27 February 2019

Energy infrastructure investments: A case study

Institutional Money Conference 2019

Credit Suisse (Deutschland) AG

For professional investors only

Created by Credit Suisse Energy Infrastructure Partners AG (“CSEIP”)

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1. Introduction to Credit Suisse Energy Infrastructure Partners

Short profile: Credit Suisse Energy Infrastructure Partners

150 institutional investors in Europe

25 sector-focused investment professionals

2 bn EUR capital under management

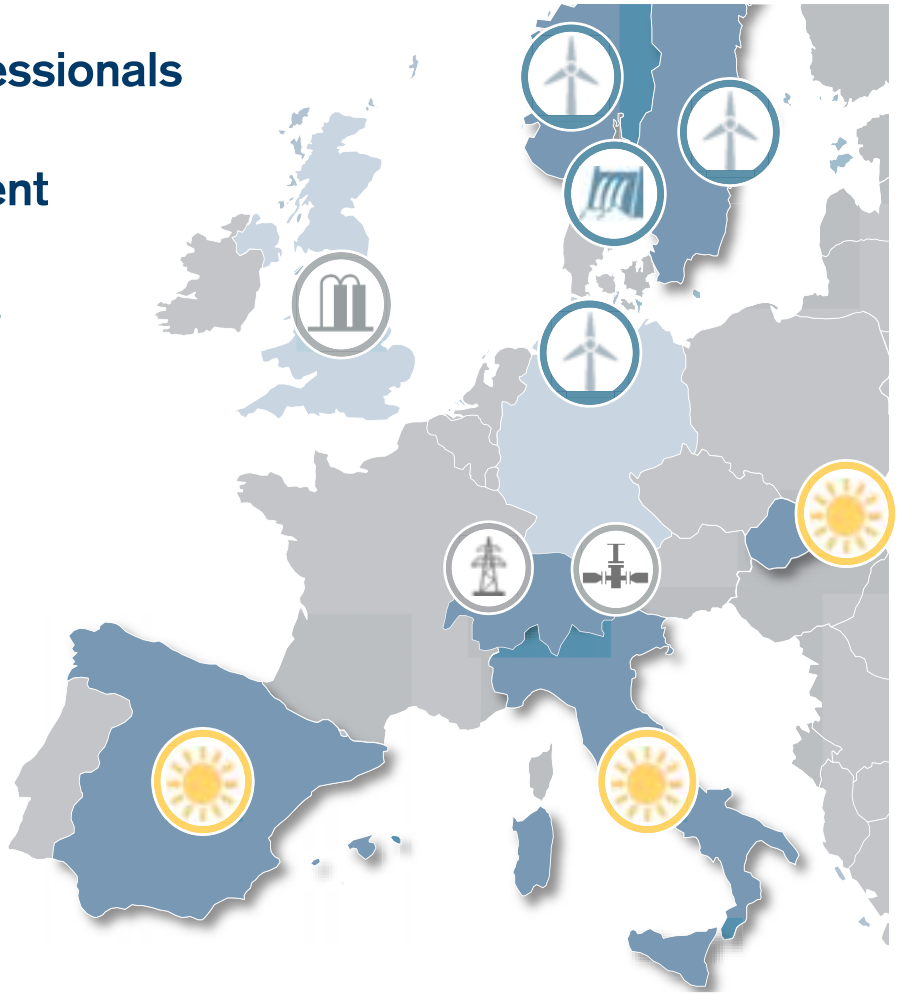
>1 GW capacity of generation assets

Selected investments

swissgrid · Fosen Vind · FLUXSWISS · ENERGIE ZürichseeLinth · ROMANDE ENERGIE

Selected industrial partners

BKW · SWISSGAS · ContourGlobal · Statkraft · e·on · FLUXYS



Source: CSEIP.

Investment closed/signed

Pipeline

CSEIP is the market leading energy infrastructure investor in one of the most innovative energy markets

Top 10 renewable deals in the Nordics[3)]

Asset	Location	Capacity	COD
Fosen		**1,000 MW**	**2020**
Markbygden		644 MW	2020
Nysäter		**474 MW**	**2021**
Valhalla		357 MW	2020
Askalen		288 MW	2020
Blakliden		210 MW	2022
Jadraas		203 MW	2013
Nordlicht Kvitfjell		197 MW	2019
Enercon Markbygden		180 MW	2020
Kraktorpet		163 MW	2019

CSEIP portfolio companies

Two of the top 3 land mark transactions in the Nordics

Europe's largest onshore wind farm

Fosen Vind

> EUR 500m[1)]

Industrial partner

Statkraft

- Construction of **278 turbines with 1,000 MW capacity** in central Norway
- **Investment alongside Statkraft,** largest European renewable energy producer and well experienced local industrial partner
- **CSEIP stake of 40%**

Largest European onshore wind farm with financial close in 2018

NYSÄTER

> EUR 500m[1)]

Industrial partner

e·on

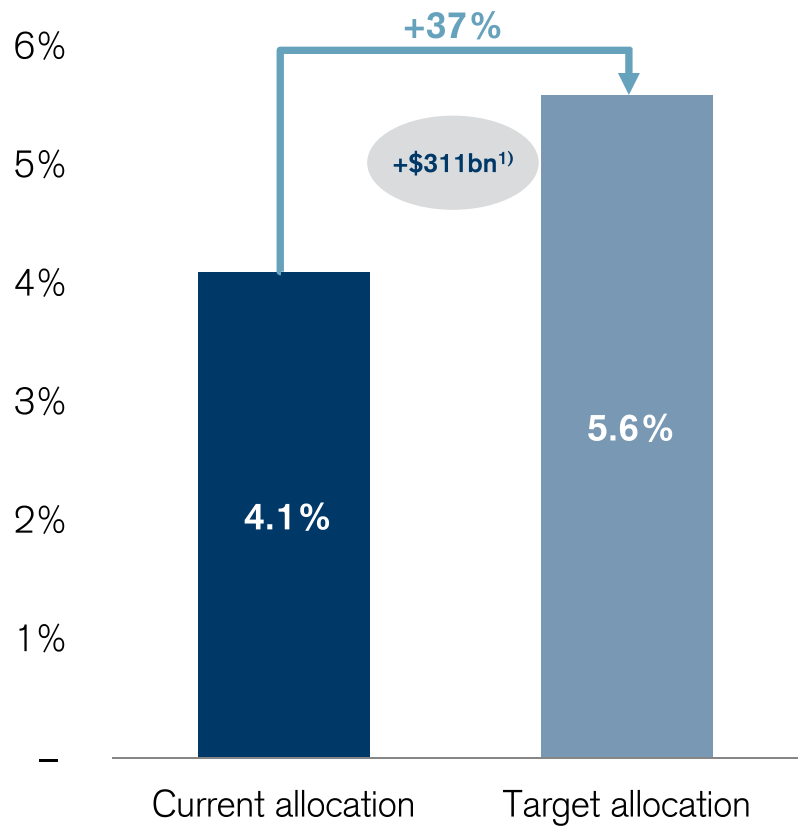
- Construction of **114 turbines with 474 MW capacity** in central Sweden
- **Investment alongside E.ON**, one of the largest European renewable energy producer and well experienced local industrial partner
- **CSEIP stake of 80%**

Source: BNEF, CSEIP.
1) Including debt organised by CSEIP.
2) Assuming a 3.7MWh annual average consumption for households in Europe (World Energy Council as of 2014).
3) By installed capacity.

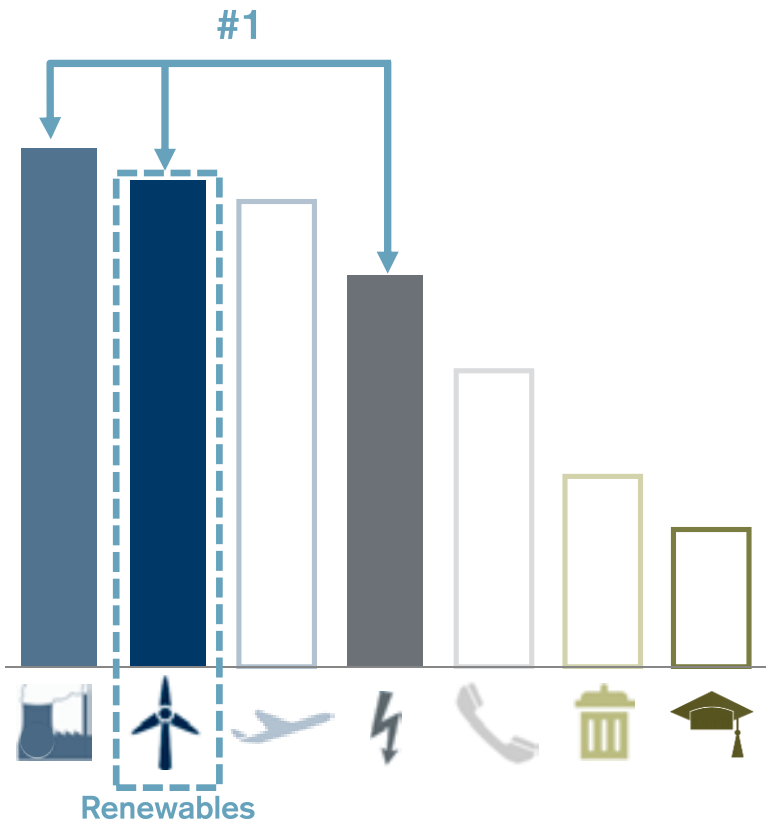
2. Energy infrastructure – An asset class receiving increasing attention from institutional investors

Long-term investors increasing their asset allocation towards infrastructure, especially in the energy sector

Infrastructure allocation by institutional investors as % of AuM



Energy as most attractive infrastructure sector2)



Source: OECD, Preqin.
1) Based on total AuM for pension funds and insurance companies for OECD Europe amounting to USD 20.7tn.
2) Sector attractiveness according to latest Preqin Investor Interviews, December 2017.

Characteristics of energy infrastructure match investment needs of long-term oriented institutional investors

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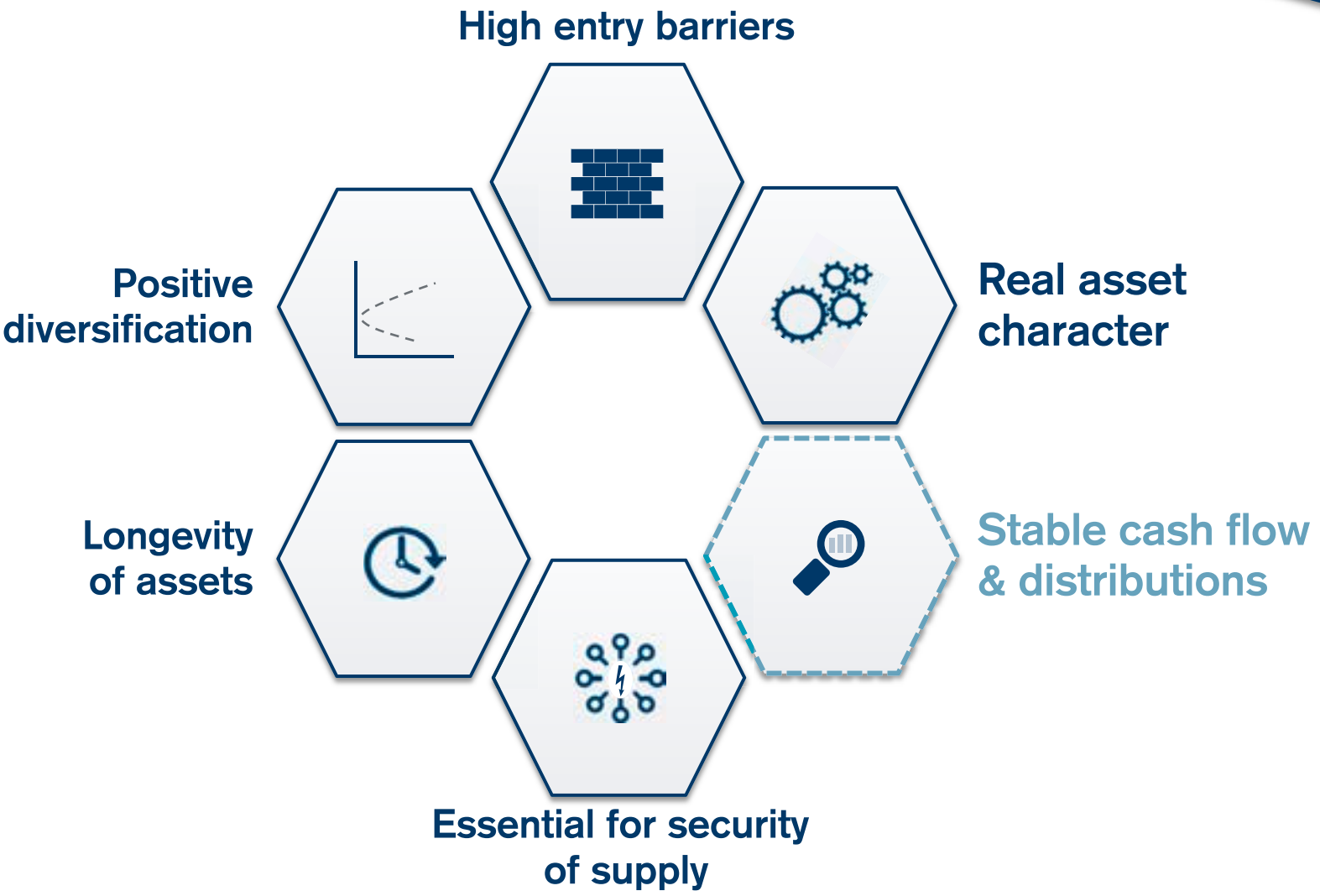

Source: CSEIP.
Note: Generalisation; only for illustrative purposes.

Value drivers and risks of energy infrastructure

		Main drivers	Key risks	
Regulated		■ Higher Regulatory Asset Base («RAB») ■ Regulated cost of capital	■ Change in legal framework ■ Chargeable costs	
«Contracted»		■ Long-term offtake agreements / collaboration models	■ Counterparty risk ■ Regulatory risk	Cash flow stable – **no structuring needed**
Subsidised		■ Feed-in tariffs / electricity price ■ Operations & maintenance costs	■ Meteorological conditions ■ Interest rate risk	
Market based		■ Merchant prices ■ Price volatility	■ Merchant prices ■ Price volatility	 Lower stability – **structuring needed**

Increasing market risk

- **Regulated assets usually already profit from stable cash flows but enjoy high demand by investors implying high acquisition prices**
- **Non-regulated assets are more complex and need structuring but therefore have, with right expertise, the chance to achieve attractive risk-return profiles**

Source: CSEIP.
Note: Only for illustration. Non exhaustive list.

Natural cash flow stability not given in market-based energy infrastructure assets due to volatile energy prices

Electricity prices in the Nordics

How can cash flows be stabilized to make energy infrastructure investable for institutional investors?

Source: Nord Pool AS.
1) Annual electricity price represented by NO3 price curve.

3. Creating cash flow stability in energy infrastructure investments

Overview of key components affecting overall cash flow stability

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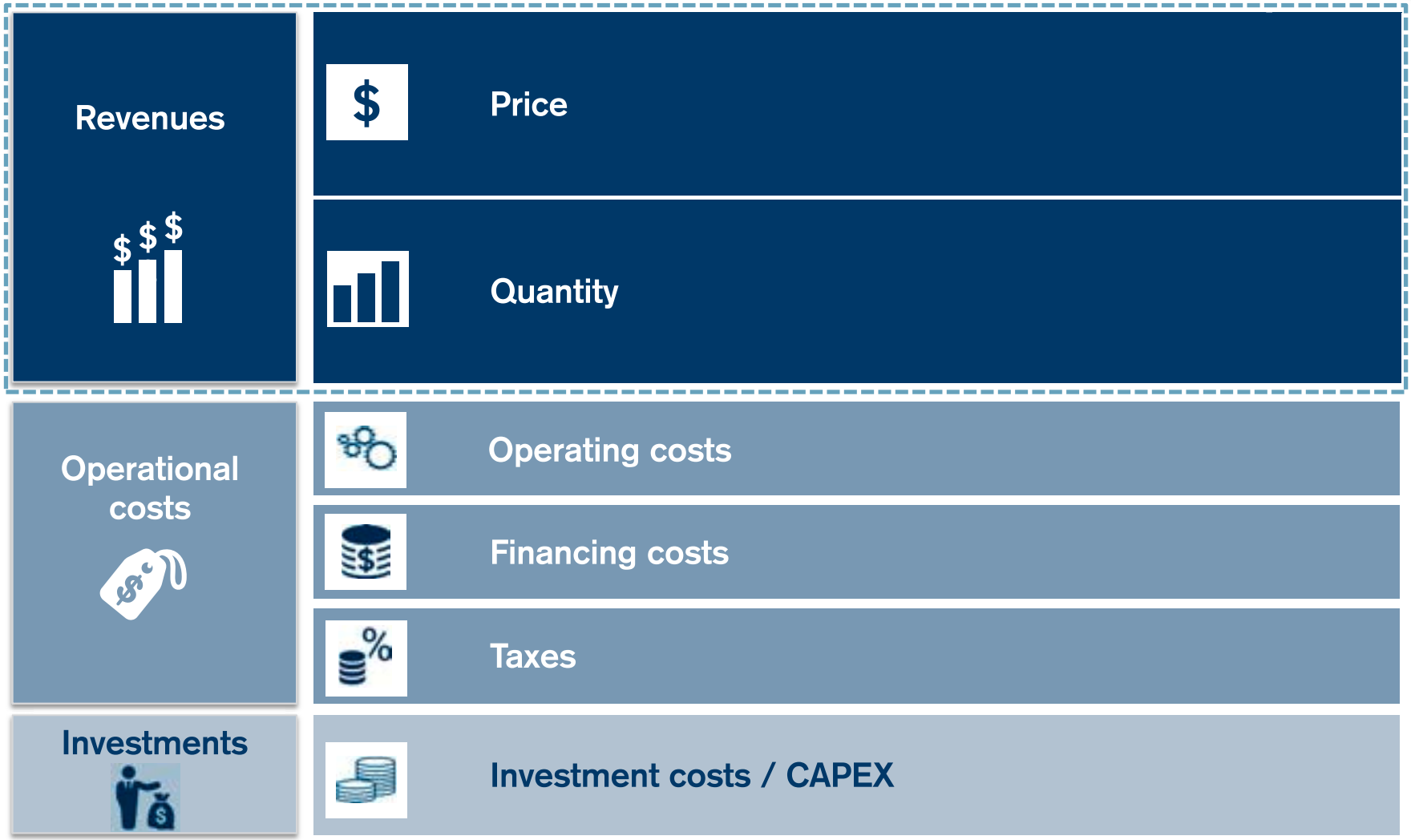
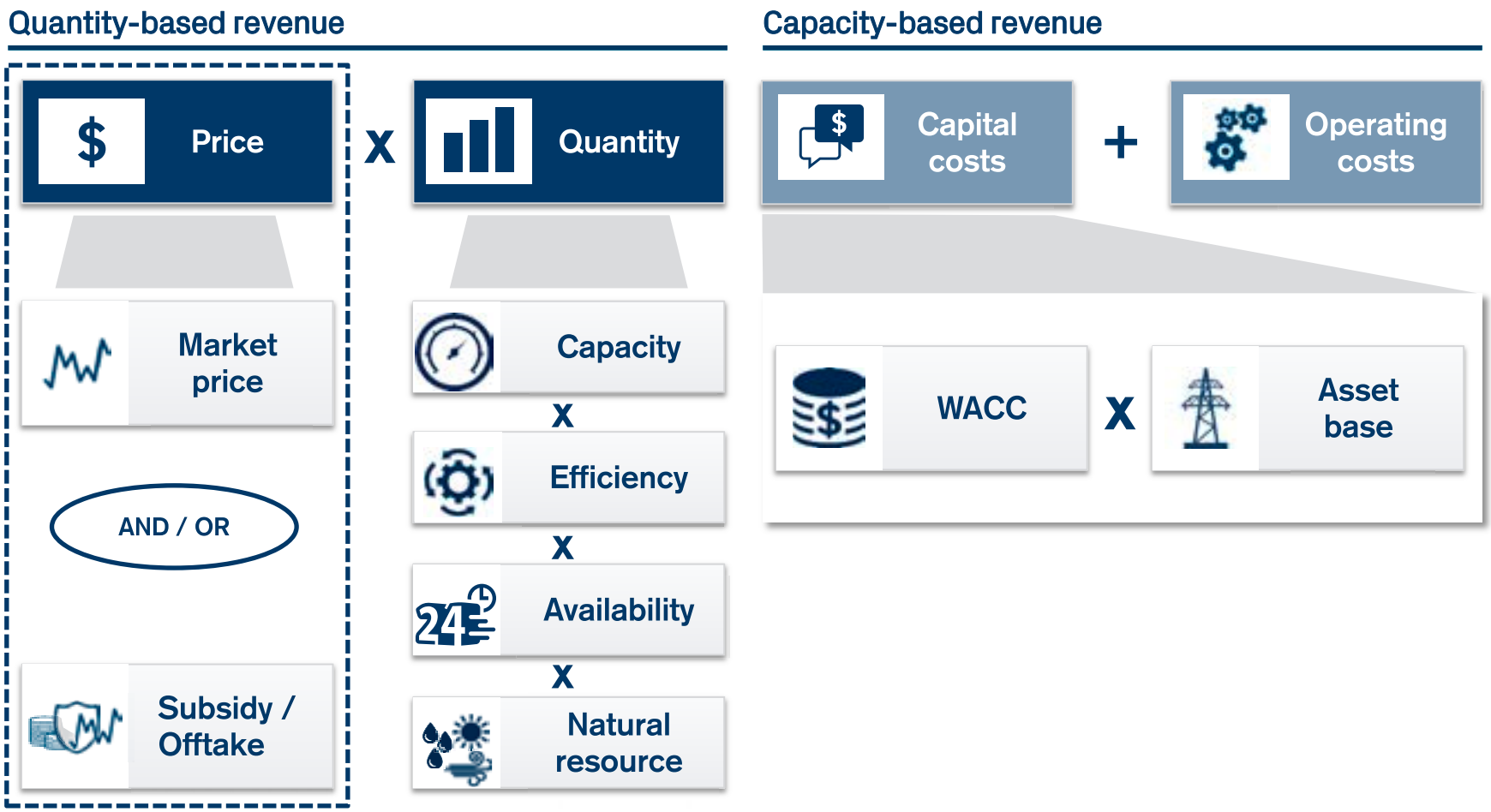


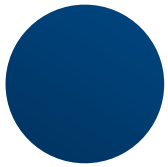
Source: CSEIP.

Revenues in energy infrastructure usually determined by quantity or capacity



Source: CSEIP.

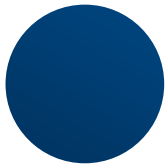
Excursus: Change towards market-based support schemes causing increased cash flow instability

	Description	Example countries[1)]	Degree of price certainty
Feed-in Tariff	■ Producer receives **fixed remuneration per MWh** produced	**Poland** **Austria** **Ireland** **Germany**	
Market / Feed-in premium	■ Producer receives a **"top-up" per MWh** produced	**France** **Italy** **Finland** **Netherlands**	
Certificates	■ Producer receives a **set number of certificates per MWh produced** ■ Certificates are then sold for additional revenue **on top of revenue from sale of electricity**	**United Kingdom** **Belgium** **Norway** **Sweden**	

Source: BNEF.

1) For new onshore wind only. The list is not exhaustive. Most of the countries listed use different variants of the three main subsidy schemes.

Excursus: Change towards market-based support schemes causing increased cash flow instability

	Description	Example countries[1)]	Degree of price certainty
Feed-in Tariff	■ Producer receives **fixed remuneration per MWh** produced	Poland Austria Ireland Germany	
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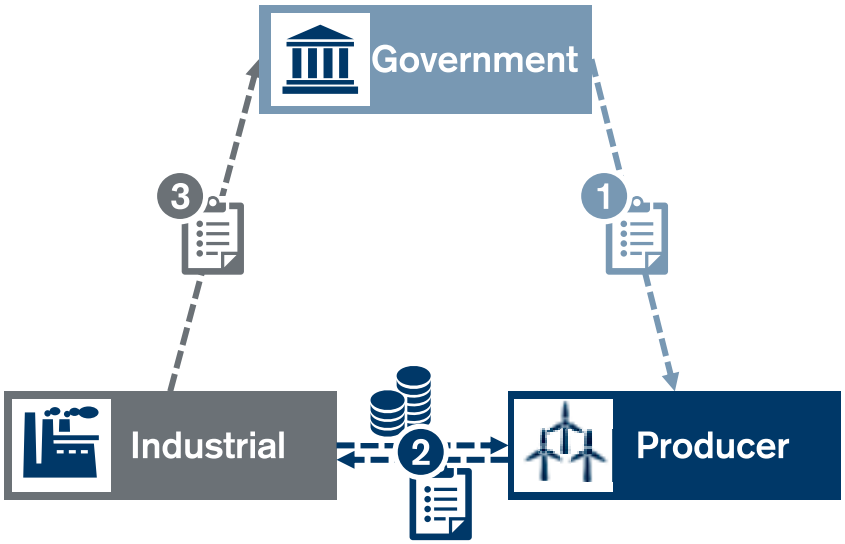
Source: BNEF.

1) For new onshore wind only. The list is not exhaustive. Most of the countries listed use different variants of the three main subsidy schemes.

Excursus: Norwegian and Swedish ElCert system as an example of market driven subsidy schemes

Revenue subject to supply and demand volatility

Elcert system financed by industrials instead of government



1. Renewable electricity producer receives one certificate per MWh
2. Renewable producer sells certificate at market price
3. Buyer returns certificate to the state

Source: CSEIP, Nord Pool AS.
1) Quoted in SEK, exchanged into EUR using the SEK / EUR exchange rate monthly average published by the European Central Bank.

Excursus: PPAs with corporate offtakers key to hedge price uncertainty in Sweden and Norway

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Selling products forward allows price stabilization

- **Stable cash flows though fixed pricing** over the duration of PPA
- **Enables project finance** in absence of regulatory support

Corporate offtake universe constantly growing

Source: CSEIP.
Note: PPA stands for „Power Purchase Agreement".

Overview of key components affecting overall cash flow stability

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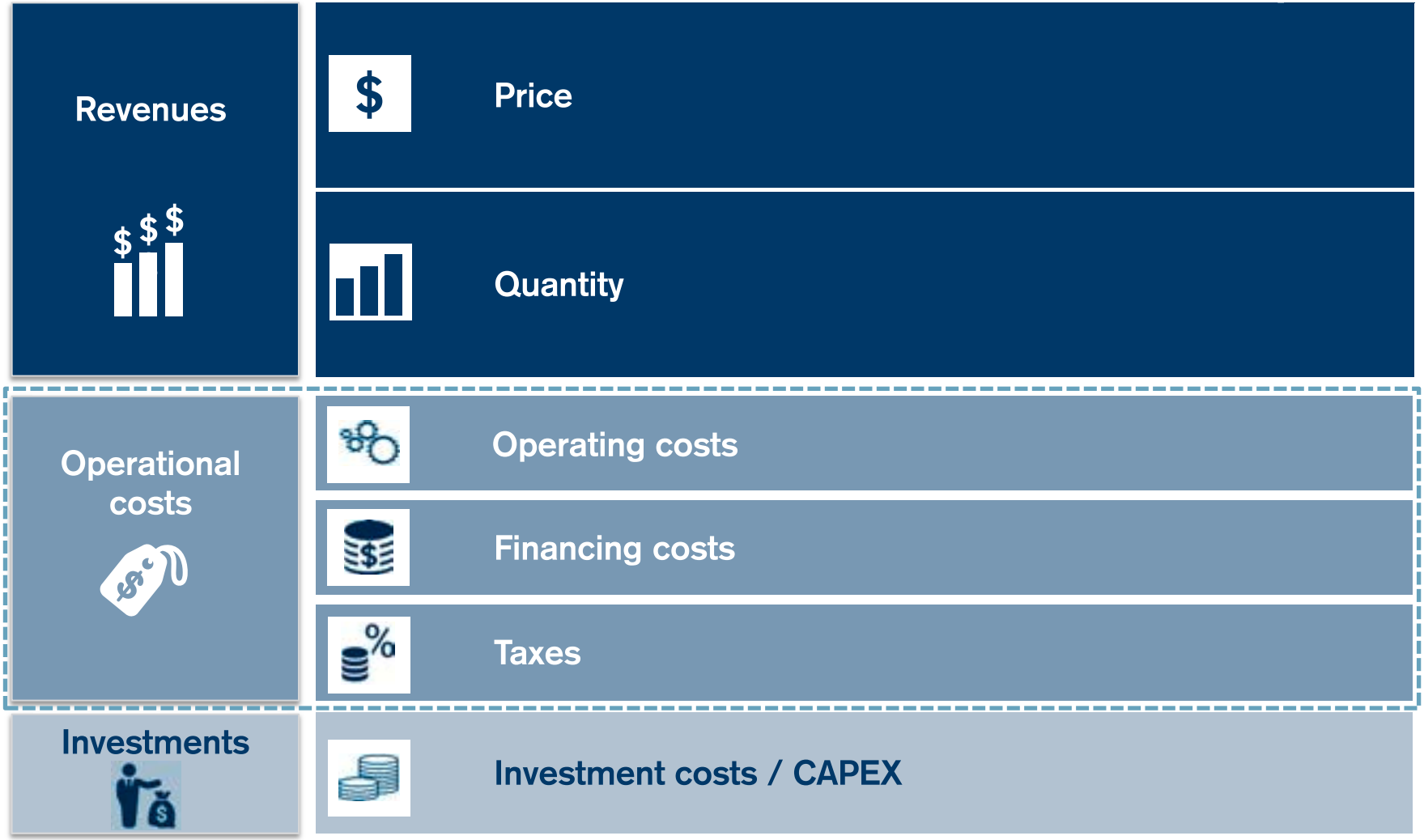

Source: CSEIP.

Stabilizing O&M costs without compromising quality is key as they constitute the largest cost driver

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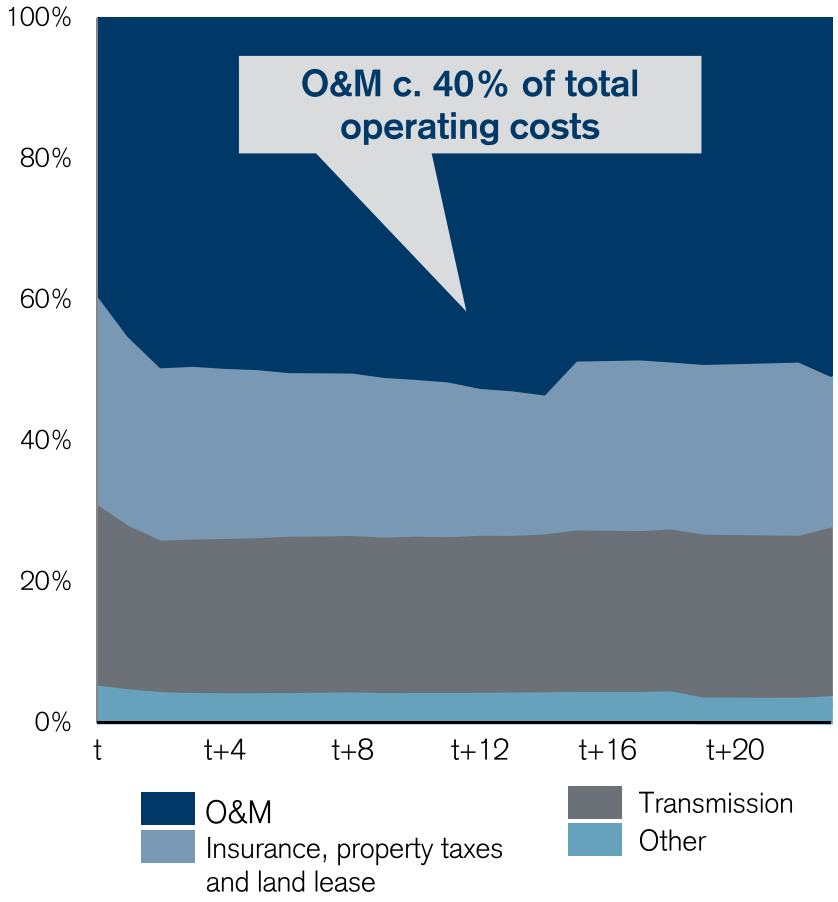
O&M costs as key driver for operational costs



Measures to ensure O&M cost stability

- **Selection of first class O&M provider**
- **Incentivation of O&M provider**
- **Liquidated damages** in case of underperformance
- **Broad scope** (e.g. including spare parts)

Source: BNEF, CSEIP.

Financing cost uncertainty arises out of variable interest but can be hedged using interest rate swaps

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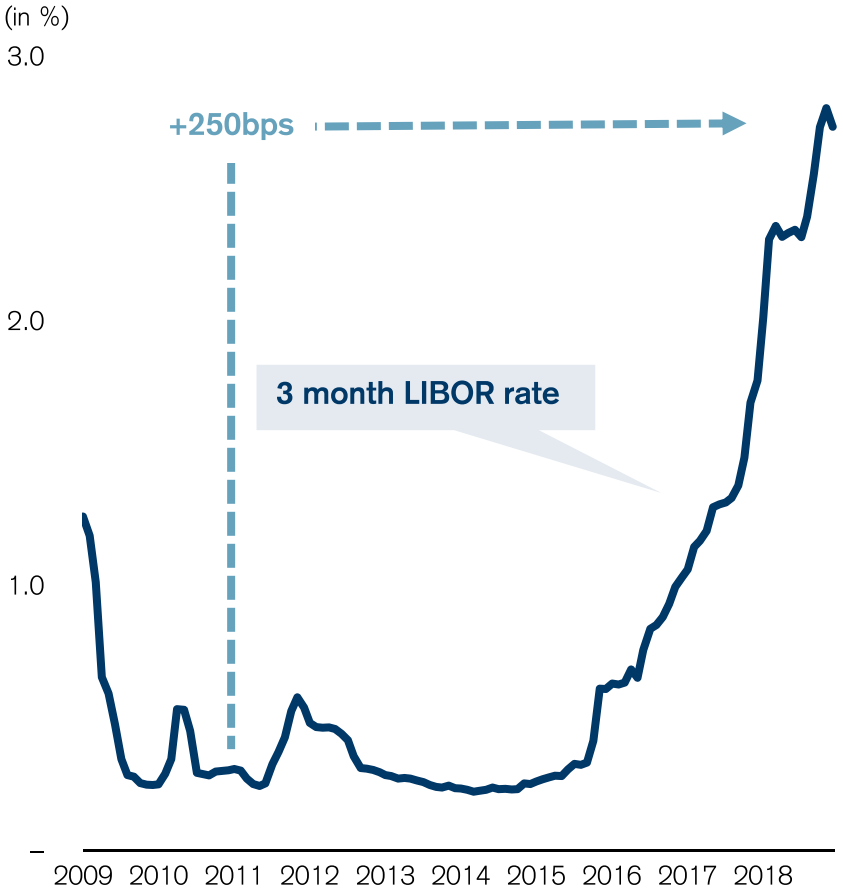
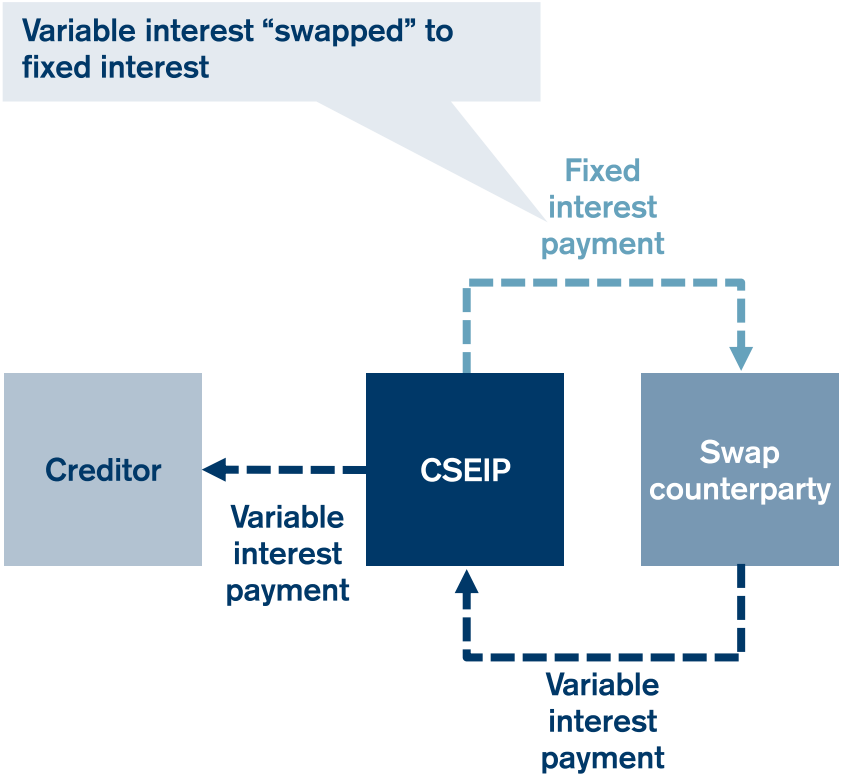
Variable interest rates as source of uncertainty



Mitigation through interest rate swap agreement



Source: FactSet.

Tax excursus: Recent Swedish tax regime changes as an example of tax cost uncertainty

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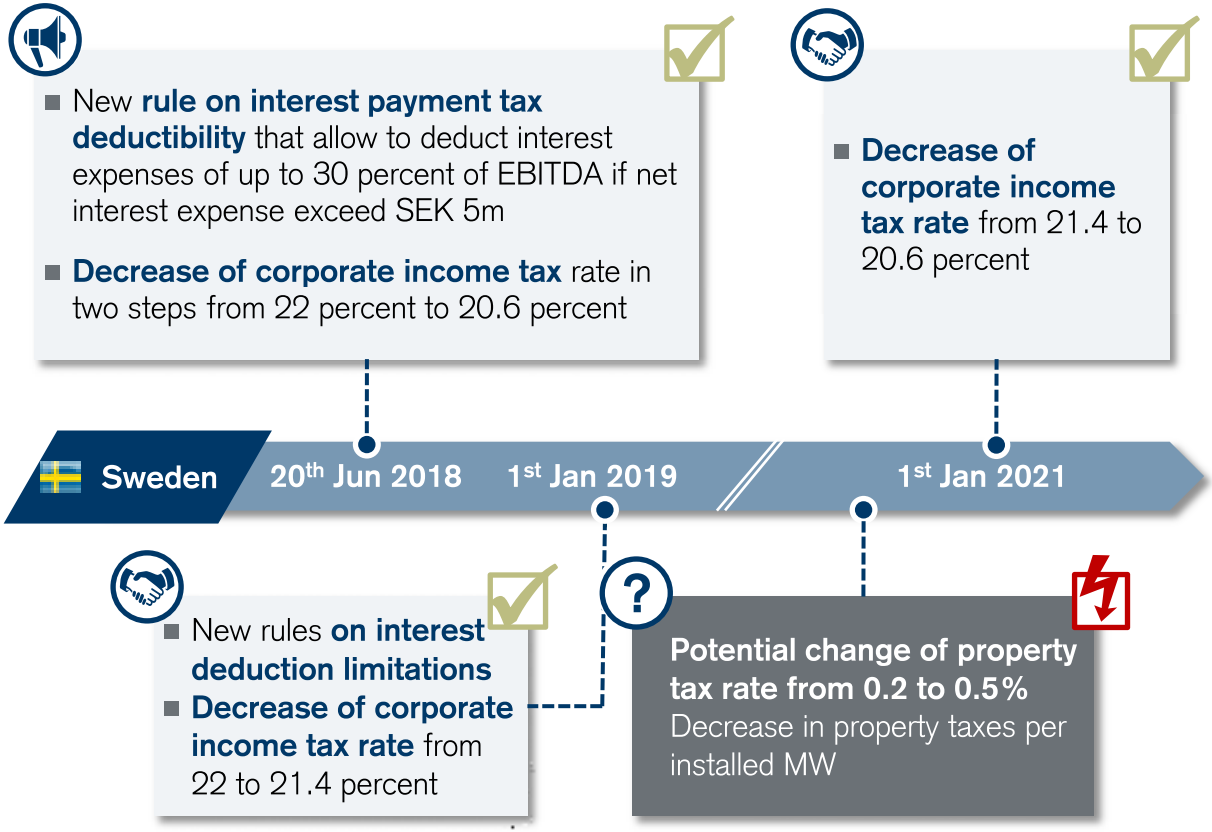
Sources of uncertainty

- **Change in corporate taxes**
- **Change in property taxes**
- **Interest deductibility**

Sweden as an example of all 3 sources of uncertainty



Taxes are primarily driven by changes in law and can lead to instability of cash flows

Source: EY, PwC.

Overview of key components affecting overall cash flow stability

ILLUSTRATIVE

Source: CSEIP.

Greenfield investment cost subject to various sources of cost uncertainty

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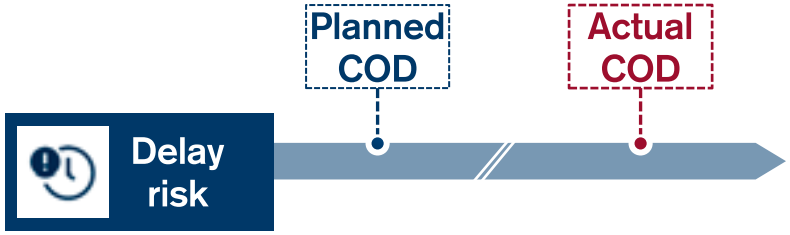
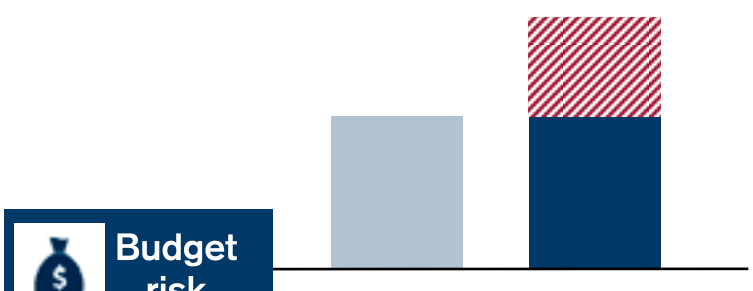
Delays and budget overruns as key sources of uncertainty in greenfield projects





Measures to reduce uncertainty

Delay liquidated damages clause for fair compensation of losses

Technical due diligence to assess and mitigate any technical risks

Budget guarantees in order to share and limit the downside risk

Technical due diligence to assess and mitigate any technical risks

Source: CSEIP.

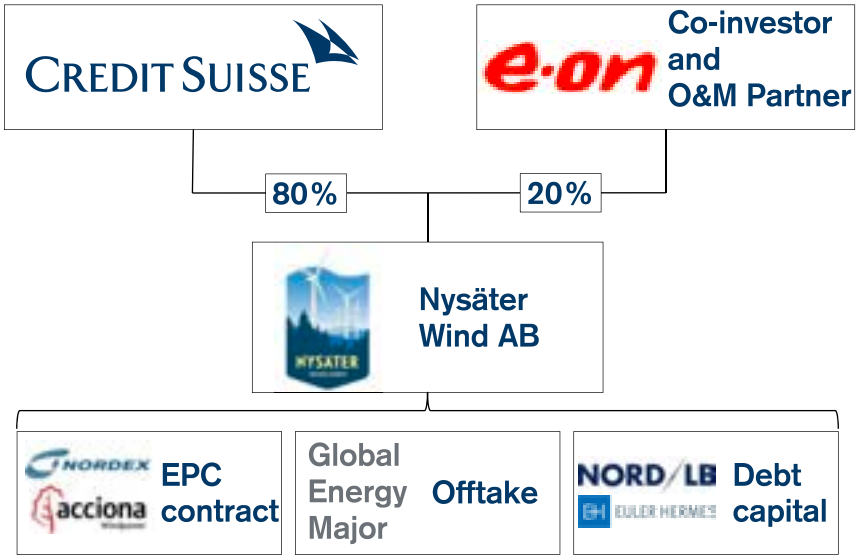
4. Cash flow stabilization in practice: Project Pegasus

Project Pegasus: 80% stake in a 474MW onshore wind farm in Sweden through CS (Lux) Energy Infrastructure Europe 1

The investment at a glance

- **474MW Onshore wind farm in Sweden** with 114 turbines
- Annual expected electricity generation for **460k households**[1)]

Investment structure



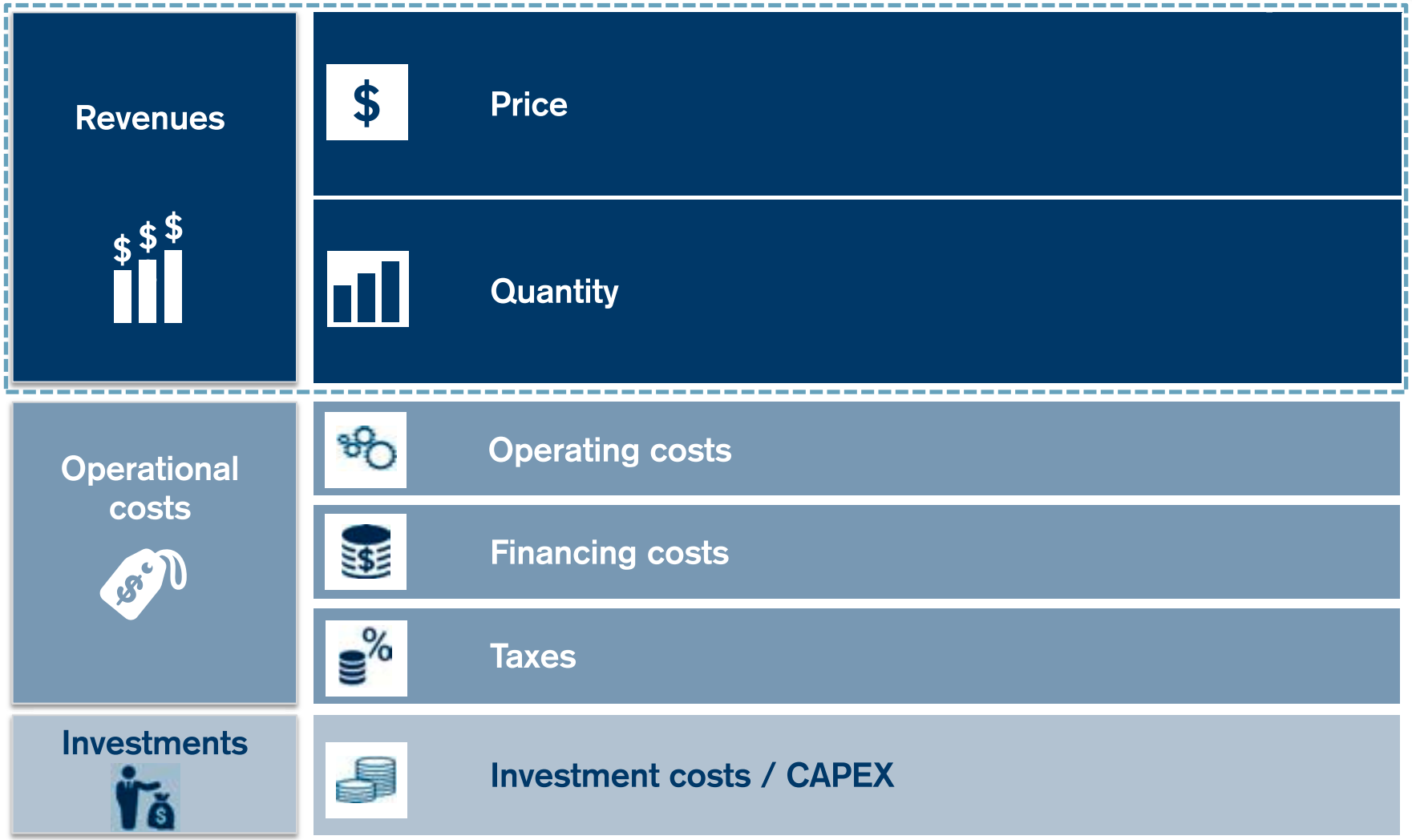
Key facts

Installed capacity 474MW	**P50 Production** 1,720MWh
Construction cost ca. EUR 550m	**Debt capital** EUR 375m
Start of construction Q4 2018	**COD** Q1 2021(HAS) Q4 2021 (BJL)

Source: CSEIP, seller's due diligence.
Note: O&M stands for Operations & Maintenance.
1) Assuming a 3.7MWh annual average consumption for households in Europe (World Energy Council as of 2014).

Overview of key components affecting overall cash flow stability

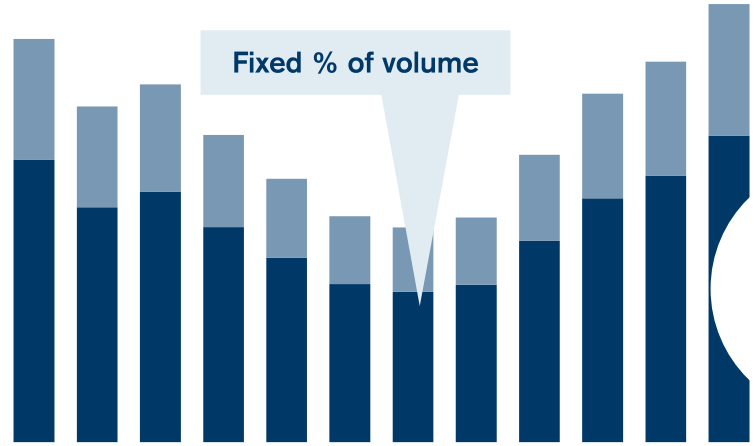
ILLUSTRATIVE



Source: CSEIP.

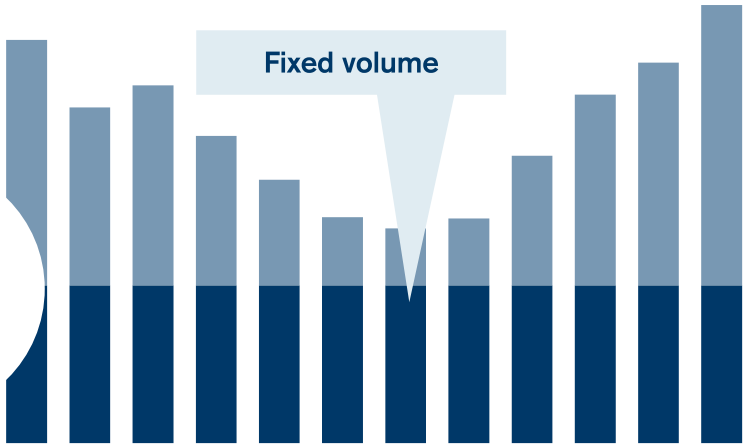
Mitigating price uncertainty using a cash flow stabilizing PPA – Pay-as-produced or baseload most common

Pay-as-produced – less risk for SPV, lower price



- $ — Fixed price for a certain % of the produced volume ☑
- Without wind resource, no liability to deliver ☑

Baseload – higher risk for SPV, higher price



- $ — Fixed price for a fixed volume ☑
- Liability to deliver even without wind resource ☒

PPAs as key tools to achieve cash flow stability but with different contractual risk levels

Source: CSEIP.

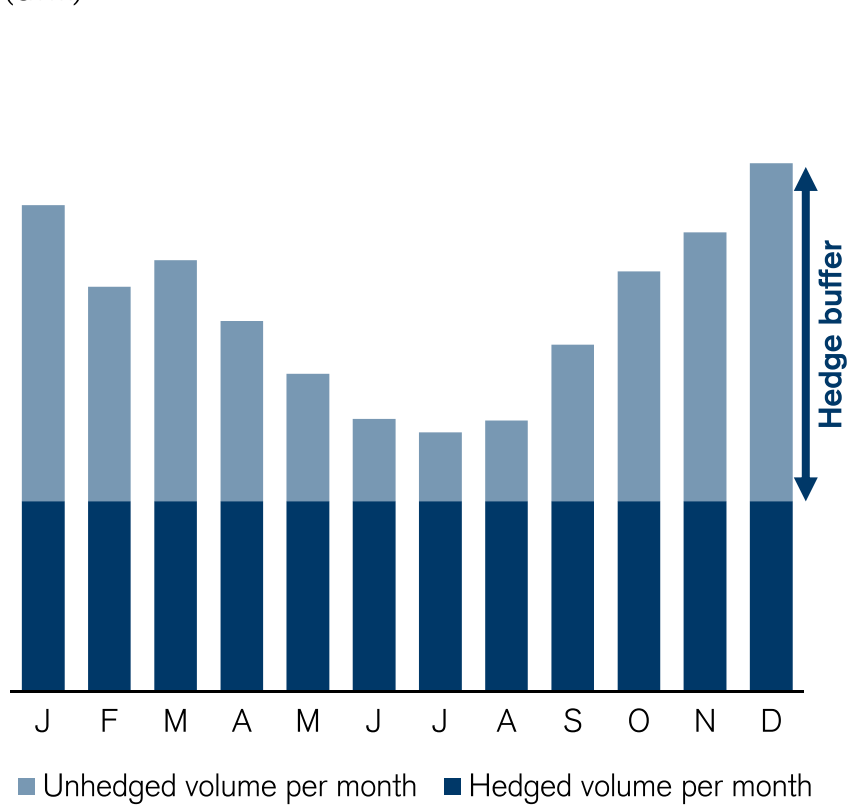
To ensure cash flow stability, PPA risks and rewards need to be understood

PPA risk aspects	Baseload	Pay-as-produced
Volume risk	**Full volume risk** – liability to deliver in lack of resource	**No volume risk** – no liability to deliver in lack of resource
Technical risk	**Full technical risk** – liability to deliver despite technical issues	**Contractually set** – certain flexibility to share risks
Profile		**Profile risk mitigated** – fixed price independent of day time
Balancing		**Needs to be procured** at fixed price for a short or long period
Price zone		**Depends on offtaker location** – no risk in the same price zone
Credit risk		**Full credit risk**

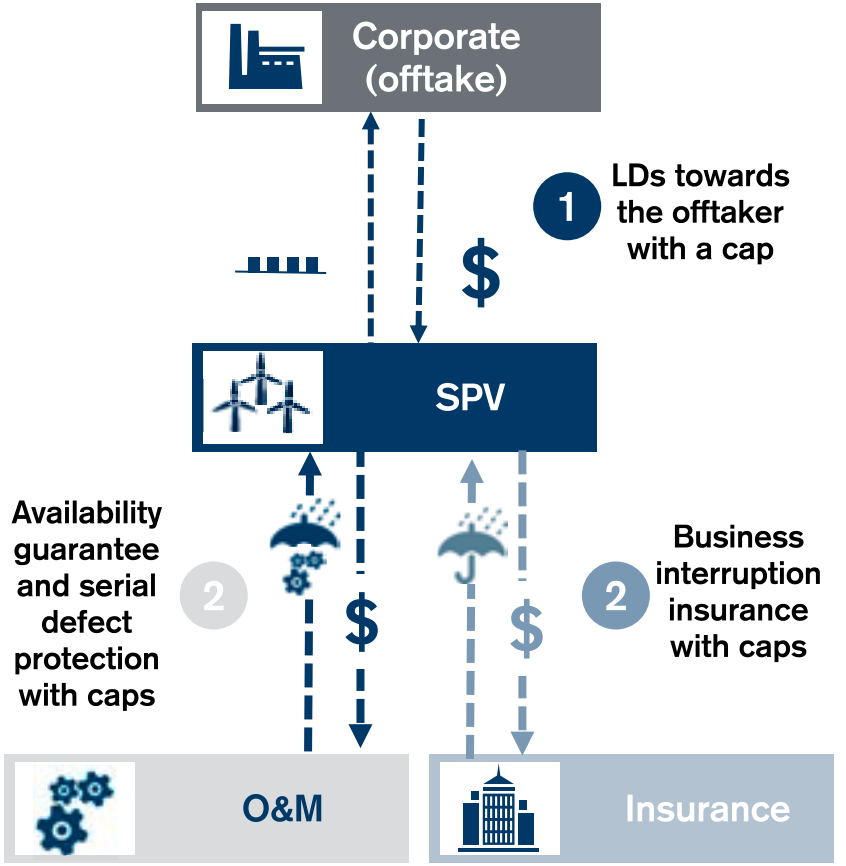
Source: CSEIP.

Volume liabilities for baseload PPAs can be mitigated by a hedge buffer or contractual protection

Allow for buffer in sizing the PPA volume



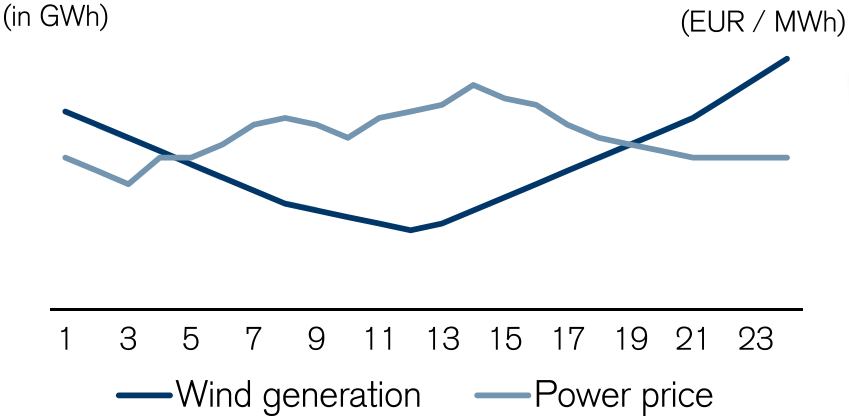
Contractual protection and risk sharing at a cost



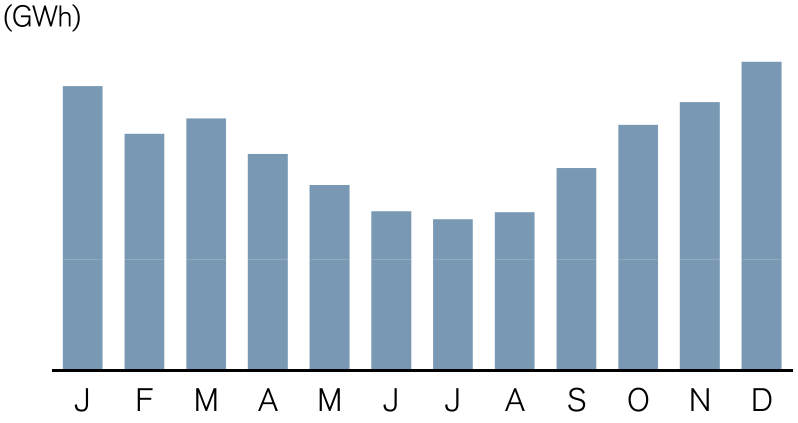
Source: CSEIP.

Profile risk and variable production can be mitigated by ensuring a fixed price hedge volume is achieved

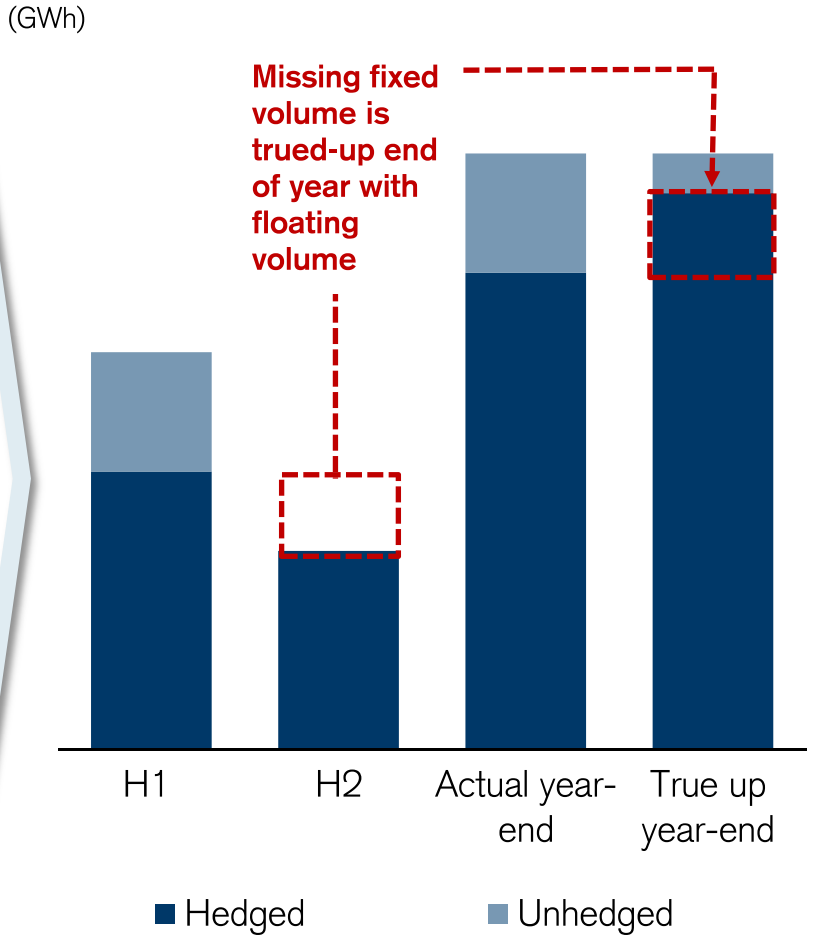
Hourly prices vs. wind production (profile risk)



Variable volume per month (production risk)



Ensuring fixed price: True-up mechanism



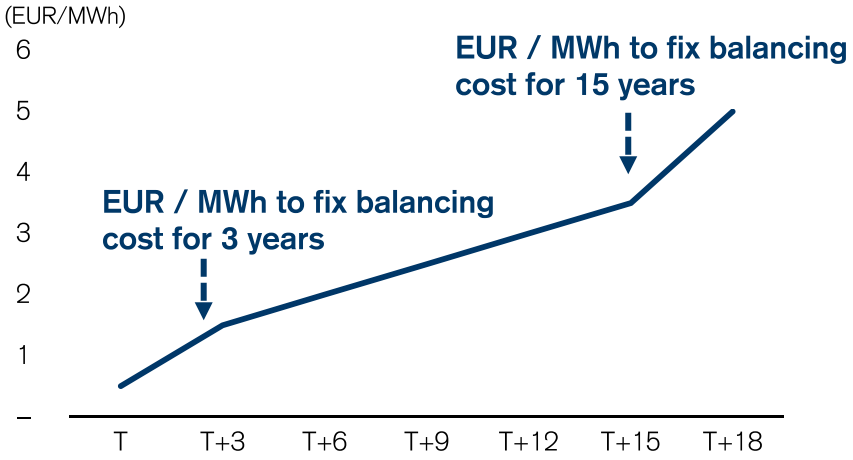
Source: CSEIP.

Balancing costs may be procured at a fixed price for a long tenure at substantial costs

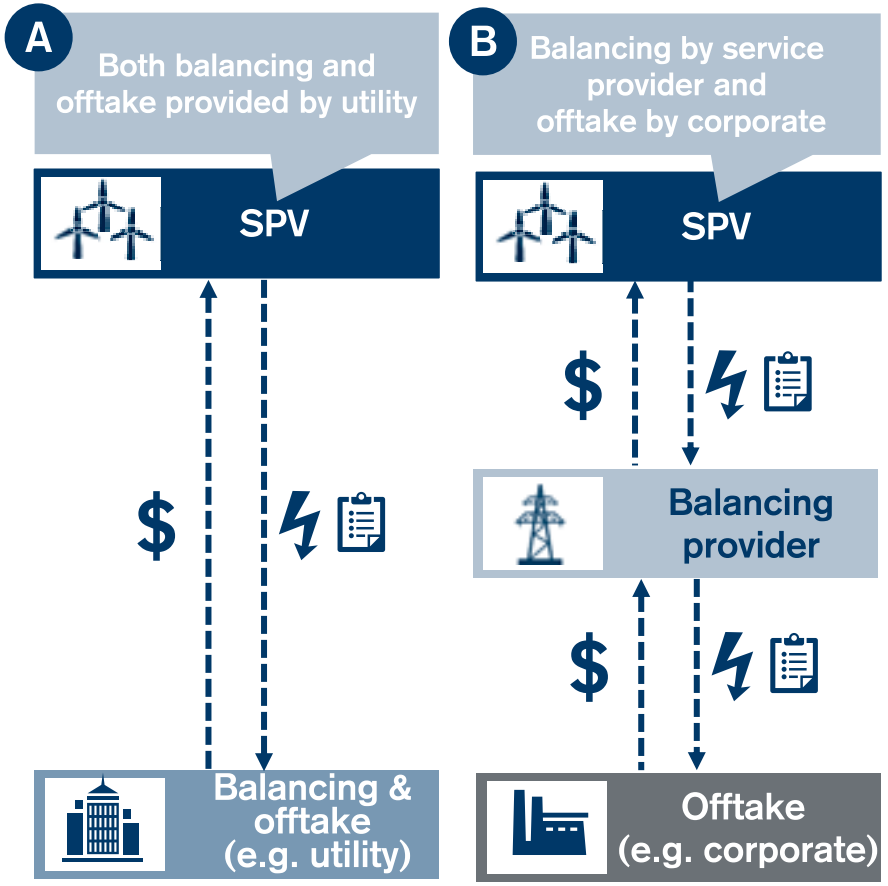
Balancing services are necessary in Sweden…

- **"Balancing responsibility" is the responsibility for balancing all the electricity** that is produced or consumed
- **Balancing company has the financial responsibility to ensure** electricity production and consumption

…but long-term fixed prices are costly



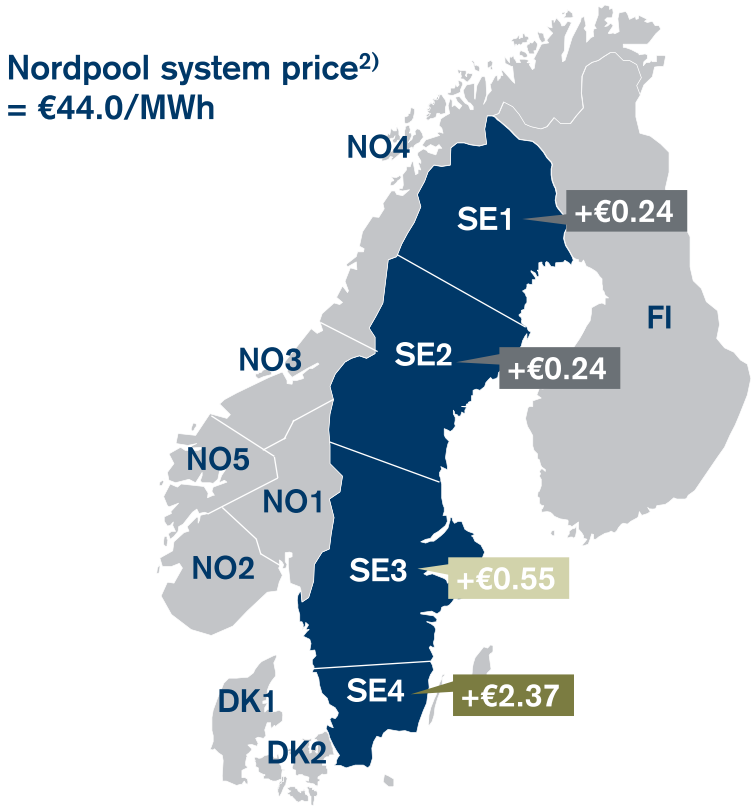
Either jointly provided by offtaker or via a 3rd party



Source: CSEIP.

Price area risk can be avoided by hedging in the same price zone or offloading the risk to a third party

Prices differ between price zones [1)]



Mitigating price zone risk

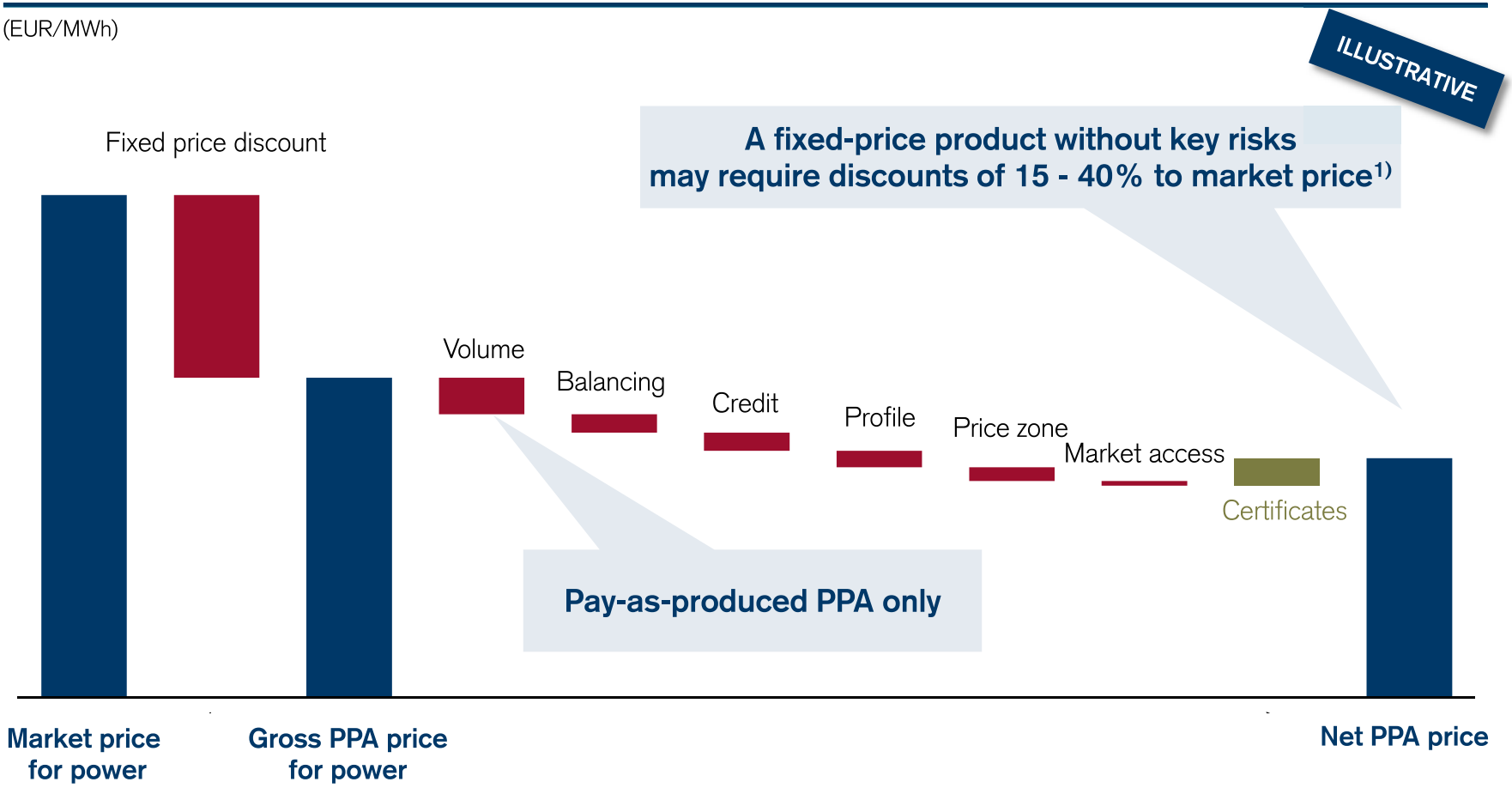
1. Sell into same price zone
2. Offload price zone risk to offtaker at a discount
3. Offload price zone risk to third party for a fee

Source: Nord Pool AS.
1) Difference between average system price and respective average zonal price for 2018.
2) Average system price for 2018.

PPA summary: In Sweden, hedging specific price and other risks with a PPA requires a substantial discount

Risk mitigation comes at a cost – risk-return trade-off necessary

(EUR/MWh)



Source: CSEIP.
1) CSEIP internal assessment in the Nordics.

CSEIP screened the Nordic PPA market to find the best cash flow stabilizing PPA solution for the project

Pegasus' PPA enables long-term cash flow stability

- Tenor covers substantial part of the park life time
- Solvent investment grade counterparty
- Majority of production hedged
- Comprehensive set of risk management services
- Guaranteed fixed price
- Innovative contractual features

- ☑ Reduced price risks
- ☑ Limited credit risk
- ☑ Base for long-term financing

PPA stabilizes cash flows and enables long-term project financing structure

Source: CSEIP.

Overview of key components affecting overall cash flow stability

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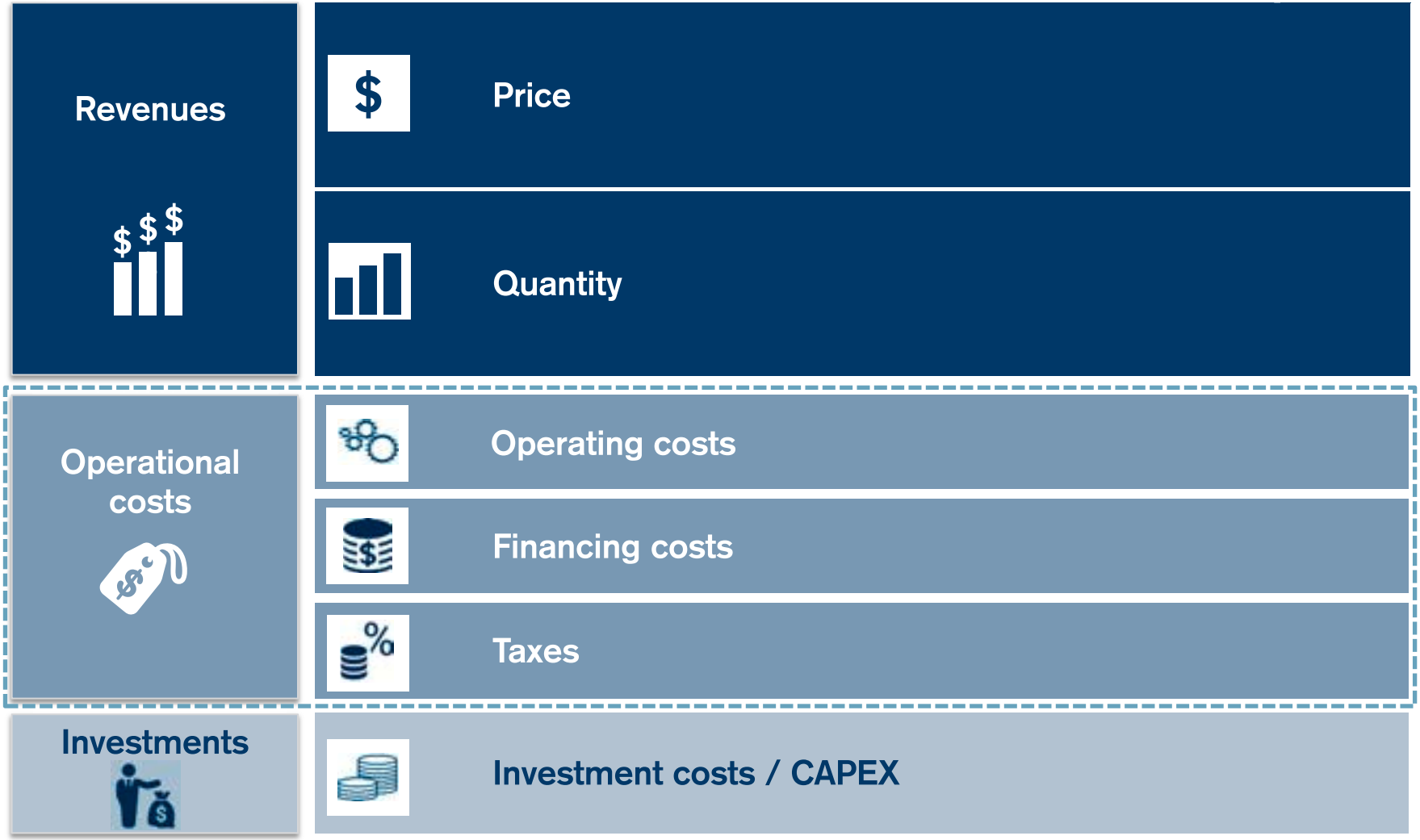


Source: CSEIP.

O&M cash flow stabilized by investing into various risk mitigating features under the O&M contract

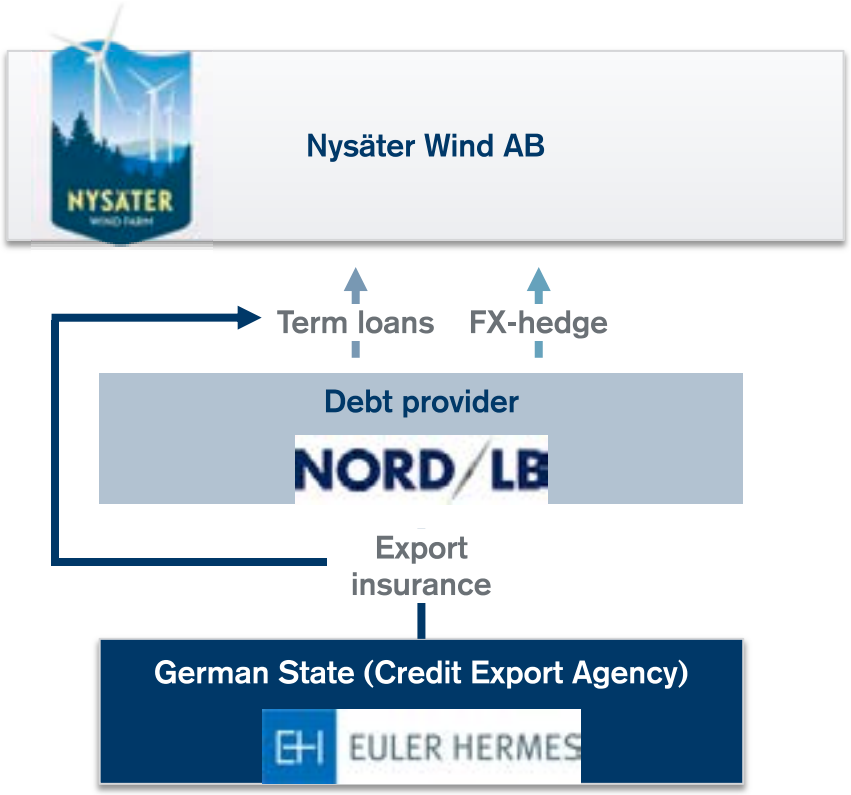
Investor risks vs. different O&M arrangements

	Higher ← Risk → Lower			
Risks	**Short-term, single maintenance contracts**	**Medium-term, multiple services (O&M) agreement**	**Long-term, full-wrap management and O&M**	**Mitigant**
Incentivation	Bonus / Malus system + co-ownership (optional)			**Co-ownership, bonus & malus systems**
Quality of service	Limited LD coverage with a cap and loose termination	Partial LD coverage with a cap and termination	Substantial LD coverage that includes PPA exposure up to a cap and ability to terminate	**LDs for guaranteed availability, termination**
Variability of costs (service / parts)	Large part of variable cost services	Partial fixed cost service	Only additional services for an extra variable fee	**Fixed cost for majority of services & spare parts**
Cost overruns	No guarantees	Limited guarantees with a cap	Budget guarantees with a cap	**Insurance, warranties & contingencies**
Scope of variable services	Limited maintenance service and responsibility according to scope	Operation and maintenance	Management, operation and maintenance	**In-depth technical due diligence & contingency**
Length of service	5-10 years of service	10-15 years of service	15-25 years of service	**Extension options**

Source: CSEIP, company information.

Cash flow stabilized by competitive debt financing package with Euler Hermes cover and interest rate swap

Simplified structure



Key highlights

- EUR 375m total debt
- Tenor of up 18 years
- ECA cover by Euler Hermes
- Nord LB as Lead Arranger
- 3 term loan facilities + ancillary facilities

Remaining risks

- Syndication risk
- Collateral + Covenants
- Counterparty risk

Source: CSEIP.
Note: ECA stands for Export Credit Agency.

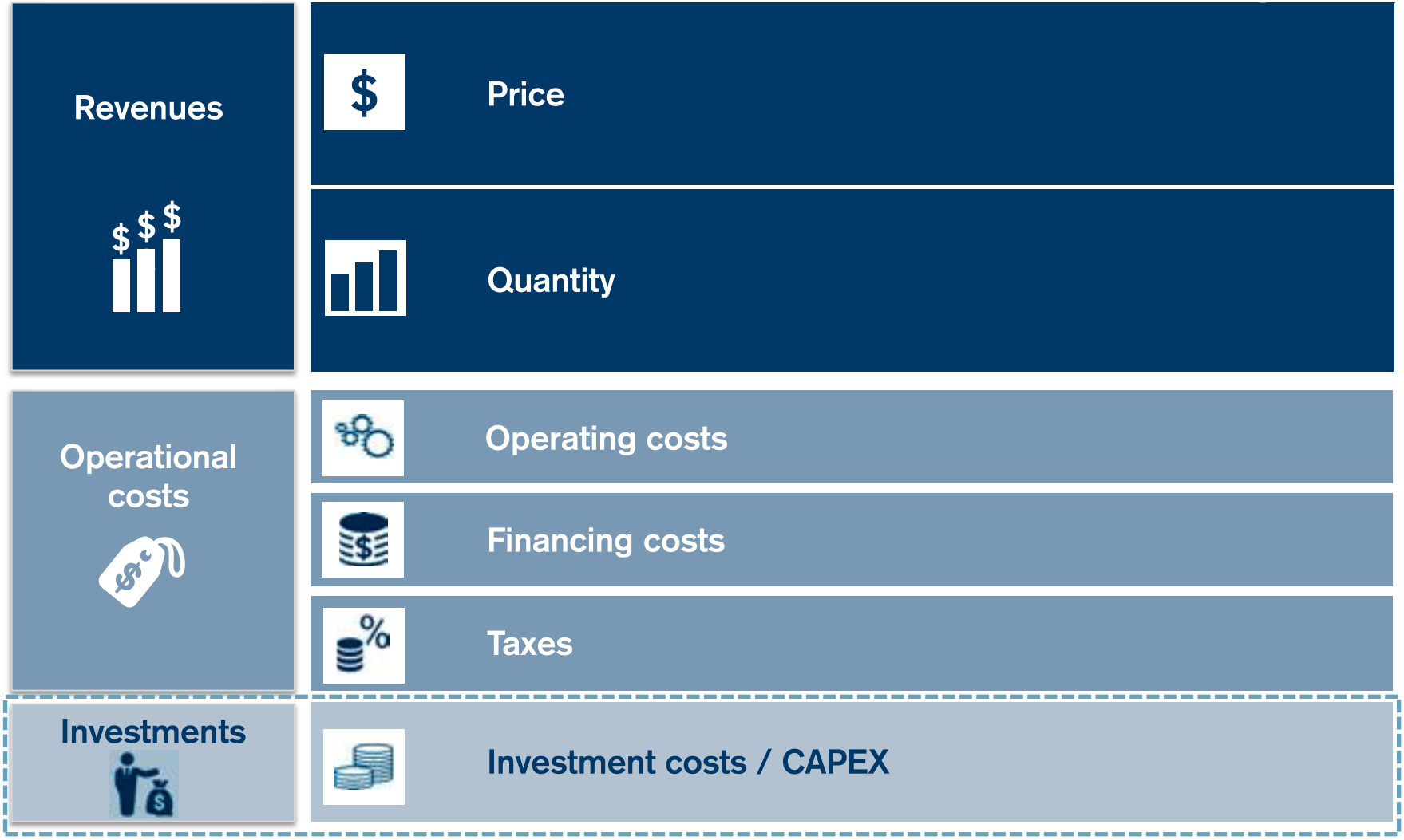
Swedish tax uncertainty mitigated by hedging the ”known” unknown as much as possible

Tax risks	Potential mitigates
Change in corporate taxes	Contractual protections
Change in property taxes	Contingency
Interest deductibility	Due diligence

Source: PwC, CSEIP.

Overview of key components affecting overall cash flow stability

ILLUSTRATIVE



Source: CSEIP.

Construction risks mitigated by full-wrap EPC contract with turbine supplier

Investor risks vs. different EPC arrangements

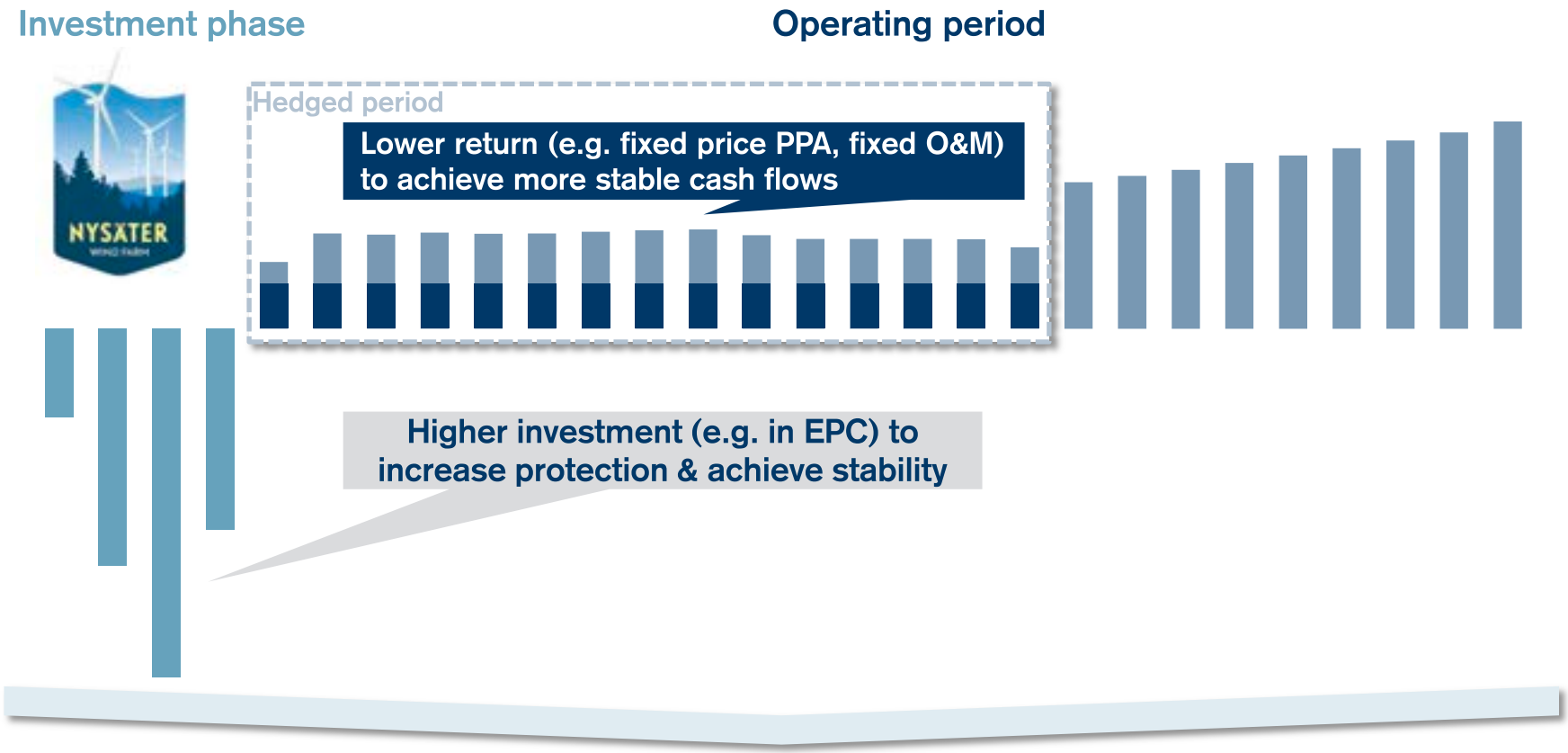
Higher — Risk — Lower

Risks	Turbine supply agreement	Light EPC	Full-wrap EPC	Mitigant
Cost overrun	Budget risk lies with employer and contractor		Budget risk primarily lies with contractor – extensive budget risk coverage	Budget guarantee
Delays	LDs (EUR/day/WTG)	LDs (EUR/day/MWh); where daily rate reflects PPA value	LDs (EUR/day/MWh); where daily rate reflects PPA value + FPA fines	Liquidated damages (LD) in case of delays
Soil risk	Soil risk lies with employer		Soil risk lies with contractor except for manmade objects	Coverage of soil risk by contractor
Adverse weather / force majeure event	Extension of time and budget for contractor	Adverse weather excluded but force majeure allows extension	Only force majeure allows extension	Coverage of adverse weather by contractor
Technical risks	■ Power curve, noise, grid compliance ■ Defect notification period		Power curve, noise, grid compliance Defect notification period for WTG works Defect notification period for serial defects Defect notification period for BoP works	Warranties
Counterparty risk	Standard 100% PCG with notice to proceed (NTP)	100% PCG with NTP for WTG and BoP works	100% PCG with NTP for WTG and BoP works + advanced payment, performance and warranty bank guarantees	Collaterals provided by contractor

Source: CSEIP, company information.
Note: BoP stands for Balance of Plant, EPC stands for Engineering Procurement Construction contract, WTG stands for Wind Turbine Generator and PCG stands for parent Company Guarantee.

In summary, robust final contractual framework allowing for stable cash flows…

Tailor-made contractual structure secures cash flow



The result is a balanced risk-return profile tailored to institutional risk-return appetite

Source: CSEIP.

…however, residual risks always remain

Revenues

- **Variance in natural resources** (e.g. wind, ice)
- **Regulatory changes** (e.g. interest deductibility)
- **Counterparty risk** (offtaker, O&M provider)
- **Force majeure**
- **Guarantee caps** (e.g. power curve and availability)

Costs during operation

- **Re-contracting risk**
- **Counterparty risk** (O&M provider, turbine supplier)
- **Force majeure**
- **Guarantee caps** (e.g. availability)

Investment costs

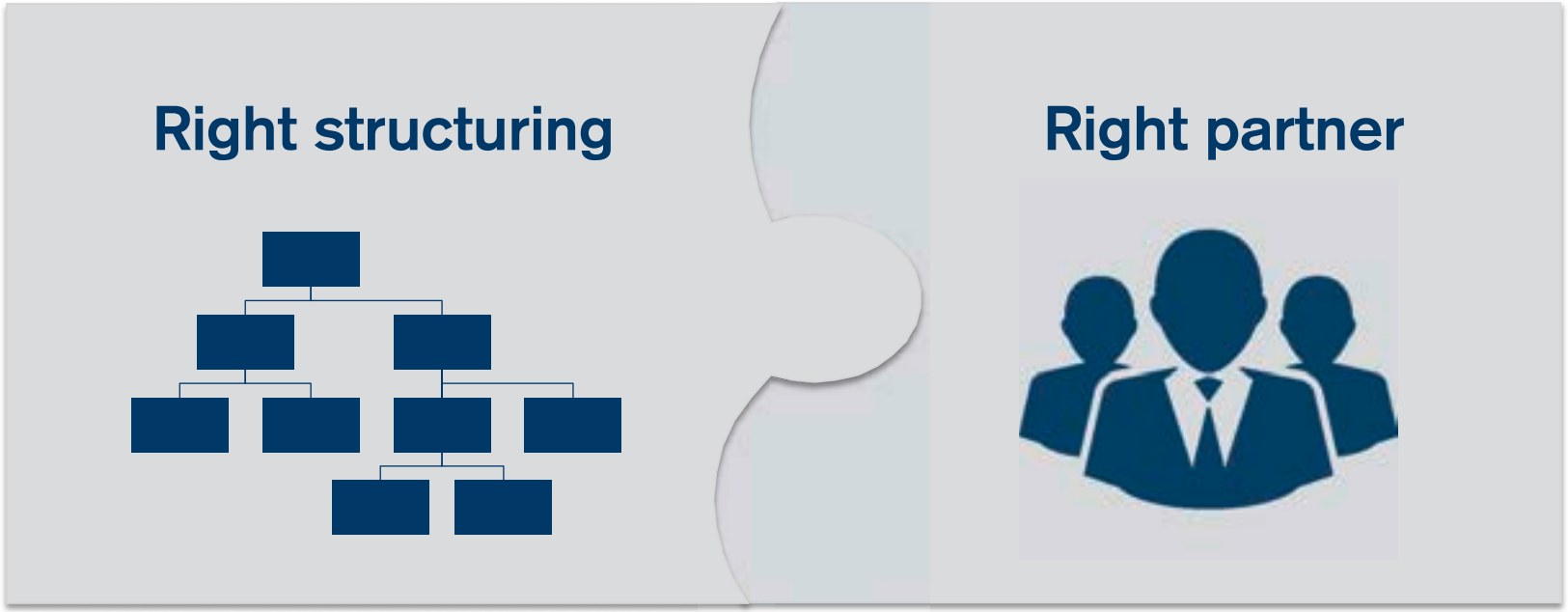
- **Counterparty risk** (O&M provider, turbine supplier)
- **Force majeure**
- **Guarantee caps** (e.g. serial defects)

The devil is in the detail

With expertise, risks can be mitigated but never fully excluded – there is no free lunch

Source: CSEIP.

How are stable cash flows and returns from long-term infrastructure investments realized in practice?



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Source: CSEIP.

Q&A

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