

Harnessing Uncertainty: How to handle Volumetric Risk for RES

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Global Presence

Structured around 4 regional hubs



Challenges and goals of the energy transition are even harder with...

...a global landscape changing significantly



Rising tensions between USA & China disrupting supply chains



Shifting global dynamics w/ Russia-Ukraine & Israel conflicts at the centre



Climate crisis with serious effects more visible than ever

Higher inflation

~5% (~€90 M)

increase in EDP's OPEX base (from 2021 to 2022)

Higher interest rates

+110 bps (>€84 M)

increase in EDP's cost of debt (2020 to 22)

Declining energy prices

~20%

decrease in pool price for 2024 and 26 in Iberia vs. BP assumptions

Increased CAPEX costs

~20%

increase in EDPR's CAPEX/MW (2023 vs 21)

Record high CO2 emissions

15%

% increase of CO2 in the atmosphere 2022 vs. 2002

Water levels at an all-time high

99

Millimetres sea level rise 2022 vs. 1993

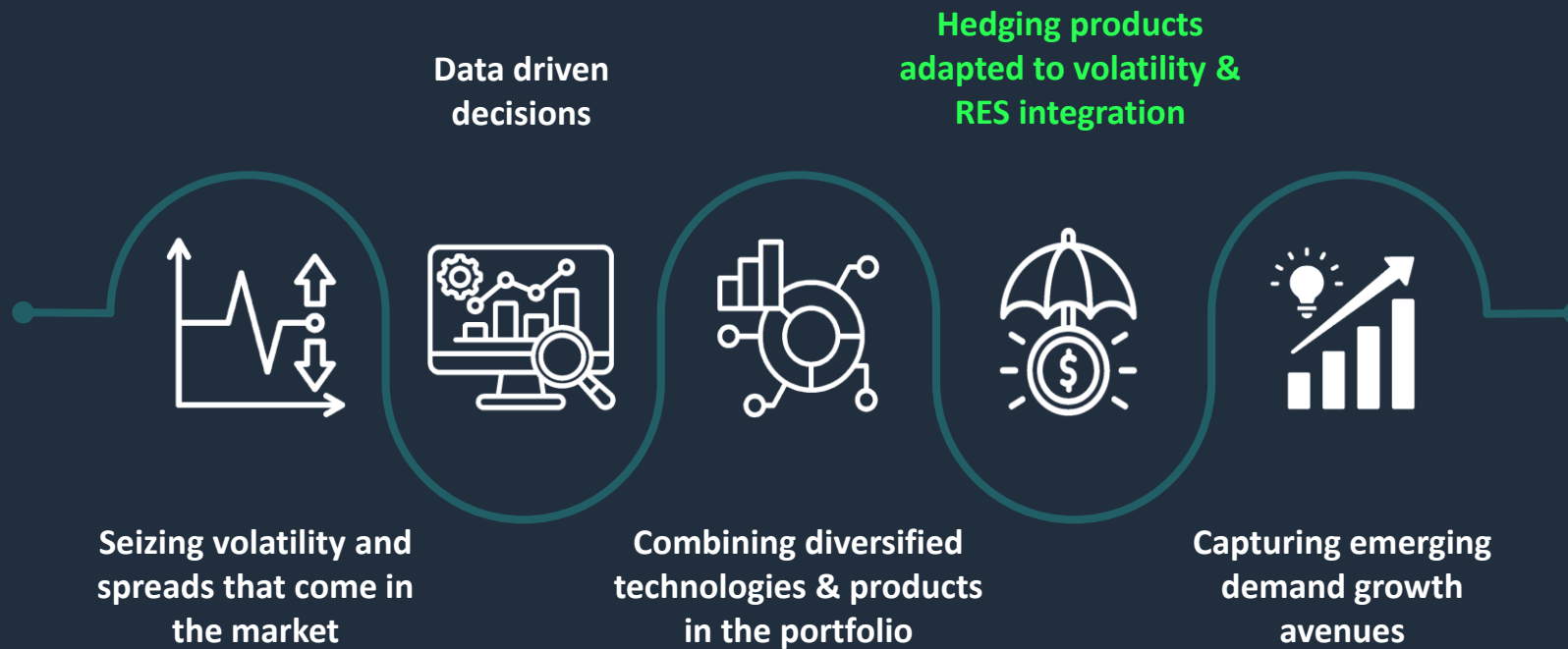
Temps. rising above historical values

+1.1°C

Increase in global temperature (vs. pre-industrial levels)

Navigating Volatility

This complexity, volatility & uncertainty imposes a holistic thinking and integrated portfolio management.
Crucial to thrive in current & future markets' challenges

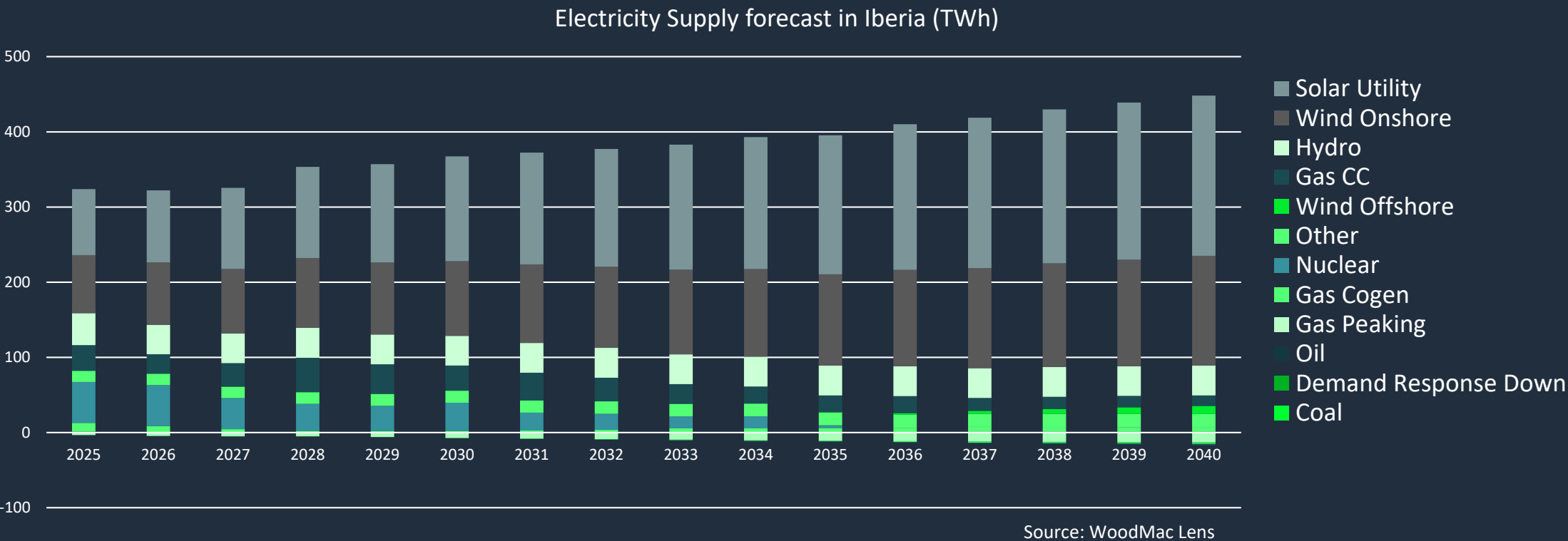


Bridge the world's complexity allowing EDP to thrive within this uncertainty

Problem - RES Penetration effect



Solar and Wind alone is expected to grow from around 50% this year to more than 85% in 2040 in Iberia

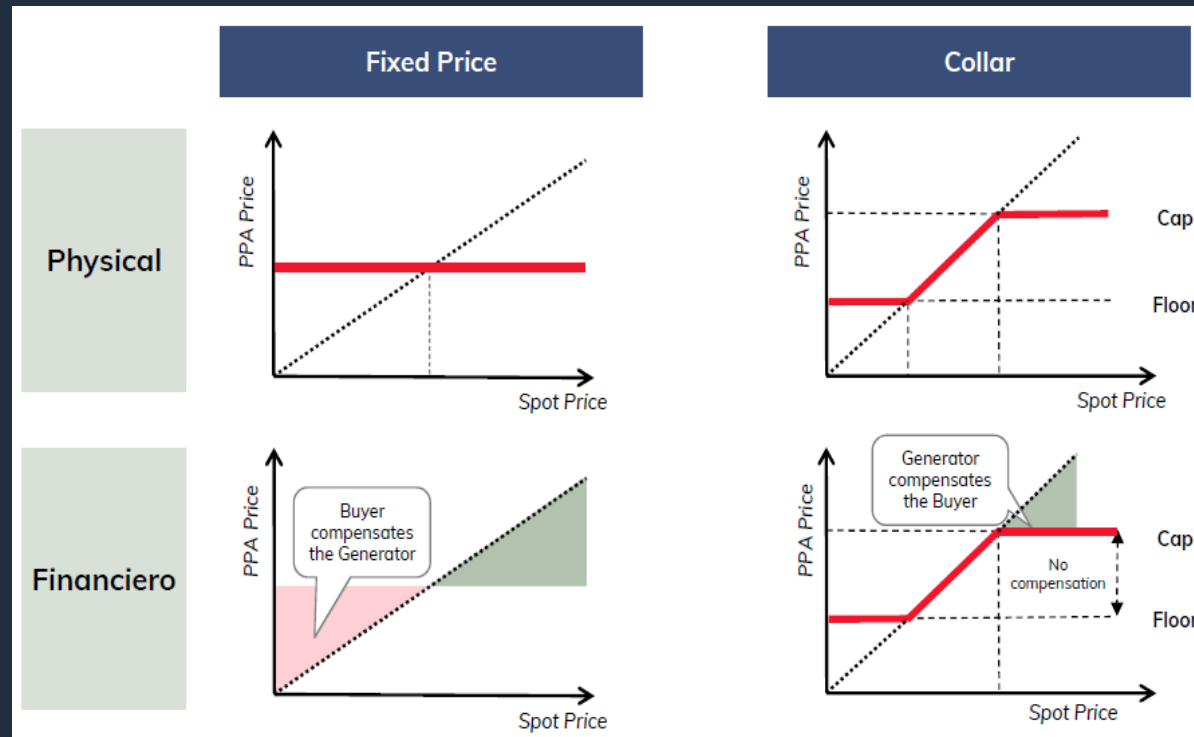


Solar + Wind will provide over 85% by 2040

How to manage RES revenue risk

Power Purchase Agreement (PPA) is the main tool to manage long term risk

$$\text{Revenue} = \text{Price} \times \text{Volume}$$



	Commitments on Energy to Be Delivered	Seller Volume & Profile Risk	Buyer Volume & Profile Risk
Fixed Volume			
Baseload	<ul style="list-style-type: none"> - Predefined volumes, hourly profile - Mandatory delivery on hourly basis 	?	?
Pre-defined Volumes	<ul style="list-style-type: none"> - Predefined monthly/quarterly/yearly volumes - Mandatory delivery during the selected period 	?	?
Variable Volume			
As-Produced	<ul style="list-style-type: none"> - % of production, based on generation profile - No volume commitment 	?	
As-Consumed	<ul style="list-style-type: none"> - % of buyer's consumption, based on consumption profile - Commitment on % of hourly consumption profile 		?



How to manage a RES portfolio to harness revenue volatility?

Considerations / Suggestions



Focus on wind. Still the backbone of RES in Iberia.
Output significantly more volatile than Solar. Although Solar is the growth driver



Consider including Capacity Factor (volume) and/or Realised Price (price) in the model



Output should provide different suggestion according to risk aversion (e.g. min var, max sharpe)



Non limited to spacial. Options (still very incipient) may be an option.



The logo features the lowercase letters 'edp' in a white, sans-serif font, centered within a dark blue circle. This central circle is surrounded by three concentric rings of varying colors: a bright cyan ring, a medium blue ring, and an outer purple ring. The background is a dark navy blue. The rings are slightly offset from each other, creating a sense of depth and movement.

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