



Offshore wind park logistics deploying helicopters

March 2020

Offshore helicopters have distinct operational advantages



Higher productive man hours per day due to **shorter travel time** to the wind turbine



More service days per year and better predictability due to **higher availability of helicopter**



Less # of personnel due to **significantly higher productivity**



Lower accidents/incidents due to **significantly better health, safety & environment records**

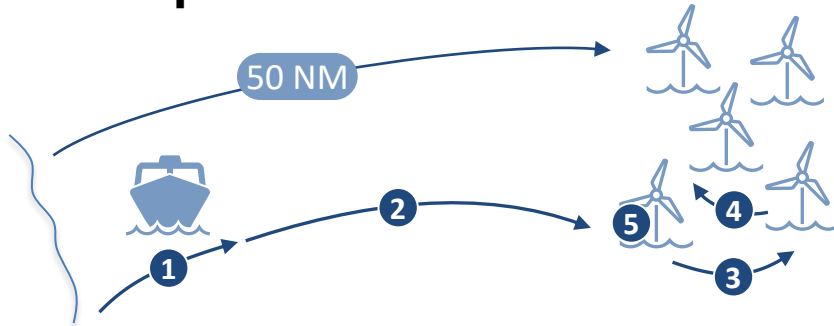


Higher uptime of turbines due to **shorter trouble shooting cycles & shorter service intervals**



Using offshore helicopters the productive working time can be significantly increased

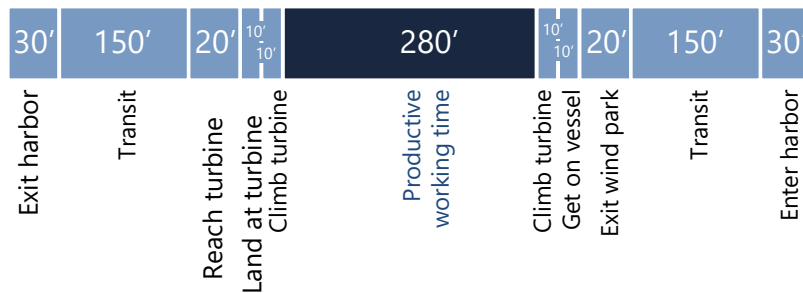
CTV operation



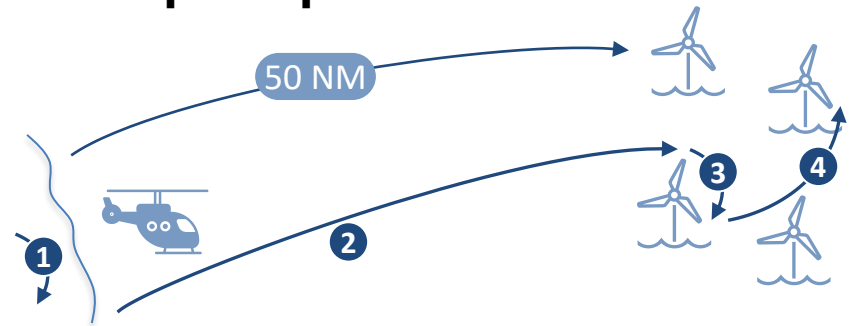
Share

- 1 Time to exit the harbor ~30 minutes
- 2 Time to transit ~2.5 hours
- 3 Time to reach the turbine ~30 minutes
- 4 Time to land at the turbine ~10 minutes
- 5 Time to climb the turbine ~10 minutes

Productive working hours – 12 hour shift



Helicopter operation



Share

- 0 Safety briefing ~20 minutes
- 1 Time to board the helicopter ~10 minutes
- 2 Time to transit to the wind park ~30 minutes
- 3 Time to hoist to the turbine (team) ~5 minutes
- 4 Transition to the next turbine ~2 minutes

Productive working hours – 12 hour shift





Helicopters have a 60% higher deployability compared to vessels

Deployability Crew Transfer Vessel

Primary limitation: Wave height

Wave height [m]	Percentage of days in a year with that condition ²⁾		Accumulated [Σ%]
	[%]	[Σ%]	
0.5	8.21%	8.21%	
1.0	26.92%	35.13%	
1.5	24.79%	59.92%	
2.0	18.33%	78.25%	
2.5	10.39%	88.64%	
3.0	5.55%	94.19%	
3.5	3.21%	97.40%	
4.0	1.23%	98.63%	
4.5	0.50%	99.13%	
5.0	0.25%	99.38%	
5.5	0.19%	99.57%	
6.0	0.15%	99.72%	

Operational Limit

CTV
Average
Deployability

60%

Deployability Helicopter

Primary limitation: Wind speed

Wind Speed [knots]	Days in a year with that condition [%]
0	
5	
10	
15	
20	
25	
30	
35	
40	
45	

Weather data not available yet
Deployability based upon actual experience Heli Service

Operational Limit

Helicopter
Average
Deployability

95%

→ The helicopter has an 60% higher deployability per year¹⁾

1) Impact due to fog, icing and other weather conditions are assumed to have the same impact on both CTV and helicopter
 2) Source: Deutscher Wetterdienst



Helicopters have a significantly better safety record in comparison with CTVs

	Offshore wind Industry	CTVs	Helicopters
Total Incidents	3,187	332 (10.4%)	28 (0.9%)
Fatal Accidents	0	0	0
Lost Work Day Incidents	92	10 (10.9%)	1 (1.1%)
Restricted Work Day Incidents	65	9 (13.8%)	1 (0%)
Medical treatment injuries	120	12 (10%)	1 (0.8%)
Total	277	31 (11.2%)	2 (0.7%)
Total Recordable Injury Rate (TRIR)	5.71	0.64	0.04
Lost Time Injury Frequency (LTIF)	1.90	0.21	0.02

Red figures are worse than the base average percentage of incidents determined against the industry total

Green figures are better than the base average percentage of incidents determined against the industry total

TRIR = the total number of recordable injuries (fatalities + lost work day incidents + restricted work day incidents + medical treatment injuries) per 1.000.000 work manhours

LTIF = the number of recordable injuries (fatalities + lost work day incidents) per 1.000.000 work manhours

1) Total Industry Input: 48.541.000 manhours



When comparing a CTV Windea four to a AW 139, the helicopter has 1/3 of the emissions per PAX

Crew Transfer Vessel Windea four – LRS 400A1



Consumption: 668 l/h
Capacity: 24 PAX
Cargo: 30 t

Helicopter AW 139



Consumption: 570 l/h
Capacity: 12 PAX
Cargo: 0.3 t

	CTV Windea four	Helicopter AW 139
Total consumption	1151.46 kg/100 km	175.87 kg/100 km
Consumption per PAX	47.98 kg/100 km	14.66 kg/100 km
Total CO ₂ emission	3.66 t/100 km	0.55 t/100 km
CO ₂ emission per PAX	0.15 t/100 km	0.05 t/100 km

Helicopters have substantial benefits to vessels on many accounts – we would like to prove it



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We would like to proof to you that helicopters have the benefit as outlined

For that we need

- Your data
- Collect some real data & real experience
- Model the logistic costs of a wind park
- & share and discuss our analyses with you!



The highest standards

Heli Service International GmbH
Gorch-Fock-Straße 105, 26721 Emden, Deutschland

Telefon +49 4921 36801-10 Telefax +49 4921 36801-39

info@heliservice.de www.heliservice.de