

# Acoustic monitoring for ice detection and wind park maintenance



WinterWind 2017  
08.02.2017 Session 9-11 / Boviken



# Background

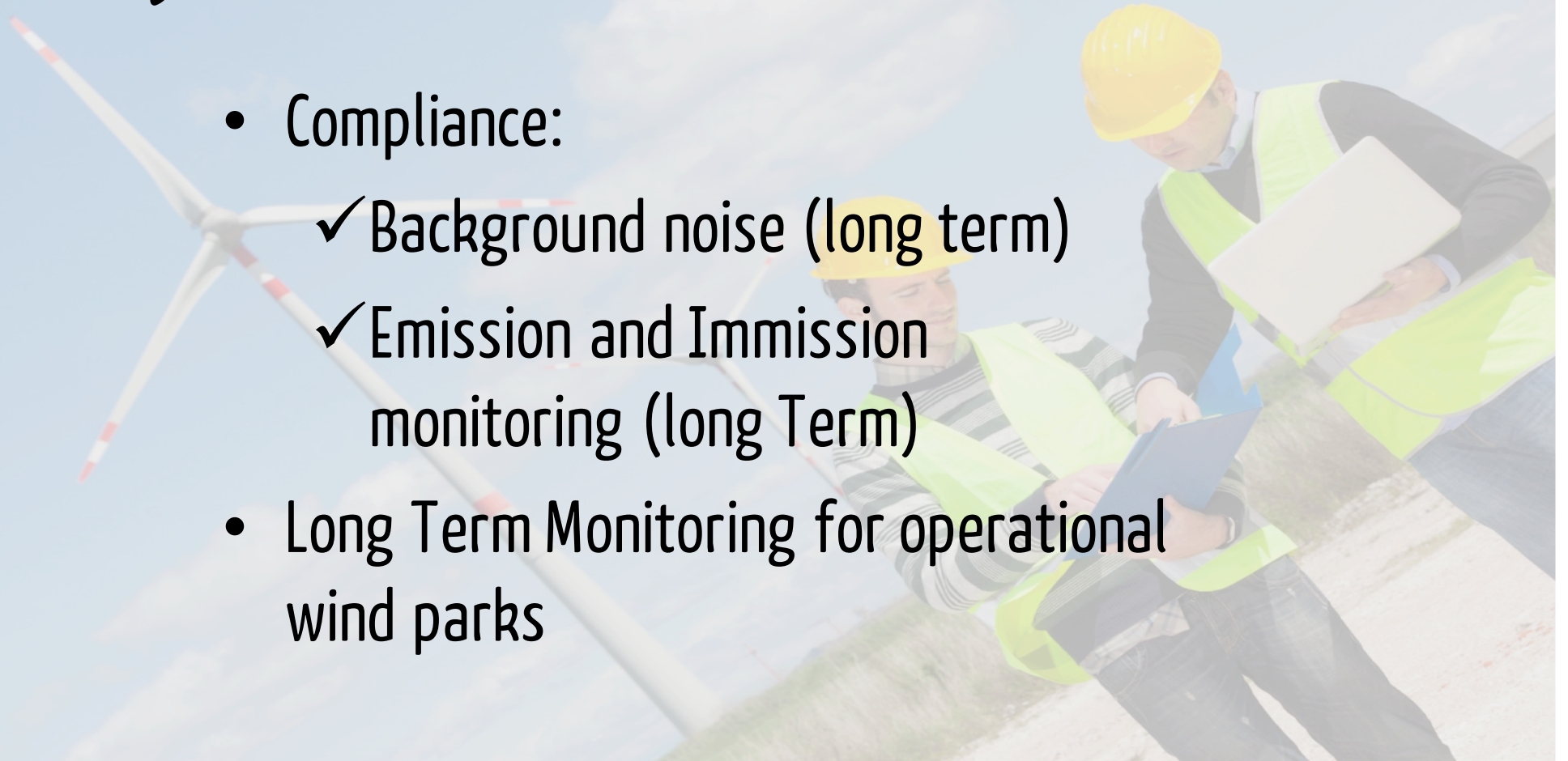
Almost 10 years in  
sounds analysis

Technology developed  
in-house

We've worked with  
wind power for 5  
years.

# Our Way

- Compliance:
  - ✓ Background noise (long term)
  - ✓ Emission and Immission monitoring (long Term)
- Long Term Monitoring for operational wind parks

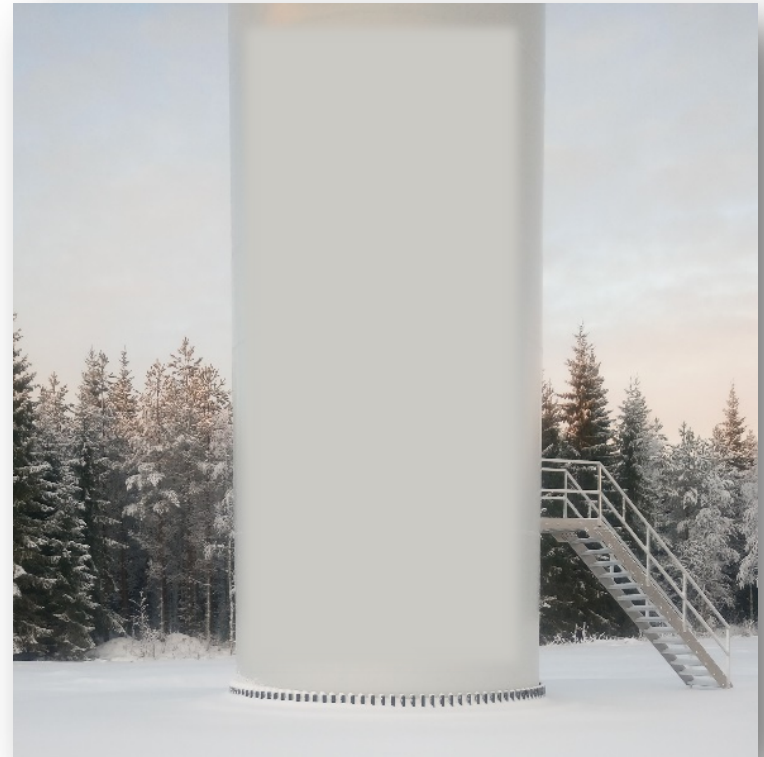


# Monitoring setup

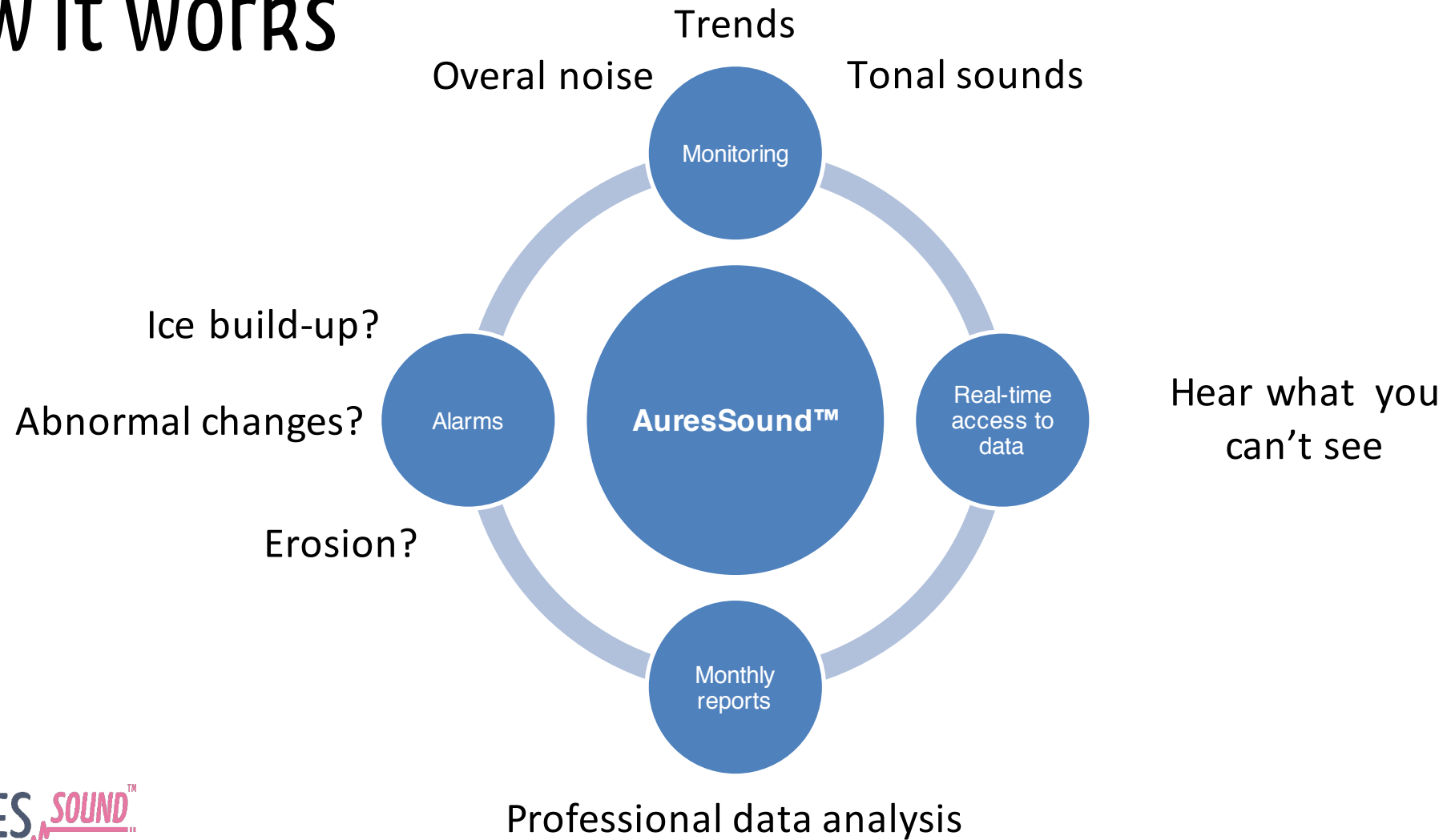
No need to setup anything at nacelle or blades.

All the installations will be made at ground level close to turbine.

Data will delivered and is accessible online or can be integrated to operational control systems.



# How it works



# What we have learned

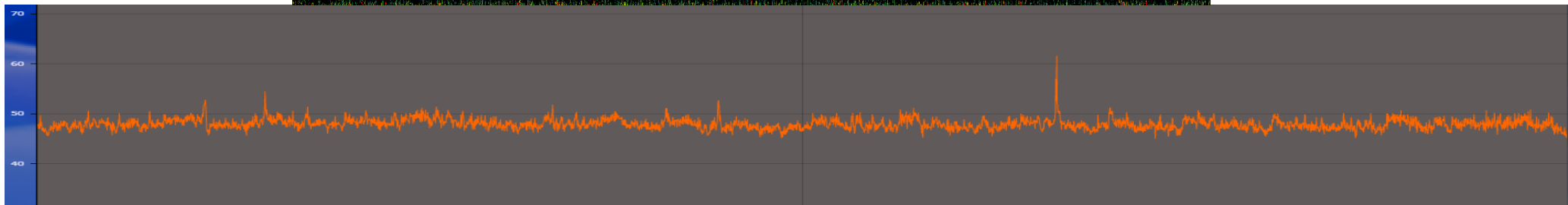
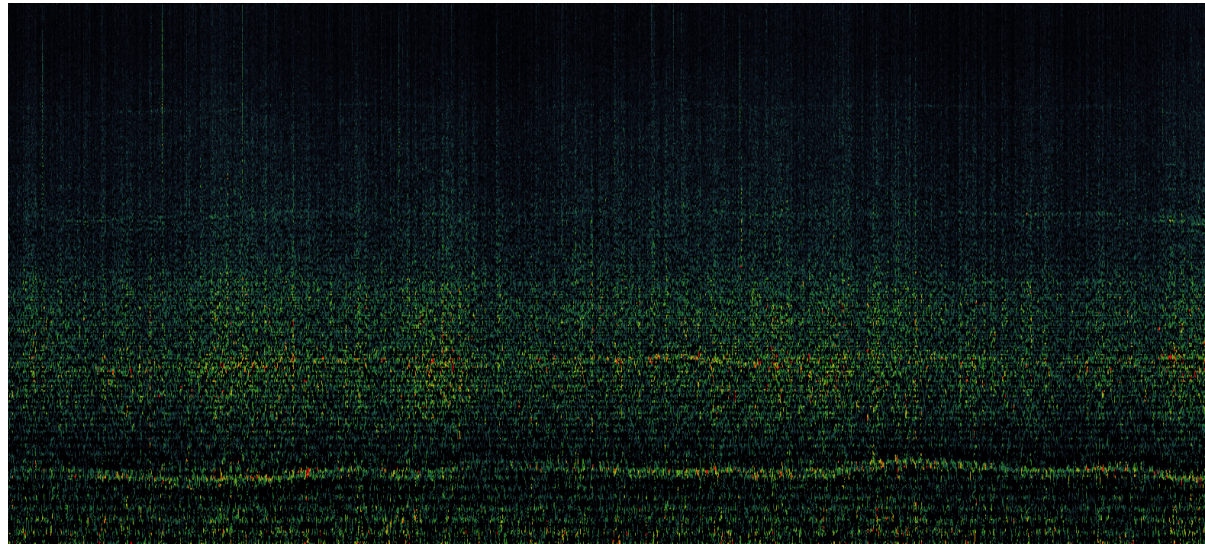
Each park has unique soundscape

Each turbine brand and each turbine has different sound

Location (geography, land-scape, etc.) influences sound profoundly

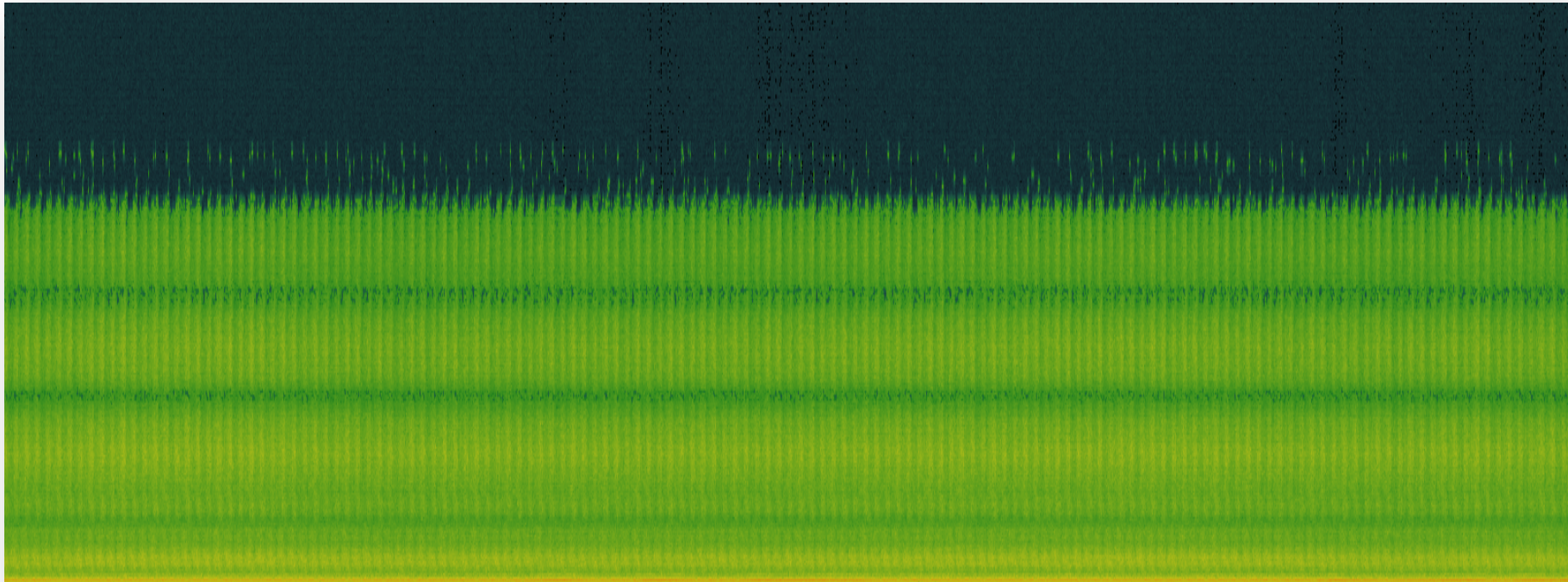
Operational deficiencies can be detected with sound analysis

# Normal wind park noise



# Monitored Sound Pattern

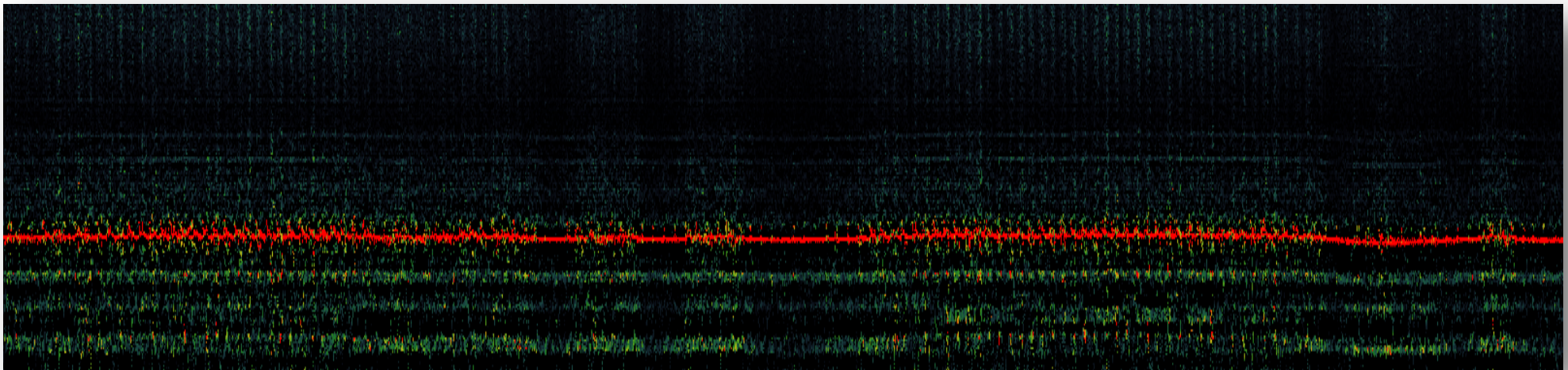
Spectrogram: visible rhythm





# Abnormal Blade Sound

Peak frequency spectrogram: 80 – 100 Hz elevated



# Tonal sounds

Wind turbines: 7

Hub height: 143 m

Output: 3 MW

Tonality

