



Kincardine Offshore Windfarm Ltd

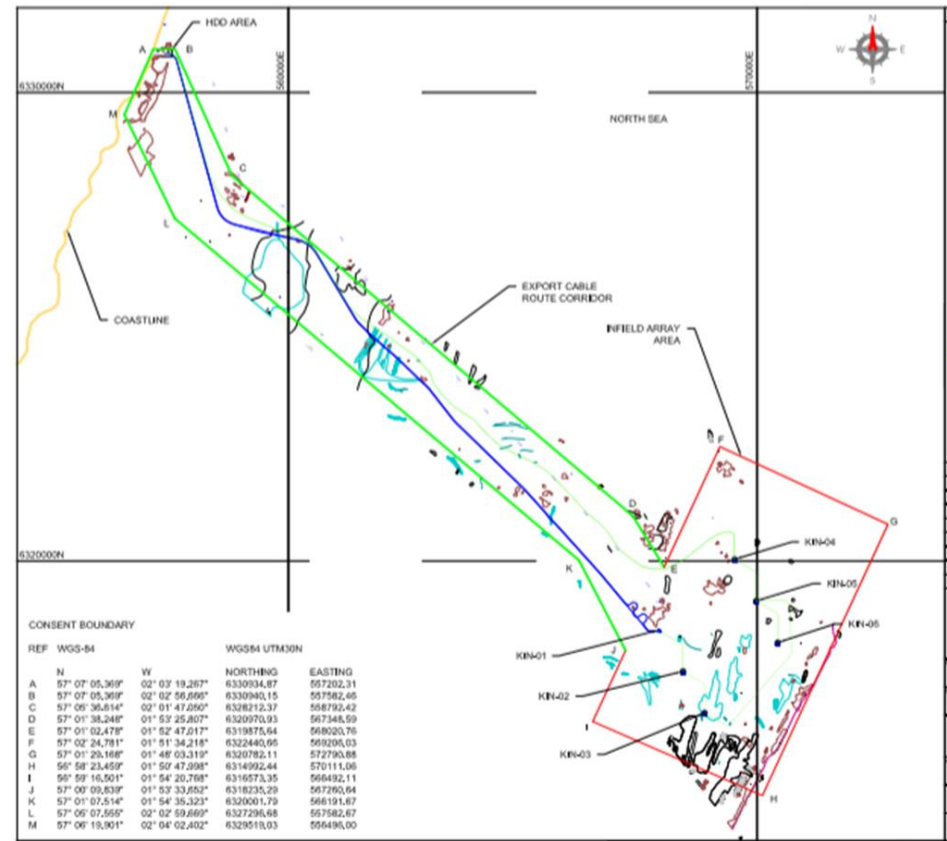
DT Bird

- Project Overview
- DT Bird

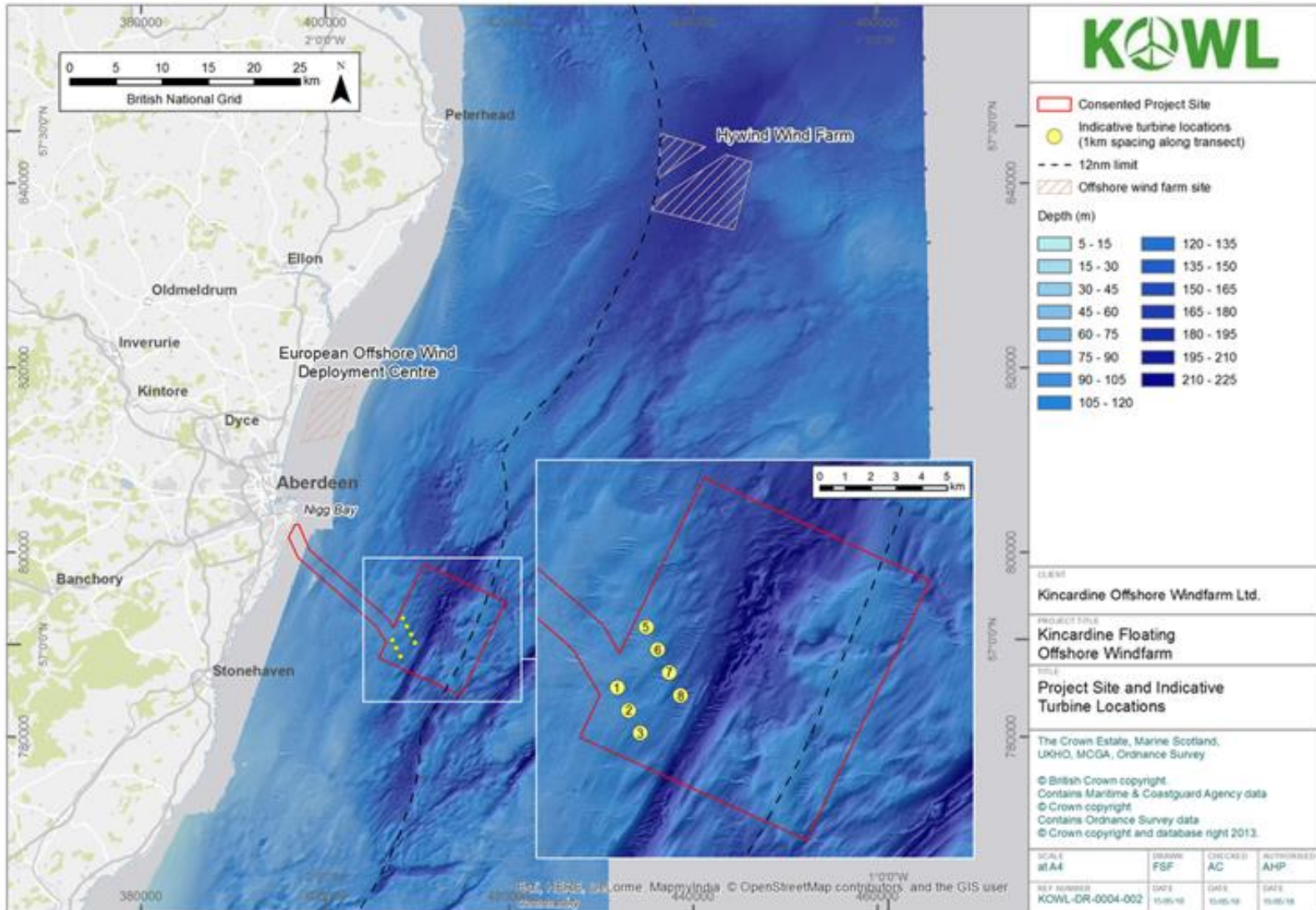
Project Overview

Summary

- Test and demonstration floating offshore wind farm in North-East Scotland with a capacity of up to 50 MW
 - 1 x 2 MW machine (Vestas V80)
 - 5 machines with 9.525 MW capacity (Vestas V164)
- First generation achieved September 2018
- 25 year operational life
- Test steel semi-submersible floating substructures
- Grid connection at Aberdeen



Location of Turbines



Project Programme

Season 1 - 2018

- Onshore facilities and first export cable
- 2 MW prototype steel semi-submersible installation
- Operation and first generation from 2MW prototype
- Technical and environmental monitoring

Season 2 - 2019

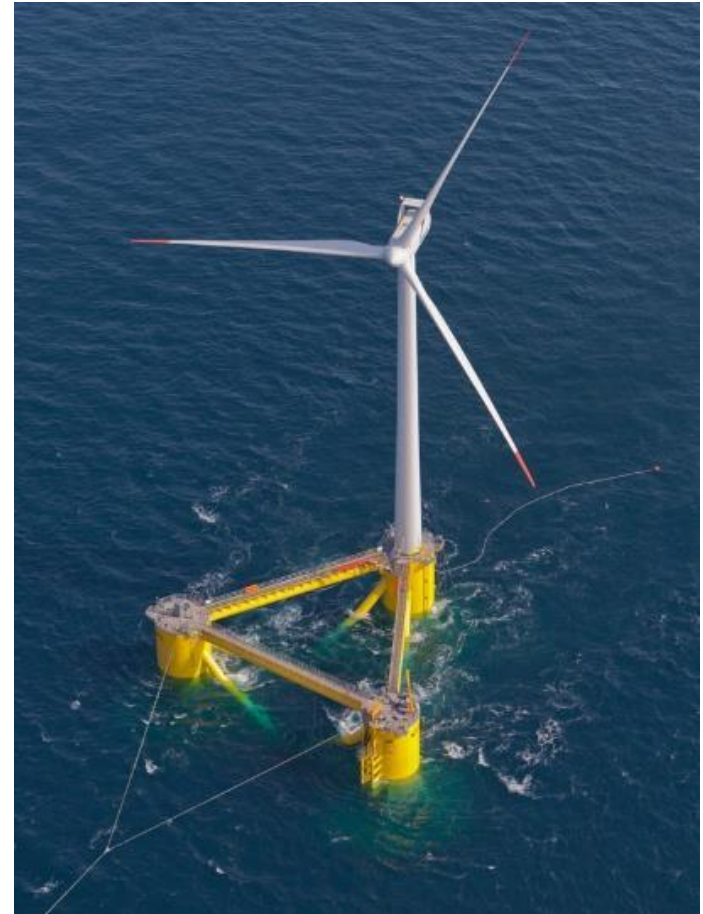
- Survey and UXO
- Commencement of fabrication of large turbines
- Commencement of fabrication of large substructures
- Technical and environmental monitoring

Season 3 - 2020

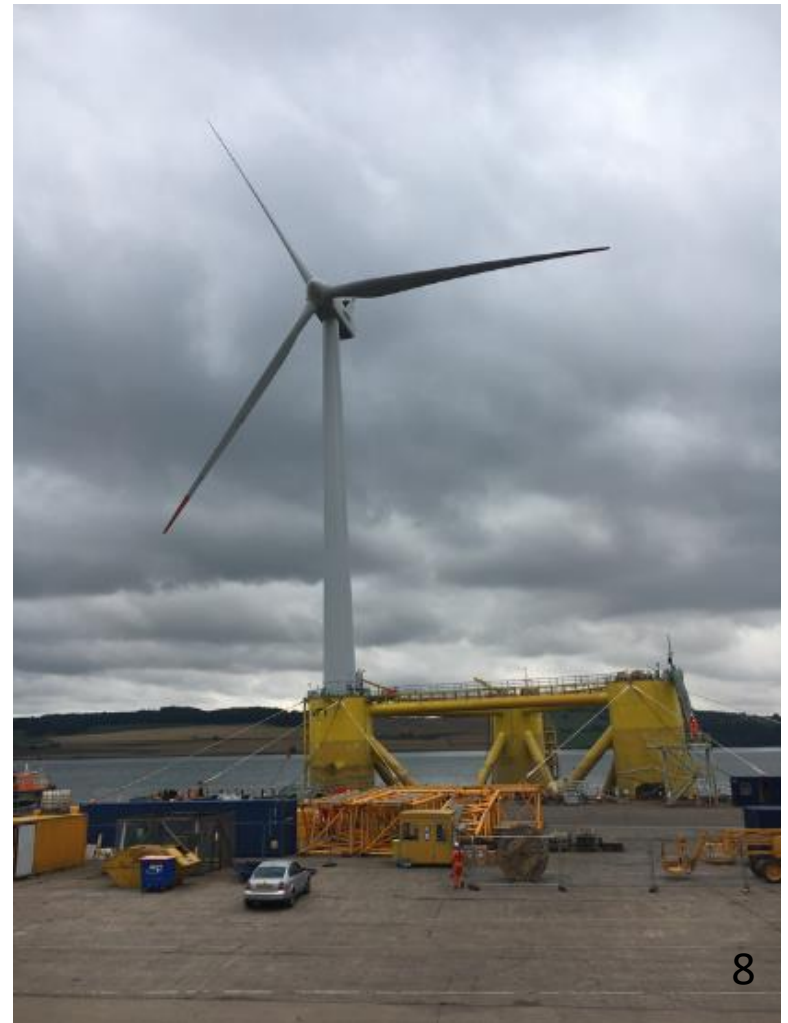
- Completion of large turbine and substructure fabrication
- Installation of large turbines onto steel semi-submersible floating structures
- Tow to site and hook up
- Operation and first generation from large turbines
- Technical and environmental monitoring

Semi-submersible Substructure

- Fabricated in steel
- Triangular semi submersible structure
- Tower over one buoyancy chamber
- 3 mooring lines (4 on 2MW structure)
- Installation of turbine at quayside
- Tow and operation in semi-submersible mode
- Maximum dimensions:
 - Tip height 191m
 - Rotor diameter 164m
 - Minimum blade height above sea level 22m



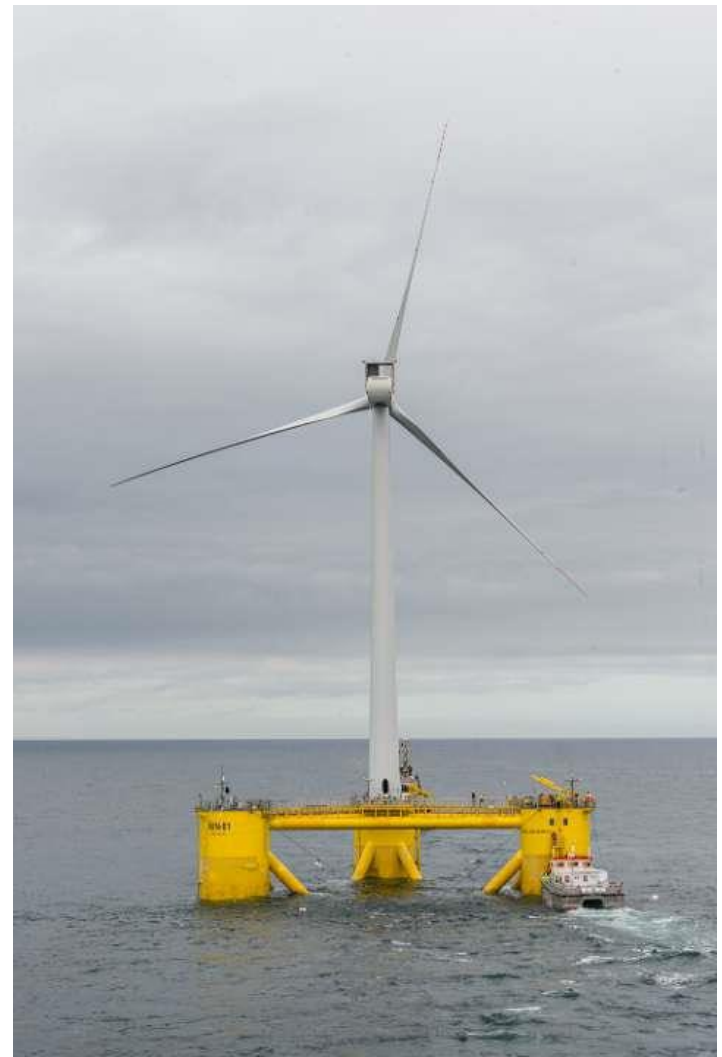
Floater (Season 1) – January / July 2018



Sailaway — August 2018



Offshore Hook-up – August 2018



Offshore Cable Installation – Pull in at cable landing point (Cove Bay - Altens) – September 2018



DT Bird

DT Bird Summary

- To fulfil Project Environmental Monitoring Plan (PEMP) requirement DT Bird system installed on 2MW prototype and 5 large turbines
- 8 HD and thermal cameras on the 2MW machine – full coverage
- Records video with sound of every flight within vicinity of turbine
- Real time and detects any bird species, day and night
- Uploads video and sound into a data analysis platform
- HD camera also takes snapshots every hour
- Environmental sensors on the DT Bird unit to collect information on light, temperature, humidity, rain, fog, wind speed and direction
- Video and audio recordings of bird collisions

DT Bird Fitted to 2MW Prototype



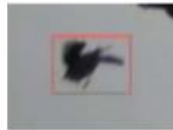
DT Bird - Reporting

- Number of flights
- Duration of flights
- Total number of birds recorded
- Total collisions caught on camera
- Following ornithologist review, size and species of bird

DT Bird – Species Captured

Example of species detected at Kincardine WF

Daylight images



European robin
(*Erithacus rubecula*)



Barn swallow
(*Hirundo rustica*)



Black-legged kittiwake
(*Rissa trydactyla*)



Common tern
(*Sterna hirundo*)



European herring gull
(*Larus argentatus*)



Lesser black-backed gull
(*Larus fuscus*)



Thermal images

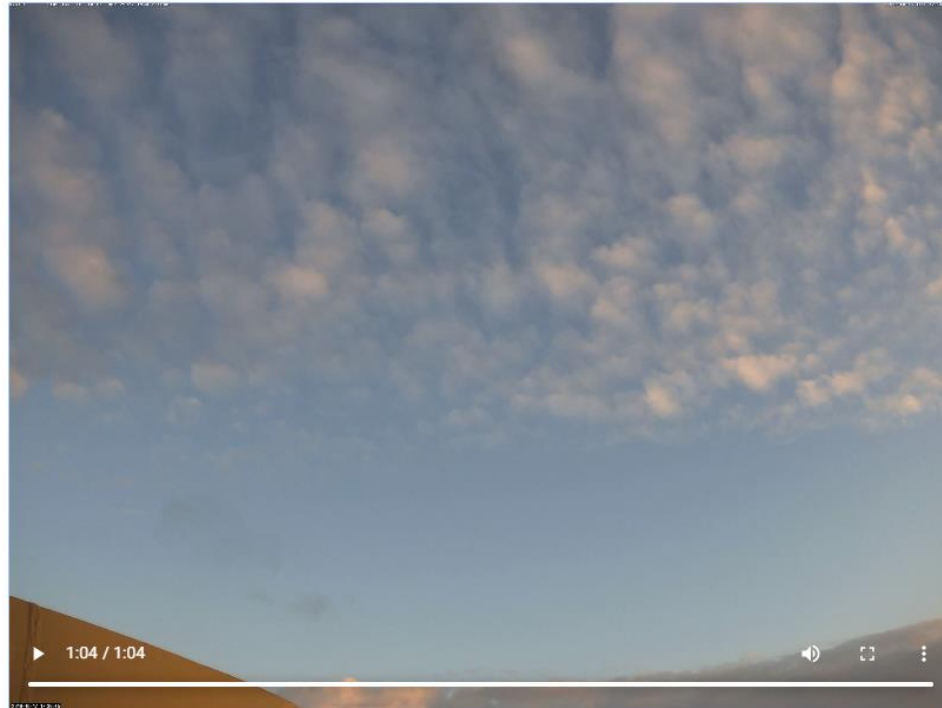


Gull
(*Larus sp.*)

DT Bird – Flight Example 1

Flight 14924 (Kincardine1) | 2019-10-17 17:35:45

×



◀ PREVIOUS FLIGHT

NEXT FLIGHT ▶

DT Bird – Flight Example 1



DT Bird – Flight Example 1



DT Bird – Flight Example 2



DT Bird – Flight Example 3 (False Positive, Aeroplane)





Kincardine Offshore Windfarm Ltd

DT Bird