

Notice of Intent No. DE-FOA-0001938

Notice of Intent to Issue Funding Opportunity Announcement No. DE-FOA-0001981

The Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Wind Energy Technologies Office (WETO), a Funding Opportunity Announcement (FOA) entitled "Advanced Next-Generation High-Efficiency Lightweight Wind Turbine Generator".

EERE is interested in developing advanced, next-generation wind turbine drivetrain technologies, such as generators and gearboxes, to radically decrease up-tower nacelle and tower mass, reduce operations and maintenance (O&M) and replacement costs, and improve performance. EERE can help lower the cost of energy and technology risk enabling continued cost effective deployment of wind power by providing funding, technical assistance, and government coordination to develop innovative technologies.

Drivetrains contribute to the cost of energy produced by wind turbines in multiple ways. First, the drivetrain includes some of the most expensive components in a wind turbine, namely the gearbox and generator, which account for nearly one half of the turbine's total capital cost [Wind Turbine Design Cost and Scaling Model National Renewable Energy Laboratory (NREL) 2006]. Heavier drivetrains also require more substantial towers to support their weight, further driving up the turbine's overall capital equipment costs. Secondly, drivetrains represent a significant proportion of the total energy losses within a wind turbine, reducing electrical power output and net revenue. Finally, conventional drivetrains are not meeting their expected 20-year operating lifetimes. This is primarily due to gearbox and bearing failures that necessitate turbine downtime, as well as expensive and time-consuming repairs or replacements, often via the deployment of very large lifting cranes, which is a logistically and financially burdensome operation. In addition to the costs of replacement equipment, crane rental, and lost revenue, widespread gearbox failures can lead financiers to demand higher interest rates for project loans due to a higher perceived level of technology risk.

The primary objective of this FOA is to develop a lightweight, more efficient system to generate electricity from the torque supplied by the rotor system. Specifically, applications under this FOA should seek to develop advanced, next-generation wind turbine drivetrain technologies that will facilitate the continued growth and acceptance of wind turbines for both land-based tall wind and offshore applications. Advancements can also help reduce the cost of energy

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through their direct impact on capital costs, O&M, and lifetime energy production. As wind turbine technology continues to evolve in the areas of blade, tower and foundation design, drivetrain technologies will contribute to scaling power capacity beyond 10 MW. An additional objective is to reduce the wind industry’s vulnerability to price fluctuations for rare earth elements used in high-performance magnets.

These technology-specific goals support the WETO programmatic goal of an overall reduction in levelized cost of energy (LCOE) from a wind plant. The expected outcome of this FOA is to fund awards that result in the up-tower testing of a megawatt-scale lightweight generator. The following metrics will be used to evaluate the submitted concepts:

Metric/ Key Performance Indicator	Unit	Minimum	Stretch Target
Impact on Wind turbine LCOE	\$/kWh	-10%	-15%
Mass reduction (for geared systems includes the weight of the gearbox and shafting in addition to the generator)	Kg	35%	50%
System Efficiency (full load)	%	+1 percentage point	+2 percentage points
Reduction in rare earth elements	%	25%	100%
Torque density	kN/kg	+35%	+50%

EERE envisions making up to three financial assistance awards in the form of cooperative agreements. The estimated period of performance for these awards will be approximately one year in length and will be followed by a down-selection to one or more ongoing awards. Each project will consist of the design and development of an innovative drivetrain, fabrication of a MW-scale prototype, and up-tower performance testing. EERE seeks to encourage and maximize direct industry engagement in this research and development. Industry involvement will provide a direct path to commercialization. Therefore, EERE intends to restrict eligibility to for-profit entities to ensure that industry takes the lead as the prime recipient on projects funded under this FOA.

This Notice is issued so that interested parties are aware of the EERE’s intention to issue this FOA in the near term. All of the information contained in this Notice is subject to change. EERE will not respond to questions concerning this Notice. Once the FOA has been released, EERE will provide an avenue for potential Applicants to submit questions.

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EERE plans to issue the FOA in October via the EERE Exchange website <https://eere-exchange.energy.gov/>. If Applicants wish to receive official notifications and information from EERE regarding this FOA, they should register in EERE Exchange. When the FOA is released, applications will be accepted only through EERE Exchange.

In anticipation of the FOA being released, Applicants are advised to complete the following steps, which are **required** for application submission:

- Register and create an account in EERE Exchange at <https://eere-exchange.energy.gov/>. This account will allow the user to register for any open EERE FOAs that are currently in EERE Exchange. It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission.

Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov

- Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (including the plus 4 extension, if applicable) at <http://fedgov.dnb.com/webform>
- Register with the System for Award Management (SAM) at <https://www.sam.gov>. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually.
- Register in FedConnect at <https://www.fedconnect.net/>. To create an organizational account, your organization's SAM MPIN is required. For more information about the SAM MPIN, or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf
- Register in Grants.gov to receive automatic updates when Amendments to a FOA are posted. However, please note that applications will not be accepted through Grants.gov. <http://www.grants.gov/>. All applications must be submitted through EERE Exchange.

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