

Optimising revenue under bat curtailment conditions

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Introduction

The impacts of operational wind turbines to bats in the UK are a growing concern to statutory and non-statutory consultees following the release of a recent study conducted by Exeter University (Matthews et al 2016). Increasingly, project consent conditions include curtailment of operational wind turbines through blanket cut-in speed adjustments (i.e. Frodsham Wind Farm, Dunsland Cross Wind Farm). While effective at reducing bat mortality (Arnett et al 2011, Baerwald et al 2009), blanket curtailment may be overly precautionary and result in more energy loss, and consequential revenue loss, than an optimised curtailment strategy which targets periods when bats are likely to be most at risk of mortality.



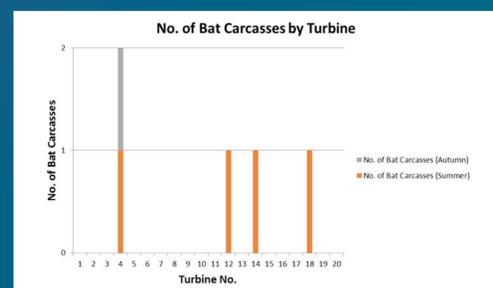
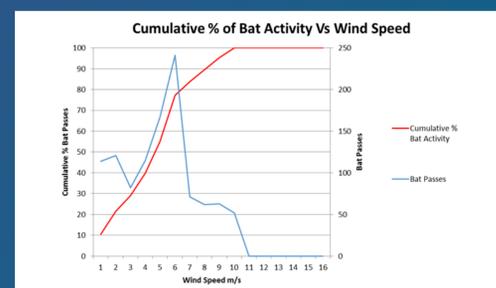
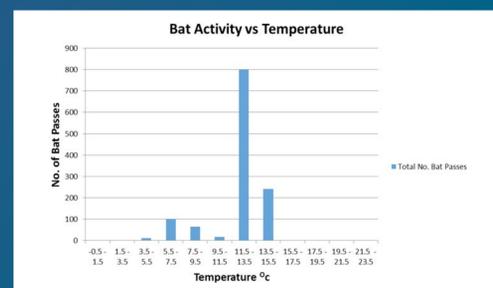
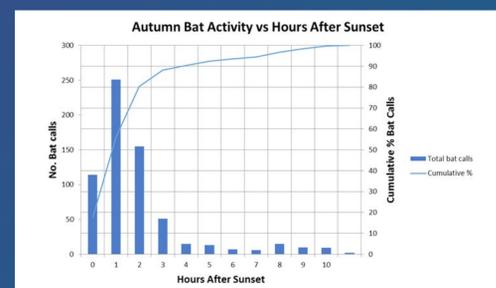
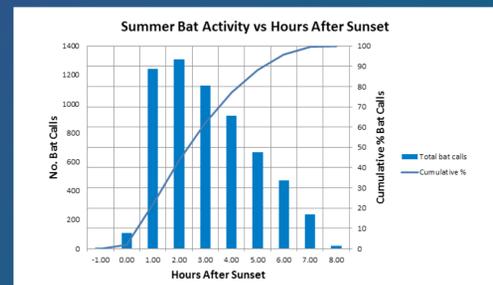
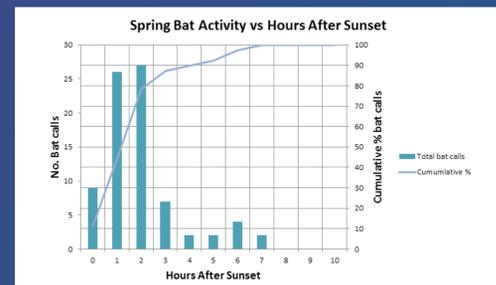
Blanket Curtailment £7.2m in lost revenue!

Methods

Here we demonstrate the revenue benefits of optimising your bat mitigation curtailment regime using modelled wind data for a hypothetical 20 x 2.5MW turbine site in southern Scotland. Bat activity data were simulated from baseline and pre-construction monitoring.

Three scenarios are presented:

- Blanket curtailment between dusk and dawn during the bat active period (April to September)
- Partially optimised curtailment - as above but curtailment only during periods of bat activity
- Smart curtailment utilises bat activity and mortality data linked to site specific meteorological conditions



VS

Smart Curtailment you save £6.5m!

The energy yield analysis was based on Nordex N90 2.5MW machines with an estimated production of 110 GWh/yr. Based on a rate of £79/MWh this equates to annual revenue of £3.35m prior to any bat mitigation curtailment.

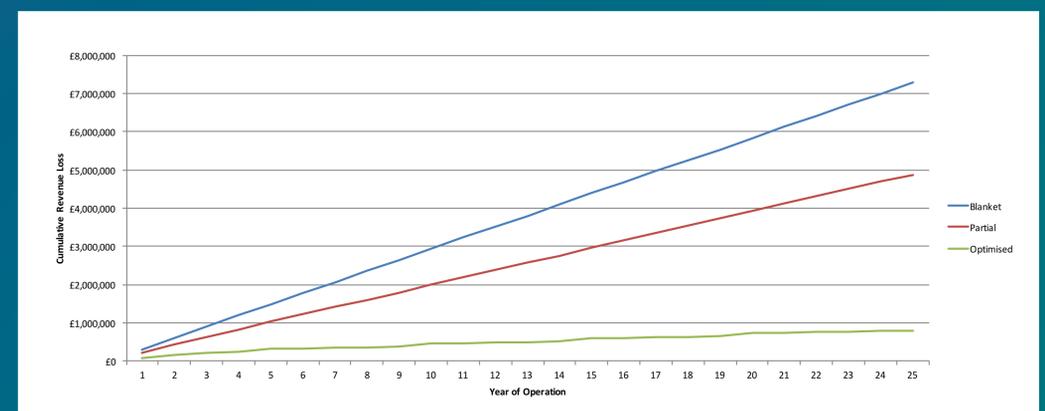
Results

Under scenario 1: production is reduced by 8.6 % resulting in annual losses of £287,000 or 3500MWh for the 25-year life of the project.

Under scenario 2: production is reduced by 5.6 % resulting in annual losses of £187,000 or 2300MWh for the 25-year life of the project.

Under scenario 3: production is reduced by 0.4% resulting in annual losses of only £14,500 or 43 MWh for the 25-year life of the project.

After accounting for all costs associated with scenario 3, smart curtailment nets £6.5m in savings over the life of the project.



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