Clean Energy BC's

OPERATIONS WORKSHOP

Thursday June 13 2019

Hyatt Regency, Vancouver

www.cleanenergybc.org
RENEWABLE ENERGY OPTIMIZATION
In 2022 the global utility scale wind and solar PV electricity generation will:

1- Lose $22 billion a year from fixable technical underperformance issues.

2- Pay 40% higher insurance and financial premiums due to poor quantification of operational risk.
Clir’s mission is to provide an affordable complete understanding of renewable energy power plant technical performance with clear actionable items to maximise project returns.
VALUE PROPOSITION

AI - Applying AI to existing data is only half the battle

Data + AI ≠ Value

Data + AI = Value in Context

‘Big Data’ – Does anyone really have this?

- Largest Owner (20GW)
- Largest OEM (101GW)
- Global Market (750GW)
OUR PLATFORM

CLOUD

Cloud-based asset reporting and optimization solution.

DOMAIN EXPERTISE

Provides world-class data integrity, analytics and reporting never before combined and implemented in one package.

ANALYTICS AND AI

Improves wind farm operations through actionable recommendations to increase wind farm revenues.

VALUE

Provides intelligent analysis to give clarity on the asset operations, protect the long term health of the asset.
ASSET OPTIMIZATION

Increase project returns by addressing areas of underperformance. Prioritised by likelihood of implementing and expected ROI.

- ICING
- LEADING EDGE EROSION
- PITCH & CONTROL
- WAKE EFFECTS
- LIFE EXTENSION
- CURTAILMENT
- STORAGE
Example of Fault-Free Main Bearing Behavior

Legend:
- Observed Main Bearing Temperature
- Predicted Main Bearing Temperature (Fault-Free)
- Filtered Residual (Observed - Predicted)

Avg. Main Bearing Temp

Moving Average of Avg. Residual

Startts (2018)

May 2  May 7  May 12  May 17  May 22  May 27  Jun 1  Jun 6  Jun 11  Jun 16  Jun 21  Jun 26  Jul 1  Jul 6  Jul 11  Jul 16
Example of Rising Main Bearing Temperature Behavior

Legend:
- Observed Main Bearing Temperature
- Predicted Main Bearing Temperature (fault-free)
- Avg. Residual

Avg. Main Bearing Temp

Avg. Residual

Jan 1, 18  Feb 1, 18  Mar 1, 18  Apr 1, 18  May 1, 18  Jun 1, 18  Jul 1, 18  Aug 1, 18
DESIGN ASSUMPTIONS

Dynamic Yaw Error Behavior By OEM

![Graph showing dynamic yaw error behavior by various OEMs](image-url)
SILOED DATA
THANK YOU FOR LISTENING

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