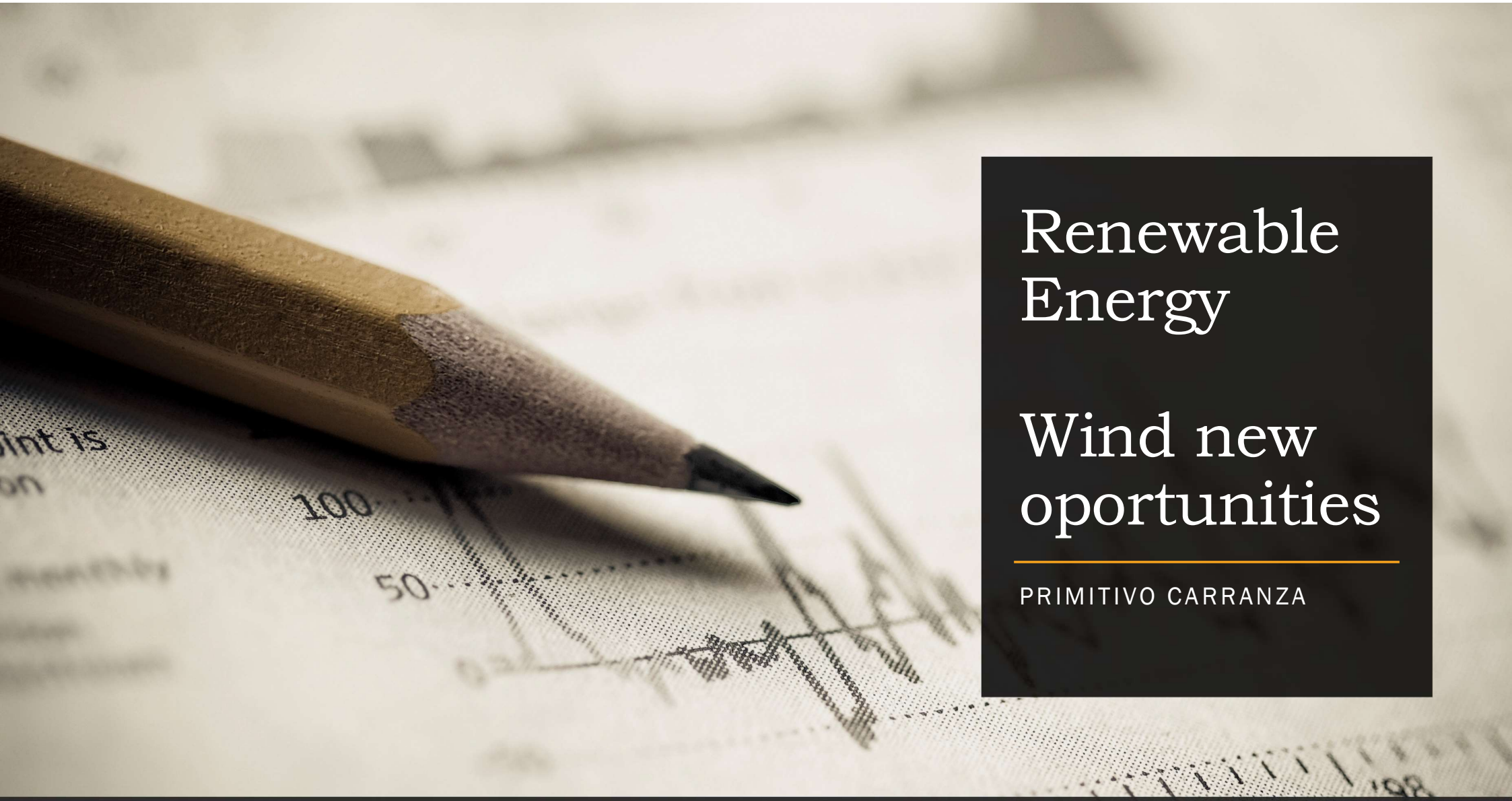


Renewable Energy

Wind new oportunities

PRIMITIVO CARRANZA

Index

1-Who we are?

Engineering-Resources is an engineering HUP where we meet professionals with experience in the construction of large industrial projects.

Our experience covers from the economic and conceptual analysis phase of the design, to its commissioning and delivery.

Our fields of expertise are Nuclear, Oil&Gas and Offshore Wind

If you are looking for a team to develop your project, here you can find a partner.

Gints Filipsons

MSc Mechanical Engineer,
IWE European Welding Engineer

Over 20 years of experience in oil & gas transportation systems, energy construction, O&M of power plants, conformity assessment, welding.

Lately, I have been involved in offshore wind projects in the Baltic Sea and now, I am coordinating the area, to introduce companies interested in the renewable energy sector and developing business.

Contact: e-mail gf@apollo.lv

Tel: +371 29102639

Primitivo Carranza

PhD Physical Engineering
MSc Industrial Engineer,

MBA, CEng, IPMA level 2.

Corporate Governance for Directors certificate

Allow me to introduce myself as a professional with over 20 years of experience in the construction of large-scale industrial projects. Throughout my career, I have worked in various industries, including nuclear energy and the oil & gas sector. All this activity was in different countries in North America, Europe, and Middle East.

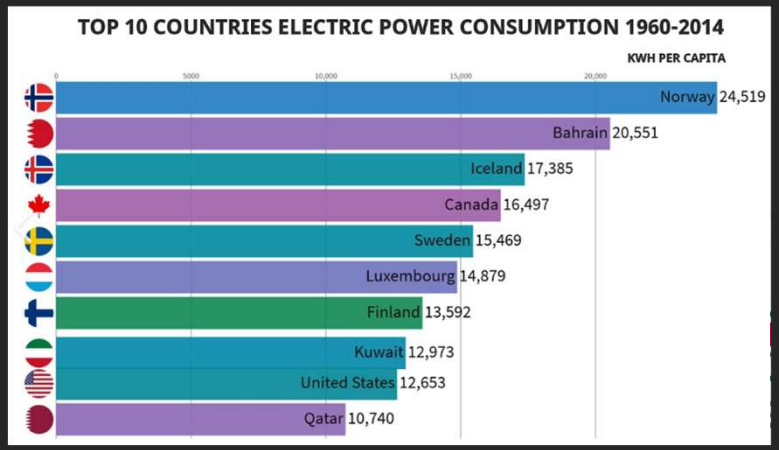
In the past 5 years, I have dedicated my expertise and knowledge to offshore wind projects in the Baltic Sea working from Germany.

I have utilized my knowledge and experience to actively participate in various technical committees, where I can share and learn from other professionals to enhance the industry. Currently, I am a member of the International Expert Committee at DNV offshore wind projects.

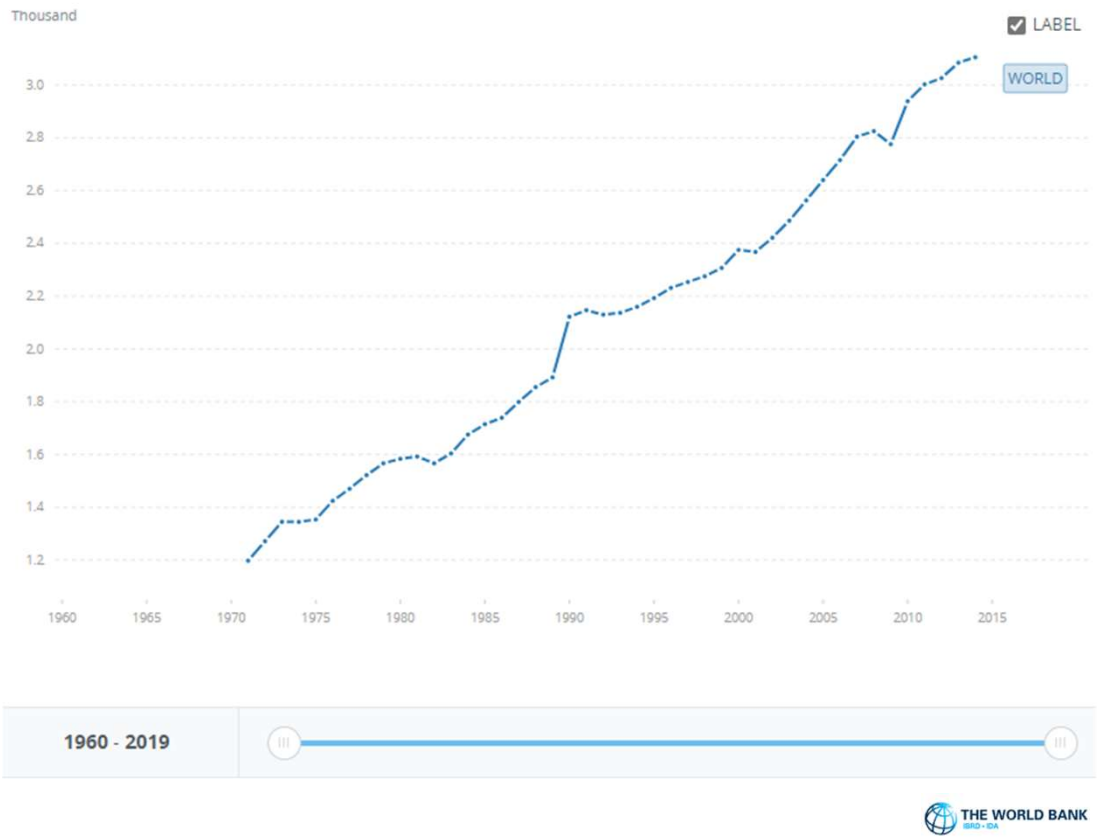
I also collaborate as a Visiting Professor for the International Master in Renewable Energy in the Marine Environment (REM+)

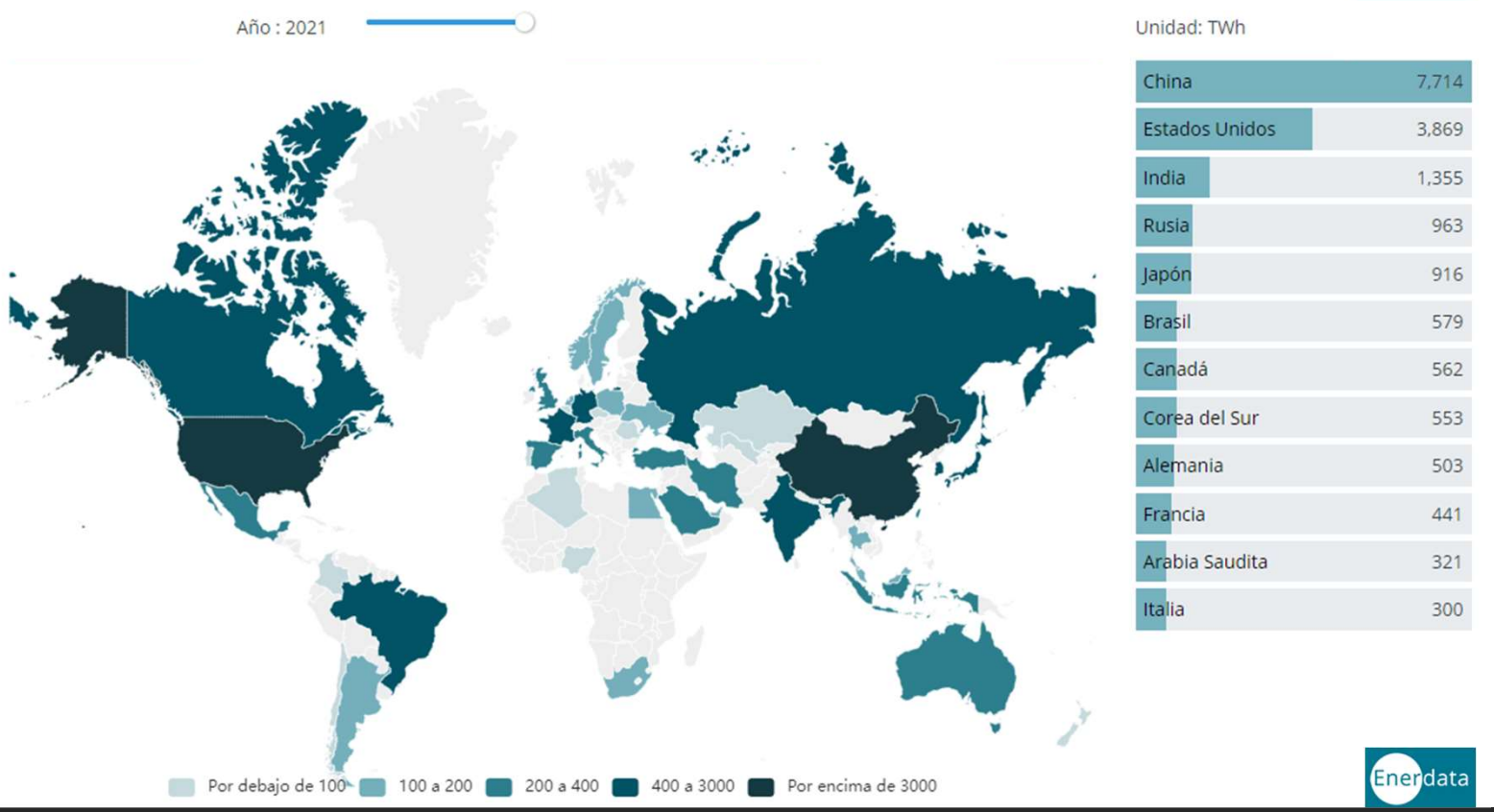
2-Energy situation around the world

Kwh Per capita



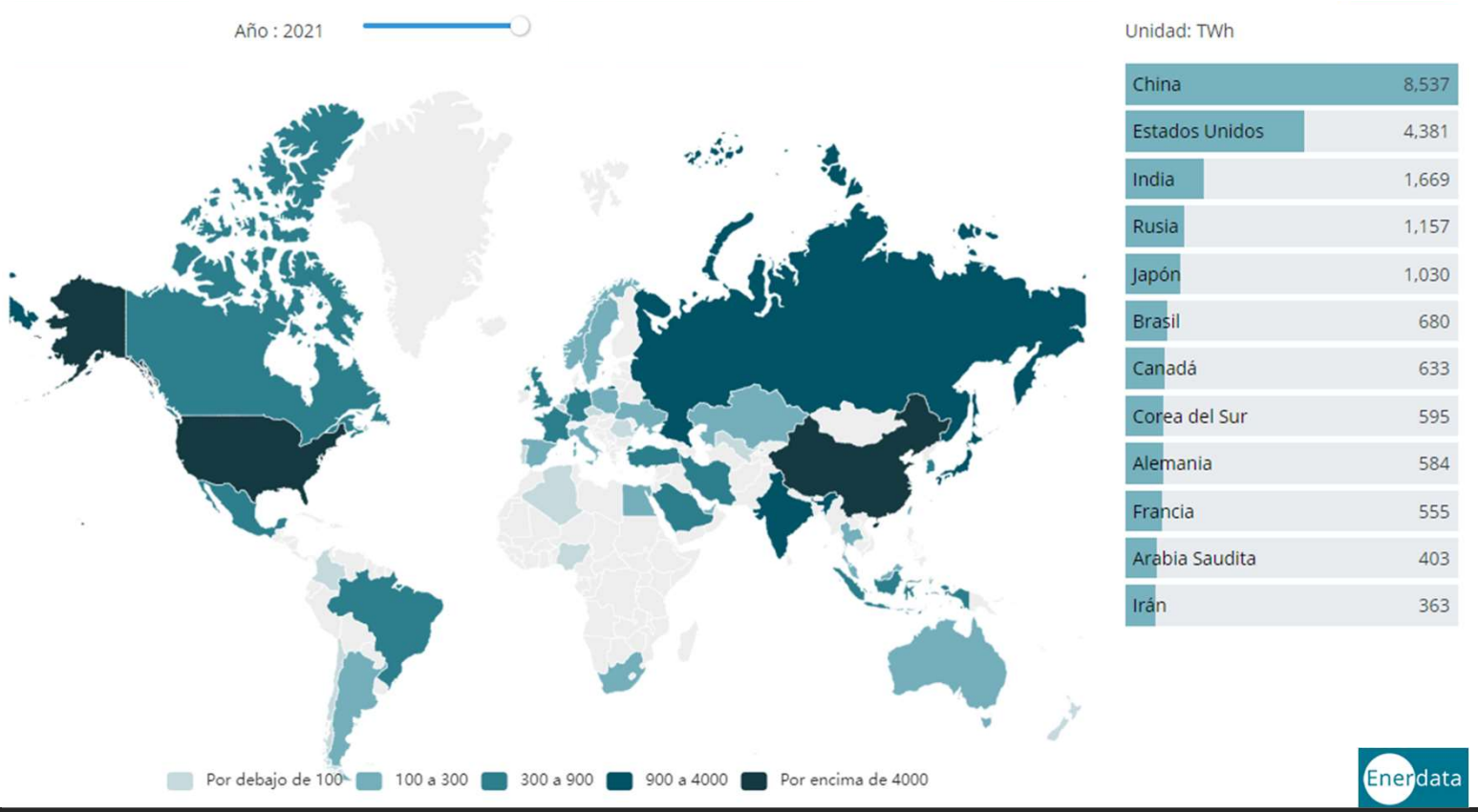
Electric power consumption (kWh per capita)





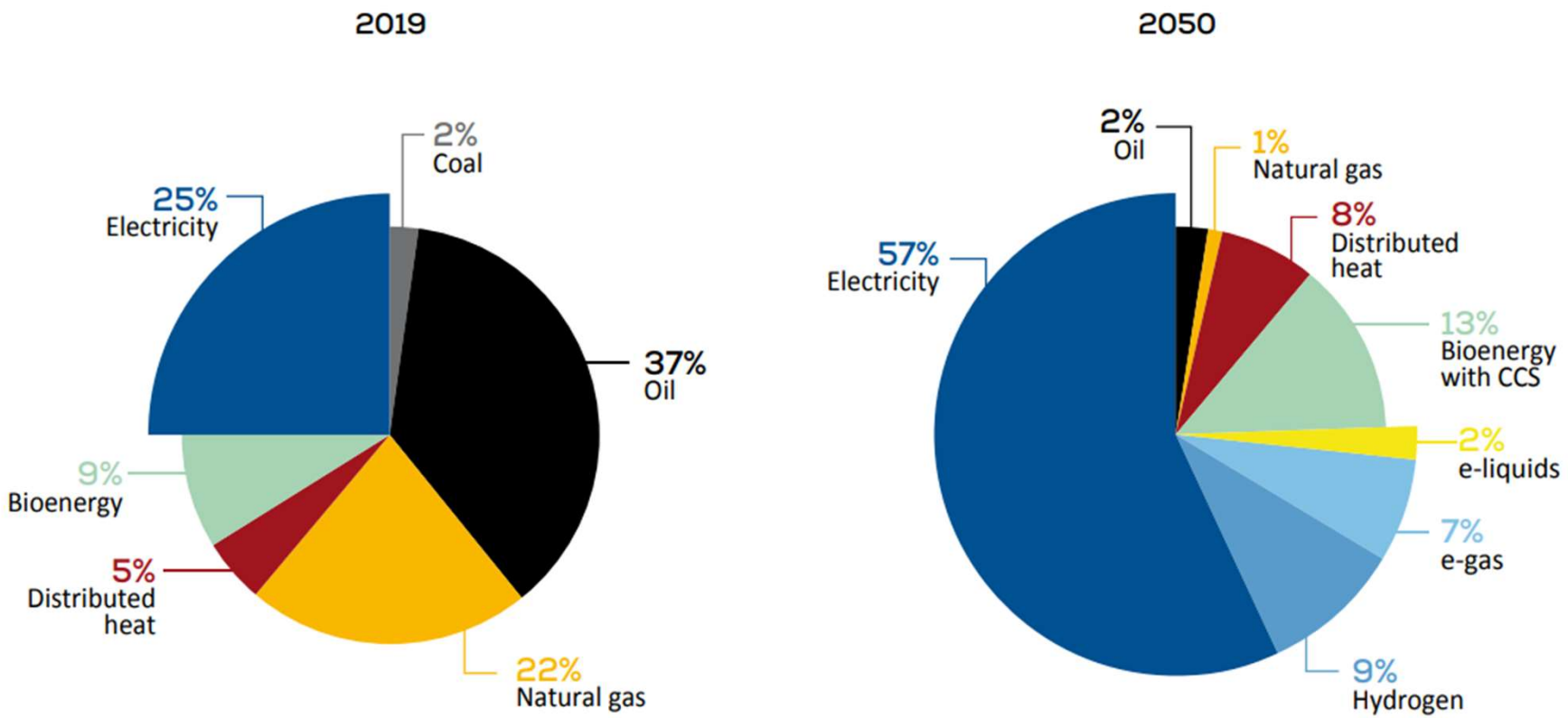
Total Consumption

2021

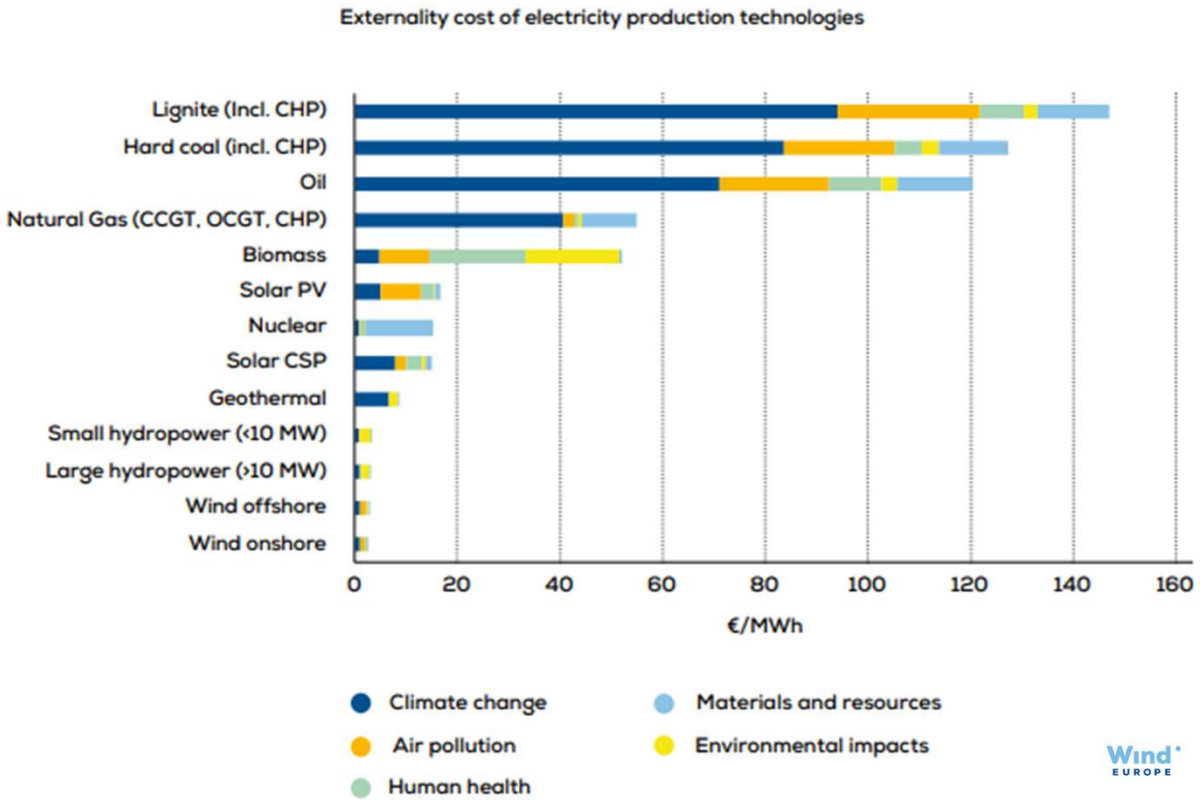


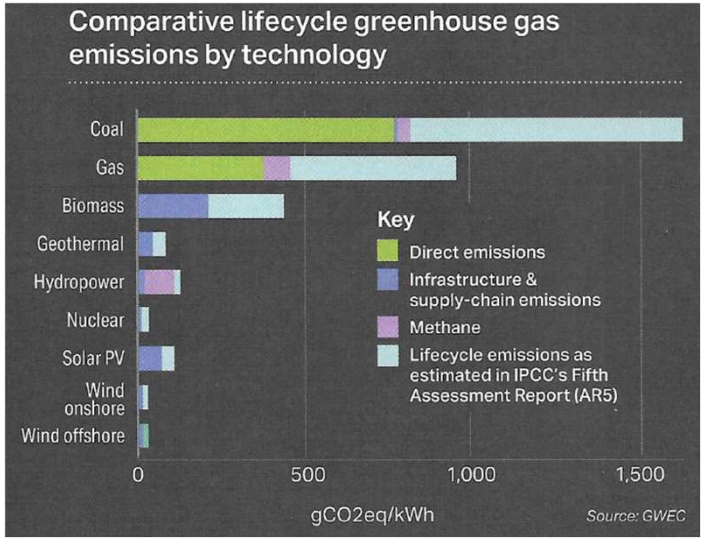
Total Production

2021



Final energy demand by energy carrier 2022

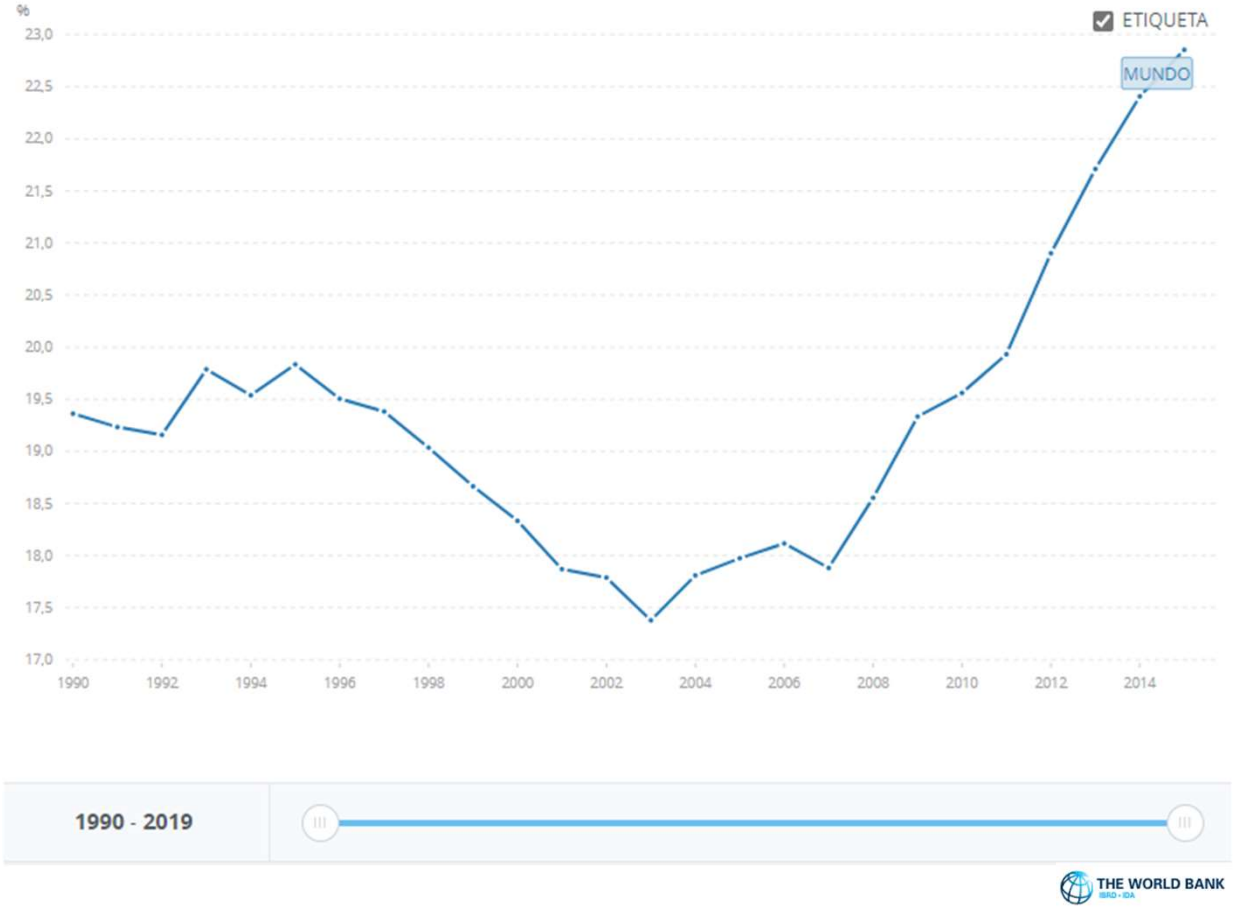


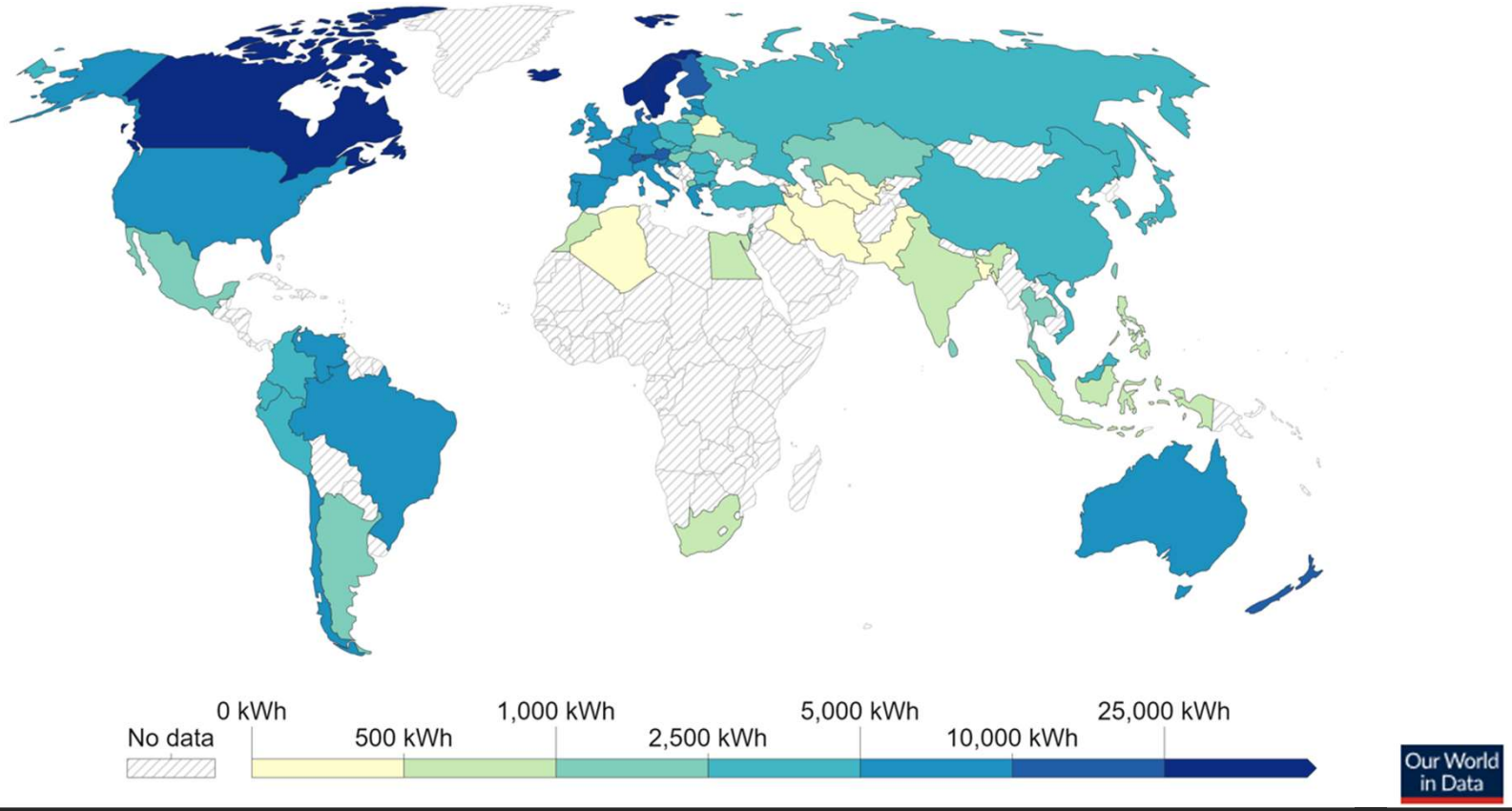


Externality cost of electricity production Technologies in the EU

3-Renewable energy outlook

Renewable electricity output (% of total electricity output)

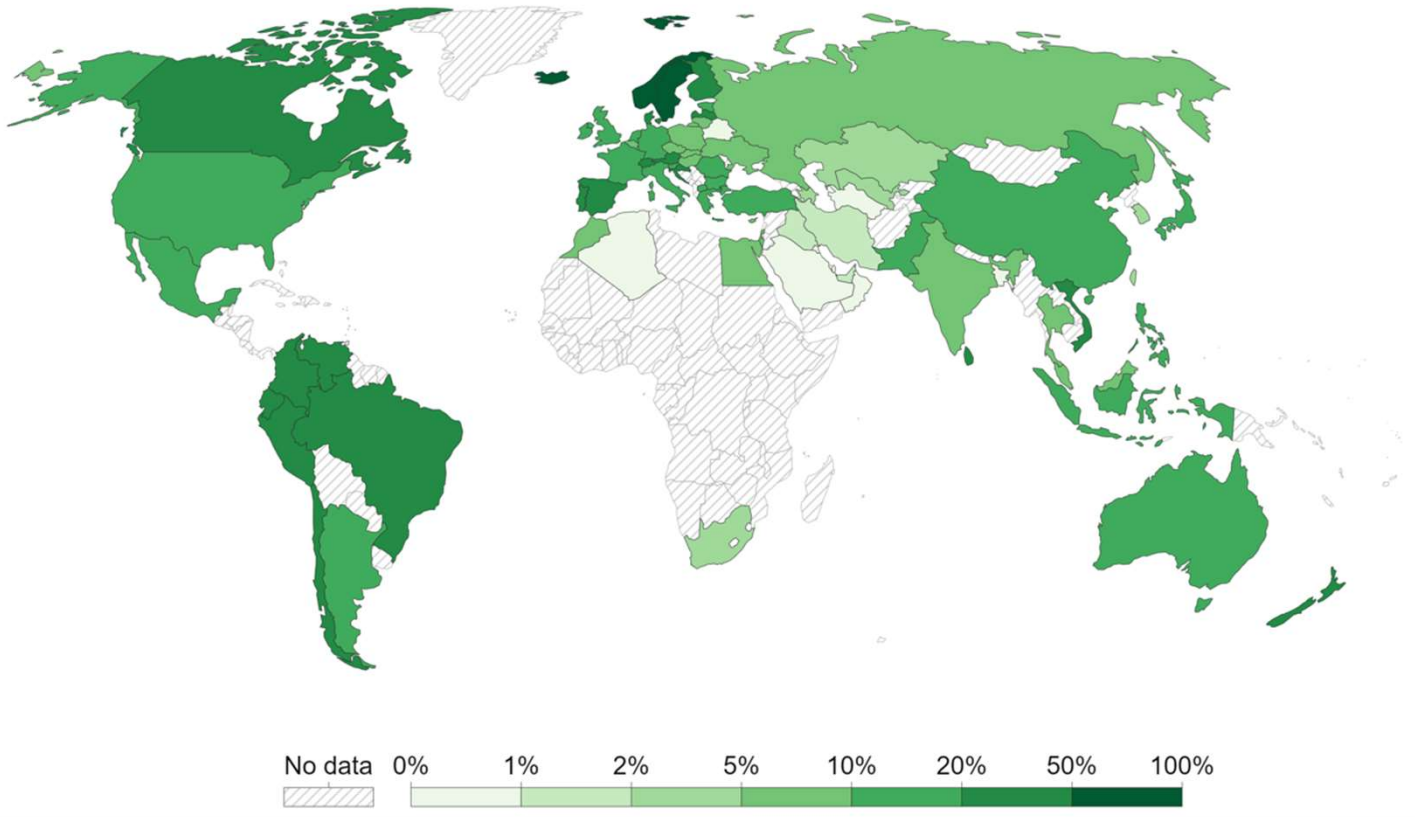




Per capita energy consumption from renewables, 2021

Renewables is the sum of energy from hydropower, wind, solar, geothermal, wave and tidal, and bioenergy. Traditional biofuels are not included.

Note: 'Primary energy' refers to energy in its raw form, before conversion into electricity, heat or transport fuels. It is here measured in terms of 'input equivalents' via the substitution method: the amount of primary energy that would be required from fossil fuels to generate the same amount of electricity from renewables.

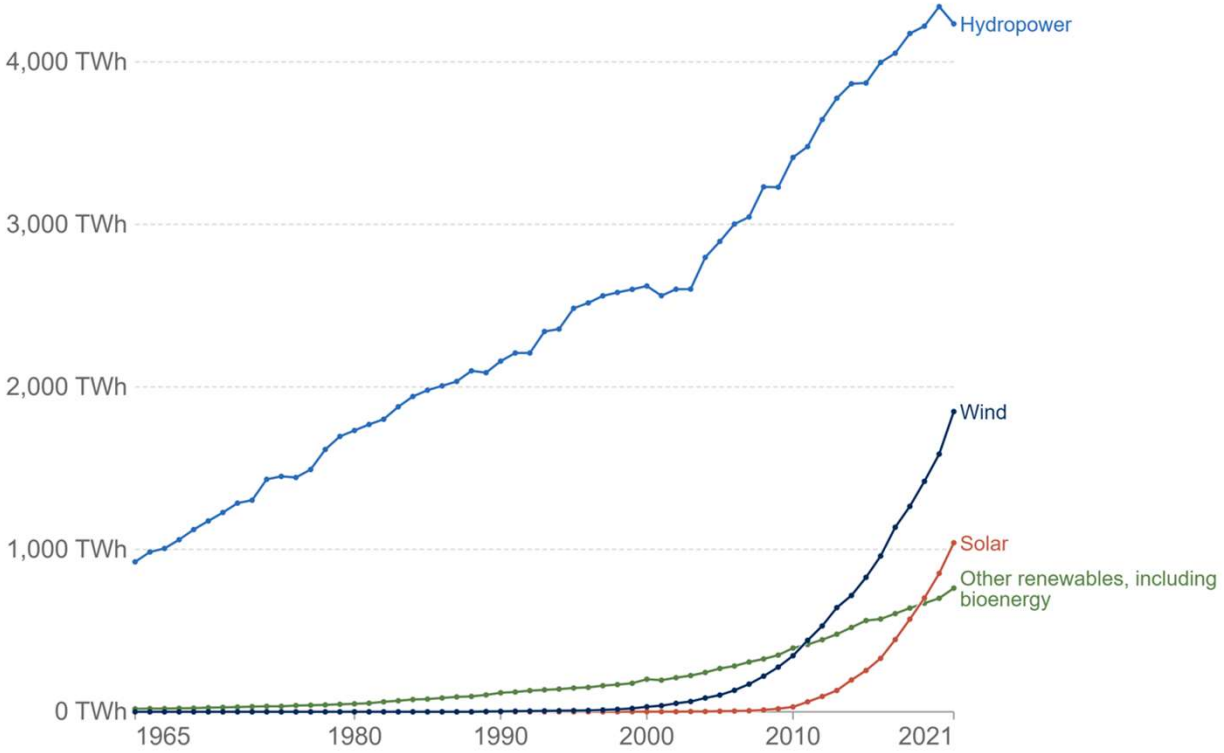


Share of primary energy from renewable sources, 2021

Renewable energy sources include hydropower, solar, wind, geothermal, bioenergy, wave, and tidal. Theydon't include traditional biofuels, which can be a key energy source, especially in lower-income settings.

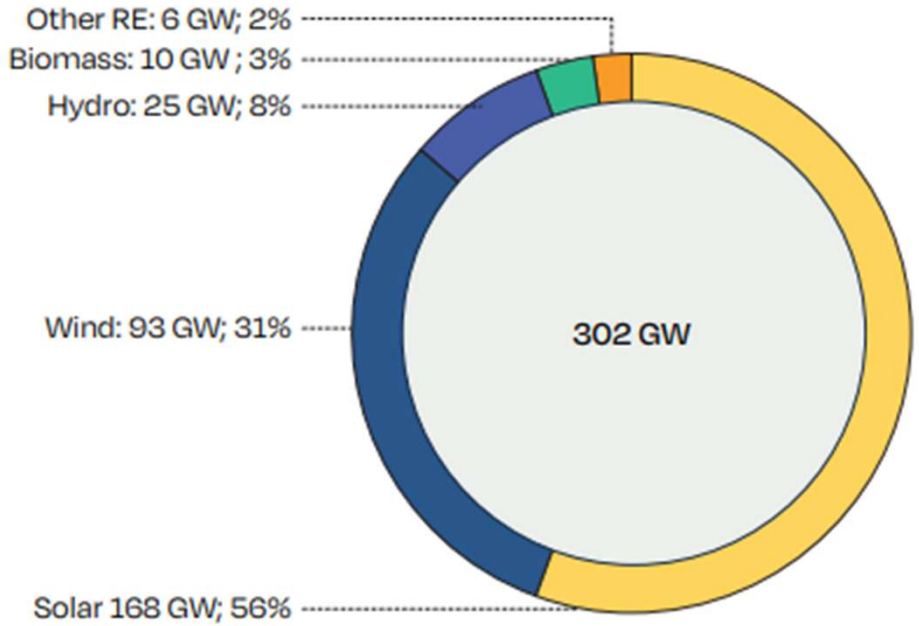
4-Tendencis

Modern renewable energy generation by source, World

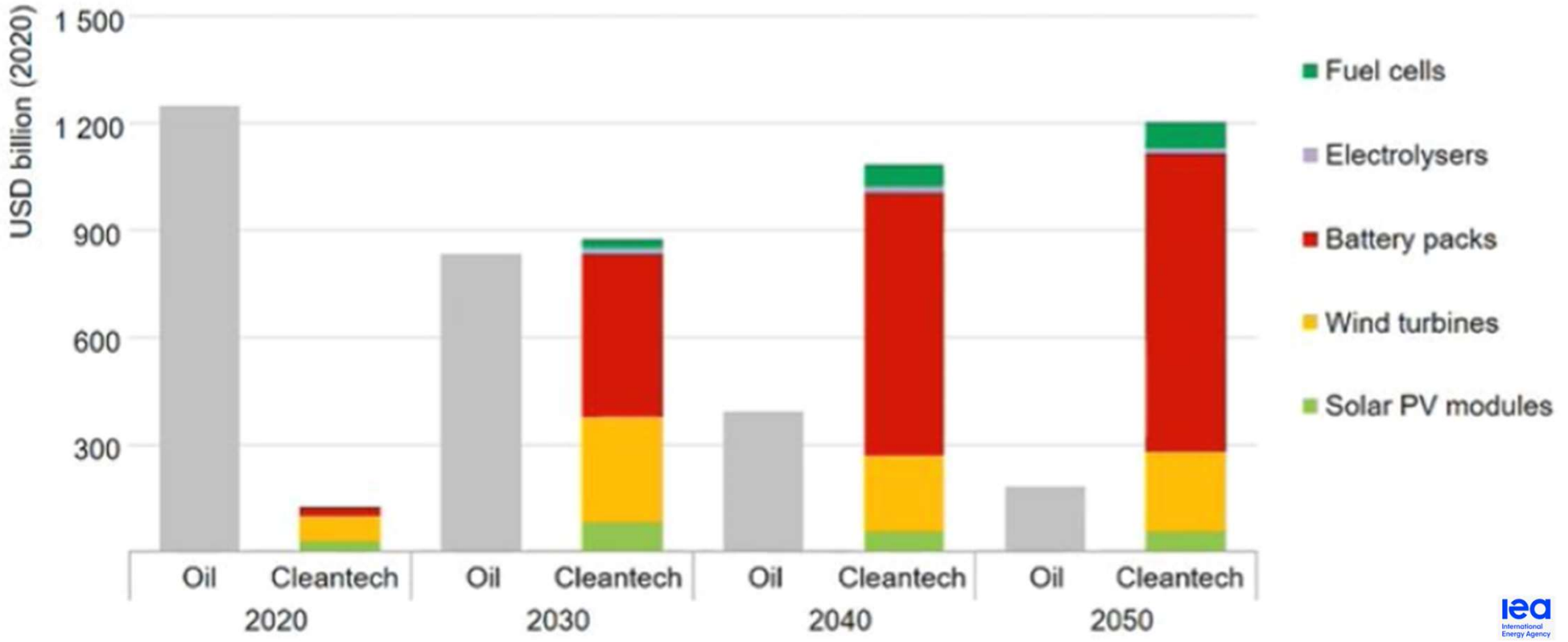


Our World in Data

NET RENEWABLE POWER GENERATING CAPACITY INSTALLED IN 2021

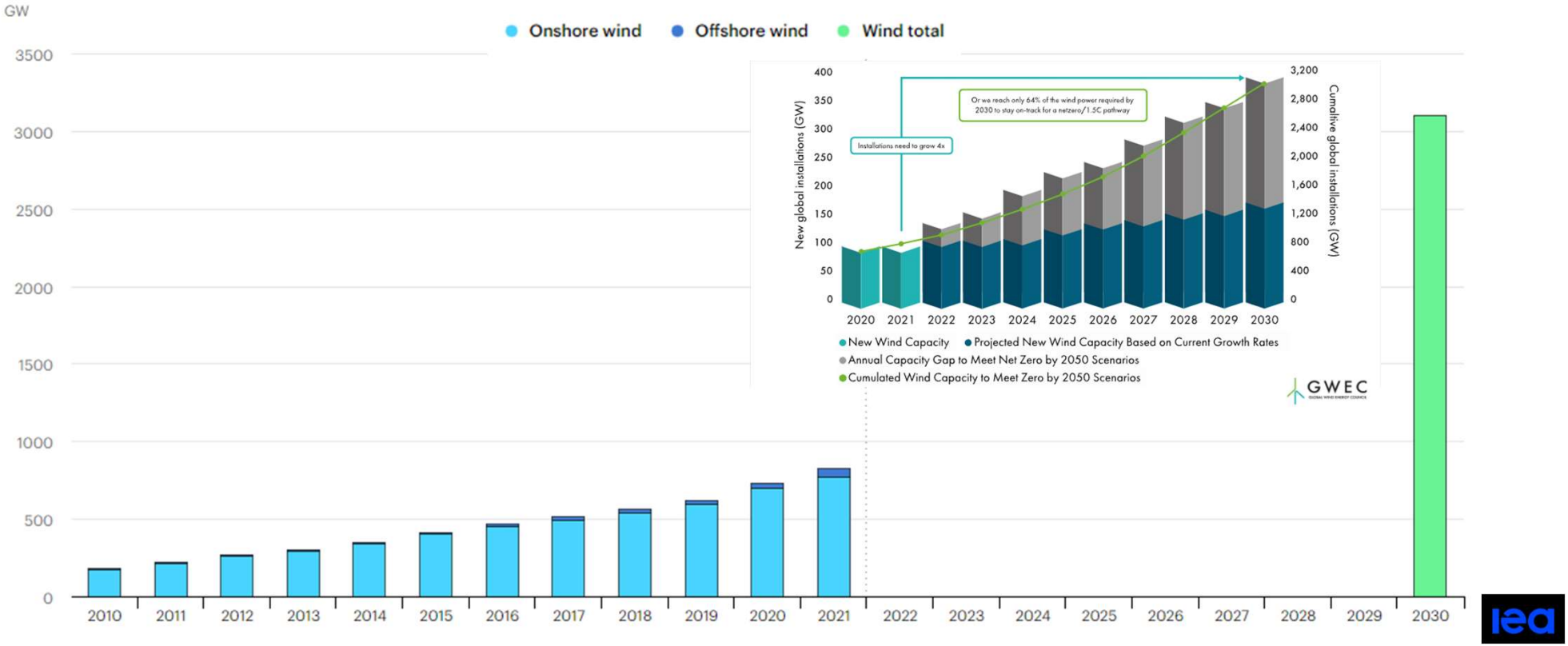


SolarPower Europe



A new global energy economy is emerging

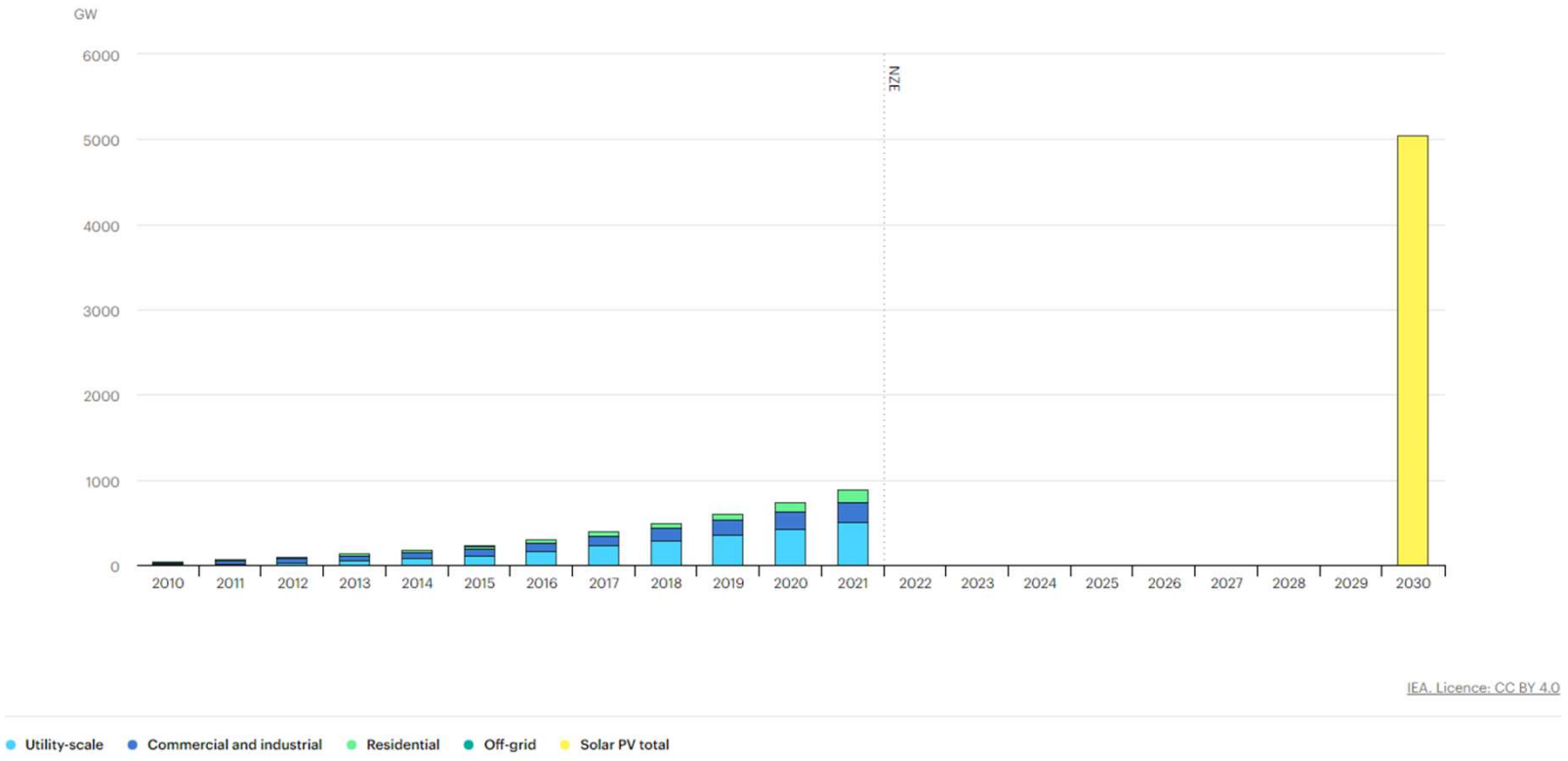
Accumulative USD 27 trillion through to 2050



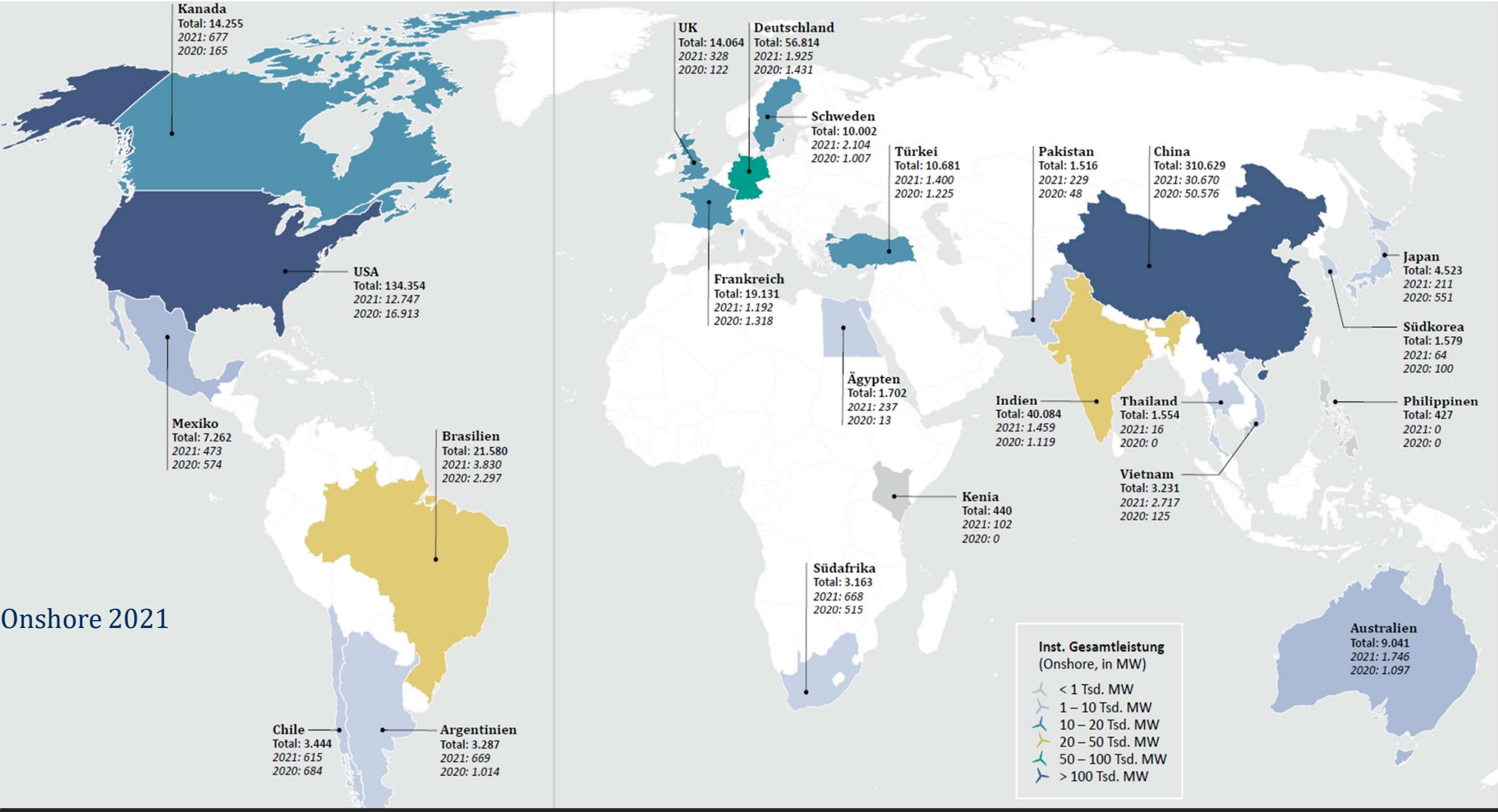
Wind power capacity in the Net Zero Scenario, 2010-2030

Lagging growth in this decade leads to wind energy shortfalls by 2030

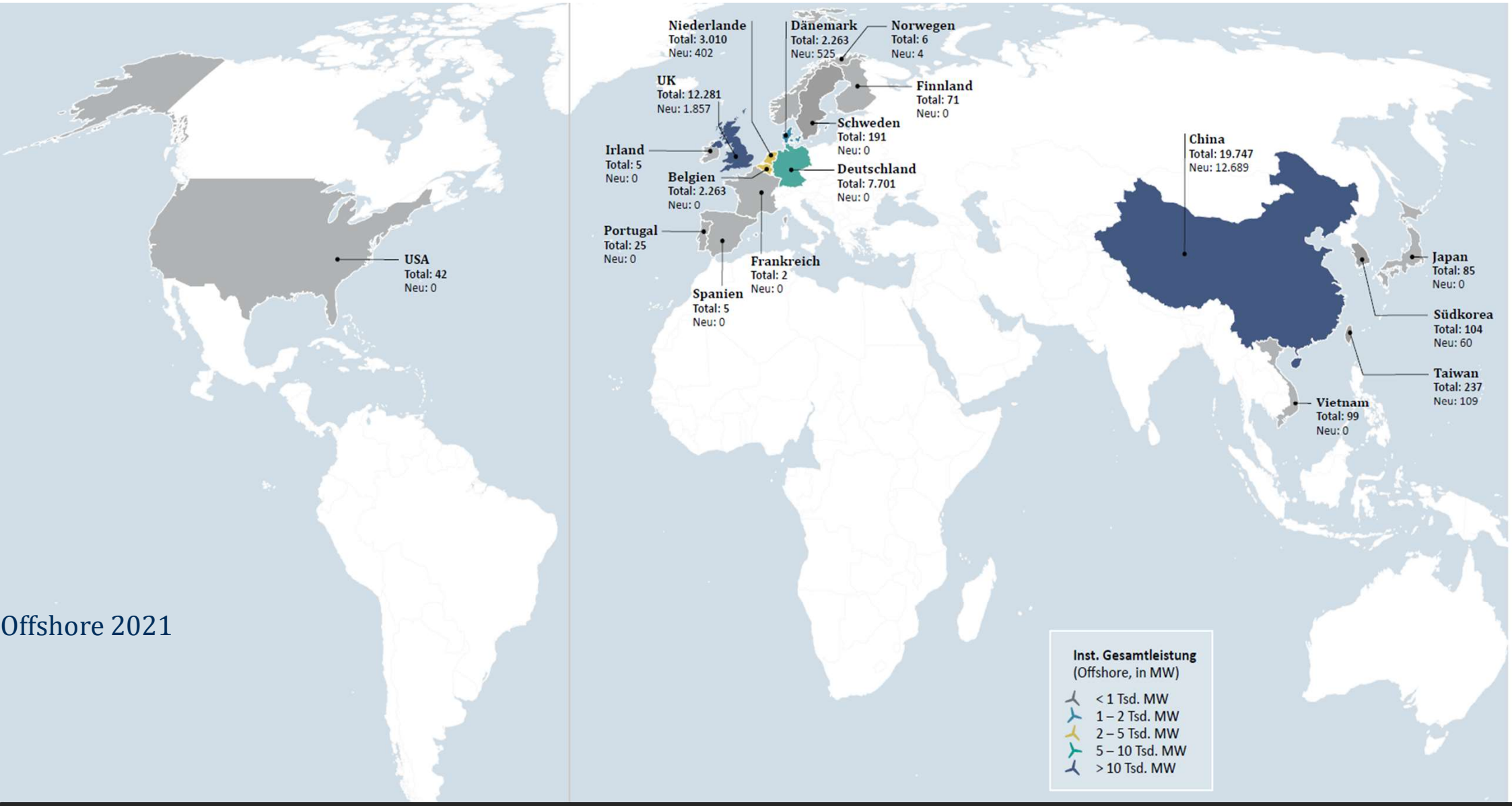
Solar PV power generation in the Net Zero Scenario, 2010-2030



Onshore 2021



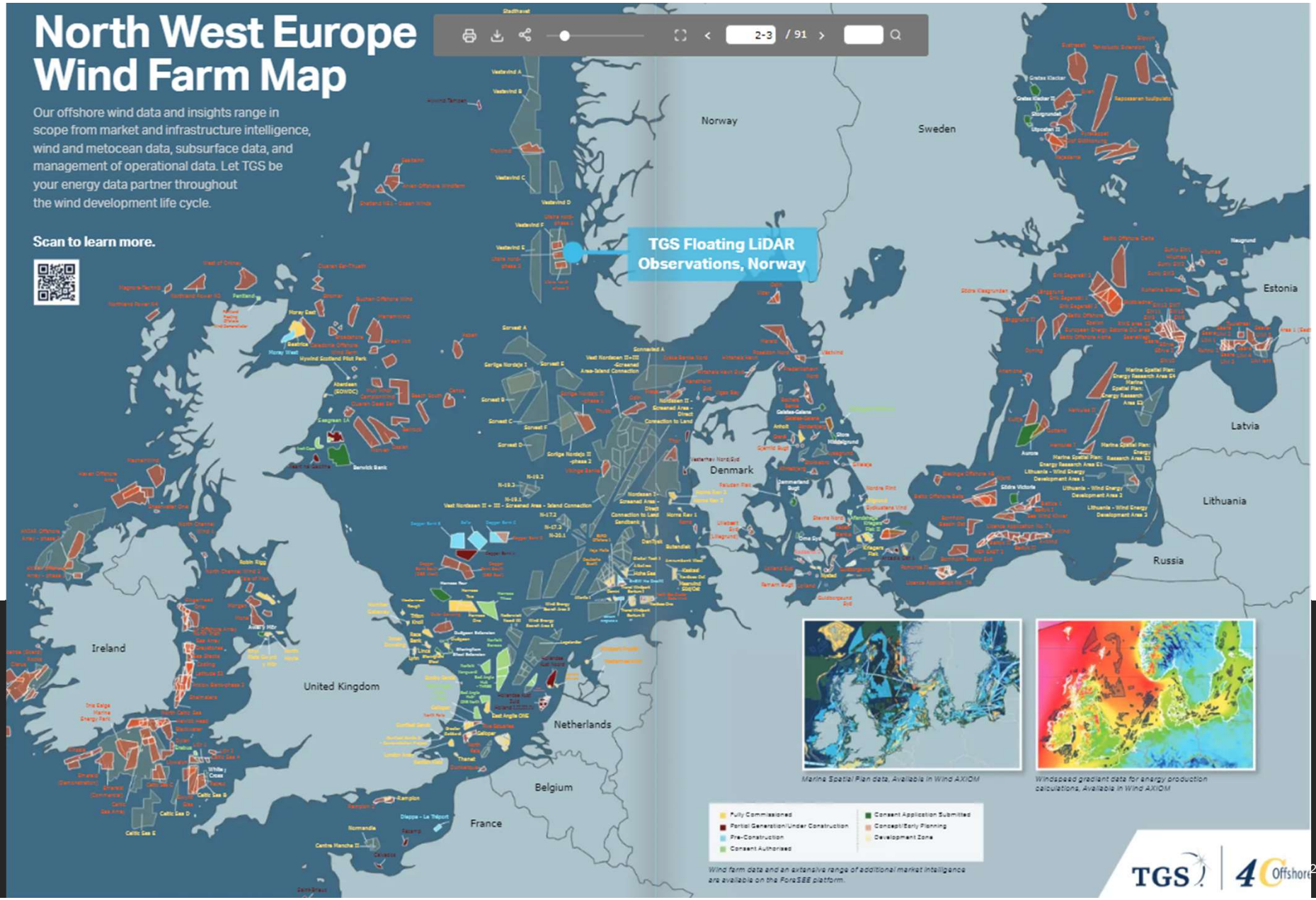
Offshore 2021



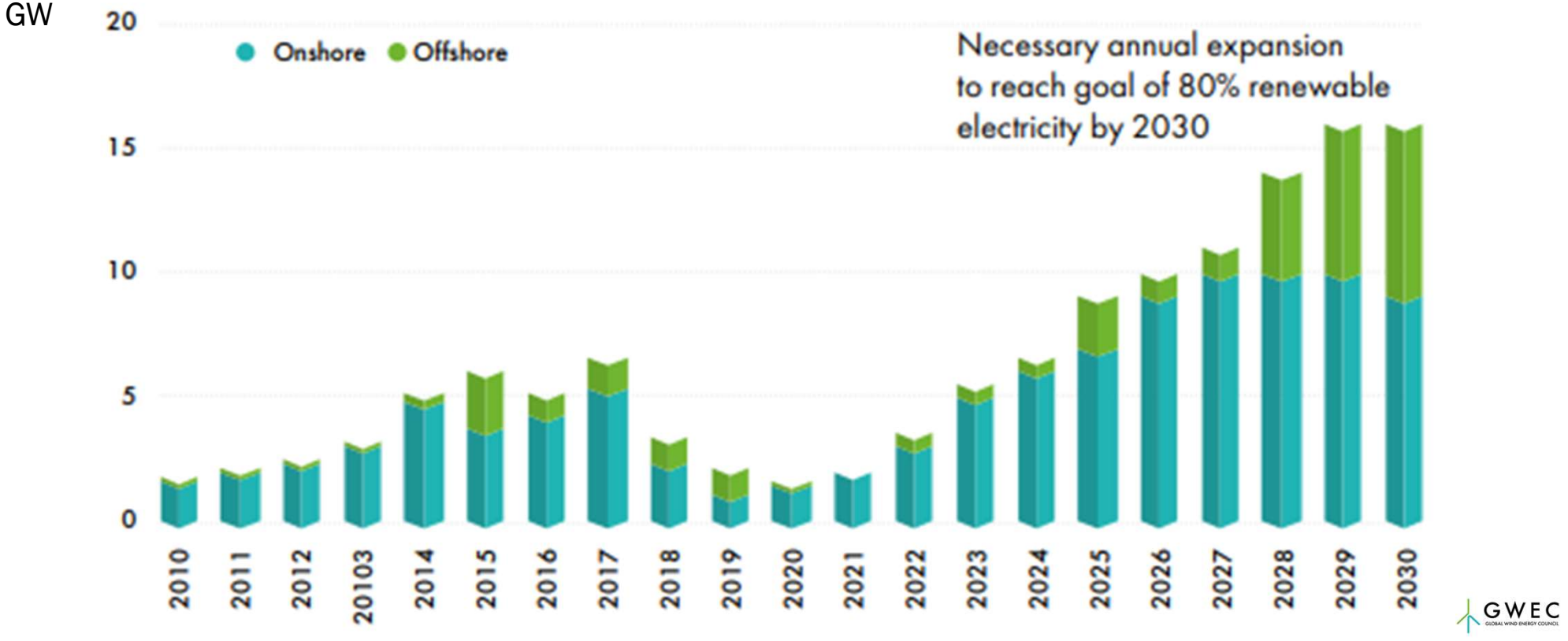
North West Europe Wind Farm Map

Our offshore wind data and insights range in scope from market and infrastructure intelligence, wind and metocean data, subsurface data, and management of operational data. Let TGS be your energy data partner throughout the wind development life cycle.

Scan to learn more.



TGS | 4C Offshore

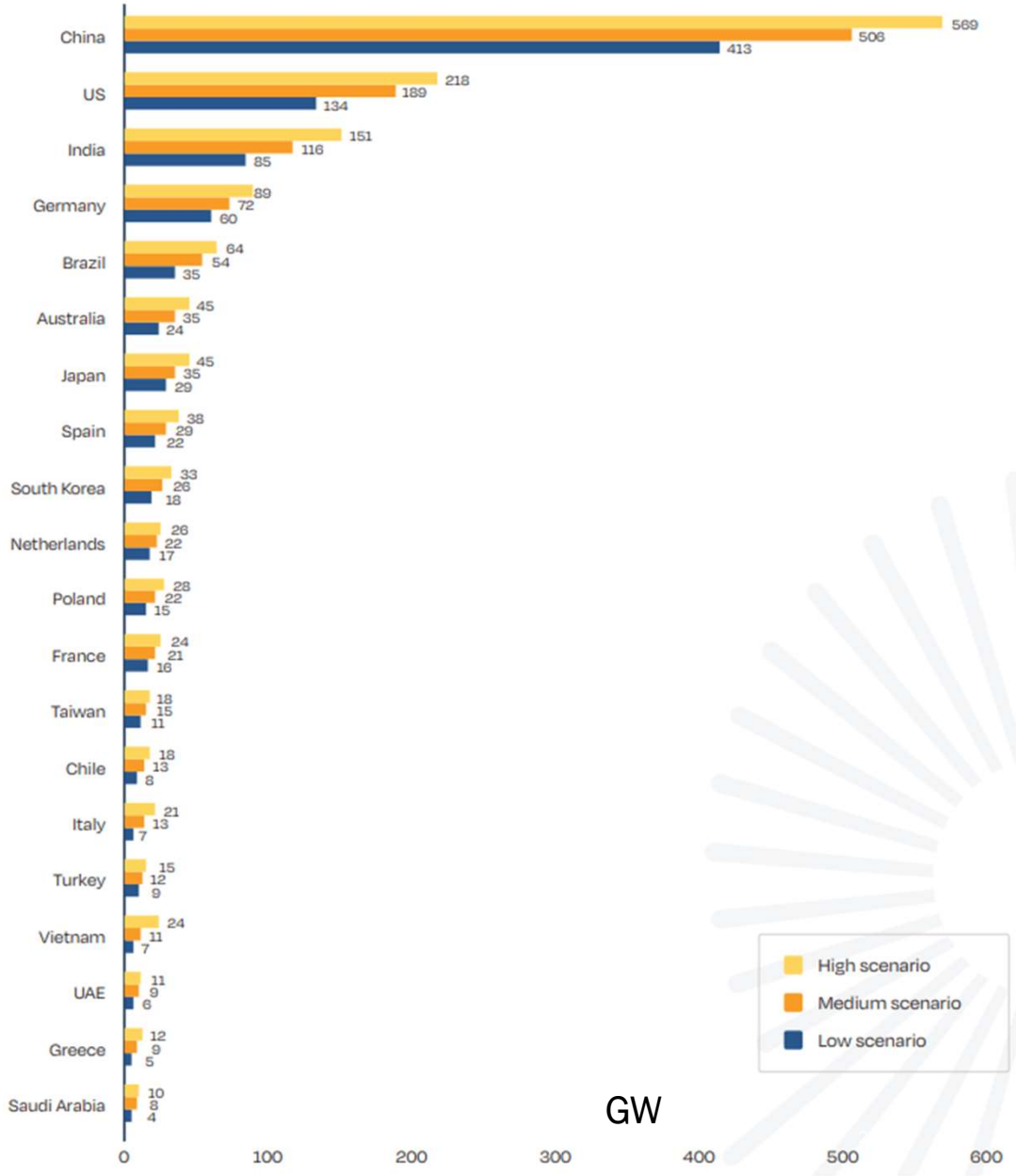


Germany, the king in EU!!

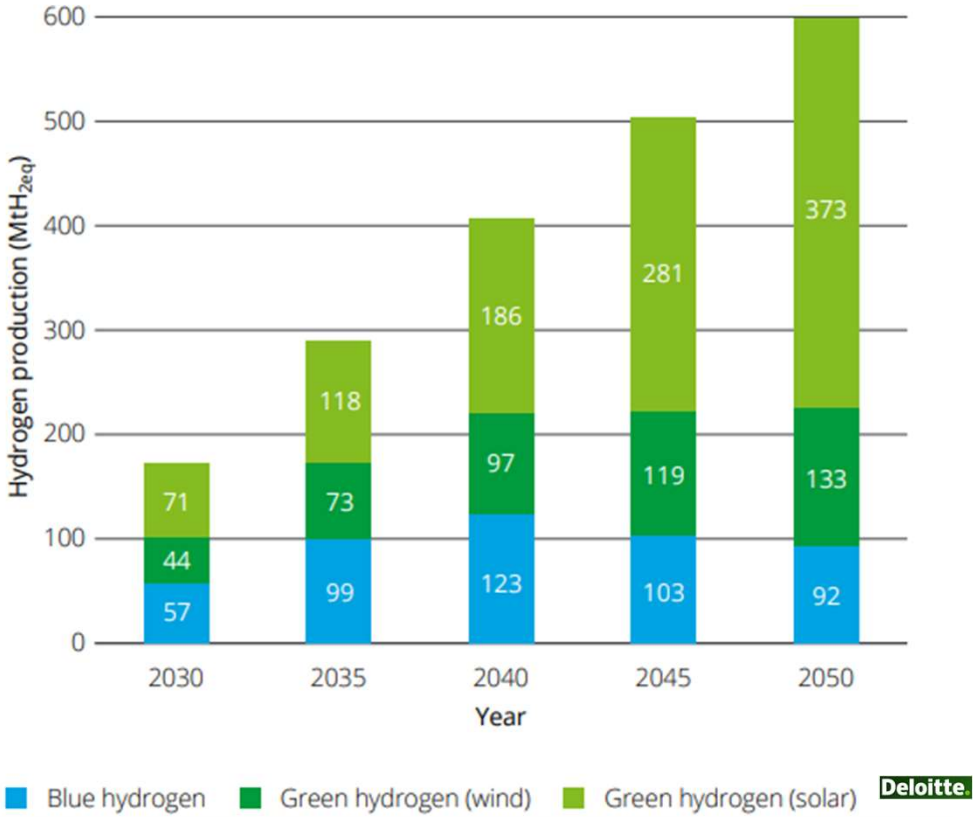
Wind energy installations in Germany (GW)

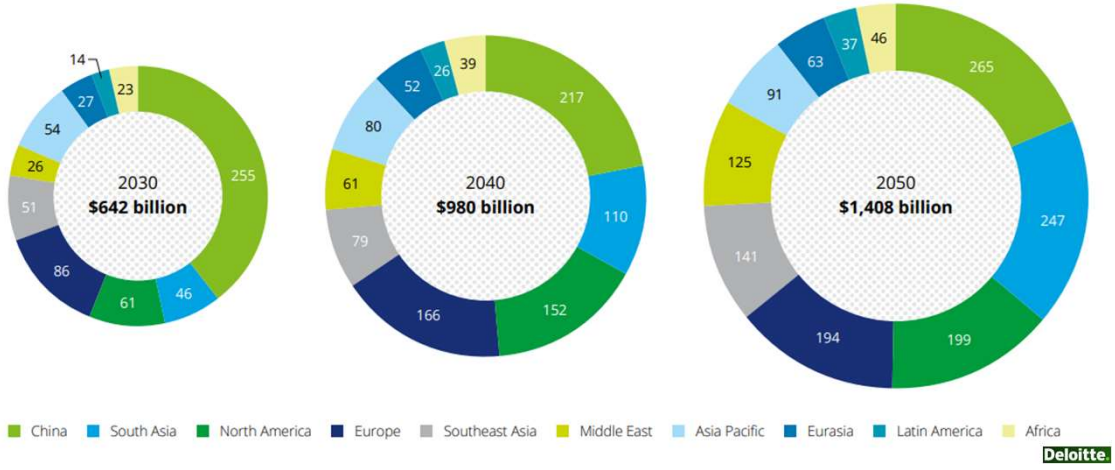
TOP 20 MARKETS SOLAR PV ADDITIONS 2022-2026

Germany, the king in EU!!



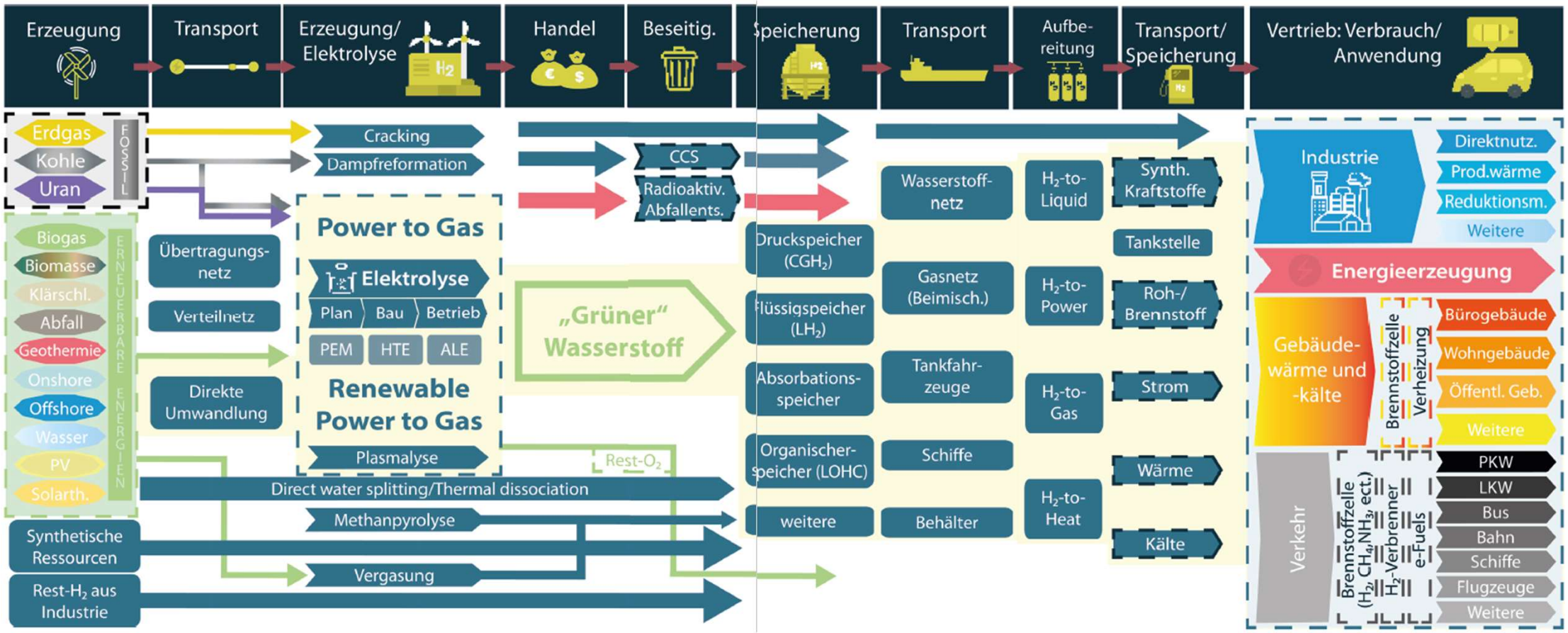
SolarPower Europe





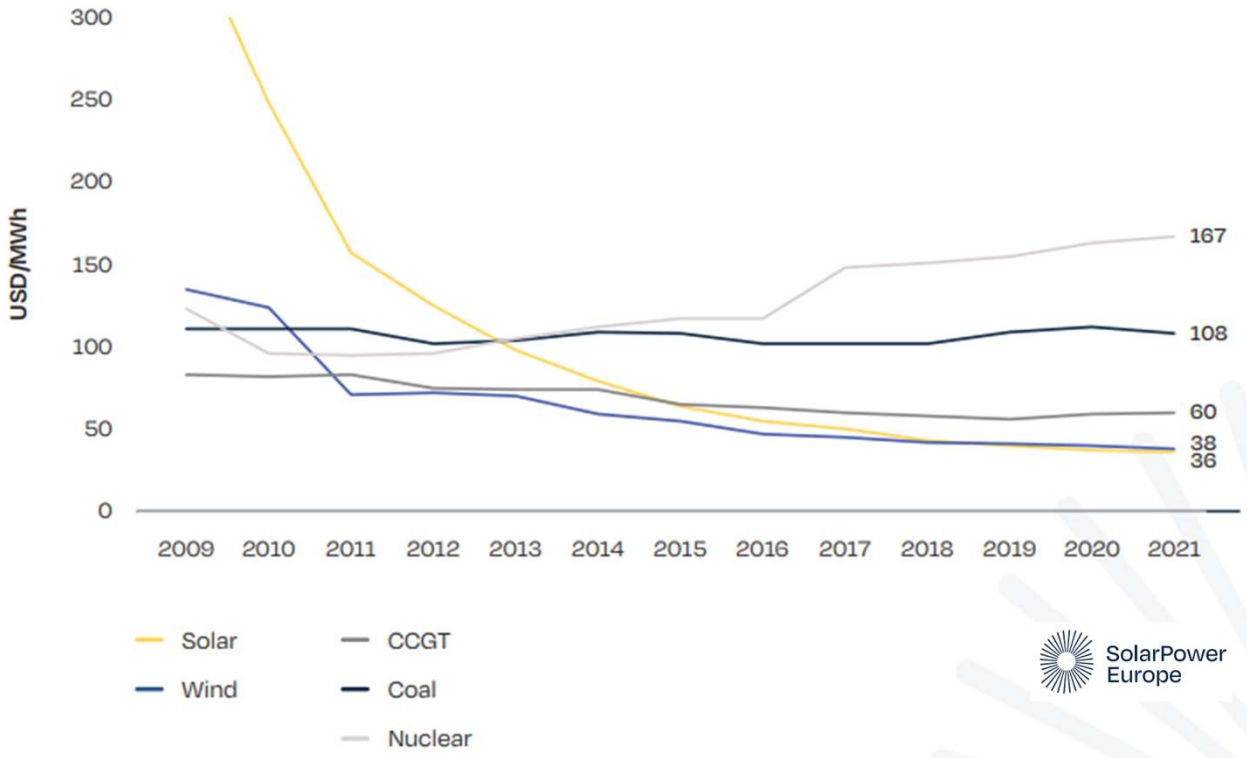
Clean hydrogen supply by technology, and Clean hydrogen market size 2030 to 2050.

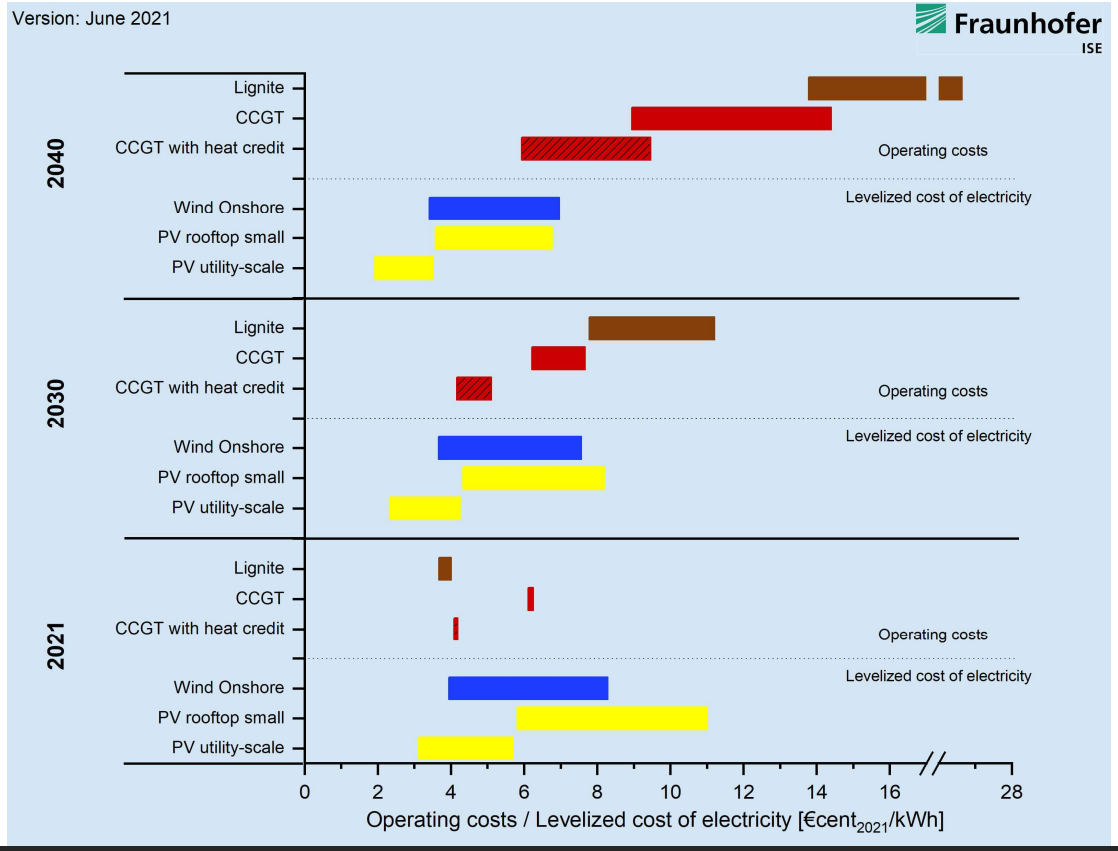
H2 production trend



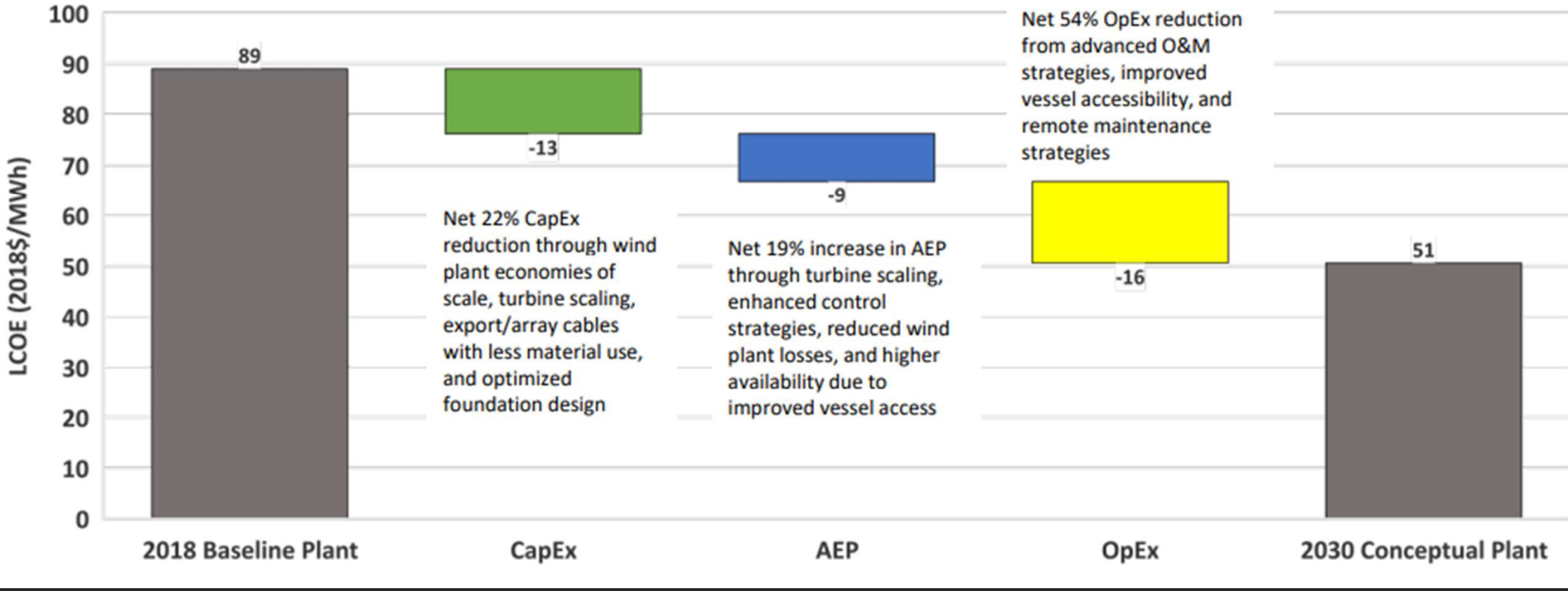
trend:research

5-Latest cost trends





Photovoltaic: GHI = 950-1300 kWh/(m²a), LR = 15%, average market development
Wind Onshore: FLH of 1800 to 3200 h/a, LR = 5%, average market development
Wind Offshore: FLH of 3200 to 4500 h/a, LR = 7%, average market development
Bioenergy: FLH of 4000 to 7000 h/a
PV small scale rooftop systems (< 30 kW_p) incl. battery storage 1 kW_p : 1 kWh
PV large scale rooftop systems (30 - 1000 kW_p) incl. battery storage 2 kW_p : 1 kWh
PV utility-scale (> 1 MW_p) incl. battery storage 3 kW_p : 2 kWh
CCGT: FLH, fuel costs, efficiencies, CO_2 prices depending on year of operation, see table 4-6
Gas Turbine: FLH, fuel costs, efficiencies, CO_2 prices depending on year of operation, see table 4-6

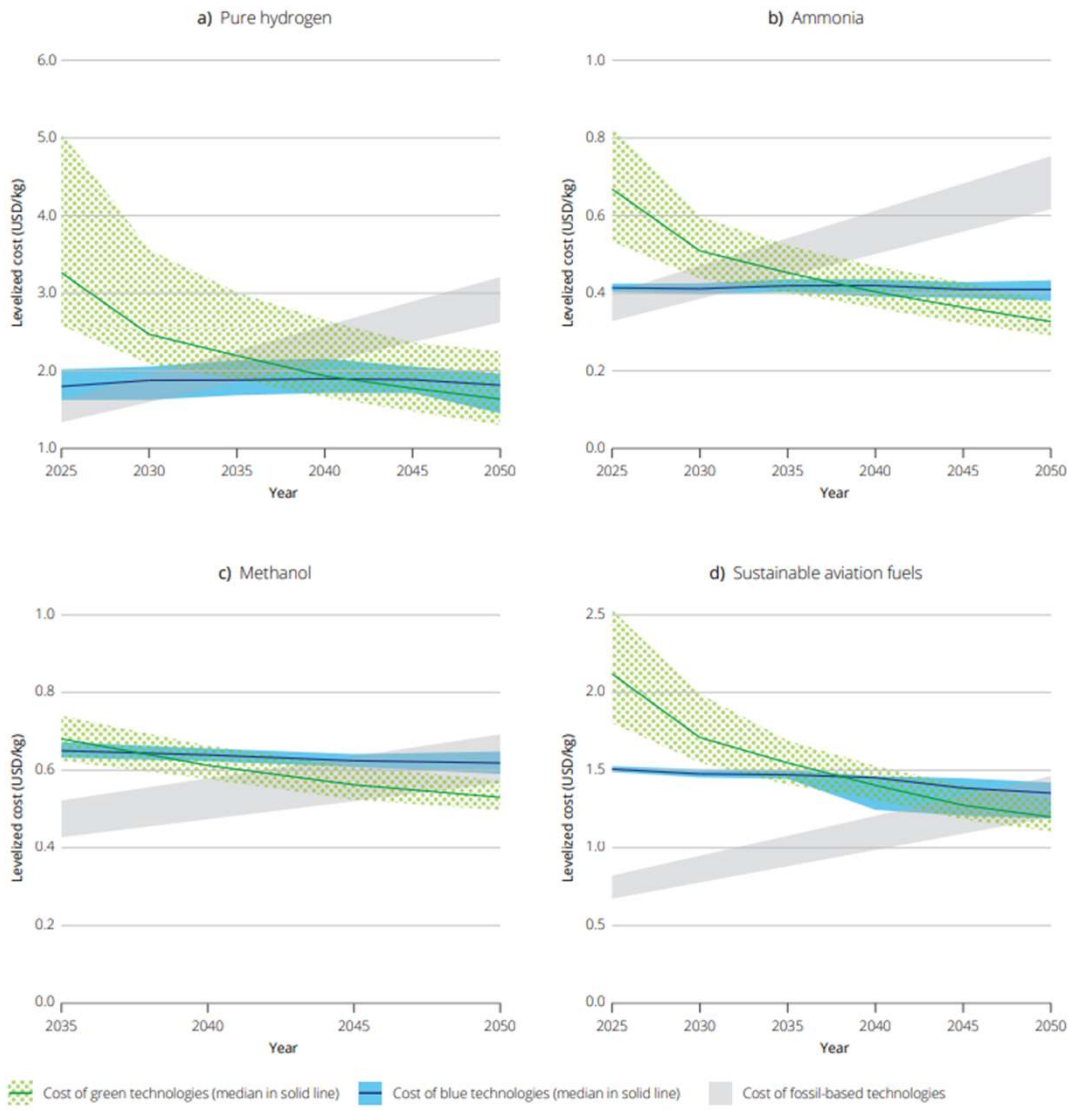


Cost Reduction Pathway From 2018 to 2030 for Fixed-Bottom Offshore Wind

The GPRA baseline value starts at $89/MWh (in 2018 USD) set in FY 2019 using 2018 reference project data reported in Stehly and Beiter (2019).

The GPRA target is $51/MWh by 2030 (in 2018 USD) and is derived for a fixed-bottom wind plant with 15 MW at the reference site based on cost reductions informed by technology innovations considered in the spatial economic analysis by Beiter et al. (2016).

Outlook on production costs of clean hydrogen and its derivatives, 2025 to 2050



6-General overview of wind parks

6.1 - Cost

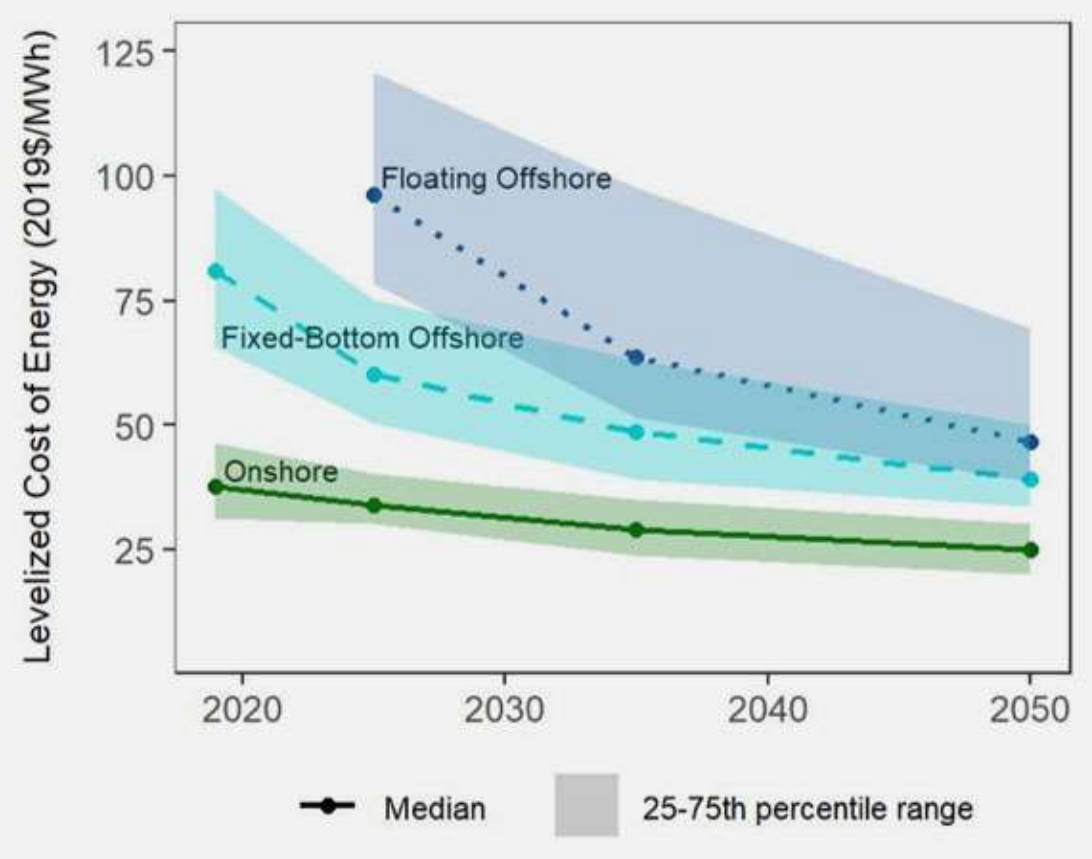
6.2 –Cost Drivers

6.3 - Tipical Capex

6.4 - Tipical Opex (25 years)

6.1 Cost

Levelled costs reflect the average cost of energy per unit of electricity output over the lifetime of an electricity plant and are useful for evaluating technology progress.



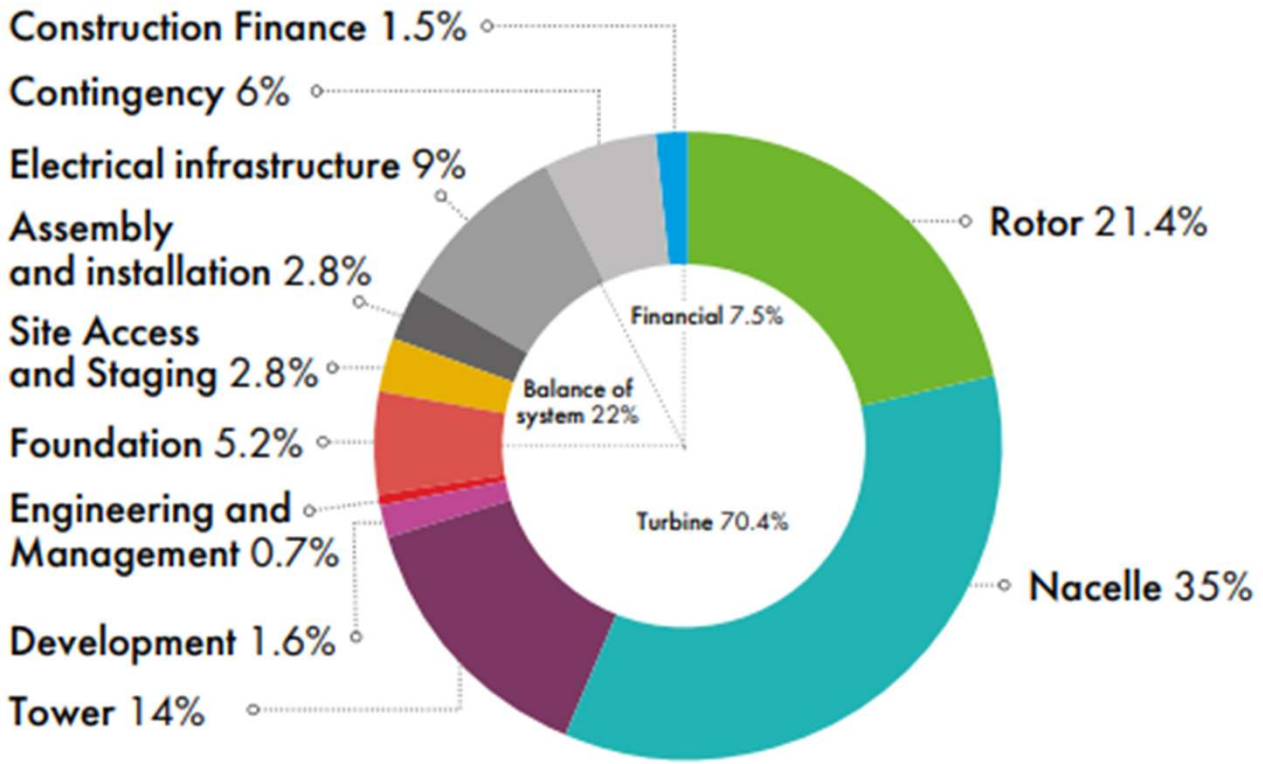
6.2 Cost Driver

A key driver in these improvements is turbine size, according to experts. For onshore wind, growth is expected not only in generator ratings (to 5.5 megawatts [MW] on average in 2035) but also in two other factors that increase capacity – rotor diameters and hub heights. Offshore wind turbines are expected to get even bigger, to 17 MW on average in 2035. Floating offshore wind is anticipated to gain market share, growing from its current pre-commercial state and accounting for up to 25% of new offshore wind projects by 2035.

6.3 Tipical Capex

- Capex for Onshore wind farm
- Capex for offshore wind farm
  - Fixed-bottom Offshore
  - Floating Offshore Wind

onshore



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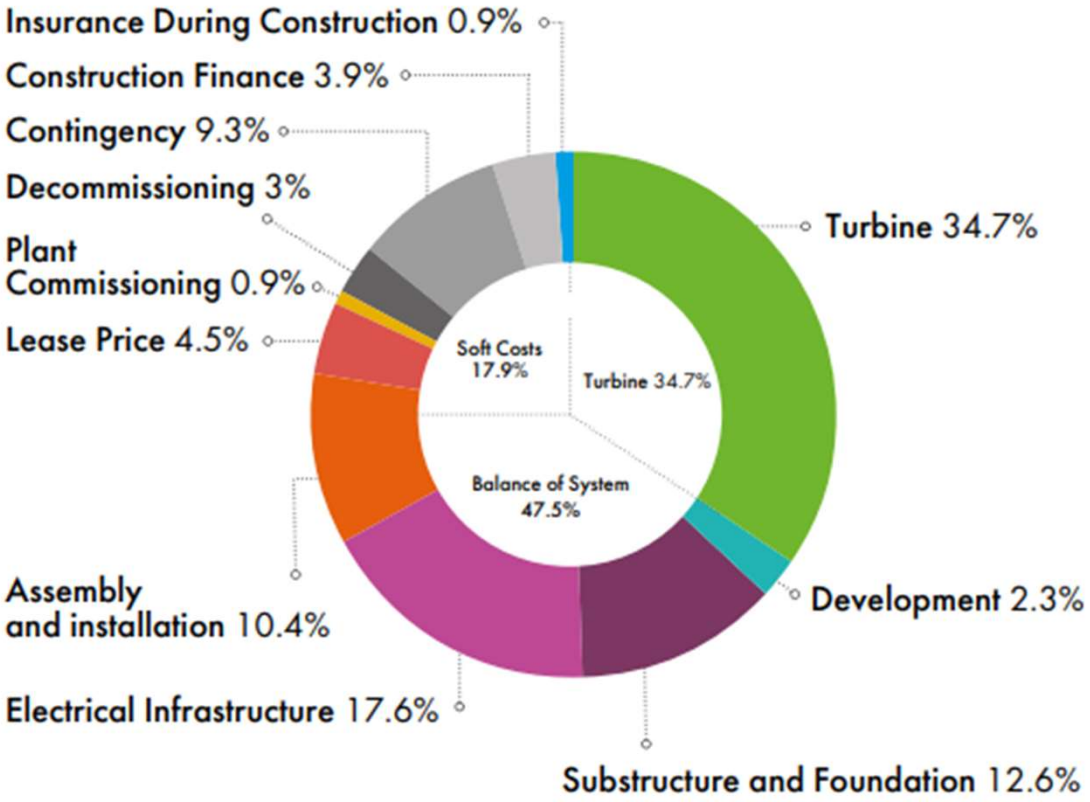
CAPEX for typical onshore wind farm, 2020

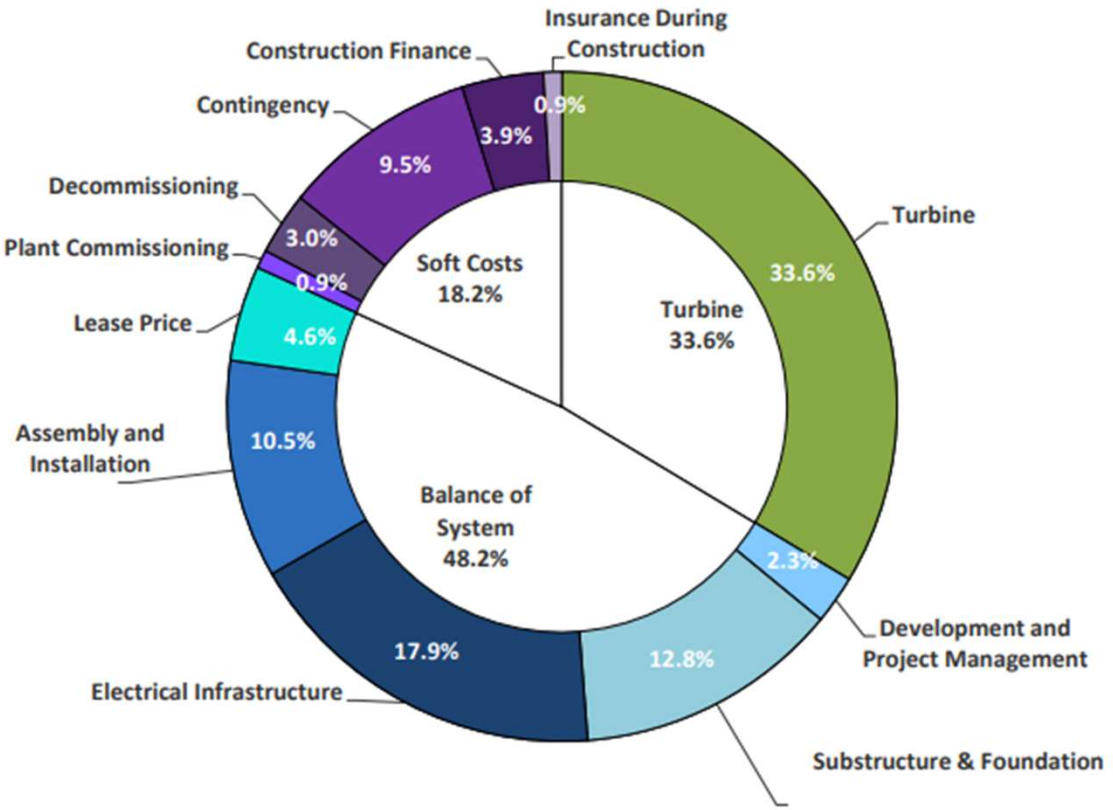
Typical 200 MW onshore wind plant in the interior US, comprising 73 wind turbines at 2.8 MW each, operating for 25 years with no major O&M events

offshore



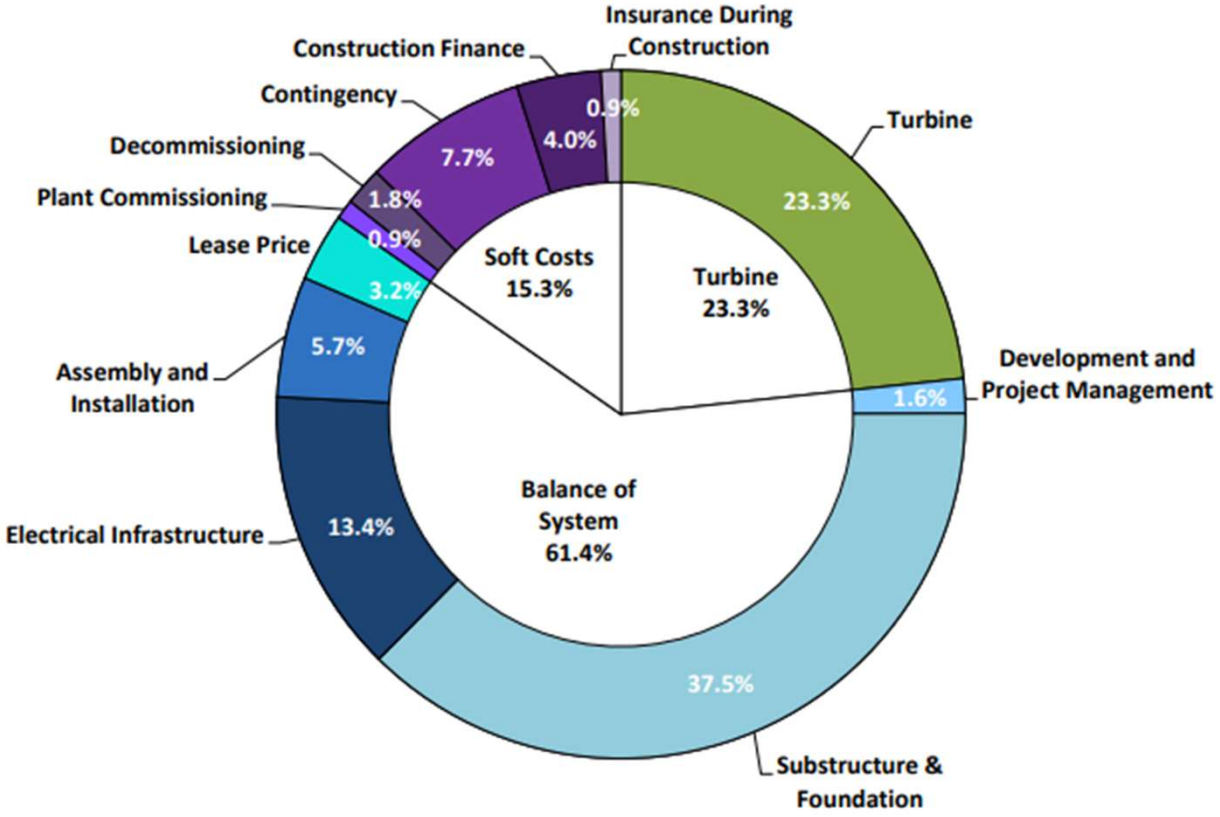
CAPEX for typical offshore wind farm, 2020

a typical 600 MW fixed-bottom offshore wind project comprising 75 wind turbines at 8.0 MW each, operating for 25 years with no major O&M events



Parameter	Value ($/kW)
Turbine	**1,301**
BOS	**1,866**
Development and project management	91
Substructure and foundation	496
Electrical infrastructure	693
Assembly and installation	408
Lease price	178
Soft Costs	**704**
Plant commissioning	34
Decommissioning	117
Contingency	366
Construction finance	152
Insurance during construction	34
Total CapEx	**3,871**

Fixed-bottom Offshore Wind System Capex Component Cost Breakdown



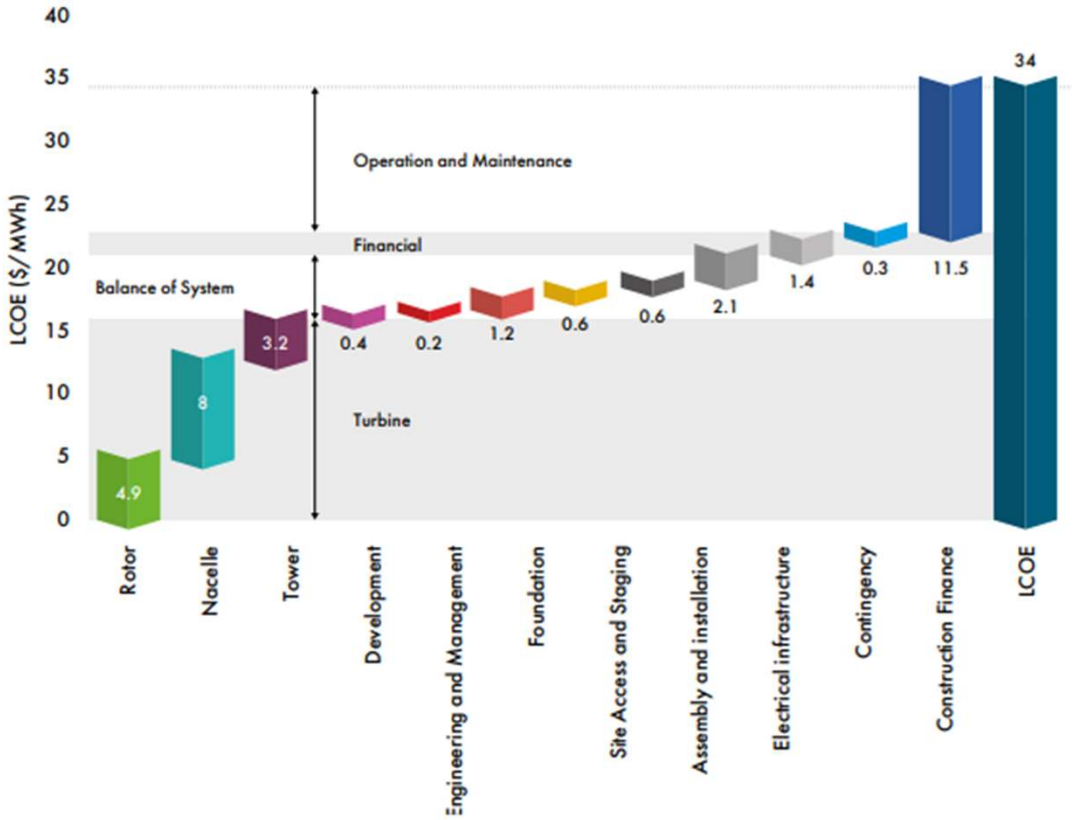
Parameter	Value ($/kW)
Turbine	**1,301**
BOS	**3,422**
Development and project management	91
Substructure and foundation	2,089
Electrical infrastructure	747
Assembly and installation	316
Lease price	178
Soft Costs	**854**
Plant commissioning	52
Decommissioning	101
Contingency	428
Construction finance	221
Insurance during construction	52
Total CapEx	**5,577**

Floating Offshore Wind System CapEx Component Cost Breakdown Parameter

6.4 Tipical Opex

- Onshore wind farm operating for 25 years
- Fixed-bottom offshore wind farm operating for 25 years

onshore



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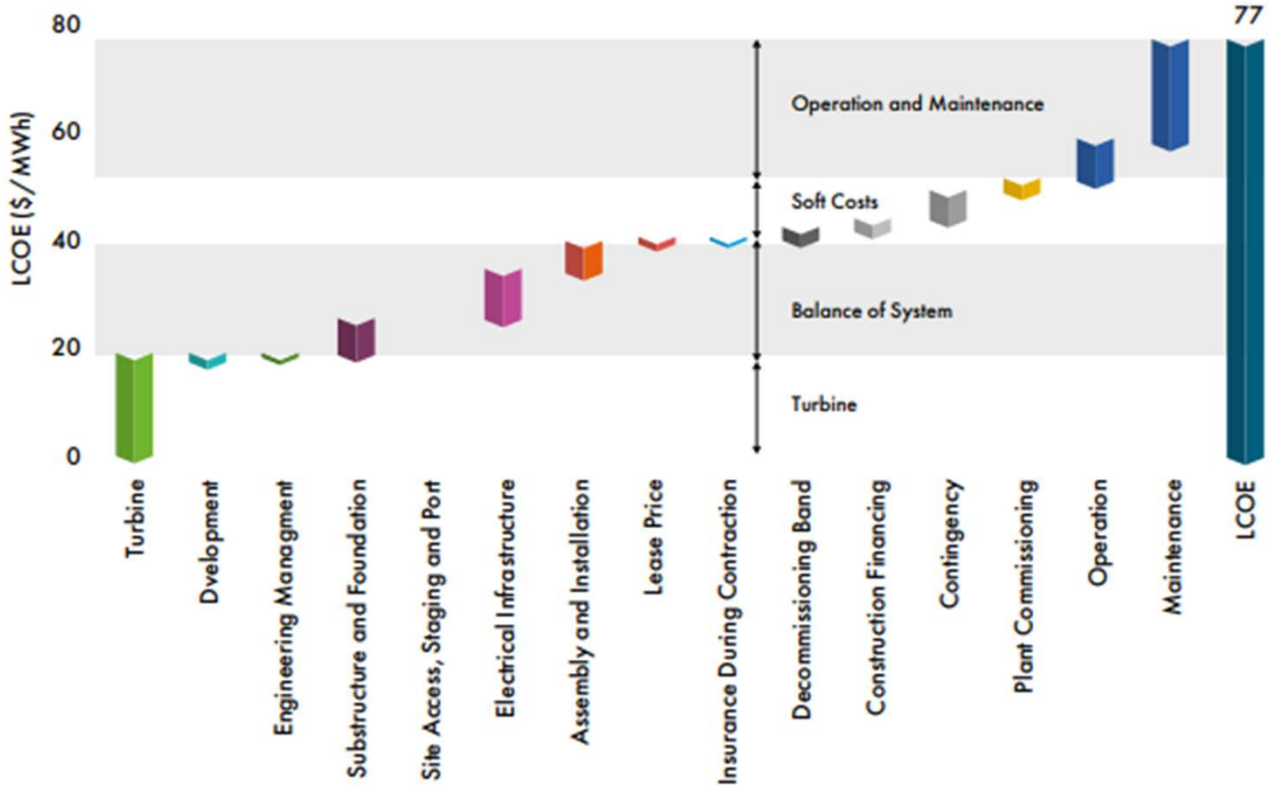
Typical Onshore wind farm operating for 25 years, 2020

Typical 200 MW onshore wind plant in the interior US, comprising 73 wind turbines at 2.8 MW each, operating for 25 years with no major O&M events

offshore



Typical Fixed-bottom offshore wind farm operating for 25 years, 2020

Typical 600 MW fixed-bottom offshore wind project comprising 75 wind turbines at 8.0 MW each, operating for 25 years with no major O&M events

7-Main players in the market

Supply Chain

7.1 Users

Orsted

Iberdrola

Equinos

RWE

EnBW

Scottish Power

EDF Renewable Energy

BP

EDP Renowables

Eon

Wattenfal

EWE

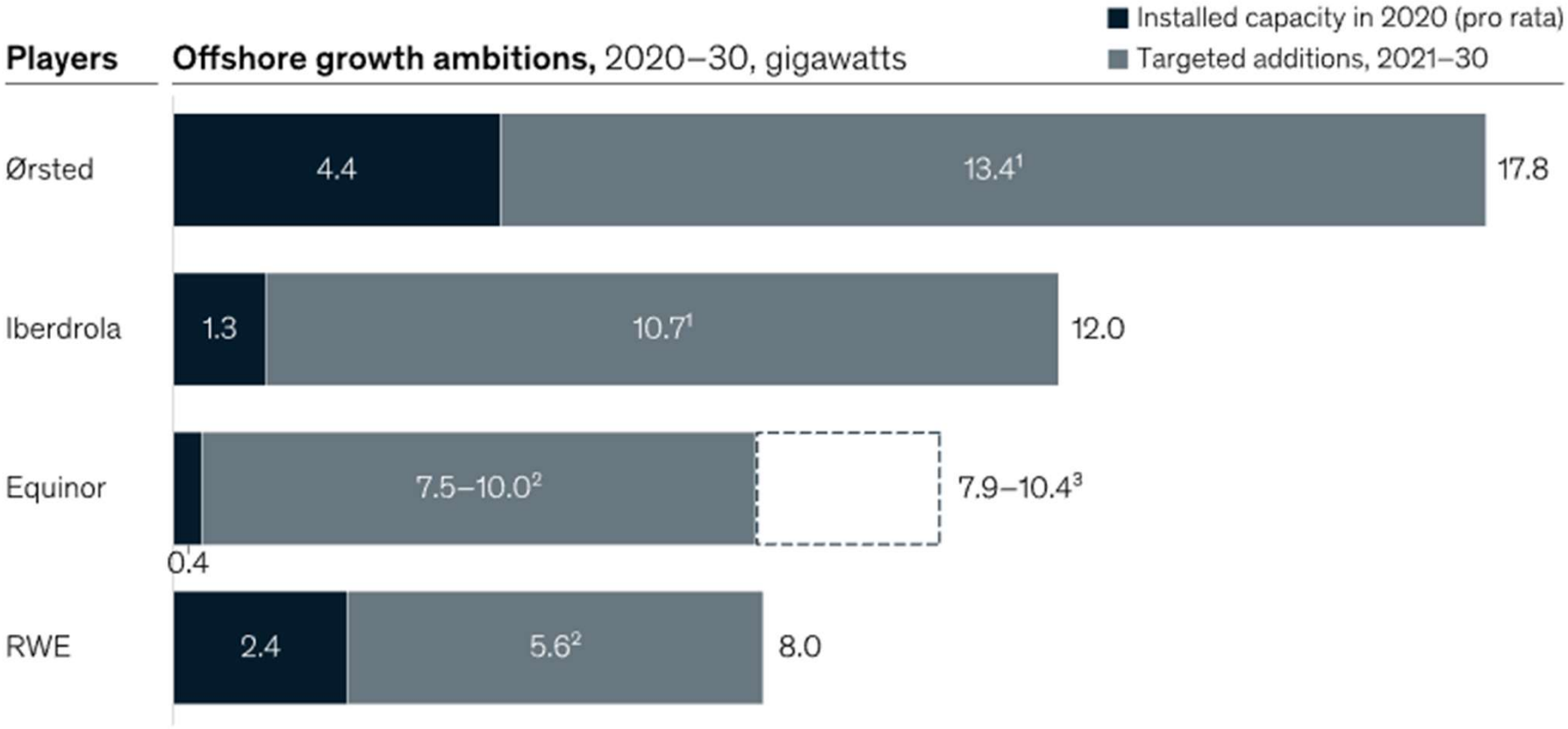
Shell

Tennet

NextEra

.....

Offshore wind majors have set growth ambitions for the coming years.

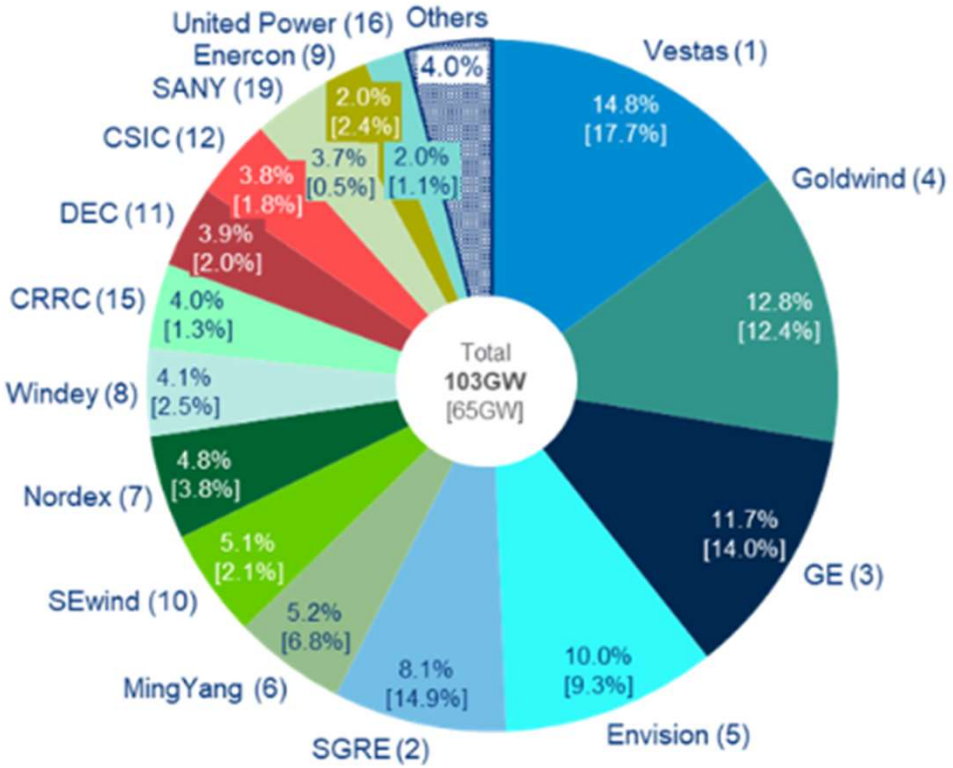


McKinsey & Company

7.2 Contractors

- Turbines
- Engineering companies
- Piles and TPs
- Offshore substation
- Cables
- Others

Global top 15 wind turbine OEMs: market share 2020



Source: Wood Mackenzie.

Note: [%] indicates 2019 market share; (#) indicates 2019 ranking. Chinese turbine OEMs based on installed capacity.

❑ Engineering
- Fugro
- Rambol
- Rina
- Technip FMC
- DNV
- …….

❑ Piles+TPs
- EEW
- Windar
- ENABL
- ASM Industries
- Bladt
- Bladt
- Dragados Offshore
- Dajin Offshore
- Eversendai
- Haizea
- Lamprell
- Saipem
- SeAH Wind
- Sif
- ……

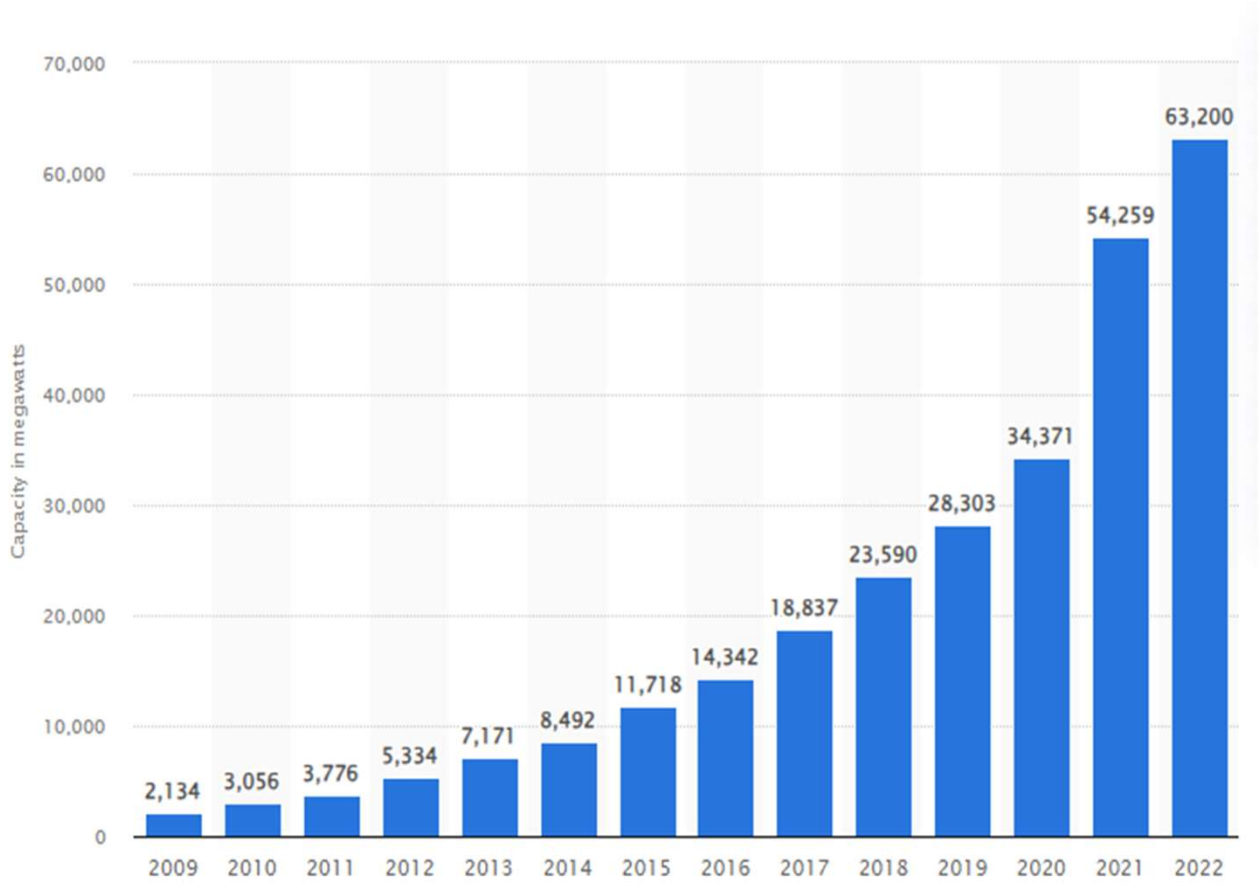
❑ OSS
- Fabricon
- Navantia
- Aker
- Engie
- Atlantique
- Offshore Energy
- Bladt
- Dragados Offshore
- Global Energy
- Harland & Wolff
- Lamprell
- Saipem
- Arbatax
- Seatrium
- ……..

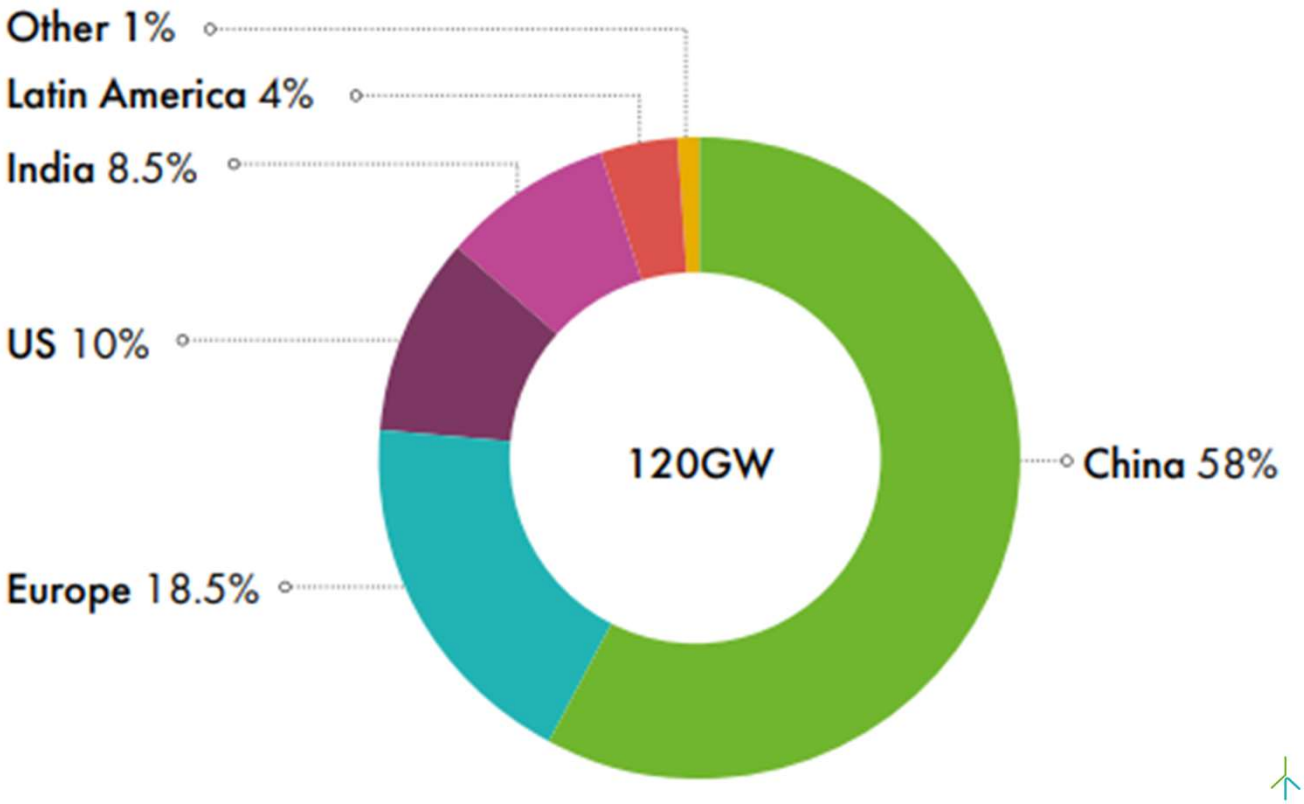
❑ Cable,
- Arcadis
- Prysmian
- TKF
- Van Oord
- Hellenic
- Asso Subsea
- Boskalis
- DEME Offshore
- Global Marine Group
- Jan De Nul
- Maersk Supply Services
- Nexans
- Seaway 7
- ……

Offshore Wind sector suppliers

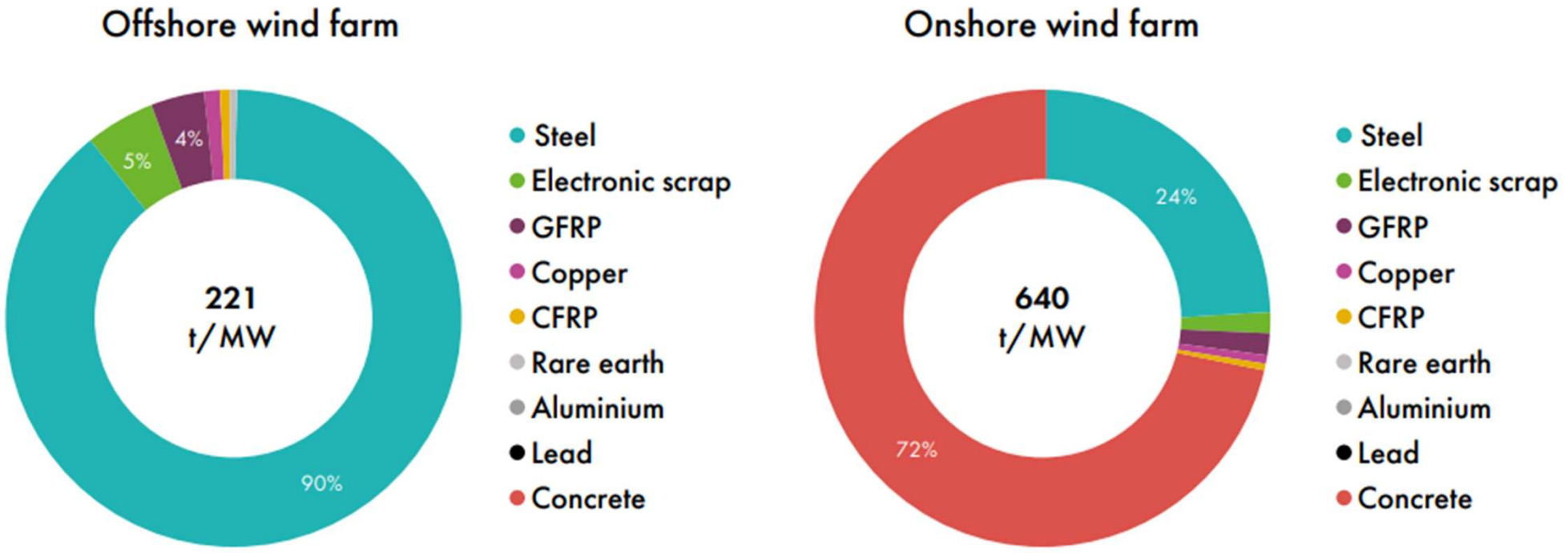
7.3 Capacities

Offshore wind energy capacity worldwide from 2009 to 2022





Global wind turbine manufacturing capacity, 2020



Source: BloombergNEF. Note: GFRP = Glass fiber reinforced plastic. CFRP - Carbon fiber reinforced plastic.

GWEC
GLOBAL WIND ENERGY COUNCIL

Materials breakdown for onshore and offshore wind farms

8. How many turbines and OSSs are this GW?

Offshore

Year	2020	2030	2050		Annually
GW targets	40	335	630	(waiting 1000)	21
Turbins 15 MW	2667	22333	42000		1400
OSS platform 500MW	80	670	1260		42

Number of Elements annually

Pile (≈100 m) 1400 units

Transition Piece (TP) 1400 units

Tower 1400 units

Blades 4200 units

Generator 1400 units

Offshore substation (OSS) — 42 Units (≈3500 Tons)

Subsea cables — 51 Km

4–6 Wind turbine installation vessels

4–8 Transport vessels

2 Scour protection installation vessels

4 Cable lay vessels

58 Crew transfer vessels

4–6 Heavy lift vessels

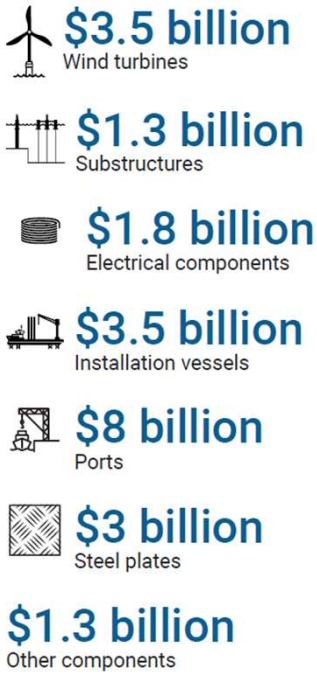
4–8 Transport vessels

11 Service operation vessels

12,300–49,000 Full-time equivalents average annual workforce

only U.S.

Investments in Manufacturing Facilities Needed To Establish a Supply Chain by 2030 for 30GW in U.S.



9. Baltic Offshore wind farm example

9.1 Financial Steps

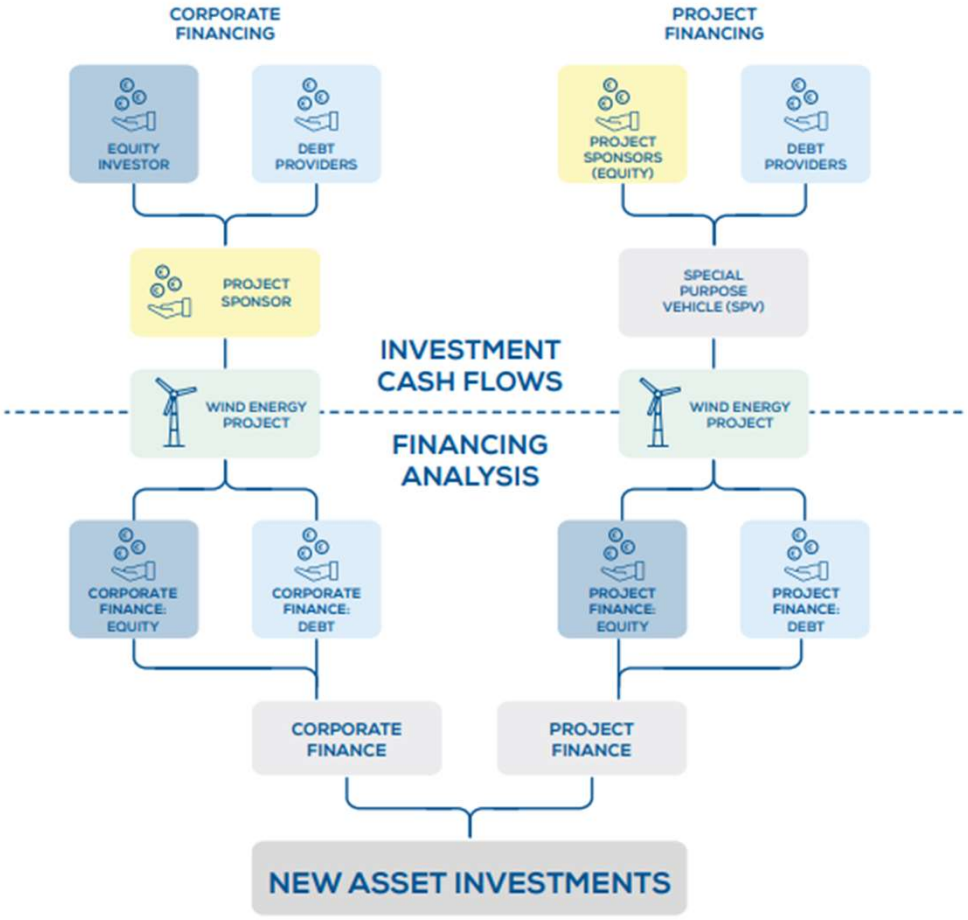
9.2 Construction Timing

9.3 Risk

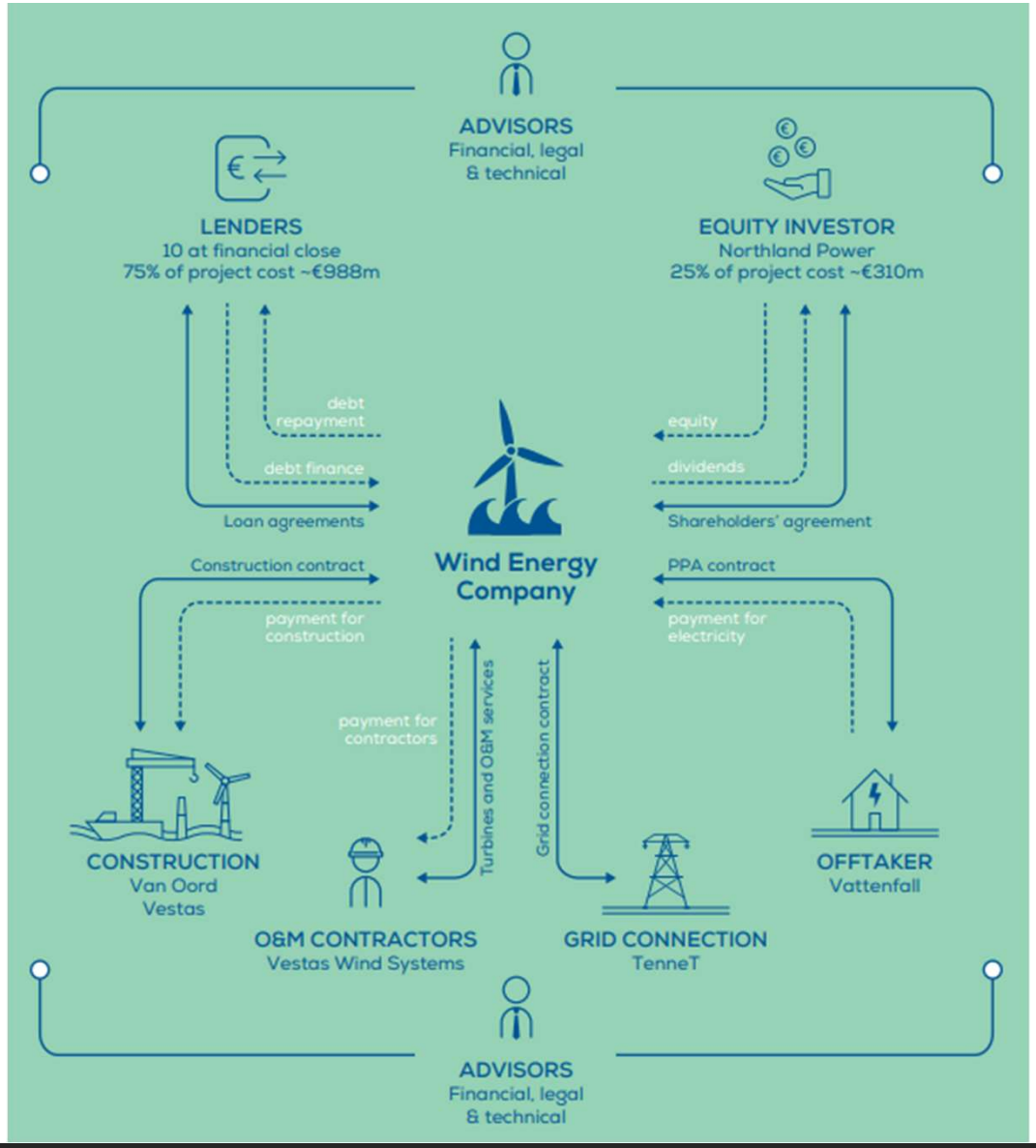
9.4 Cost Structure

9.1 Financial steps

Corporate finance vs Project finance



252 MW | 31 Turbines | €1.3bn

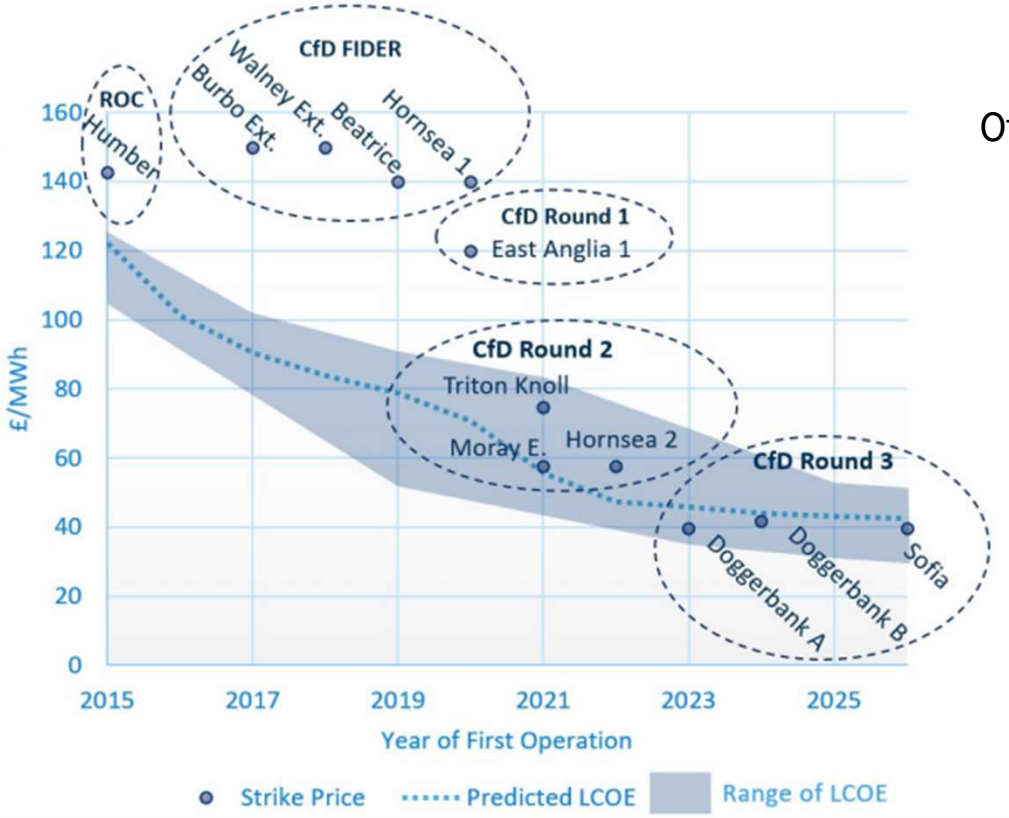


9.2 Construction Timing

	1 year	*2 year*	*3 year*	*4 year*
Engineering	Meteocean Studies			
	Geological Reports			
	Geophysical Survey			
	Basic Electrical Studies			
	Certification			
	tender process			
Foundation		Design		
		Certification		
			Fabrication	
				Installation
Turbines		Design		
		Certification		
		Fabrication	Fabrication	
				Installation
				Commissioning
Cables			Design	
			Certification	
			Fabrication	
				Installation
				Commissioning
OSS		Design		
		Certification		
		Fabrication		
			Fabrication	Fabrication
				Installation
				Comissioning

9.3 Risks

- Political decision (subsidizing + permits)
- Country Resources planning
- Geology problems
- Contractors delays
- Price increase due to lack of suppliers



Offshore wind in the UK

Political decisions

Government subsidizing (contracts for differences CfD)

Short-Term Actions To Build a Strong Foundation (2023–2024)

To build a strong supply chain foundation for the offshore wind energy industry, the country needs to:

- Convene working groups focused on regional and holistic supply chain development
- Identify locations to build the next wave of supply chain development equitably and efficiently
- Continue to expand the offshore wind energy pipeline
- Assess the need for and impact of incentive mechanisms beyond existing programs
- Establish strategies and incentive mechanisms targeted at floating wind infrastructure
- Establish curriculum and funding streams for workforce training centers
- Conduct outreach and education activities with existing suppliers to increase awareness of offshore wind energy opportunities.

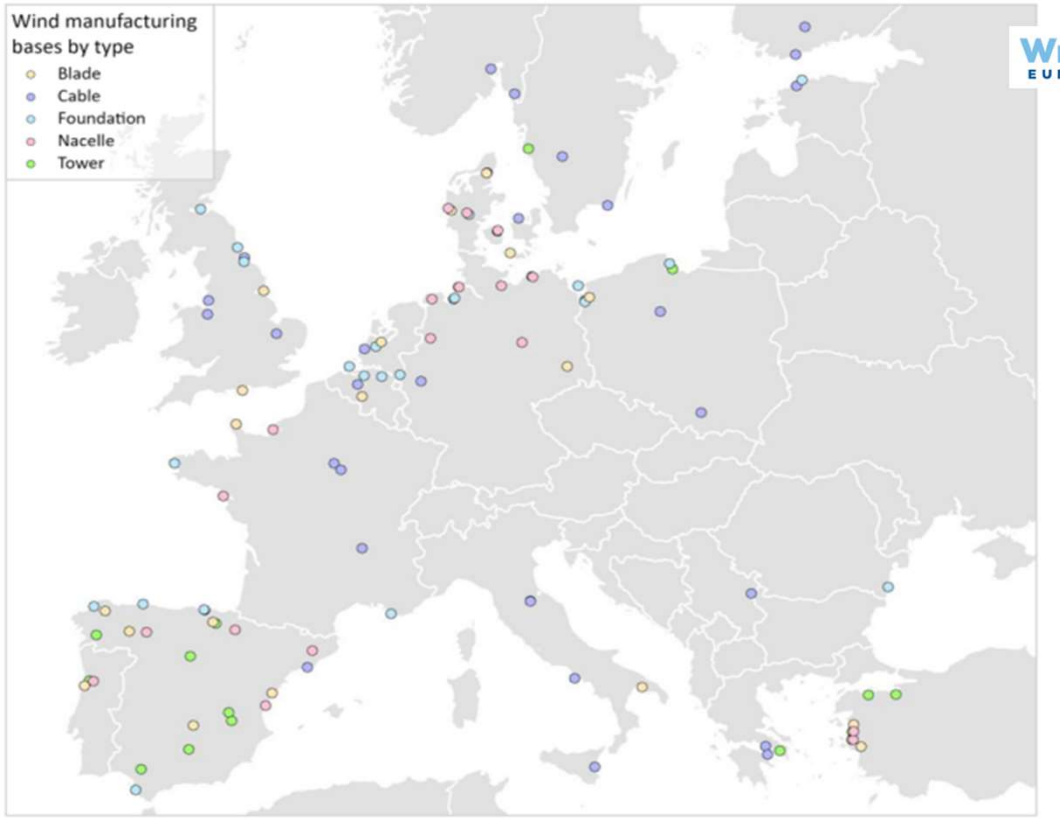
Medium-Term Actions To Gain Momentum (2025–2029)

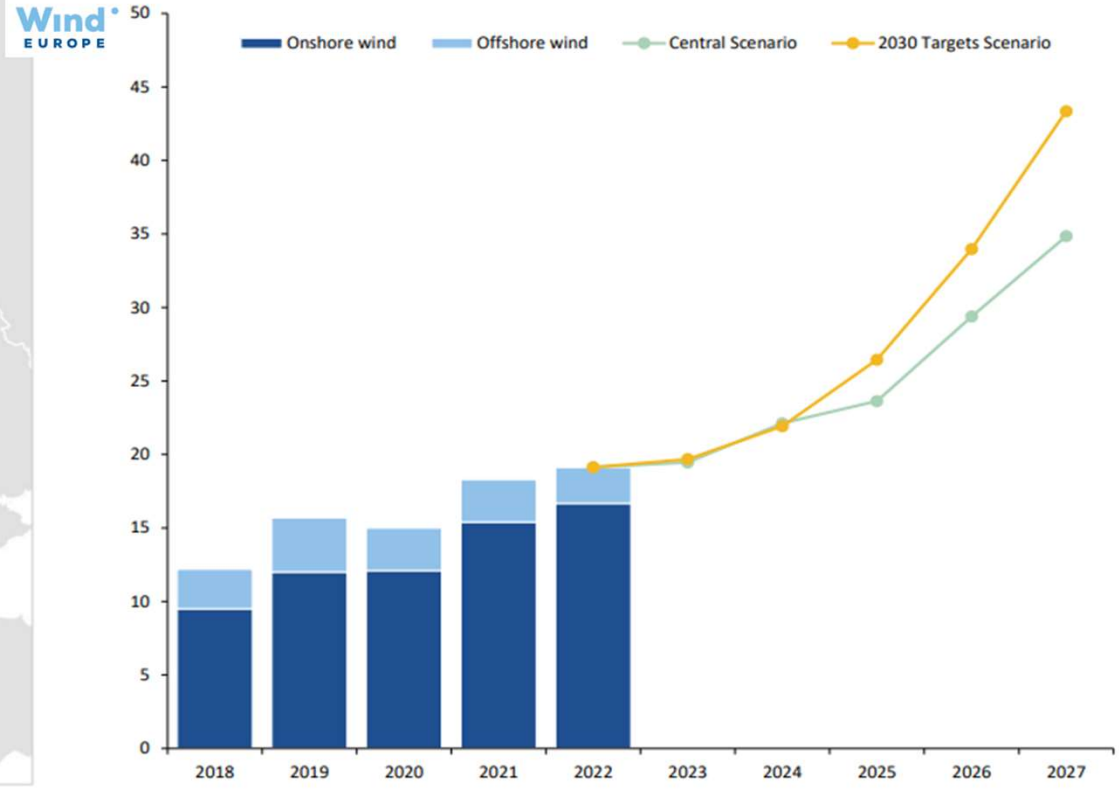
To gain momentum with a smoothly running domestic supply chain for the offshore wind energy industry, the country needs to:

- Construct the major supply chain facilities needed to meet the demand pipeline
- Continue to expand the offshore wind energy pipeline
- Leverage national, regional, and industry working groups to share and develop best practices for supply chain activities
- Incorporate learning from early-stage commercial-scale projects into ongoing operations and decision-making
- Train a sufficient manufacturing workforce
- Evaluate procedural and impact equity metrics for early-stage commercial-scale projects and incorporate best practices into ongoing supply chain development activities

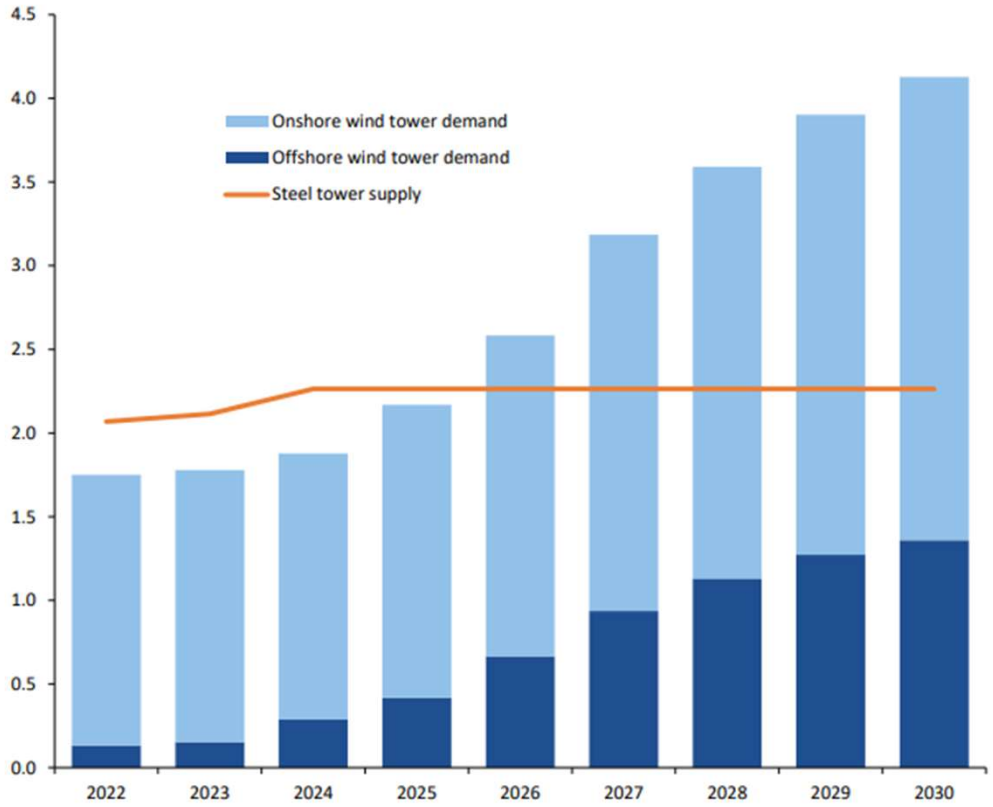
Country resource planning (Supply chain)

Segment	Industry	Sub-segment	2022-2030 demand growth*	Time to action*	Urgency assessment	Comment
Turbines	Onshore & Offshore wind	Total market	**~3X** *Capacity (MW)*	**2024-2025**		• *High inflation, low margins and an R&D race to supply the largest turbines on the market has put pressure on western OEM's ability to expand manufacturing capacities or repurpose facilities to accommodate a changing demand.* • *While onshore wind turbine size demand is relatively more stable, expansion of manufacturing is needed to match growth in activity levels in the 2030 Targets Scenario.* • *Offshore wind serves as the key challenge, with a large gap between current manufacturing capacity and projected demand for the largest models.* • *Rotor blade manufacturing represents the current bottleneck for European turbine supply, but both need a rapid expansion to meet demand in this scenario.*
	Offshore wind	>12 MW turbines	**0-29 GW**	**2024**		
Towers	Onshore & Offshore wind	All	**~2.5X** *Metric tons*	**2025**		• *Centralized tower supply for a larger range of turbines has enabled the supply chain to expand with growing activity.* • *Tower demand will be driven by a relatively high number of onshore wind turbines (compared to offshore wind) and increasing offshore wind activity and sizes.* • *Growth is expected to accelerate in the second half of the decade, creating an additional need for expansion.*
Foundations	Offshore wind	Monopiles	**~12X** *Metric tons*	**2024-2025**		• *Monopiles will remain the most popular concept in Europe, and with rapid growth in activity and turbine sizes in offshore wind, manufacturing must be scaled up quickly within the largest monopile segments.* • *Jacket manufacturing capacity less constrained thanks to O&G industry.* • *Floating foundation manufacturing must be industrialized. Today, it is characterized by pilots, demos and pre-commercial projects with one-off manufacturing and few units. From this small basis, manufacturing capacity must grow substantially towards the end of the decade.*
		Other grounded	**~7X** *Metric tons*	**None**		
		Floating	**~23X** *Metric tons*	**2024**		
WTIVs	Offshore wind	Total market	**~7.5X** *Vessel years*	**2024-2025**		• *Strong fleet additions in recent years have put supply in a strong position to cover demand in the next two to three years. Increased demand in the second half of the decade, primarily in the largest turbine size ranges will put pressure on supply.* • *A global fleet and increasing demand outside Europe will likely pull supply out of Europe, worsening the supply-demand balance, with new units forecast to be needed.* • *An increasing share of demand in the 15-20 MW range towards 2030 will also drive a need for new units, as the fleet of vessels capable of installing these units is currently limited.*
		>12 MW turbines	**0-25 vessel years**			





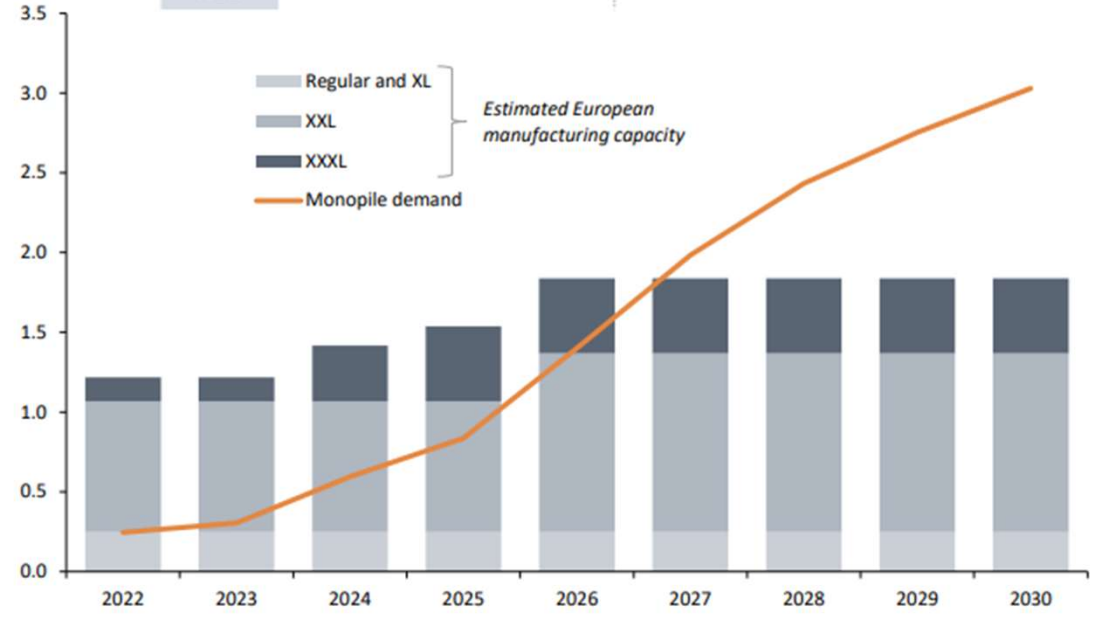
Wind manufacturing facilities in Europe and European demand

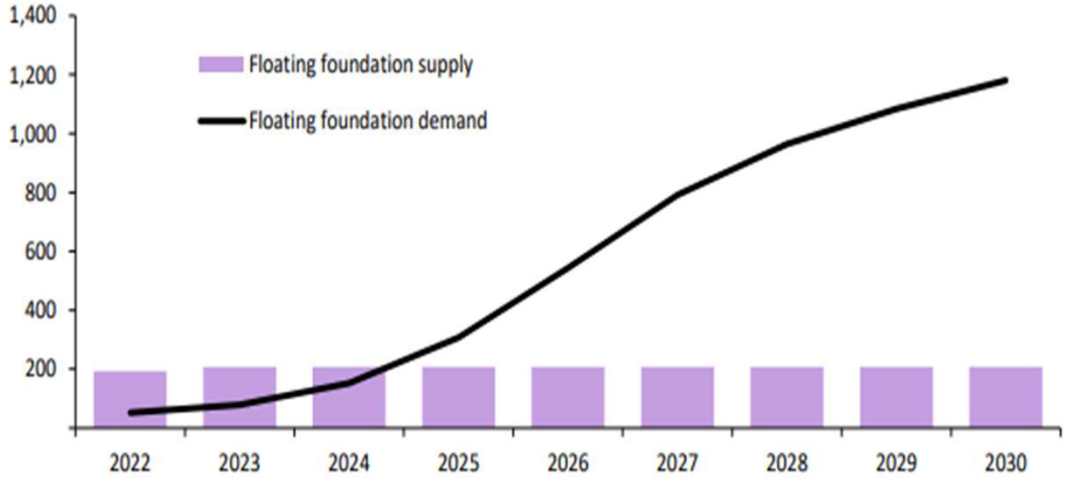


Tower manufacturing capacity and demand in Europe

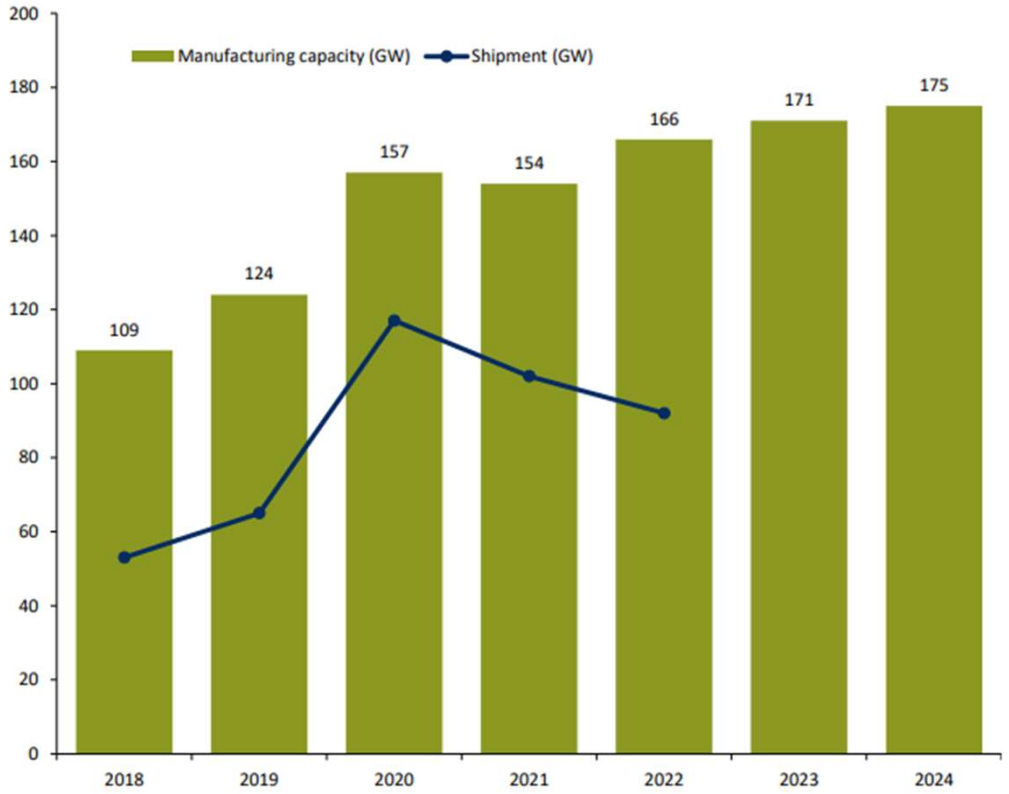
Million metric tons of steel per year

Type	Typical diameter	Typical turbine size supported
Regular	5-6 m	<6 MW
XL	6-8 m	6-10 MW
XXL	8-11 m	10-14 MW
XXXL	>11 m	>14 MW





European monopile and floating supply and demand



Global wind turbine manufacturing and shipments

9.4 Cost structure

Number of Elements annually

Pile (≈100 m)

Transition Piece (≈10 m)

4 M€/unit

Tower

Blades

13 M€/unit

Generator

Offshore substation (OSS) 140 M€

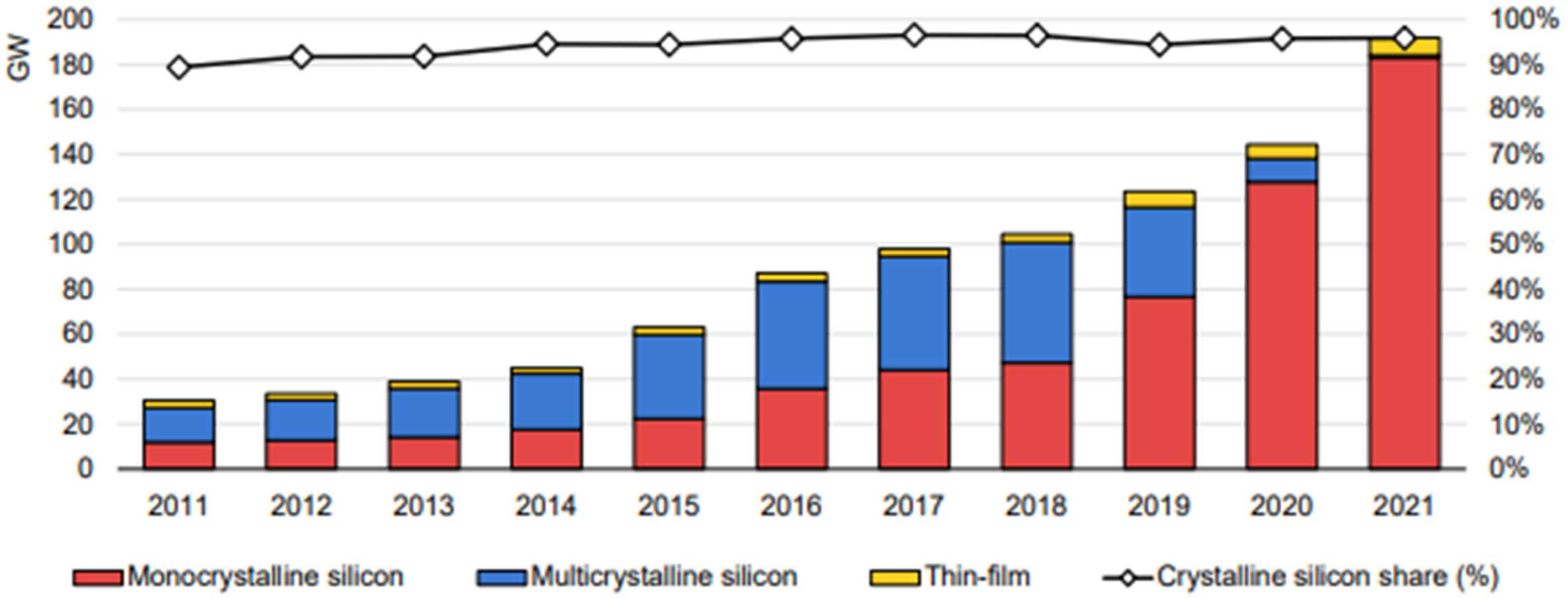
Subsea cables 1 M€/km installed

Transport & Installation 3 M€/unit

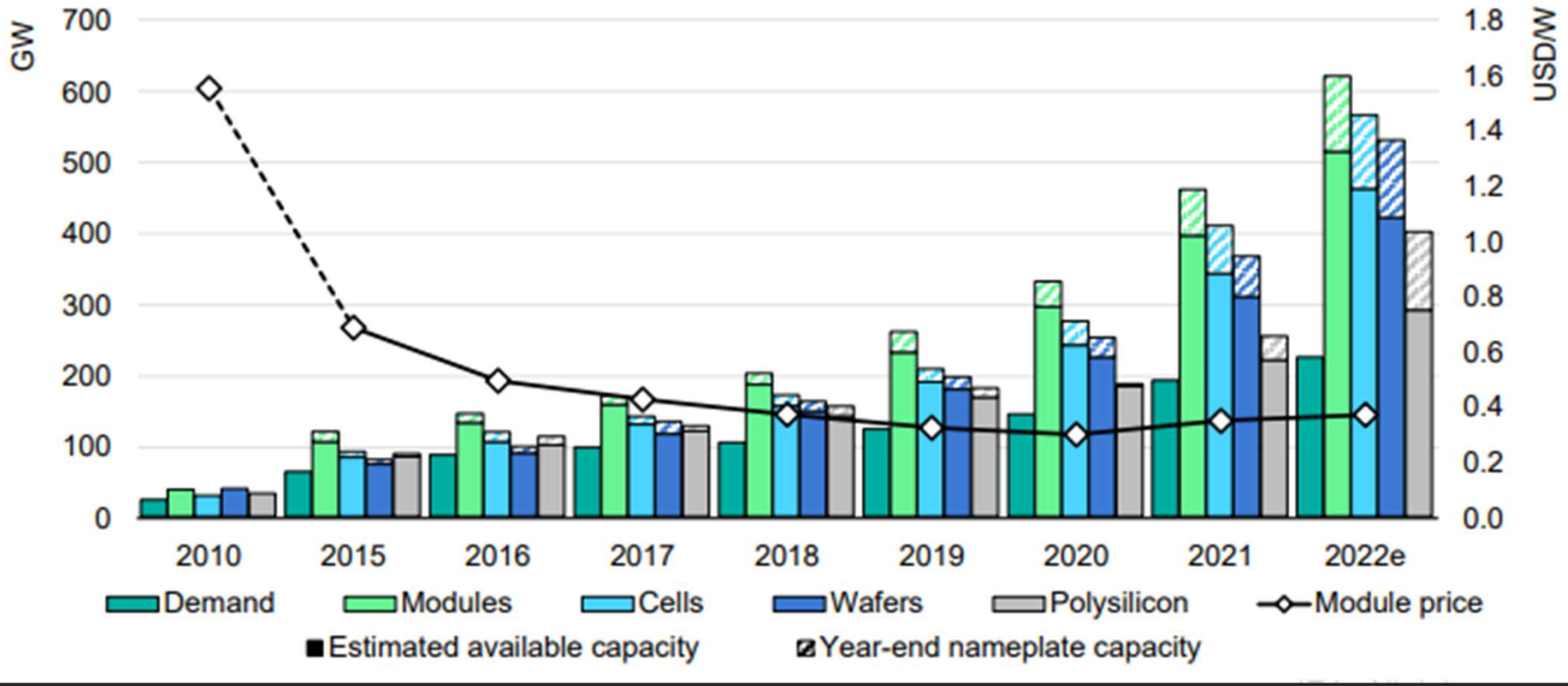
Summary per Turbine ≈ 26 M€

10-General overview of solar farm

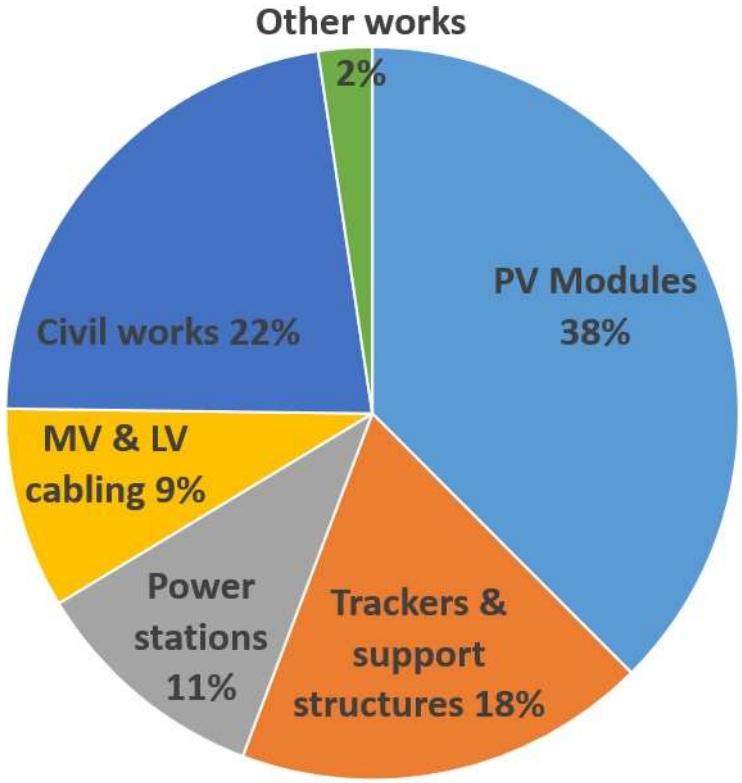
- Solar panels production
- Global panels manufacturing capacity
- Capex
- Opex



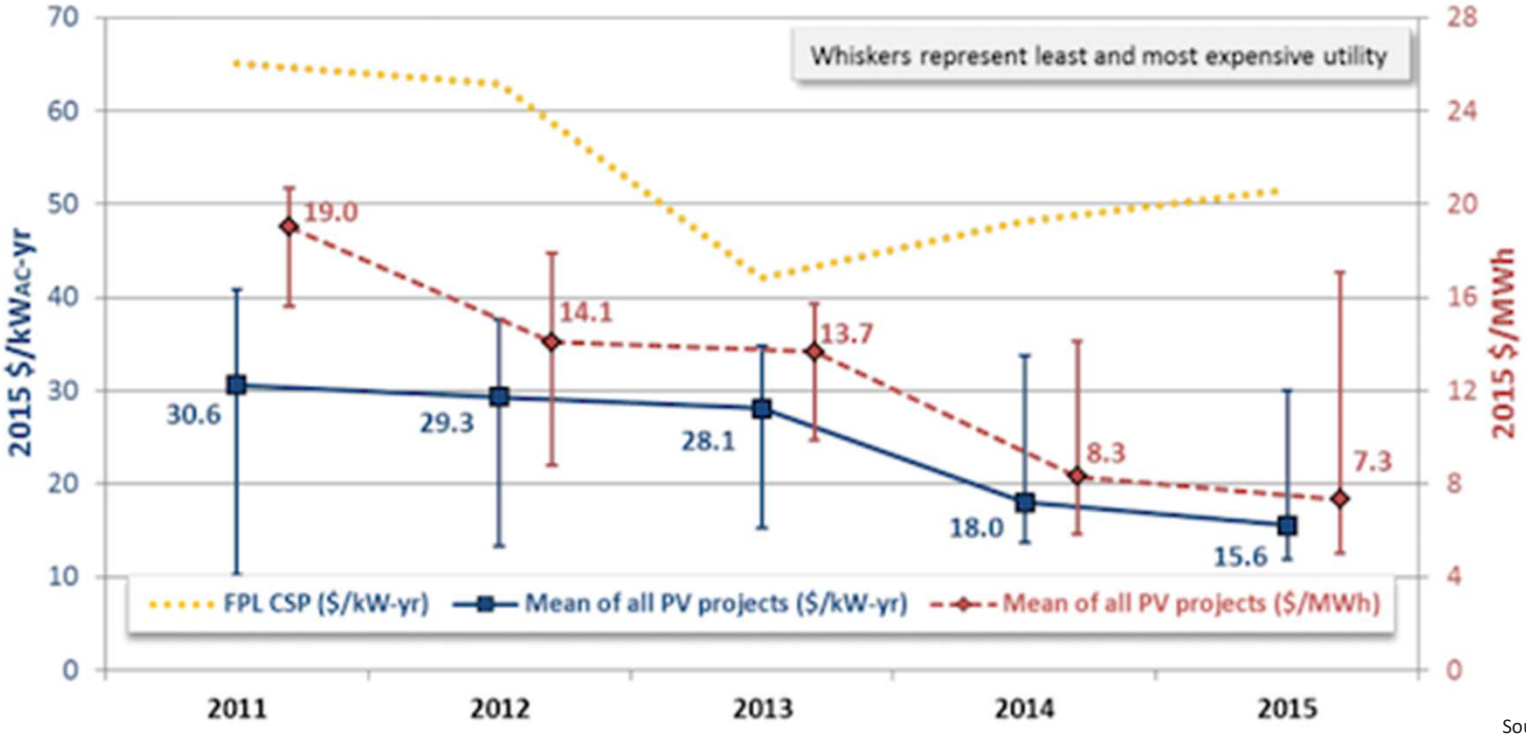
Solar PV module production by technology, 2011-2021



Global PV manufacturing capacity, demand and average module selling price, 2010- 2022



CAPEX breakdown for commercial solar PV



Source: LBNL (2015): Utility scale solar

Solar O&M cost (Opex) from 2011 to 2015

Solar panels EPCs + panels fabricators

Solar panels

- Trina Solar (China)
- First Solar (U.S.)
- Yingli Solar (China)
- Tata Power Solar System Ltd (India)
- Abengoa (Spain)
- Canadian Solar Inc. (Canada)
- Waaree Group (India)
- General Electric Company (U.S.)
- BrightSource Energy, Inc. (U.S.)
- SunPower Corporation (U.S.)
- Convert Italia (Italy)
- Urja Global Limited (India)
- eSolar Inc (U.S.)

By Technology

- Solar Photovoltaic
  - Mono-Si
  - Thin Film
  - Multi-Si
  - Others
- CSP
  - Parabolic Trough
  - Power Tower
  - Linear Fresnel

11. Conclusion

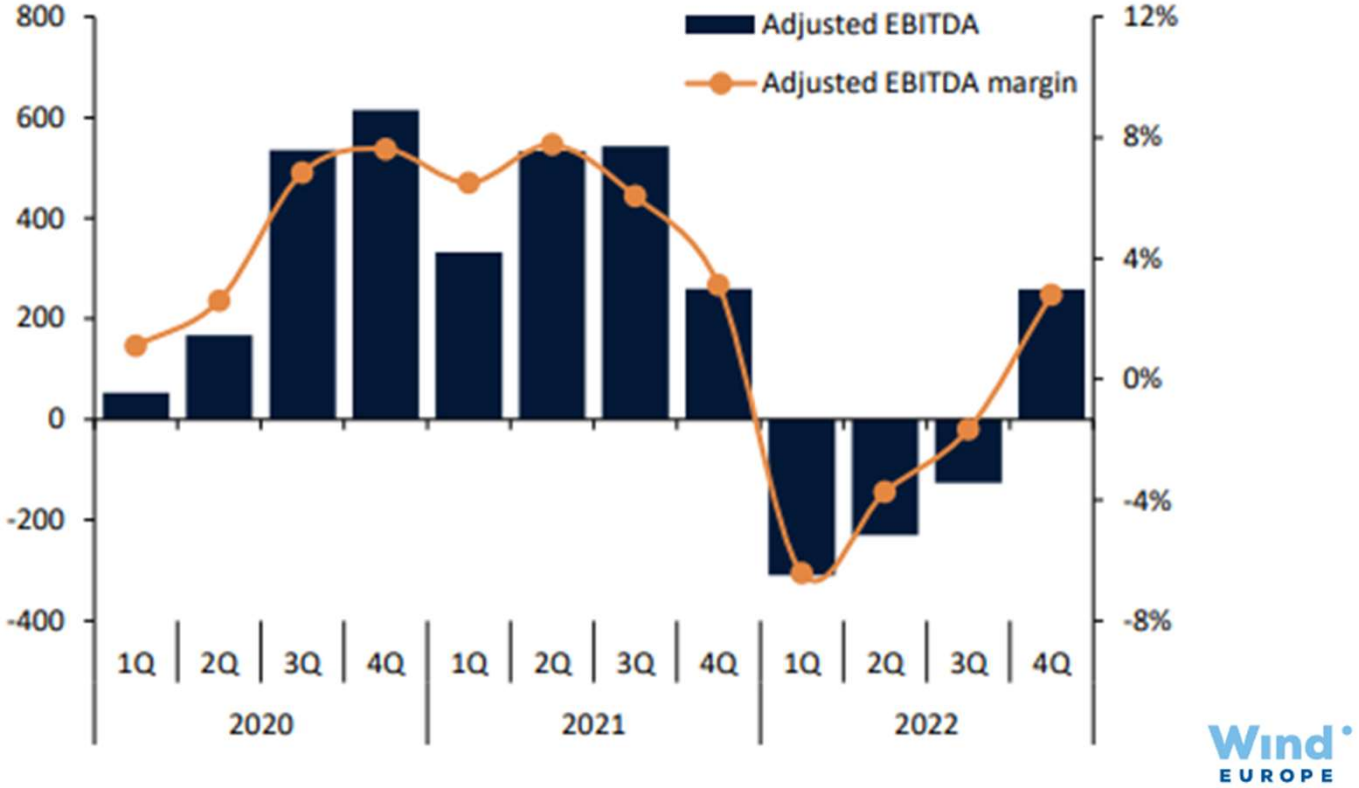
Is the “Green Industry” a good business?

300 GW

The EU has an objective of 60 GW offshore wind capacity by 2030, and **300 GW by 2050** in order to reach climate neutrality

93 GW

The Baltic Sea has an offshore wind potential of **93 GW by 2050***



Adjusted EBITDA and EBITDA margin for selected wind turbine suppliers (M€)

Vestas

INCOME STATEMENT | BALANCE SHEET | CASH FLOW STATEMENT | RATIOS | SEGMENTS

Ratios | TIKR.com	31/12/12	31/12/13	31/12/14	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19	31/12/20	31/12/21	31/12/22	LTM
Return Ratios:												
Return on Assets %	0,1 %	2,1 %	5,6 %	6,9 %	9,8 %	7,5 %	5,3 %	4,8 %	2,9 %	1,4 %	(3,0 %)	(2,3 %)
Return on Capital %	0,2 %	9,8 %	18,7 %	25,3 %	39,0 %	34,1 %	26,0 %	23,3 %	12,2 %	6,6 %	(17,0 %)	(12,3 %)
Return On Equity %	(45,9 %)	(5,2 %)	20,1 %	26,0 %	31,7 %	28,4 %	22,0 %	21,7 %	19,2 %	3,0 %	(40,5 %)	(22,9 %)
Return on Common Equity %	(45,9 %)	(5,2 %)	20,1 %	26,0 %	31,7 %	28,4 %	22,1 %	22,1 %	19,3 %	2,9 %	(40,7 %)	(23,0 %)
Margin Analysis:												
Gross Profit Margin %	11,0 %	14,7 %	17,0 %	17,9 %	20,9 %	19,6 %	16,1 %	14,5 %	10,5 %	10,0 %	1,3 %	2,4 %
SG&A Margin %	7,4 %	7,2 %	5,9 %	5,2 %	4,6 %	5,0 %	4,4 %	4,0 %	3,5 %	4,7 %	5,5 %	5,4 %
EBITDA Margin %	3,5 %	6,4 %	10,8 %	12,4 %	16,4 %	15,1 %	12,1 %	10,6 %	7,3 %	5,7 %	(4,6 %)	(3,8 %)
EBITA Margin %	0,1 %	3,5 %	8,1 %	10,2 %	14,3 %	12,7 %	9,7 %	8,4 %	5,2 %	3,2 %	(6,3 %)	(4,7 %)
EBIT Margin %	0,1 %	3,5 %	8,1 %	10,2 %	14,2 %	12,6 %	9,6 %	8,3 %	5,1 %	2,7 %	(6,6 %)	(5,1 %)
Income From Continuing Operations Margin %	(13,3 %)	(1,3 %)	5,7 %	8,1 %	9,4 %	9,0 %	6,7 %	5,8 %	5,2 %	0,9 %	(10,9 %)	(5,3 %)
Net Income Margin %	(13,3 %)	(1,3 %)	5,7 %	8,1 %	9,4 %	9,0 %	6,7 %	5,8 %	5,2 %	0,9 %	(10,9 %)	(5,3 %)
Normalized Net Income Margin %	(0,1 %)	0,7 %	4,3 %	6,5 %	8,0 %	7,6 %	5,9 %	4,7 %	4,2 %	1,4 %	(4,6 %)	(3,7 %)
Net Avail. For Common Margin %	(13,3 %)	(1,3 %)	5,7 %	8,1 %	9,4 %	9,0 %	6,7 %	5,8 %	5,2 %	0,9 %	(10,9 %)	(5,3 %)
Levered Free Cash Flow Margin %	(5,1 %)	15,5 %	13,1 %	12,3 %	14,1 %	7,5 %	4,3 %	0,1 %	1,8 %	2,1 %	(1,9 %)	(8,1 %)
Unlevered Free Cash Flow Margin %	(4,6 %)	16,4 %	13,4 %	12,4 %	14,2 %	7,6 %	4,4 %	0,3 %	2,0 %	2,3 %	(1,6 %)	(7,8 %)
Asset Turnover:												
Asset Turnover	1,03x	1,08x	0,99x	0,98x	1,03x	0,92x	0,85x	0,85x	0,82x	0,79x	0,72x	0,74x
Fixed Assets Turnover	4,53x	4,85x	5,87x	6,99x	7,85x	7,73x	7,90x	8,13x	8,03x	7,58x	7,54x	7,93x
Receivables Turnover	8,89x	8,19x	10,05x	11,14x	10,97x	8,72x	8,03x	7,40x	6,89x	6,15x	5,33x	5,63x
Inventory Turnover	2,68x	2,83x	3,91x	4,06x	4,17x	3,42x	2,99x	2,93x	2,83x	2,56x	2,37x	2,13x
Working Capital Turnover	9,10x	30,57x	15,63x	6,61x	7,22x	6,76x	8,81x	11,09x	14,60x	95,04x	125,97x	20,95x
Short Term Liquidity:												
Current Ratio	1,21x	1,06x	1,10x	1,27x	1,25x	1,23x	1,16x	1,12x	1,09x	1,01x	1,01x	1,06x
Quick Ratio	0,57x	0,53x	0,73x	0,85x	0,88x	0,81x	0,71x	0,63x	0,59x	0,51x	0,47x	0,45x
Op Cash Flow to Current Liab	(0,02x)	0,38x	0,26x	0,31x	0,39x	0,25x	0,14x	0,09x	0,07x	0,08x	(0,01x)	(0,02x)

Avg. Cash Conversion Cycle		96,78	73,97	55,11	44,54	58,02	62,05	85,97	97,44	102,01	120,36	141,15
Avg. Days Sales Outstanding		44,57	36,31	32,76	33,37	41,86	45,44	49,35	53,11	59,37	68,50	64,83
Avg. Days Outstanding Inventory		129,07	93,41	89,90	87,76	106,81	122,00	124,50	129,45	142,58	153,80	171,21
Avg. Days Payable Outstanding		76,86	55,76	67,55	76,60	90,65	105,39	87,88	85,13	99,94	101,94	94,89
Long-Term Solvency:												
Total Debt / Equity	108,0 %	39,9 %	25,5 %	17,1 %	15,5 %	16,0 %	16,0 %	24,5 %	28,8 %	30,6 %	79,3 %	96,7 %
Total Debt / Capital	51,7 %	28,2 %	20,2 %	14,5 %	13,3 %	13,5 %	13,4 %	19,0 %	21,8 %	22,1 %	43,0 %	47,9 %
Total Liabilities / Total Assets	76,7 %	73,0 %	66,0 %	66,2 %	67,9 %	71,4 %	73,9 %	76,7 %	74,1 %	76,1 %	84,8 %	84,8 %
EBIT / Interest Expense	0,14x	2,48x	16,09x	45,42x	55,73x	83,53x	44,00x	21,36x	19,03x	8,23x	(15,27x)	(10,12x)
EBITDA / Interest Expense	4,22x	4,58x	21,40x	54,79x	64,38x	100,40x	55,68x	28,70x	28,85x	19,87x	(8,16x)	(5,59x)
(EBITDA - Capex) / Interest Expense	1,39x	3,72x	16,74x	43,21x	53,35x	82,53x	41,50x	19,11x	19,38x	10,71x	(14,05x)	(10,19x)
FFO Interest Coverage	(1,24x)	14,68x	32,17x	77,47x	83,88x	108,33x	46,41x	17,51x	18,58x	18,38x	(3,10x)	(3,26x)
FFO to Total Debt (x)	(0,04x)	2,05x	1,86x	2,97x	4,40x	3,27x	2,05x	1,00x	0,55x	0,67x	(0,08x)	(0,08x)
Total Debt / EBITDA	7,03x	1,56x	0,81x	0,48x	0,30x	0,33x	0,41x	0,61x	1,17x	1,39x	(4,72x)	(7,06x)
Net Debt / EBITDA	3,61x	(0,22x)	(1,88x)	(2,18x)	(1,94x)	(2,10x)	(2,32x)	(1,66x)	(1,58x)	(1,06x)	(0,10x)	(2,94x)
Net Debt / (EBITDA - Capex)	10,98x	(0,27x)	(2,41x)	(2,76x)	(2,35x)	(2,55x)	(3,11x)	(2,50x)	(2,35x)	(1,97x)	(0,06x)	(1,61x)

Multiples | TIKR.com	31/12/12	31/12/13	31/12/14	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19	31/12/20	31/12/21	31/12/22	16/6/23
Forward Multiples												
NTM Total Enterprise Value / Revenues	0,34x	0,82x	0,85x	1,41x	1,10x	0,93x	1,08x	1,22x	2,33x	1,48x	1,90x	1,75x
NTM Price / Sales (P/S)	0,14x	0,70x	0,93x	1,62x	1,31x	1,19x	1,22x	1,34x	2,42x	1,51x	1,81x	1,67x
NTM Total Enterprise Value / EBITDA	4,58x	8,09x	6,24x	10,04x	6,91x	6,20x	8,63x	9,08x	18,94x	14,20x	29,86x	23,67x
NTM Total Enterprise Value / EBIT	15,59x	20,83x	9,95x	14,45x	9,07x	8,49x	12,37x	13,01x	29,82x	27,67x	205,30x	76,36x
NTM Price / Normalized Earnings (P/E)	6,55x	32,79x	15,19x	20,81x	36,50x	14,95x	17,95x	19,98x	36,09x	34,64x	325,69x	188,39x
NTM Market Cap / Free Cash Flow	(9,89x)	13,15x	14,59x	21,10x	16,10x	14,37x	25,95x	25,54x	40,20x	46,19x	131,62x	72,24x
NTM Levered Free Cash Flow Yield	(10,1 %)	7,6 %	6,9 %	4,7 %	6,2 %	7,0 %	3,9 %	3,9 %	2,5 %	2,2 %	0,8 %	1,4 %
NTM Dividend Yield	0,1 %	0,0 %	1,2 %	1,3 %	1,8 %	2,1 %	1,8 %	1,2 %	0,5 %	0,7 %	0,2 %	0,1 %

Prysmian

Ratios | TIKR.com	31/12/12	31/12/13	31/12/14	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19	31/12/20	31/12/21	31/12/22
Return Ratios:											
Return on Assets %	4,9 %	3,8 %	2,7 %	3,6 %	4,7 %	4,1 %	2,0 %	3,7 %	2,5 %	3,1 %	4,2 %
Return on Capital %	15,0 %	12,8 %	9,1 %	11,4 %	15,5 %	12,0 %	4,6 %	10,0 %	7,1 %	7,8 %	11,7 %
Return On Equity %	14,9 %	13,1 %	9,7 %	15,9 %	16,5 %	14,3 %	2,9 %	11,9 %	6,9 %	11,2 %	14,8 %
Return on Common Equity %	15,4 %	13,2 %	10,0 %	17,6 %	18,0 %	16,6 %	3,2 %	12,7 %	7,6 %	11,9 %	15,5 %
Margin Analysis:											
Gross Profit Margin %	34,1 %	36,9 %	36,6 %	38,0 %	40,9 %	38,2 %	34,0 %	36,5 %	35,4 %	31,5 %	33,2 %
SG&A Margin %	12,5 %	13,2 %	13,3 %	13,2 %	13,5 %	13,4 %	13,0 %	12,8 %	14,8 %	11,9 %	11,4 %
EBITDA Margin %	7,8 %	6,9 %	5,5 %	6,6 %	8,5 %	7,5 %	4,8 %	7,6 %	6,7 %	6,3 %	6,9 %
EBITA Margin %	6,2 %	5,3 %	3,8 %	4,9 %	6,8 %	5,9 %	3,1 %	5,8 %	4,7 %	4,7 %	5,5 %
EBIT Margin %	5,9 %	5,0 %	3,5 %	4,6 %	6,3 %	5,4 %	2,7 %	5,3 %	4,1 %	4,3 %	5,1 %
Income From Continuing Operations Margin %	2,1 %	2,2 %	1,7 %	2,9 %	3,4 %	3,0 %	0,6 %	2,6 %	1,7 %	2,4 %	3,2 %
Net Income Margin %	2,1 %	2,1 %	1,7 %	2,9 %	3,2 %	3,0 %	0,6 %	2,5 %	1,8 %	2,4 %	3,1 %
Normalized Net Income Margin %	2,8 %	2,7 %	1,9 %	2,6 %	3,4 %	3,1 %	1,4 %	2,8 %	2,2 %	2,3 %	2,9 %
Net Avail. For Common Margin %	2,1 %	2,1 %	1,7 %	2,9 %	3,2 %	3,0 %	0,6 %	2,5 %	1,8 %	2,4 %	3,1 %
Levered Free Cash Flow Margin %	4,5 %	4,0 %	1,4 %	2,4 %	4,6 %	5,6 %	(1,6 %)	3,4 %	4,3 %	2,7 %	3,2 %
Unlevered Free Cash Flow Margin %	5,2 %	4,5 %	1,8 %	2,8 %	4,9 %	6,0 %	(1,3 %)	3,8 %	4,7 %	3,0 %	3,4 %
Asset Turnover:											
Asset Turnover	1,31x	1,27x	1,21x	1,19x	1,21x	1,18x	1,00x	1,10x	1,01x	1,07x	1,26x
Fixed Assets Turnover	5,13x	4,78x	4,88x	5,00x	4,80x	4,86x	4,77x	4,26x	3,69x	4,72x	5,54x
Receivables Turnover	5,40x	4,82x	4,87x	5,04x	4,88x	5,46x	6,10x	5,88x	5,79x	7,48x	7,45x
Inventory Turnover	5,69x	4,96x	4,66x	4,68x	4,78x	5,30x	5,47x	4,85x	4,26x	4,90x	5,01x
Working Capital Turnover	11,14x	16,27x	45,60x	15,10x	13,46x	9,80x	10,44x	12,50x	10,37x	16,51x	13,51x
Short Term Liquidity:											
Current Ratio	1,25x	1,16x	1,05x	1,16x	1,19x	1,26x	1,25x	1,23x	1,26x	1,14x	1,21x
Quick Ratio	0,91x	0,81x	0,72x	0,79x	0,86x	0,93x	0,85x	0,83x	0,82x	0,74x	0,79x
Dividend Yield %											
Op Cash Flow to Current Liab	0,19x	0,15x	0,12x	0,23x	0,21x	0,19x	0,12x	0,19x	0,19x	0,14x	0,19x
Avg. Cash Conversion Cycle		30,53	37,11	39,72	32,98	18,89	31,07	33,50	36,20	34,06	33,34

Multiples | TIKR.com	31/12/12	31/12/13	31/12/14	31/12/15	31/12/16	31/12/17	31/12/18	31/12/19	31/12/20	31/12/21	31/12/22
Avg. Cash Conversion Cycle		30,53	37,11	39,72	32,98	18,89	31,07	33,50	36,20	34,06	33,34
Avg. Days Sales Outstanding		75,69	74,89	72,47	74,97	66,80	59,82	62,11	63,23	48,79	49,00
Avg. Days Outstanding Inventory		73,56	78,32	77,99	76,64	68,90	66,78	75,27	85,92	74,42	72,79
Avg. Days Payable Outstanding		118,72	116,10	110,75	118,63	116,80	95,54	103,88	112,95	89,15	88,45
Long-Term Solvency:											
Total Debt / Equity	157,8 %	120,8 %	117,4 %	93,4 %	76,8 %	112,1 %	138,0 %	125,6 %	132,1 %	121,1 %	81,5 %
Total Debt / Capital	59,3 %	52,8 %	52,9 %	46,5 %	41,9 %	51,3 %	55,6 %	53,7 %	55,0 %	53,3 %	43,7 %
Total Liabilities / Total Assets	80,7 %	78,6 %	79,1 %	75,9 %	73,5 %	75,6 %	76,7 %	75,2 %	75,6 %	74,3 %	70,4 %
EBIT / Interest Expense	5,57x	6,43x	5,33x	6,50x	9,94x	7,82x	4,11x	8,34x	6,16x	7,64x	12,89x
EBITDA / Interest Expense	7,43x	8,98x	8,38x	9,18x	13,44x	10,91x	7,41x	12,59x	10,88x	11,99x	18,34x
(EBITDA - Capex) / Interest Expense	5,84x	7,22x	5,20x	5,33x	8,81x	6,60x	3,36x	9,30x	7,30x	8,40x	11,64x
FFO Interest Coverage	6,58x	7,44x	8,07x	13,15x	12,81x	11,04x	7,00x	10,62x	10,52x	10,79x	16,22x
FFO to Total Debt (x)	0,30x	0,28x	0,26x	0,50x	0,48x	0,33x	0,14x	0,24x	0,22x	0,21x	0,34x
Total Debt / EBITDA	2,97x	2,95x	3,68x	2,89x	2,00x	3,06x	6,70x	3,56x	4,39x	4,33x	2,62x
Net Debt / EBITDA	1,52x	1,70x	2,17x	1,59x	0,91x	0,75x	4,58x	2,35x	2,75x	2,07x	1,27x
Net Debt / (EBITDA - Capex)	1,94x	2,12x	3,50x	2,74x	1,38x	1,24x	10,09x	3,18x	4,10x	2,95x	2,01x
Forward Multiples											
NTM Total Enterprise Value / Revenues	0,57x	0,69x	0,65x	0,71x	0,83x	0,87x	0,66x	0,76x	0,98x	0,91x	0,76x
NTM Price / Sales (P/S)	0,39x	0,52x	0,46x	0,57x	0,67x	0,71x	0,39x	0,48x	0,72x	0,68x	0,59x
NTM Total Enterprise Value / EBITDA	6,88x	7,95x	7,90x	8,02x	8,73x	9,03x	7,84x	8,60x	11,38x	11,12x	8,88x
NTM Total Enterprise Value / EBIT	9,12x	10,50x	10,45x	10,70x	11,41x	11,83x	10,55x	12,01x	17,52x	16,59x	12,51x
NTM Price / Normalized Earnings (P/E)	10,57x	13,36x	13,41x	15,33x	15,34x	16,12x	9,42x	12,32x	22,27x	20,70x	15,30x
NTM Market Cap / Free Cash Flow	14,40x	17,43x	17,53x	24,70x	21,67x	20,78x	12,20x	13,22x	21,76x	24,73x	17,35x
NTM Levered Free Cash Flow Yield	6,9 %	5,7 %	5,7 %	4,0 %	4,6 %	4,8 %	8,2 %	7,6 %	4,6 %	4,0 %	5,8 %
NTM Dividend Yield	2,0 %	2,4 %	3,0 %	2,4 %	2,1 %	1,9 %	3,0 %	2,3 %	1,7 %	1,7 %	2,0 %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