



PEXAPARK

How to best structure corporate PPA

Insights and trends from across Europe
applied to Poland

Gdańsk, 13-14 March 2019

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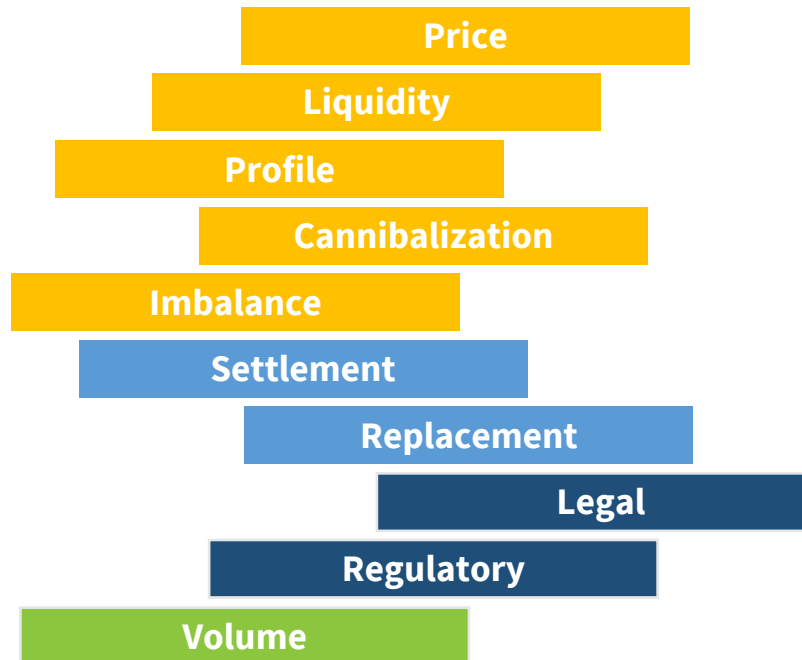
Introduction –
Energy Risks and
their Allocation

Chapter 1

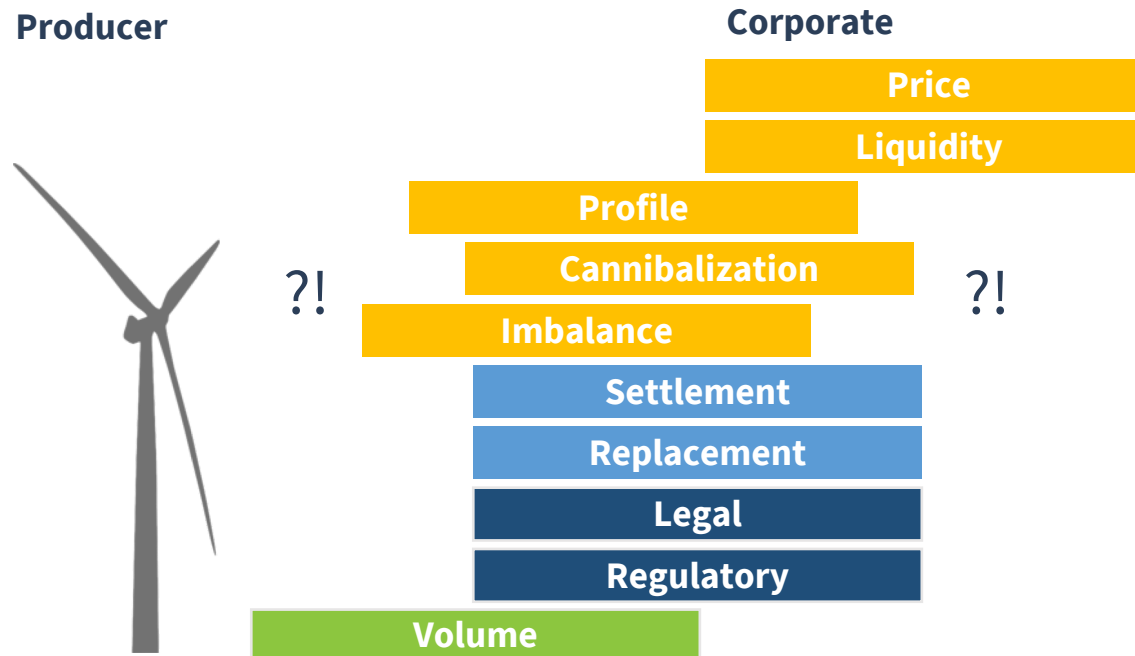


Energy Risks Involved in Producing and Selling Electricity

Exposure to uncertainties when producing and selling energy



Risk Allocation under a Corporate PPA

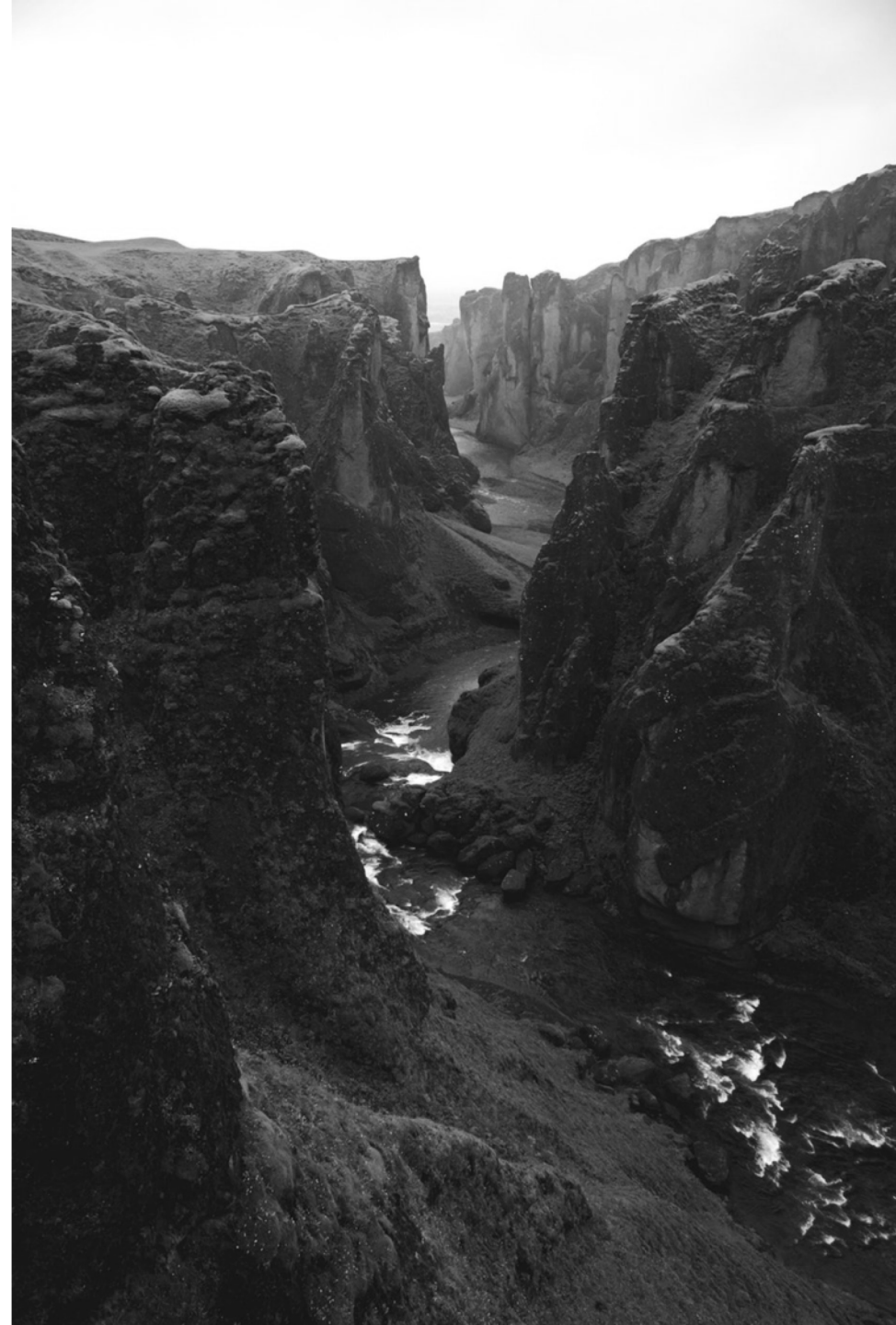


- Energy risk considerations are the same as for a utility PPA
- Imbalance and profile risks need to be carefully looked at from both sides
- Structure normally more complex, as on notional basis, requiring a service provider for the physical leg
- Credit risks (settlement and replacement) are generally of higher concern in the corporate world than with utilities

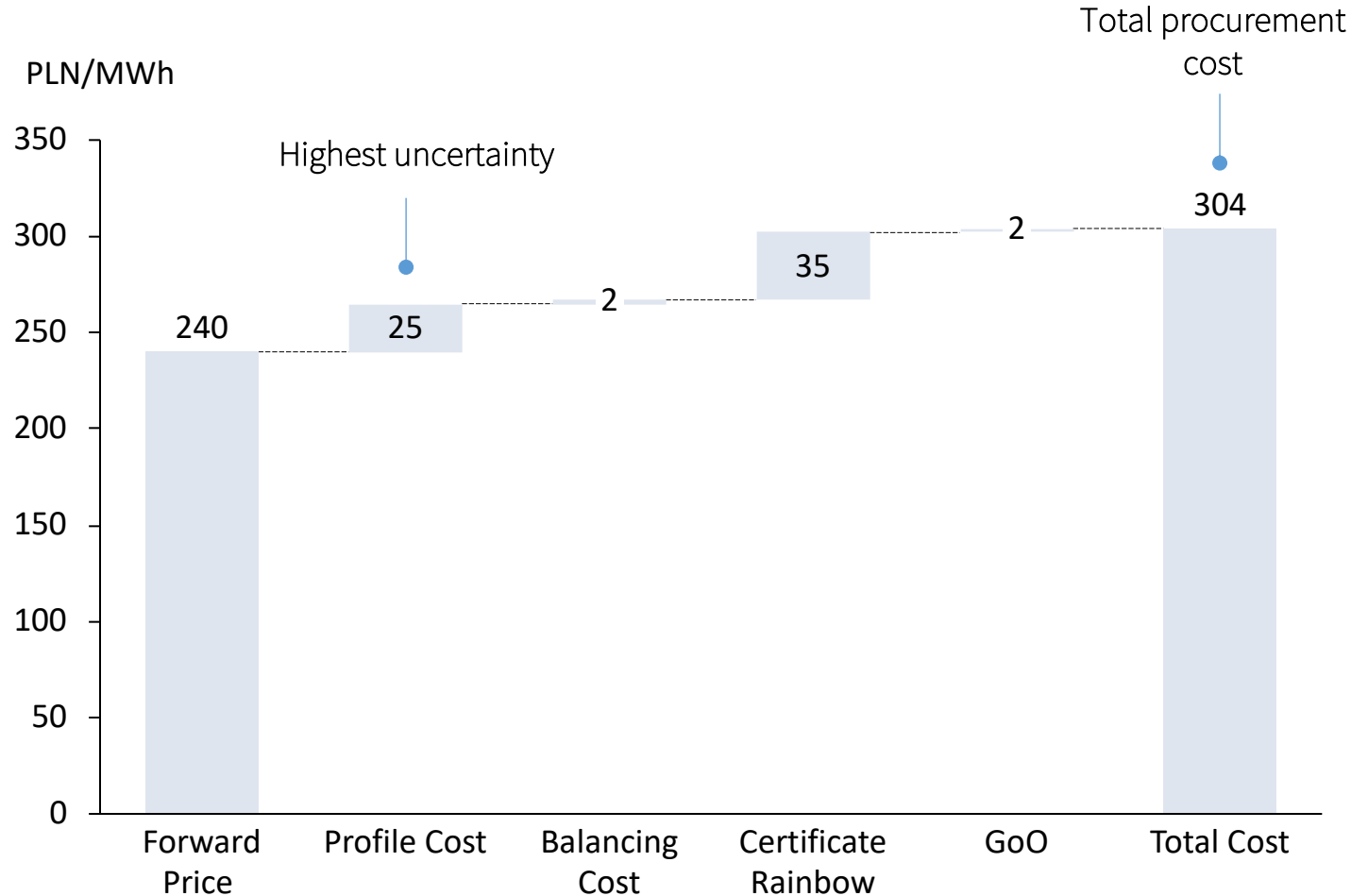


Electricity
Procurement – View
from the Corporate
Side

Chapter 2

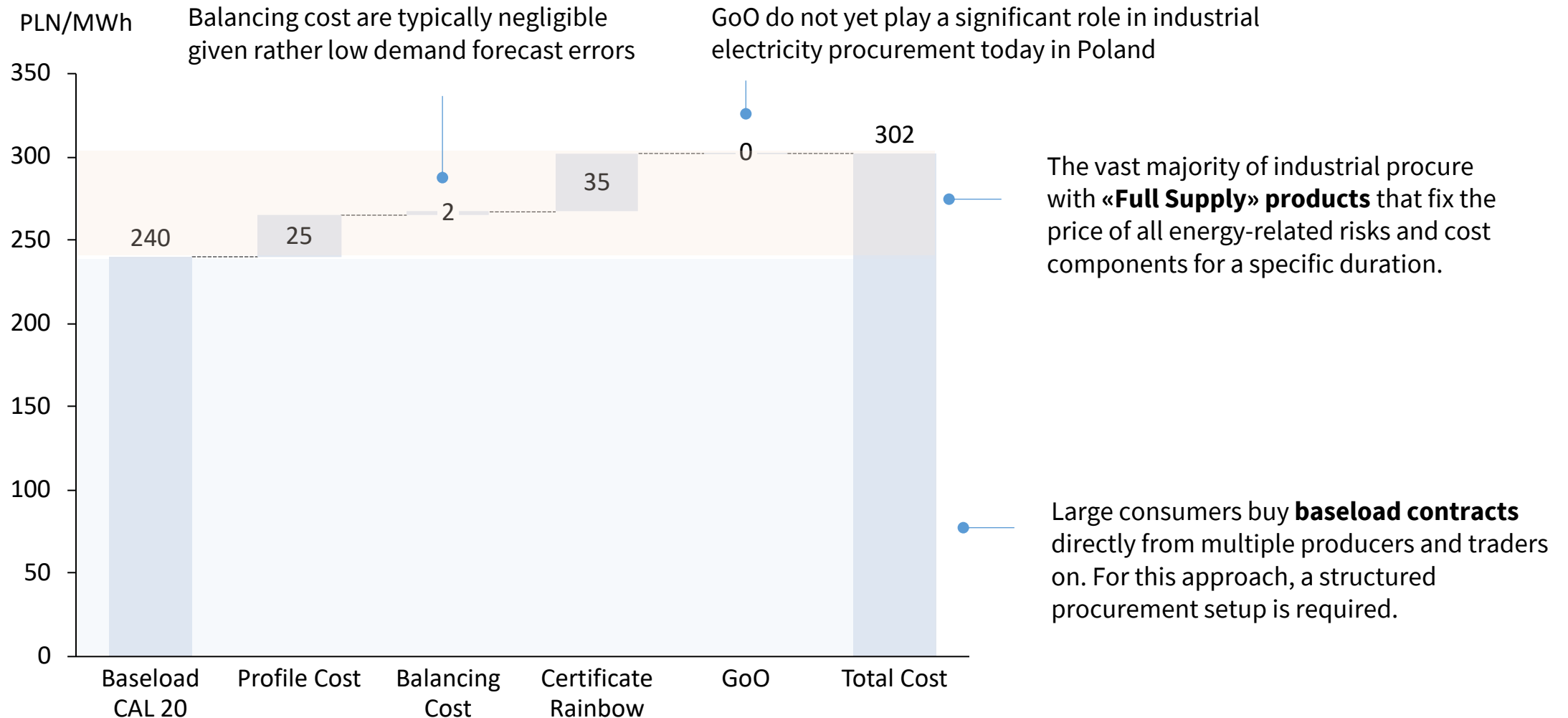


The Energy Risk Waterfall for a Corporate in Poland

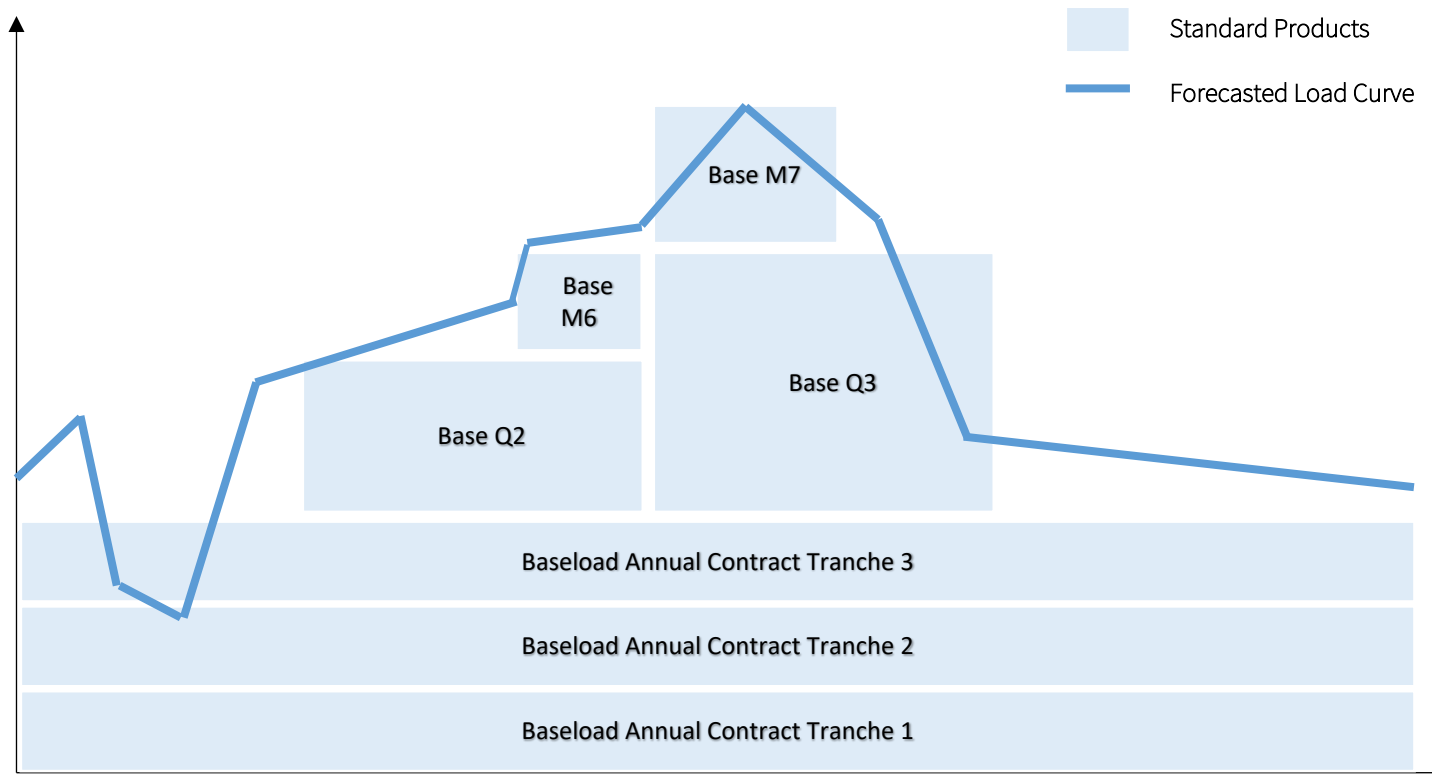


- Reference price used by market participants are exchange traded baseload forward contracts (e.g. TGE BL CAL 2020)
- The principal risk elements are profile and balancing cost
- The quota obligation on certificates is a typical local differentiator
- GoO are a voluntary contribution
- Credit costs and utility margins are not considered yet

How industrial electricity procurement looks in Poland today



Structured Procurement Approach used by Large Industrials



- To minimize timing risks, tranches are purchased in regular intervals
- To spread credit risks, tranches are procured in standard products from multiple sellers
- A utility and/or trader is engaged as balance responsible party to cover daily deviations between forecasted load curve and actual consumptions (“balancing cost”)
- In similar way, profile costs is either realized on daily basis or fixed in “off-standard” products

The key challenges for corporate procurement



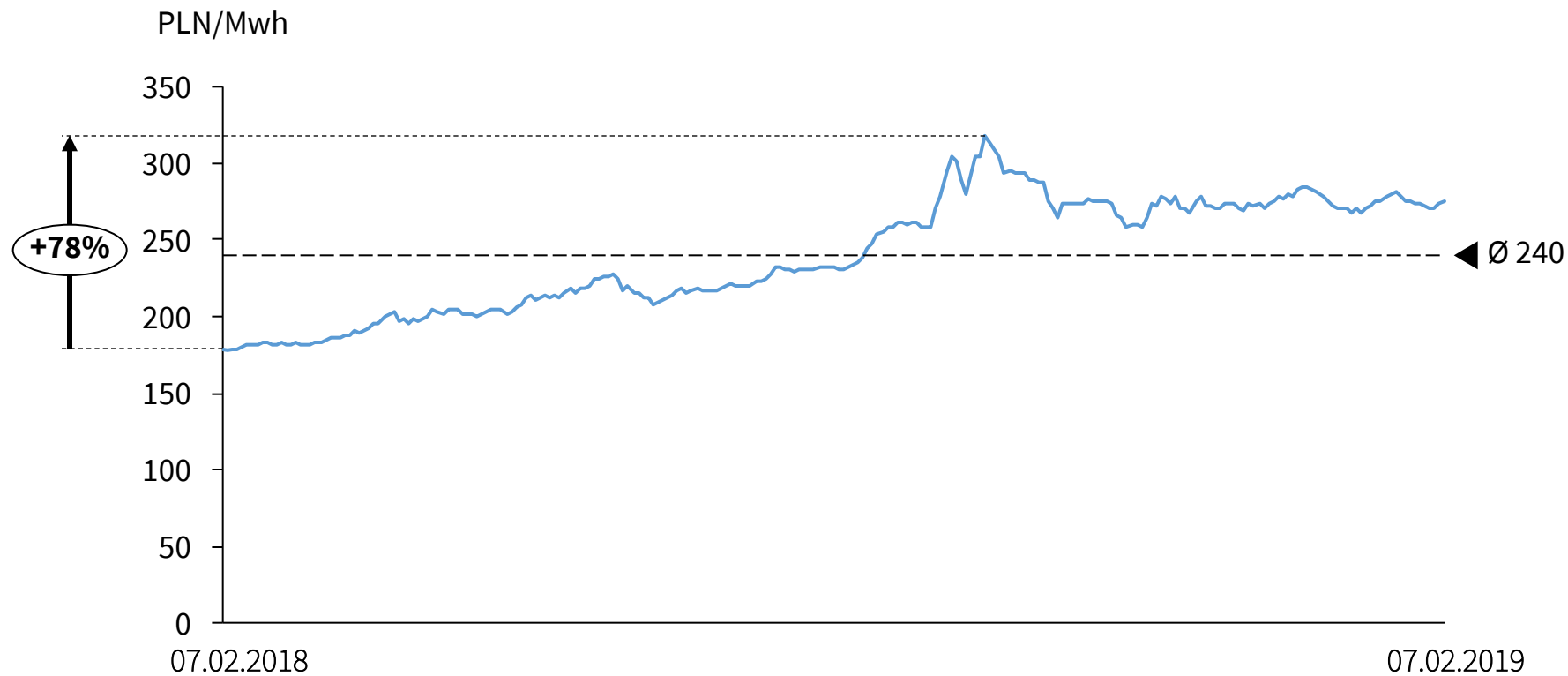
Timing Risk

Competitive
Product
Pricing

Procure-
ment Setup

Timing risk – When to buy?

Settlement Price CAL BL 2020¹



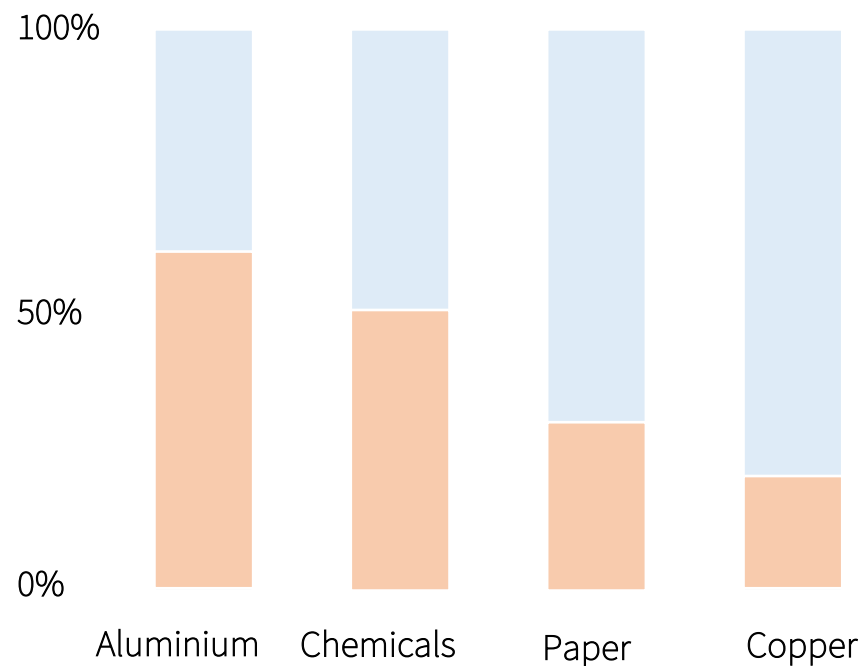
¹ Source: TGE

Price Risk

- Price of CAL20 Baseload was between 179 and 318 PLN/MWh during the last 12 months
- Timing is critical to secure value
- Solution: Structured Procurement to achieve averaging effect

Competitive Product Pricing – Electricity Cost Impact on COGS

Electricity as a Share of Total Cost of Goods Sold (COGS)¹



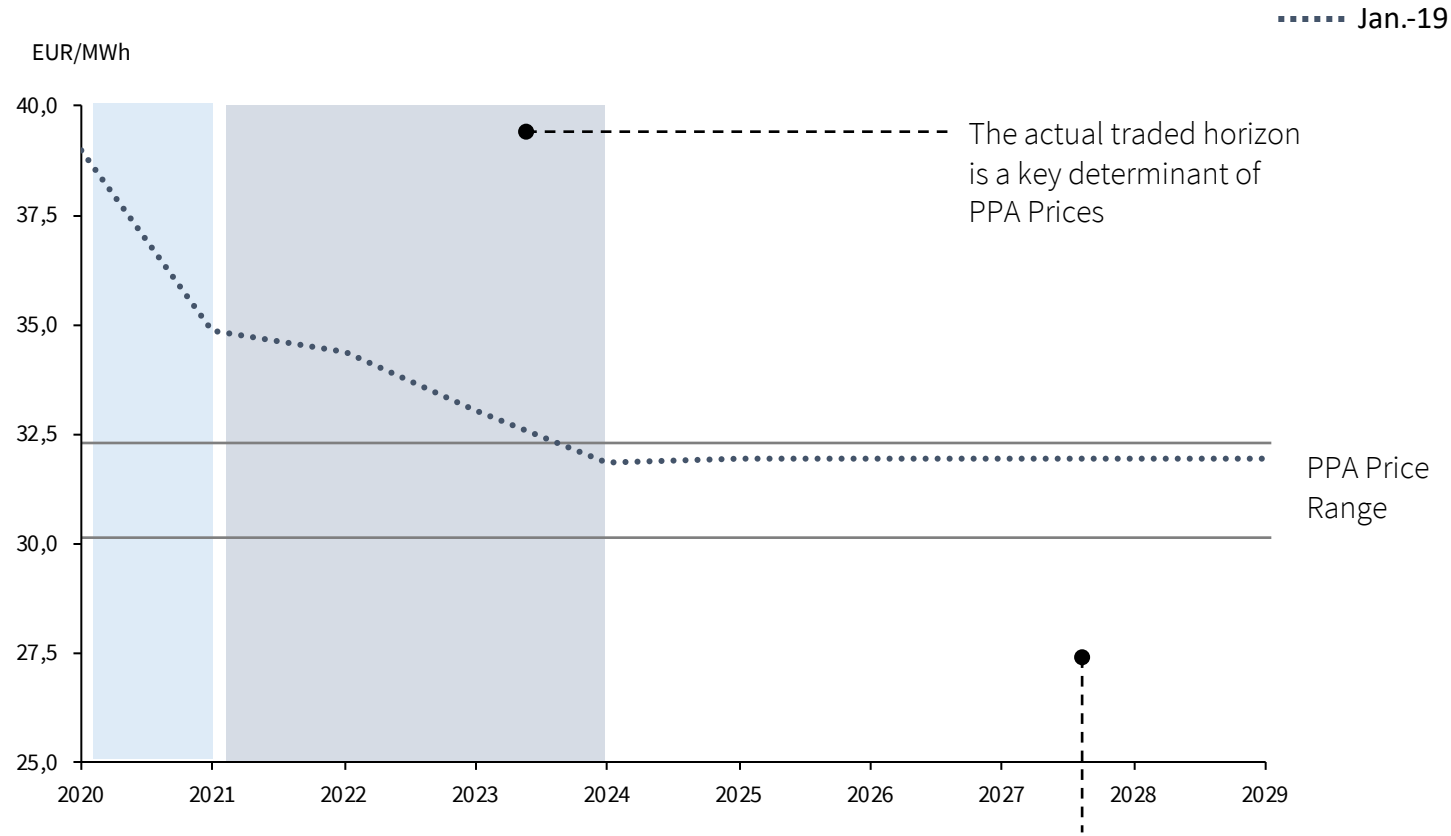
- Structured procurement approaches to reduce timing risks (“Averaging effect”) were first introduced by industries with high electricity share in COGS
- From a risk management point of view, it makes sense for all involved parties to limit their electricity procurement to the liquid horizon. First to limit liquidity premiums, secondly to reduce risks to deviate from industry average.
- Traditional large and long-term industrial electricity consumer have a very large share of electricity cost in their total COGS and occurred in markets with larger degree of price visibility. A rigorous electricity procurement strategy is key to business success

¹ Cost of Goods Sold is a metrics that shows the direct costs attributable to the production of the goods sold by a company or the services provided. This includes the cost of the materials used in creating the good, along with the direct labor costs used to produce the good or service. Estimates from Fraunhofer Institute Study “Electricity Costs of Energy Intensive Industries



Liquid Markets Support Price Discovery

Price Forward Curve – Nordics¹



1 Source: NASDAQ

Factors that determine the «tenor» structure of the market

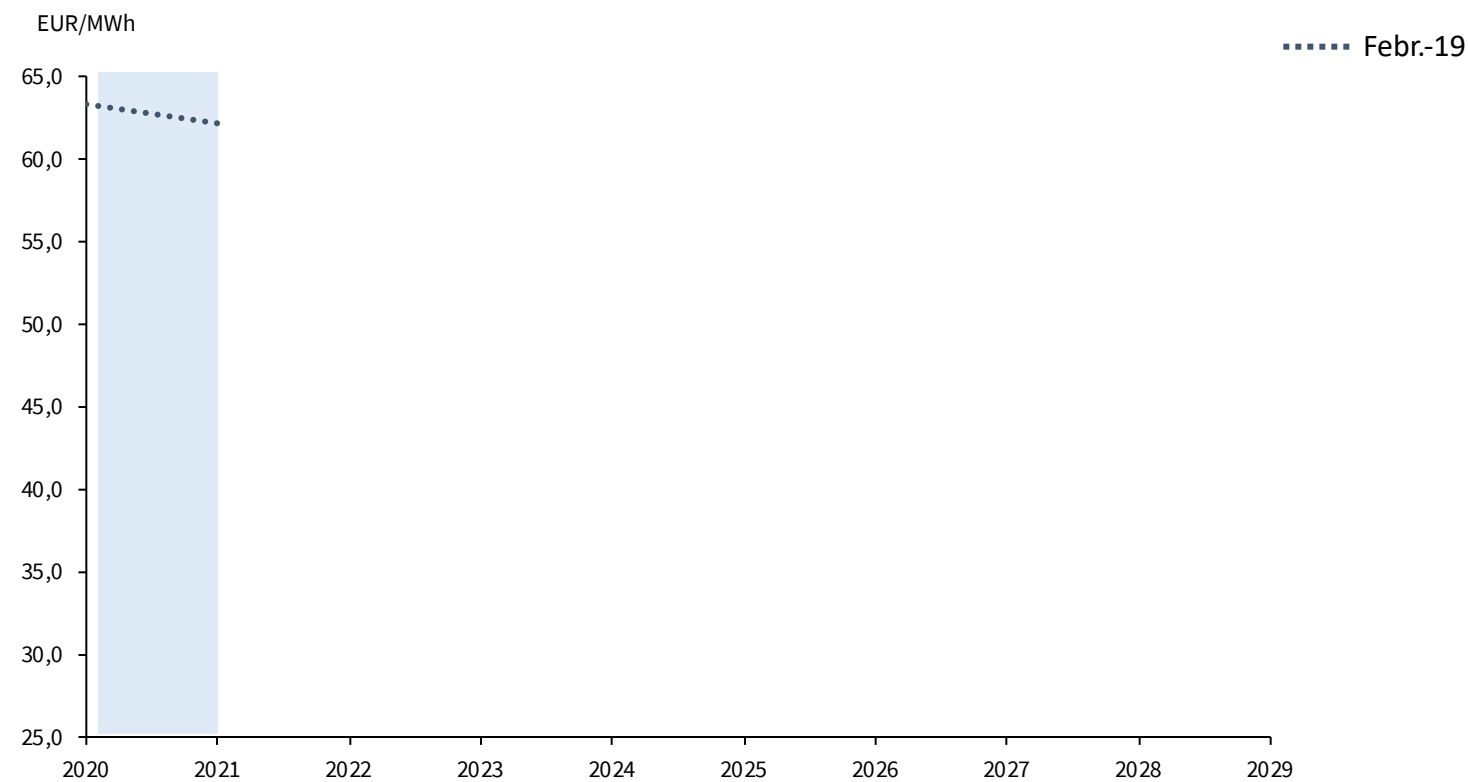
- Some buyer have a need to hedge electricity cost over long tenors
- Retail demand generally limited to 1-3 years
- Maturity of trading market and services
- Presence of risk capital (and its regulation) and risk appetite in form of trading houses

Rather illiquid. Relatively low volatility of observed prices



Price discovery in Poland

Price Forward Curve – Poland¹



¹ Source: TGE



Procurement Setup

- Systems allowing for transparency on positions and costs
- Internal price forward curve for valuation
- Defined procurement strategy
- Execution setup
- Accounting Treatment



Renewable
Corporate PPA in
Poland – The View
from the Producer

Chapter 3




What is not so important...

PPA Structure

It's a technical matter

The Key Challenges on the Energy Side for New Renewables

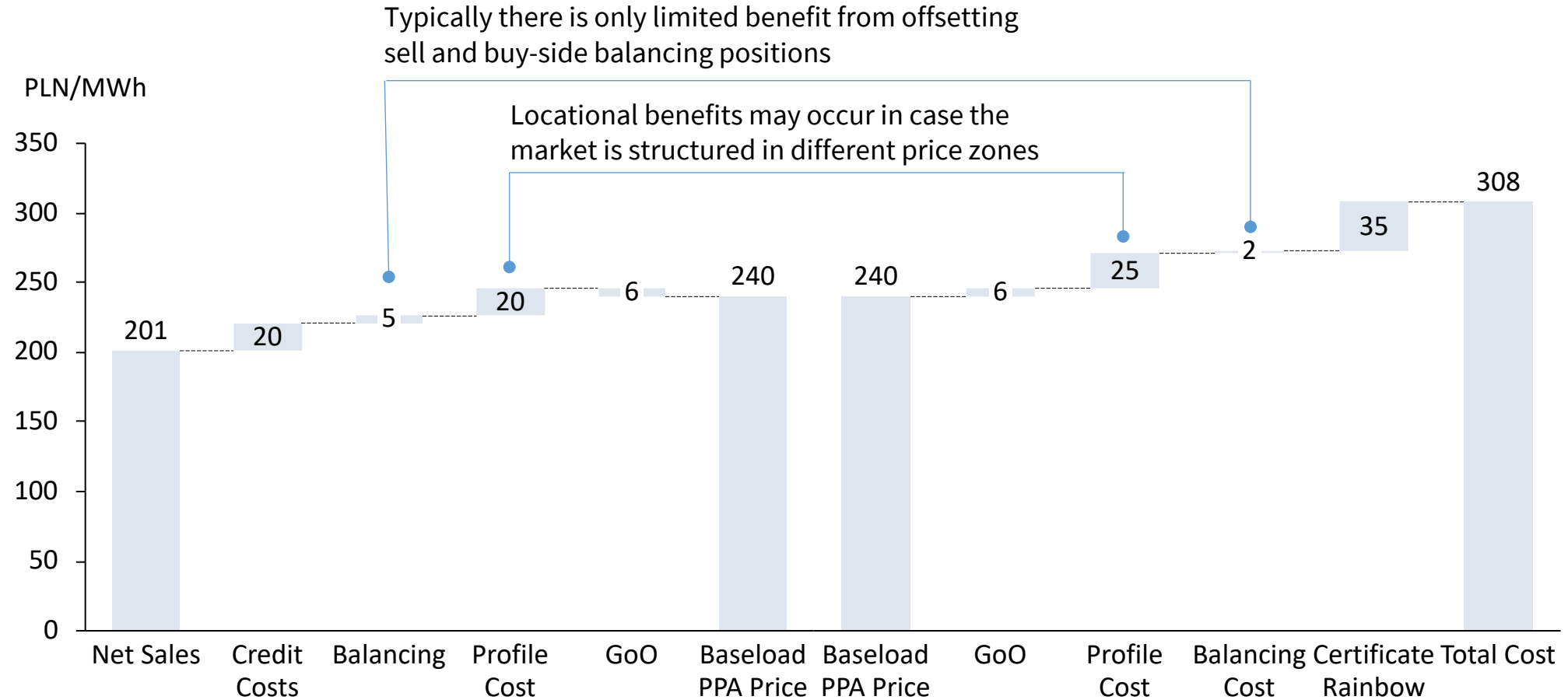


Risk appetite
for long-term
deals

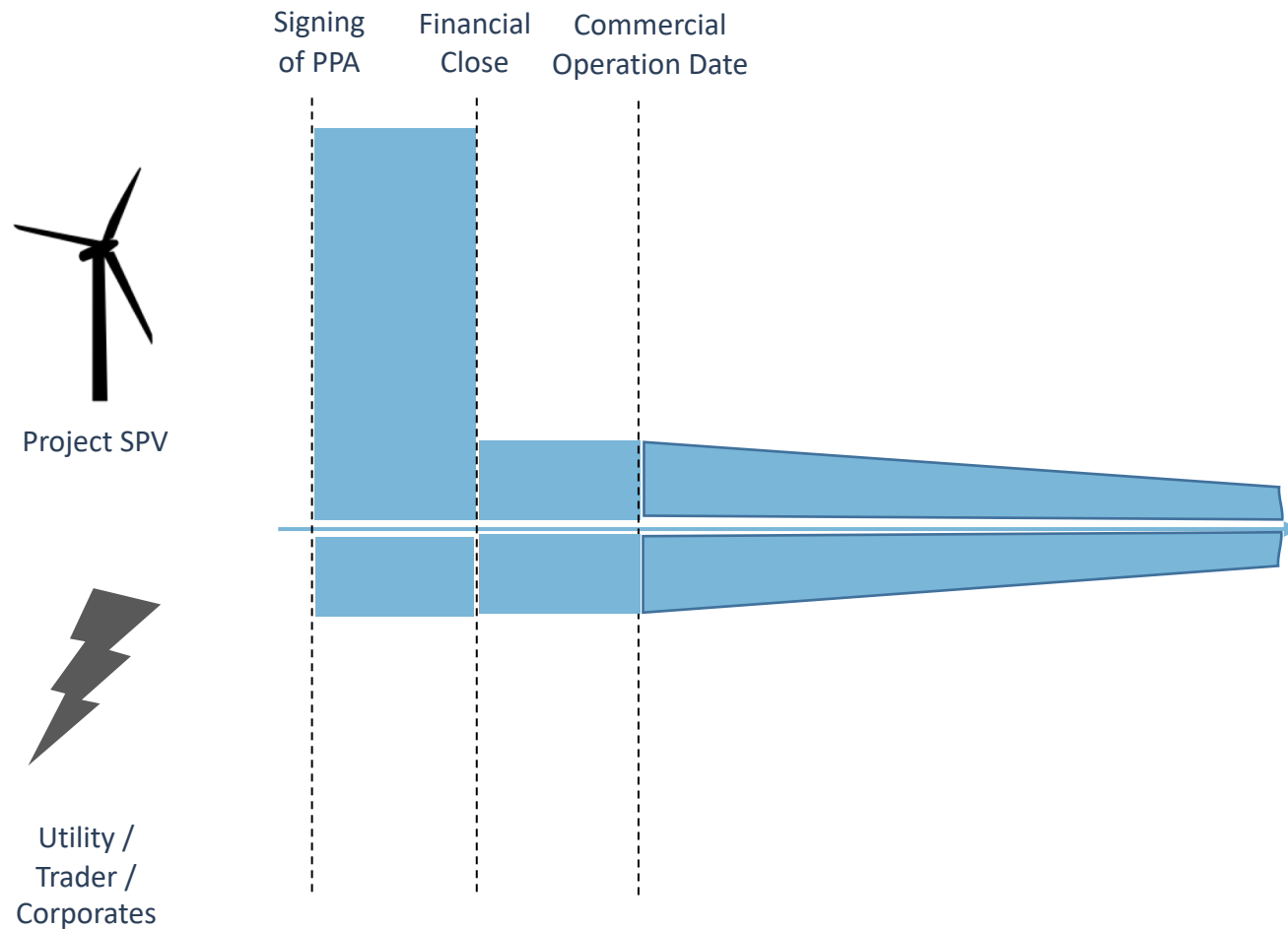
Securing
bankability of
cash flows

More
exposure to
Energy Risk

Price Match on Baseload Basis



Typical Guarantee Structures in long-term PPAs



- The amount of credit securities required is assessed on case-by-case basis
- The main driver is the Replacement Exposure which is the difference between the purchase price and current value of the energy (“mark-to-market” exposure)
- Typical additional security guarantee requirement on both sides may range from 50 to 100k EUR per installed MW¹



Credit Insurance make industrial PPA cash flows bankable

- Typically, industrial offtakers have lower credit ratings than utilities which is negatively affecting their “bankability”.
- In addition to private insurances, an important enabling factor for industrial PPAs e.g. in Norway is the so-called «GIEK» scheme. GIEK is the Norwegian Export Credit Guarantee Agency.
- The insurance covers up to 80% of the credit exposure under long-term PPAs that are concluded with industrials in the wood, chemicals and metals business located in a Norwegian price zone.
- The guarantee is calculated on the basis of a credit rating from an independent third party (e.g. Standard & Poors) and might be limited in terms of coverage.

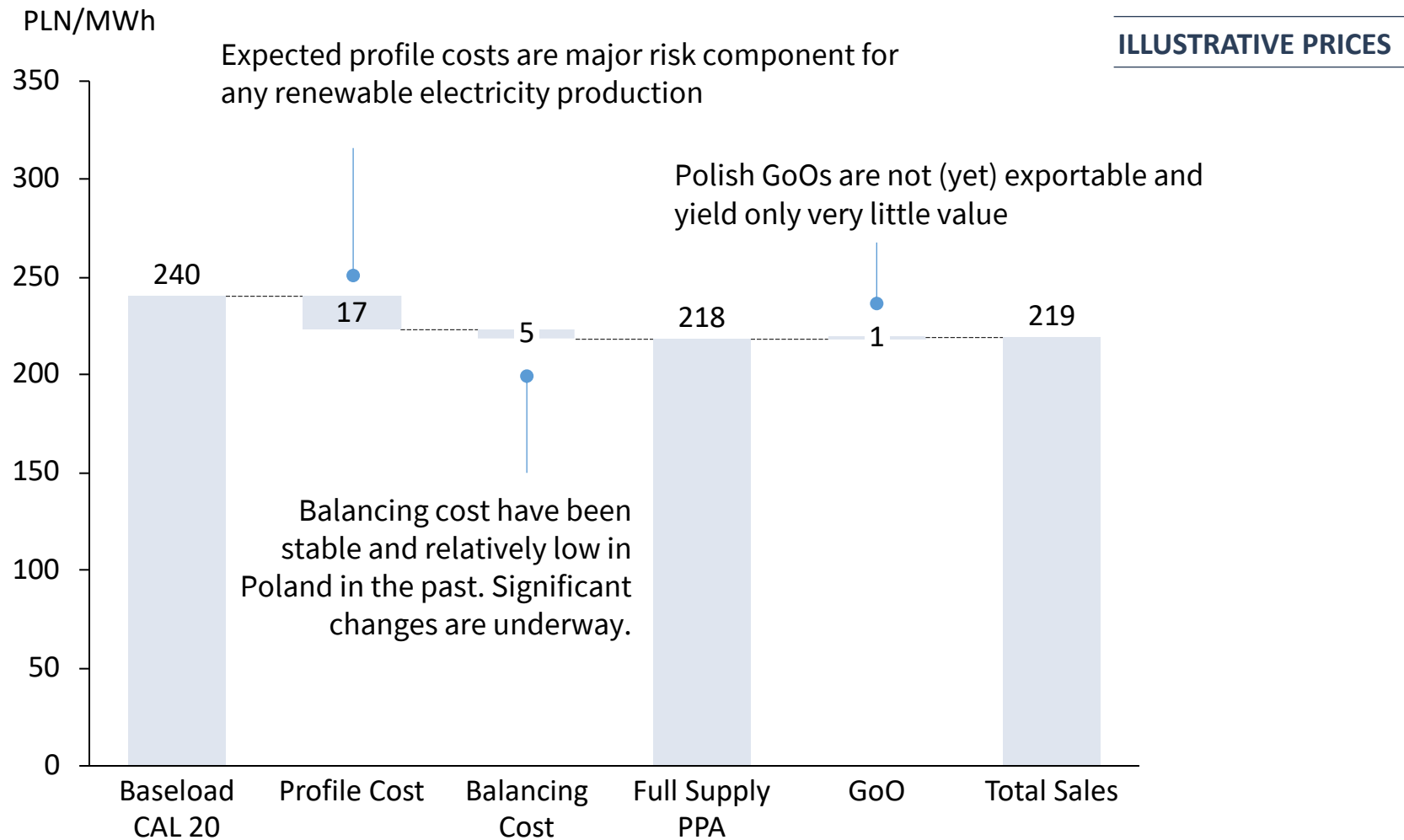
Indicative quotes for Guarantee premiums

EUR/MWh

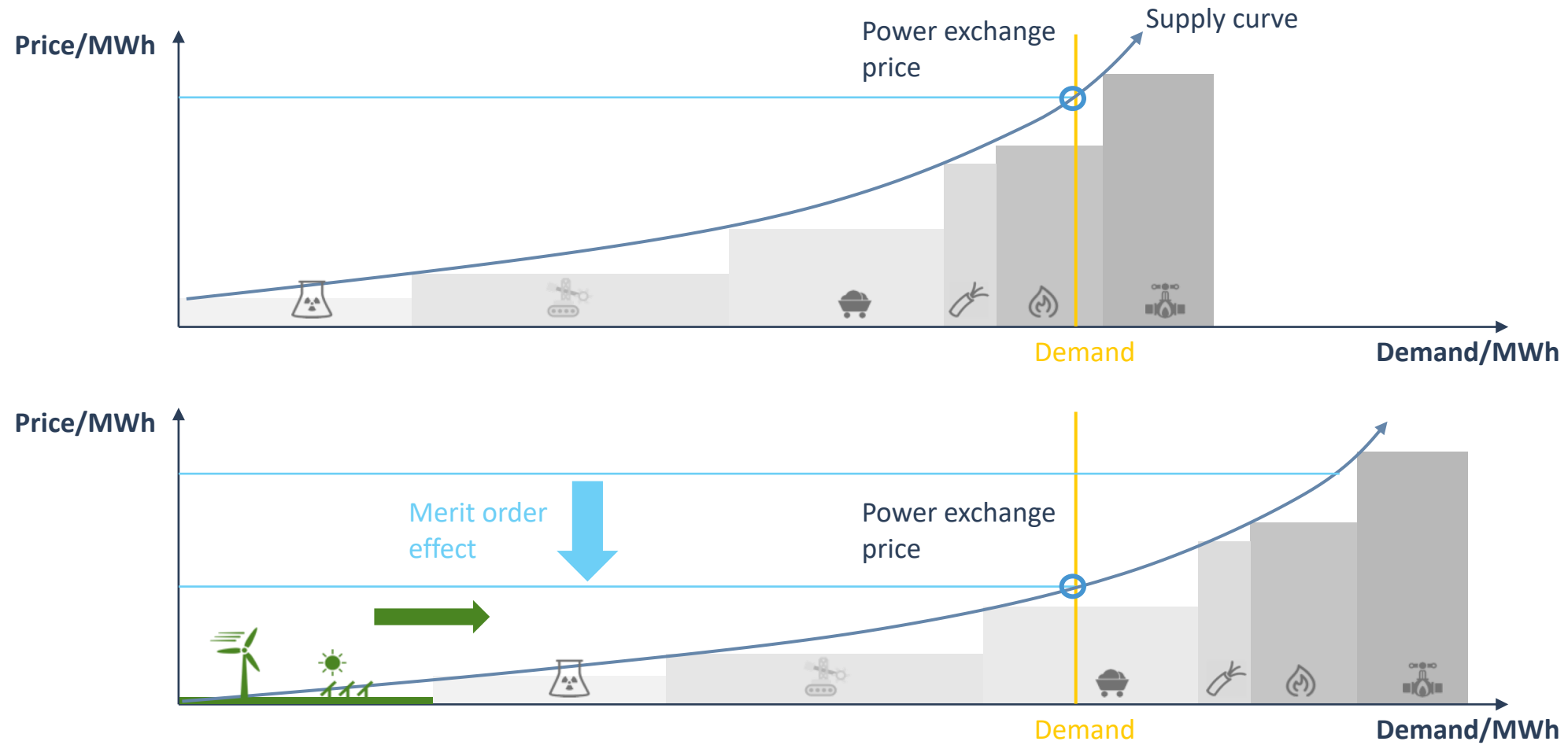
Guarantee premium (EUR) per MWh produced. Sensitivity table with rating and coverage interval

| Rating | Interval down to (EUR/MWh) - > | | | | |
|--------|--------------------------------|-------|-------|-------|------|
| | 25,00 | 20,00 | 15,00 | 10,00 | 0,00 |
| BB | 0,74 | 1,07 | 1,32 | 1,55 | 1,98 |
| BB- | 0,93 | 1,31 | 1,59 | 1,82 | 2,25 |
| B+ | 1,10 | 1,53 | 1,82 | 2,06 | 2,49 |

Electricity Revenues for Renewables in Poland



Explained: What Drives Profile Value





Costs for Balancing and Physical Services in Poland

- The main driver of imbalance cost in Poland is the design of the balancing system with symmetrical prices both for short and long positions, making the spread between Spot and balancing price the key cost indicator.
- Given our market research and transaction experience, balancing costs for wind production have been on a clearly decreasing trend for the last 5 years. Indicated levels then were above 2.0 EUR/MWh compared to 0.90 -1.00EUR/MWh today¹.
- Lately, a significant uptick in pricing has been noticed which might be the result of changes to spread in balancing and spot market prices and premium for expected regulatory changes.
- Generally speaking, market participants attribute the market, a high level of competition intensity. Correspondingly, the offtaker claims the risk taking service, a low-margin business.
- Across Europe (and so as well in Poland) we have noted a trend among lenders to allow a rolling management of balancing costs with initial fees typically only fixed for 1-2 years and then followed by a competitive tendering process.

¹ Source: Pexapark Team Analysis

Poland not yet part of European GoO system

- Poland is not yet part of AIB (Association of Issuing Bodies)
- The AIB operates the inter-registry telecommunications hub. It facilitates and harmonizes trading of GoO via the EECS (European Energy Certificate System)
- On the European markets, GoOs currently trade above 1.5 EUR/MWh while the local market value for Polish GoOs is approximately only 0.10 to 0.20 EUR/MWh
- The Ministry of Energy is currently preparing the policy to enable export of GoOs from new built renewables in Poland which is currently not possible



Last words: Why it might be a good time now for Corporate PPAs in Poland



- Across Europe, most Corporate PPAs have been closed on top of support systems (e.g. SDE+ in Netherlands, elcertificates in Sweden, GIEK credit insurance in Norway)
- A key characteristic of the recent Polish auction was that many projects bided (successfully) low CfD volumes compared to P90/P50
- To reduce exposure to market risks mid-term corporate PPAs (5-7 years) on top of the CfD might be a viable evolution for corporate PPA deal making in Poland
- Mid-term structures would be in many ways easier: price discovery, bankability requirements



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PEXAPARK at a glance



Company started

August 2017



of employees

24



PPAs in last 12m

+3.0GW



Headquarters

Zurich

OUR PURPOSE

Build a 100%
renewable
energy future

OUR VISION

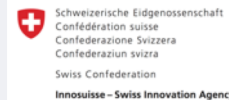
Be the global
transaction
platform to
sell and buy
renewable
energy

OUR MISSION

Making
energy sales
and PPA
transactions
simpler and
cheaper



SUPPORT AND MEMBERSHIPS



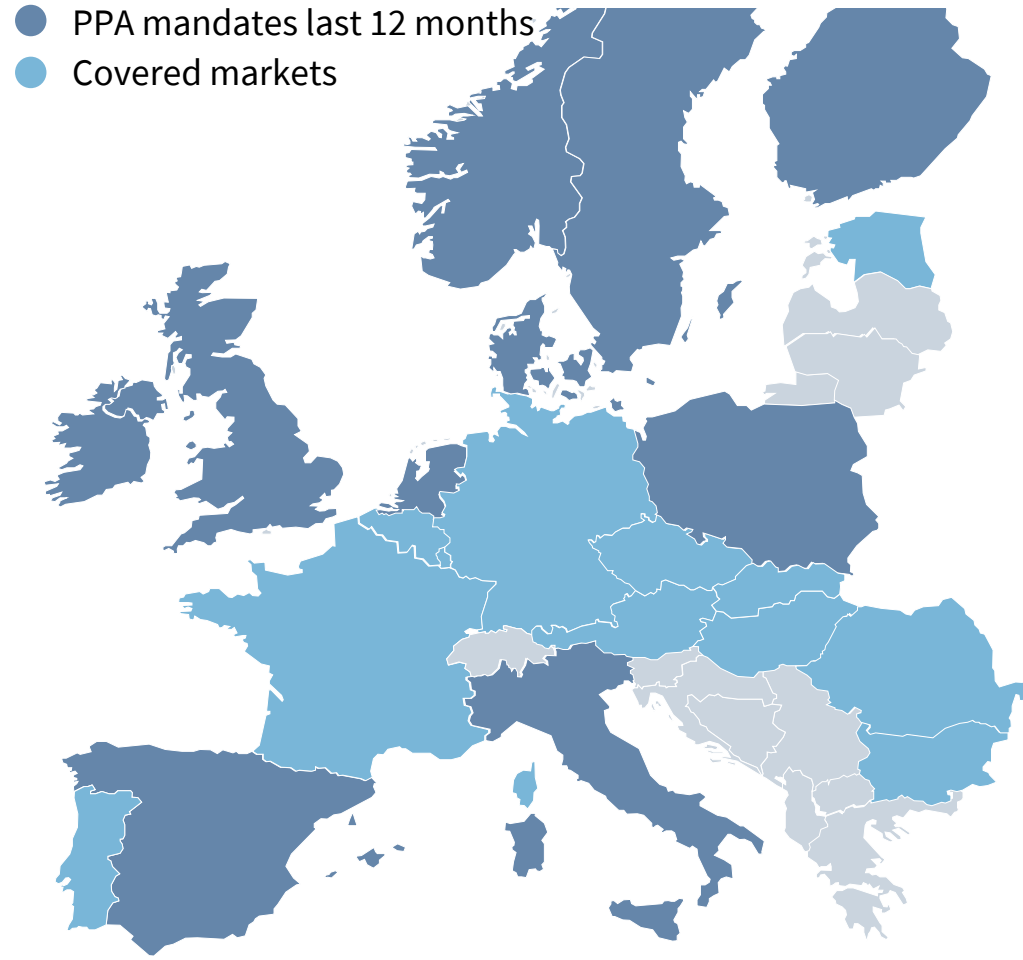
NORD
POOL

Wind
EUROPE

SolarPower
Europe

Crypto Valley
Member

Pexapark advised on +3'000 MW of PPA transactions in Europe over the last 12 months



Among others

ABO
WIND

CREDIT SUISSE

TAAIERI

ENCAVIS

PNE
pure new energy

re cap
global investors

Vestas

MEAG

VORTEX

EUROPEAN
ENERGY

TOTAL

enern

FONTAVIS
CLEAN ENERGY INVESTMENT

winergy

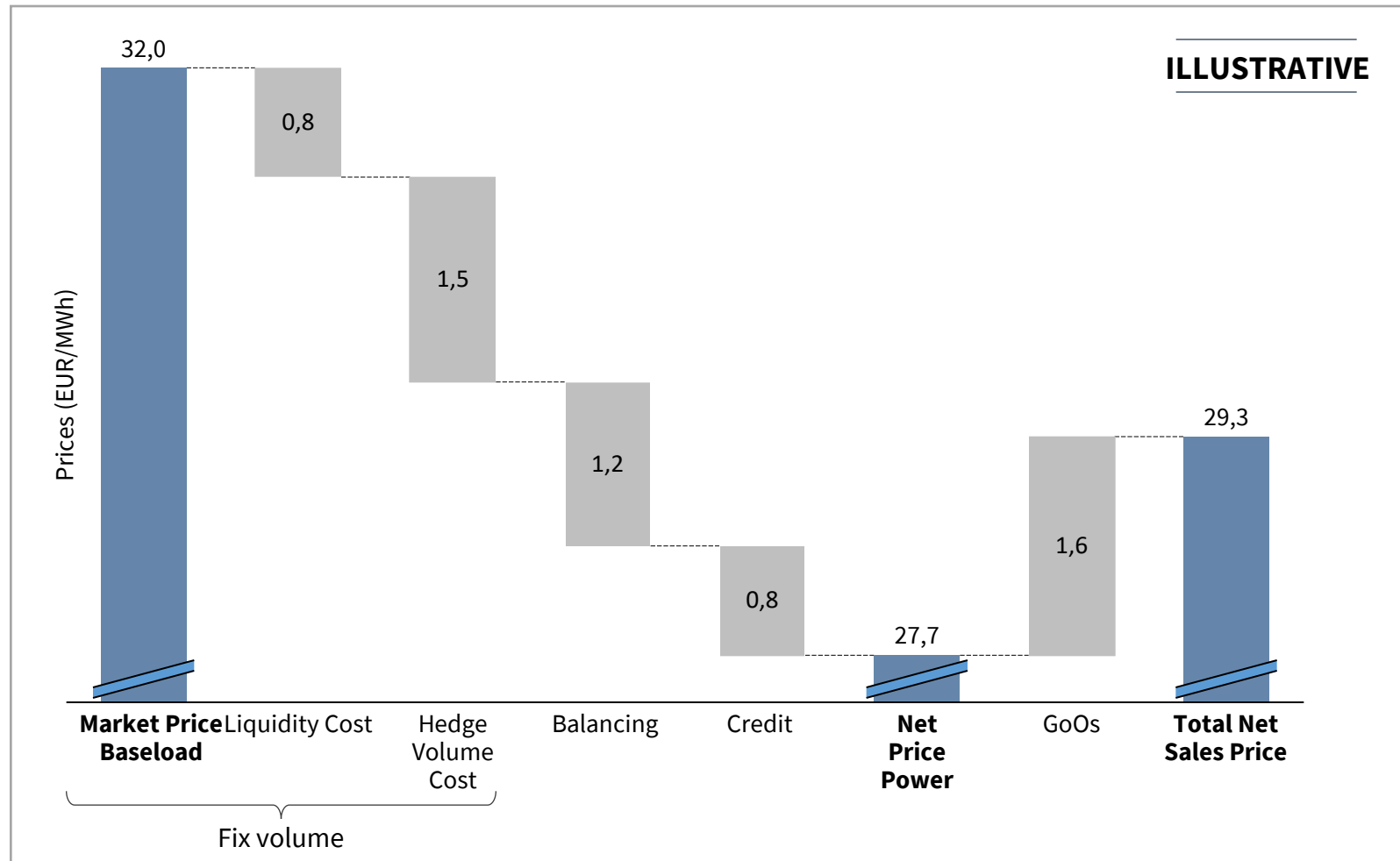
solarcentury

Samples of Pexpark PPA advisory works



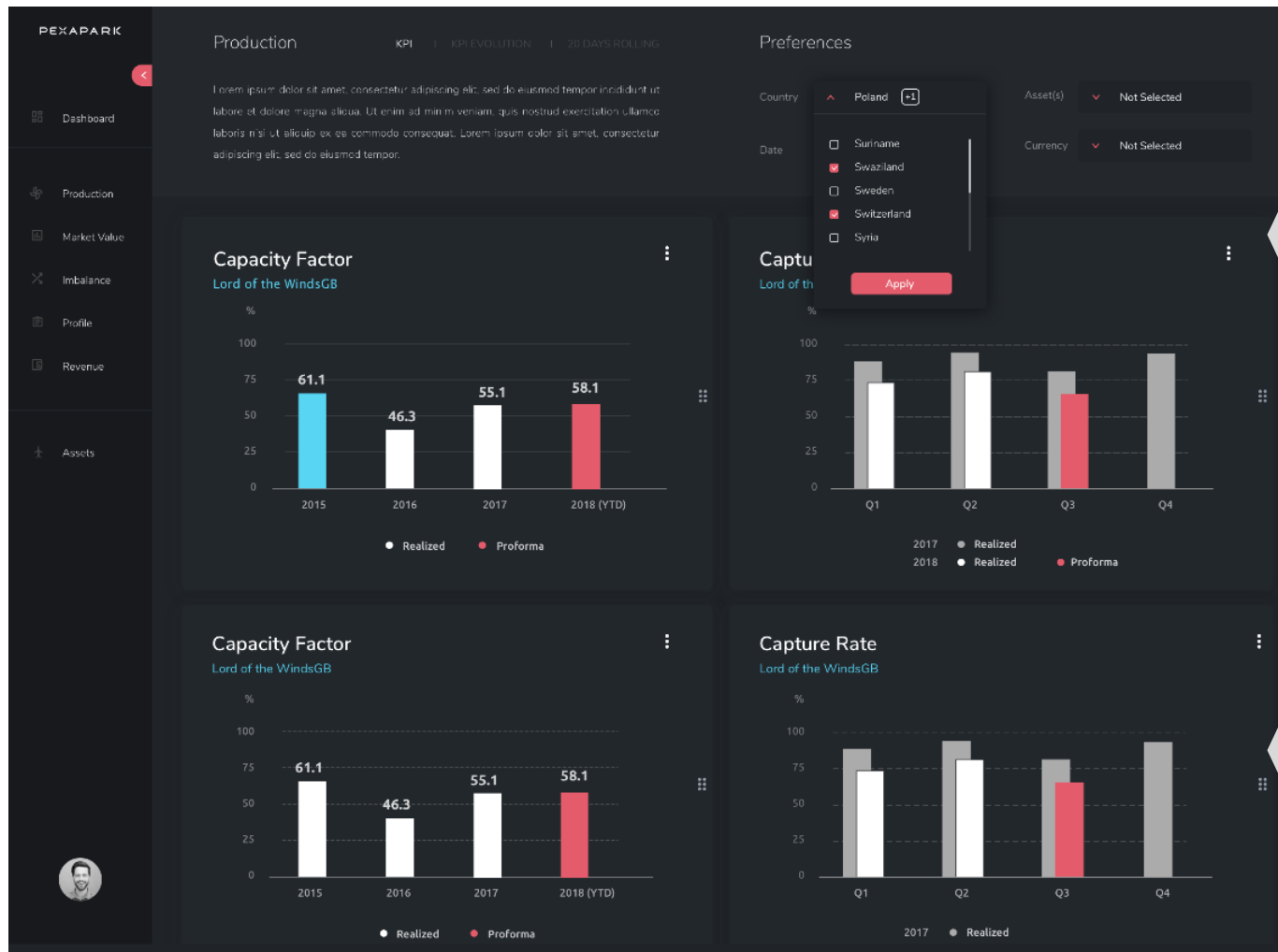
| Transaction | Country | Clients | Our role | Jobs performed |
|--|--------------------------|---------------------------------------|----------------------|---|
| Structured offtake arrangements for power, elCerts and GoO (15 year, 18 TWh) | Sweden | E.On / Credit Suisse | Analytics | <ul style="list-style-type: none"> Commercial PPA Review of 6 structures Quantification and pricing of selected risks Development and verification of settlement mechanics for lenders |
| Long-term PPA for non-subsidized solar projects | Spain | Not disclosed | Transaction Mandate | <ul style="list-style-type: none"> Management of PPA transaction with 3 offtakers Valuation of entire risk exposure Optimization of hedge profile and volumes |
| Various long-term PPA structures | Nordics, Poland, Ireland | Selected inst. investors & developers | Analytics | <ul style="list-style-type: none"> Commercial Review of PPA offers Quantification of selected risks Tactical advice on route to market and execution |
| Long-term PPA structures for portfolio of new builds | Nordics, Iberia | Not disclosed | Transaction Mandates | <ul style="list-style-type: none"> Pan-European advisory framework for entire portfolio of new built Tactical advice on execution |
| Auction Bid | Poland | Not disclosed | Analytics | <ul style="list-style-type: none"> Quantification of selected energy risks and hedging strategies / bids under a specific auction regime |

Example I on energy risk analytics – Quantifying and pricing all underlying energy risks



- Each risk is quantified and underlying drivers explained to aid decision making
- Applying a continuous, rigorous energy risk management approach reduces errors, costs and exploits market (in)efficiencies
- Tactical experience in negotiations important

The Monitor allows to keep an overview of the portfolio while allowing for deep dives



- ✓ Production
- ✓ Revenue
- ✓ Market Value
- ✓ Profile
- ✓ Imbalance
- ✓ Mark-to-Market (NPV)

MAIN CATEGORIES

- ✓ Contract notifications
- ✓ Portfolio view
- ✓ KPI filters and comparison
- ✓ Contract storage
- ✓ Reports
- ✓ Budget tracking

SELECTED FEATURES

Knowing what is happening in PPA markets – Stay updated with PPA Market Insights Report



- Contents
 - PPA market summary
 - Overview of market offerings and players
 - Detailed discussion of pricing structure and risk allocation
- Frequent updates
- Countries available: Spain, Poland, Finland, Sweden

Become a bit like an energy trader with Pexapark's PPA Academy – key concepts, tools and practical examples



WORKSHOP OVERVIEW

From FiT To FiP And PPA Markets

- What characterizes the post-Fit world
- Risks in FiT, FiP and PPA markets
- Key PPA considerations

Energy Risk Management Framework

- Basics on energy risk management
- Key activities and analytics
- Policy, risk analysis and hedging
- PPA execution

PPA Execution Program

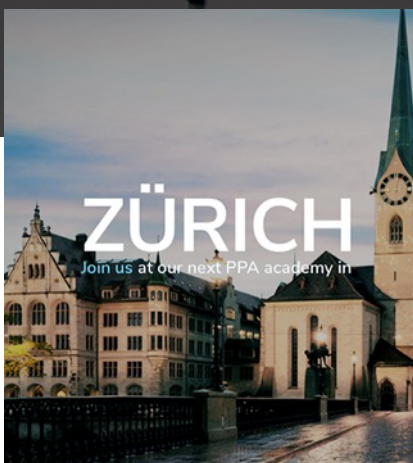
- What are the biggest risks
- Designing the optimal RfQ
- Other execution approaches

PPA Structures

- What is a typical PPA structure
- PPA pricing formulas
- Risks associated with pricing
- Typical corporate PPA structures

A Primer On Energy Risk Analytics

- Flat price risk
- Market liquidity risk
- Profile risk
- Imbalance risk
- Volume / Hedge profile risk
- Credit risk



A highly qualified PPA Team with hands-on experience on more than 5'000 MW of renewable PPAs across Europe

Management



Michael Waldner
CEO, Co-Founder



Luca Pedretti
COO, Co-Founder,
Head of PPA Practice

PPA Advisory



Jens Hollstein
Germany & Nordics



Grzegorz Skarzynski
Eastern Europe



Matthieu Ville
Southern Europe



Richard Boydell
UK & Ireland

Energy Analytics



Christoph Staub
Senior Energy Quant



Amanda Niklaus
Energy Analyst



Vladimir Kadlec
Senior Energy Structurer