris on the system, identification of wear and damage, and performance data such as: flowspeed through the turbine, rpm, voltage, current, temperature, and other on-board sensor data.

On-site turbine monitoring, periodic inspections and various studies will be conducted throughout the Project to de-risk, refine, and validate cost and environmental impact models for future commercialized SmarTurbine™ systems. This will include velocity profile data which would be used to refine the selection of attractive siting for the turbines. Turbine debris, wear, damage, and potential fish entrainment data would also be used to inform design changes to minimize maintenance costs and riverine environmental impacts. Performance data would be used to direct design changes, and refine turbine design to maximize energy production. The primary metrics in analyzing the efficacy of proposed changes would be minimizing the levelized cost of energy and meeting the government requirements for full commercial licensing. Differences between design and performance predictions and the results from collected data would be analyzed where appropriate. The outcome would be an organization of the collected data reflected in turbine design changes.

Performance of the project tasks by FFP and its subcontractors would include budget and finance control, communications with the Department of Energy customer and other stakeholders, and to report on various findings. This would include periodic progress reports, a final report, and presentations and meetings as required.

The primary species of concern in the Project area is the endangered pallid sturgeon. The US Army Corps of Engineers (USACE) authorized the Project under the USACE Nationwide Permit #5. The USACE issued a letter to the recipient, dated July 28, 2009, stating that "the proposed work is not likely to adversely affect any species listed as threatened or endangered by the US Departments of Interior or Commerce". The US Fish and Wildlife Service (USFWS) issued an email message on June 1, 2010, expressing concurrence with the previous USACE determination dated July 27, 2009, which stated that the proposed Project "is not likely to adversely impact the endangered pallid sturgeon." The USFWS email in response to DOE's consultation stated: "we maintain our concurrence with the Corps' previous effect determination for this project."

Per the requirements of Permit #5, the recipient is required to explore utilizing devices mounted to the mooring device of the turbine to monitor wildlife behavior (fish, reptile, bird) in response to operation of the turbine. Additionally, the fact that the initial prototype turbine would be deployed in a near-shore floating mode would present less risk of impact to the endangered adult pallid sturgeon.

The Project was granted a Preliminary Permit by FERC, dated January 29, 2008, which allows for the installation of up to 1,000 20 kilowatt turbines, an electrical transmission line, and associated appurtenances at the Scotlandville Bend site. The Permit allows for the proposed activities to occur before the issuance of a FERC License for the Project. Terms of the Permit place conditions on turbine locations within the Mississippi River. Turbines may only be placed outside of defined navigable areas of the waterway. Typically this would be in the range of 500 to 10,000 feet from the riverbank, depending on site-specific criteria.

Activities under this project will involve research, data analysis, information gathering and dissemination, and document preparation; therefore an A9 Categorical Exclusion will apply.

This Project also involves renewable energy research and development and is a renewable energy pilot project; therefore a B5.1 Categorical Exclusion will apply.

#### NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

Insert the following language in the award:

You are required to:

You are required to comply with terms and conditions as established by the US Army Corps Permit and the Federal Energy Regulatory Commission's Preliminary Permit.

US Army Corps permit's special conditions (permit valid until 7/28/2011):

a) Your use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters

of the United States.

b) You must install and maintain, at your expense, any safety lights and signals prescribed by the United States Coast Guard, through regulations or otherwise, on your authorized facilities.

c) If the proposed project, or future maintenance work, involves the use of floating construction equipment (barge mounted cranes, barge mounted pile driving equipment, floating dredge equipment, dredge discharge pipelines, etc.) in the waterway, you are advised to notify the US Coast Guard so that a Notice to Mariners, if required, may be prepared. Notification, with a copy of your permit approval and drawings, should be mailed to the US Coast Guard, Sector New Orleans Command Center, 201 Hammond Highway, Metairie, Louisiana 70005 about one month before you plan to start work. Telephone inquiries can be directed to: (504) 846-5923.

d) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No Claim shall be made against the United States on account of any such removal or alteration.

e) Should changes occur in the location or section of the levee and/or river, or in the prevailing conditions in that vicinity, the permittee may be required in the future in the public interest, to make changes in the project layout, as necessary to satisfactorily revise the project, and shall bear the cost of the changes.

f) The permittee shall explore use of a DISON sonar imaging camera mounted to the mooring device of the turbine to begin assessing its applicability to observing/monitoring fish (e.g., sturgeon, bass, catfish, etc.), reptile (e.g., river cooter, alligator snapping turtle, snakes, etc.), and diving bird (e.g., cormorants, anhingas, terns, gulls) behaviors in response to operation of the turbine.

g) The permittee shall attempt to determine the appropriate technology for measuring electromagnetic fields in the project environment and begin gathering baseline information regarding potential effects to project-area fish and wildlife.

h) The permittee shall monitor which types and species of fish and wildlife encounter the structure and record any observed responses (both physical and behavioral) in an effort to provide some initial report of fish and wildlife response to turbine deployment in the local environment.

i) The permittee shall contact the Fish and Wildlife Service, Lafayette Office immediately should any life stage of pallid sturgeon be observed passing through the structure. At that time, the permittee shall report the results of the incident and initiate further consultation.

You are reminded of Nationwide Permit General Condition Number 26 that requires that you provide a signed certification stating that the authorized work was conducted in accordance with the permit, including any special conditions, and that mitigation (if required) was completed in accordance with the permit.

FERC Preliminary Permit's terms and conditions:

Article 1. The purpose of the permit is to maintain priority of application for a license during the term of the permit while the Permittee conducts investigations and secures data necessary to determine the feasibility of the proposed project and, if said project is found to be feasible, prepares an acceptable application for license. In the course of whatever field studies the Permittee undertakes, the Permittee shall at all times exercise appropriate measures to prevent irreparable damage to the environment of the proposed project. All test sites shall be restored as closely as possible to their original condition and to the satisfaction of the Commission's authorized representative or, where federal lands are affected, to the satisfaction of the agency administering such lands.

Article 2. The permit is not transferable and may, after notice and opportunity for hearing, be canceled by order of the Commission upon failure of the Permittee to prosecute diligently the activities for which a permit is issued, or for any other good cause shown.

Article 3. The priority granted under the permit shall be lost if the permit is canceled pursuant to Article 2 of this permit, or if the Permittee fails, on or before the expiration date of the permit, to file with the Commission an application for license for the proposed project in conformity with the Commission's rules and regulations then in effect.

Article 4. At the close of each six-month period from the effective date of this permit, the Permittee shall file four copies of a progress report with the Secretary, Federal Energy Regulatory Commission, 888 First Street, N.E., Washington, D.C. 20426; and shall serve a copy on the interveners in this proceeding. The report shall describe, for

that report period, the nature and timing of what the Permittee has done under the pre-filing requirements of 18 CFR sections 4.38 and 5 and other applicable regulations; and, where studies require access to and use of land not owned by the Permittee, the status of the Permittee's efforts to obtain permission.

Note to Specialist :

Doug Eichler 6/2/2010

**SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.**

NEPA Compliance Officer Signature:  Date: 6/2/10  
NEPA Compliance Officer

**FIELD OFFICE MANAGER DETERMINATION**

Field Office Manager review required

**NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:**

- Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
- Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

**BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :**

Field Office Manager's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Field Office Manager