

Linxon ako EPC dodávateľ pre Seagreen

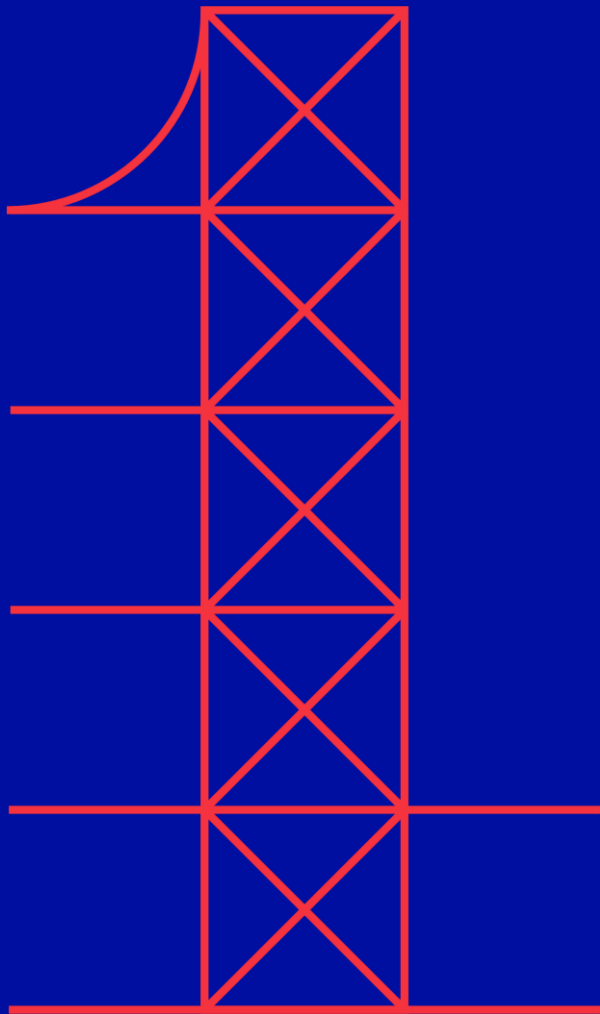
Najväčší Škótsky veterný park s najhlbším základom na svete

Michal Kolcun ml.

Engineering Team Leader

Poráč 3/11/2022





Linxon

Predstavenie firmy Linxon

We combine SNC-Lavalin's project management expertise and Hitachi Energy's industry leading technological knowledge into a company dedicated to turnkey electrical AC substations

... we are Linxon.



51%
SNC-
Lavalin

49%
Hitachi
Energy

Budujeme
infraštruktúru

aby sme napájali
svet energiou bez
uhlíkovej stopy

E E A A C E A E D B F

Linxon ponúka inžiniering,
obstarávanie a výstavbu vvn/zvn
(AC) elektrických staníc.

Linxon pokrýva 6 hlavných
zákazníckych segmentov:



D C Eb E Eb

G# E F# G# Bb Gb Bb

G# E# E#

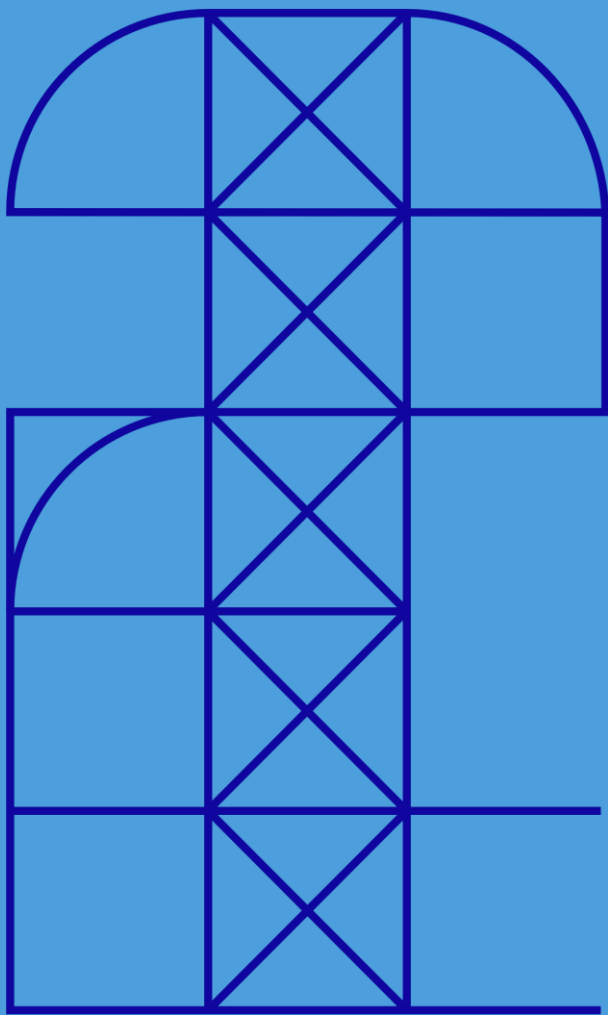
zamestancov

G hubov

Severná Amerika
UK, Írsko & Centrálna Európa
Severské krajiny
Blízky východ & Afrika
Ázia Pacifik

linxon



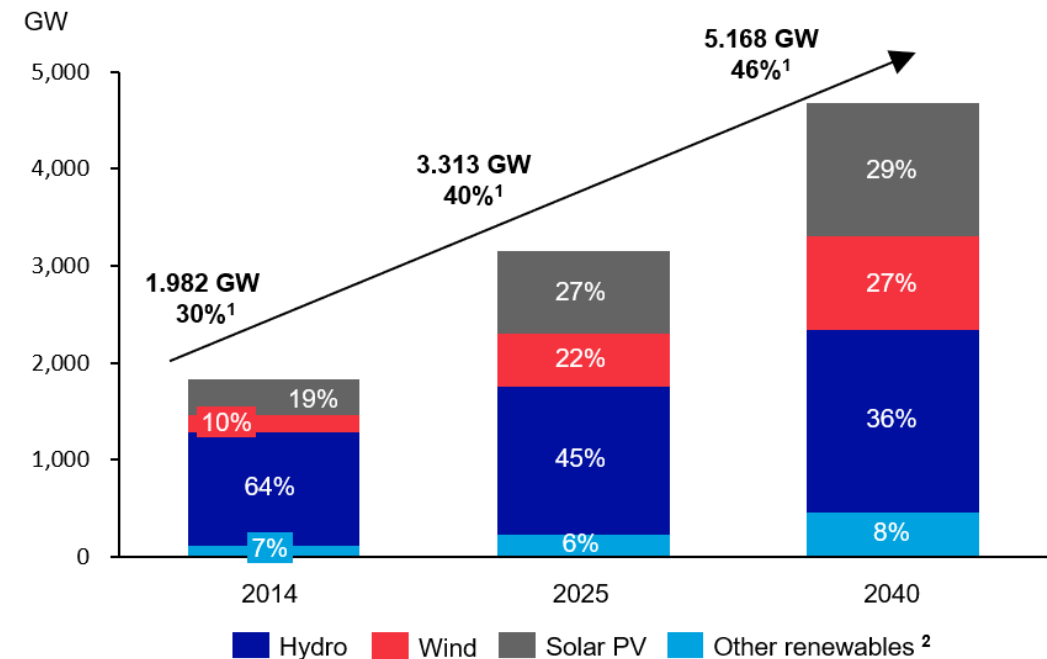
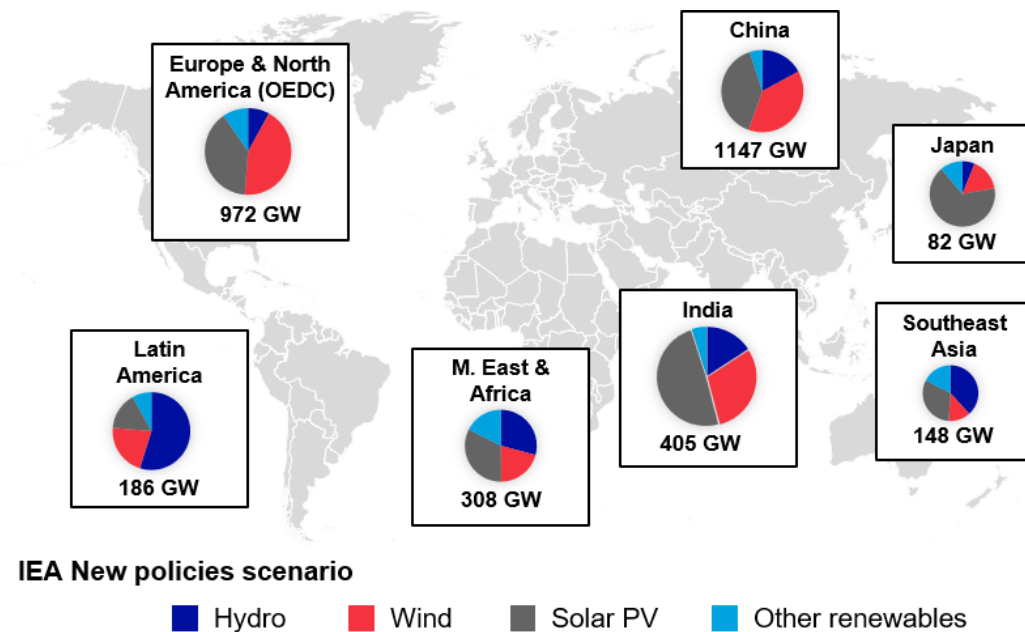


Veterná energia

Obnoviteľná energia

Svetová inštalovaná kapacita do roku 2040

Prírastok kapacity 2018-2040



Očakáva sa obrovský rast obnoviteľných zdrojov, keďže vietor a slnko sa stávajú preferovanými technológiami na výrobu energie

Largest operational offshore wind farms [[edit](#)]

See also: *[Lists of offshore wind farms by country](#)*

This is a list of offshore wind farms with at least 300 MW nameplate capacity that are currently operational.

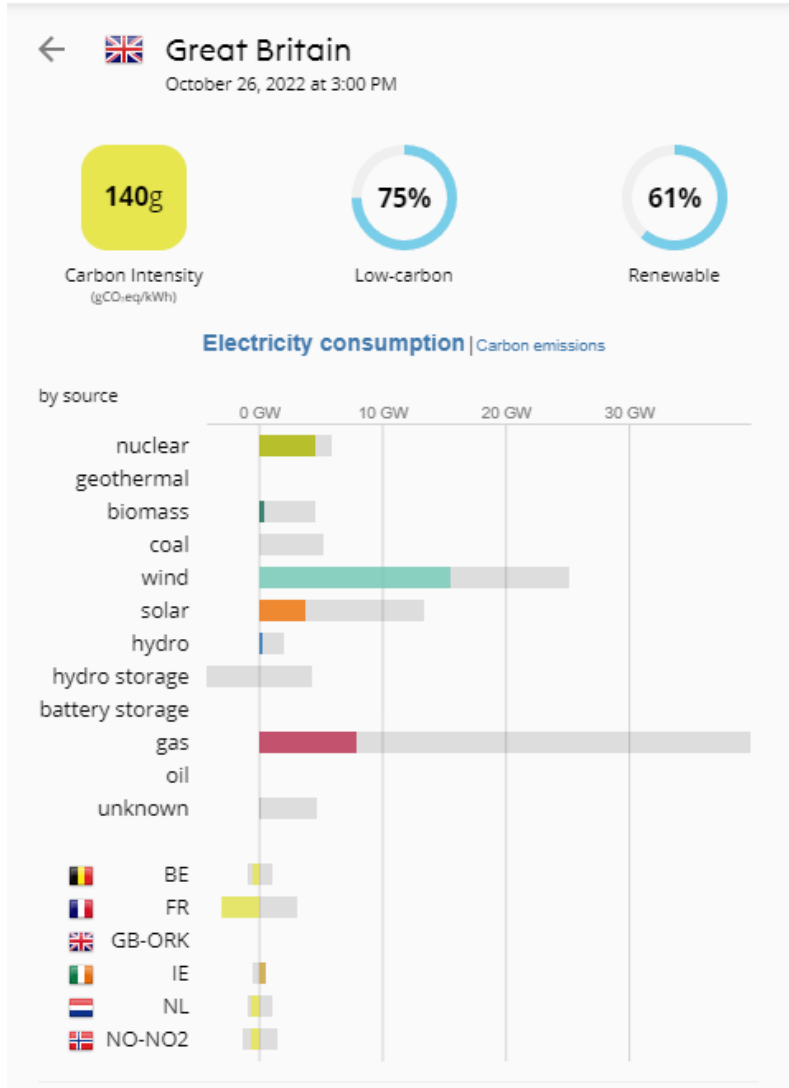
Wind farm	Location	Coordinates	Capacity (MW)	Turbines number	Turbines model	Commissioning date	Refs
Hornsea Project Two	United Kingdom	53°54′36.0″N 1°33′6.5″E﻿ / ﻿53.91000°N 1.55181°E﻿ / 53.91000; 1.55181	1,386	165	Siemens Gamesa 8.0-167 DD	2022	[2][3]
Hornsea Project One	United Kingdom	53.885°N 1.791°E﻿ / ﻿53.885°N 1.791°E﻿ / 53.885; 1.791	1,218	174	Siemens Gamesa SWT-7.0-154	2019	[4][5]
Moray East	United Kingdom	58°10′1.49″N 2°41′54.67″W﻿ / ﻿58.16958°N 2.69880°W﻿ / 58.16958; -2.69880	950	100	MHI Vestas V164 9.5 MW	2022	[6]
Triton Knoll	United Kingdom	53°24′N 0°54′E﻿ / ﻿53.4°N 0.9°E﻿ / 53.4; 0.9	857	90	MHI Vestas 9.5 MW	2021	[7][8]
Borssele 1&2	Netherlands	51°42′10″N 3°4′34″E﻿ / ﻿51.70278°N 3.07611°E﻿ / 51.70278; 3.07611	752	94	Siemens Gamesa 8MW	2020	[9][10]
Borssele 3&4	Netherlands	51°42′25.2″N 2°54′44.6″E﻿ / ﻿51.70699°N 2.91239°E﻿ / 51.70699; 2.91239	731.5	77	MHI Vestas V164 9.5MW	2021	[11][12]
East Anglia ONE	United Kingdom	52°14′53″N 2°30′22″E﻿ / ﻿52.24806°N 2.50583°E﻿ / 52.24806; 2.50583	714	102	Siemens Gamesa SWT-7.0-154	2020	[13][14]
Walney Extension	United Kingdom	54°5′17″N 3°44′17″W﻿ / ﻿54.08806°N 3.73806°W﻿ / 54.08806; -3.73806	659	40+47	MHI-Vestas 8.25 MW Siemens Gamesa SWT-7.0-154	2018	[15]
London Array	United Kingdom	51°38′38″N 01°33′13″E﻿ / ﻿51.64389°N 1.55361°E﻿ / 51.64389; 1.55361	630	175	Siemens Gamesa SWT-3.6-120	2013	[16][17][18]
Kriegers Flak	Denmark	55°01′00″N 12°56′00″E﻿ / ﻿55.01667°N 12.93333°E﻿ / 55.01667; 12.93333	605	72	Siemens Gamesa SWT-8.4-167	2021	[19][20]
Gemini Wind Farm	Netherlands	54°2′10″N 05°57′47″E﻿ / ﻿54.03611°N 5.96278°E﻿ / 54.03611; 5.96278	600	150	Siemens Gamesa SWT-4.0	2017	[21][22][23][24]
Beatrice	United Kingdom	58°7′48″N 3°4′12″W﻿ / ﻿58.13°N 3.07°W﻿ / 58.13; -3.07	588	84	Siemens Gamesa SWT-7.0-154	2019	[25]
Gode Wind (phases 1+2)	Germany	54°04′N 7°02′E﻿ / ﻿54.06667°N 7.03333°E﻿ / 54.06667; 7.03333	582	97	Siemens Gamesa SWT-6.0-154	2017	[26][27]
Gwynt y Môr	United Kingdom	53°27′00″N 03°35′00″W﻿ / ﻿53.45°N 3.58333°W﻿ / 53.45; -3.58333	576	160	Siemens Gamesa SWT-3.6-107	2015	[28]
Race Bank	United Kingdom	53°16′N 0°50′E﻿ / ﻿53.26667°N 0.83333°E﻿ / 53.26667; 0.83333	573	91	Siemens Gamesa SWT-6.0-154	2018	[29][30]
Greater Gabbard	United Kingdom	51°52′48″N 1°56′24″E﻿ / ﻿51.88°N 1.94°E﻿ / 51.88; 1.94	504	140	Siemens Gamesa SWT-3.6-107	2012	[31][32][33]
Jiangsu Qidong H1+H2	China	32°7′12″N 122°9′36″E﻿ / ﻿32.12°N 122.16°E﻿ / 32.12; 122.16	503	84	Shanghai Electric	2021	[34][35]
CGN Shanwei Jiazi I	China	32°10′N 122°10′E﻿ / ﻿32.16667°N 122.16667°E﻿ / 32.16667; 122.16667	503	78	MySE6.45-180	2022	[36]
Hohe See	Germany	54°26′N 6°19′E﻿ / ﻿54.43333°N 6.31667°E﻿ / 54.43333; 6.31667	497	71	Siemens Gamesa SWT-7.0-154	2019	[37]
Borkum Riffgrund 2	Germany	53°57′7″N 6°29′17″E﻿ / ﻿53.95194°N 6.48806°E﻿ / 53.95194; 6.48806	450	56	MHI Vestas V164-8.0 MW	2019	[38]

Largest under construction [[edit](#)]


This is a list of wind farms with a nameplate capacity of more than 300MW currently under construction.

Wind farm	Location	Coordinates	Capacity (MW)	Turbines & model	Completion	Refs
Dogger Bank A	United Kingdom		1,200	95 × GE Haliade-X 13MW	2023	[103]
Dogger Bank B	United Kingdom		1,200	95 × GE Haliade-X 13MW	2024	[103]
Seagreen (Alpha & Bravo)	United Kingdom		1,140	114 × MHI Vestas V164-10 MW	2023	[104][105]
Greater Changhua	Taiwan		900	111 × Siemens Gamesa 8.0-167 DD	2022	[106]
Vineyard Wind	United States	41.03325°N 70.61667°W﻿•﻿	800	62 × 13.6MW GE Haliade-X	2023	[107][108][109][110]
Hollandse Kust Zuid I-II	Netherlands		770	70 × Siemens Gamesa 11MW	2022-2023	[111]
Hollandse Kust Zuid III-IV	Netherlands		770	70 × Siemens Gamesa 11MW	2023	[112]
Hollandse Kust Noord	Netherlands		759	69 × SG 11.0-200 DD	2023	[36][113]
Yunlin	Taiwan		640	80 × Siemens Gamesa 8.0-167 DD	2023	[114][115]
Changfang	Taiwan		589	62 × MHI Vestas V174-9.5 MW	2023	[116][117][118]
Guodian Xiangshan 1 phase 2	China		500	41 × 12MW units	2025	[36][119]
Fécamp	France		497	71 × Siemens Gamesa SWT-7.0-154	2023	[120]
Saint-Brieuc	France		496	62 × Siemens Gamesa 8.0-167 DD	2023	[121][122]
Saint-Nazaire	France		480	80 × GE Haliade 150-6MW	2022	[123][124]
Calvados	France		448	64 × Siemens Gamesa SWT-7.0-154	2024	[125]
The Neart na Gaoithe (NnG)	United Kingdom		450	54 × Siemens Gamesa 8.0-167 DD	2023	[126][127]
Formosa II	Taiwan		376	47 × Siemens Gamesa 8.0-167 DD	2022	[128]
Kaskasi ^[de]	Germany	54°29′0″N 7°41′0″E﻿•﻿	342	38 × Siemens Gamesa 8.0-167 DD	2022	[129]
Fujian Putian City Flat Bay Three Zone C	China		308	44 × SWT-7.0-154	2022	[36]
Changle Area A	China		300	36 × DEW-D10000-185 & GW175-8.0MW	2022	[36]
Changle Area C 2	China		300	37 × DEW-D10000-185 & SG 10.0-193 DD	2022	[36]
Mingyang Yangjiang Shapa	China		300	46 × MySE6.45-180	2022	[36]

ELECTRICITY MAPS



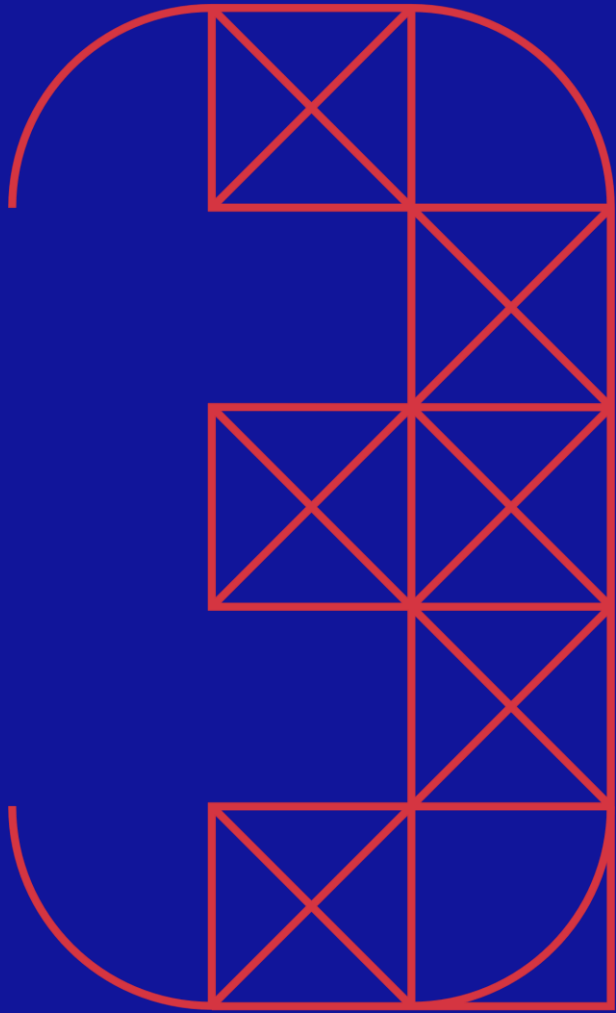
October 26, 2022 at 3:00 PM

47.06 % of electricity available in  **Great Britain** comes from wind
 (15.5GW / 33.0GW)

utilizing **61.83 %** of installed capacity
 (15.5GW / 25.1GW)

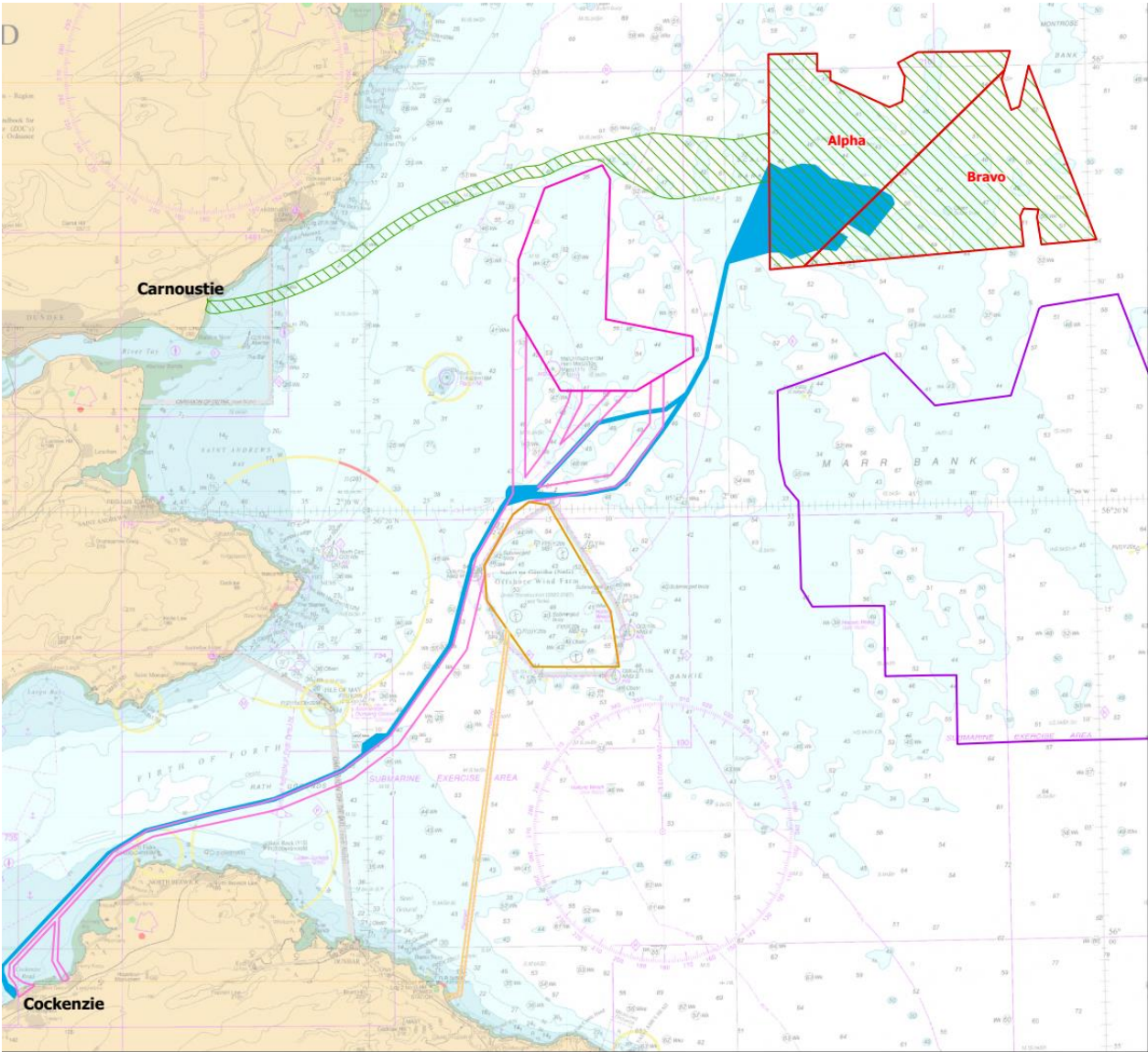
representing **3.7 %** of emissions
 (2.84t of CO₂eq per minute / 76.8t of CO₂eq per minute)

with a carbon intensity of
■ **11 gCO₂eq/kWh** (Source: IPCC 2014)



Projekt Seagreen

Veterný park Seagreen



Legend

- Seagreen 1A Export Cable Marine Licence Boundary
- Seagreen Site Boundary
- Seagreen Offshore Transmission Asset Marine Licence Boundary

3rd Party Sites

- Neart na Gaoithe Offshore Boundary
- Neart na Gaoithe Offshore Cable Corridor
- Inch Cape Offshore Boundary
- Inch Cape Offshore Cable Corridor
- Berwick Bank Site Boundary

© Crown copyright 2022. All rights reserved. EN001-042200

04					
03					
02					
01	31/09/2022			CT	EM
Rev	Date	Status	Drawn	Checked	Appd

Sea green
WIND ENERGY

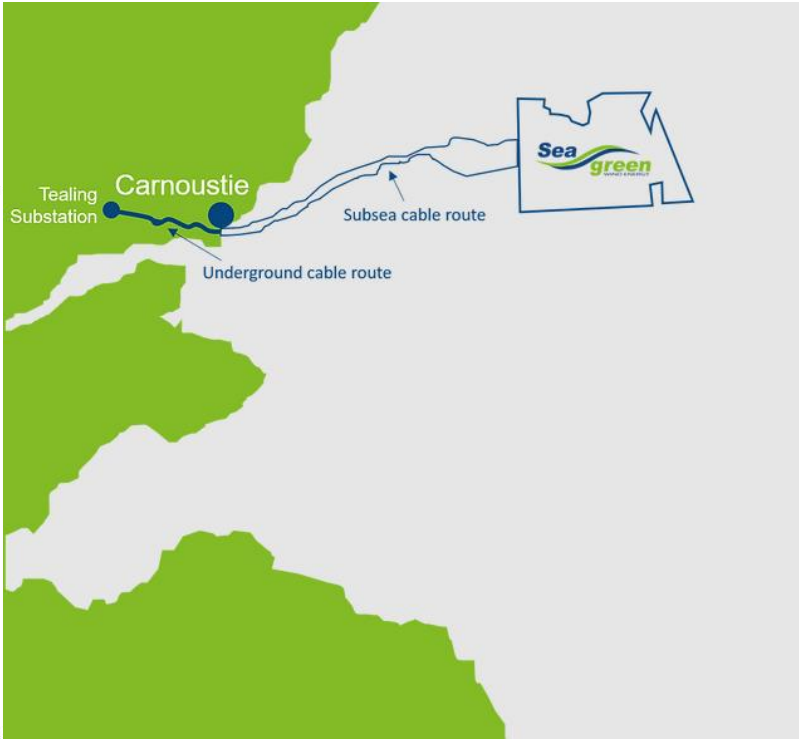
Project
SEAGREEN 1A

Title
PROJECT OVERVIEW

© Seagreen 1A Ltd. 2021. Seagreen 1A does not warrant that this document is definitive or that it is correct and does not accept liability for any loss caused or arising from reliance upon the information contained.

Scale	Plot Size	Datum	Projection
1:320,000	A3	WGS84	UTM50N

Drawing Number: SEA1A-M-SOC-0004-01 Sheet No: 001 OF 001



Source: Seagreenwindenergy.com

Veterný park Seagreen



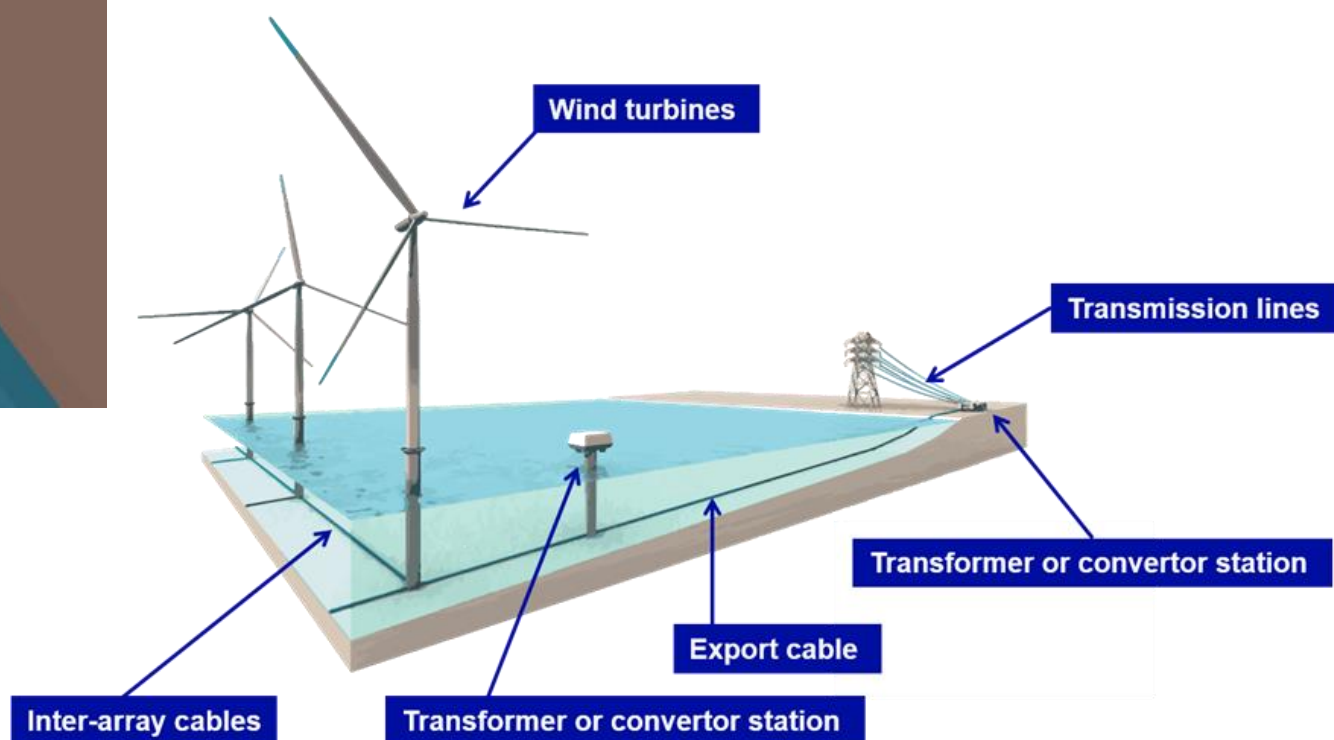
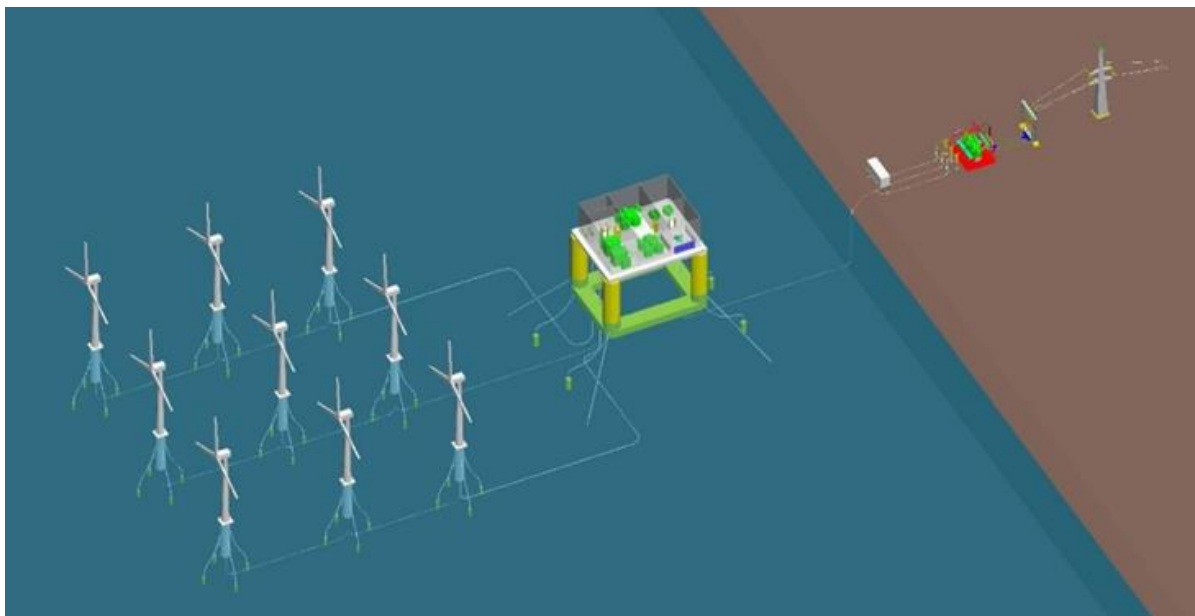
Fakty:

- Najväčšia Škótska offshore veterná farma
- Investori: SSE Renewables 49% a Total Energies 51%
- Najhlbšia pevne kotvená konštrukcia v hĺbke 59m na svete
- Vzdialená 27km od pobrežia
- Počet turbín: 114 MHI Vestas 10MW
- Inštalovaný výkon: 1075MW
- Ročná výroba elektrickej energie 5 TWh (napájanie pre 1,6 milióna domácností)
- Uvedenie do prevádzky August 2022
- Kompletné ukončenie Q2/2023
- Cena: 3 miliardy Libier
- Očakávaná životnosť: 25 rokov

Source: Seagreen Wind Energy Limited/Twitter



Veterný park Seagreen – princiipiálna schéma



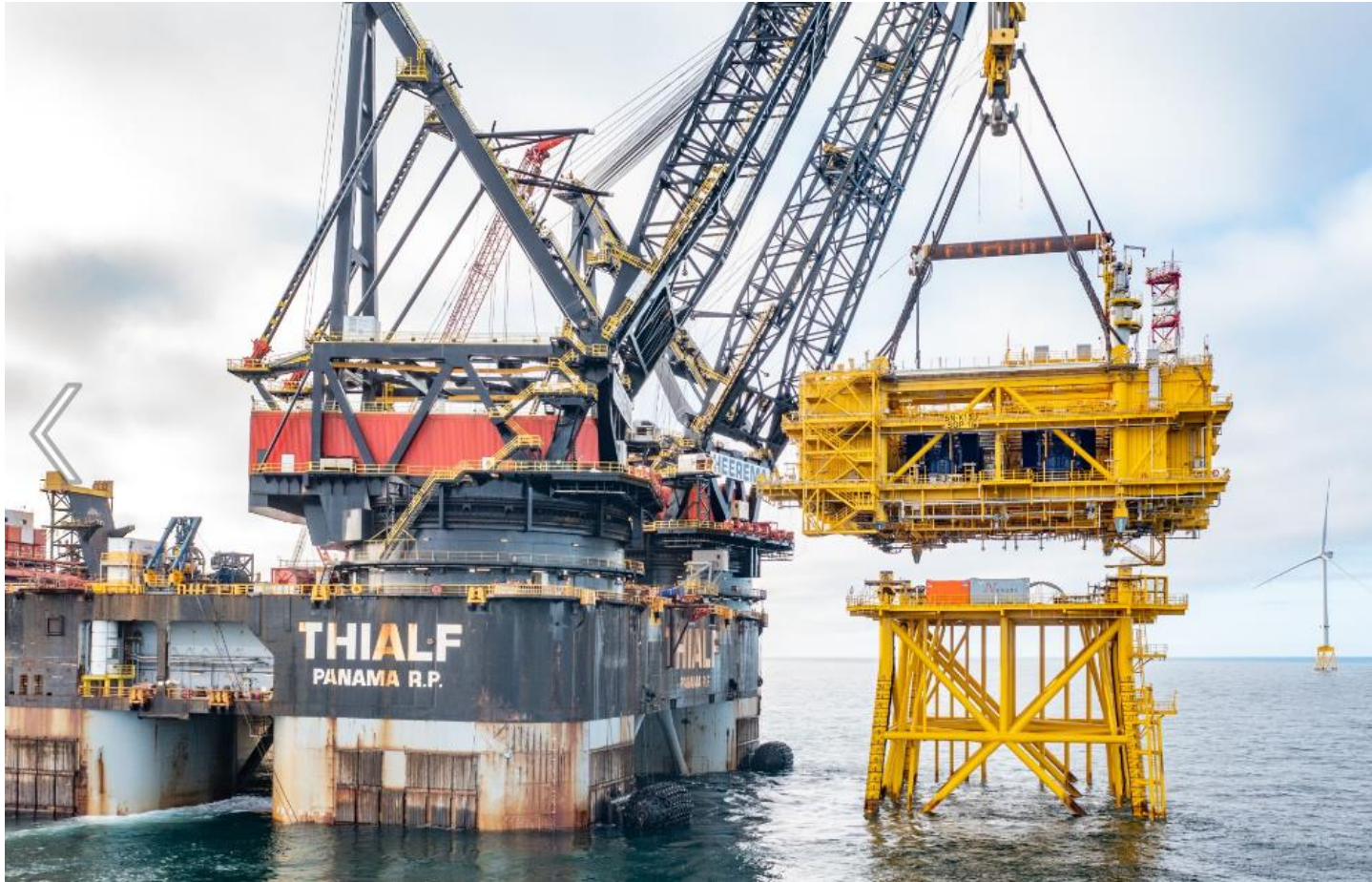
Veterný park Seagreen



Turbíny:

- MHI (Mitsubishi Heavy Industries) VESTAS
- V164 – 10MW
- Priemer rotora: 164m
- Plný výkon pri prúde vetra 10m/s
- Full scale converter 50Hz pri 66kV nominálnom napätí

Source: Seagreenwindenergy.com



Source: Petrofac LinkedIn

OFFSHORE platforma:

- Inštalácia 03/2022
- Stojí na dne na konštrukcii, ktorá váži 5.100 ton
- OSP (OFFSHORE PLATFORM)
4.800 t 40m x 45m x 15m

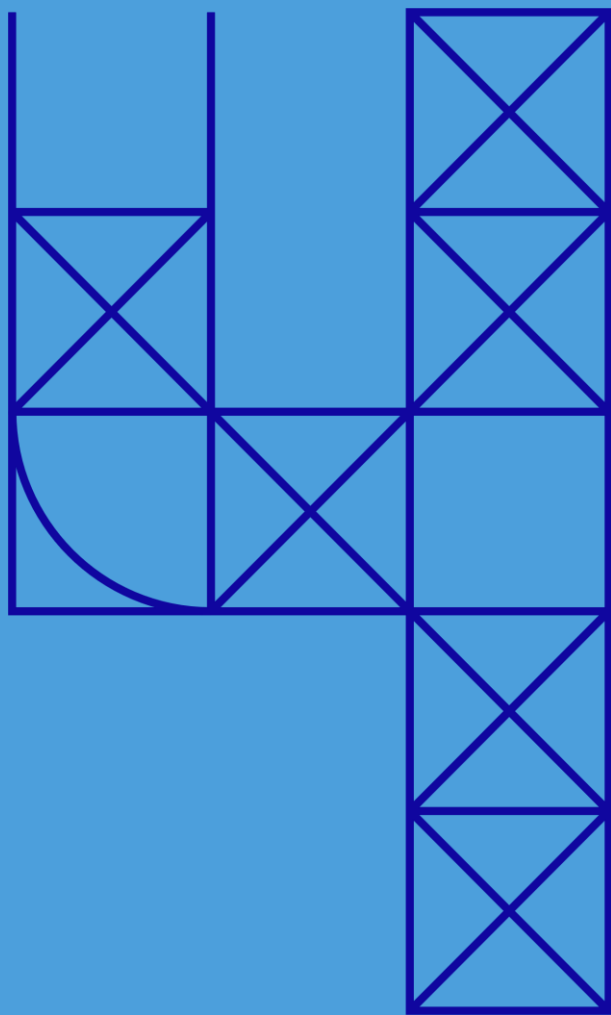


Source: Petrofac LinkedIn

Veterný park Seagreen - ONSHORE



Source: Petrofac LinkedIn



SKOPC na projekte Seagreen

SKOPC na projekte Seagreen

- SKOPC na projekte pracuje od 09/2019
- Slovenský Seagreen team má 6 členov
- Odpracované vyše 18.000 inžinierskych hodín
- Projekcia, inžinierska činnosť, koordinácia subdodávateľov, účasť na FAT testoch
- Inžinierska podpora na ONSHORE počas uvádzania do prevádzky
- Uvedenie do prevádzky / riadenie prác na OFFSHORE plošine



Photo: Michal Kolcun

SKOPC na projekte Seagreen



Photo: Ján Dzedzina

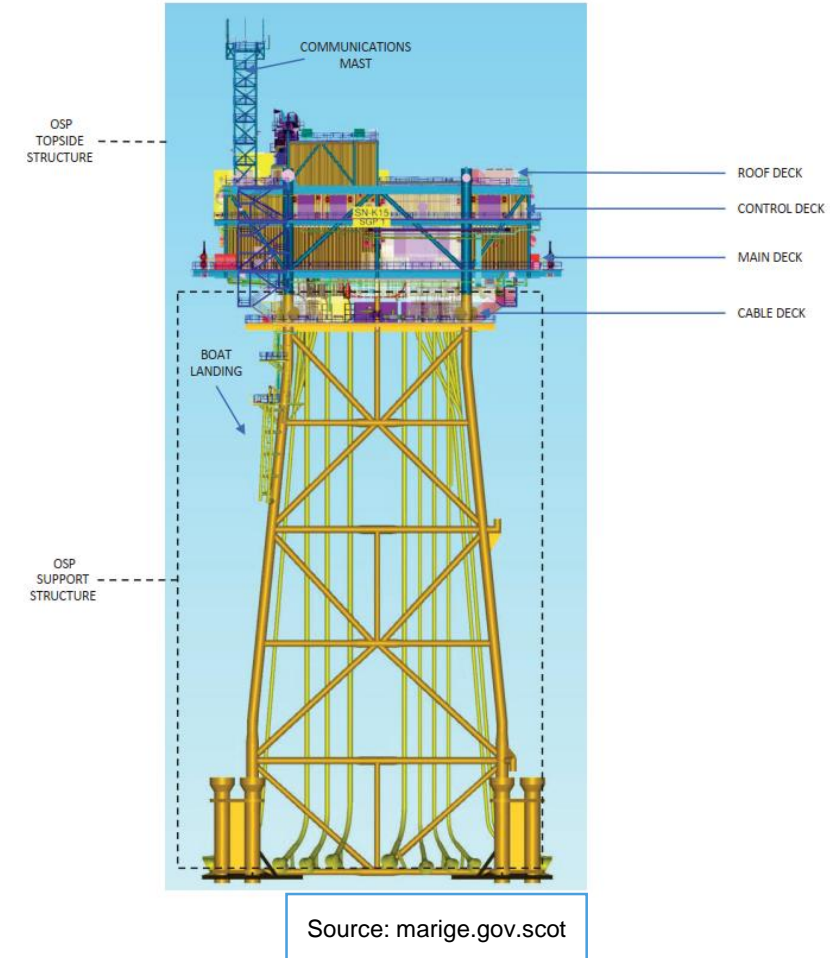
Sekundárna technika:

1. Layouty – rozmiestnenie zariadení
2. Vlastná spotreba / napájanie
3. Ochrany
4. Riadiaci systém
5. Meranie a fakturácia
6. Optické prepoje
7. TECHNET (kamerový systém, telefóny, WIFI)

SKOPC na projekte Seagreen – skúšky na OSP



Source: Seagreenwindenergy.com



Source: marige.gov.scot



Photo: NEXANS Norway

Kontakt:



Ďakujem za pozornosť!



Ľuboš Ungvarský

General manager
Slovakia Linxon OPC

lubos.ungvarsky@linxon.com



Pavol Bačík

Engineering Team Leader

pavol.bacik@linxon.com



Michal Kolcun ml.

Engineering Team Leader

michal.Kolcun@linxon.com

linxon