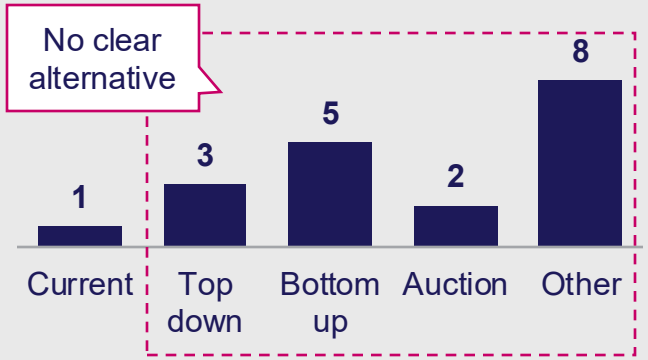
VAPRI: Pricing risks in large infrastructure projects

Roundtable, 23rd July 2025

CONFIDENTIAL

Roundtable 1: *January*

What model for sustainable investment in infrastructure?



>90% of attendees agree that change to CAPM model is needed to enable step change in investment

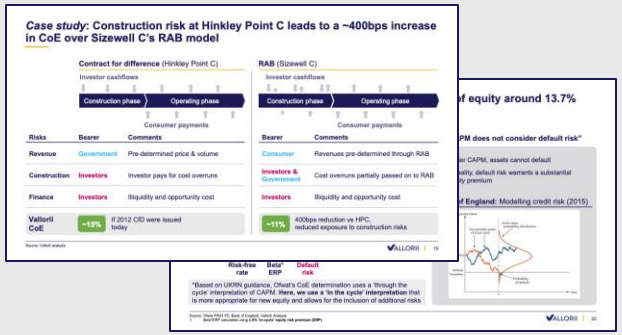
The Guardian

8 July 2025

"Vallorii, […] estimates that CfDs for offshore wind will be up again to £90-£111 a megawatt hour […]
Vallorii's projection is credible for the reasons it gives. There are bottlenecks in supply chains,…"

Roundtable 2: *March*

What is the fair cost of equity for Sizewell C and Thames Water?



CoE depends on government underwriting and granular risks:

- 10-11% CoE Sizewell C
- 13-14% CoE Thames Water

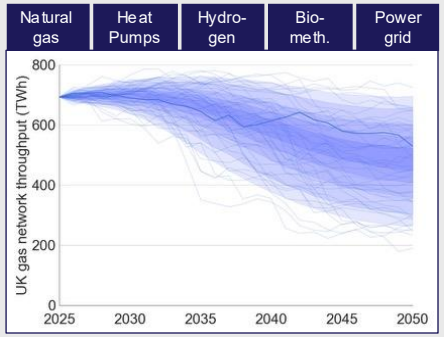
The Economist

5 June 2025

"Analysis by Vallorii, a technology firm, suggests default risk alone raises Thames Water cost of equity from the 5.1% real-terms return that Ofwat allows to 13.7%"

Roundtable 3: *May*

What is the (likely) future of the UK's gas network?



AI-based forecasts for UK gas sector in 2050

- 28-93% drop in gas demand
- 7-56% drop in gas network

Utility Week

7 July 2025

"Our AI-based analysis shows that natural gas demand in the UK in highly uncertain: could fall by anywhere from 28% to 93% by 2050."

Agenda

Vallorii Price of Risk Model (VAPRI): A new, theoretically-robust Cost of Equity (CoE) model that leverages AI to enable granular insights on risks and regulatory design, split into three drivers:

1. **Market conditions:** UK infrastructure assets compete internationally for capital
   - Current capital market pressure leads to 20-40% risk premium impacts for new infrastructure equity

2. **Asset-specific risk:** Case study of major water project shows 9.2-9.6% CoE
   - DPC projects see 3.9-4.8% risk premium above CAPM, due to construction and counterparty risks
   - Asset health risks affect NPV but do not significantly impact forward-looking CoE

AI

3. **Risk allocation:** Risk-allocation can lower CoE by 1.8-2.8% for water DPC and other projects
   - 140-210 bps of CoE reduction due to limited risk-sharing with UK contractors
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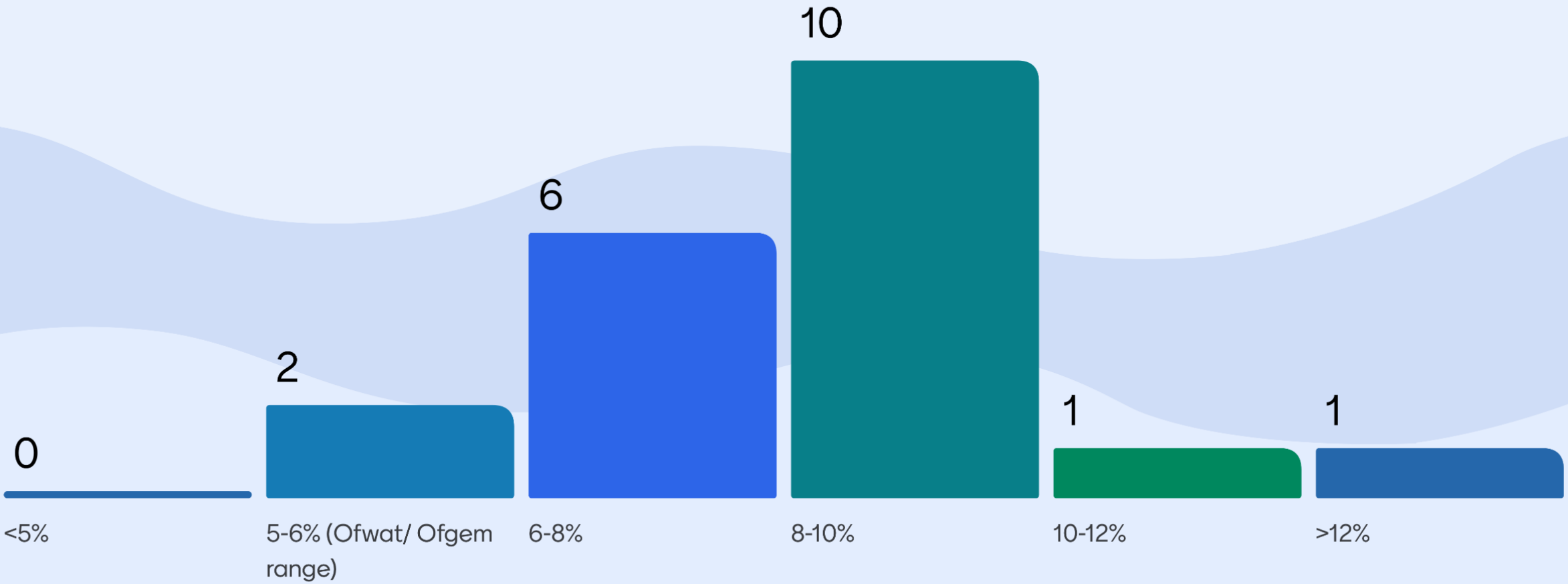
VAPRI can be deployed for transaction, portfolio and scenario analysis across assets, sectors and countries

POLL #1: What (real) return on equity do investors require to fund new UK infrastructure projects (like a large reservoir)?

- <5%
- 5-6% (current Ofwat/Ofgem CoE range)
- 6-7%
- 7-8%
- 8-10%
- 10-12%
- >12%

What (real) return on equity do investors require to fund new UK infrastructure projects (like a large reservoir)?

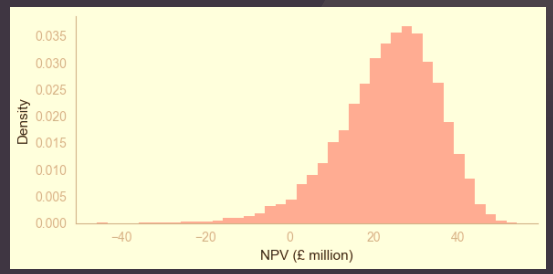


The Vallorii Price of Risk Model (VAPRI)

Financial theory and modelling

- RoE spread is translated into CoE using convex optimization
- Based on Nobel Prize-winning asset pricing theory beyond CAPM (Ross 1976, Merton 1980)

Granular investment conditions



- Fine-grained understanding of current **capital supply & demand**
- Empirically grounded risk model
- Granular **risk narratives** using AI

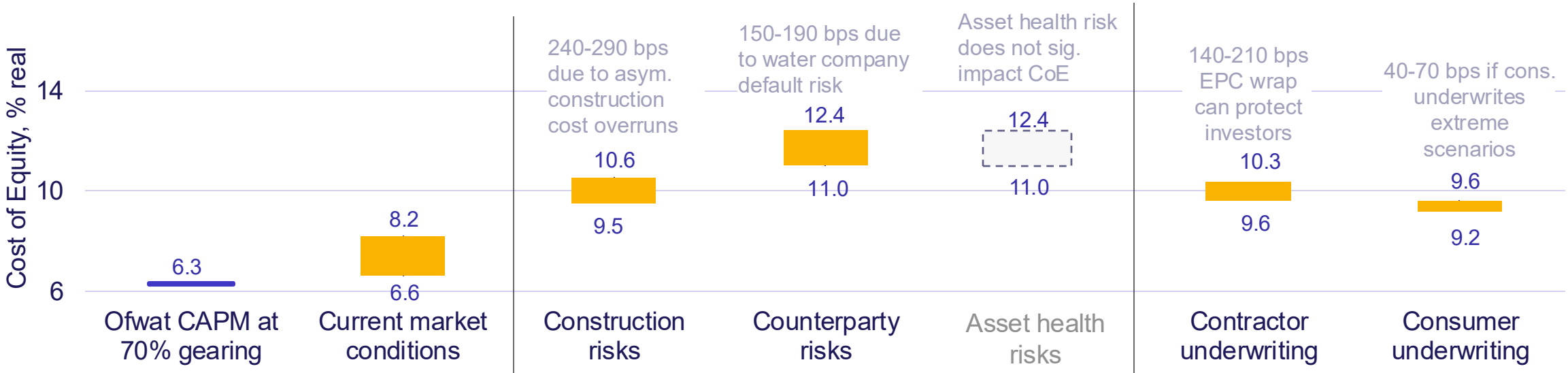
VAPRI leverages bottom-up AI-driven risk evaluation to estimate true Cost of Equity across greenfield infrastructure projects

Sector	Key risks	Case example	Cost of Equity		
			CAPM (backwards)	VAPRI (forwards)	Further models in development
Offshore wind	• Construction cost overruns • Merchant and volume risks	AR7 *(CfD webinar – 26 Jun)*	7.7%	9.7 – 10.6%	• Multi-factor models • Inter-temporal and dynamic volatility models • NAV, DGM, other cross-checks
Nuclear	• Construction cost overruns • Illiquidity	SZC	5.7 – 7.3%	10.0 – 12.0% *(FID: 10.8%)*	
Telecoms	• Roll-out delays • Consumer willingness to pay	5G Auctions	5.5 – 7.9%	10.4 - 13.1%	
Water	• Construction costs & delays • Counterparty risks	DPCs	6.3%	9.2 – 9.6%	
Electricity T&D	• Supply chain constraints and costs • Permitting & consents	RIIO-3	5.6 – 6.0%	TBC	
Transport	• Customer demand • Planning complexity (brownfield construction)	LHR - base	5.6% – 8.3%	<6% (TBC)	
		LHR – 3rd runway	5.6% – 8.3%	>7% (TBC)	

Vallorii Cost of Capital Lab

Source: Vallorii analysis (Vallorii CoC Lab, Vallorii Research Lab), regulators' final determination documents

VAPRI estimates CoE of 9.2-9.6% for *Beckton Water Recycling* based on market factors, asset-specific forward-looking risks, and underwriting



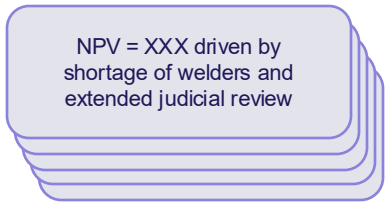
1 Market conditions

0.3–1.9% increase dep. on beta

- CAPM is based on historical market average
- VAPRI estimates future market expectations

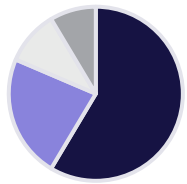
2 Asset-specific risk

Asset-specific, forward-looking risk factors based on AI-generated stochastic valuation modelling



3 Risk allocation

Fine-grained risk allocation within contractual and regulatory frameworks



Sources: 6.6-8.2% CoE determined using 5.5-7.4% ERP using "in-cycle" interpretation implied by infrastructure funds' NAV discounts, beta calculated using 5y estimation window, SVT and UU as comparator companies, RfR defined as 20y UK real gilt yield; Construction risk defined as risk of capex cost overrun, counterparty risk defined as risk of water company default resulting in missed payments or CAP termination; asset health risks defined as risk of performance penalties and terminal payment discount due to lower asset health quality; contractor underwriting defined as EPC covering cost overruns up to 110% of capex, consumer underwriting defined as consumers covering cost overruns in excess of 50% and reducing likelihood of counterparty payment default by 20%

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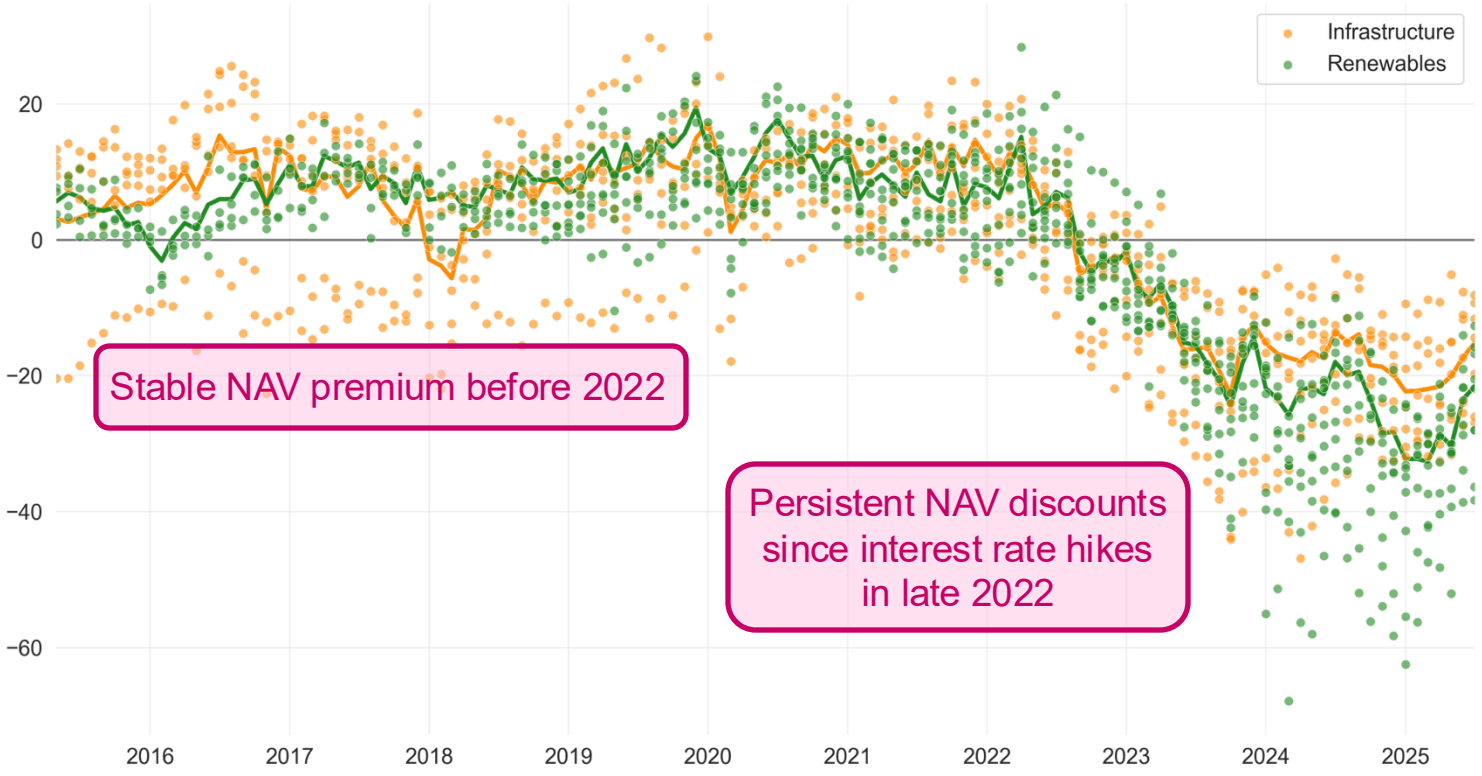
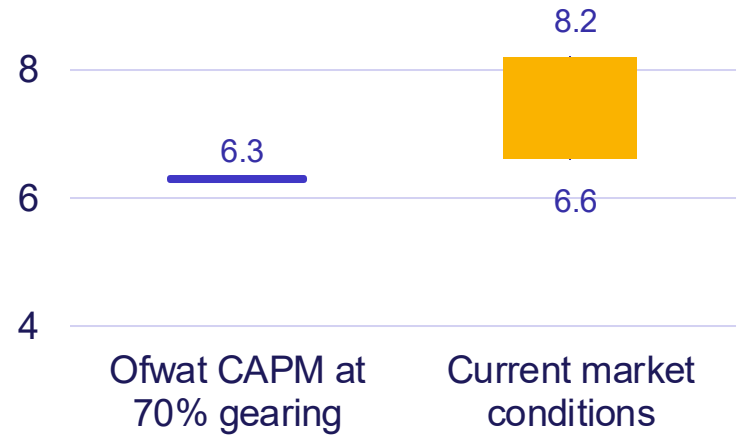
VAPRI can be deployed for transaction, portfolio and scenario analysis across assets, sectors and countries

Increased capital market pressure drives 10-30% infrastructure fund discounts and 20-40% increase in required risk premia since 2024

Infrastructure funds market NAV premium / discount (%)



Infrastructure return requirements (CoE, %)



Intuition:

i) Higher risk-free rate since 2022

ii) Greater competition for capital requires **additional incentive for risk-taking** since 2024*

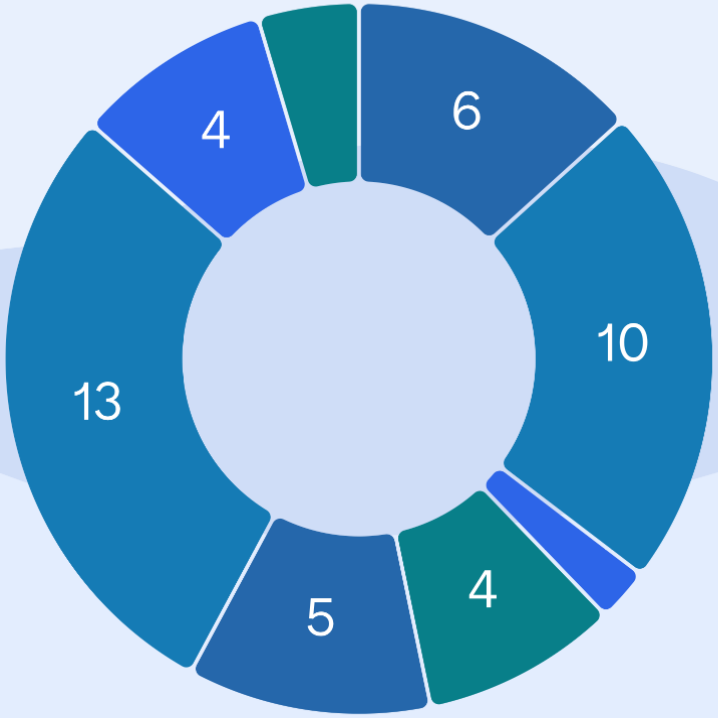
Source: Vallorii analysis, data source Factset, NAV premiums across selected UK-listed infrastructure managers: 3i, Bluefield, Cordiant, Downing, Ecofin, Foresight, GCP, Gore Street, Greencoat Wind UK, Gresham House, HICL, International Public Partnerships, NextEnergy, Octopus Renewables, SDCL, Sequoia

*This model is consistent with Merton's 1973/80 ICAPM, where changes in the investment opportunity set constitute a shift in the expected returns of an asset

POLL #2: Which macro risks currently dominate infrastructure fund prices and NAV discounts?

- Inflation
- Interest rates
- FX
- Competition from fixed income
- Competition from passive funds
- Competition from other geographies
- Infrastructure market sentiment
- Reputational concerns
- Other

Which macro risks currently dominate infrastructure fund prices and NAV discounts?



6	Inflation
10	Interest rates
1	FX
4	Competition from fixed income
0	Competition from passive funds
5	Competition from other geographies
13	Infrastructure market sentiment
4	Reputational concerns
2	Other

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Water DPCs: Privately financed SPVs of £40bn+ to secure water supply and improve the environment

£40bn+ planned totex across 24 DPC projects

Transfer	GUC	Cheddar 2
Recycling	HWTWR	Beckton
De-salination	Bacton	Mable-thorpe
...	...	...

Beckton Water Recycling

- Totex: £3.51bn
- Construction start: 2028-29
- ~7 years construction
- ~30 year DPC contract
- 60 year asset life

- Competitive tender – Full tender in 2026 (if RAPID approves)
- Availability-based, inflation-linked revenues
- Off balance sheet SPV
- Likely target-cost NEC4 contract with profit sharing

Source: Ofwat; Thames Water

POLL #3: Is Cunliffe the answer? If implemented, will the Cunliffe recommendations deliver infrastructure in water (and beyond)?

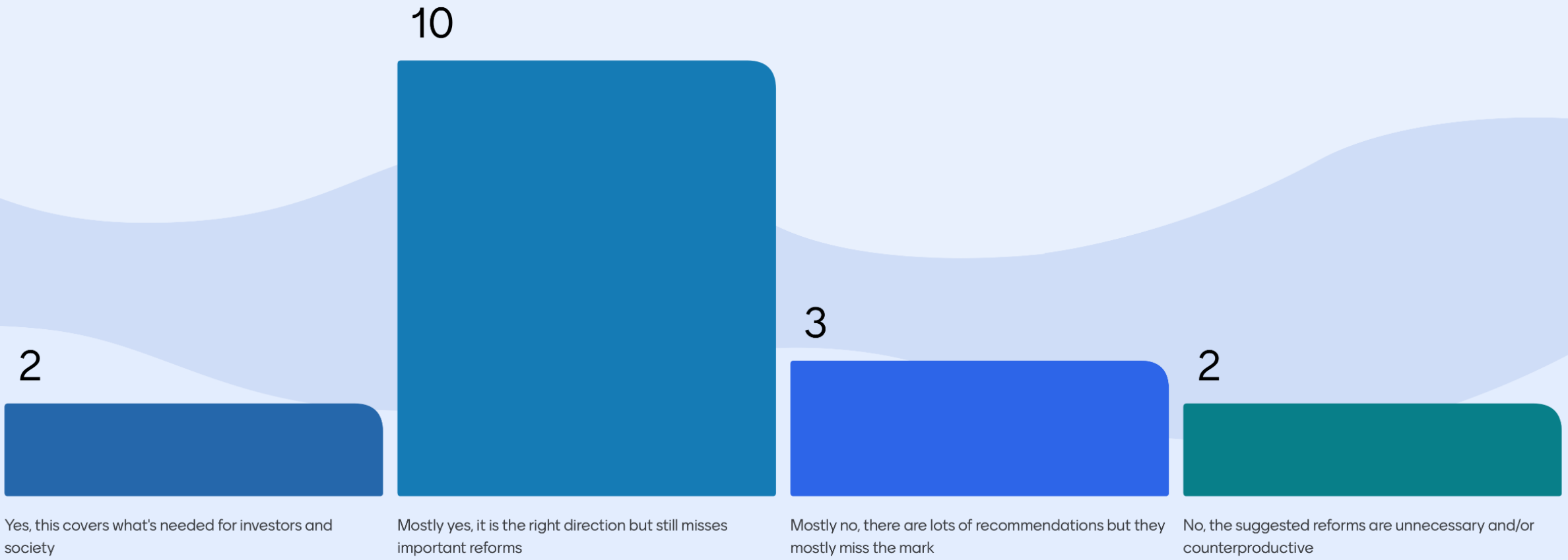
Yes, this covers what's needed for investors and society

Mostly yes, it is the right direction but still misses important reforms

Mostly no, there are lots of recommendations, but they mostly miss the mark

No, the suggested reforms are unnecessary and/or counterproductive

Is Cunliffe the answer? If implemented, will the Cunliffe recommendations deliver investment in water (and beyond)?



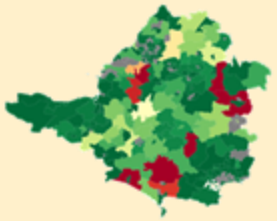
Vallorii uses AI to quantify impact of risks on valuation and CoE. Today we investigate asset health risks, counterparty risk and construction risks

Risks analysed so far

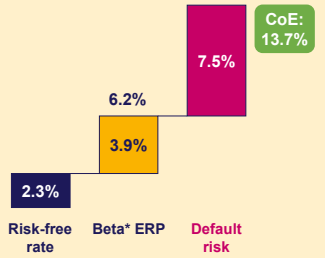
- Asset Health risks
- Illiquidity risks
- Counterparty & Financial default risks
- Infrastructure demand risks
- System risks
- Construction risks
- Political / regulatory risks
- Bond yields
- Exchange rates
- …

Risks discussed over the next meetings

Jan Roundtable
Low asset health leads to degraded RAB and performance penalties



Mar Roundtable
Appointee water company defaults and unable to guarantee revenue stream



June CfD workshop
Construction cost overruns lower IRR

Source: Vallorii analysis

VAPRI generates ~1 million AI scenarios, discards hallucinations with data, and quantifies cash flow uncertainties

A ~1 million AI scenarios

Example: EPC contractor insolvency

Fixed-price EPC to a tier-one contractor with 10% parent guarantee cap

Contractor issues profit warning— share price collapses, credit tightens

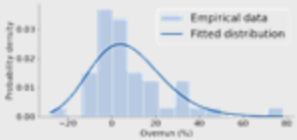
Suppliers owed >£1 bn; SPV triggers step-in but guarantee is exhausted; Contractor enters liquidation

Re-procurement at 28% higher price; COD slips three years. Equity IRR falls from **12 % to <7 %**

B Discard scenarios & assign likelihood using data

Construction risks

Synthesised from real cost overrun data for water projects

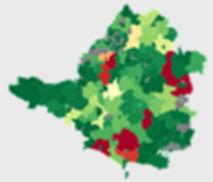


Counterparty risk

Default probability calibrated from credit ratings

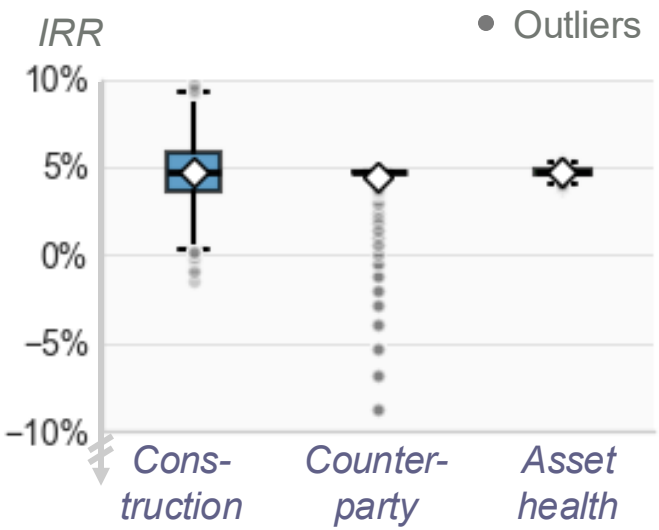
Asset health risks

Volatility in required maintenance compared to budget



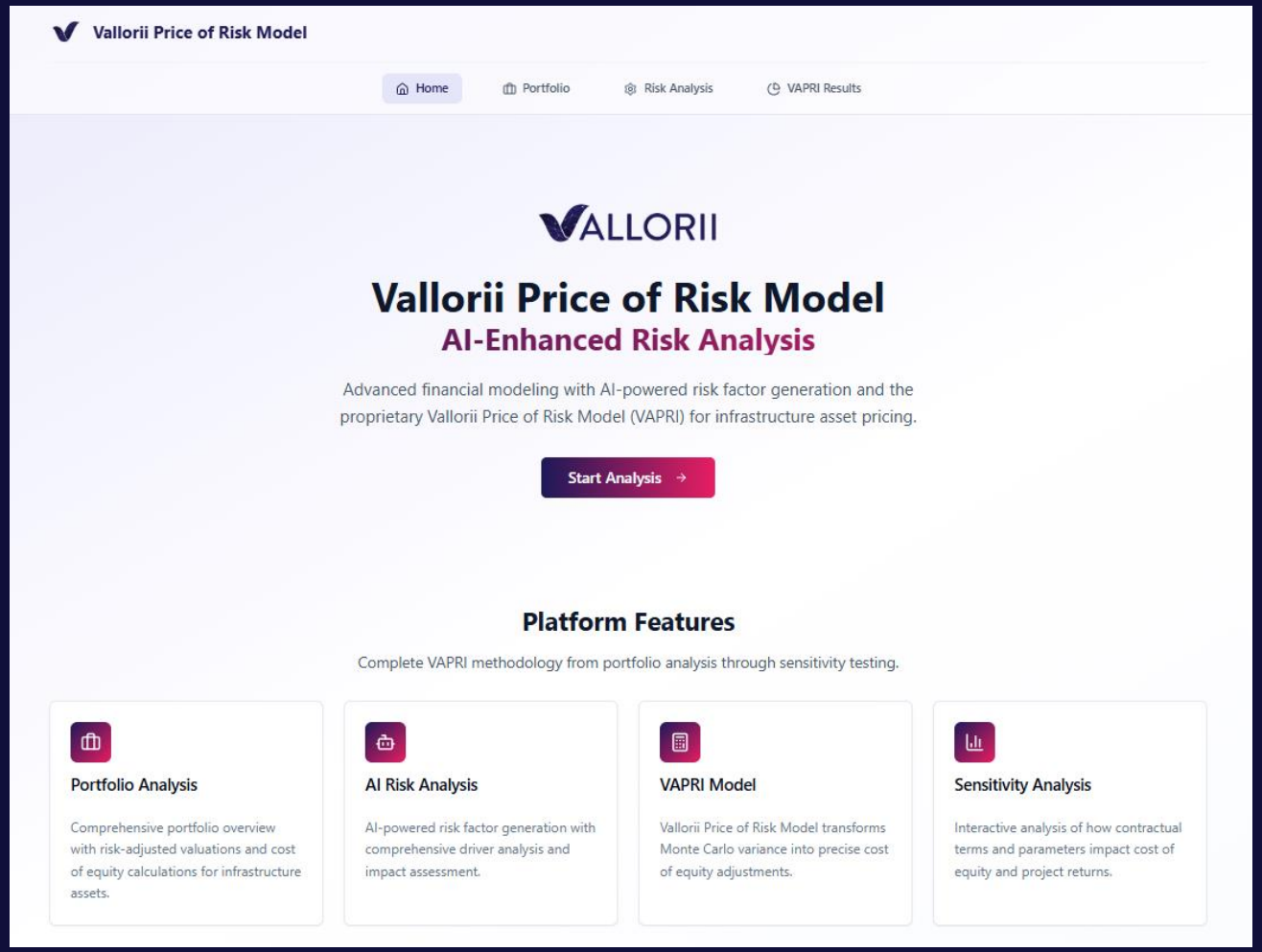
C DCF quantifies IRR impacts

IRR of DPC scenarios (calibrated to 5%)



Source: Vallorii analysis; AI scenarios generated using OpenAI 4.1mini; Counterparty risk data: S&P Global Ratings, *2023 Annual Global Corporate Default and Rating Transition Study* and Thames Water S&P credit report (February 2025); Construction risk data from paper on costs of 1093 water infrastructure projects; asset health data from Thames Water asset deficit report

VAPRI: Risk analysis demonstration



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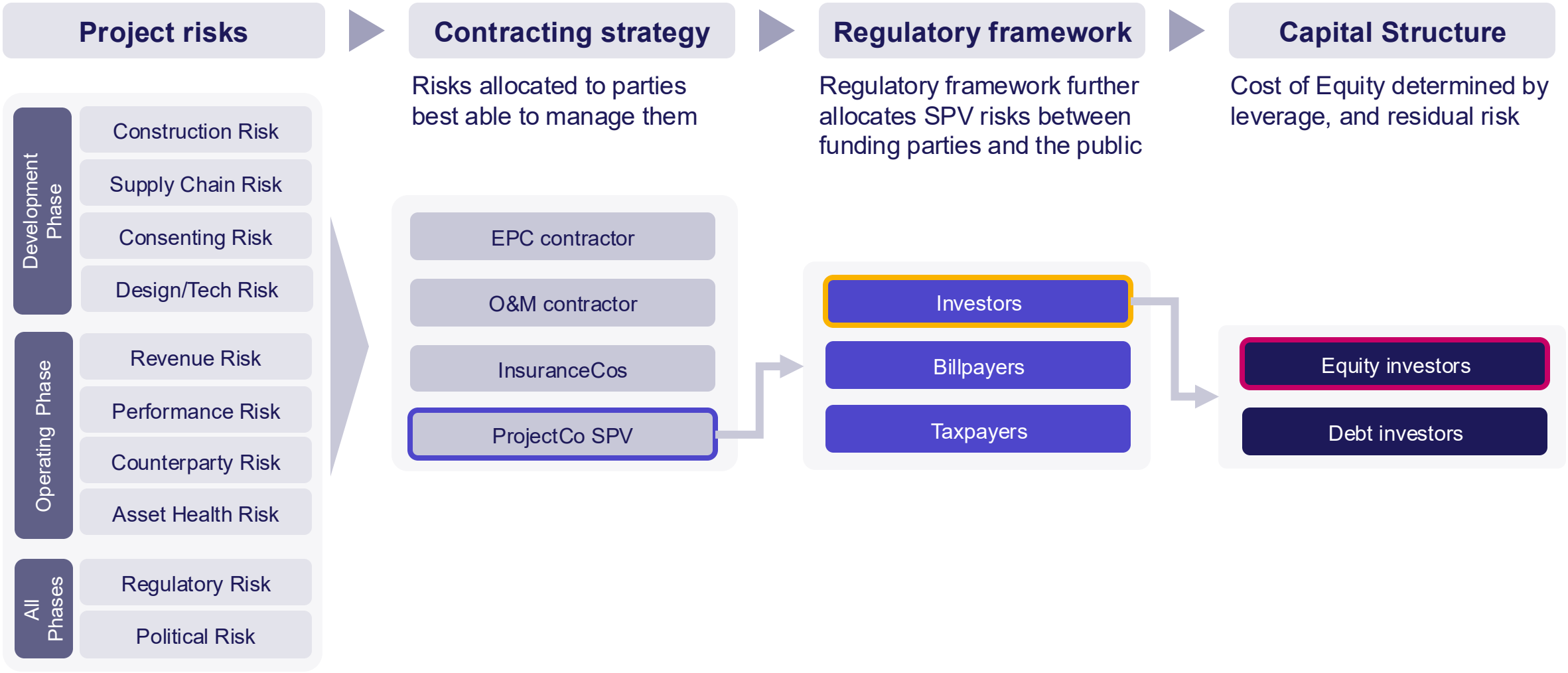
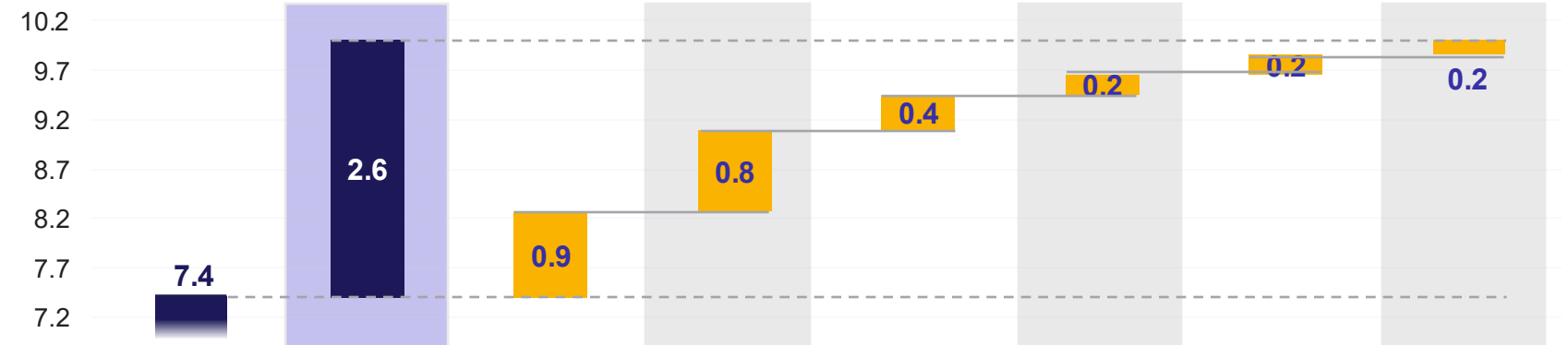
Project risks are allocated by contracting strategy, regulatory framework and capital structure – residual risk for equity holders determines CoE

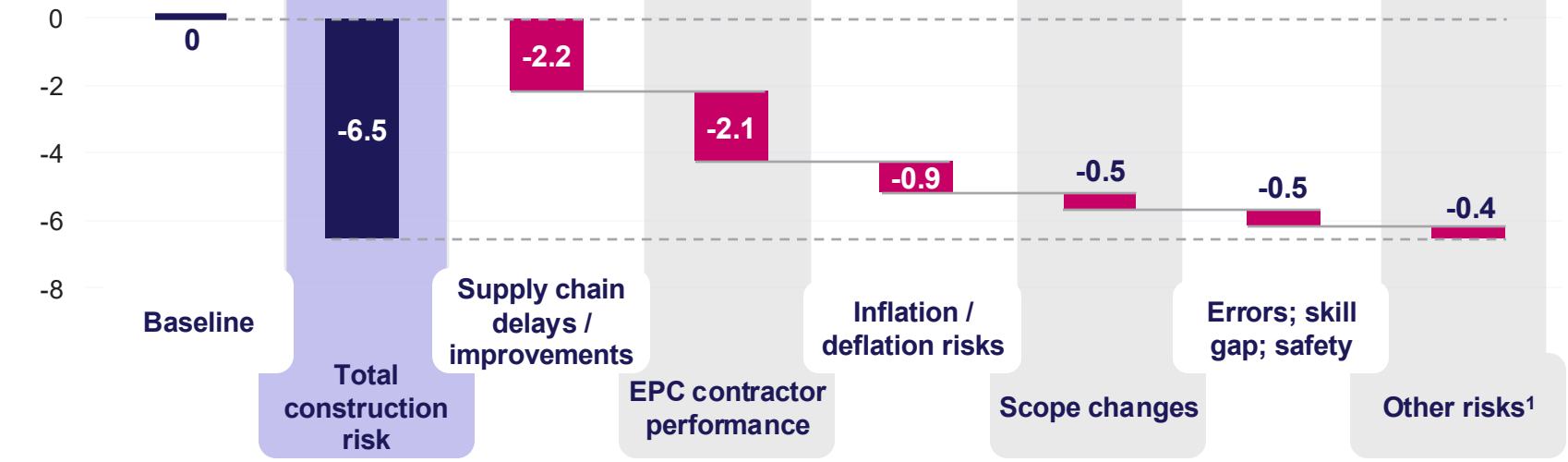


VAPRI breaks down key risks into underlying drivers, allowing for granular risk allocation between parties

Cost of Equity, real %



NPV, % of £300m book value, calibrated to baseline CAPM



Source: Vallorii Analysis, OpenAI GPT 4.1. used for scenario generation. Assuming fixed 70% gearing.
1. Other risk factors identified include: Bidding outcomes and extreme weather events

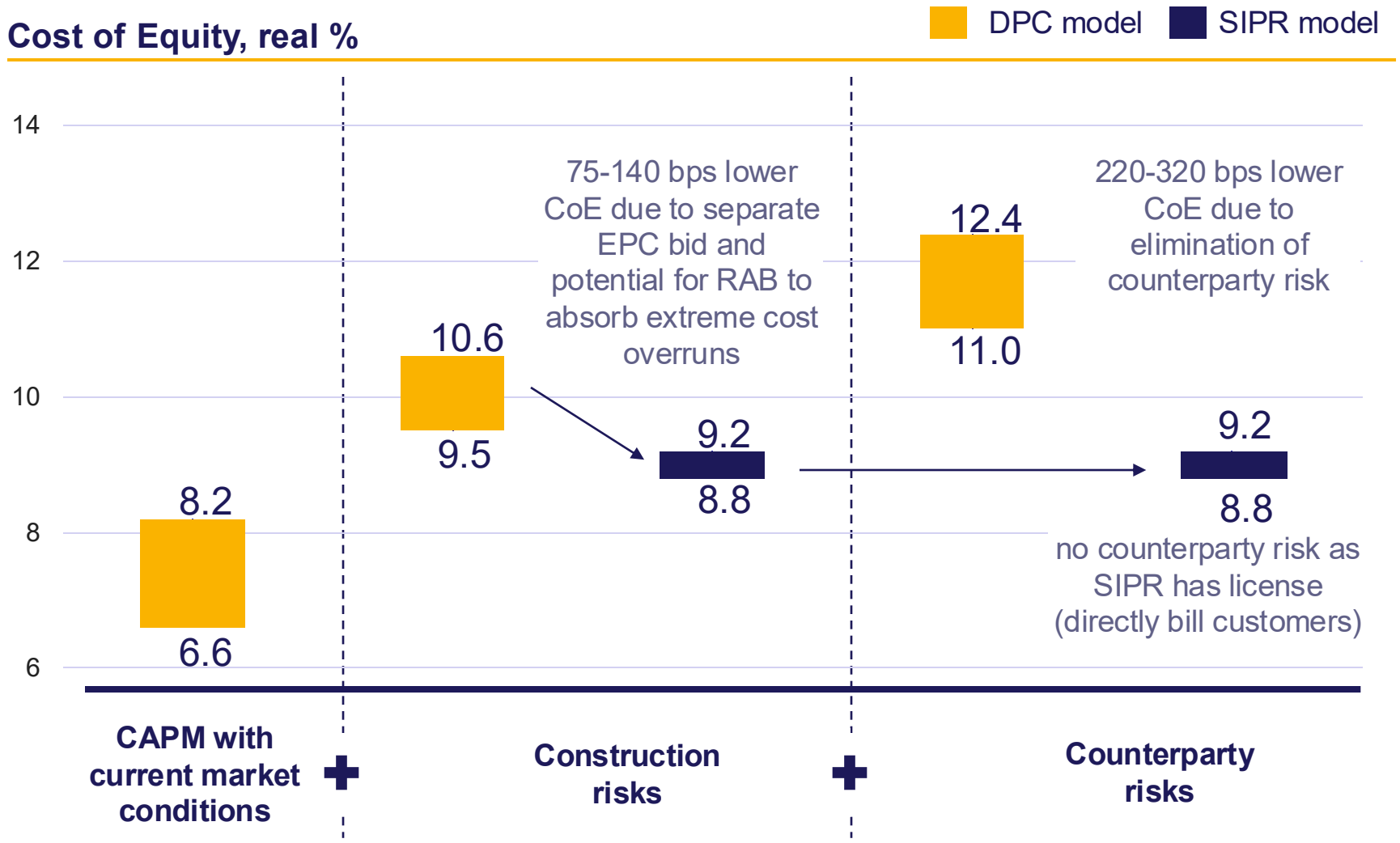
Key insights

AI scenarios can be used for **granular breakdown of risk**

- **Allocation of risks** to the most appropriate party
- CoE and NPV impact calculation
- Understand NPV/CoE tradeoff for each risk

SIPR model leads to 220-320 bps lower CoE than DPC by absorbing construction risks and eliminating counterparty risk

Cost of Equity, real %



Assumptions: In SIPR model, assume that cost overruns in excess of 120% are added to RAB, initial bid WACC lasts for 15 years, regulatory CoE after BWACC set at 5%

Key insights

Allocation of some **construction risk to consumer** bills (share of overruns added to RAB)

Elimination of **EPC counterparty risk** (due to separate EPC bid)

Elimination of **water company counterparty risk** (direct recovery from consumer bills)

VAPRI Roadshow
Applying AI-enabled model to your portfolio

Date
1st-12th September

Limited availability
Please reach out soon to Sandy Arbuthnott

Apply VAPRI to your questions for **tailored modeling and insights** for new or existing infrastructure investment decisions

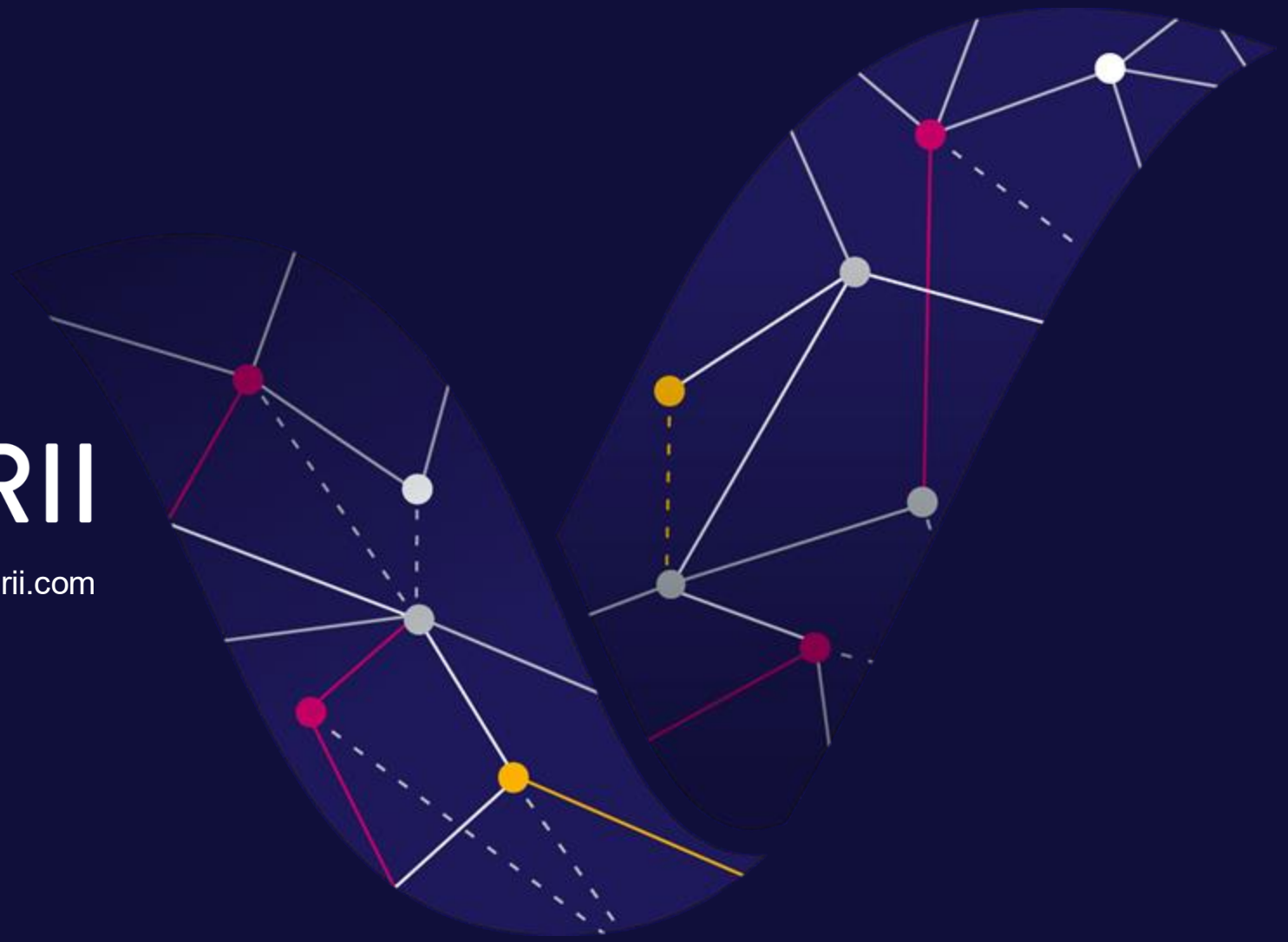
Applications
- Rapid asset valuation
- Fair cost of equity, auction bids
- Portfolio analytics

Approach
- AI-based scenario generation
- Multi-risk perspective
- Rich sensitivity analysis

Next Vallorii Roundtable
17th September 3-4.30pm

Delivering infrastructure in a new macroeconomic environment

- Interest rates & fixed income markets
- Foreign exchange risks
- Commodity markets
- …



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