

PMC-ND

(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION

**RECIPIENT:** MF Fire**STATE:** MD

PROJECT TITLE: Swirl Stove – Swirling combustion for efficient wood burning

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002029	DE-EE0008913	GFO-0008913-001	

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

CX, EA, EIS APPENDIX AND NUMBER:

Description:

A9 Information gathering, analysis, and dissemination Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

B5.15 Small-scale renewable energy research and development and pilot projects

Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to MF Fire to develop a novel wood stove to incorporate swirling combustion (i.e., swirl stove); a process in which combustion air is mixed with fuel gasification products to produce a more efficient burn with reduced emissions. MF Fire would utilize one of its existing EPA-certified fireboxes as the base technology to create the upgraded model.

The proposed project would be completed over a two year period. The first year would focus on the development of a swirl stove prototype by adapting MF's existing Nova wood stove. During this period, computer modeling would be used to formulate designs for the core system and its associated components. Modular prototypes would then be fabricated and tested for performance/emissions. During the second year, a single prototype model would be fabricated, incorporating the lessons learned from the first year research. The model unit would then be used for emissions testing in a laboratory setting and for performance testing in real world settings.

Proposed tasks for each year are as follows:

Year 1

Task 1 – Initial Verification: On-site verification of baseline data and project targets. Verification data would be submitted to DOE for review.

Task 2 – Design and Modeling: This task would consist of the initial design work for multiple prototype cyclone combustion chamber units. A product requirements document and assembly drawings would be drafted. Computational fluid dynamics modeling would be performed to assess design performance.

Task 3 – Manufacture Enclosed Prototype: Two modular enclosed prototypes would be manufactured and transported to testing facilities. Manufacturing of the prototypes would be performed by an existing commercial steel fabricator. The fabricator would be selected after design work has been performed.

Task 4 – Usability and Baseline Emissions Testing: Laboratory testing would be performed to assess the prototypes' operational performance and to obtain baseline emissions measurements.

Year 2

Task 5 – Adapt Nova Design to Incorporate Swirl: The design of MF Fire's existing firebox would be updated to incorporate features of the prototypes and lessons learned from the usability testing performed as part of Task 4. Assembly drawings would be developed for the swirl wood stove.

Task 6 – Manufacture Test Units: Seven test units would be fabricated for testing. As was the case for Task 3, manufacturing would be performed by an existing commercial steel fabricator to be selected after the completion of associated design work.

Task 7 – Unit Alpha Testing and Optimization: User testing and emissions safety testing would be performed with the units fabricated as part of Task 6.

Two (2) of the units would be used for emissions/safety testing and optimization. This testing would be performed in a controlled laboratory setting.

Five (5) of the units would be used for in-home user testing/feedback. The units used for in-home testing would be installed by a certified wood stove installer in accordance with all applicable local regulations relating to wood stove installation. Participant selection criteria would be fully defined during the project, prior to selection. Candidates would be home owners of single family dwellings with experience using wood burning stoves. Consent forms would be drafted and vetting processes defined during the project. All candidates would be required to sign any associated agreements/waivers prior to participating in the testing.

Task 8 – Final Verification and Reporting: A final report would be developed and submitted to DOE for review/verification of results.

MF Fire would coordinate all project activities. Design work and stove laboratory testing would be performed at MF Fire's headquarters in Baltimore, MD. Additional stove laboratory testing would be performed at Biomass Emissions Solutions & Testing at its facilities in Colville, WA. Both of these facilities are purpose-built laboratory facilities. No physical modification to existing facilities, construction of new facilities, ground disturbing activities, or changes to the use, mission, or operation of existing facilities would be required. Likewise, no additional permits or authorizations would be needed for the completion of project activities.

Risks inherent to design, laboratory testing, and fabrication activities would be mitigated through adherence to established corporate health and safety policies and procedures. Protocols would include employee training, the use of proper protective equipment, engineering controls, monitoring, and internal assessments.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Bioenergy Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Jonathan Hartman, 12/18/2019

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on

environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  Casey Strickland Date: 12/18/2019
NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- Field Office Manager review not required
- Field Office Manager review required

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

Field Office Manager's Signature: _____ Date: _____
Field Office Manager