

**INDUSTRIALPROJECTS**

# SPEED BOAT PORT INFRASTRUCTURE

ENERGY & TRANSPORT SUMMIT IV DIGITAL

15<sup>th</sup> December 2020

DHL Global forwarding – Excellence. Simply delivered.



## Speaker #2 – Nicolai N. Andersen

### PROFILE



#### Employment

- Global Sector Head, Renewable Energy, DHL Industrial projects
  - Primary focus within on-/off-shore wind & Solar



#### Past employment

- GEODIS, deugro, ALPI



#### Background

- Freight forwarder by nature
- +10 years in Projects logistics for the Wind Industry in Denmark, South Africa, Indonesia & Australia



#### Presentation today

- Status update on speed boat:  
**Specifications for existing and future wind ports**



## DHL Industrial Projects – Snapshot ( wind focused )

In-house  
**Engineering**

**Global** Wind  
organization structure  
in place

**Zero Harm and Zero  
tolerance** principles



**33%**  
Carbon efficiency  
improvement since  
2007

**+1,000**  
WTG's transported  
across 6 continents

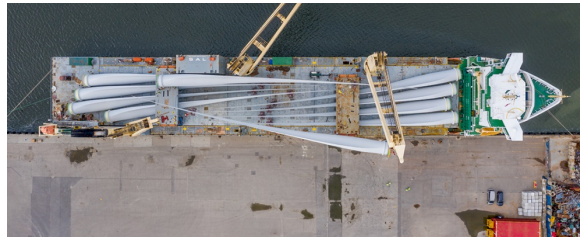


**Leading** freight  
forwarder in the  
Wind Industry

**650+**  
Projects Forwarding  
Experts



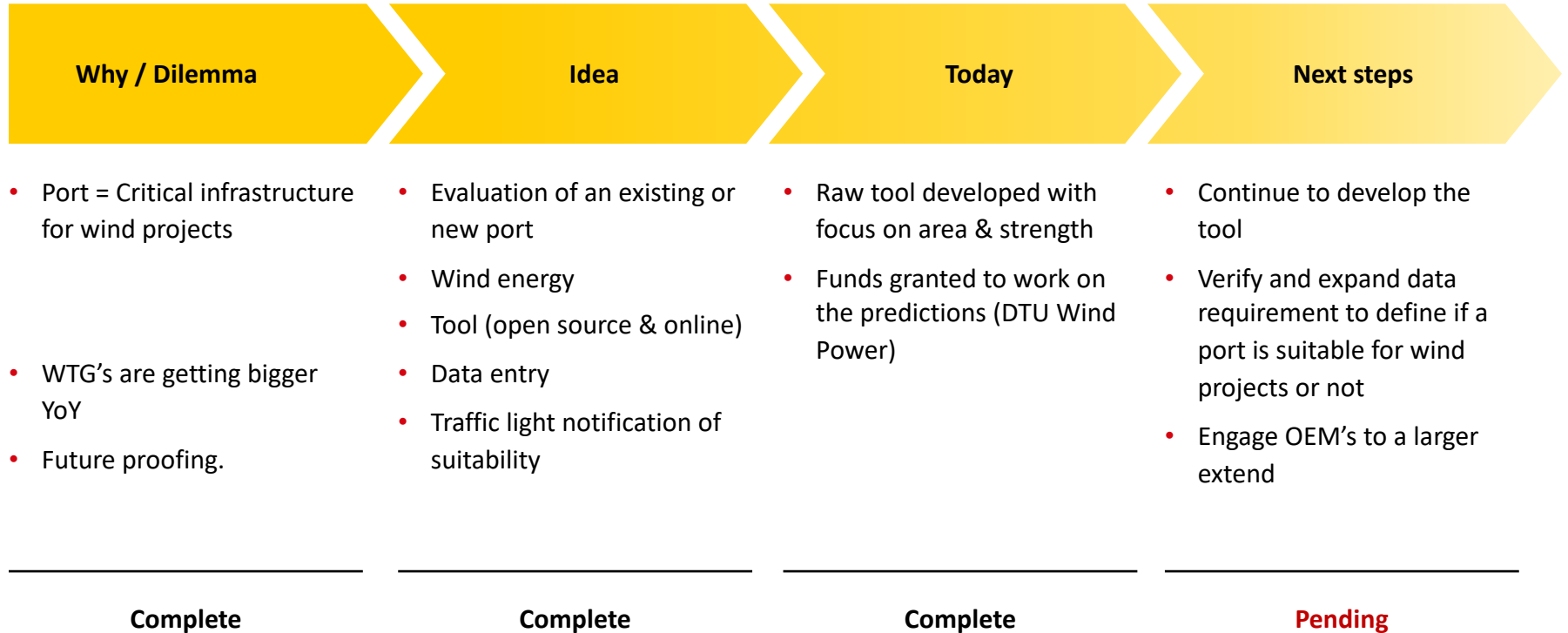
Zero emissions  
**by 2050**  
Ambitious  
environmental  
protection target



**50+**  
Countries

**End to End**  
Management and  
Execution of Wind  
Projects

## Speed boat: Specification for existing & future wind ports



## More insights to the tool in it's raw form

### Output:

#### Graphics to predicts the future

- Blade length/weight
  - Blade length/blade root diameter
  - Nacelle yield/weight/size
  - Etc...
- 



#### Tables with data from the past

- Showing developments
- 



#### Traffic light

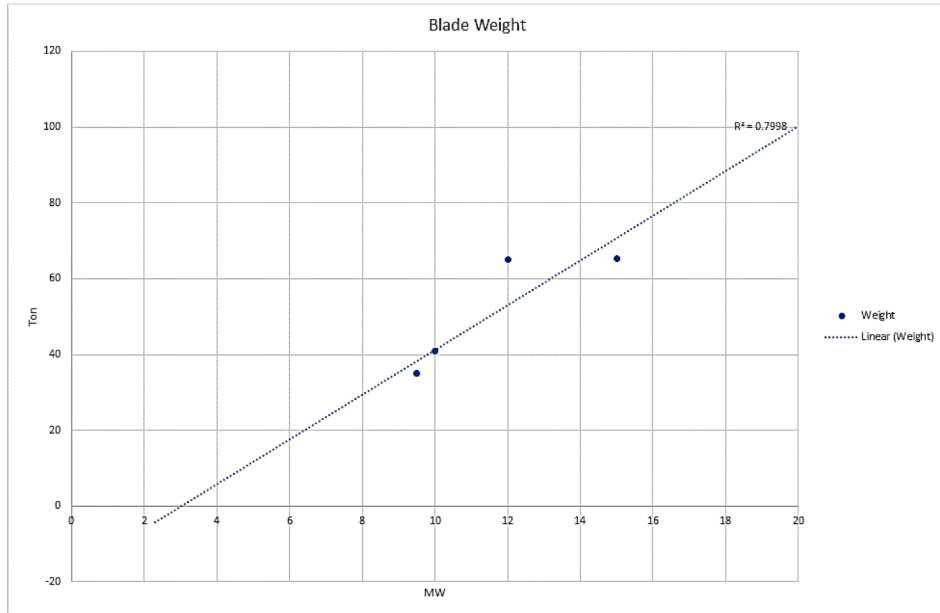
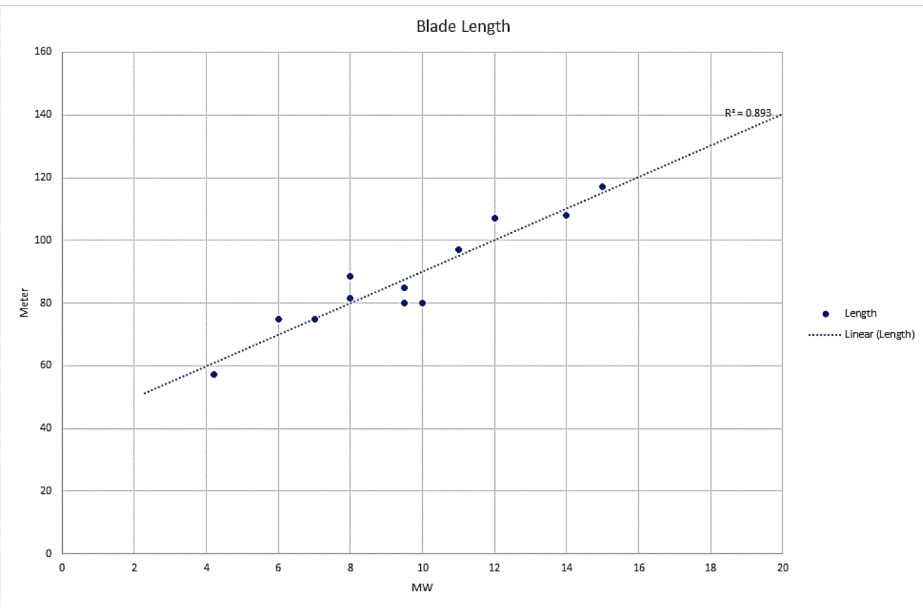
- What turbines can your port handle  
( in current stage area + strength / bearing focused )



# PORT TOOL

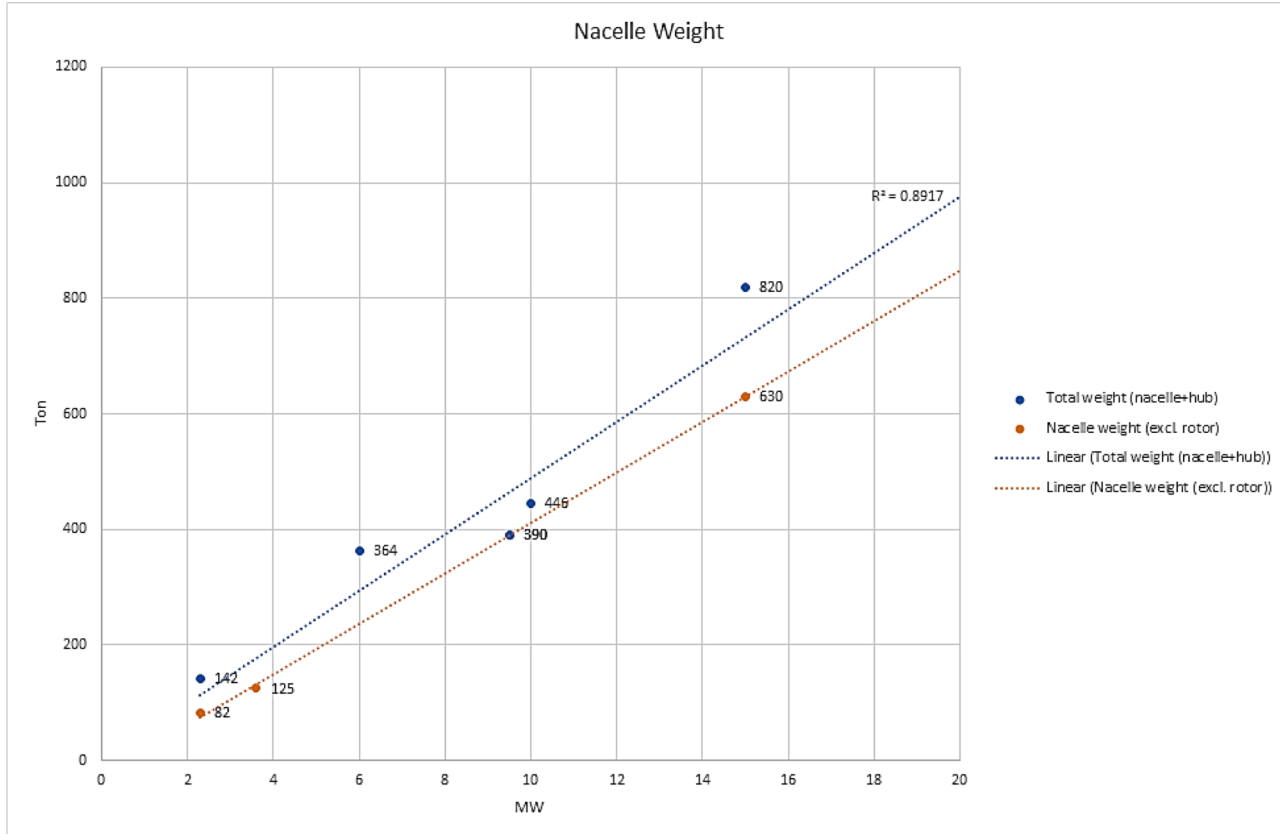
# More insights to the tool in it's raw form

## Graphic examples



# More insights to the tool in it's raw form

## Graphic examples



## More insights to the tool in it's raw form

### Traffic light example

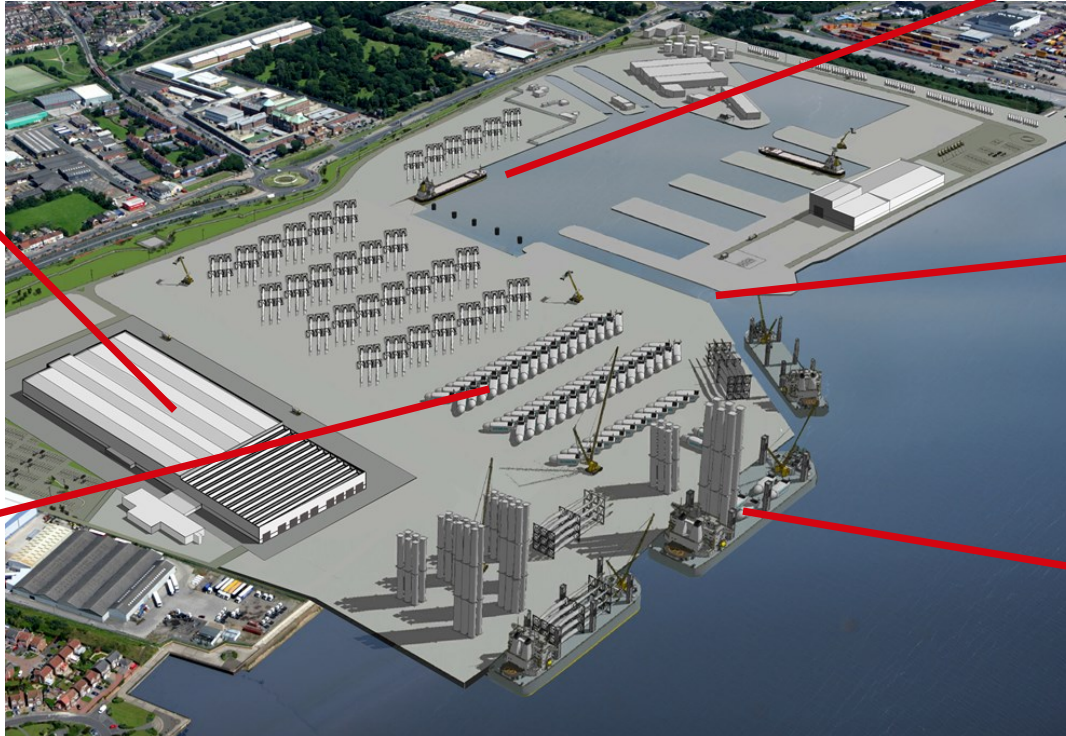
What turbines can your port handle?									
Only edit yellow fields!									
				Rating (MW)	10	15	20		
				Model	DTU 10-MW	IEA Wind 15 MW	MU turbine		
<b>Blades</b>									
	Storage area for blades	m2	17,000	●	17,421	●	15,210	●	16,266
	Maximum lifting height	m	11	●	11.4	●	11.2	●	12.2
	Turning radius (blade)	m	100	●	86.4	●	117.0	●	140.1
<b>Towers</b>									
	Quayside strength	ton/m2	10	●	13.7	●	7.8	●	8.6
	Required lifting height	m	130	●	121.6	●	141.0	●	160.4
<b>Input Used</b>									
<b>Blades</b>									
	Blade length	m			86.4		117.0		140.1
	Root diameter	m			5.4		5.2		6.2
<b>Towers</b>									
	Weight	t			987.0		860.0		1348.1
	Diameter at base	m			8.0		10.0		12.0
	Height	m			115.6		135.0		154.4



# Challenging the input / output possibilities for a 'Port Tool' - Wish list from a transporters perspective

Outbound factory

Transport vessels discharging WTGs



LOA, DRAFT & BEAM restrictions

Transport and Pre-assembly operations

Load-out operations

# THANK YOU

## Back up 2:

MW Rating		3	3.6	4.2	6	7	8	9.5	9.5	10	10	11	12	14	15	Definition	
Company	Vestas	SGRE	SGRE	MVOW	https://SGRE	https://SGRE	https://SGRE	https://Adwen	MVOW	https://MVOW	https://MVOW	DTU 10-MW	DTU 10-MW	SGRE	https://GE	https://SGRE	https://NREL/DTU
Model	V112			V117-4.2 MW**	SWT-6.0-154	SWT-7.0-154	SG 8.0-167 DD	AD 8-180	V164-9.5 MW**	V174-9.5 MW**	V164-10.0 M	DTU 10-MW	SG 11.0-200 DD	Haliade-X 12 MW	SG 14-222 DC	IEA Wind 15 MW	
Serial Production (year)				2014	2014	2017	2019				2021		2022		2024		
<b>Wind Turbine Generator</b>																	
<b>Blade</b>																	
Full component																	
Length	m			57.2	75	75	81.4	88.5	80	85	80		97	107	108	117	5
Weight	t								35	35		41	5	65		65	5
Root diameter	m							4.2	4.6	https://www.windpowermonthly.com/article/1435504/mhi-vestas-launch		3.332	5	5.5	Product sheet		5
Piv-bend	deg																4
Storage footprint	m2																608
Rotor diameter	m											178.3	5				240
Centre of Mass	m																27
<b>Nacelle and Hub</b>																	
Total weight (nac)	t				364				390	390		446					820
Nacelle weight (exc)	t	TP		125	https://en.wind-turbine-models.com/turbines/649-siemens-out-3.6-120-offshore												630
Hub weight	t																190
Hub diameter	m											5.6	5				8
Length	m			12.8					20	21	20.7						
Width	m			4.2					8	9	8.8						
Height	m			3.4					8	9	9.3						
Ton/footprint	Ton/m2																
Direct Drive									1					1	1		
Geared				1													
<b>Towers</b>																	
Full component																	
Weight	t	TP		210	https://en.wind-turbine-models.com/turbines/649-siemens-out-3.6-120-offshore							987	5			860	5
Length	m													150		135	6
Diameter at base	m											8	5			10	5
Diameter at top	m															7	23
Storage footprint	m2																
<b>Largely Part components</b>																	
Weight	t																
Length	m																
Diameter at base	m											8	5				10
Storage footprint	m2																
<b>Other</b>																	
Hub Height		TP		80	https://en.wind-turb	135	TP		105	110		119	5		150	TP	150
<b>Balance of Plant</b>																	
<b>Transition Piece</b>																	
Full component																	
Weight	t											987	5				860
Length	m											10	5				15
Diameter at base	m											8	5				10
Storage footprint	m2																
<b>Managile</b>																	
Full component																	
Weight	t											2044	5				1,158
Length	m																25
Water depth used																	30
Embedment depth	m											42.6	5				45
Diameter at base	m											9	5				10
Storage footprint	m2																

## Back up 1:

### Cheat sheet – weight, volume, and dimensions



Weight & Dimensions	Full Nacelle Weight (t)	Nacelle dimensions (m)	Hub Weight (t)	Total Hub Mass (t)	Hub Height (m)	Blade Length (m)	Blade Weight (t)	Tower Weight (t)
Siemens 2.3 MW	82			142	80	45		162
Siemens 3.6 MW	140				80	58.5	18	
REpower 6.15 MW	325					61		
Siemens 6 (9) MW	364		96	360	135	75	27	
Samsung 7.5 MW						83		
MHI Vestas 8 (9.5) MW	390	20 x 8 x 8			105-140	80	35	
NREL/DTU 10 MW	446		106-180	700		86-100	42-57	628
GE 12 MW					150	107	65	
NREL/SGRE 15 MW			303	1000		125	100	1000
DTU 20 MW	1061		299			125	118	1985