CBS 2023 CASE COMPETITION

Moving Towards a Sustainable Tomorrow

Presented by

Night Sky

Executive Summary

GOAL

Ørsted to reach its 2030 target of 30 GW offshore wind capacity

Ørsted should maintain a healthy financial business and industry

Pain Points

Which Auction should be prioritised?

How much budget should be allocated?

How to implement sustainability Goals?

IMPLEMENTATION

Targeted Auctions in 4 Different countries

Allocated a Budget of 108.8 DKKbn

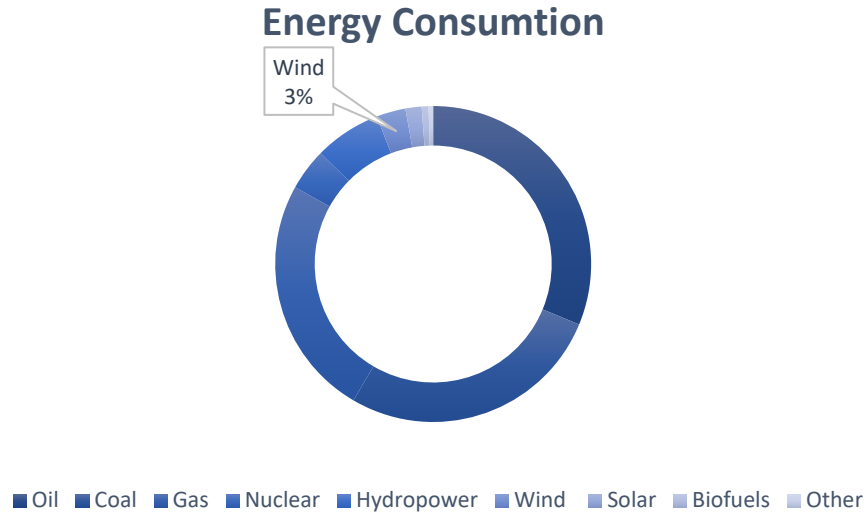
Prioritised sustainable and ecologically friendly methods during the Construction period

IMPACT

- Achievement of 30 GW offshore capacity
- Decarbonization of the Supply chain
- Expansion of domain to floating wind turbines

Energy Industry as a whole

Why is Renewable Energy in demand? & Ørsted's goal



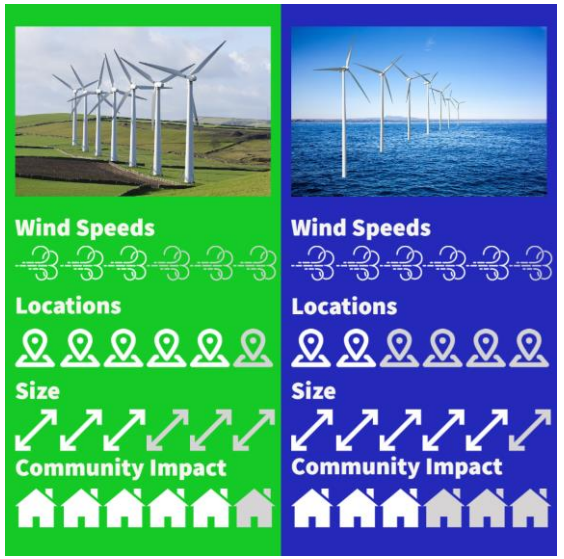
About 83% of total Energy consumption is through Carbon based sources.

To complete the goal of keeping the rise of earth's temperature below 1.5°C and supporting the Increase consumption of energy Renewable Energy is in demand

Wind Energy contributes to about 3% of total energy consumption

Wind Energy

- **Offshore**
  About 7% of the total generating capacity
- **Onshore**
  About 93% of the total generating capacity



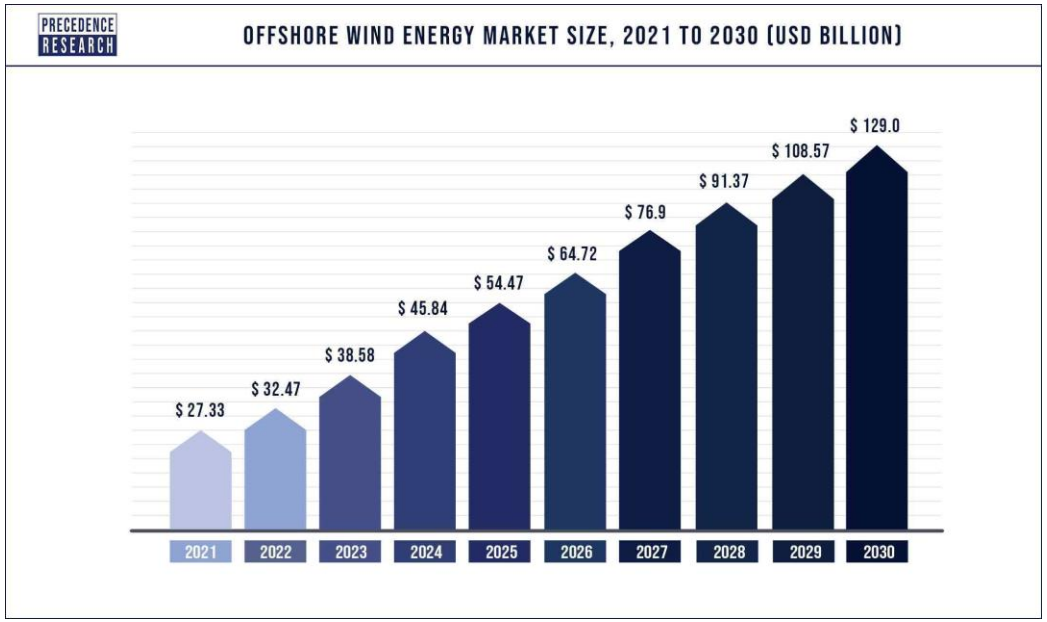
As Offshore wind energy has better characteristics than Onshore wind energy
Ørsted has focused to increase its Offshore wind energy production to 30 GW by 2030

An Overview of the Offshore Wind Industry

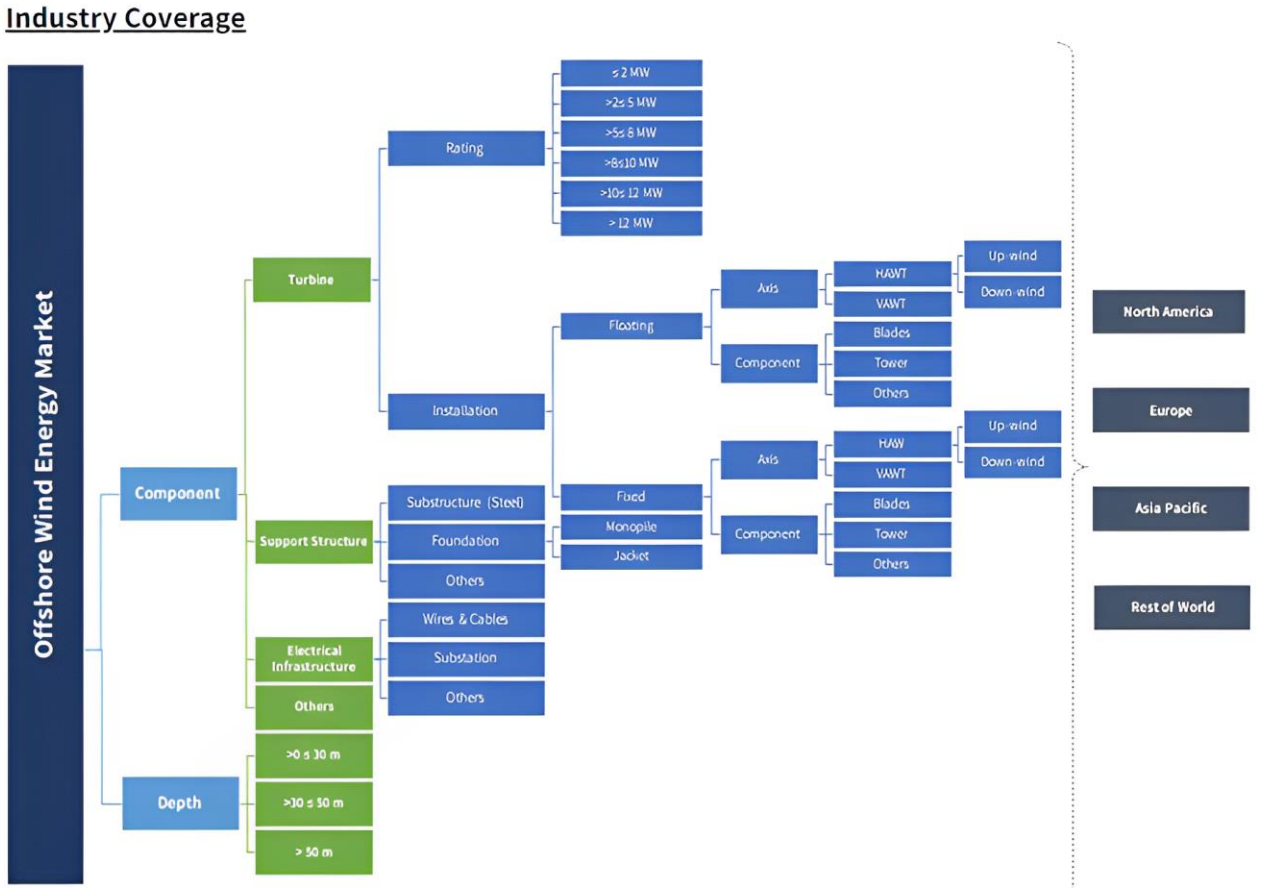
Offshore Wind Energy's Growth, Share & Production map

Offshore Wind Energy

Market Size:	>$30 Billion USD
CAGR:	18.82%
Production Capacity:	55.7 GW



Production Considerations



Position of Ørsted in the Offshore Wind Race

Major Presence, Generating capacity & Market share of Ørsted's Competitors

	Ørsted	RWE	VATTENFALL	IBERDROLA	equinor	sse
Operating Locations	Denmark, Germany, Taiwan, UK, US, Poland, Netherlands	Denmark, Germany, Sweden, UK, US, Japan	Denmark, Germany, Sweden, Netherlands, UK	Poland, Sweden, Ireland, Japan, Korea, France, Brazil, Taiwan, Philippines, Australia	US, UK, Poland Norway, Germany, Japan, South Korea, France, Spain, Vietnam	Ireland, UK
Generating Capacity	22.2 GW	8.8 GW	6.7 GW	6.1 GW	6.0 GW	5.4 GW
Market Share (Europe)*	17%	10%	6%	4%	2%	2%

Selection of Auction Sites

Selection of key locations according to their Market Interest

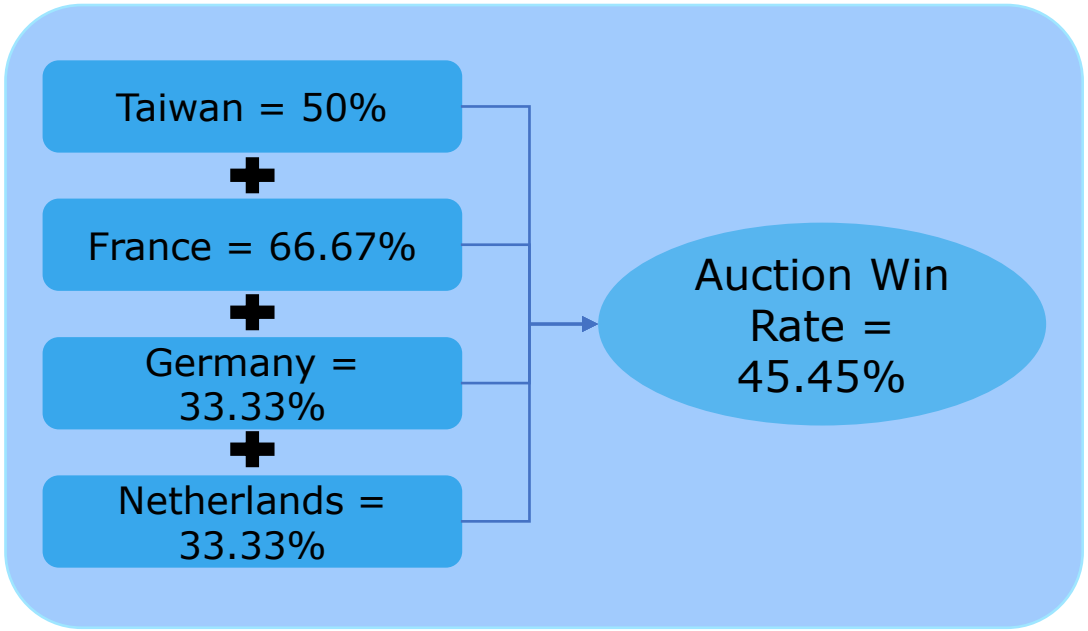
Ørsted's main focus values other than Cost reduction of turbine

Tender Locations:

	Taiwan	France	Netherlands	Germany
Country	Taiwan	France	Netherlands	Germany
Generating Capacity	3GW	2GW	1GW	2GW
Total Bids	2	3	3	3
Bidding Year	2023	2025	2023	2024
Key Reason	Less Competition	Auction Parameters	Auction Parameters	Auction Parameters
Innovation Focus	Price, Ecological mitigation	Price, Sustainability, Ecological mitigation	Price, System Integration, Ecological mitigation	Price, System Integration, Ecological mitigation, Sustainability
Win Probability	Very High	High	Medium	Medium

Financials of Auction

Cost Planning & Bidding Strategies to provide a preferred scenario



Cost Analysis:

Bid Cost Y2023= 0.475 DKKbn
Bid Cost Y2024= 0.375 DKKbn
Bid Cost Y2025= 0.7 DKKbn
→ Total Bidding cost= 1.55 DKKbn

Floating Construction Cost= 25 DKKbn
Fixed Construction Cost= 80 DKKbn
→ Net Cost for Construction= 105 DKKbn

Major Market = Core market
Major Technology= Fixed
Auction Format = Central

Cost for Innovation & Implementation of sustainable methods = 2.25 DKKbn

Total Bid Generation Capacity = 19 GW

Total Cost to achieve Ørsted 30GW goal = 108.8 DKKbn < 200 DKKbn

Differentiability

Staying ahead of existing and new market competitors

Key advantages

- Largest market cap
- High risk-taking ability
- **Value beyond value chain**
- Target carbon neutrality by 2025

Improvement areas

- Installation methods
- Foundation designs
- Logistics and digitalization
- Overall cost reduction

Powerful partnerships

maintain high paced build out of offshore wind farms.
Re-invest money in new, capital-intensive renewable projects
Continue divesting 50% of the offshore windfarms

Increasing geographical reach

Continue construction in Europe, Asia, and North America.

Winning the auction in Taiwan will allow them to capture the low competition market

Pioneering technology

Suction bucket jacket research and development:
- Reduce footprint
- Scale up to drive down costs

Leads- Big data collection through big radar (first of its kind)

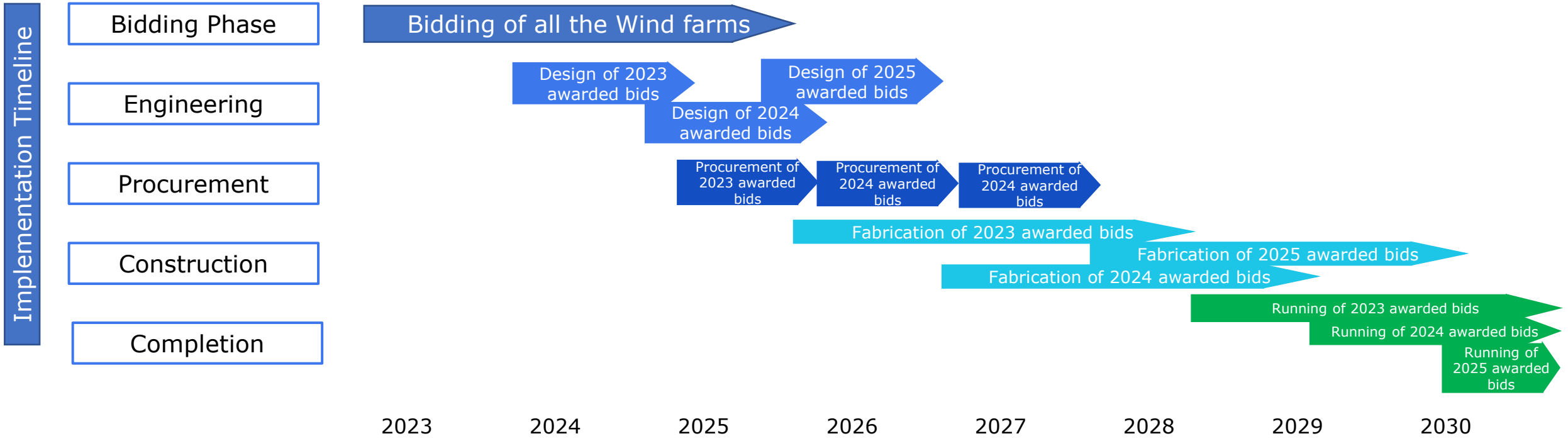
Scaling up

Scale up with more 11MW turbines with rotor diameter of 200m.

Drive down offshore costs to make the sector highly competitive

Roadmap for Ørsted to achieve a Better Tomorrow

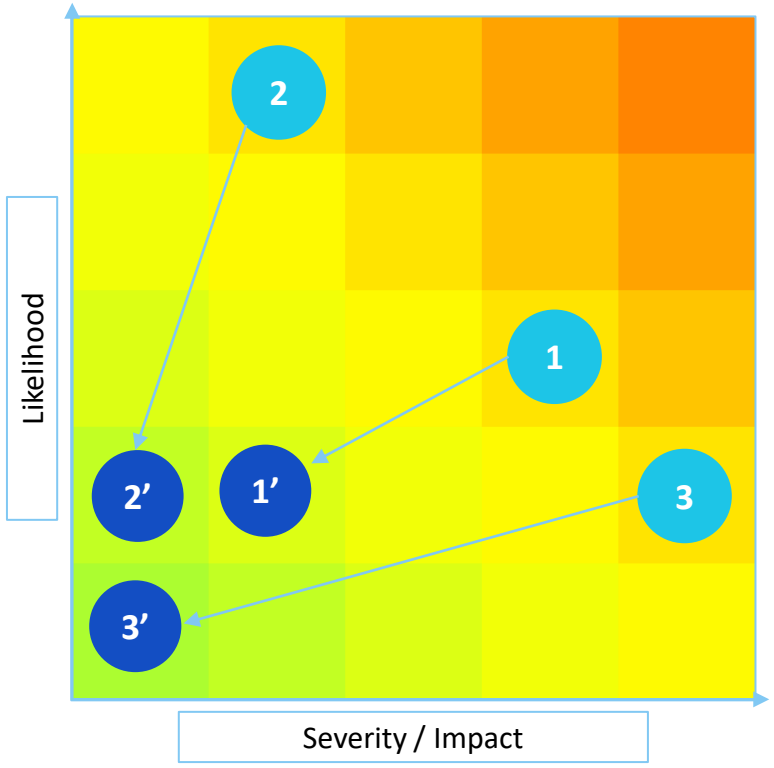
Bidding and EPC timeline for Ørsted



Overall, the Completion of all the Wind farms is Completed by 2030 allowing Ørsted to achieve its 30 GW goal

Facing the Challenges during Implementation

Risks are Identified well in Advance to be fully Mitigated



Risks

1. Failing to Win the Bid
2. Delay in Schedule due to Environmental reasons
3. Lack of Immediate Budget due to past projects

Mitigation

1'. To avoid this Care has been taken to select the core markets and close markets which have their goals aligned with that of Ørsted

2'. Sufficient time has been allocated to the construction phase

3'. Few prioritised Auction are kept in the year 2023, While the majority of Auctions in focus are occurring in 2025

Innovation Technologies

Making the wind energy more efficient

Floating Wind Turbines

This technology allows wind turbines to be placed in deeper waters, where the wind is stronger and more consistent, making it possible to generate more electricity.

Floating wind turbines have a smaller environmental impact than bottom- fixed turbines, a they do not require the excavation of the seabed, and they have a lower visual impact on the surrounding area.

Smart Blades

Able to adjust themselves to the wind flow to remain at peak performance. Computer simulations and wind tunnel tests are being used to optimize the shape of the blades for maximum efficiency.

Blades are being designed to have a longer lifespan, reducing the need for frequent maintenance and replacements. Blade design improvements will increase the efficiency and cost-effectiveness of wind turbines, making offshore wind energy a more viable solution for meeting global energy demand.

Direct Drive Generators

Direct drive generators use fewer moving parts and generate electricity more efficiently, reducing maintenance costs and increasing the lifespan of wind turbines.

Several benefits are added here within the advanced control features, which provide users with high energy yield, quiet operation and long-term reliability and availability.

Innovation Technologies

Making the wind energy more efficient

Grid Integration

The integration of offshore wind energy into the existing grid is becoming more advanced, allowing for greater stability and reliability in the electricity supply. Effective grid integration can help ensure a reliable electricity supply while reducing the cost of energy and maximizing the contribution of renewables.

Artificial Intelligence

AI is being used to optimize the operation of wind farms, including optimizing energy production, reducing downtime, and improving safety. This enables assessment of new technologies or turbine design before testing them in the field.

Offshore wind farms

Offshore wind farms are becoming larger and more complex, with multiple turbines connected to form a single generating unit, increasing efficiency and reducing costs. Offshore wind speed tends to be steadier than on land. A steadier supply of winds mean more reliable source of energy.

These technologies have the potential to significantly increase the efficiency and cost-effectiveness of offshore wind energy, making it a more attractive option for meeting the world's energy needs.

Sustainability

Learning from the past and future-proofing

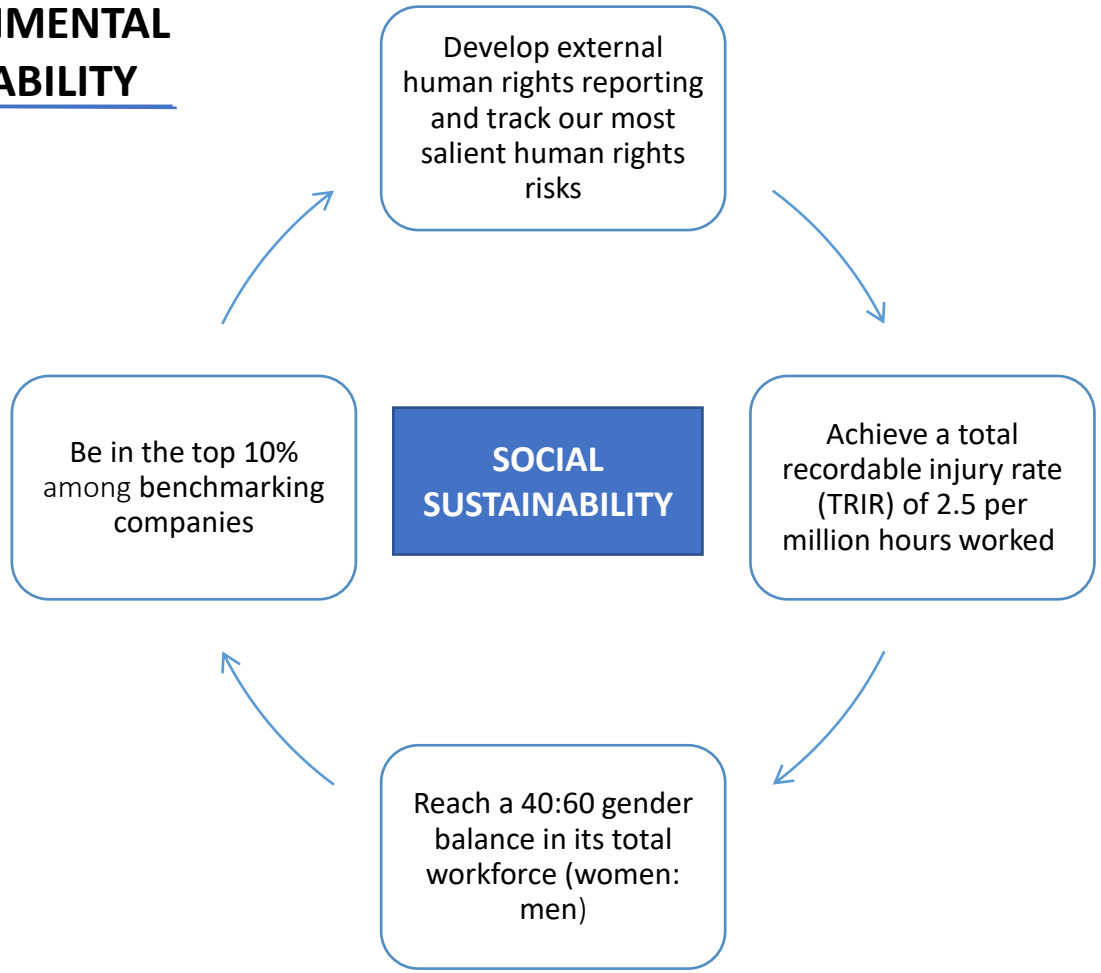
ENVIRONMENTAL SUSTAINABILITY

Decarbonizing the supply chain

- using less cement in turbine foundations
- sourcing sustainable steel
- zero wind turbine blades directed to landfill/recycling wind turbine blades
- Engaging in other green procurement activities

Circular use of resources

•The materials needed for renewable energy are increasingly in demand ,potentially leading to increased competition ,higher costs, supply chain bottlenecks.
•Creating a more circular value chain will lower the dependency on raw materials and build a more resilient supply chain



Appendix 1: Auction Selection and Budget Calculation

Country	Tender name	Auction format	Technology	Year	Capacity (GW)	Additional comment	Devex Cost DKKm	Capex Cost (floating and fixed)	Capex Cost (minor + local + sustainable)	Total Cost
Germany	Germany N-12.2	Central	Fixed	2023	2		150 DKKm	0	0	150 DKKm
Taiwan	Round Three Centralized Auction	Central	Fixed	2023	3		225 DKKm	20 DKKbn	450 DKKm	20675 DKKm
France	Round 10	Central	Fixed	2023	1		100 DKKm	0	0	100 DKKm
Netherlands	IJmuiden Ver III	Central	Fixed	2023	1		75 DKKm	20 DKKbn	450 DKKm	20525 DKKm
Germany	Germany N-9.2	Central	Fixed	2024	2		150 DKKm	20 DKKbn	450 DKKm	20600 DKKm
Taiwan	Round Three Centralized Auction	Central	Optional	2024	3		225 DKKm	0	0	225 DKKm
Germany	Germany N-10.1	Central	Fixed	2025	2		200 DKKm	0	0	200 DKKm
Netherlands	IJmuiden (Noord) Ver VII	Central	Fixed	2025	1		75 DKKm	0	0	75 DKKm
France	Round 11 Mediterranean Extensio	Central	Floating	2025	1		100 DKKm	25 DKKbn	450 DKKm	25550 DKKm
France	Round 12	Central	Fixed	2025	1		100 DKKm	20 DKKbn	450 DKKm	20550 DKKm
Netherlands	Nederwiek South I	Central	Fixed	2025	2		150 DKKm	0	0	150 DKKm
										= 108800 DKKm

	Devex			Capex	
	75DKKm	core market		20DKKbn	fixed
	100DKKm	Close market		5DKKbn	floating
	125DKKm	New market		200DKKm	minor
	1DKKbn	Lease market		150DKKm	local
				100DKKm	sustainable