ANALYZING EUROPEAN OFFSHORE WIND ENERGY PROJECT FINANCE STRUCTURES TO PROPOSE A WORKABLE MODEL FOR THE TURKISH CASE

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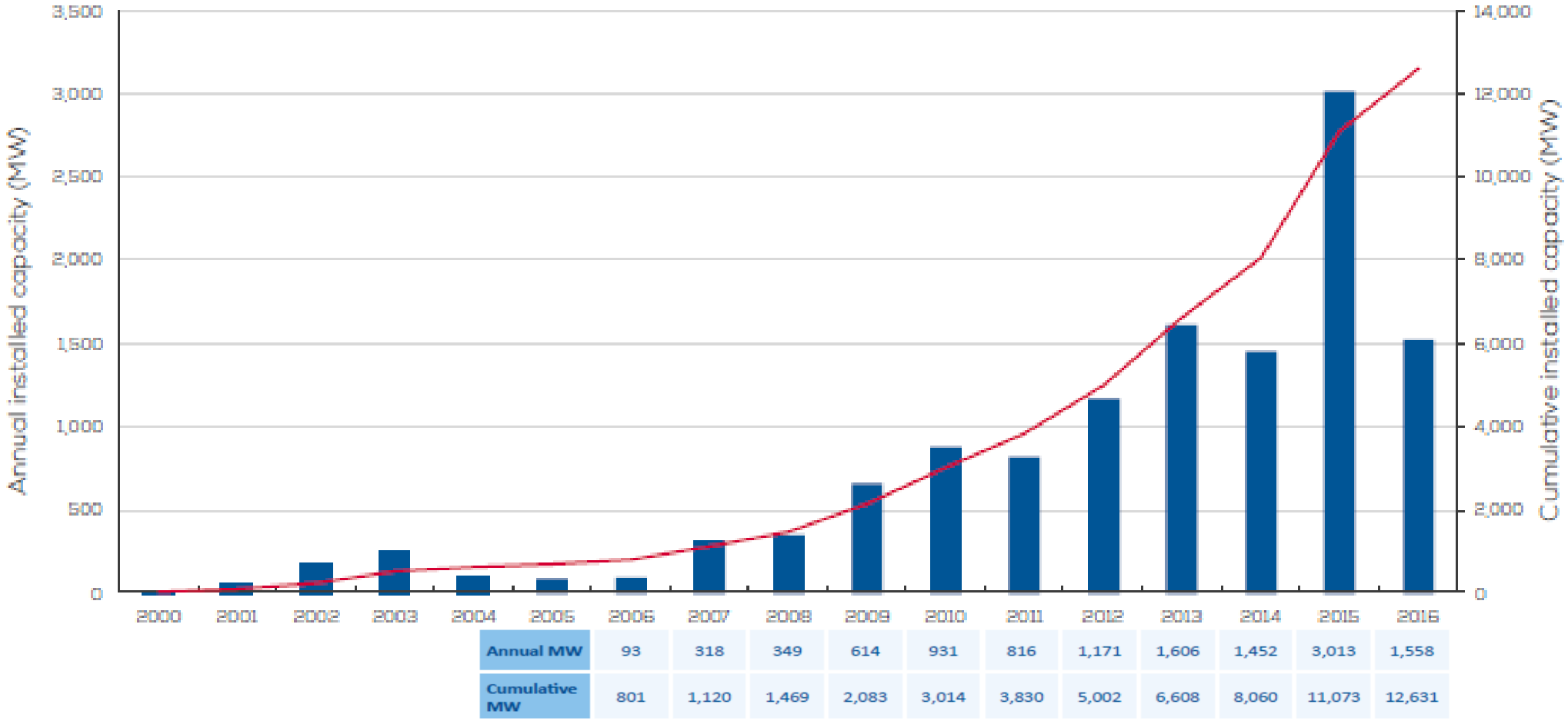
EUROPEAN OFFSHORE WIND IN 2018

Cumulative Installed Capacity	**18,500 MW**
Number of Total Wind Turbines	**4,543**
Number of Offshore Wind Farms	**105**
Load Factors	**%33 -%43**
Average Wind Turbine Capacity	**6,5 MW**
Average Wind Farm Size	**550 MW**

CUMULATIVE & ANNUAL OFFSHORE WIND INSTALLATIONS 2000 – 2016



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Annual MW	93	318	349	614	931	816	1,171	1,606	1,452	3,013	1,558						
Cumulative MW	801	1,120	1,469	2,083	3,014	3,830	5,002	6,608	8,060	11,073	12,631						

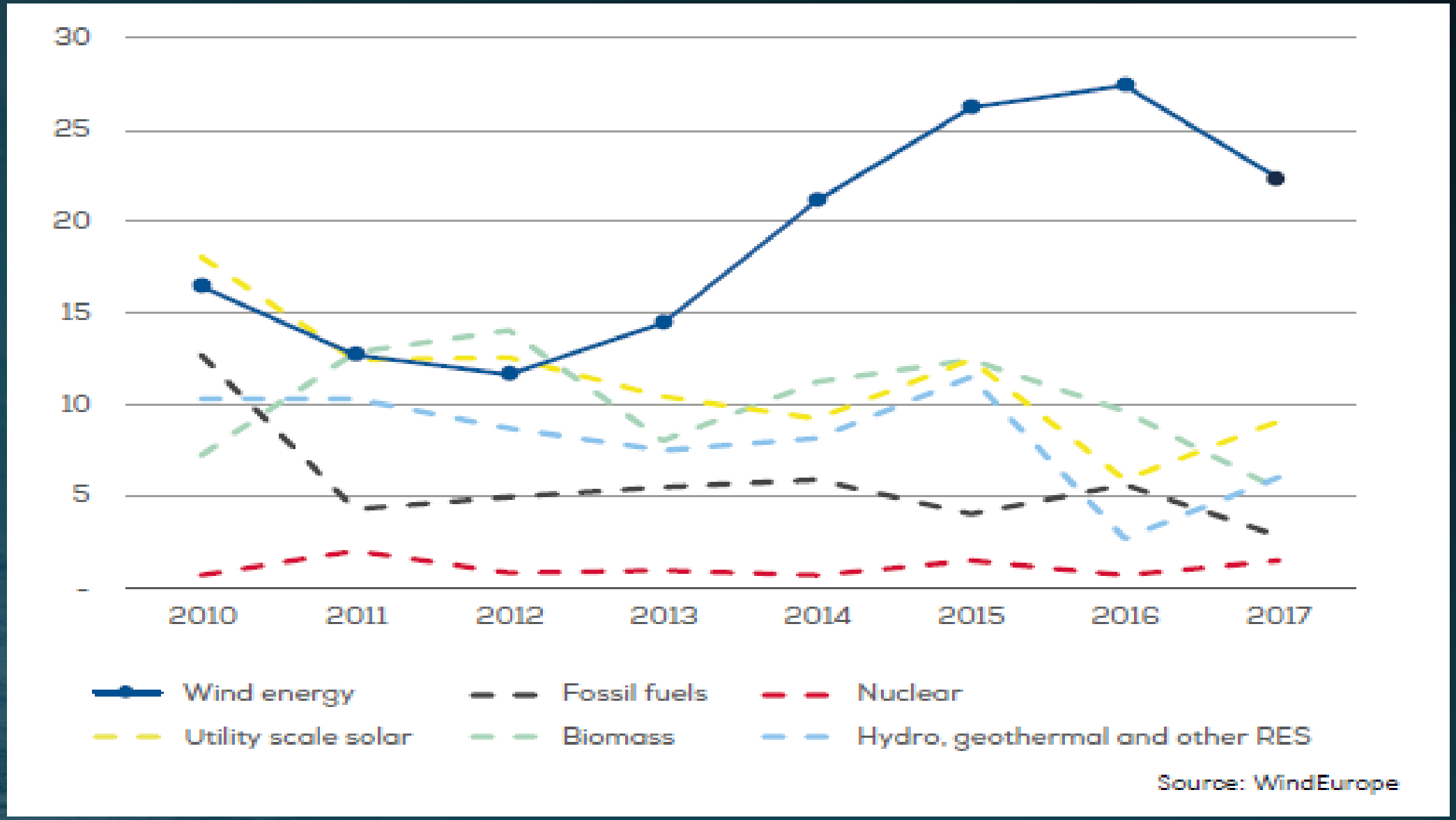
Source: WindEurope

EUROPEAN WIND ENERGY INVESTMENTS 2017

- Leading Energy Type in European Energy Mix Investments with a **CAGR of 6 %**
- Largest Investment Opportunity in The Power Sector in Europe
- Totaling **27.5 billion EUR**
- Financing **10.5 GW** of New Wind Energy Capacity
- Offshore wind taking **48%** in new capacity and **66%** of investment

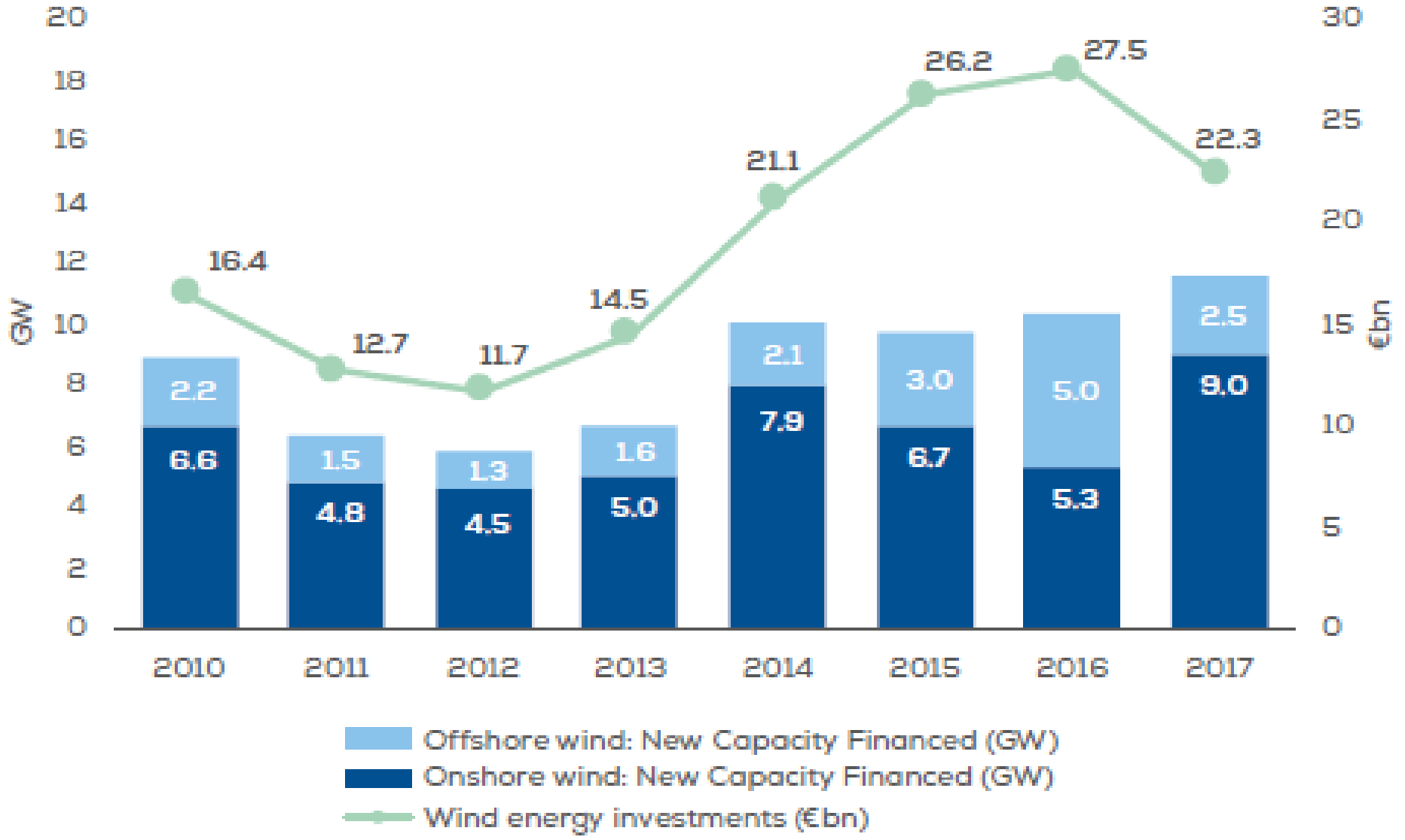
(Turkish Energy market has received in total **75 billion EUR** investment from 2008 and onwards with a financing amount of **55 billion EUR**)

INVESTMENTS: NEW POWER CAPACITY IN EUROPE (€BN)



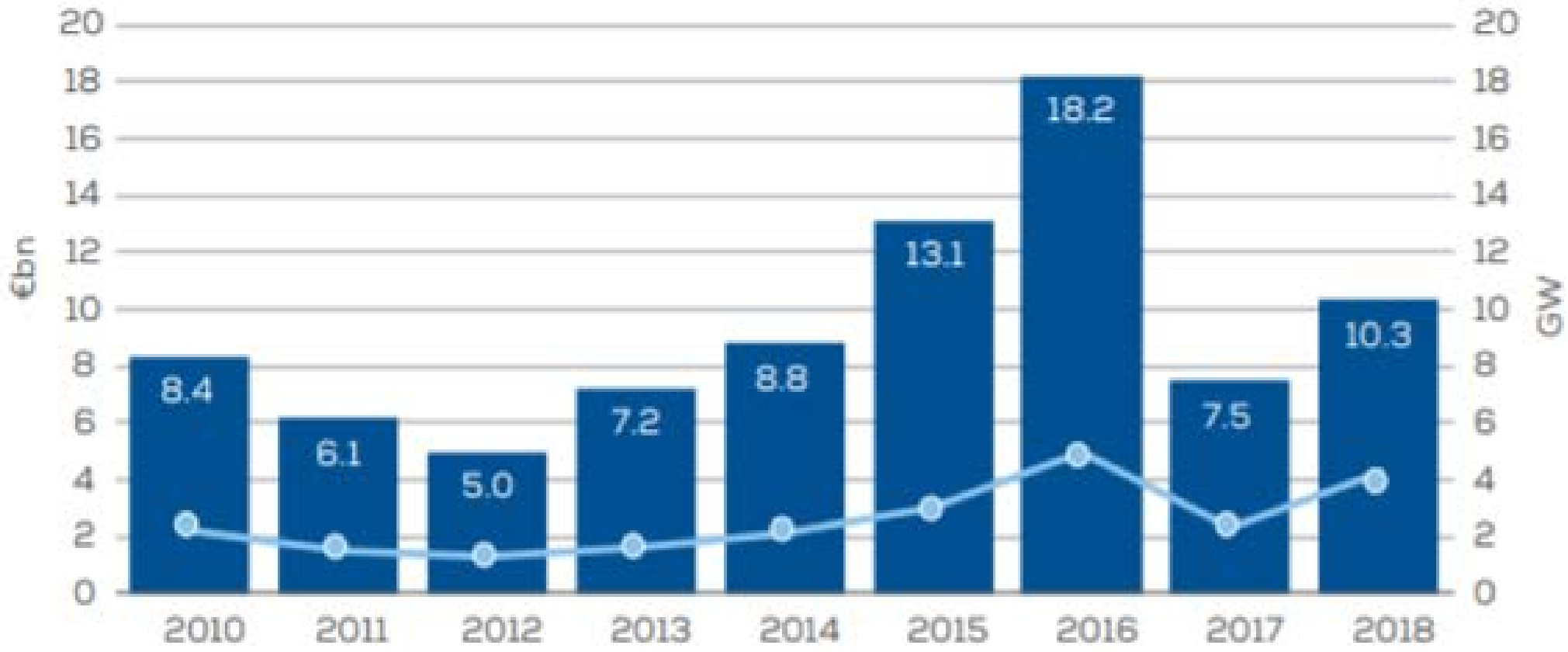
Source: WindEurope

NEW ASSET FINANCE IN WIND ENERGY



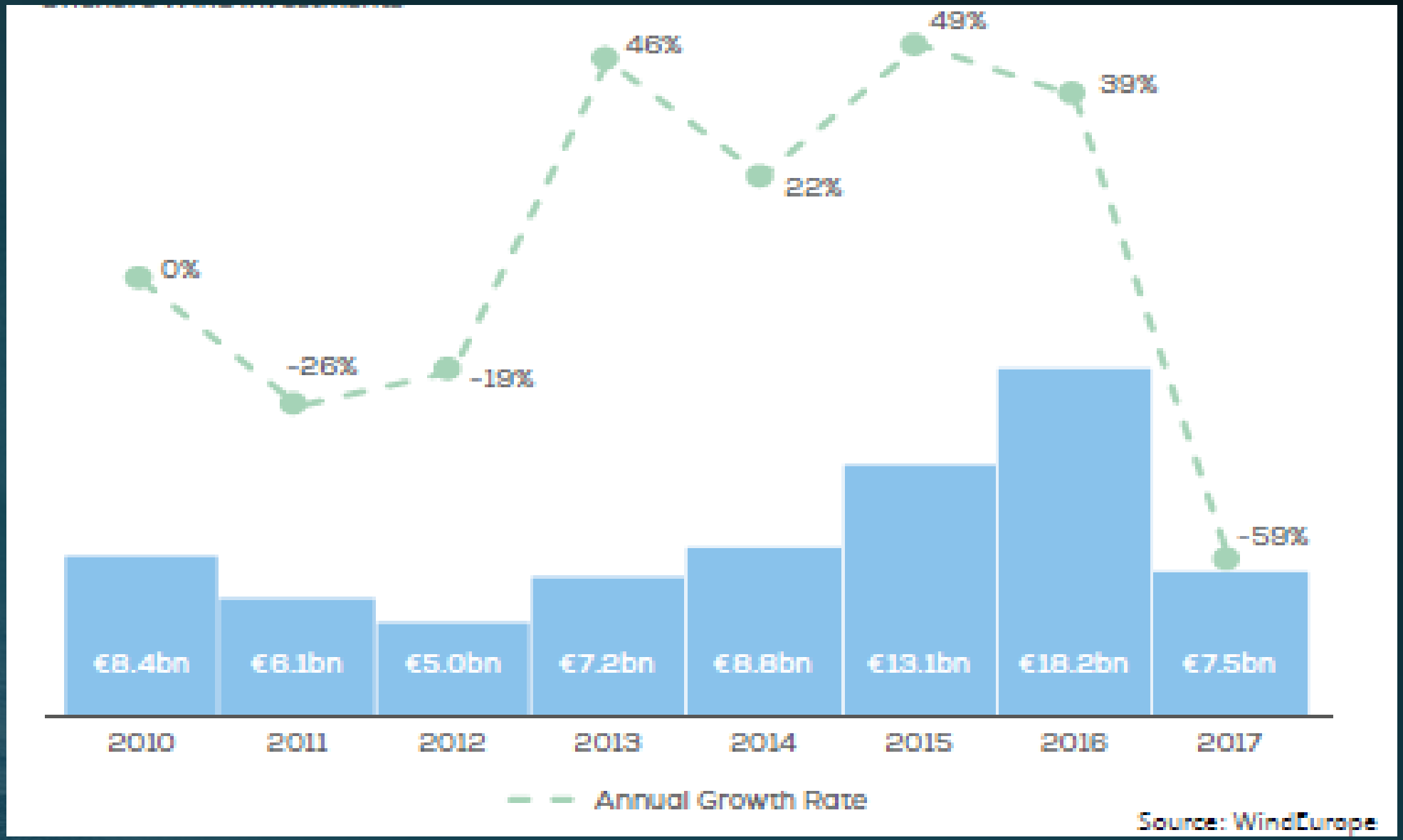
Source: WindEurope

OFFSHORE WIND INVESTMENTS

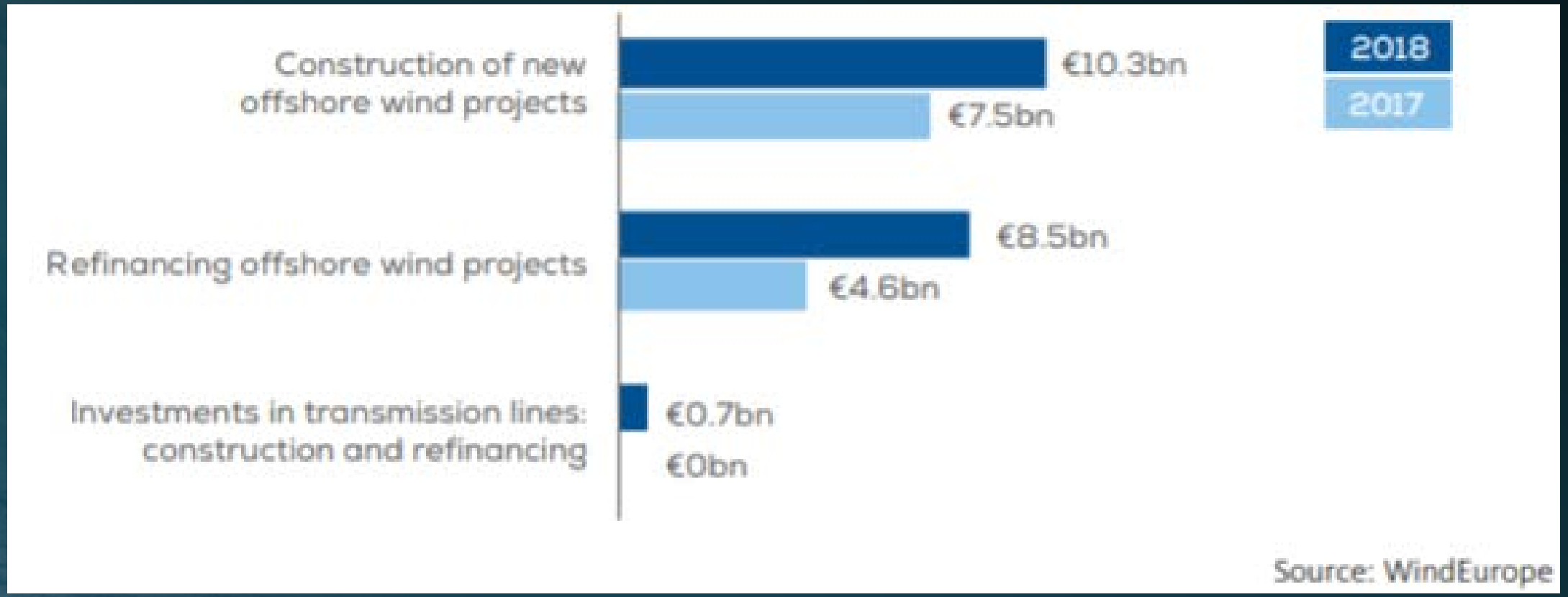


Source: WindEurope

OFFSHORE WIND INVESTMENTS



OFFSHORE WIND INVESTMENTS



OFFSHORE WIND INVESTMENTS (LCOE)

For offshore wind, there was an increasing cost trend for some years as project developers moved into deeper waters, further from shore, but since the peak in 2012, there has been an LCOE decline of 44% to $124 per MWh in 2017.

Offshore wind costs have declined in the past couple of years as developers compete for contracts in auctions, meaning that less investment is required per megawatt of capacity. The average capital expenditure for offshore wind has fallen from $4.1 million per MW in 2016 to $3.7 million per MW in 2017.

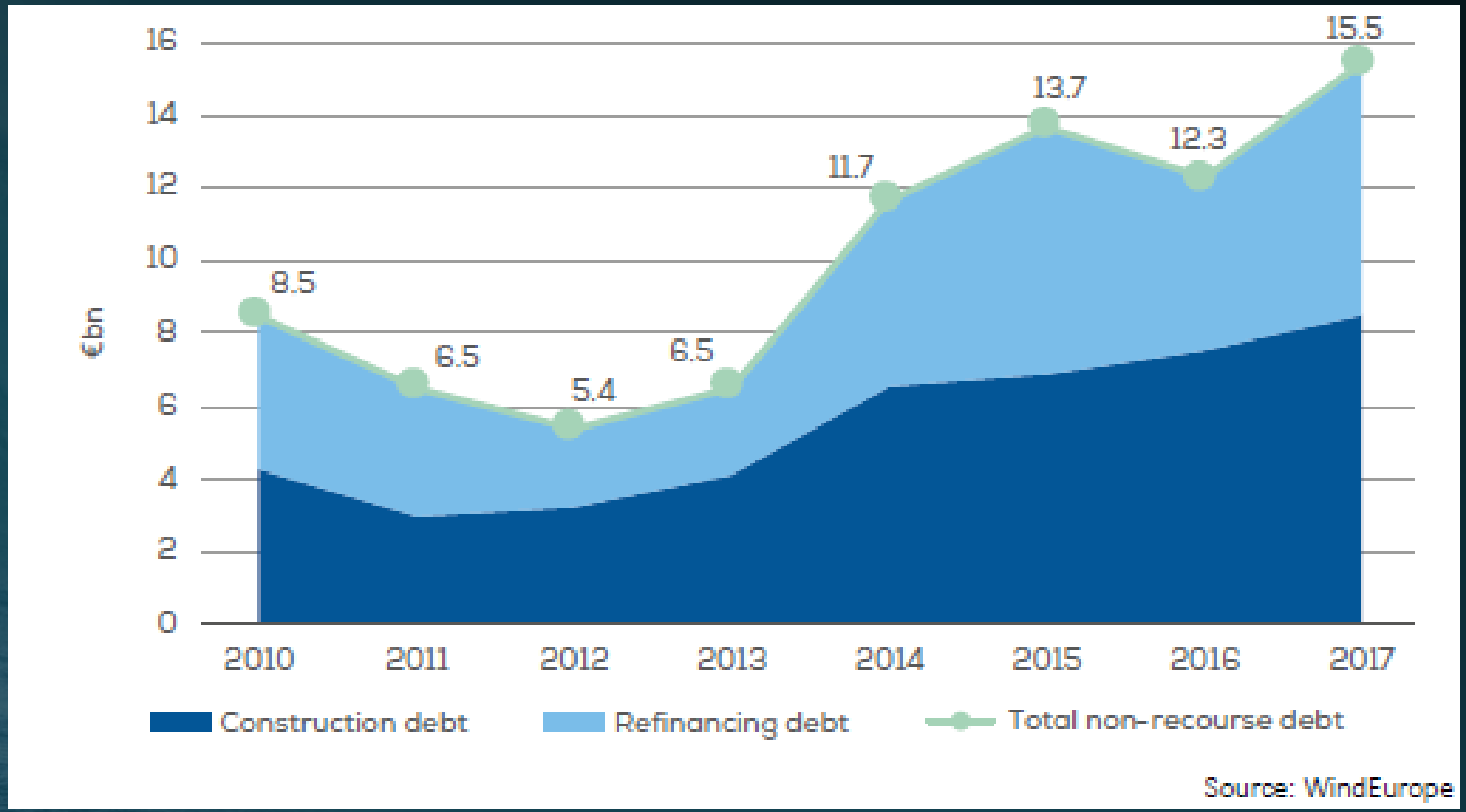
OFFSHORE WIND INVESTMENTS (LCOE)

	Units	Solar Thermal Tower with Storage	Fuel Cell	Geothermal	Wind—Onshore	Wind—Offshore
Net Facility Output	MW	135 – 110	2.4	20 – 50	150	210 – 385
Total Capital Cost [1]	$/kW	$3,850 – $10,000	$3,300 – $6,500	$4,000 – $6,400	$1,150 – $1,550	$2,250 – $3,800
Fixed O&M	$/kW-yr	$75.00 – $80.00	—	—	$28.00 – $36.50	$80.00 – $110.00
Variable O&M	$/MWh	—	$30.00 – $44.00	$25.00 – $35.00	—	—
Heat Rate	Btu/kWh	—	8,027 – 7,260	—	—	—
Capacity Factor	%	43% – 52%	95%	90% – 85%	55% – 38%	55% – 45%
Fuel Price	$/MMBtu	—	3.45	—	—	—
Construction Time	Months	36	3	36	12	12
Facility Life	Years	35	20	25	20	20
Levelized Cost of Energy	$/MWh	$98 – $181	$103 – $152	$71 – $111	$29 – $56	$62 – $121

EUROPEAN WIND ENERGY FINANCE IN 2018

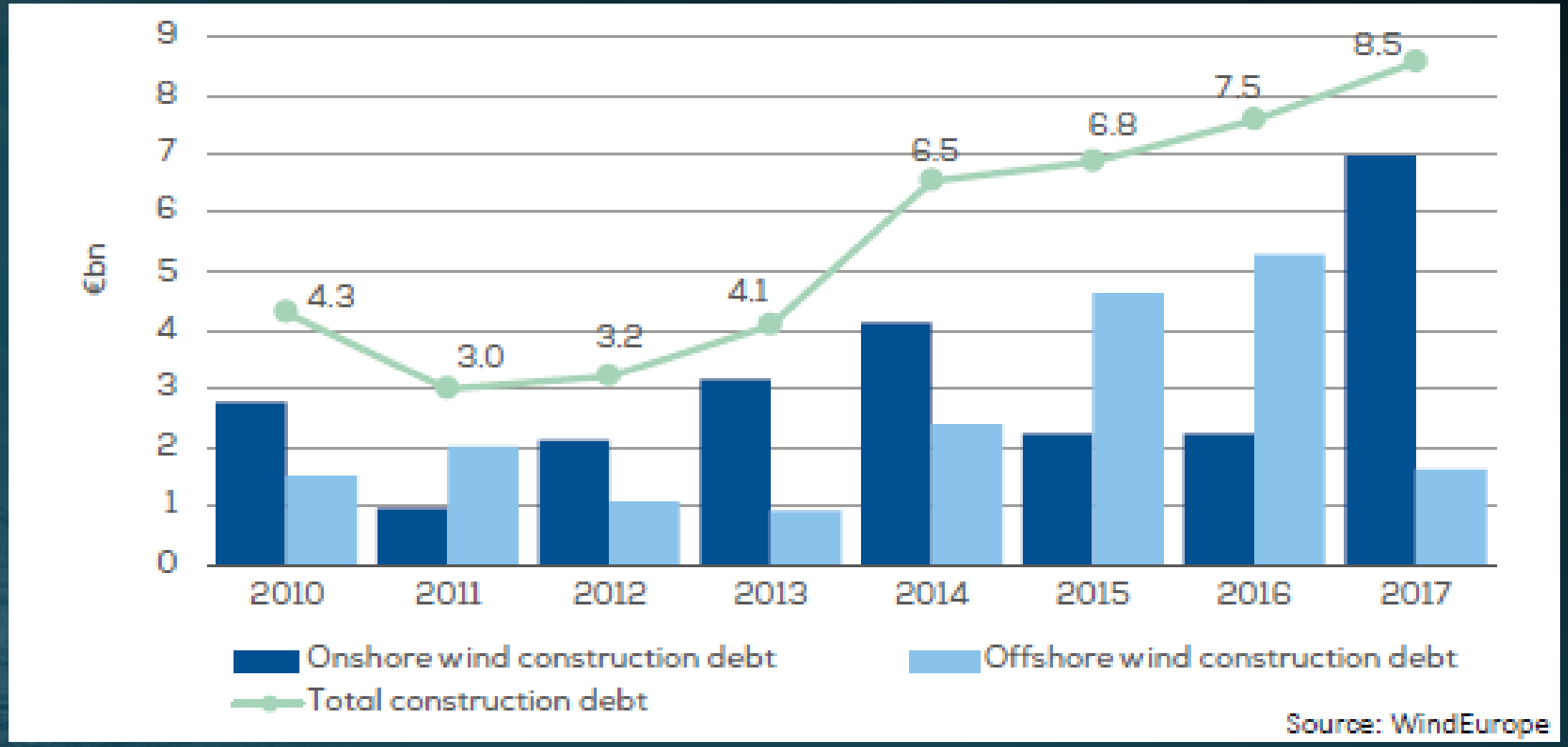
- 16.5 Billion EUR Debt Raised Non-recourse
- Offshore Wind Taking 35% Of Non-recourse Debt
- 10.3 Billion EUR of Debt Raised Used for Construction of Wind Energy
- 65 % of Construction Finance is Disbursed for Offshore Wind

NON-RECOURSE FINANCING

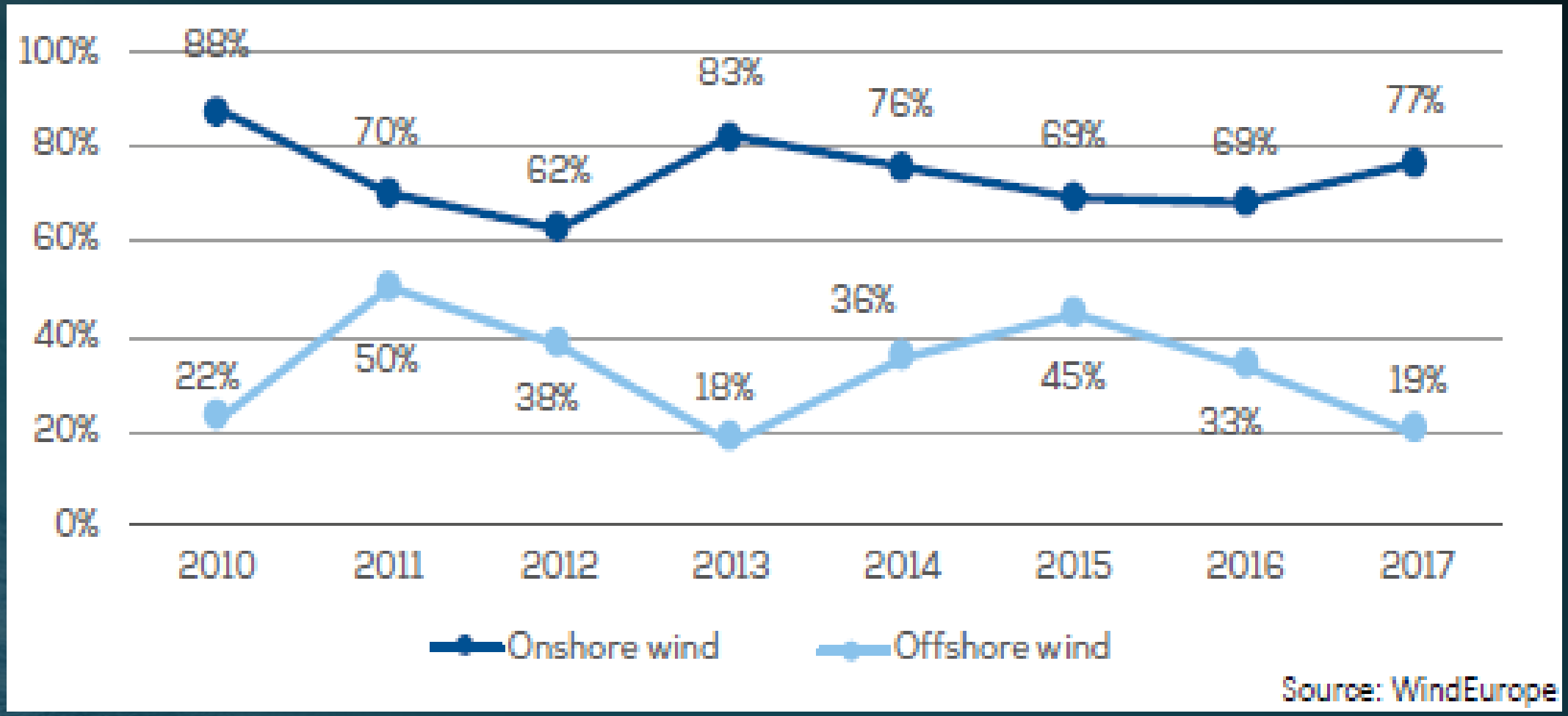


Source: WindEurope

NON-RECOURSE CONSTRUCTION DEBT PER TECHNOLOGY



SHARE OF NON-RECOURSE DEBT IN NEW CAPACITY FINANCED



Source: WindEurope

WHAT IS NON-RECOURSE FINANCE?

"Balance sheet" (equity) vs "non-recourse" (debt)

Large projects are typically developed through a stand alone project company

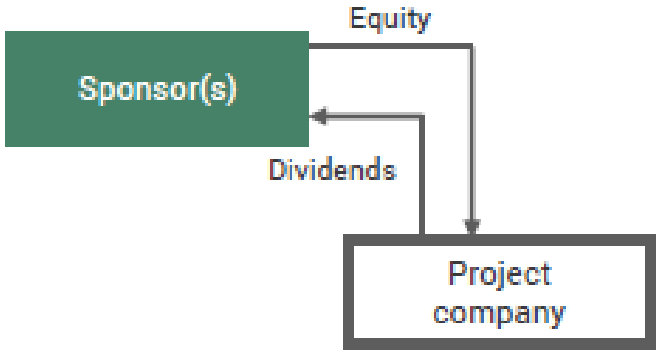
- Owned by the project investors
- With its own revenues & balance sheet and thus the ability to raise debt on its own merits

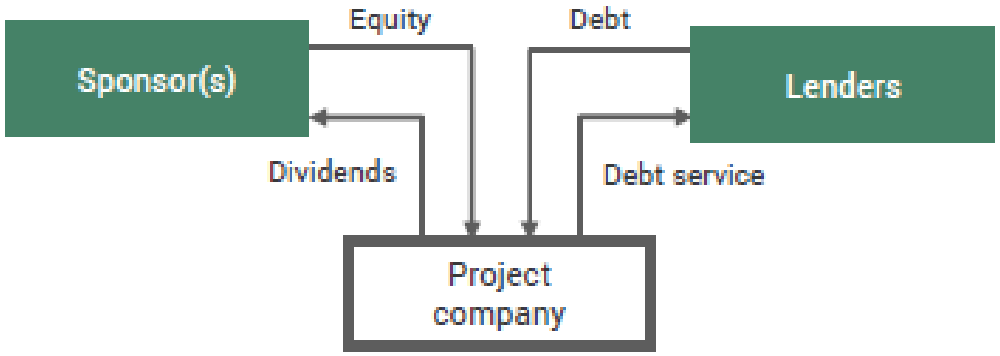
There are only two discrete sources of funding

- By the owners (directly via equity or shareholder loans, or indirectly via guarantees)
- By banks without recourse to the equity investors – this is "project finance"

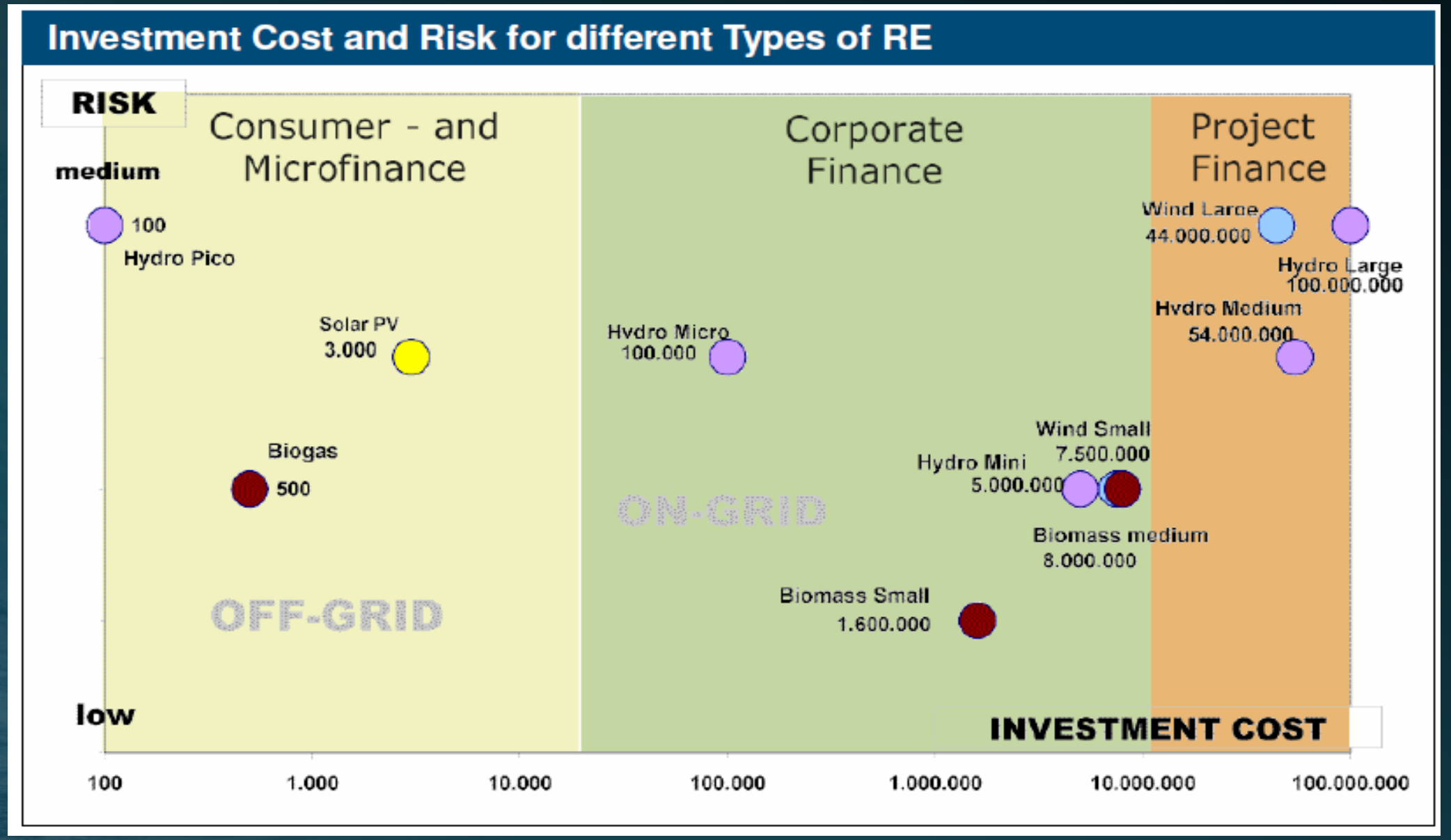
The way a project is funded will have a material impact on how it deals with contractors

- In a project finance deal, you need to deal with the senior lenders' requirements!
- Tax, accounting, consolidation and rating issues





HOW TO FINANCE RENEWABLE ENERGY?



HOW TO FINANCE RENEWABLE ENERGY?

Typical Project Financing Structure for Conventional Power Project		
Sources	**% of Project Costs**	**Tenors**
Foreign Export Credits	40% total project costs, and/or 85 % equipment costs	12 years, 3 years grace, slightly concessionary rates
Multilateral Agencies	10-15% credits & loan guarantees	12-15 years
Commercial Bank Debt	10% loans, 5-15 member bank syndicate	5-12 years
Multilateral Co-Financing Facilities	10% loans, umbrella for commercial banks reduces risk; participation limits may require co-financing	12-15 years
Local Bank Debt	10% loans in local currency for working capital	5-8 years, 2 years grace, usually higher interest rates
Private Placements	10% loans, beyond what may be available for commercial banks	5-12 years

OFFSHORE WIND ENERGY FINANCING STRUCTURES

Corporate Financing: Corporate lines depending on a Producer or Contractor Balance sheet

Project Financing: Traditional project financing structures customized for offshore wind

Investor Equity: Institutional and Financial Investor or Infrastructure Fund based structures

Project Bond: Bond structures for offshore wind financings

WHAT IS PROJECT FINANCE?

Project finance is an industrial/infrastructural project financed **off-balance sheet** in a *Special Purpose Vehicle* (SPV) within a network of contractual agreements with key counterparts (contractors, purchasers, suppliers, operator agents, etc.)

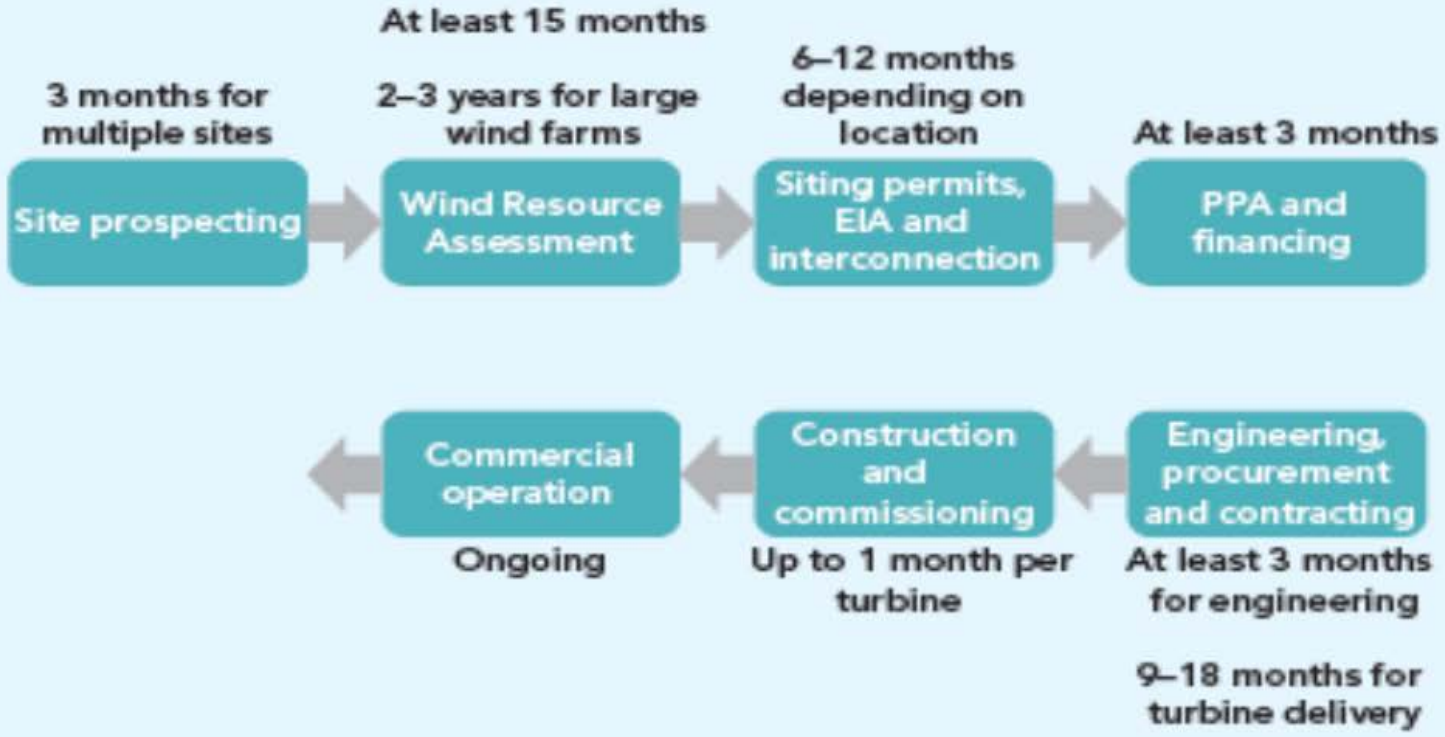
- The **borrower of funds** is a project company set up on an ad hoc basis that is financially and legally independent from the sponsors (separate incorporation) (the SPV).
- All **economic consequences** generated by the initiative are attributed to the SPV that is designated to secure cash receipts and payments (lenders finance a venture, not an operating firm).
- The assets of the SPV are the only collateral available to lenders together with the cash flow from the initiative (no-recourse financing).
- Approval of the financing is a function of the project's ability to generate cash flow, to repay the debt contracted, and also pay capital invested at a rate consistent with the degree of risk inherent to the venture concerned.

WHAT IS PROJECT FINANCE?

- SPV Based Financing
- Long Term Financing
- Completion & Operation Period Structures
- Risk Mitigation Through Due Diligence
- Contractual Arrangements for Project
- Repayment Based on Project Cash Flow
- Security is Based on Project Assets

TYPICAL PROJECT FINANCE TIME-LINE IN WIND ENERGY

A typical project development timetable for wind projects, shown below, illustrates the length of the development process. Even at the soonest, this would take 2 to 3 years to reach financial close; site identification and resource assessment in particular take time. Substantial preinvestment financing is needed to cover the costs up to the point where revenues are generated, and to allow for the risk of delays.

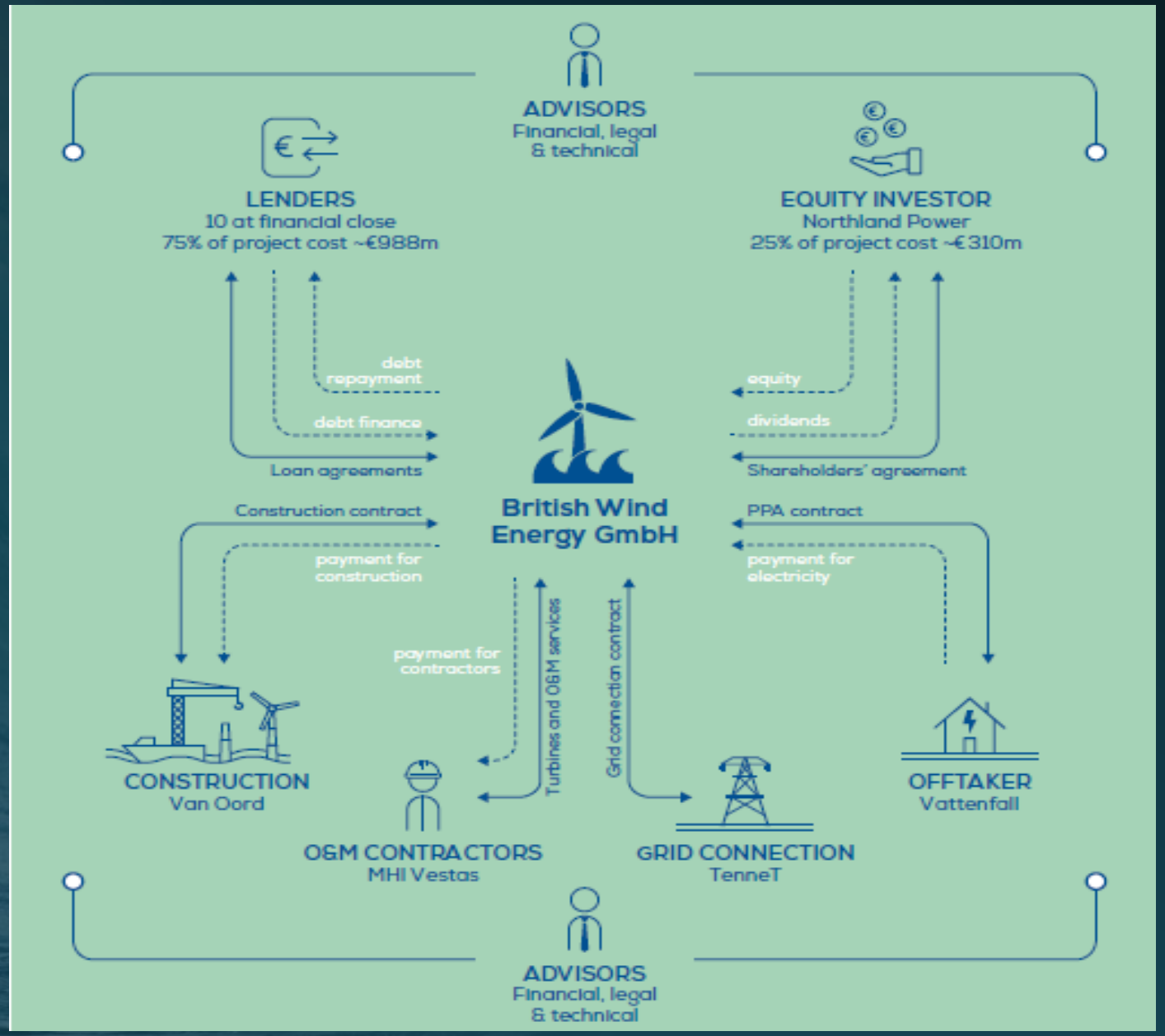


Source: Bankable Wind Resource Assessment, Tetra Tech (2011). RET

KEY VARIABLES THAT IMPACT FINANCIAL VIABILITY

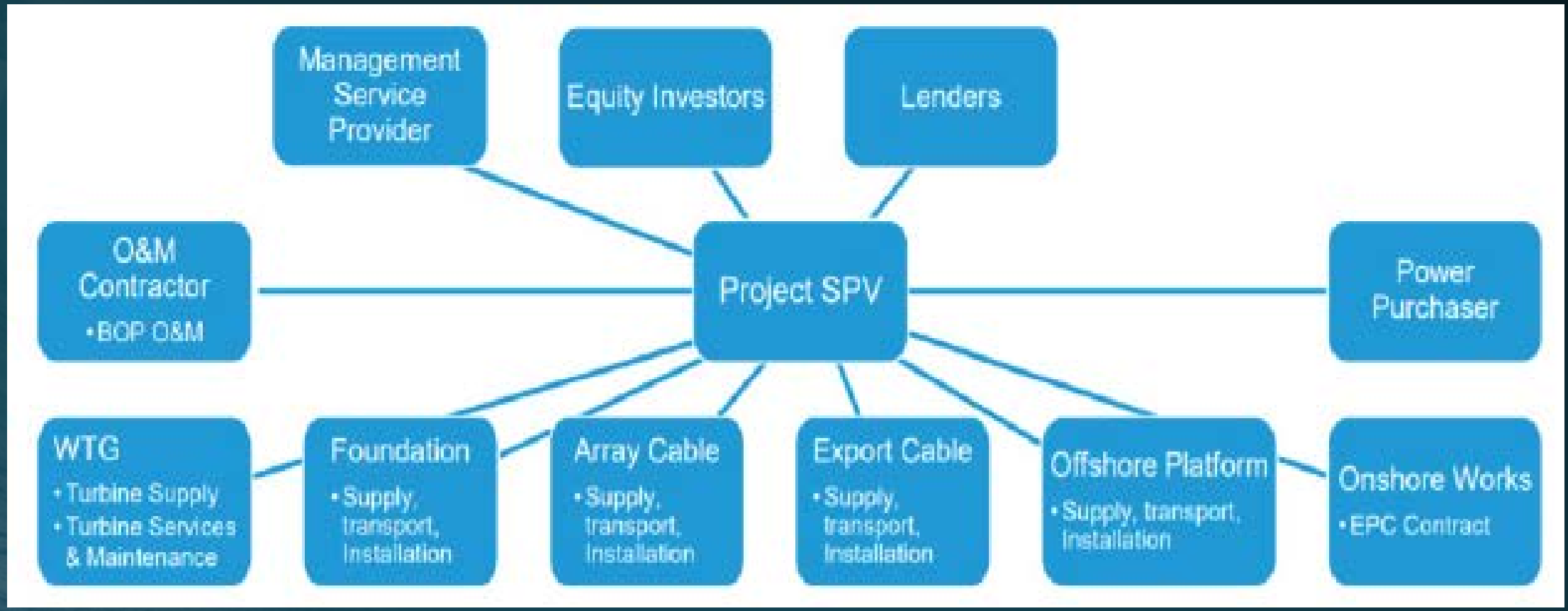
- ✓ Quality of the wind
- ✓ Price and availability of the turbines
- ✓ Installation costs
- ✓ Availability of incentives and other forms of support
- ✓ Distance the power needs to be transported
- ✓ Selling price of the power
- ✓ Cost of financing

TYPICAL PF STRUCTURE IN OFFSHORE WIND

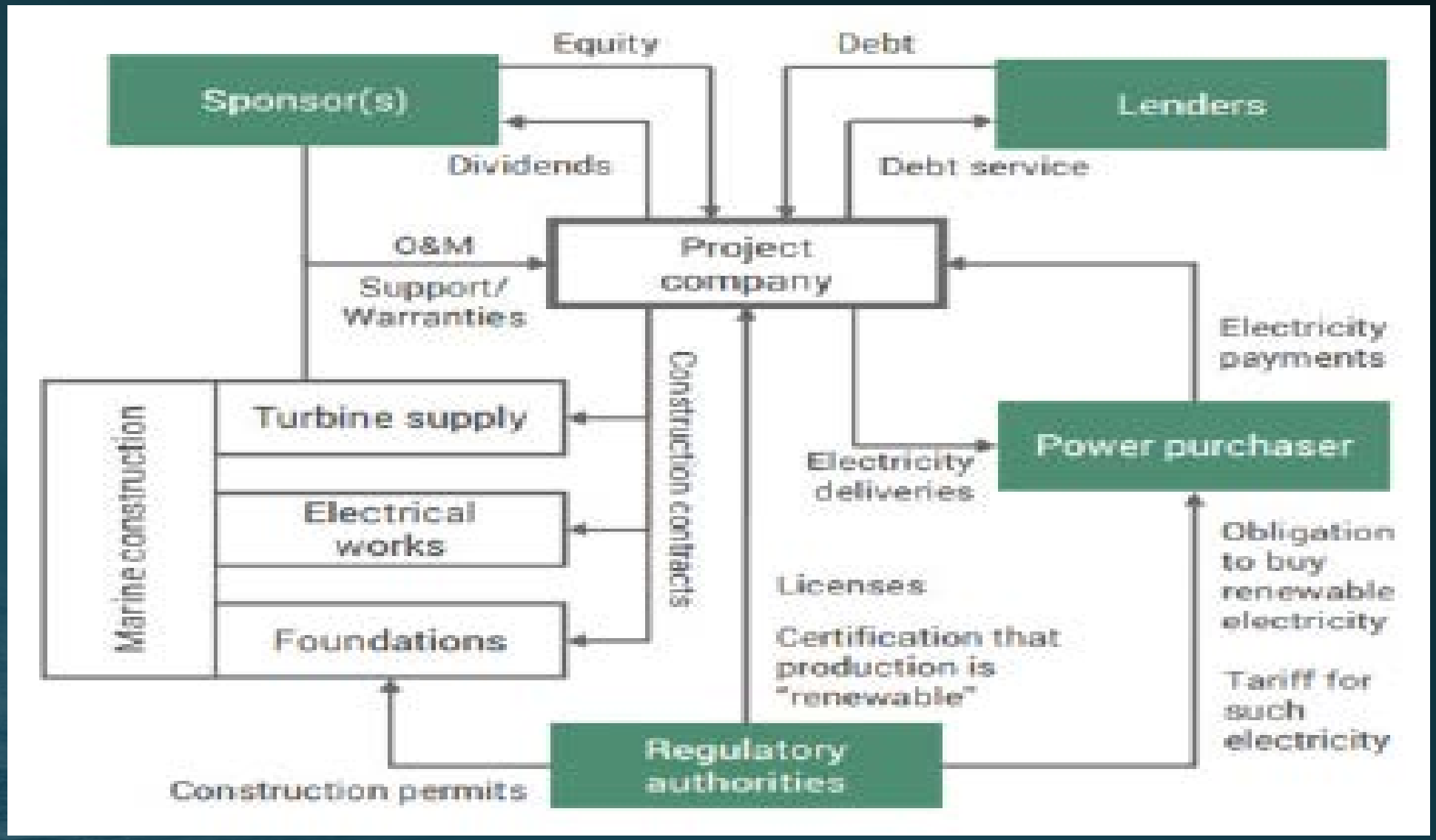


Offshore wind projects reach commissioning 2-3 years after final investment decision.

TYPICAL PROJECT FINANCE STRUCTURE IN OFFSHORE WIND



TYPICAL PROJECT FINANCE STRUCTURE IN OFFSHORE WIND



TYPICAL PROJECT RISKS IN OFFSHORE WIND

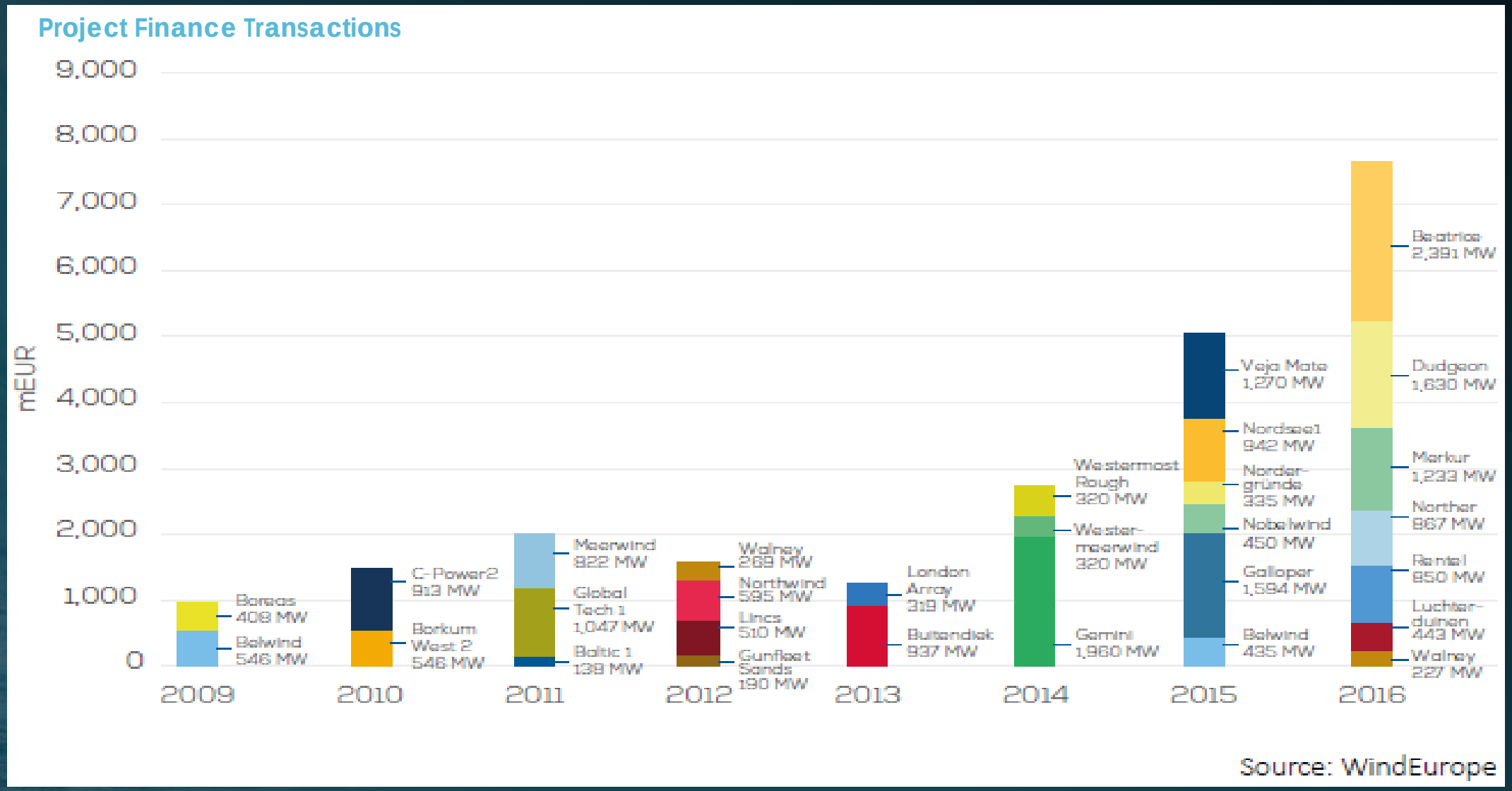
Risk	Subcategory
1. Strategic / business risks	Financing risks / insufficient expertise / insufficient public acceptance / complex approval processes / insufficient management know-how
2. Transport / construction / completion	Revenue loss due to start-up delay / damage or theft during transport or construction
3. Operation / maintenance	a) General operation and maintenance risks / damages / technological and innovation risk
	b) Revenue loss due to business interruption
	c) Damage due to natural hazards (severe weather)
	d) Damage due to serial losses
4. Liability / legal risk	Liabilities to third parties / law costs / contracting risk
5. Market / sales risks	a) Variability of revenue due to weather / resource risk
	b) Variability of revenue due to grid availability / curtailment risk
	c) Variability of revenue due to price volatility
6. Counterparty risk	a) Supplier of O&M services
	b) Counterparty risk Power Purchase Agreement (PPA)
7. Political / Policy / regulatory risks	Policy support / Feed-in-Tariff (FiT) changes; uncertainty regarding regulation (e.g., Solvency II and Basel III)

TYPICAL PROJECT RISK MITIGATION IN OFFSHORE WIND

Risk area	Mitigation approach
General approach	· Meticulous planning of the process from project to individual level; · Carry out a number of walkthrough tests with all parties involved to assess how the process will be operate in practice and identify risks as early as possible; · Seeking "lessons learnt" and other meaningful industry data in order to better understand the risks; · Set up contingency plans for a variety of likely "what if" scenarios.
Weather risk	· Systematic weather monitoring and advanced prediction techniques; · Better site investigation techniques; · Use of new build vessels that are better equipped to cope with adverse weather conditions.
Technology and components	· Use of evolutionary technology thoroughly tested on demonstration sites; · Certification and standardisation; · Guarantees and warranties backed by parent company balance sheet; · Contractual obligations such as defect liability above market level, especially if the technology is more revolutionary.
Counter party and interface risk	· Use of expert interface teams to monitor the transition and the passing of associated risks from phase to phase; · Selection of reputable contractors; · Strong contractual provisions e.g. liquidated damages for delays.
Installation and logistics	· Use of contractors with local construction experience, therefore good knowledge of local conditions; · Availability of sufficient capex contingency for unforeseen issues.
Grid connection and availability	· Clear responsibilities allocated for grid development; · Project sponsor manages and works directly with offshore transmission contractor.

Source: Offshore wind survey 2013

EUROPEAN PROJECT FINANCE STRUCTURE DEVELOPMENT FOR OFFSHORE WIND



Source: WindEurope

EUROPEAN PROJECT FINANCE STRUCTURE DEVELOPMENT FOR OFFSHORE WIND

Typical project finance conditions - offshore	Leverage	Maturity post-completion	Pricing	Maximum underwriting
2006-2007	60:40	10-15 years	150-200 bps	EUR 50-100 M
2009-2011	65:35	10-15 years	300 bps	EUR 30-50 M
2012-2013	70:30	10-15 years	300-375 bps	EUR 50-75 M
2014-2015	70:30	10-15 years	200-250 bps	EUR 100-200 M
2016-2017	75:25	15-17 years	150-225 bps	EUR 100-150 M

Debt is currently extremely cheap

- Margins rose after the crisis (reflecting higher bank cost of funding), but have been trending down since 2014
- With low underlying rates, the overall cost of >15-year debt is now around 3%

Structures (ratios, maturity, covenants) have actually been quite stable since 2007

- Debt terms fundamentally driven by regulatory framework (duration, merchant risk, public financing opportunities)
- Commercial fights are rarely about debt sizing or pricing
- General improvement in commercial terms over the past two years

EUROPEAN PROJECT FINANCE LENDERS FOR OFFSHORE WIND

- Commercial Banks
- Export Credit Agencies (ECA)
- Regional Development Banks
- Government Funding Sources
- Institutional Investors

From 2015 and onwards the consortiums are mainly formed by commercial banks

EUROPEAN PROJECT FINANCE LENDERS FOR OFFSHORE WIND

Mix of 50 lenders were active in 2018,

Substantial increase to those present in 2017,

including multilateral financial institutions, insurance companies, export credit agencies, and commercial banks.

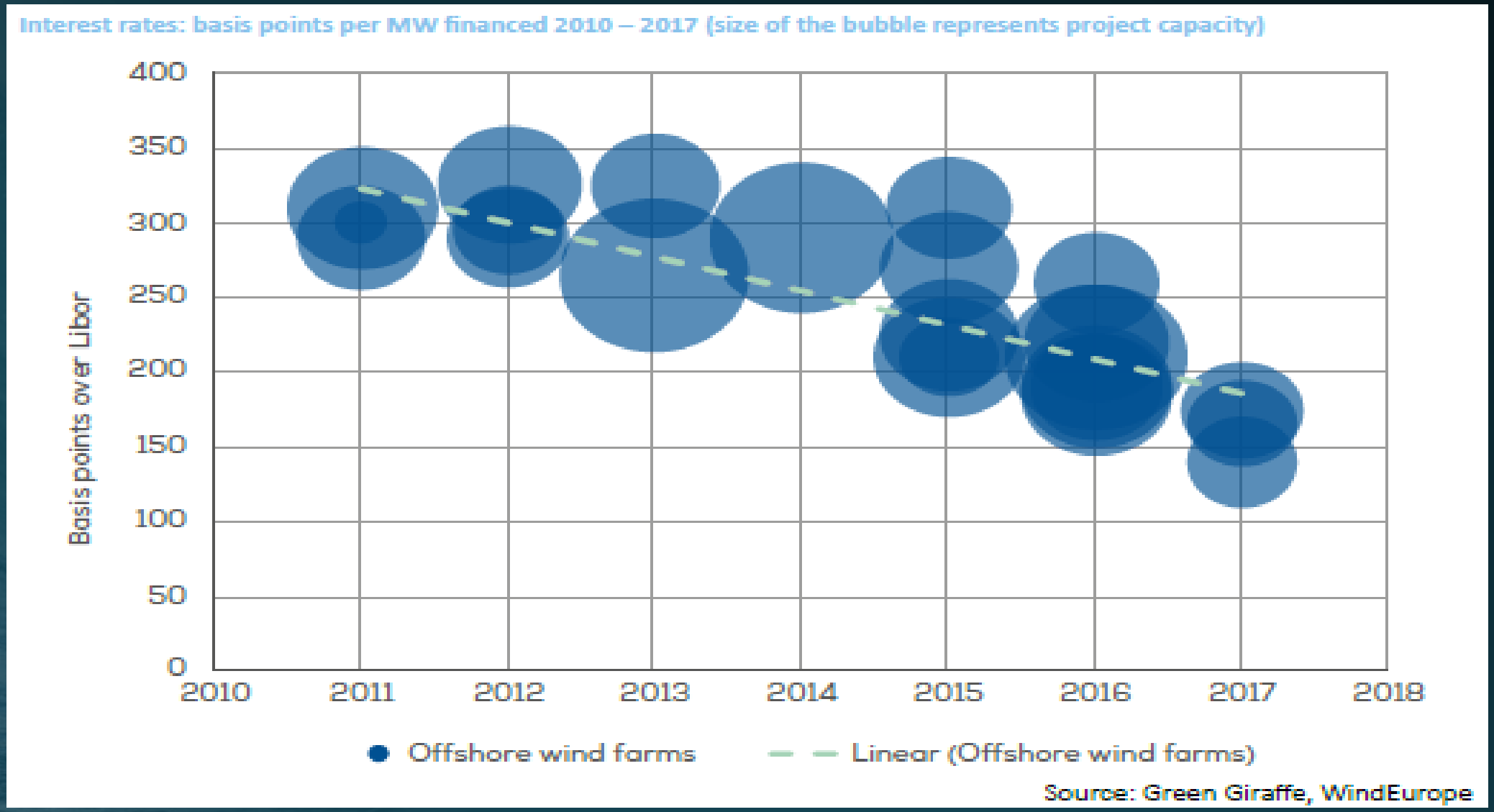
As confidence continues to increase further in the European offshore wind sector, Japanese banks continue to strengthen their presence in the market.

EUROPEAN PROJECT FINANCE LENDERS FOR OFFSHORE WIND

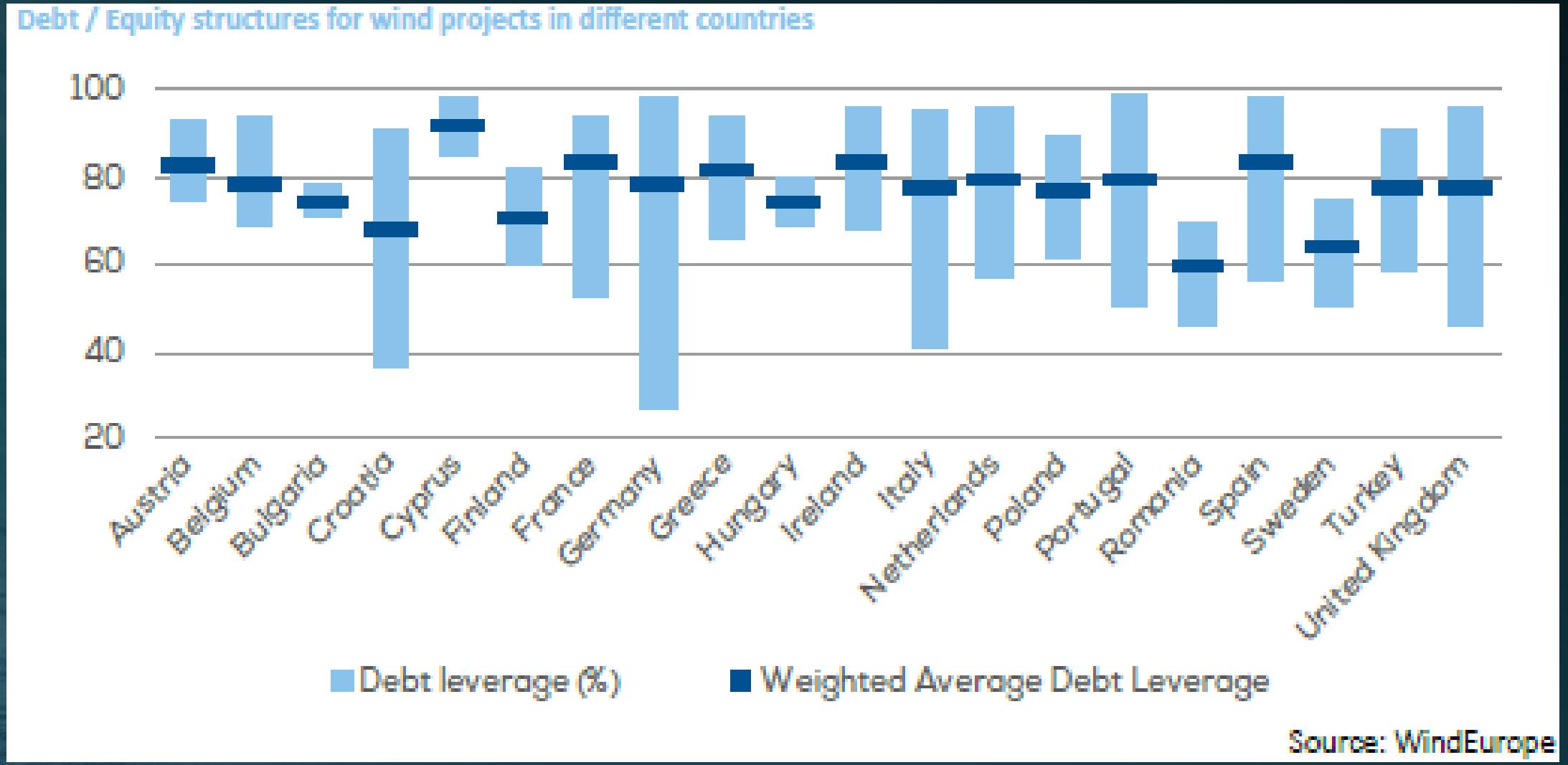
Bank	Home market	Stage of lending	Example projects with location
National Australia Bank	Australia	Operation	Lynn and Inner Dowsing
Belfius (formerly Dexia)	Belgium	Construction stage	Northwind, Thornton Bank (Phases 2 & 3)
BNP Paribas	France	Construction, Operation	Lincs, Northwind, Lynn and Inner Dowsing
Crédit Agricole CIB	France	Operation	Lynn and Inner Dowsing
Natixis	France	Construction	Global Tech
Société Générae S.A.	France	Construction	Global Tech, Thornton Bank Phases 2&3
LBBW	Germany	Construction	Baltic 1
BayernLB	Germany	Construction	Butendiek
Bremer Landesbank	Germany	Construction	Butendiek
Commerzbank	Germany	Construction	Meerwind
Deutsche Bank	Germany	Construction	Borkum West II
HeLaBa	Germany	Construction	Butendiek
HSH Nordbank	Germany	Construction	Butendiek
Nord/LB	Germany	Construction	Global Tech
SEB	Germany	Construction	Butendiek, Global Tech, Borkum West II
Siemens Financial Services	Germany	Construction	Butendiek, Walney, Meerwind
Bank of Ireland	Ireland	Operation	Lynn and Inner Dowsing wind farms
Unicredit Bank	Italy	Construction	Butendiek
Bank of Tokyo-Mitsubishi UFJ	Japan	Construction	Lincs, Meerwind
Mizuho Corporate Bank	Japan	Operation	Gunfleet Sands
Sumitomo Mitsui Banking Group	Japan	Operation	Gunfleet Sands
ASN Bank	Netherlands	Construction	Bligh Bank Phase I, Northwind
ING Bank N.V.	Netherlands	Construction	Northwind, Butendiek
NIBC Bank N.V.	Netherlands	Construction, Operation	Baltic 1, Global Tech, Borkum West II, Lynn and Inner Dowsing
DNB Bank	Norway	Construction	Lincs
Banco de Sabadell SA	Spain	Construction	Global Tech
Banco Santander	Spain	Construction and Operation	Walney, Lincs
BBVA	Spain	Operation	Lynn and Inner Dowsing
HSBC	UK	Construction	Lincs
Lloyds TSB	UK	Construction, Operation	Lynn and Inner Dowsing, Walney, Lincs, Meerwind

Source: Clean Energy pipeline VB, Infrastructure Journal

EUROPEAN PROJECT FINANCE PRICING DEVELOPMENT FOR OFFSHORE WIND



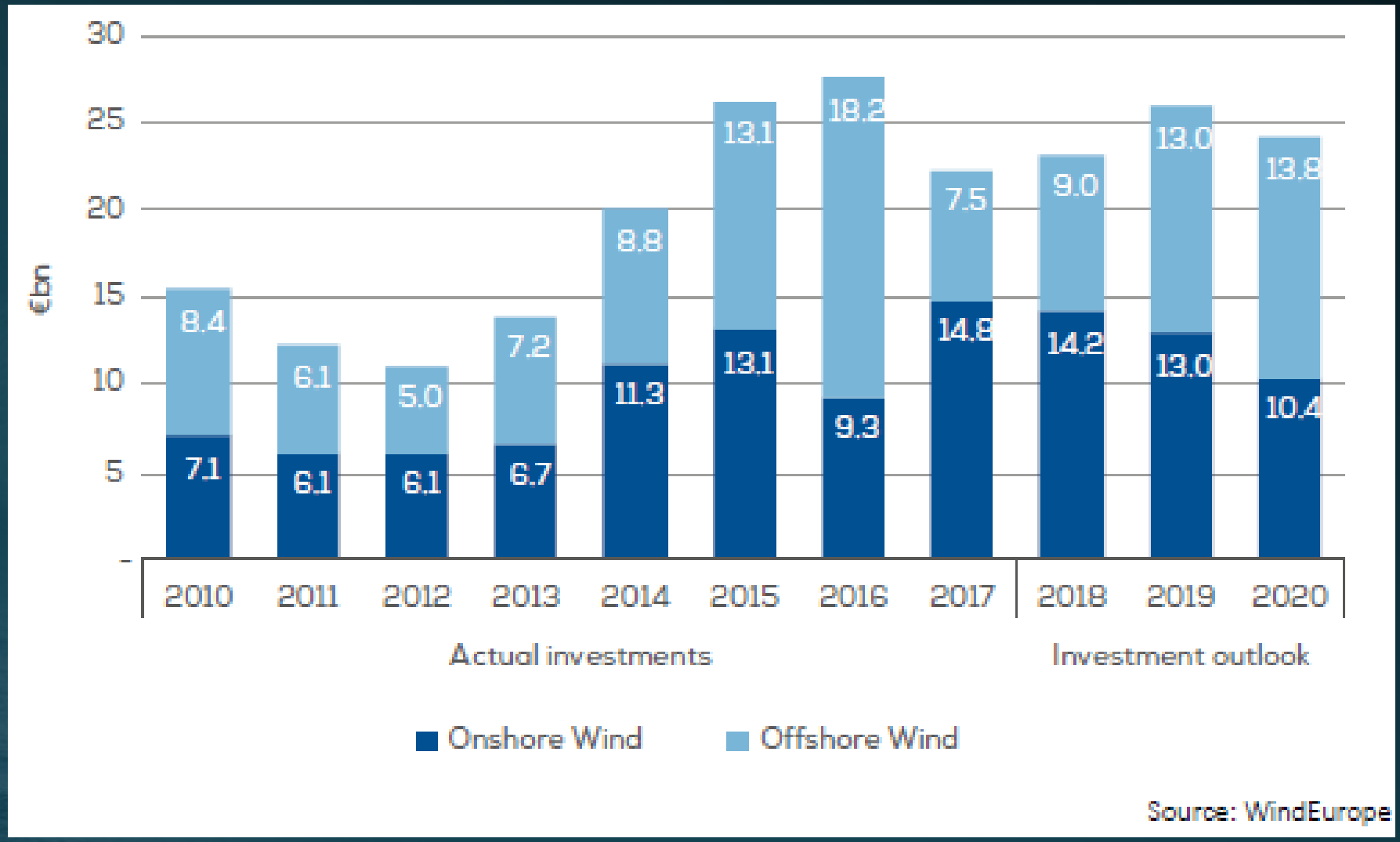
EUROPEAN PROJECT DEBT LEVERAGE DEVELOPMENT FOR WIND



WORKABLE PROJECT FINANCE STRUCTURE FOR THE TURKISH MARKET

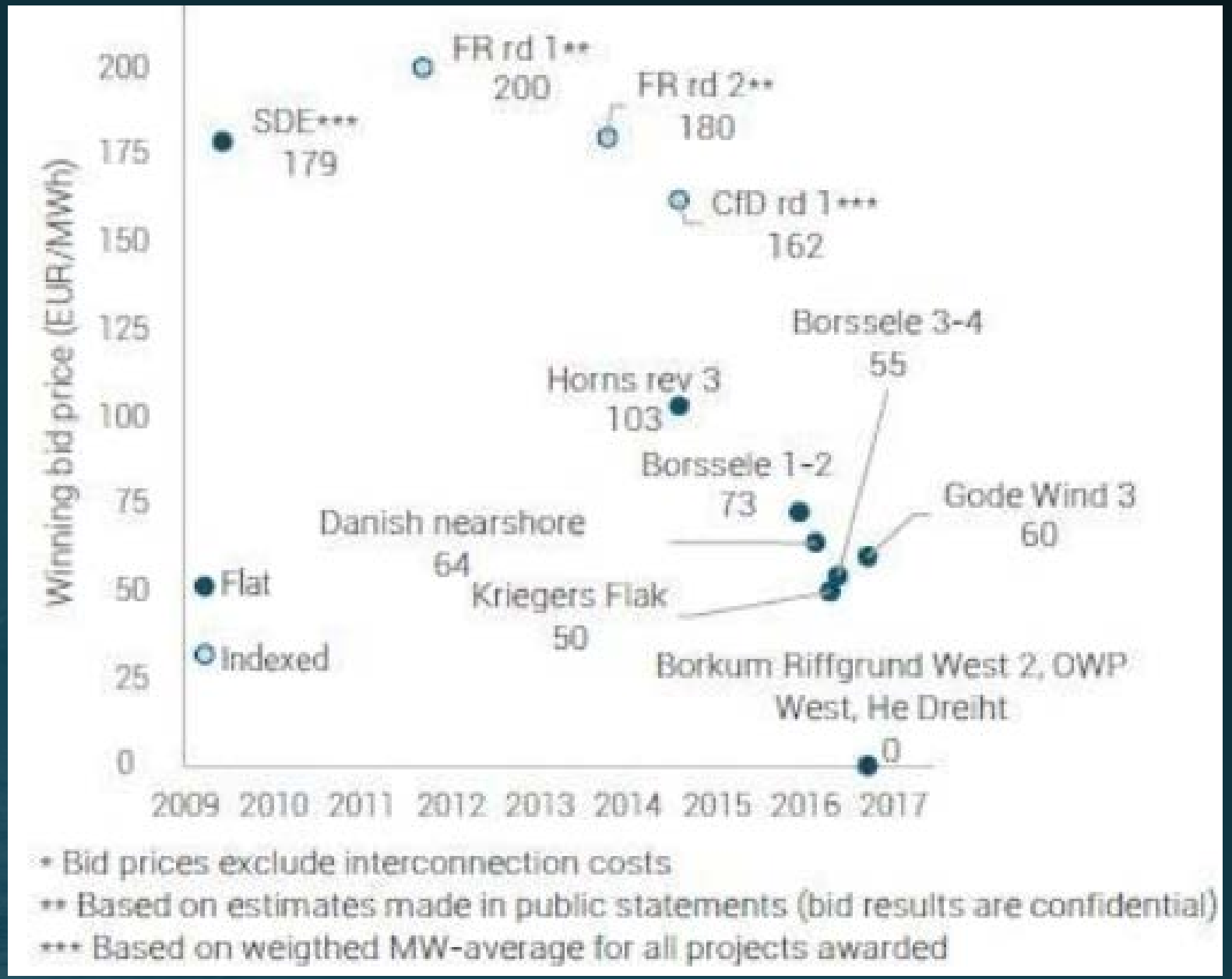
- Export Credit Agencies (ECA) & Regional Development Banks & Turkish Commercial Bank Consortium
- Debt/Equity - %65/35 - %70/30
- 15 year term
- P75 / 1.45
- Importance in due diligence

OUTLOOK:
OFFSHORE WIND INVESTMENT IN EUROPE

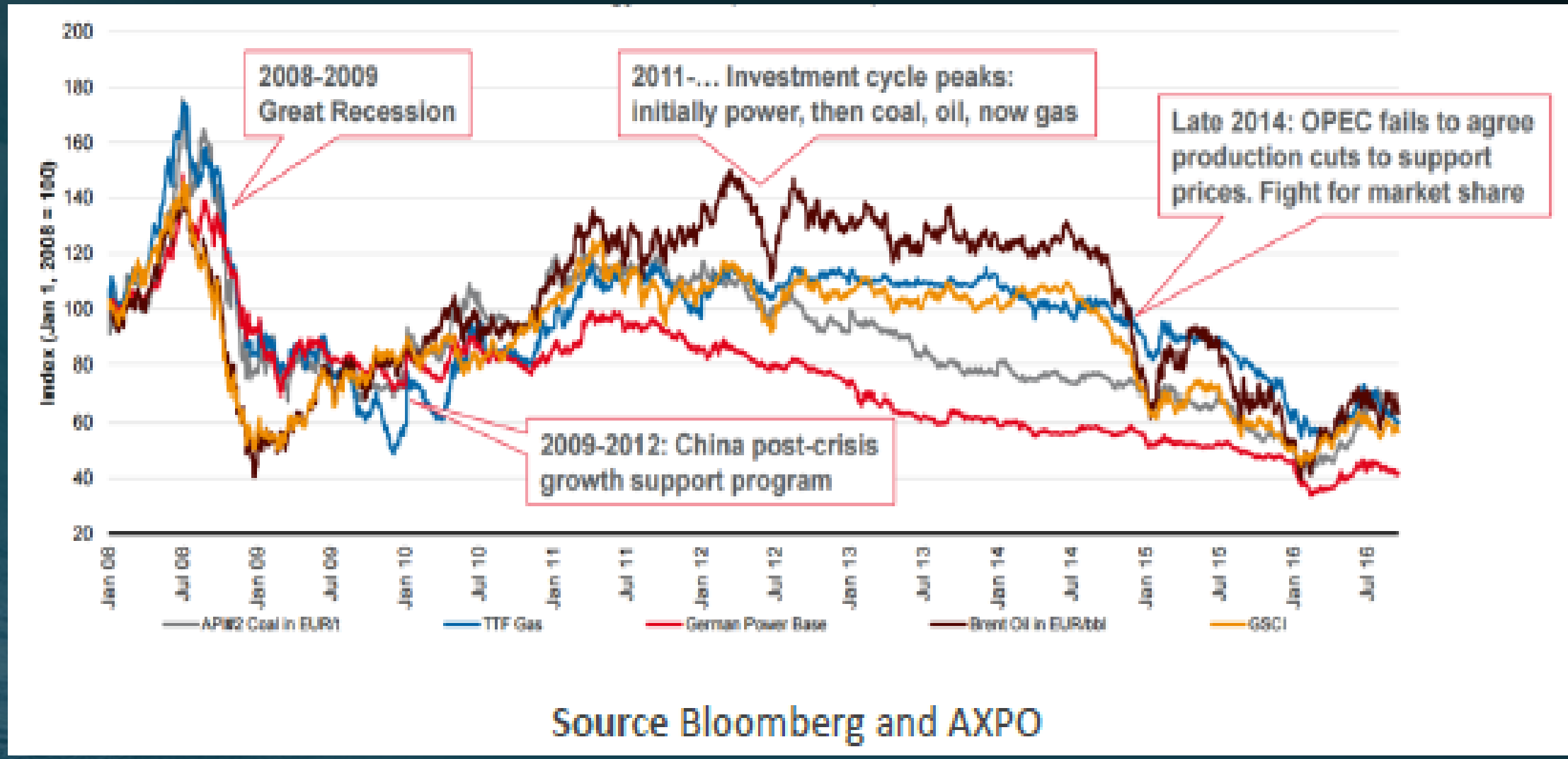


Source: WindEurope

OFFSHORE WIND TENDER RESULTS



FUTURE OF ENERGY PRICE?



Source Bloomberg and AXPO

FUTURE OF LCOE IN OFFSHORE INVESTMENTS?

£/MWh		2010 financial close	2015 financial close	2020 financial close	2025 financial close	2030 financial close
Offshore Wind	Low	149	123	95	87	81
	Medium	169	139	107	98	91
	High	191	158	121	111	104

Turkish market in competition with the European market in an era of decreasing costs in relation to volatile energy prices with downward trend

Thank you for your time & interest

Knowledge is like money:
to be of value it must circulate,
and in circulating it can increase
in quantity and, hopefully, in value.
Louis L'Amour