



Introduction to Renewable Energy Project Finance



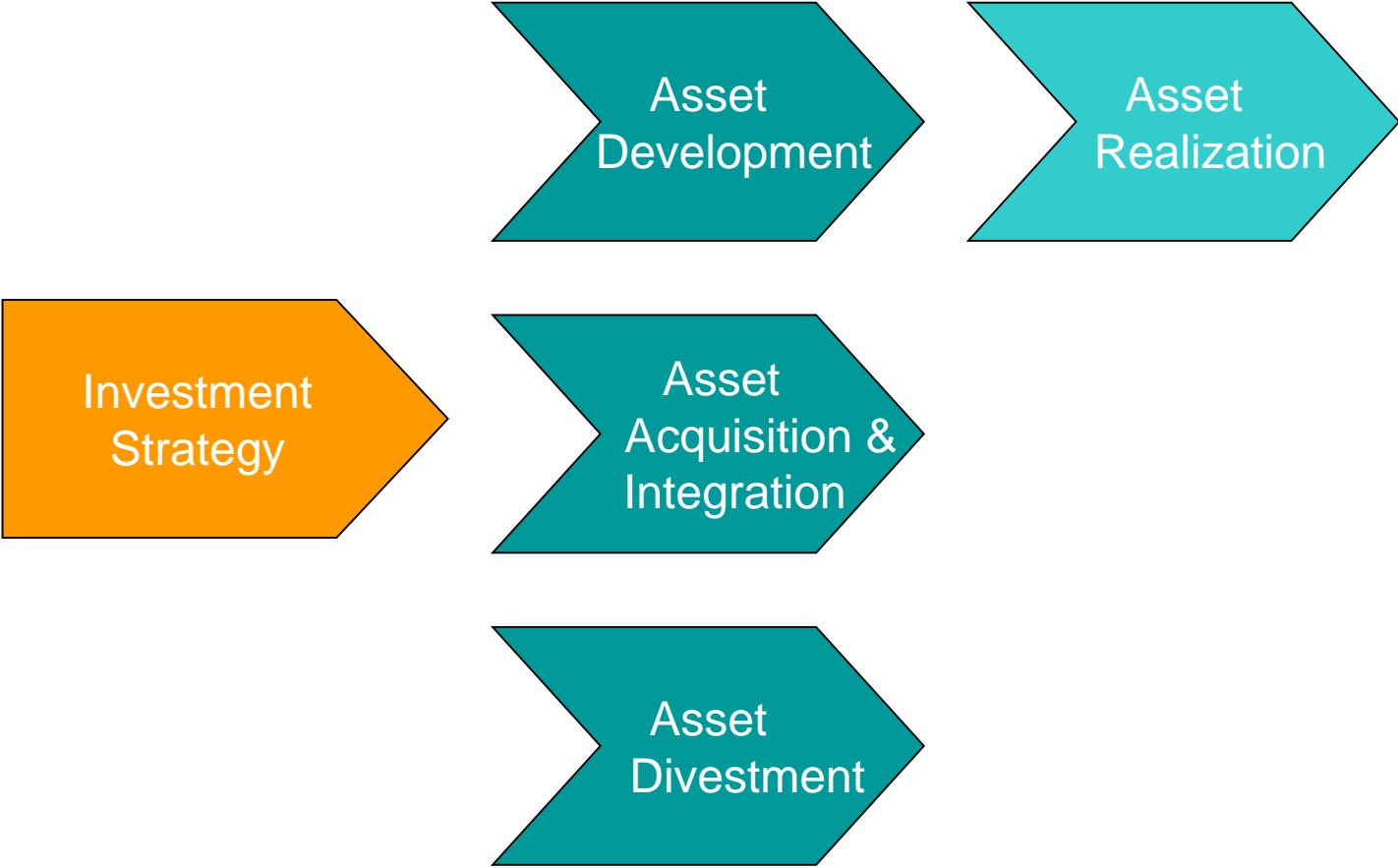
Introduction to Maas Capital

Investment fund owned by ABN AMRO

- Total team consists of +- 20 persons
- Investments in oil & gas services, shipping and renewables
- Renewables team focusses on onshore wind and solar projects throughout Europe



Energy Investment Management





Energy Investment Management

Leadership based on

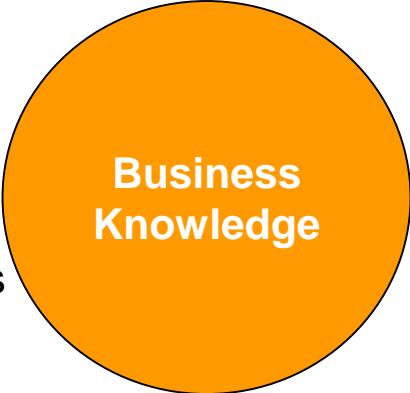
Business case valuation

Regulatory frameworks

Application processes

Best in class agreements

- SPA
- EPC
- O&M
- land (lease)
- grid connection

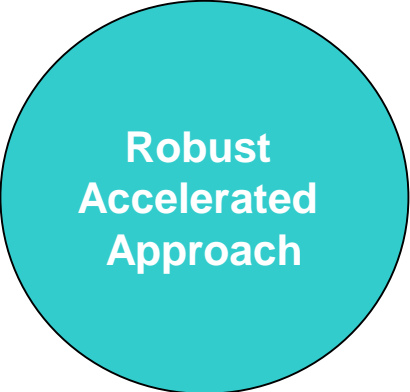


Equity investors

Debt providers

Pre-developers

(Sub) contractors



Effective structure

Approach based on phases with clear goals

Responsibilities and deliverables

Execution excellence

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 - 2. Introduction to financing energy projects**
 3. Wind and project financials
 4. Financial Wind Model
 5. Evaluation work session
-

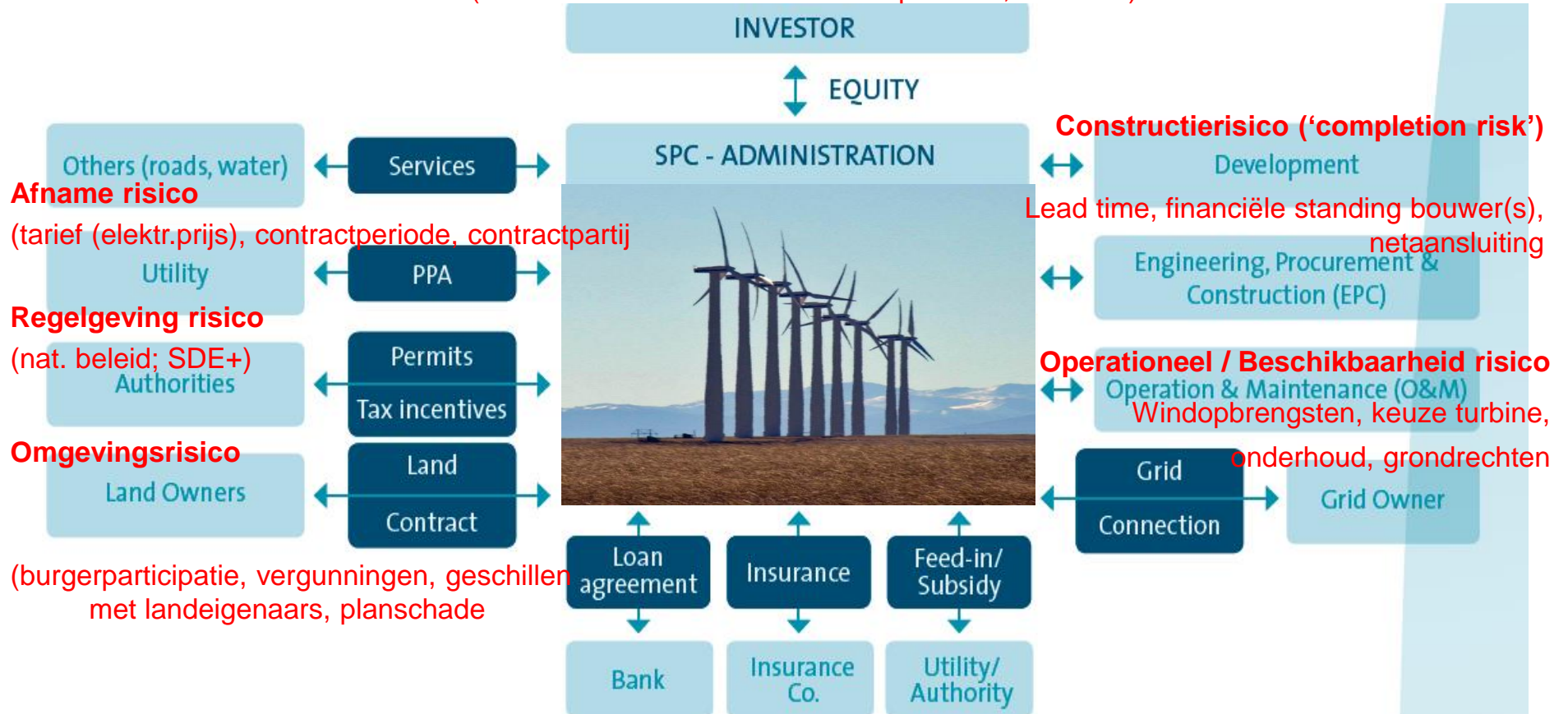
Examples of project financed assets



What is needed to prepare by the developer before arranging bank finance?

Structuurrisico entiteit ('juridische infra')

(Robuustheid van contracten met partners, fiscaliteit)



Financiële risico's

- Inflatie, rente, fiscaliteit
- Valutarisico: investering in valuta X vs. opbrengsten in valuta Y

Definitions in Project Finance

Recourse to Cash Flow

A financial structure where **lenders have recourse primarily to the revenue-stream** of the project or asset they are financing, rather than to the balance sheet of the sponsors

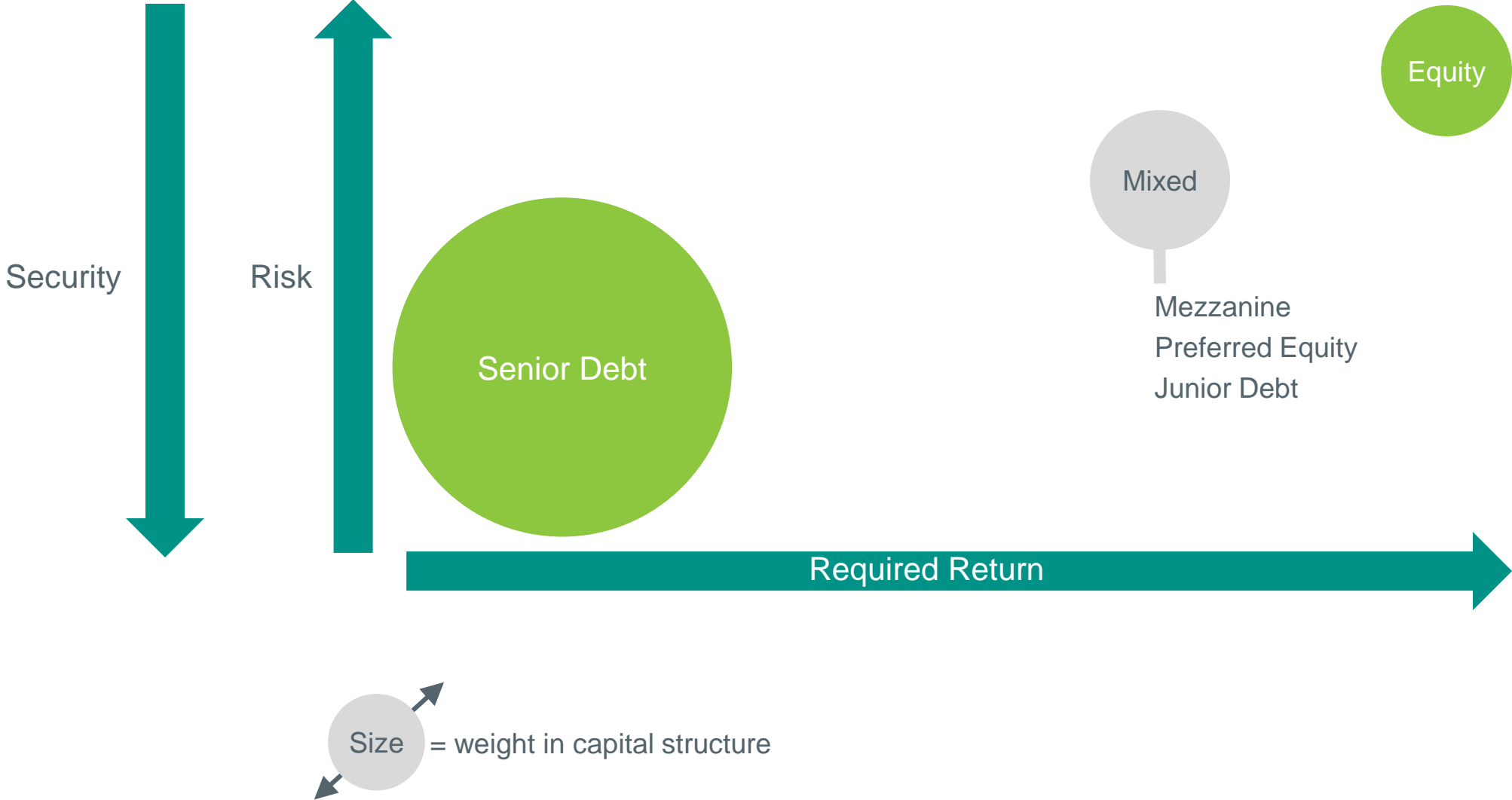


Emphasis is on forecasting

In Project Finance the focus of the bank will be **at forecasting cash flows** instead of looking at status quo



Capital layers in project finance structure



Different goals of a developer and financier?

Goals financiers



predictable long term cash flows
Low gearing and high cover ratio's
'financial strong' project
maximize security
complete understanding project risks

vs.

Goals sponsors & developers



vs. entrepreneurship
vs. High gearing and high IRR
vs. 'financial optimized' project
vs. minimize costs
vs. fast process and execution

Investors, banks and credit agencies



Different investors may target different positions at different stages in the capital structure of a renewable energy project dependent on their experience and risk appetite

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How to realize 6,000 MW in 2020?

3.000 MW large scale development projects: 100+ MW projects.

Structuurvisie & PlanMER Wind onshore

1.240 MW in existing RCR procedure

1.820 MW in preparation op RCR procedure

Havengebied Rotterdam

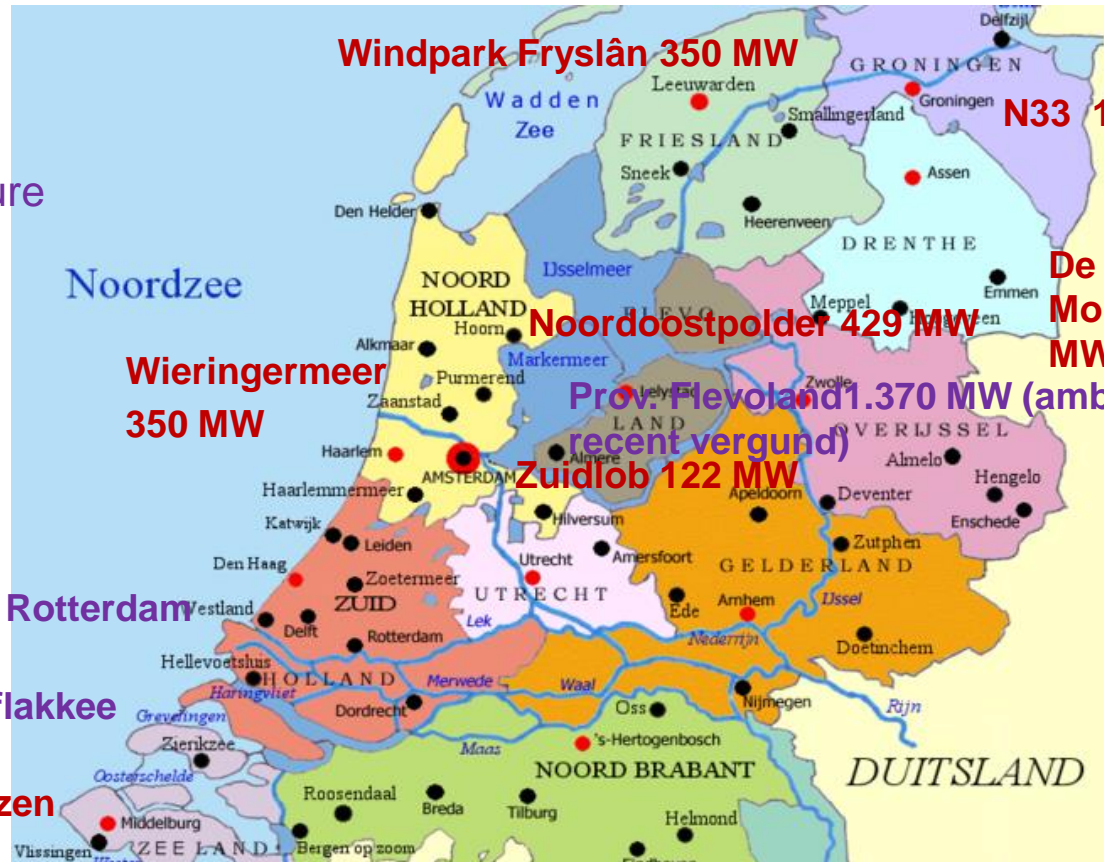
150 MW

Goeree-Overflakkee

260 MW

Krammersluizen

120 MW

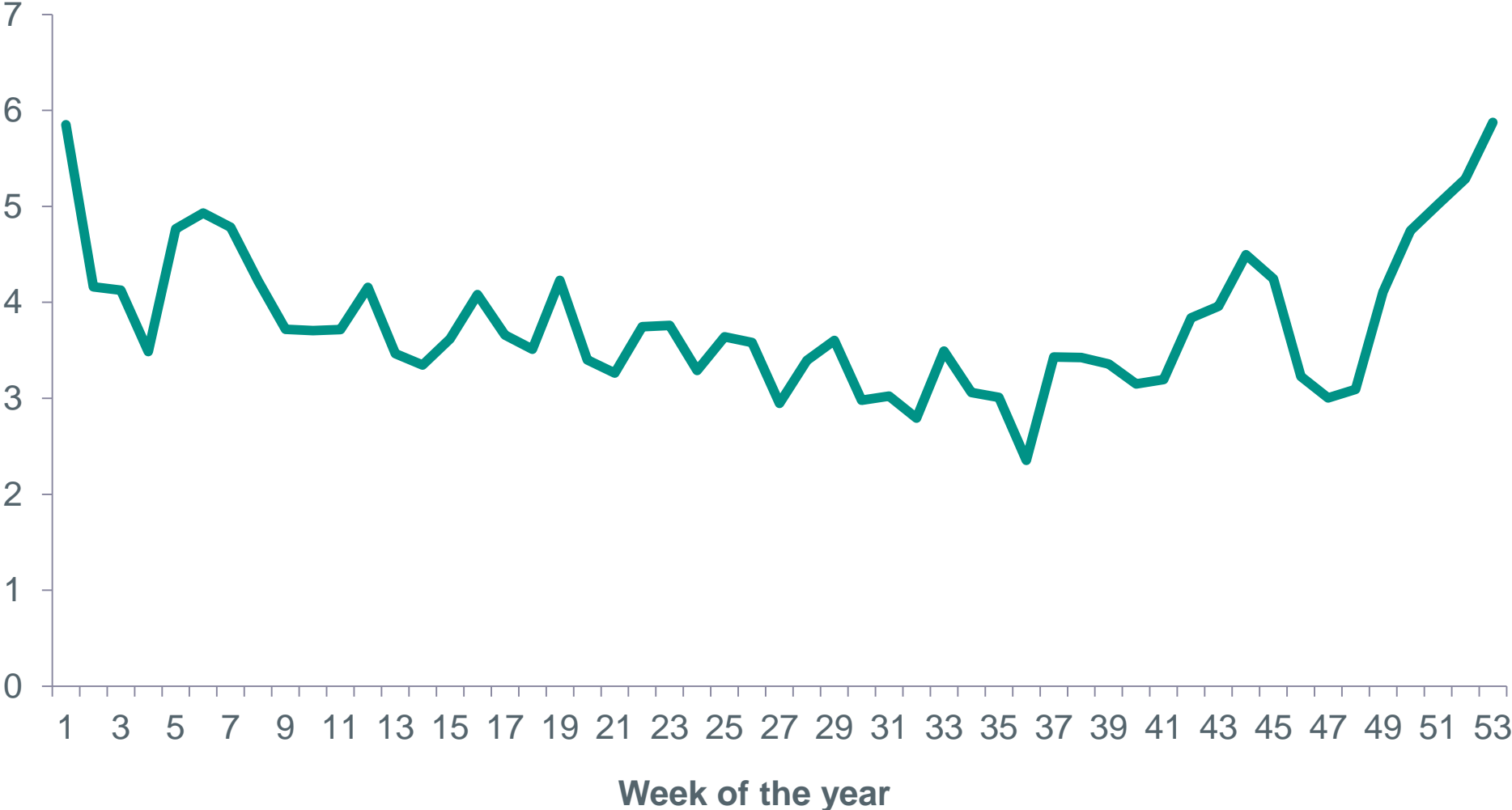


- **1.000 MW** still operational in 2020 of current installed capacity

→ **2.000 MW** “small scale” wind energy projects needed (< 100 MW) !?!

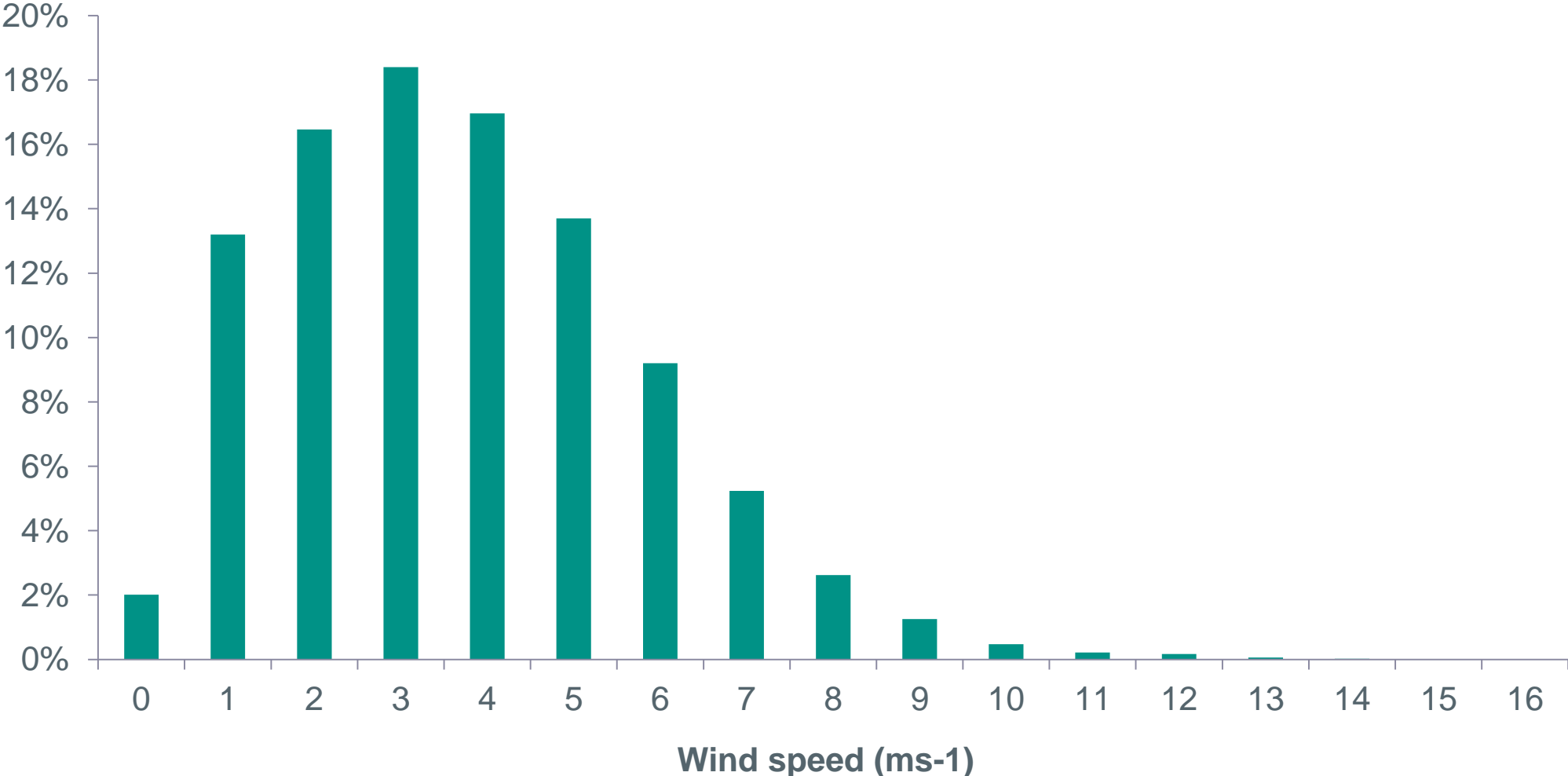
Average wind speed per weekday (KNMI, Heino)

Wind speed (ms-1)

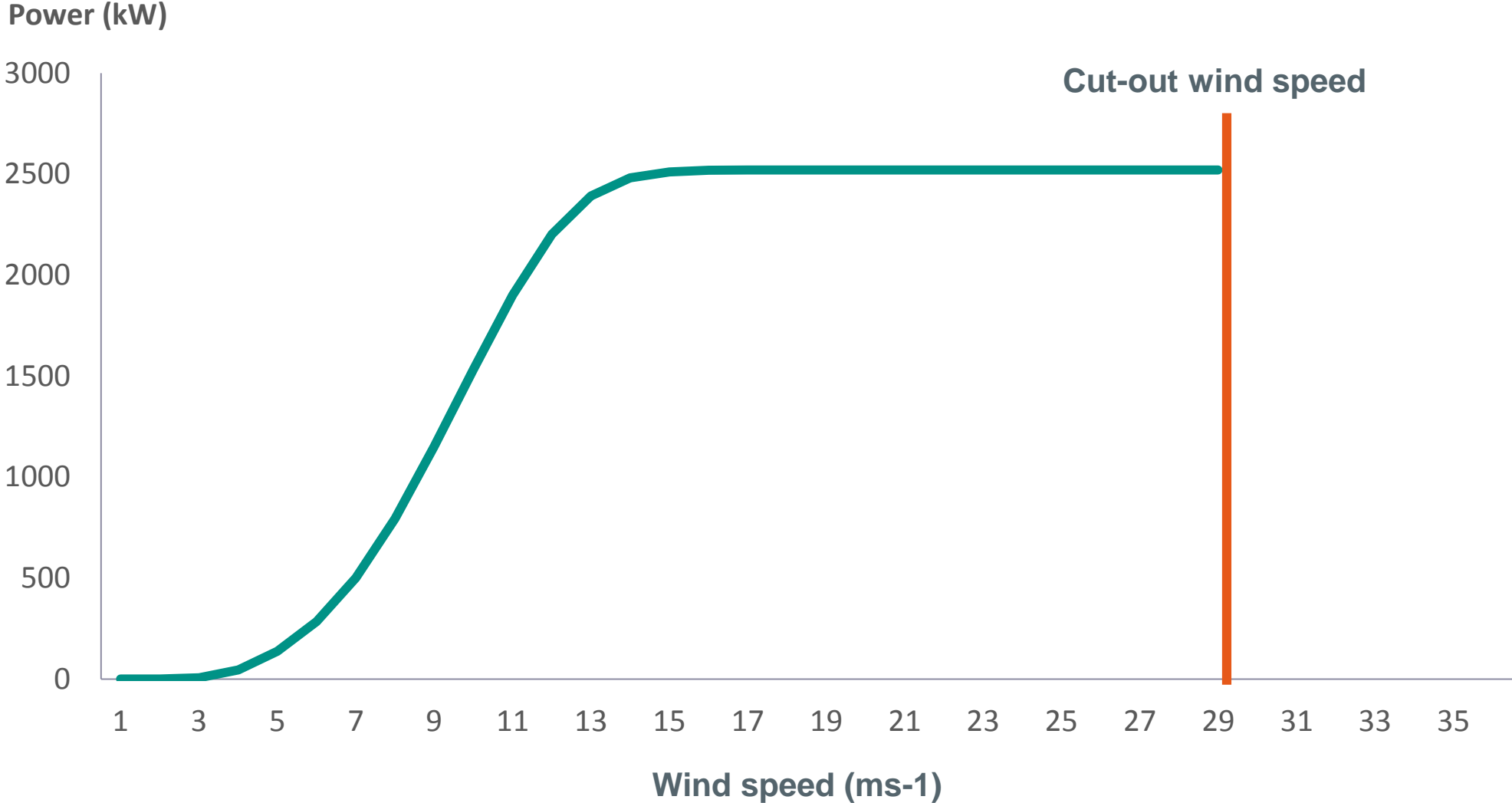


Historical wind distribution (KNMI, Heino)

Historic occurrence



Wind power curve for a turbine

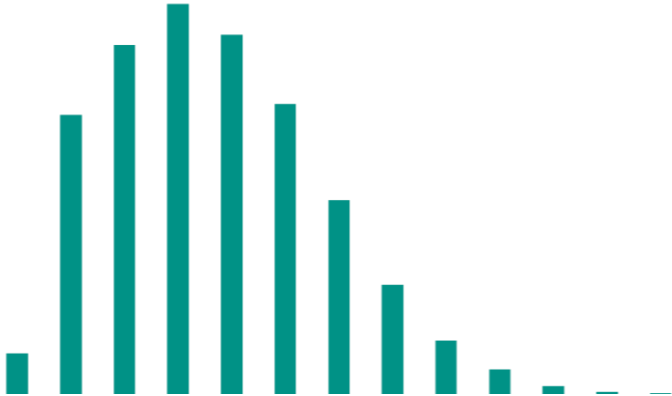


Estimation of expected annual energy yield

Energy yield =



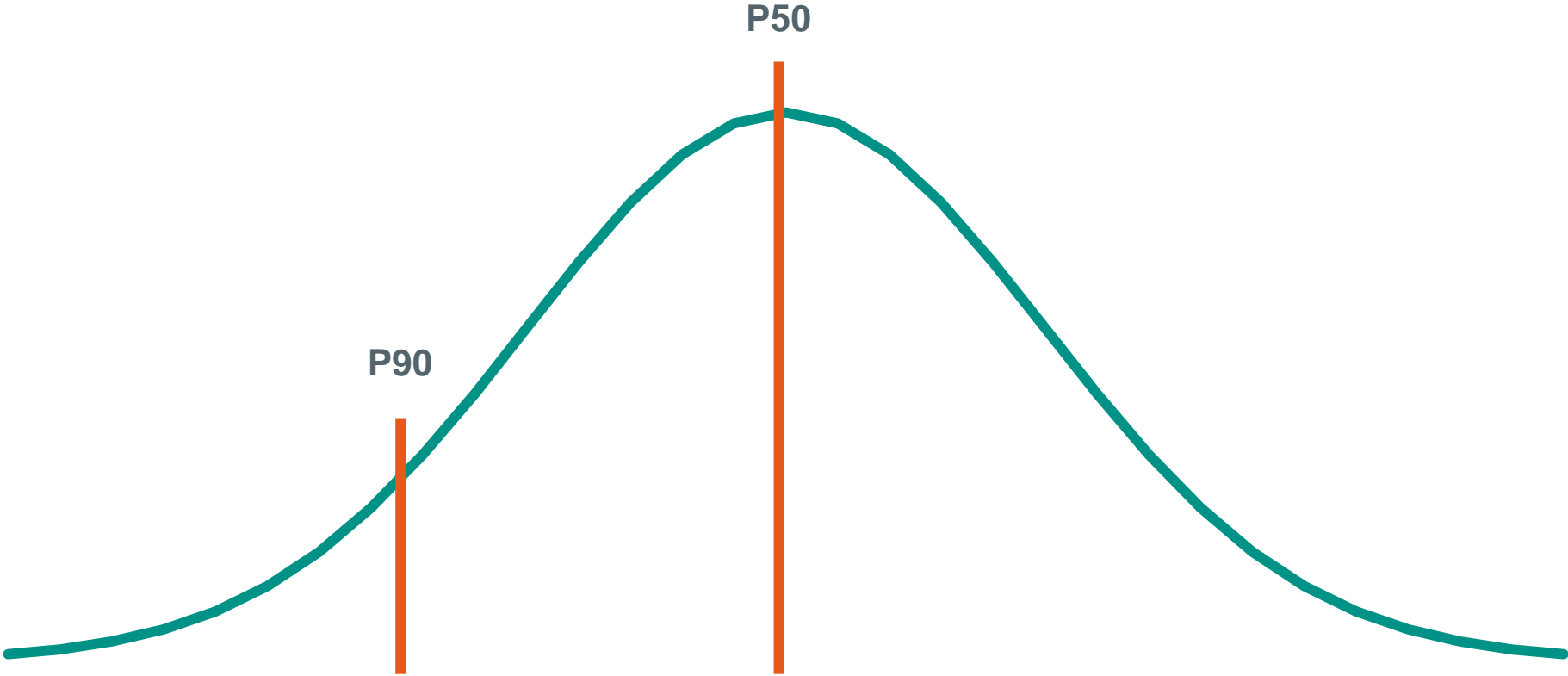
X



Dependent on wind turbine
Different safety margins per supplier

- Geographically specific
- Site specific
- Intrawindpark effects
- Reliability of measurements

Power production probability distribution

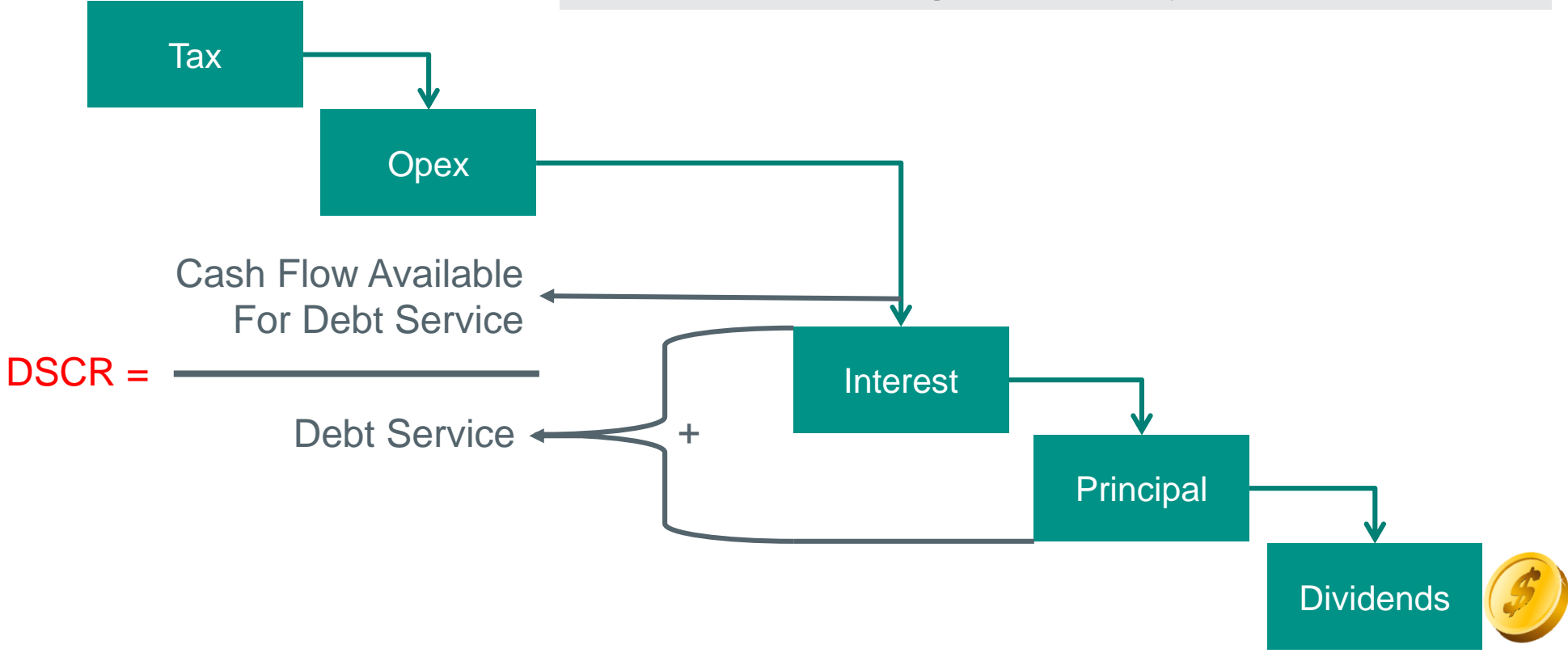


Debt financier's models might size the debt based on a P90 production estimate for instance at a 1.30 **Debt Service Cover Ratio**

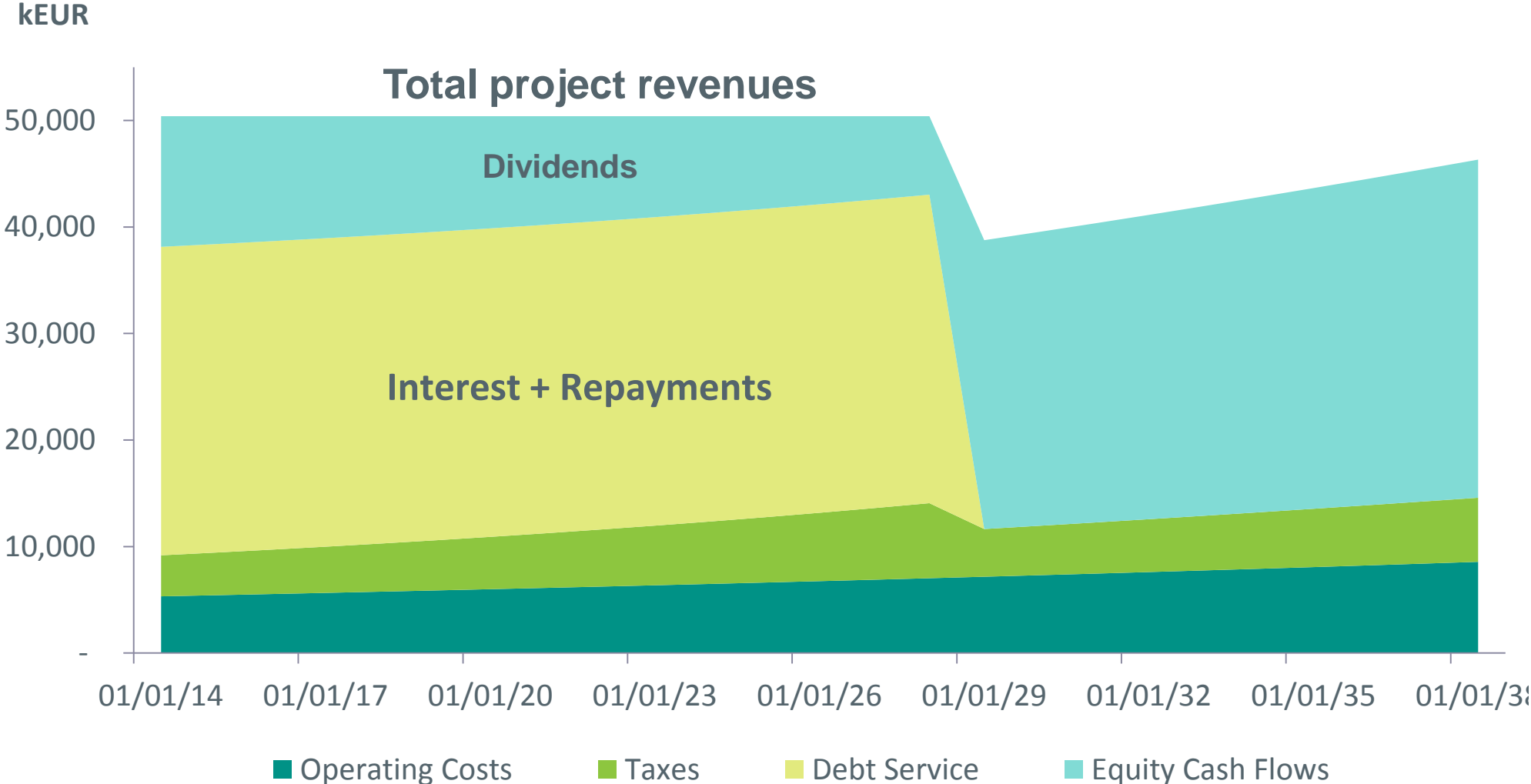
Cash Flow Waterfall and DSCR calculation



Debt Service Cover Ratio is an important ratio used by banks for determining debt capacity of a project



Illustrative cash flow overview of a wind project



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Case Study Wind Farm

Introduction:

Energyco.. intends to invest in a new 90 MW onshore wind farm. To optimize the capital structure Energyco. wants attract a project finance facility at ABN AMRO

Your role:

The coming 45 minutes you will (in teams of 5) fulfill the role of the investment analyst at Energyco. and analyse the debt capacity of the project and the impact on the returns

Questions

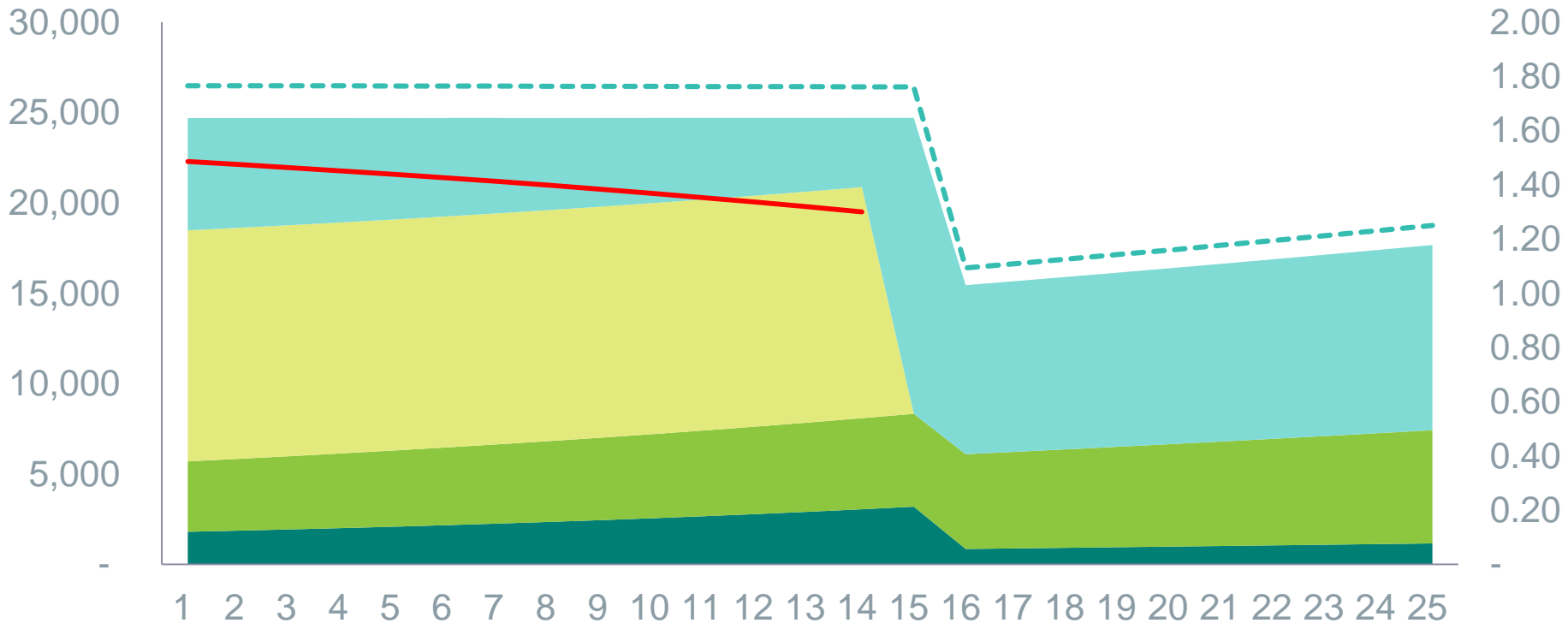
- What is the projects debt capacity based on p90 and 1.30 dscr?
- What would be the debt capacity if p50 was used instead of p90 at the same dscr?
- What is the difference in Equity return for Energyco. if dscr of 1.20x was used instead of 1.30x dscr (using p90 wind resource)

Assumptions on wind project of 90 MW

Revenues:

- Different wind resource probabilities have been provided
- SDE+ subsidy granted
 - Project receives grey power price + subsidy
 - Subsidy increases revenue per MWh to EUR 80 per MWh
 - Subsidy cannot exceed EUR 50 per MWh
- Operating costs are corrected for inflation
- Other assumptions find in the model (blue cells)
- In case of questions, ask the financial advisors...

Project financials: base case

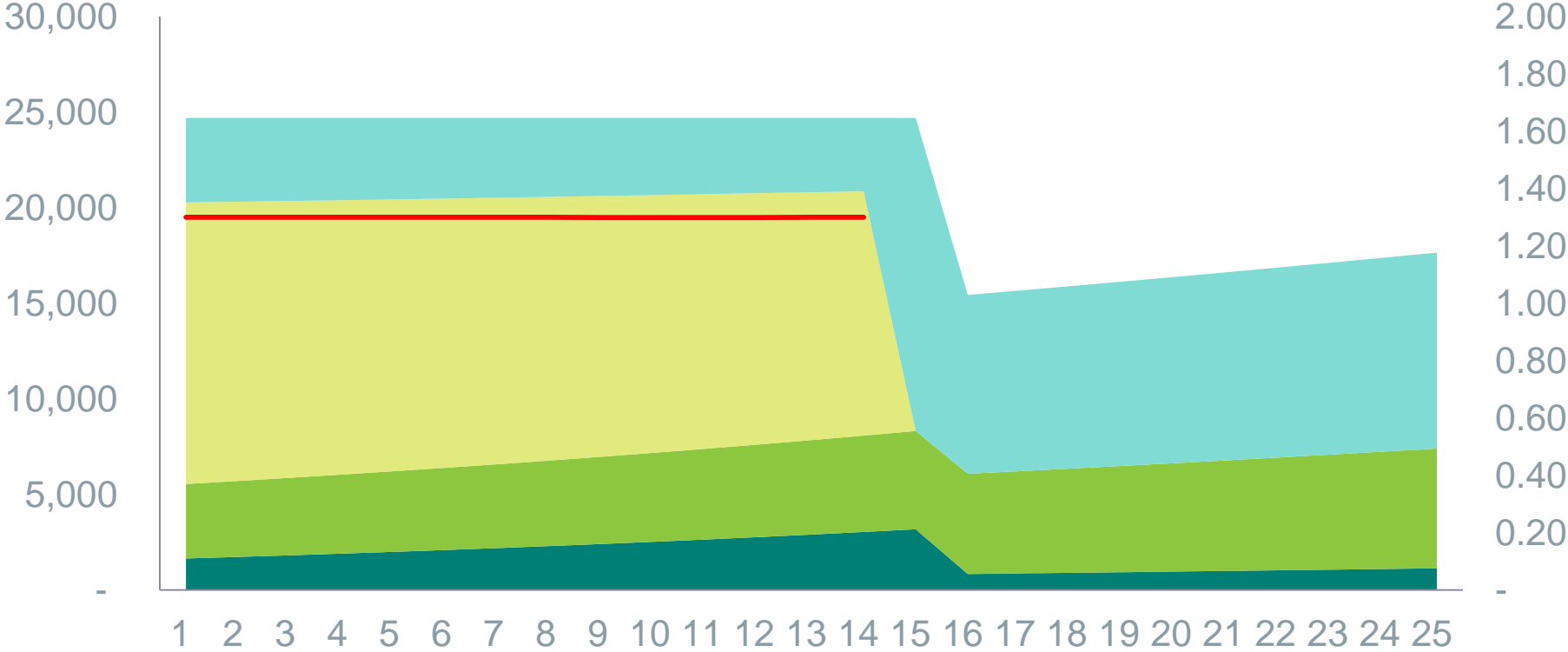


Following Assumptions:

- Annuity Profile
- P90 at 1.30x minimum DSCR

	P50	P75	P90
Maximum Leverage	79.23%	75.36%	71.68%
Internal Rate of Return	18%	14%	11%

Project financials: sculpted debt case



Following Assumptions:

- Sculpted Repayment Profile
- P90 at 1.30x minimum DSCR

	P50	P75	P90
Maximum Leverage	92.72%		78.23%
Internal Rate of Return	22%		13%

Masterclass Financing Renewable Energy Projects



Masterclass

Financing Renewable Energy Projects

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