

Rampion Offshore Wind Farm

October 2017

Rampion Offshore Wind is owned by:

e-on

Green
Investment
Bank

ENBRIDGE

Presentation Overview

1. Who/What is Rampion?
2. Historic milestone
3. Final design
4. Offshore construction
5. Onshore construction
6. O&M Base
7. Jobs, skills and suppliers
8. Project benefits

1. Rampion Offshore Wind Ltd.



Rampion Offshore Wind Ltd (ROW) owned by:

50.1% E.ON

25.0% Green Investment Bank

24.9% Enbridge

E.ON is the construction management company building Rampion on behalf of ROW



2. Historic milestones

Jan 2010: E.ON awarded exclusivity to develop 'Zone 6' off Sussex coast

2010-11: Early engagement, engineering and environmental surveys

2012: Consultation on draft proposals

Mar 2013: Submit Development Consent application of final proposals

Jun 2013: Planning Inspectorate Examination of application

July 2014: Development Consent Award

May 2015: Final investment decision

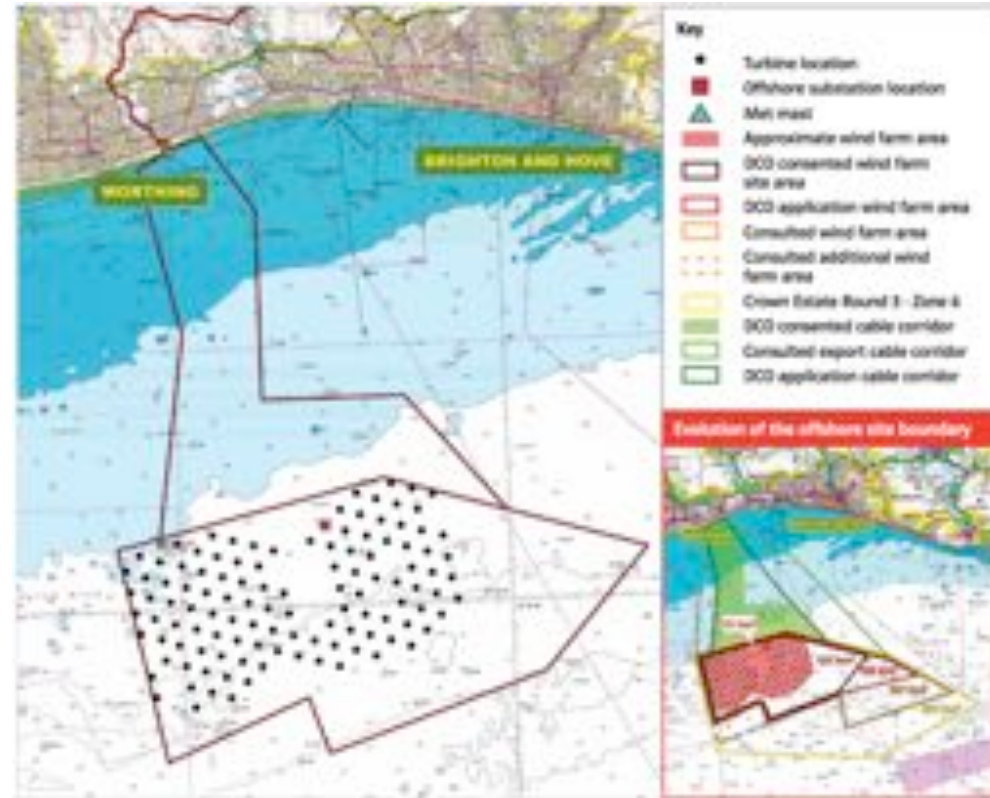
Sept 2015: Construction commences



*Left: Worthing
Public Exhibition*

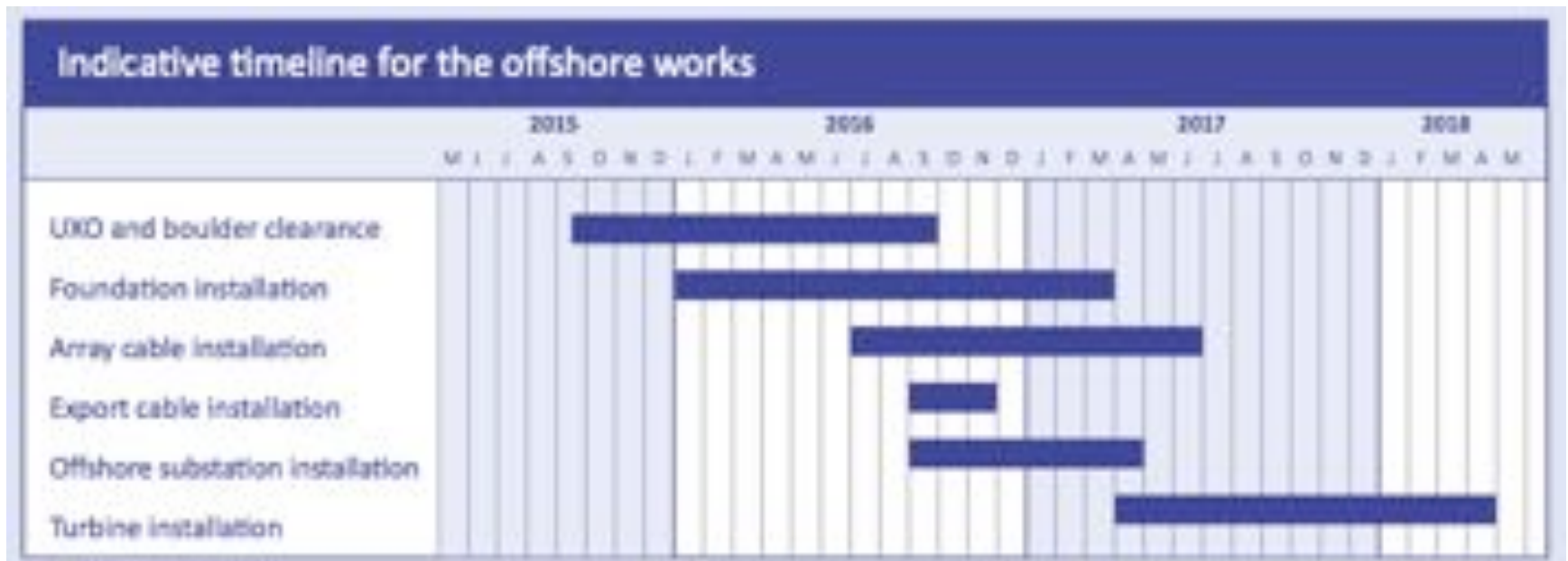
3. Final design

- 13-20km off Sussex coast / 72km² site area
- 116 x 3.45MW MHI Vestas turbines on monopile foundations piled into the seabed
- 400MW installed electrical capacity
- Hub height 84m / Tip height 140m / Blade length 55m / Rotor diameter 112m
- 12 strings of subsea array cables, total length 140km, taking power at 33kV
- Offshore substation on four-leg jacket foundation transforms power up to 150kV
- 2 x subsea export cables transport power over 16km to landfall at Brooklands
- 27km underground onshore cable route via 2 x circuits to Twineham
- Onshore substation transforms power to 400kV to connect into transmission grid at Bolney



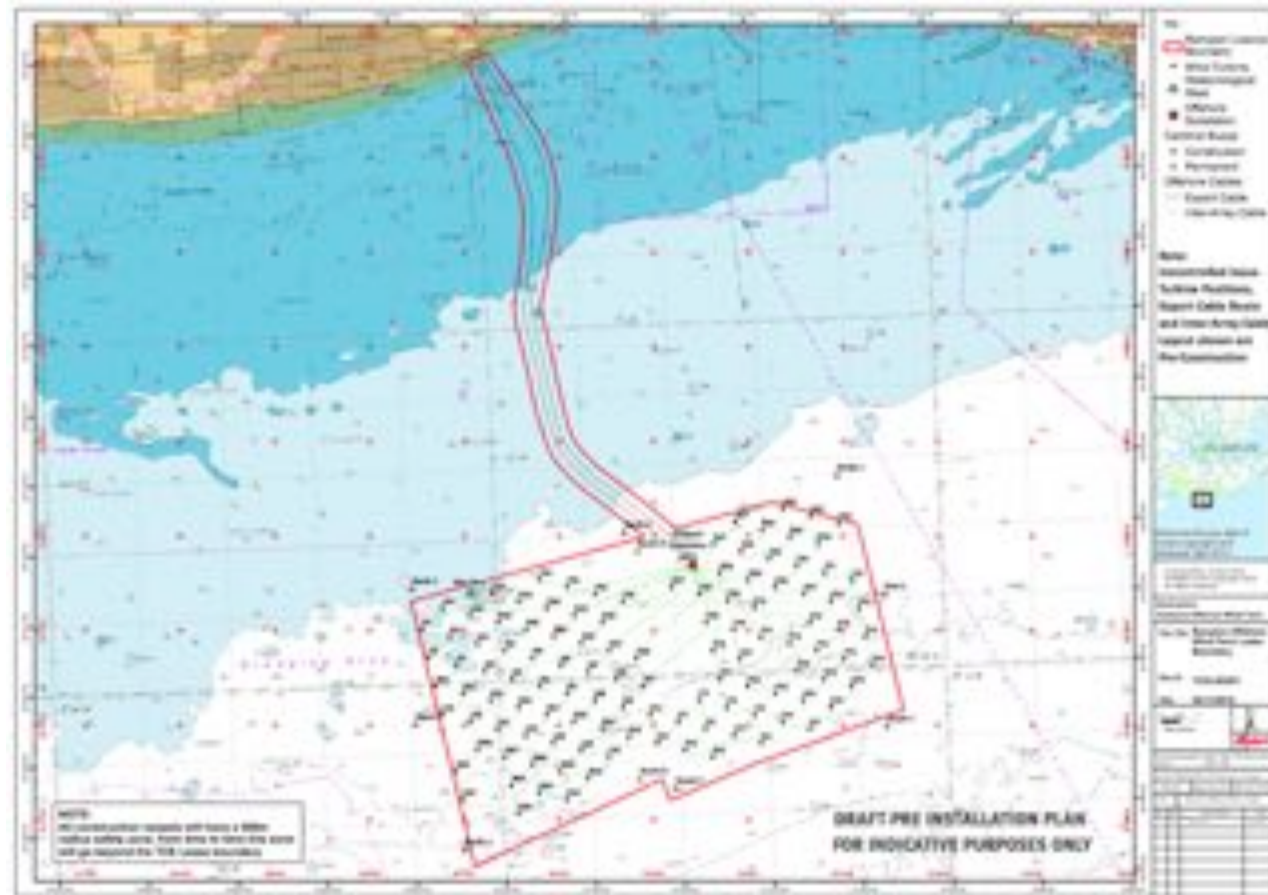
4. Offshore construction

Indicative offshore construction timetable



Offshore construction boundary

- 8 cardinal buoys & 2 permanent buoys mark site boundary (Dec 2015)
- Picked up on S-Band radar within 2-3miles
- Morse V light signature



Preparing for construction



- Fish ecology surveys
- Benthic surveys
- Boulder relocation works
- UXO surveys and clearance, if required
- Construction Project Management Facility at Newhaven Port - free standing modular buildings
- Offshore pontoons and quayside works for crew transfer vessels

Boulder relocation

- Relocate boulders down to 30cm in diameter
- Approx. 12,000 boulders relocated
- Haphazard relocations to prevent reef
- Informing fishermen of new boulder locations

Below: Pegasus



Above: Rock grab UTROV

UXO (unexploded ordnance)

- 1,200 potential targets surveyed, primarily from WWII
- Survey and analysis on ultrasonic magnetic targets to discount non-explosives
- Remote Operating Vehicle (ROV) identification of remaining targets
- Divers assess last remaining targets



Above: ROV



Left: Neptunas (nearshore surveys)

UXO controlled explosions

- 2 x WWII 500lb bombs identified 3km off Lancing beach, 13m depth
- Routine controlled explosions mid August following MMO consultation
- Sea users informed and ROW monitored a 2km safety exclusion zone around site



Above: SIEM N-Sea
(deeper water surveys)

Construction Project Management

- Temporary Construction Base, Newhaven Port
- Quayside floating pontoon complete
- 16 Crew Transfer Vessels (CTVs) operating (9 Newhaven Port, 5 Shoreham Port, 2 Brighton Marina)
- Start of CTV operations: Jan 2016



Left: Windcat moored on pontoon

- High speed: 24.1 / 23.4 kts (max/avg)
- Draught: 1.9m / Gross tonnage: 40T
- Length x breadth: up to 22 x 6.5m

Monopile foundations



Above: Verbrugge Port

Each monopile tailor made according to water depth and seabed geology

- 550 - 830 tonnes
- 60 - 85m long
- 5.75 - 6.5m diameter
- Transition piece connects to pile flange
- Transition piece platform 20m above HAT



Fabrication Yard

- Transition pieces (TPs) 250 tonnes
- Ladder giving crew transfer vessels access to deck
- Stored in dry dock, Belgium
- 84 x 75mm bolts connect TP to turbine tower



- *Turbine towers (top)*
- *Transition pieces (bottom)*

Monopile installation

- Jan '16: MPI Discovery jack up vessel - load out from Vlissingen, Netherlands
- End Jan: Discovery arrives on site with first 3 x monopiles and transition pieces



- Mid April - end June: Planned pause to protect black bream spawning
- 1st July: Pacific Orca joins MPI Discovery to completion

Monopile installation

- Monopile hammer 2-4 hours every 24-36 hours
- 1,000 T crane to lift monopiles. Self install to 5-10m then lower monopile through gripper
- All 116 foundations completed with final installation on 8th November '16



Substation foundation installation

- Steel jacket foundation - 900 tonnes
- Installed 21st September 2016
- Four pin piles to connect to seabed
- Collection of steel tubes for array cables and two large tubes for export cables



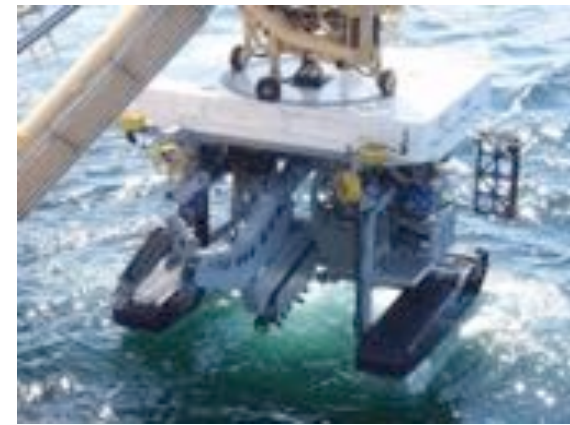
- 2,000 tonne topside installation April 2017, nearly 3,000 tonnes in total
- Pacific Osprey 'Flotel' for completion and commissioning of substation

Substation installation



Array cable installation

- August - October 2016: First campaign x 60 cables installed
- 120 cable ends stabilised with a total of 215 rock bags
- March/April - June 2017: Second campaign - works complete
- Symphony (*below*) and Q1400 (*right*), are trenching for the array cables.
- Saltire then lays the cables



Burial Depth

- Minimum depth 0.5m, target depth 1m
- If minimum depth not achieved, rock bags or mattressing to protect cables

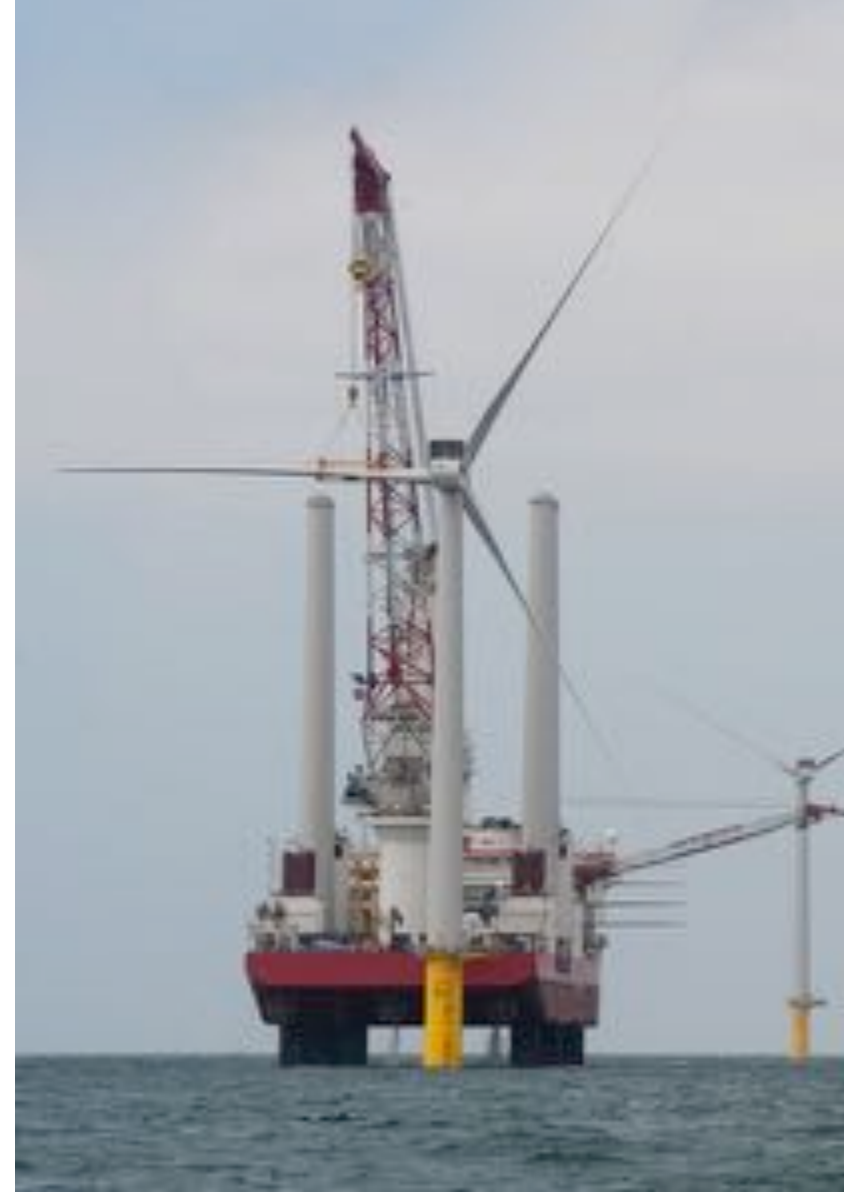
Export cable lay and bury

- Saltire and Stemat Spirit cable laying vessels for 2 weeks per circuit
- 7 anchors and 3,500 tonnes of cable on vessels
- 40 tonne winch pulls cable from onshore through intertidal zone
- Cable plough (*below right*) pushes cable to minimum depth of 1m, target 2m
- If minimum depth not achieved, rock bags or mattresses to protect the cables



Turbine installation

- First turbine being installed - March 2017
- Installation of 116 turbines complete Sept'17
- First generation end 2017 / early 2018
- Testing and commissioning continues in 2018
- Full operation in 2018

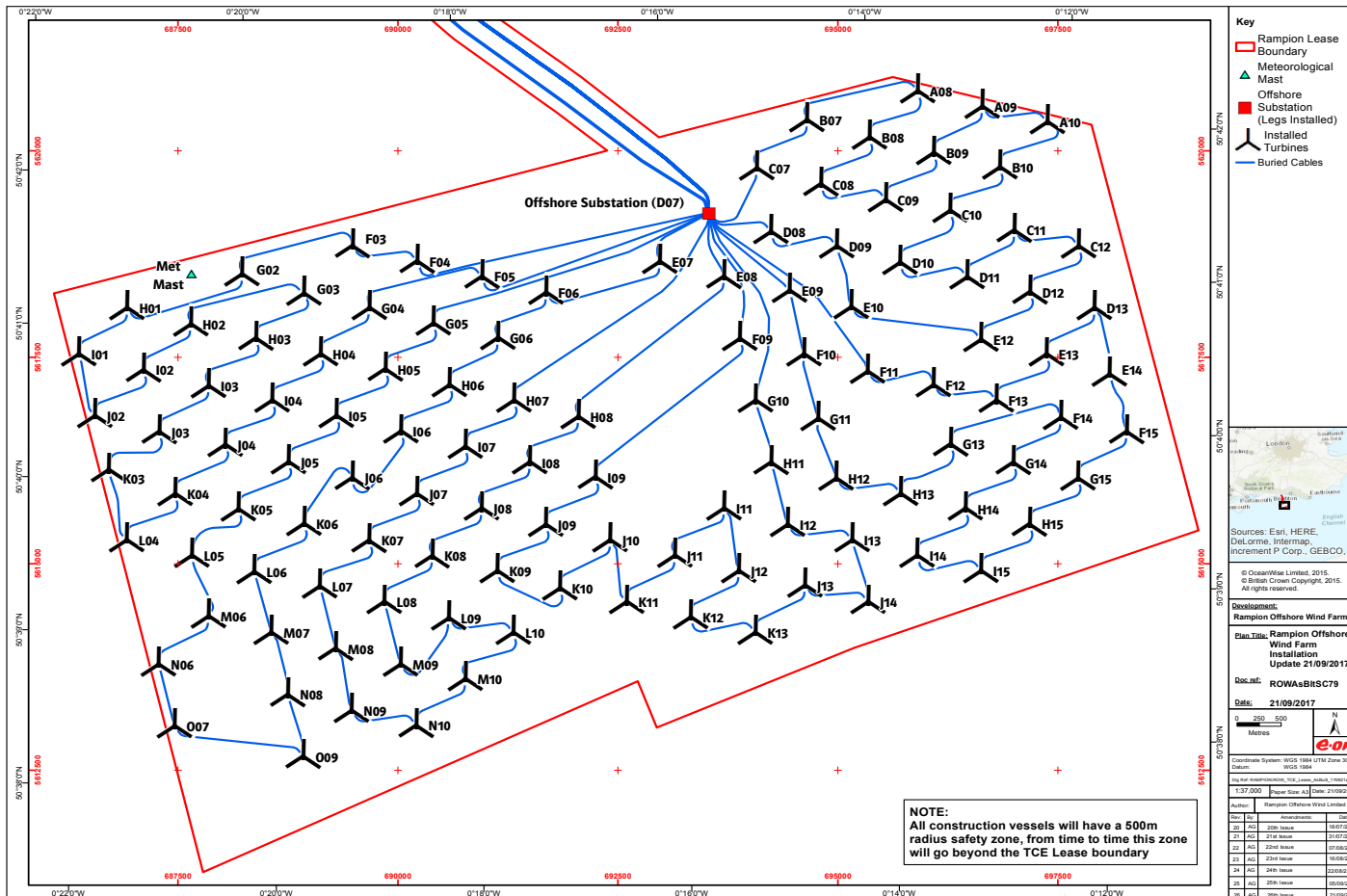


Offshore communications

- Ongoing engagement with commercial fishermen and charter boat owners
 - Brown & May Marine Ltd, Company Fishing Liaison Officer
 - David Guy, Offshore Fishing Liaison Officer on board construction vessels
 - Diving Liaison Officer
 - Divers & Sea Users Fact Sheet & laminated wind farm chart issued
 - Event for dive clubs and other sea users, clubs and associations
- Safety zones communicated
 - Notices on public slipways
 - Weekly Notice emailed to sea users
 - Notices to Mariners highlighting hazards emailed to sea users
 - Construction photo and video record



Construction progress to date



5. Onshore construction

Landfall at Brooklands, East Worthing

27km underground cable route - 12 stages

Ducting & HDD methods of installation

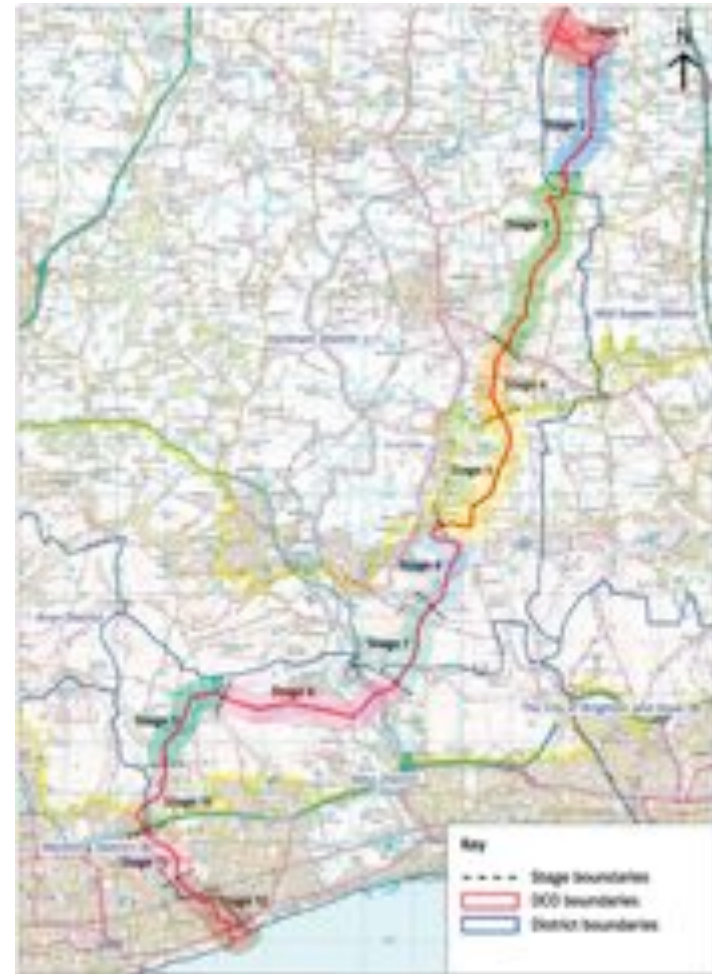
2 x 132/150kV circuits

30m working width / 15m easement requiring haul road, topsoil and subsoil storage, and distance between circuits

New substation at Bolney connecting to 400kV National Transmission Grid

Active engagement with Local Liaison Group on final layout design, seeking to reduce site area, size and scale of buildings and protect hedges and trees

Constructed under development consent requirements e.g. environmental or traffic management plans



Development Consent Requirements

DCO Requirements (similar to planning conditions) includes a suite of management plans to reduce impacts:

- Construction Traffic Management Plan (CTMP)
- Construction Environment Management Plan (CEMP)
- Ecology and Landscape Management Plan
- Archaeological Written Scheme of Investigation
- Public Rights of Way Strategy



Hedge netting for breeding birds



Badger sett mitigations



Great Crested Newt fencing



Bat boxes

Cable route preliminary works

- Ecology works
- Fencing and gates
- Hedge removal
- Site access points



Cable route preliminary works

- Drainage ditches
- Public Rights of Way (PRoW) diversions
- Traffic lights / stop-go installation where required



Managing Archaeology

- Completed number of archaeological assessments, including:
 - Review of historic information;
 - Geophysical surveys;
 - Targeted trial trenching of identified anomalies and areas of higher potential of archaeological finds
- During construction:
 - Archaeologist on-site monitoring works and keeping records of findings;
 - Findings will be analysed and the results shared with local historic groups (this could take several months)

Cable route construction works

- Topsoil strip
- Separate topsoil storage
- Neat and clean lines, tidy site



Cable route construction works

- Trenching machine
- Ducting (including fibre optic)



Cable route construction works



360 digger with V-bucket

Cable route construction works

- Tottington Mount hairpin
- Successful turfing approach



Cable route construction works



- Tottington Mount turf reinstatement after onshore export cable duct installation
- RSK and SDNPA inspecting turfing reinstatement



6. Operations & Maintenance Base

- Operations Base located at Newhaven Port, to include control room, office, warehouse and quayside infrastructure, benefiting the local economy by:
- Triggering regeneration plans for NPP (already encouraged new tenants)

Development process:

2014 - held discussions with Lewes District Council on the planning process

2015 - design proposals and planning application

2015 - Lewes DC approves application (Sept)

2016 - Final design

2017 - Construction starts

2018 - O&M base complete



7. Jobs, skills and supply chain

- E.ON recognise importance of securing local & UK content for a major project, to supply products and services for offshore construction logistics
- Opportunities for indirect local employment in form of support service contracts (security, grounds maintenance, cleaning) & local expenditure
- Rampion Supply Chain Steering Group in partnership with local authorities
- Meet the Buyer Event, Amex, Feb 2014, attracted 300 suppliers (mostly local)
- Three focused Meet the Buyer Events in 2015-16 highlighting opportunities for subcontracts
- **Local suppliers encouraged to register on database at:** www.sussexwindenergy.org.uk

Intended as supplier “search portal” for the project and contractors

Details of supplier database was provided in all tender documentation

Contractor contact details and some subcontracting opportunities placed on web portal



Skills training and education

- Joint active local recruitment drive with MHI Vestas, only in Sussex - investigating whether Seahaven Maritime Academy suitable to provide training for 24 technicians
- Engagement with local higher education institutions to encourage applications for 2 x Wind Turbine Maintenance Apprentices each year, for the first 3 years of Operation
- Commitment to focusing recruitment in local area, with specific advertising campaigns in Sussex
- Support for Newhaven University Technical College
- Working with Sussex EBP to identify possible 'feeder schools' for Rampion jobs and placements
- Exhibited at Worldskills Careers Fair, Brighton to 1,685 students and Worthing College Recruitment Fair, and Big Bang event at Northbrook College



8. Project benefits

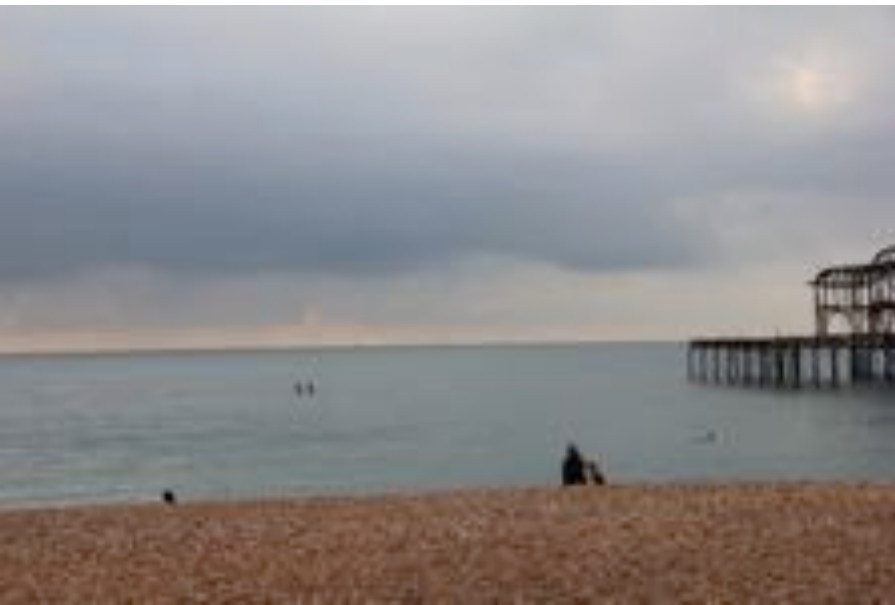
- Generate 1,366GWh power output from 'home grown' clean sustainable energy source
- Supply equivalent of around 347,000 homes, almost half of all the homes in East & West Sussex, including the city of Brighton & Hove
- Offset almost 600,000 tonnes CO₂ annually
- Create approx. 60 full time permanent jobs for lifetime of project (20-25 years)
- Construction workers up to 660 in construction workforce at peaks (500 peak offshore), with local supply chain opportunities and trickledown benefits to local economy
- Catalyst for regeneration of Newhaven Port
- Rampion legacy:
 - Visitor Centre on the Sussex coast with a view of Rampion and millions of visitors every year - announcement November 2017
 - Community Benefits Scheme to support local community project initiatives in Sussex - announcement November 2017



Rampion Community Fund

Rampion announces a **£4million community fund**, with three key elements:

- £100,000 donation to local RNLI stations who help save lives at sea
- £800,000 investment in a Rampion Visitor Centre
- £3.1million Rampion Fund for local projects to benefit the Sussex community



Rampion Visitor Centre

- Visitor Centre will be located in the newly refurbished seafront arches in Brighton, just east of the i360
- Considered 10+ venues in Brighton and Worthing

Location chosen due to:

- High footfall (12million visitors a year)
- Seafront location with view of wind farm
- Excellent public transport connections
- Floor space area
- Newly refurbished

Currently being let free of charge to local artists



Rampion Visitor Centre

The Rampion Visitor Centre will:

- Tell story of Rampion from a technical, environmental and community perspective
- Raise awareness of climate change, renewable energy, offshore wind and The Living Coast Biosphere designation
- Utilise the latest interactive displays and exhibitions



- Engage with local schools and colleges to give students access
- Be freely available for residents, businesses and visitors alike
- Open in summer / autumn 2018

£3.1million Rampion Fund



- A voluntary commitment to support community projects from Littlehampton to Beachy Head and north to Twineham, which we hope will make a real difference
- Specific ring-fenced funds for East Worthing & Lancing and the onshore substation community recognising the two onshore areas where the project has had a greater presence
- Recognise Rampion as a permanent neighbour in the community and thank you for engaging with us
- For information on how to apply, visit: www.sussexgiving.org.uk/rampion



- General enquiries and complaints
- Freephone Helpline 0800 2800 886
- Email info@rampionoffshore.com
- Website www.rampionoffshore.com
- Chris Tomlinson, Stakeholder Manager, 01273-603-721
- Company Fishing Liaison Officer: Courtney French, 01379 872 145
- Offshore Fishing & Diving Liaison Officer: David Guy, 07980 591 631

Thank you for listening

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