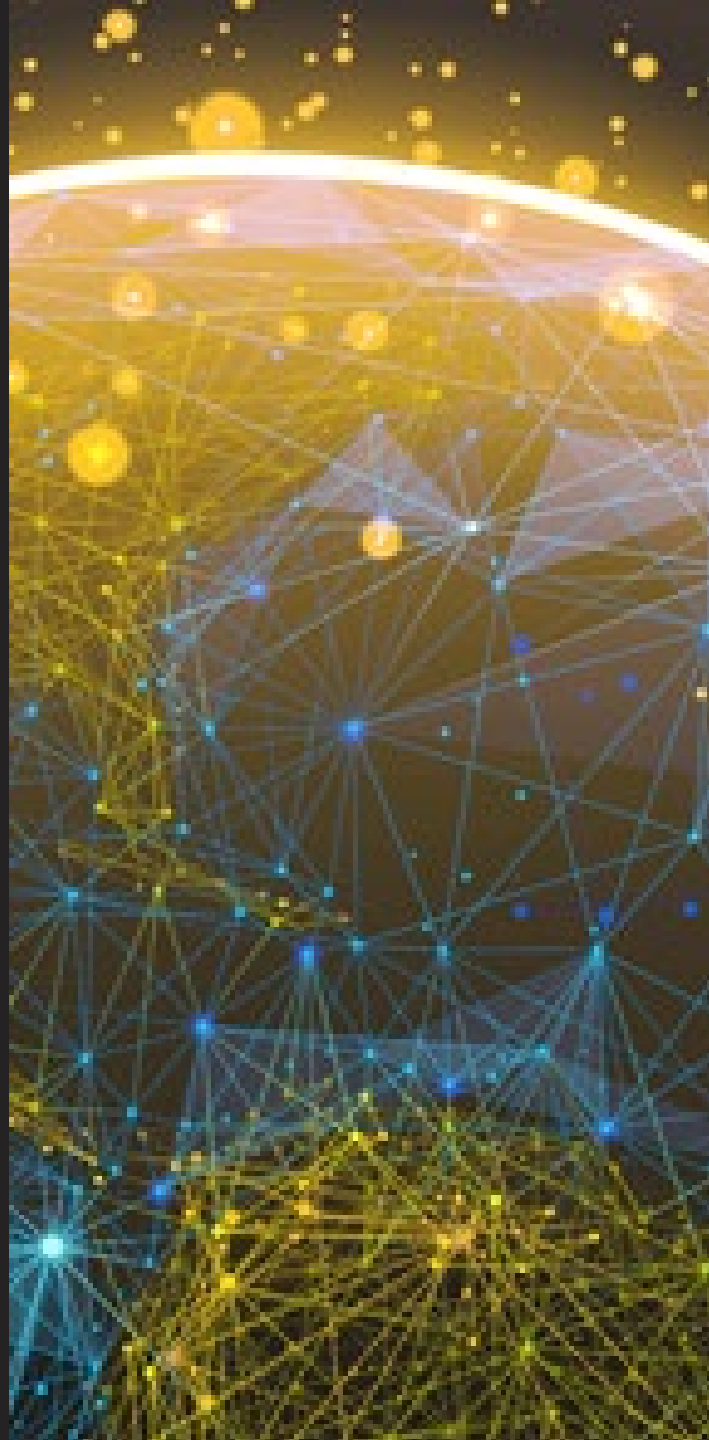
Cambridge Centre for Risk Studies

2022 ANNUAL RISK SUMMIT

SYSTEMIC RISKS AND INTERLINKED GLOBAL CHALLENGES

Plenary Session 4: McKinsey Risk Prize and Parallel Sessions



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Energy and Power Risk

Fransje van der Marel

Partner, McKinsey

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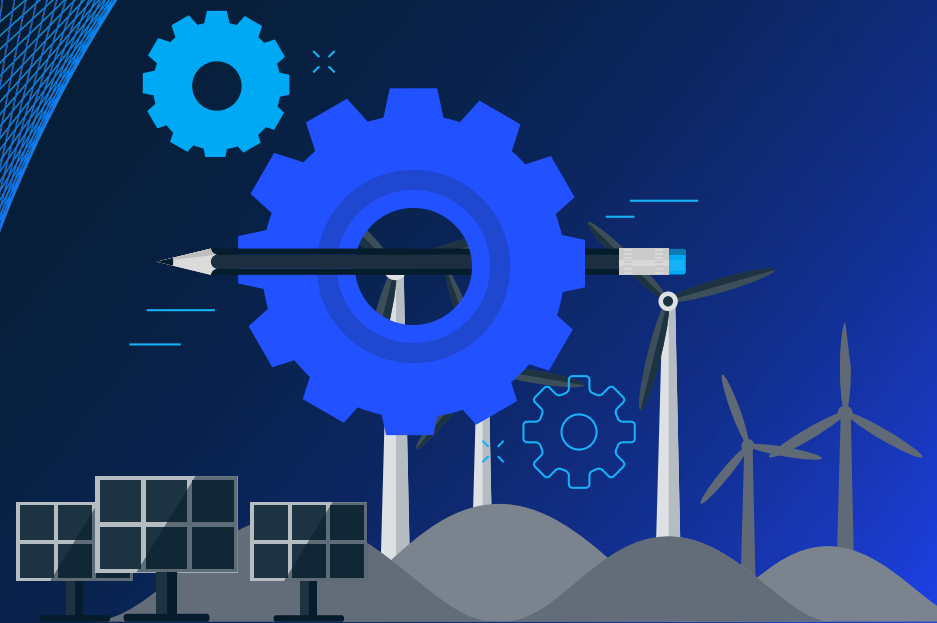
Antifragile and the energy transition

Cambridge Risk Summit

Fransje van der Marel| June 2022



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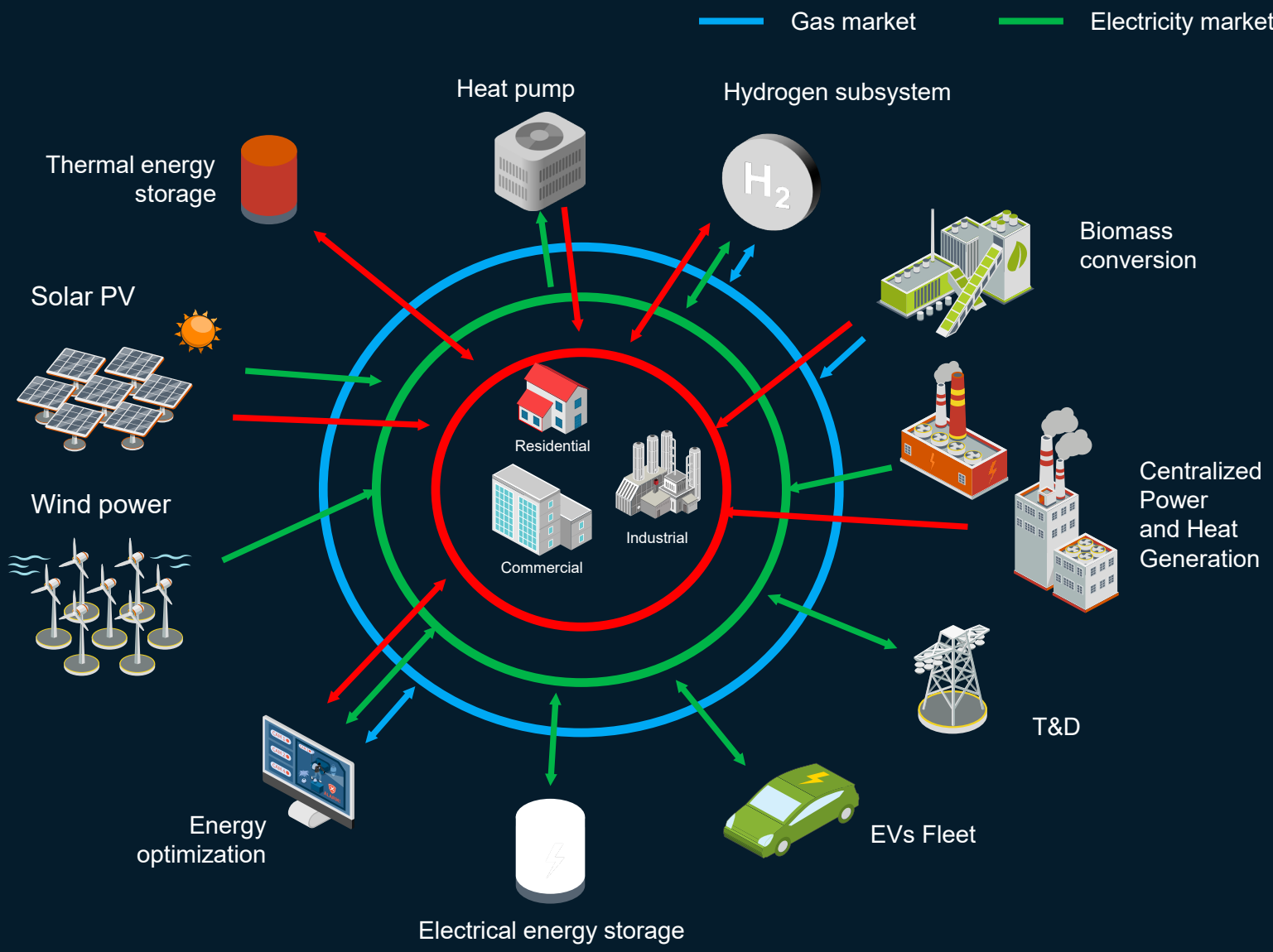
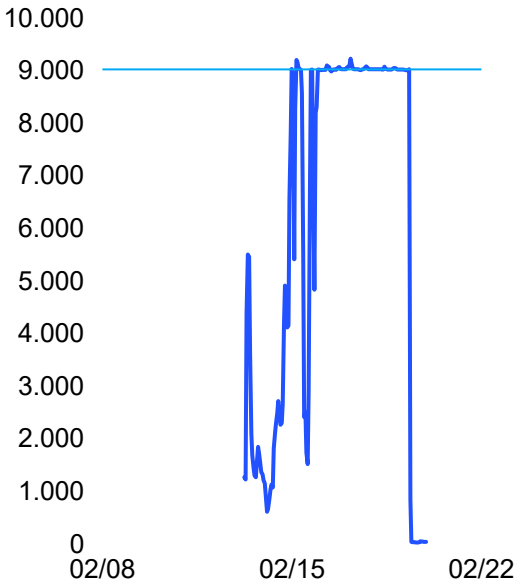
Energy companies face an increasingly complex energy ecosystem to reach net-zero



Volatility only to increase going forward

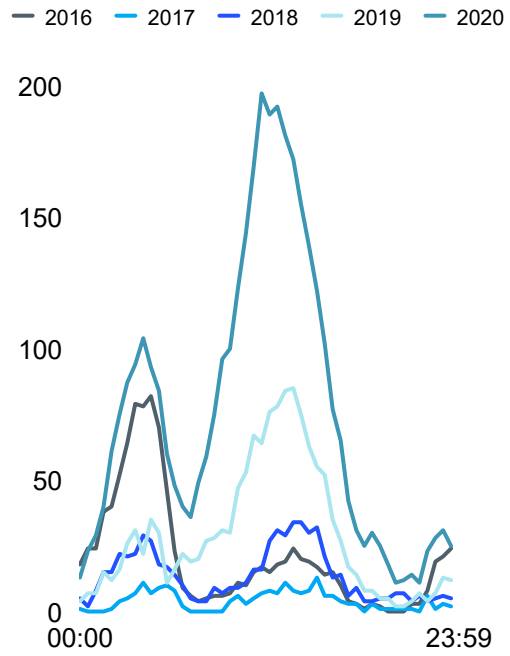
Texas freeze with power prices up to 9'000 USD/MWh in Feb. '21

Power prices and administrative price cap



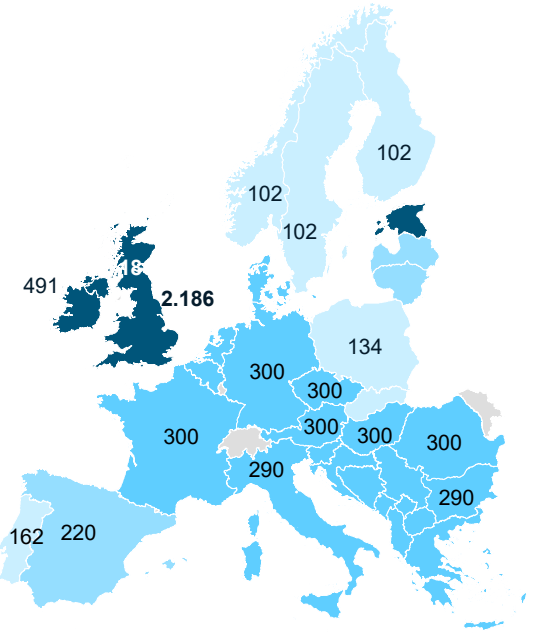
Massive increase of negative price events driven by distributed solar

Count of trading intervals with negative prices



UK record power prices of >2'000 GBP/MWh

Power prices on 15.11.2021, 18:00

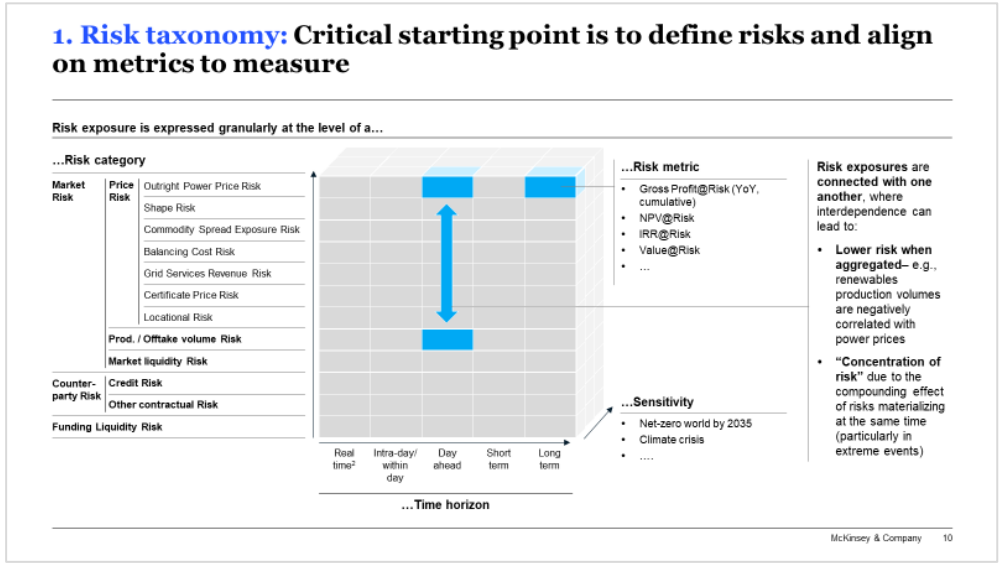


Price volatility only expected to increase further due to higher penetration of intermittent renewables

4 steps towards becoming antifragile

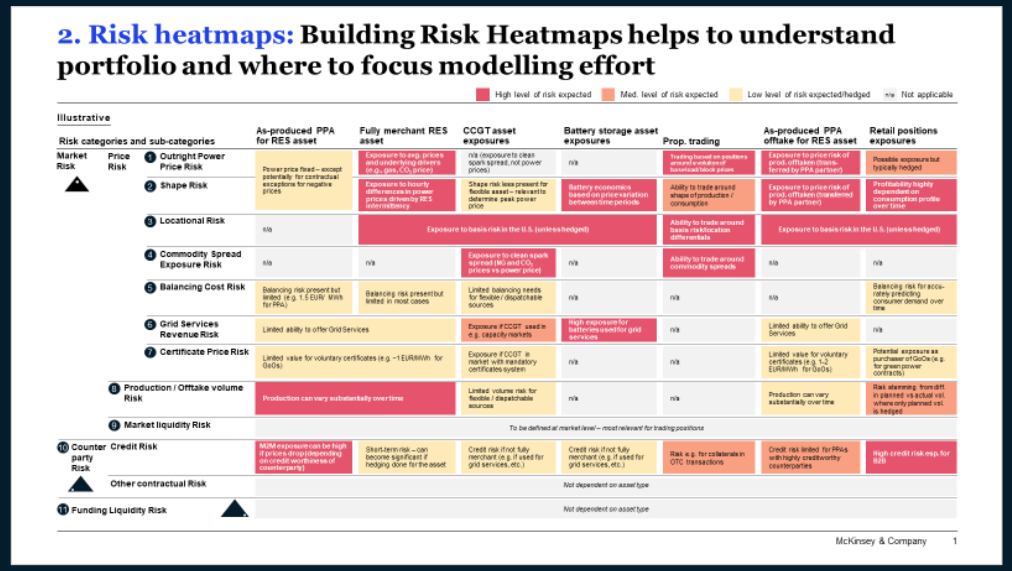
Step 1

Risk taxonomy definition to align an understanding of "portfolio" and "positions"



Step 2

Mapping risks along dimensions of risk factor and positions type by market



Assess materiality in detailed model (step 3)

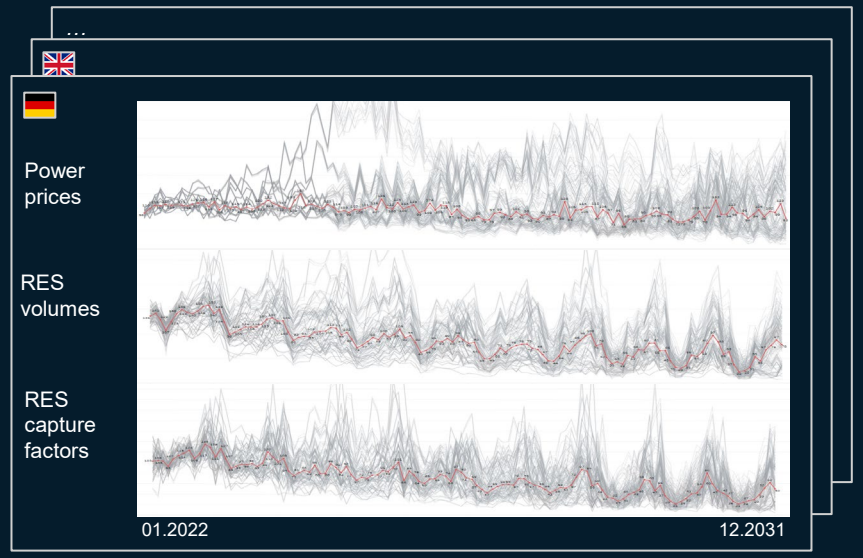
A Contract parametrization

```
name: Offshore Wind CfD
name: Battery
name: Solar Merchant
name: PAP PPA Offshore Wind
asset_type: Generation
asset_subtype: Offshore Wind
business: RES
currency: "eur"
currency_exchange_rate: 1.16
region: Europe
subregion: nl
price_area: nl
installed_capacity: 250
load_factor: 0.495
rf_baseload_price_monthly: dam_price_nl_nl
ref_asset_ind: nl_offw
date_online: 2024-01-01
ppa:
  type: pay-as-produced
  volume_pc: 1
  volume_yr: 0
  price: 39
  inflation: 0.01
  start_date: 2025-01-01
  end_date: 2121-01-01
```

Each asset/position characteristic is **parametrized** in a configuration dictionary including:**, e.g.,**:

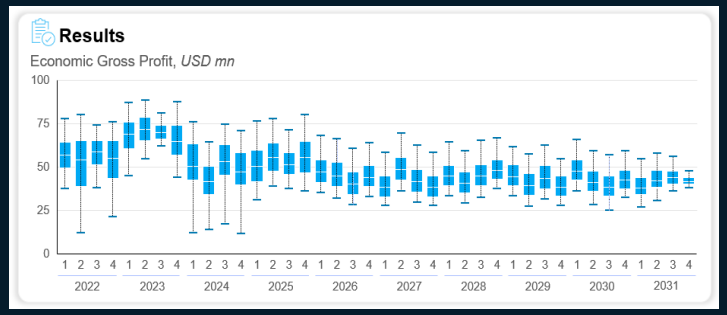
- **Asset parameters:** e.g. market, installed capacity, load factor, COD dates, etc.
- **PPA parameters:** e.g. PPA type, PPA price, volume, start & end date, etc.
- **CfD parameters:** e.g. type, CfD price, % of volume applicable

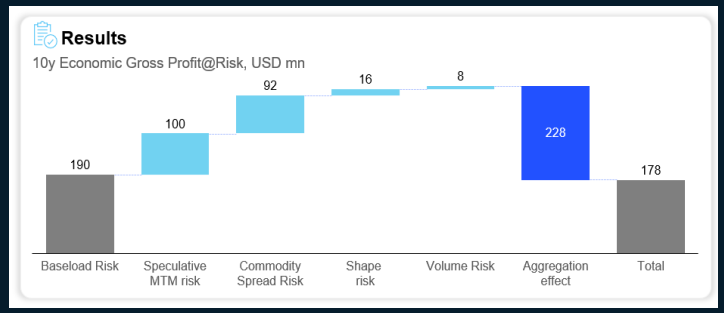
B Risk factor simulation

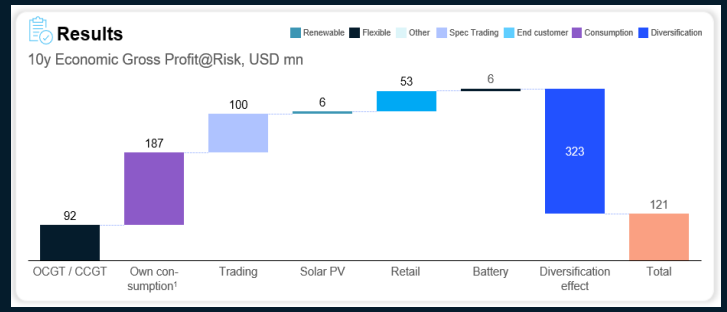


Risk factors simulations are used to **compute merchant revenues** in each simulation for the whole portfolio

C Gross profit computation

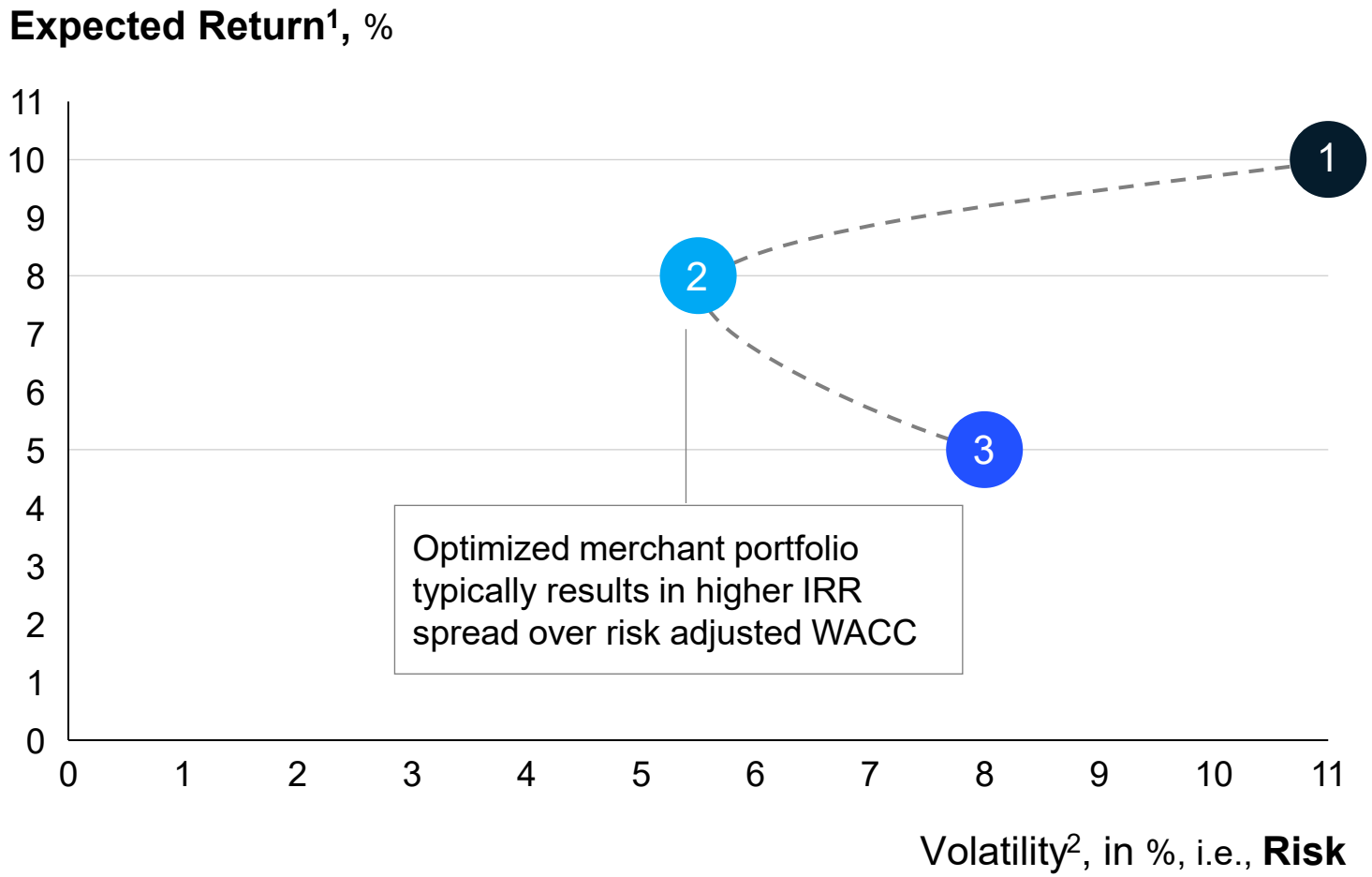






Making the right portfolio choices to enhance value (step 4)

Illustrative - Each investment opportunity with unique risk-return profiles



1 Internal rate of return (IRR) of base-case scenario
2. Expected IRR vs P5 IRR (IRR@Risk)

Source: McKinsey CapEx/OpEx assumptions & market scenarios; PexaPark PPA benchmarks

1 Fully merchant asset

Unhedged wind asset Assuming no global risk diversification

2 Merchant portfolio of different technologies and in different geographies

Wind
PV
Storage
Power-to-X

3 De-risked asset with merchant tail

As-produced PPA + merchant tail

2022 Cambridge-McKinsey Risk Prize
Announcement of Finalists and Winner

Rob Glew

Risk Management in Development Aid: A Modular Approach

Shan Liu

De-risking for Huimin Bao Insurance

Aditya Panse

'MAP'ping the uncharted: proposal to make international tax dispute resolution more efficient

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