

Review Report of Concerns
Identified In

Arran Wind Energy Project
Draft Project Description Report
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Ontario Ministry of the Environment

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Prepared by: Golder Associates
For Arran Wind Project ULC

Report Signed:

For Golder Associates Ltd. by:
Ian Callum, Golder Project Manager
and Danny da Silva, Associate, Golder Project Director

For Arran Wind Project ULC by:
Joanna Szarek, Development Officer, Leader Resources Services Corp.
and Charles Edey, President, LRS Corp

This Review Report dated July 2010 Prepared by:

William K.G. Palmer P. Eng.
TRI-LEA-EM RR 5
Paisley, ON NOG 2N0
trileaem@bmts.com

Copies Sent to:

Joanna Szarek, Leader Resources Joanna@leaderwind.com
Ian Callum, Golder Associates iCallum@golder.com
Director EAAB, MoE Ontario EAABGen@ene.gov.on.ca
Duncan Moffett, Golder Associates dmoffett@golder.com
Mayor and Council Saugeen Shores c/o Town Clerk whitel@town.saugeenshores.on.ca
Mayor and Council Arran-Elderslie c/o Town Clerk areld@bmts.com

Appendix 1

Known Industrial Size Turbine Failures – Resulting in Blades on the Ground Jan2008 to Dec 2009 (24 month period)

List Compiled From Public Records

- Dec. 2009, all blades are removed from 25 Gamesa 2 MW turbines in the Kumeyaay Wind Project due to damage. Photos show one-third to one-half of some blades lost. California USA (counted as only 1 failure due to lack of detail.)
- Dec 2009, 1.5 MW GE wind turbine in New York State (Fenner Wind Farm) collapses after loss of power. Cause under investigation. USA.
- Nov 2009, 2.1 MW Suzlon wind turbine at Siif Energies Praia Formosa development “exploded” losing a blade, Brazil.
- Nov 2009, 1.5 MW turbine at Acciona – Aibar Wind Development, nacelle, blades, and top third of prototype concrete tower collapse, Spain.
- Nov 2009, Vestas V47 turbine failure one blade lands on path used by hikers, (Falkenberg) Sweden.
- Nov 2009, Wincon turbine in Denmark (Esbjerg) – defective axle causes all blades of 40 m high turbine to come loose, one hit a power transformer – article notes that since 2000, Denmark has had 27 incidents of wind turbines losing blades,
- Oct 2009, Vestas V90 turbine failure, braking fails in winds of 30 metres/sec, Sweden.
- Sept 2009, blade failure, second in 15 months, 56 m turbine, Sheffield U, UK.
- July 2009, GE 1.5 MW turbine loses blade after lightning strike, Montana, USA.
- Jul 2009, Vestas V80 turbine loses blade after lightning strike, broken blade parts travel 150 metres, Germany.
- Jun 2009, GE 1.5 MW turbine blade failure following lightning strike, MO, USA.
- May 2009, Wind turbine blade falls off and onto highway A6, Lelystad, the Netherlands.
- May 2009, Vestas turbine overspeeds and collapses, North Palm Springs, CA, USA.
- April 2009, wind turbine failure, and collapse, CA, USA.
- Mar 2009, GE 1.5 MW turbine blade failure in Illinois, USA.
- Mar 2009, GE 1.5 MW turbine collapses at Noble Environmental NY State site when blades spin out of control, USA.
- Feb 2009, turbine collapses at Waverly Idaho when under construction as blades spin out of control, USA.

- Jan 2009, Enercon turbine loses one 20 m blade (bolt failure) and second blade damaged, UK.
- Dec 2008, Vestas V90 turbine blade damage - pieces travel to home 490 m away, PEI, Canada
- Oct 2008, 42 m long blade breaks off turbine, Illinois, US.
- Oct 2008, turbine blade contacts tower, buckles it, collapses VT, US.
- Jun 2008, blade failure, 2 months after in service, 56 m turbine, Sheffield U, UK.
- May 2008, blade failure Vestas V47 turbine - full 23 m long blade broke off, passes over road, the Netherlands.
- May 2008, Suzlon turbine fire, blades come off in fire. Minn, USA.
- Apr 2008, 2 turbines each lose 37 m long blades in storm, Japan.
- Mar 2008, 10 metre section breaks off wind turbine blade, flies 200 metres, Italy.
- Mar 2008, Lagerway turbine collapse, the Netherlands.
- Feb 2008, Vestas turbine loses blade - travels 100 m, Denmark.
- Feb 2008, (another) Vestas turbine blades contact tower, tower collapses, blade pieces travel up to 500 m Denmark.
- Feb 2008, Nordex turbine blade failure Norway.
- Feb 2008, Vestas turbine loses blade, travels 40 metres – Sweden.
- Feb 2008, turbine collapse, Island of Texel, Northern the Netherlands.
- Jan 2008, GE 1.5 MW blade failure in winter storm - Prince Wind Farm, ON, Canada.
- Jan 2008, Vestas turbine collapses, Cumbria, UK.

This list does not tabulate turbine fires in the same period, unless they resulted in blades falling to the ground. Tabulated fault data shows at least 15 wind turbine fires have occurred in the same period, which can result in falling burning fiberglass and oils.

The 35+ known blade failures that resulted in blades on the ground occurred over a world wind turbine experience exposure of about 160,000 wind turbine years of experience. It is noted that many countries with numerous wind turbines do not report turbine failures, such as India or China. However, even assuming this list constitutes all failures, it is a failure rate of 219×10^{-6} failures per turbine year of operation.

Ontario has seen two incidents in about 1200 turbine years of operation in this period where portions of a wind turbine blade have fallen to the ground. One on a GE turbine the Port Burwell Wind Farm reported by A Channel News in April 2007, and the second also on a GE turbine at Prince Wind Farm reported by the Sault Star in January 2008. There was also one blade failure at a wind turbine at Belwood, ON, in Sept 2006 where a failed 600 pound blade traveled 100 metres, which is not counted in these failure figures.