

GE Renewable Energy

GE Ultrasonic Jet Bat Deterrent System Advancement Study (2021 season)

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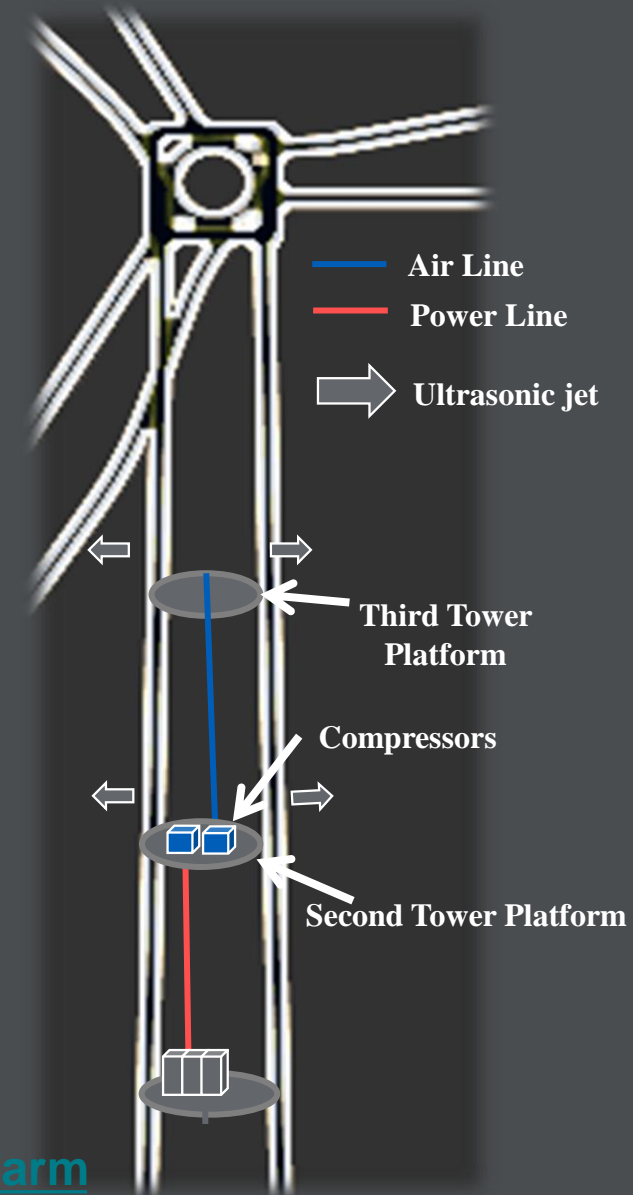
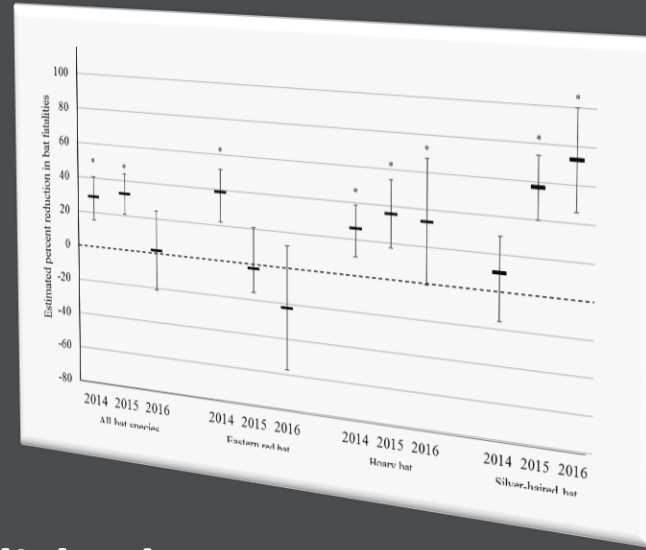


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GE Bat Deterrent Background

Beginning in 2013, GE Renewable Energy developed a low cost jet system to ensonify a wind turbine rotor with powerful broadband ultrasonic noise that effectively reduces bat fatalities at wind turbines.



2014 -2016 Study Methods and Results Published in a Peer Reviewed Journal Article...

“Evaluation of an acoustic deterrent to reduce bat mortalities at an Illinois wind farm”

Direct link to the open access Wildlife Society Bulletin publication...

<https://wildlife.onlinelibrary.wiley.com/doi/full/10.1002/wsb.1025>

Link to the TETHYS Blast...

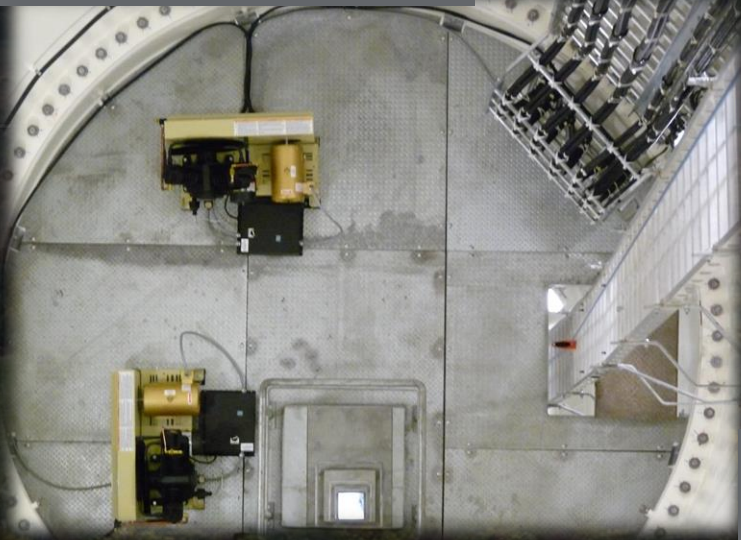
[Evaluation of an Acoustic Deterrent to Reduce Bat Mortalities at an Illinois Wind Farm](#)



GE Bat Deterrent System Design

- a) Ultrasonic air jet designed to emit broad frequency range, broad coverage, and high reliability
- b) Spherical volume airspace coverage
- c) No electronics exposed to weather
- d) Simple, robust hardware
- e) Study results across multiple seasons

Compressors installed on tower platform



Ultrasonic jet installed through hole in tower wall



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Why is additional field validation needed?

- After the completion of the 2016 DOE funded study of the GE bat deterrent...
 - **GE conducted customer and regulator outreach to obtain input to further the commercialization of the system.**
- The feedback obtained included apprehension on making an investment risk on all bat deterrents due to:
 - Unknown regulatory agency acceptance of deterrents as a fatality avoidance and minimization strategy,
 - Limited validation of acoustic deterrent effectiveness data,
 - What is the performance of the deterrent in multiple habitats with different species assemblages,
 - How might effectiveness change if the system was deployed over an entire wind farm,
 - How do the relative effectiveness of deterrence vs. curtailment compare (such a comparison would allow stakeholders to determine if deterrence is a cost-effective, acceptable conservation tool to be used in lieu of or in conjunction with curtailment).

How... What is DOE funding supporting?

The DOE award is funding a 2021 bat deterrent validation study on approximately 40 wind turbines at the Orangeville Wind Farm in New York. Project Objectives...

- 1) Evaluate relative effectiveness of deter vs. curtail at the site using a four-way study of control, deterred, deterred plus curtailed, and curtailed turbines
- 2) Determine all-bat and species-specific fatality reductions under deterrence, deterrent plus curtailment, and curtailment treatments. Detailed analysis will compare species-specific effects to provide important data on how deterrent and curtailment effectiveness may vary species
- 3) Use canine search teams for high searcher efficiency
- 4) Utilize thermal video imaging to understand flight path behavior when deterrent is active
- 5) Execute during the 2021 migration season in New York and assess effectiveness of ultrasonic deterrent system in a forested landscape

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Link to the DOE program website:

<https://www.energy.gov/eere/wind/environmental-impacts-and-siting-wind-projects>

Impact

Increase confidence in acoustic ultrasonic deterrent technologies, reducing stakeholder's investment risks, and increase adoption of acoustic deterrents to protect bats. This study will...

- 1) Demonstrate relative effectiveness of deterrence vs. curtailment
- 2) Demonstrate performance in northeastern US with different bat species
- 3) Provide additional evidence of performance to further efforts aimed at reaching regulatory acceptance of deterrents as a fatality avoidance and minimization strategy



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