

Normandeau Associates, Inc. is an environmental and regulatory consulting firm with over 45 years of experience providing scientific expertise to the public and private sectors.

Normandeau stands out for its ability to guide clients to defensible and reasonable science-based decisions for project and regulatory compliance. We have earned a reputation for excellence in understanding and solving complex natural resource issues using sound science and innovative technology.

Normandeau staff from 19 nationwide offices provides a depth of knowledge and experience in disciplines ranging from ecological assessments and permitting to stakeholder interviews and facilitation, and conducts a wide range of environmental services for our clients from baseline studies to complex NEPA assessments.

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SMART CURTAILMENT

Turbine Integrated Mortality Reduction—TIMRSM

REDUCING BAT MORTALITY
AT WIND FACILITIES

NORMANDEAU'S SMART CURTAILMENT SYSTEM

Significantly Reduces Bat Fatalities and Increases Operating Time for Wind Energy Facilities

MONITORING & DETECTING BAT ACTIVITY

Remote Bat Acoustic Technology—ReBAT®

- Developed by bat biologists and software engineers
- Patented system for long-term remote monitoring & detecting real-time bat activity
- Detects bats within 60 meters of nacelle
- Uses full-spectrum ultrasonic detectors to capture activity at the nacelle
- Transmits real-time remote data via cellular modem or direct LAN connection
- Rapid bat identification & continuous system monitoring
- Unique data management, reporting and website interface
- Automatic data processing & filtering
- Continuous hardware & data management monitoring for high reliability

SMART CURTAILMENT

Turbine Integrated Mortality Reduction—TIMRSM

- Receives real-time bat activity from ReBAT®
- Collects weather data from on-site nacelle
- Calculates a relative risk value based on bat activity and weather conditions
- Communicates with the SCADA in 10 minute increments
- Alerts SCADA to curtail turbines when risk is too high
- Normal operations resume when risk value drops to low
- Fully automated system but may be overridden by operations center

BENEFITS OF TIMRSM SMART CURTAILMENT SYSTEM

Reduces Bat Fatalities

- Reduced total Bat mortality by 83%
- *Myotis lucifugus* fatalities reduced by 90%
- First study to show a significant decrease in *Myotis* fatalities*

Increases Operating Time

- Curtails only when bats are present, increasing operational times compared to wind speed-only curtailment
- 48% greater operational time compared to 7 meters per second wind-speed curtailment

System Flexibility

- System is independent of turbine manufacturer and model
- Independent of inter-annual changes in bat migration
- Bat activity level and weather thresholds can be customized to each specific site to reflect climate conditions & land characteristics
- Dynamic exposure threshold within a season
- Can be applied to single turbine or a group of turbines

Long Term Reliable Service & Support

- Bat acoustic specialists
- Cloud data storage
- Hardware and technology engineers for equipment maintenance
- Software upgrades and enhancements by our skilled software engineers and bat biologists

*The TIMRSM smart curtailment system was the result of research conducted by Normandeau Associates, Inc. sponsored by the Electric Power Research Institute, Inc. and hosted by We Energies

