SOUTHWIND Partnermøte

04.07.2023

Andreas Strand, Torgeir Nærø
Tilretteleggere,Kongstein AS

SOUTHWIND

I fokus i dag:

- *Bli kjent med hverandre*
- *Prosjekt Southwind*
- *Prosjekt Nasjonalt Kompetansesenter*
- *Forventninger og videre arbeid*

AGENDA 1:2

08.45-09.00:	**Registrering og kaffe**	
09.00-10.00:	**Innledning**	
	Velkommen og agenda for dagen – 5 min	Torgeir Nærø, Kongstein AS
	Southwind-partnerskapet: Hvordan byggeklossene passer sammen - Nasjonalt kompetansesenter - Southwind - Fremtidens havvind DETTE GJØR VI SAMMEN!	Rune Klausen, GCE Node, og Jonas Kvåle, CEO Southwind AS
	Southwind-partnerne presenterer seg – 45 min. Kort introduksjon med focus på hver partners unique selling points for mot Offshore Wind	Alfabetisk, 1min pitch min hver
1000-1015:	***Pause & mingling***	

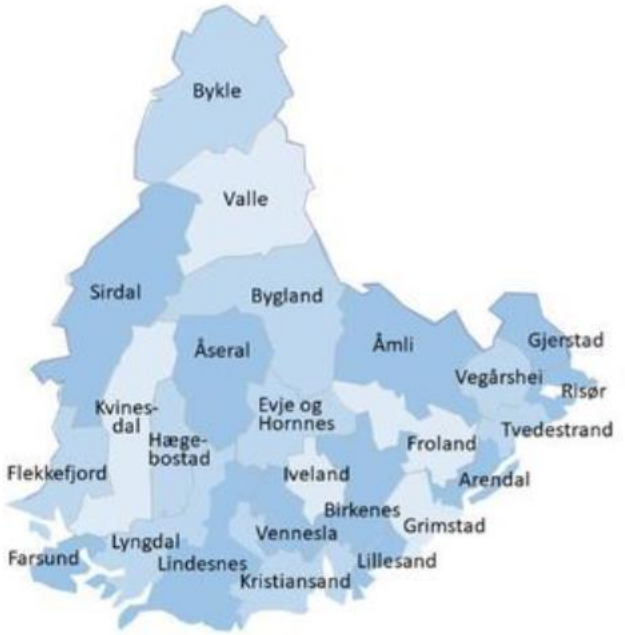
AGENDA 2:2

1015-1115:	**Prosjekt Regional basedrift offshore vind** -Ulike modeller for basedrift – aktører og roller -Hvilke typiske tjenester leveres fra vår fremtidige base -Internasjonale eksempler til etterfølgelse -Ringvirkninger – tidlige funn fra analysen Videre plan for arbeidet og bidrag fra partnerne	Kongstein AS ved T. Nærø P. Millmaker A. Strand Jonas Kvåle, CEO Southwind AS
1115-1130:	***Pause og mingling***	
1130-1230:	**Prosjekt Nasjonalt kompetansesenter offshore vind** Nasjonalt Kompetansesenter – status og planer FoU og kandidatproduksjon - løsninger fra UiA og institutter – 15 min Innretning og prosjekter – typiske gap i industrien – 10 min Plan for arbeidet og bidrag fra partnerne – 15 min	Rune Klausen, Fremtidens havvind AS Prof. Geir Grasmo, UiA Andreas Strand, Kongstein AS Tom Bredesen, Skeie Eiendom AS
1230-1315:	**Felles lunsj - Verter: Rune Klausen og Jonas Kvåle** *Takk for i dag!*	

Southwind-parnerskapet

DETTE GJØR VI SAMMEN

Samarbeidsprosjekter med helhetlig regional verdikjede og verdiskaping i fokus



Felles mål

- Mest mulig lønnsom aktivitet og verdiskaping til Agder
- Optimale positive ringvirkninger regionalt i Agder

Prosjekt: Southwind O&M base

- Industri-initiativ for å vinne regionale basetjenester for havvind
- Full regional leveransekjede for inspeksjon, drift og vedlikehold

Prosjekt: Nasjonalt kompetansesenter for havvind

- Industri møter skoleverk og akademia
- Fylle identifiserte gap i industrien gjennom målrettet FoU
- Koordinere utdanning av regionale kandidater på alle nivå

KRS BIZ:

- Fremme næringsvirksomhet i Kristiansand
- Dra i samme retning - offentlig og privat

Fremtidens Havvind

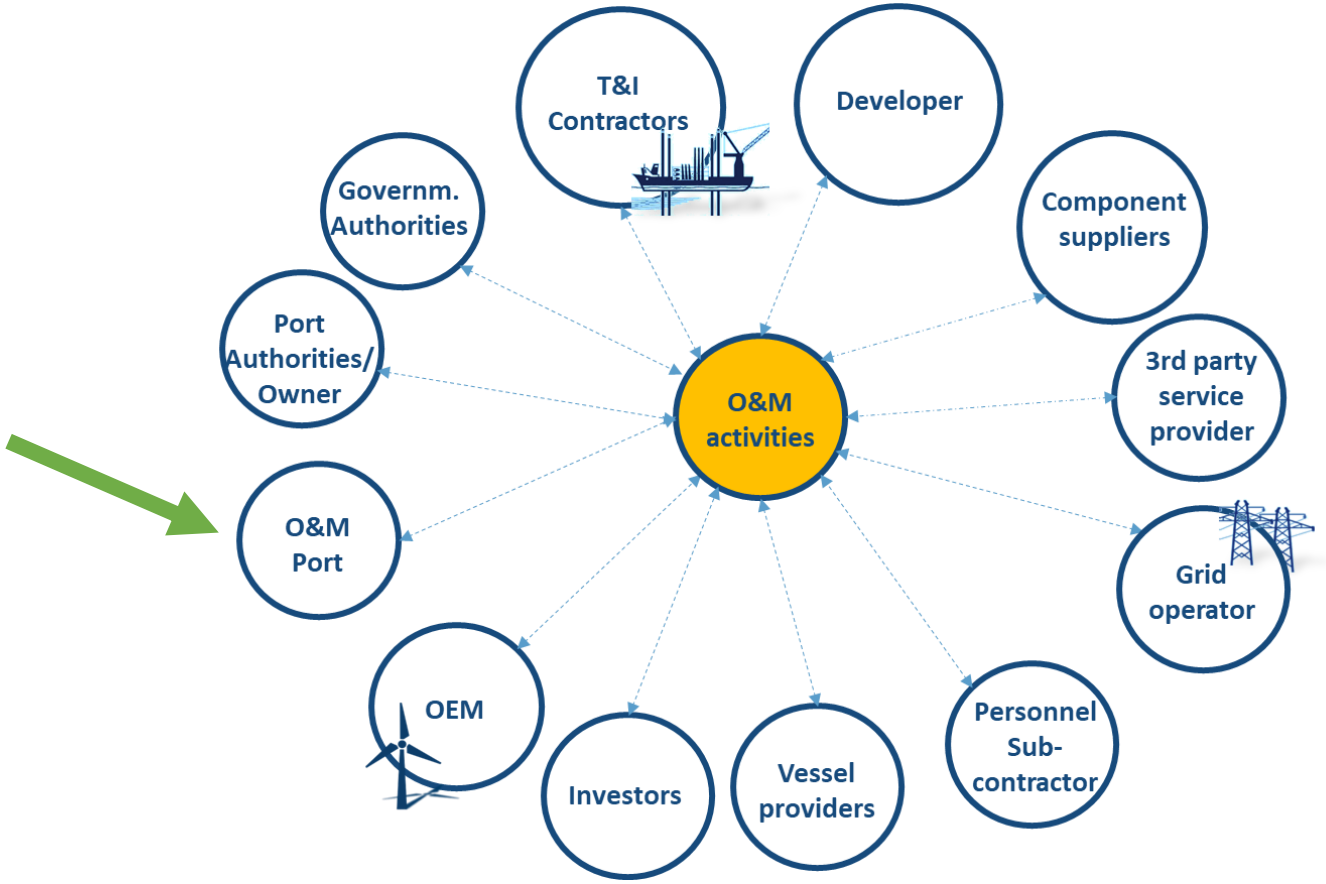
- Industriklynger, akademia, arbeidslivsorganisasjoner og myndigheter
- Nettverk for å utvikle lokale intiativ og leveranse-evne
- 18 arbeidspakker fra A til Å
- Dekker både utbyggings-, drifts- og avviklingsfaser


Southwind-
partnere
1 min. pitch i
alfabetisk
orden

Prosjekt: Regional basedrift offshore wind

Stakeholder assessment

Typical stakeholders into our port offerings



OEMs

Developer

O&M supplier GRID and OSS

O&M supplier BoP

O&M supplier Subsea

Southwind partner, where do you fit in this map?

Different models and approaches to base operations

Baseline:

- *Developer's/operator's contract strategies*
  - *Total size and split of OWF*
  - *Complexity of infrastructure*
  - *Offshore sub-/converter station*
- *Work sharing between operators, turbine OEMs and ports*
- *Types and numbers of vessels*

Port as future hub or satellite:

- *Geographical suitability/location*
  - *Sailing distances*

- Availability on local services and regional functions:
  - *Adjacent port services*
  - *Road and rail network, airport and accomodation*
  - *Yards, workshops and warehouses*
  - *Long term access to qualified personnel and course providers*

Important inputs to developers' O&M strategy

1. ***Turbine Technology:*** *The design, size, and complexity of offshore wind turbines influence the O&M strategies. The turbines of the newest generation to be deployed at SNII may offer sophisticated built-in monitoring systems and enhanced reliability features potentially effecting the amount of required regular visits.*
2. ***Location and Site Conditions:*** *Site-specific factors such as wave height, wind speed, water depth, and seabed conditions impact O&M strategies, as they affect accessibility, maintenance logistics, and equipment durability. However, most importantly, the distance from shore to port is to be considered.*
3. ***Contractual Agreements:*** *O&M strategies are often influenced by contractual agreements between wind farm owners, operators, and service providers. These agreements outline performance guarantees, response times, availability requirements, and responsibilities for maintenance activities, which can shape the O&M approach.*
4. ***Data and Digitalization:*** *The availability of accurate and comprehensive data, along with advancements in digitalization and data analytics, effects the O&M activities and can reduce costs.*
5. ***Economic Considerations:*** *Naturally, O&M strategies and the asset selection will be assessed and developed considering total costs along the lifetime of the offshore windfarm.*
6. ***Sustainability:*** *Considerations concerning GHG-emissions, life-cycle assessments and similar may influence the O&M strategy or at least certain aspects of it.*
7. ***Regulatory Requirements:*** *Safety regulations, environmental requirements, and certifications influence the choice of maintenance approaches and the frequency of inspections.*

WTG selection

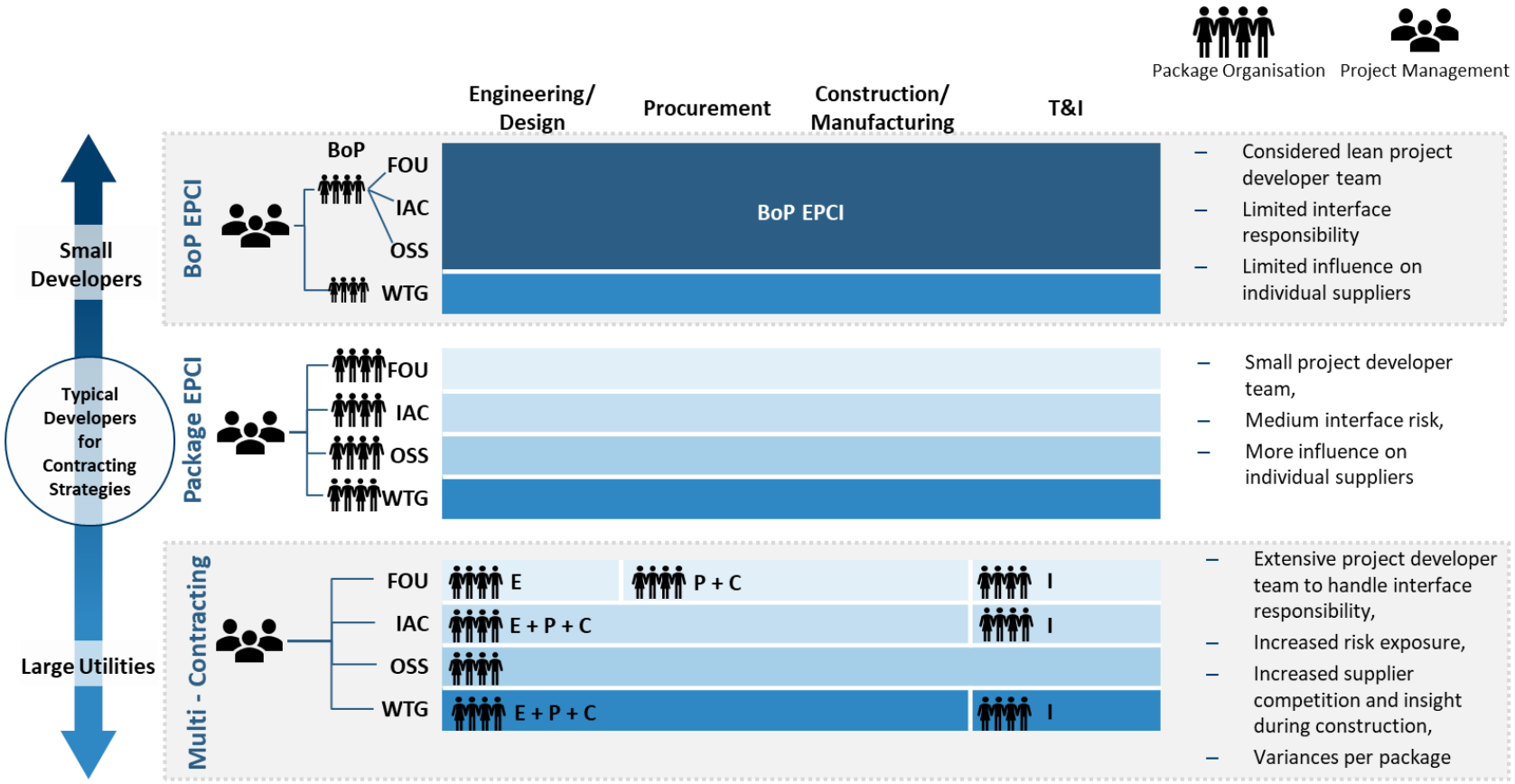
Identify preferred contract strategies

Your unique value proposition

Cost competitiveness is key

Contract strategies

Opportunities in the construction phase



EPCI: Engineering, Procurement, Construction, Installation; BoP: Balance of Plant
FOU: Foundations, IAC: Inter-Array Cable, OSS: Offshore Substation, WTG: Wind Turbine Generator

Port for Vessels, (Geo.tech. Transport, cable lay, scour protection, seabed preparation etc.)

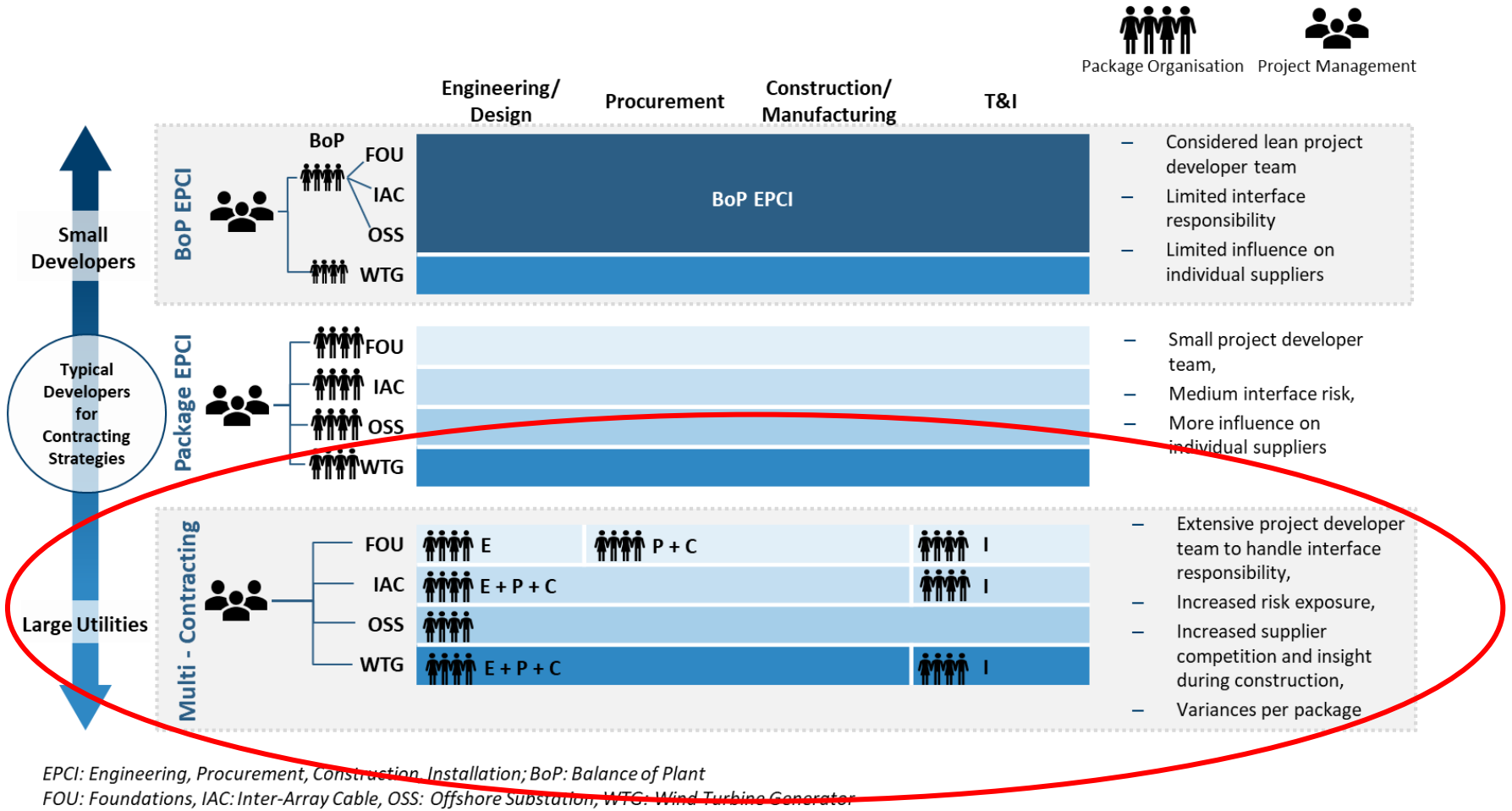
Temporary storage, (FOU, IAC, Export cable)

Southwind partners, where and to whom will you target to position (How can this strengthen Kongsgård as the preferred O&M port)

Assuming Multi contracting

Contract strategies

Opportunities in the construction phase



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Assuming Multi contracting

International examples

O&M base ***Grimsby***

O&M base ***Heligoland***

O&M base ***Tyne***

Geographical close to OWF

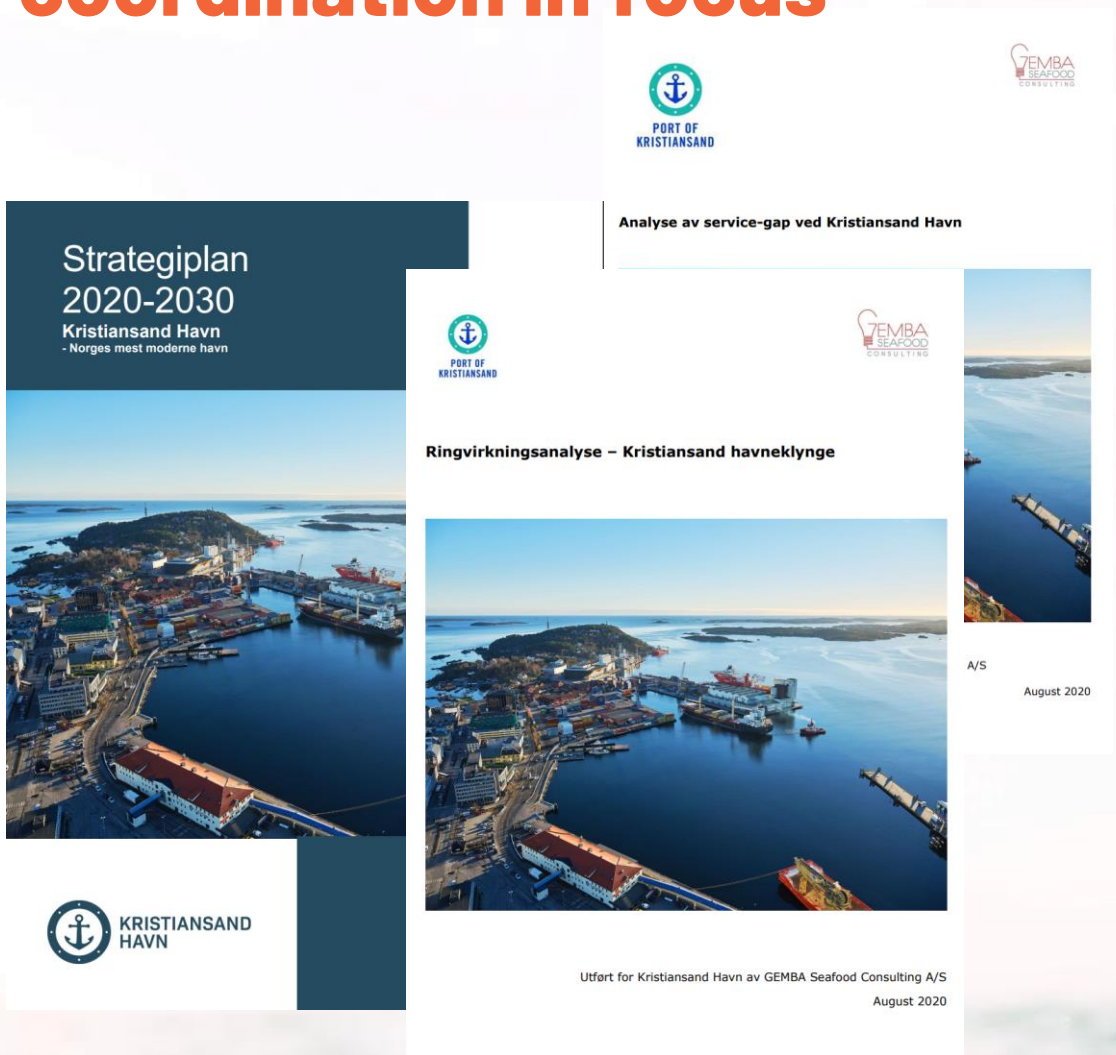
Taken the transition(s)

Bundle services and competitiveness

Net zero and sustainability

Positive local effects

Continuation and coordination in focus



VISJON:
Norges mest moderne havn

SAMFUNNSOPPDRAG:
Kristiansand havn skal være dynamisk, miljøvennlig og fremtidsrettet knutepunkt. Vi skal ivareta maritim aktivitet på en måte som bidrar til økt verdiskapning og en styrket region. Kristiansand havn skal ta samfunnsansvar, bidra til bærekraftsmålene, være en god nabo, og en pådriver i miljørettet omstilling og styrket nasjonal og internasjonal beredskap.

MÅL 1:	MÅL 2:	MÅL 3:	MÅL 4:
Drive økonomisk bærekraftig	Levere effektive og moderne havnetjenester som bidrar til verdiskapning	Være en ledende miljøhavn som bidrar til omstilling i maritim bransje	Legge til rette for å flytte gods fra vei til sjø gjennom satsing på kystlast og nærskipsfart

FORRETNINGSOMRÅDER

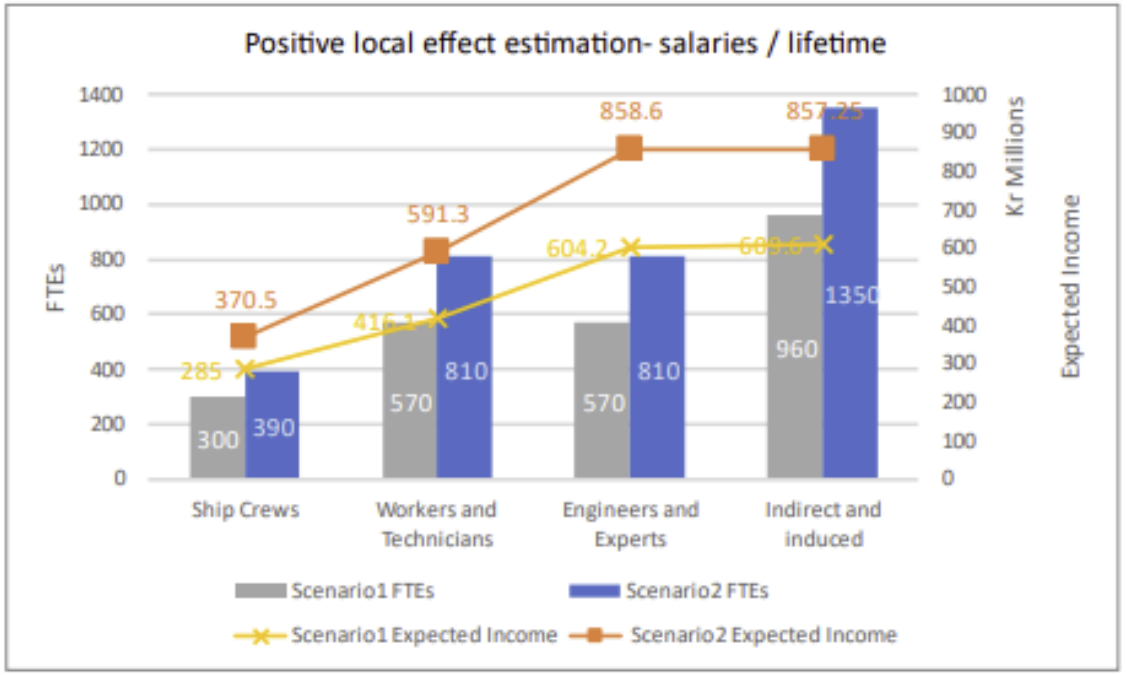
PASSASJER-TRANSPORT:	GODS:	EIENDOM:	OFFSHORE:	FISKERI:
Kristiansand havn skal bli Norges ledende, og mest miljøvennlige fergehavn	Kristiansand havn skal være Norges mest moderne, miljøvennlige og effektive godsterminal	Kristiansand havn skal forvalte tilstrekkelige areal og infrastruktur som sikrer havnas strategiområder og styrker havnas økonomi over tid.	Kristiansand havn skal være en av de foretrukne fullservicehavner for offshore	Kristiansand Havn skal være Sør-Norges ledende fiskerihavn.

VERDIER
Mot – Åpenhet – Samarbeid

SN2—phase 1, local effects – early findings

	SCENARIO 1	SCENARIO 2
FTE/MW	0.113 FTE/MW	0.146 FTE/MW
Direct	80 FTEs in total; 60% assumed for local business community -> 48 FTEs	112 FTEs in total; 60% assumed for local business community -> 67 FTEs
Indirect	15% assumed of total: 12	15% assumed of total: 17
Induced		
Total (FTEs) per year		
Total FTE-years along OWFs lifetime (30 years)		

	SCENARIO 1		SCENARIO 2	
	FTEs/ year	Expected Income	FTEs/ year	Expected Income
Ship Crews **Assumed 20% of direct FTEs Assumed average salary Kr 950,000/year**	10	Kr 9.5 million (per year) Kr 285 million (lifetime)	13	Kr 12.5 million (per year) Kr 371 million (lifetime)
Workers and Technicians **Assumed 40% of direct FTEs Assumed average salary Kr 730,000/year**				
Engineers and Experts **Assumed 40% of direct FTEs Assumed average salary Kr 1,060,000/year**				
Indirect and induced **Assumed average salary Kr 635,000/year**				
Total				



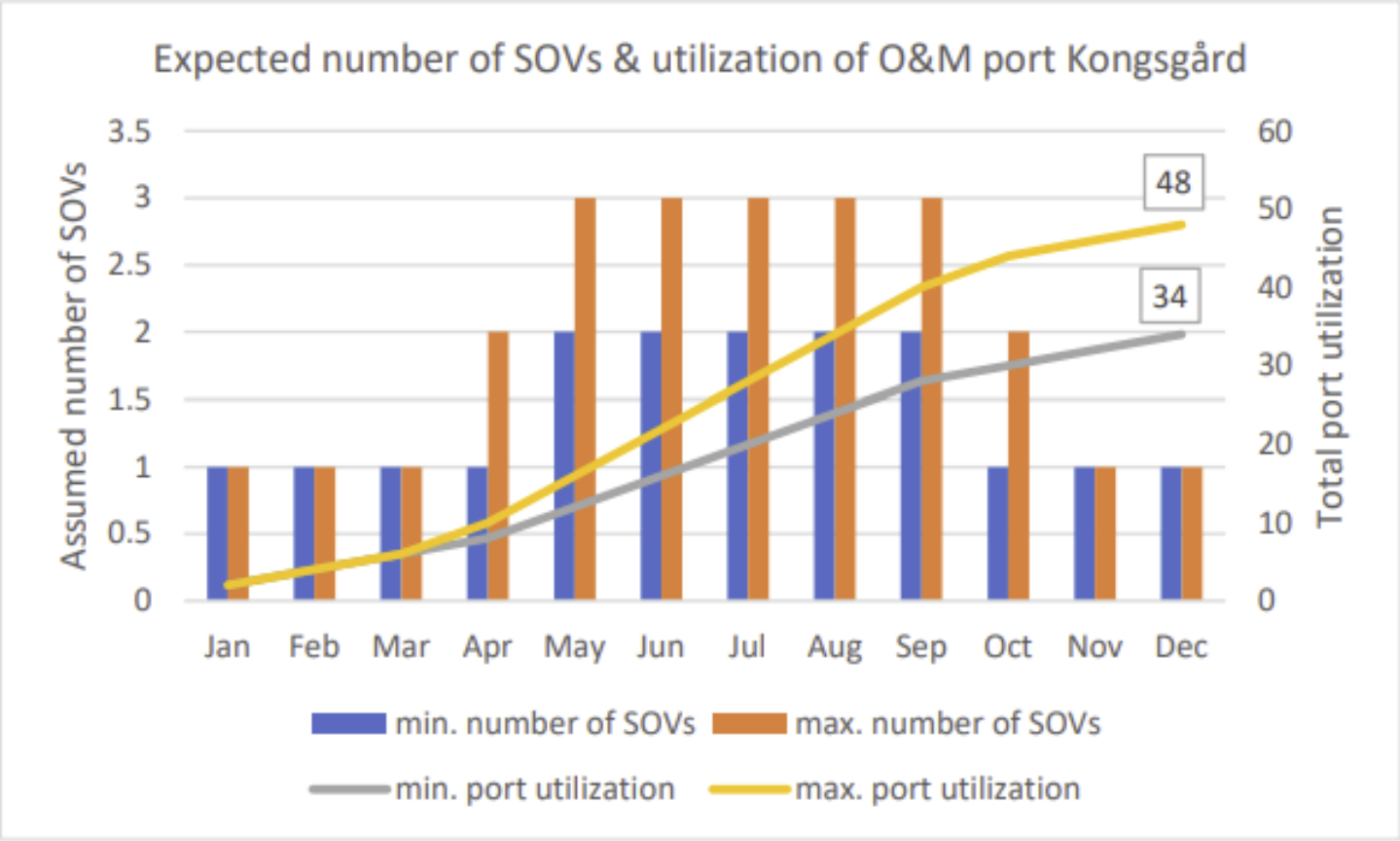
Local:80 FTEs per year, (excluding developer and OEM personnel)

65-90MNOK per year

Engineers & experts

Typical positive impact on indirect and induced activities

Positive local effects – early findings – ph. 1



We anticipate

- concrete vessel availbility requirements during winter season
- Offshore IMR activities during summer season with port swap repair
- Continous control room function in or by the port

Increased vessel activity in port

Strong contributions to development of port infrastructure

Assumed involvement in / preparation for installation and O&M activities

Significant opportunities for SMEs

Access to insights and RD&D for research institutes and academia

Positive local effects – early findings – ph. 1

Primary

PREPARATION OF INSTALLATION WORKS AND O&M OF OFFSHORE WINDFARM

Before the construction of the offshore windfarm and of course during the operational life of the windfarm, a variety of services will be required which should be covered by local suppliers as far as possible (and foreseen by the contracting parties):

- Provision of vessels
- Helicopter services
- Provision of equipment for material handling
- Vessel crews
- ROVs/AUVs; Drones
- Performance of environmental assessments
- Warehouse management and security personnel
- Riggers, crane/forklift/reachstacker/SPMT operators (onshore logistic)
- SCADA engineers/personnel for control and monitoring centre
- Administrative works
- Provision of solution to enhance sustainability
- Provision of green hydrogen (in case respective vessels are deployed)
- Performance of inspections (HSE, coating, blades, ladders, davit crane, elec. equipment etc.)
- Performance of repair works e.g. coating
- Performance of subsea surveys
- Provision of scour material for scour protection repairs

Secondary

DEVELOPMENT OF PORT INFRASTRUCTURE

The development of Kongsgård to become a leading O&M hub will trigger the construction of new facilities close to the relevant quays:

- Civil engineering
- Architecture
- Construction workers
- Electricians, plumbers etc.

Tertiary

AFFECTED SERVICES DUE TO INCREASED ACTIVITY IN THE PORT

- Hotels
- Restaurants
- Grocery stores
- Recreation
- Public transport incl. the airport


Prosjekt:
Nasjonalt kompetanse-senter offshore wind

Typical tech or functional gaps

Demanding political targets

Increasing cost base

Floating wind often communicated as the next big Norwegian adventure

BYGGER VINDKRAFTKOMPETANSE: GE satser 600 mill. på norsk vindkraft

Vil skape minst 100 jobber innen vindteknologi i Oslo og Verdal.

- Vi skal bygge en ny industri

Næringsminister Trond Giske la frem det han mener er blant høydepunktene i sin politiske karriere.

1 MIN | PUBLISERT: 25.03.10 — 11.52 | OPPDATERT: 9 ÅR SIDEN

Vinden som snudde

Norge skulle bli verdensledende på vindkraft til havs. Nå ligger næringen nede for telling.

PRØVEMØLLE: Vindmøllen som flyter ensom utenfor Kollsnes i Øygarden er en liten versjon av kjempemøllene som bergensfirmaet Sway ser for seg skal flyte tett i havbaserte anlegg. FOTO: EIRIK BREKKE

Av Kjetil Gillesvik

Publisert: 4. desember 2012

- Project Locations
- Bankable technologies in planned projects
- Concept selection, (e.g.: floating or bottom fixed)
- How and when to position

Into the daily details:
Some basic (recent) BOP pain points to look out for

Corrossion – active and passive measures -

Corrosion is no. 1 issue

Corrocean's ICPPE active system works OK

Passive anodes configurations often a challenge – rod/chain mounted at lowest point on FOU vs accessible circular config at TP

- *Force Technology – e.g. DanTysk, vs*
- *Ørsted – choice at Krieger's Flak with TP based passive anodes easier to change out*

Marking-/flood lights

- *Often bad quality – lowest price*
- *Too many lost light sources implies forced use og guard vessel – cost driver for O&M*
- *Marking lights must be checked early and often*

Ventilation vs confined space for switch gear – check that it is in place

- *Often condensation of water in TP lower deck/s – poses a challenge*
- *Is there functional mechanical ventilation for switch gear space?*

Scour protection, Cable interface / J-tube

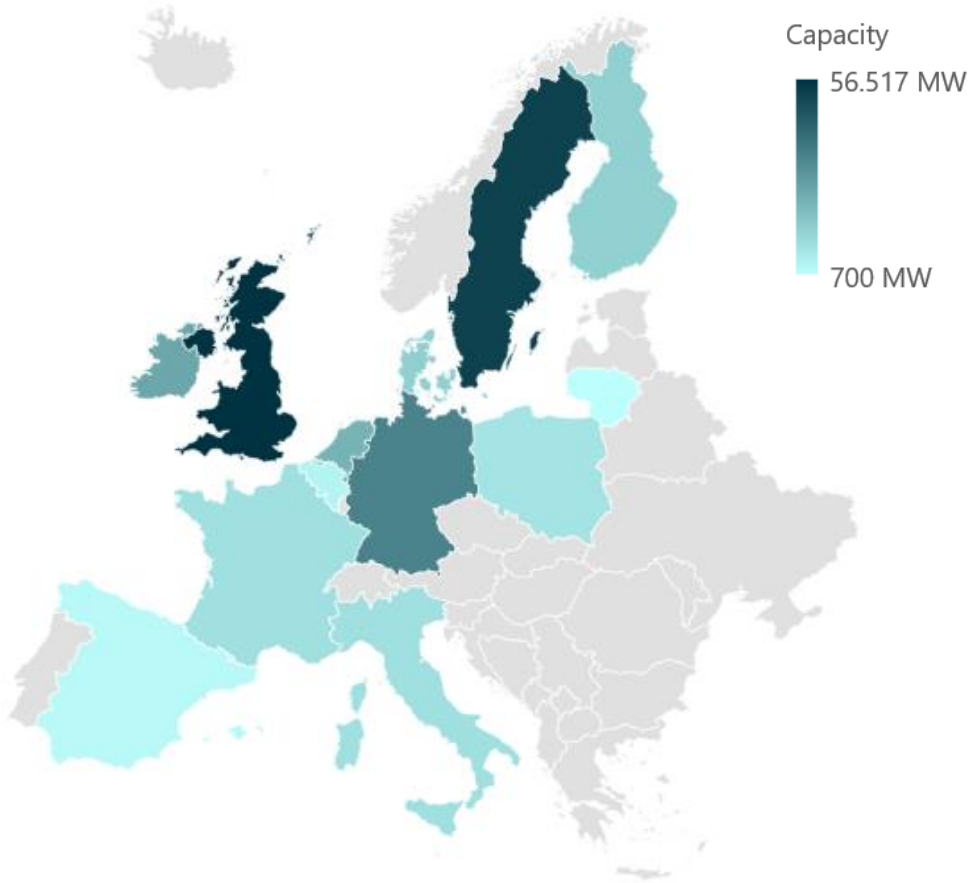
- *Cable buried to shallow close to intake – induces motions*
- *Challenge when cable and J-tube do not fit perfectly. Cable motions in J-tube damages cable protection layer*

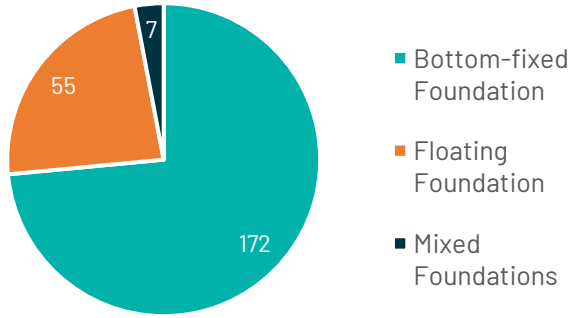
Cranes at TP – demand warranties and direct service/follow-up from supplier

- *Corrossion main issue in general hydraulic oil a challenge to maintain*
- *Wires must be regularly greased up*
- *Lifting height vs railing – access to rigging in front of access door*

Largest opportunities are in UK, Germany and Sweden*

There is a big market for bottom-fixed foundations in Europe, 172 projects with a total expected capacity of 193 675 MW

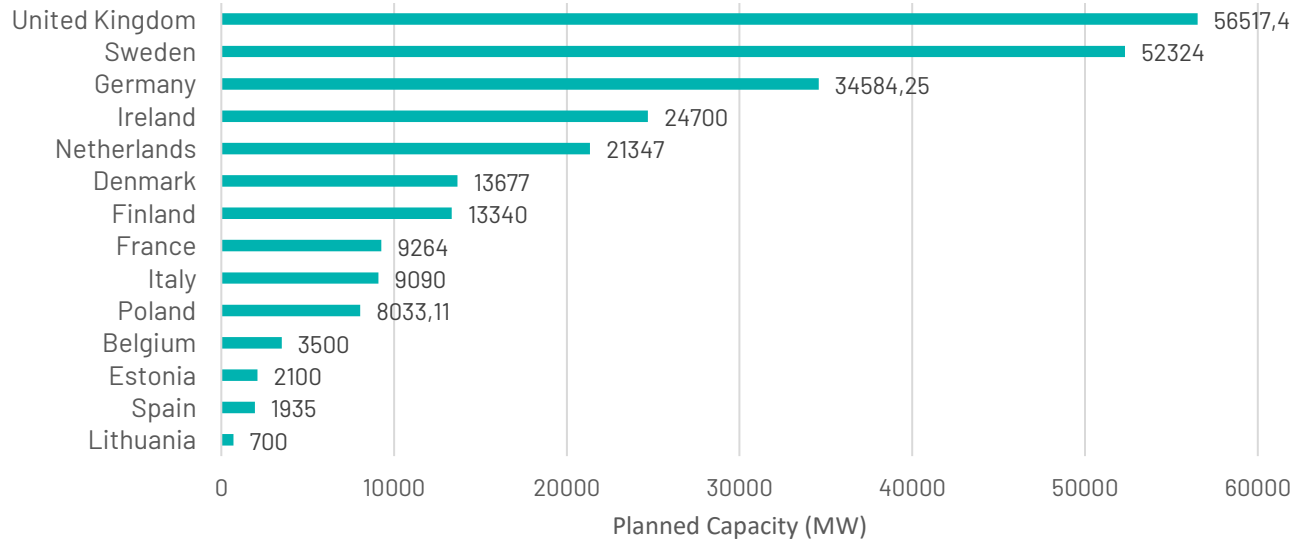




Criteria for project selection:

- Construction starts 2020-2032
- Still not fully commissioned
- OWF Capacity above 50 MW

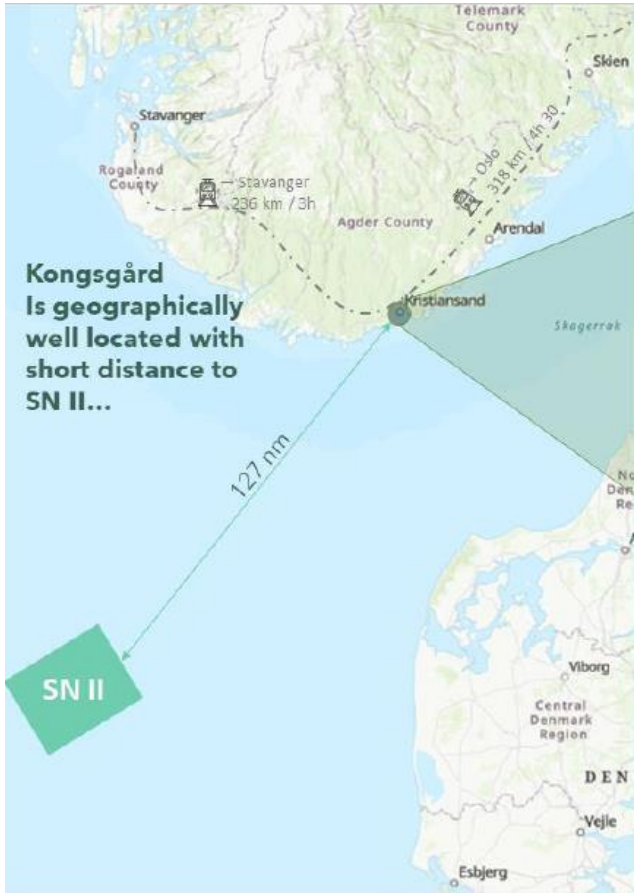
ESTIMATED OWF CAPACITY TO BE CONSTRUCTED 2020 - 2032

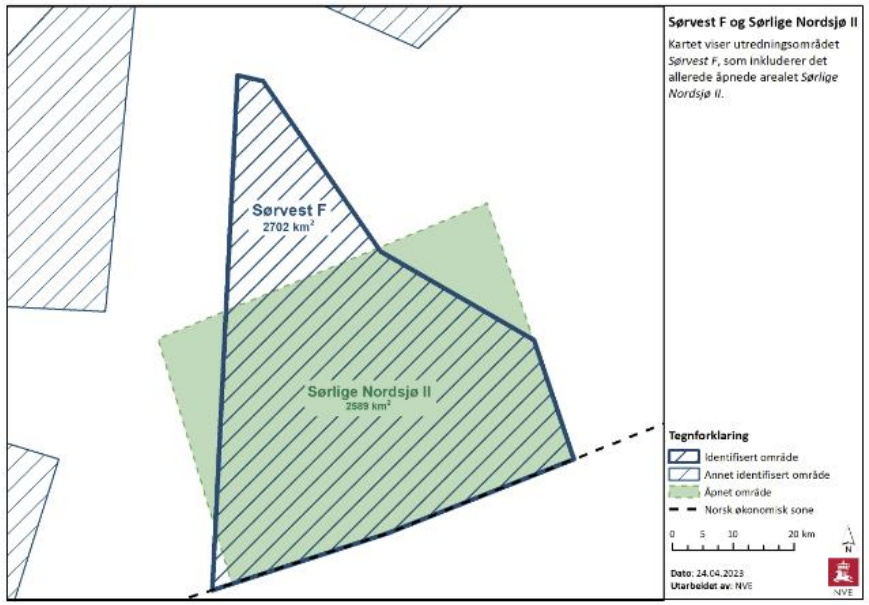


* Sweden registered with developer's ambitions in different marketing tools/databases, NOTE! Political ambitions are lower

Largest regional opportunities in Norway*

There is a big market for bottom-fixed foundations in Sørvest F, 1500MW SN2-phase 1, a total expected capacity between 5,7GW and 11,5GW Sørvest F 2025





Sørvest F:

- Construction starts 2027-2031?
- Majority asumed bottom-fixed
- Increasing with 525km" to a total of 2702km2
- NVE proposes 3-4 new areas in addition to SN2-phase 1
- Low conflict, co-exisitence
- Available capacity GRID connection, both in Norway and Europe

https://veiledere.nve.no/havvind/identifisering-av-utredningsomrader-for-havvind/forslag-til-utredningsprogram/utredningsprogram-for-sorvest-f-og-vestavind-f/

https://veiledere.nve.no/havvind/identifisering-av-utredningsomrader-for-havvind/nye-omrader-for-havvind/sorvest-f-inkl-sorlige-nordsjo-ii/

Typical GAPs

Increasing cost and ambitions, ability to change way of working

Factors for costs

- Repair cost for gearbox for failure
- Failure rate of electrical system
- Operation duration of repair
- Planning delay to conduct failure
- Cost of subcontracted workforce to conduct failure repair
- Number of technicians per corrective maintenance team
- Work end time
- Annual fixed cost of helicopter
- Day rate of HLV
- Maximum number of failures before mobilization of jack up vessel Main
- Time to mobilize HLV
- Distance to O&M base from OWF centre

Factors for availability

- Failure rate of control system for failure
- Failure rate of electrical system for failure
- Number of teams required to repair failure
- Operation duration of repair for failure
- Work end time
- Number of type Vessels
- Average BoP availability

Access & repair cost

Failure rates, both minor and major

Cost of components

Length of time conducting the maintenance

Increasing warranty issues