

EchoPITCH™

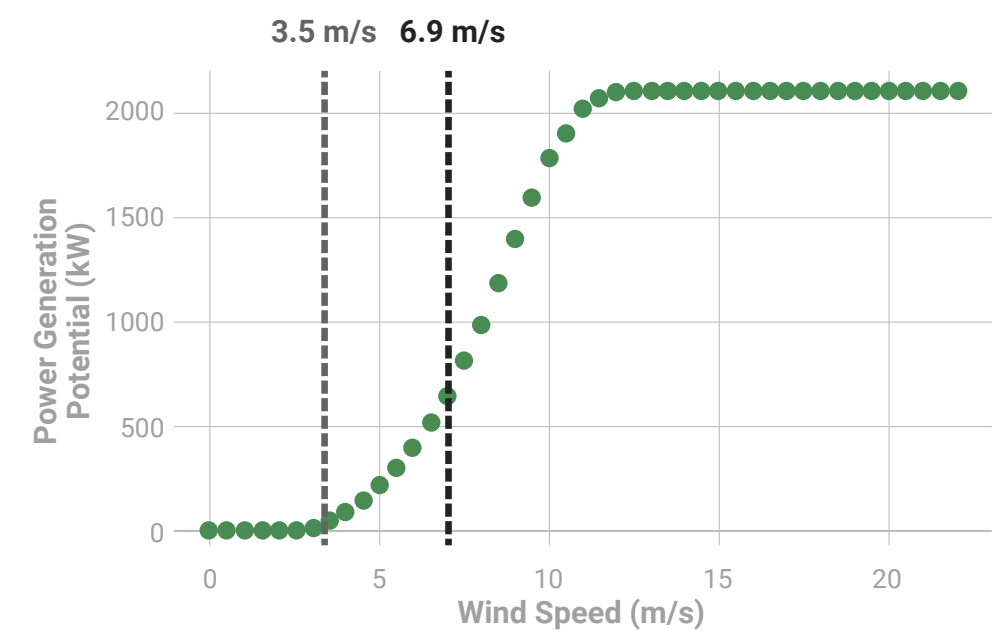
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EchoPITCH™ FOCUSES CURTAILMENT ON CONDITIONS WITH HIGHEST RISK, ALLOWING TURBINES TO GENERATE MORE POWER WHILE MINIMIZING RISK TO BATS.

Understanding blanket curtailment

Global carbon reduction commitments are seeing the demand for renewable wind power growing exponentially. With increased turbine construction comes increased regulations for wildlife conservation—especially for bats. Although bats use ultrasonic echolocation to avoid obstacles and capture insect prey, bats are prone to collision with fast-moving wind turbine blades. Current practices to measure bat fatality rates at wind projects rely on standardized carcass monitoring—often a costly technique that fails to provide the feedback needed to fine-tune efforts to minimize risk to bats.

An increasingly common measure to minimize bat mortality is to increase the cut-in wind speeds (e.g., from 3.0 meters per second to 6.9 m/s)—when the blades start turbine rotation and power generation. Termed blanket curtailment, increasing cut-in speed over a broad seasonal period without additional input parameters means substantial turbine downtime even during conditions and times when bats are at lower risk of impacts. When operating under these higher cut-in speeds, blanket curtailment can result in a reduction of 90–460 megawatt-hours (\$2,000 to \$8,000) per turbine per year. Multiply that for a 50-turbine wind farm, the loss in power generation and revenue is substantial.



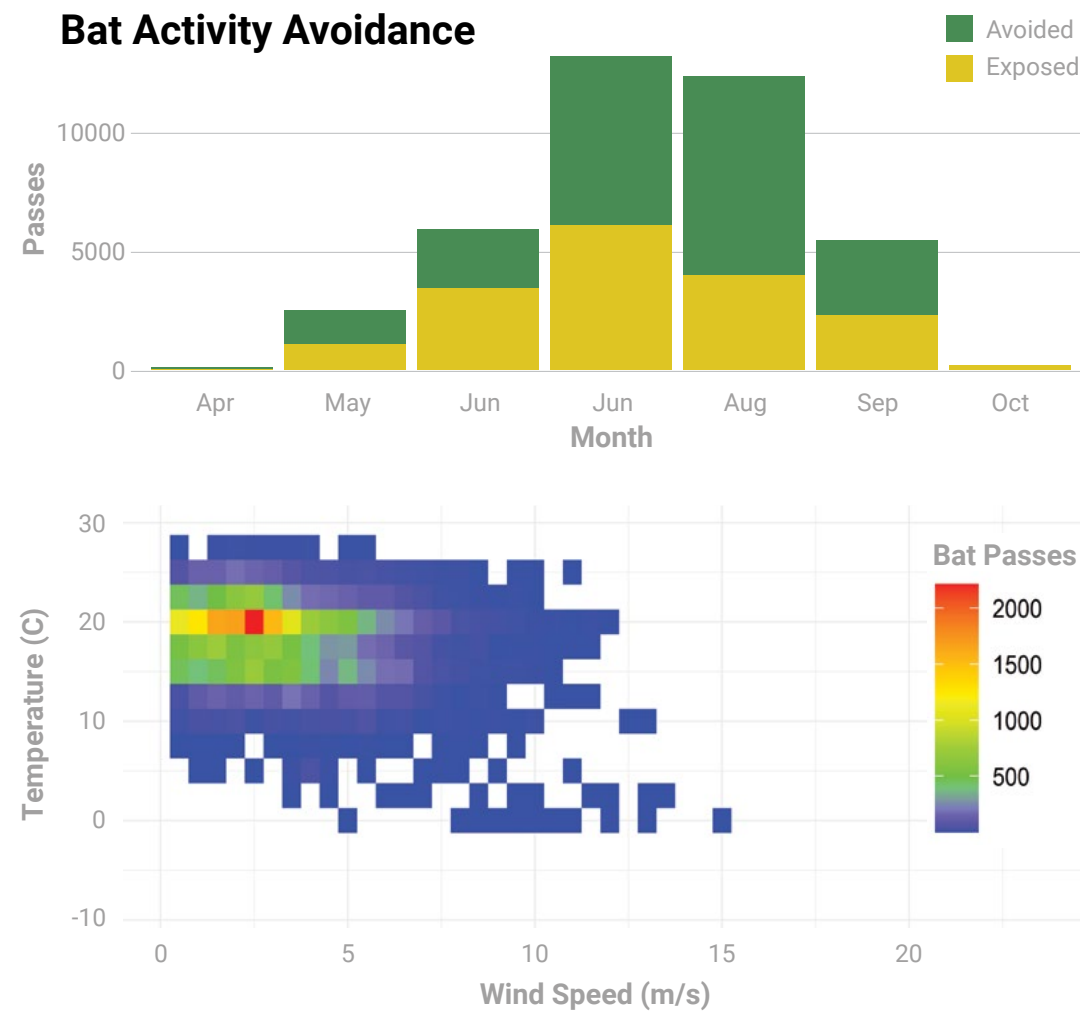
Power generation potential increases rapidly above 3 m/s, as does the cost of blanket curtailment plans with higher cut-in speeds.

\$6.13

billion in annual revenue produced by wind in the US



Antrim Wind Energy Project, Antrim, New Hampshire, US



Project Example
 Stantec recently helped a client design an EchoPITCH™ alternative for a wind energy facility in New England using acoustic data collected previously at the site. Through coordination with our client and representatives from the state wildlife agency, we designed an alternative curtailment strategy that should be more protective of bats while reducing energy loss from curtailment by 4.2 gigawatt-hours annually.

How does it work?

Bat activity follows remarkably consistent seasonal and temporal patterns. Bats also appear to respond predictably to changes in temperature and wind speed, although such patterns likely vary among species and regions. The consistency of timing and species composition drives a credible understanding of bat fatalities at wind projects. Acoustic detectors mounted on top of wind turbines provide a straightforward method to characterize such patterns by defining the seasonal and temporal windows and the set of temperatures and wind speeds in which increased bat risk occurs. This same data can also identify exposure on a nightly basis, exploring factors related to specific mortality events. EchoPITCH™ relies on custom software to visualize such patterns in order to design a curtailment regime that supports targeted levels of bat risk reduction, while minimizing energy loss.

What is the benefit?

About one-third of wind farms may be required to implement curtailment practices due to government regulations. This is where EchoPITCH™ comes in, to reduce mortality rates while maintaining power and revenue generation. EchoPITCH™ uses acoustic data recorded at turbine nacelles to identify the envelope of conditions (i.e., temperature and wind speeds) in which bats are active. Measuring seasonal and temporal variation during this activity, EchoPITCH™ focuses curtailment on periods when it is most warranted. This approach enables project operators to evaluate the potential benefits and costs of curtailment

during set conditions. EchoPITCH™ is incorporated into existing turbine control systems—resulting in minimal implementation costs. Once implemented, ongoing acoustic data collection provides quantitative feedback on the effectiveness in reducing bat risk. Designing an activity-based informed curtailment program using EchoPITCH™ reduces energy loss and equivalent bat risk by 25-50%. By reducing bat risk, EchoPITCH™ provides reliable statistical analysis for operators to increase turbine uptime, generating additional power and revenue not realized by traditional blanket curtailment regimes.



Antrim Wind Energy Project, Antrim, New Hampshire, US



At its core, smart curtailment using EchoPITCH™ recognizes that the value of curtailment is proportional to the amount of avoided risk to bats."

TREVOR PETERSON
 DEVELOPER, ASSOCIATE, PROJECT MANAGER



WE CAN HELP YOU

Design your custom curtailment program –increase uptime and reduce risk with EchoPITCH™:

Smart curtailment
 – the battle between nature and wind

Managing risk
 – a smarter framework for curtailment

CONTACT US

Send us an email at EchoPITCH@stantec.com to learn more about EchoPITCH™ and how it can support your wind farm operations and development plans.

Our EchoPITCH™ experts:

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