



# U.S. Department of Energy Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Energy Storage Systems, Inc. - 25 kW 200 kWh Energy Storage System Based on All-Iron Hybrid Flow Battery

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Portland, OR

Proposed Action Description:

Funding will support small-scale, research and development activities to continue research and development efforts related to the development of an all-iron redox flow battery (IFB) technology, which aims to significantly improve performance and reliability of the electrolyte rebalancing system and to reduce its cost. Specific technical R&D tasks for the proposed funding include fabrication and analysis of iron redox flow batteries. Fabrication of the batteries involves cutting and assembly of electrodes, bipolar plates, membrane and additional current collecting hardware and seals. Analysis of the batteries includes pumping iron-based electrolytes into and out of the battery, while conducting numerous tests involving battery cycling and charge capacity. If successful, the project will result in a reliable and cost-effective electrolyte rebalancing system that contributes directly towards the original goal to demonstrate high performance energy storage systems with a cost less than \$100/kWh.

Project activities will be conducted at existing facilities, and will be conducted in accordance with applicable Federal, State, and local safety and environmental requirements.

Categorical Exclusion(s) Applied:

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer:

Date Determined: 10/15/2015



# U.S. Department of Energy Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Energy Storage Systems, Inc. (ESS) - 25kW 200kWh Energy Storage System based on All-Iron Hybrid Flow Battery

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Portland, OR

Proposed Action Description:

Funding will support efforts to implement Phase II of the ESS project to research, design, construct, and test a cost-effective and efficient 25kW 200kWh energy storage system based on the all-Iron Hybrid Flow Battery technology.

As part of this effort, ESS will construct additional testing facilities (approximately 1000 square feet) directly adjacent to its existing facilities on the Portland State University campus. Construction will be done in accordance with all applicable Federal, state, and local requirements and after obtaining all required permits. Project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and local requirements. Any air emissions associated with laboratory activities will be captured by fume hoods and exhausted to the ambient air, and will be within any applicable permit limits or requirements.

Categorical Exclusion(s) Applied:

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of [10 CFR Part 1021](#).

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal 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.

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Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer:

Date Determined: 04/10/2015



# U.S. Department of Energy Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: (0674-1586) Energy Storage Systems Inc. - 25 kW 200 kWh Energy Storage System based on All-Iron Hybrid Flow Battery

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Portland, OR

Proposed Action Description:

Funding will support efforts to develop a low-cost Iron Redox Battery (IRB).

Proposed work will consist of: (1) Analysis, design, and fabrication of a small-scale test model that produces the same or greater efficiencies and results as the lab-scale model developed by ESS; (2) build a breadbox energy storage system comprised of a number of small-scale units for application analysis; and (3) testing and analysis of the energy storage system to determine compliance with program and project metrics.

Some additional construction will be necessary in the latter portions of the project. This construction will occur in a relatively small area of a parking lot on the Portland State University campus and will consist of fencing, electrical connections, and network connections.

Categorical Exclusion(s) Applied:

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

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Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer:

Date Determined: 08/24/2012