



## CHALLENGE: MAINTAINING A RELIABLE WIND TURBINE FLEET AROUND THE GLOBE

Renewables now play an important part in meeting the world’s energy demand, and wind is one of its fastest growing sectors.

- Global installed wind power capacity increased from 197.6 GW in 2010 to 594.5 GW in 2018 at a compound annual growth rate (CAGR) of 14.8%
- U.S. wind power capacity increased 8 percent in 2018, to 96,433 megawatts of cumulative installed wind capacity – more than double the capacity the U.S. had in 2010

## RENEWABLES USE DATA TO ACHIEVE ASSET HEALTH

-  OEM was managing 6,000 North American Turbine Service Contracts
-  Fleets were coming off of Warranty and Owner was assuming risk
-  Owner needed to hit cost reduction and availability goals
-  Implemented Asset Health™ Program for 190 Wind Farms with DINGO
-  Oil Now Changed On Condition; Achieving up to 50% Savings
-  Data Analytics also identified a Lubrication Degradation Issue; Supplier was changed and performance improved

These strong winds of growth present both opportunity and challenges for the wind turbine original equipment manufacturer (OEM) and wind farm owner operators who are responsible for day to day operations of these geographically dispersed wind farms. The estimated life span of a wind turbine is more than 20 years; however, gearbox technology has not yet matured to the point where they can be expected to work reliably for two decades. Identifying problems and performing maintenance on these gearboxes is a key issue for turbine OEMs and Owners alike.

## OEM BATTLES COSTS

One of the top two global turbine OEMs contacted DINGO for help with a gearbox maintenance issue. They provide maintenance service contracts of 2-5 year durations for almost 6,000 turbines in North America. A significant expenditure for them was the repair and maintenance costs associated with the gearbox and performing oil changes in the lubrication system. Customers were frequently inquiring about gearbox and oil condition and the OEM was very limited in their ability to respond due to the following challenges:

- Each of the 80 field offices managed their own oil condition data, and there was no central system.
- Data was being received from five different oil analysis providers, each in a different format with inconsistent limits.
- The large number of samples made information sharing extremely difficult.

Given that one of the OEMs major goals was to increase the percentage of service contracts, they needed to:

- Address customer data requests quickly.
- Stop performing oil changes on schedule to satisfy customer requests with no knowledge of oil condition, at a cost of \$5000 per incident.

After trying to develop an in-house solution for 12 months they contacted DINGO for help.



## THE SOLUTION

DINGO implemented its Asset Health software TRAKKA® to provide data management and a standardized analytics platform for 6,000 turbines.

The primary goals were:

- Reduce unplanned breakdowns and maintenance by allowing the OEM to monitor the condition of all gearboxes and hydraulic systems.
- Consolidate all oil analysis information in one system that is available on demand to all staff.
- Provide benchmarking across the entire database so maintenance decisions would be driven by data analysis, not schedules.

## THE RESULTS

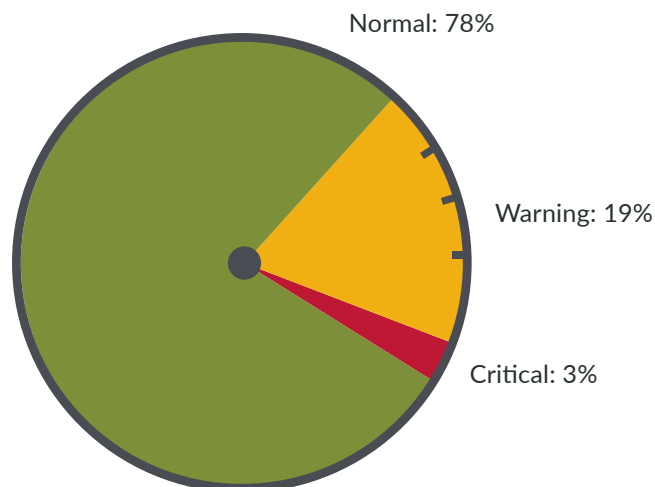
Over several years, the program generated a number of key improvements for the OEM:

- Oil drains are now performed on condition, resulting in up to 50% saving in oil use.
- Data analytics is helping drive lubricant selection, maintenance decisions and comparison of gearboxes.
- 87,000 samples from 11,500 components across 180 wind farms are now available to all project offices immediately, resulting in very rapid response time to customer data requests.

## OFF-WARRANTY TURBINES

669 Assets

- ✘ 20 (3%)
- ! 128 (19%)
- ✓ 514 (78%)



## OWNER TAKES CHARGE

One of this OEM's key customers had several wind farms that were operated by another large OEM and coming to the end of their warranty period.

The owner decided to take over the maintenance activities for these turbines, but with very little experience in this area, they reached out to DINGO for help with the data management and analytics of oil analysis information. DINGO implemented Trakka® for over 650 off-warranty turbines and compiled the data from three separate lab sources into a single database.

Using DINGO's data analysis capabilities the owner was able to:

- Establish practical alert limits and maintenance actions to respond to any abnormal conditions.
- Use data trending to extend oil drains from three to five years.
- Identify degradation of certain oil types, prompting a change in oil supplier.
- Benchmark and compare component health and performance across the entire database, improving their ability to prioritize maintenance work for their limited resources.