



# Strategic Evaluation of Carbon Storage Potential

Strategic Energy Transition: Portfolio Analysis

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GSEU Day: Brussels, Belgium

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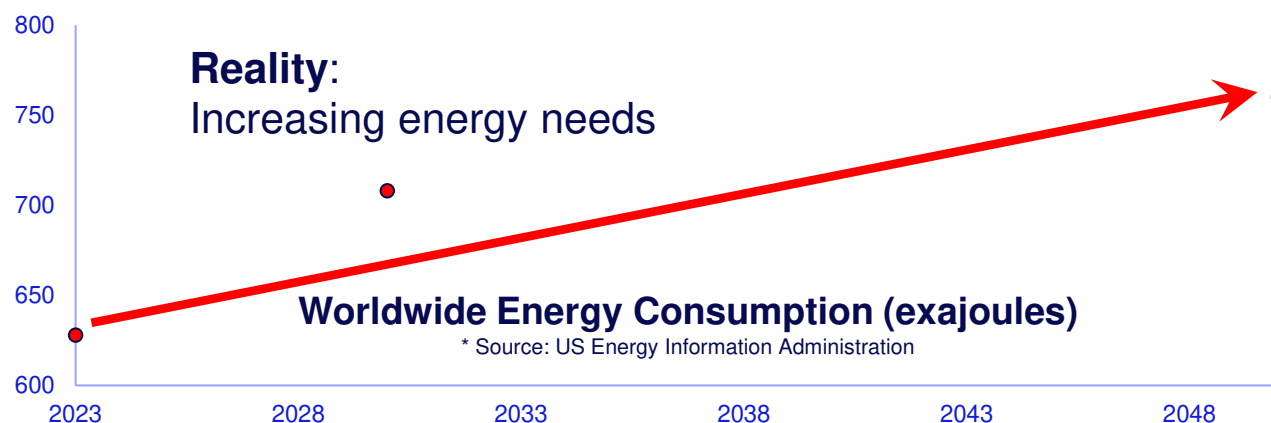
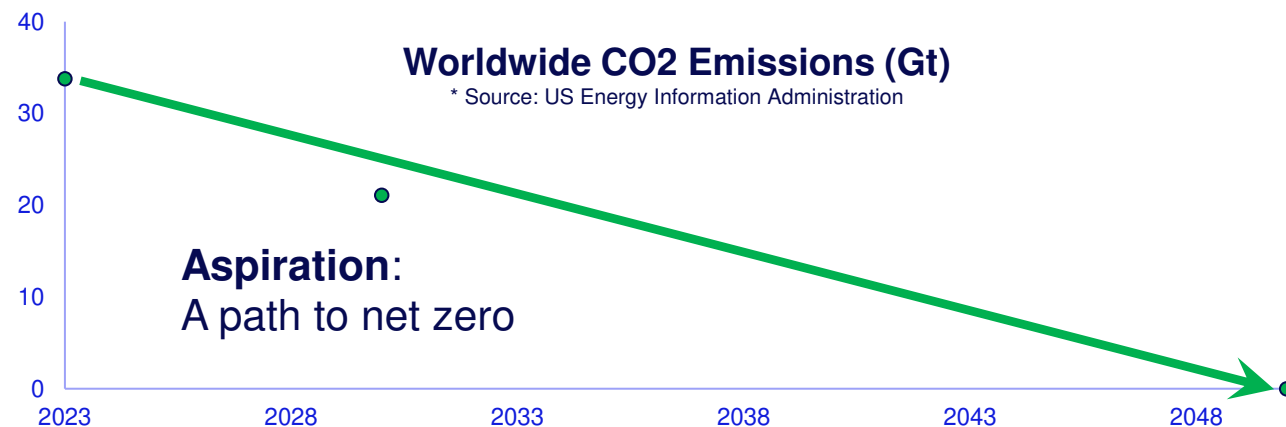
# Strategic Energy Transition

A need to **BALANCE** competing demands



## CHALLENGE

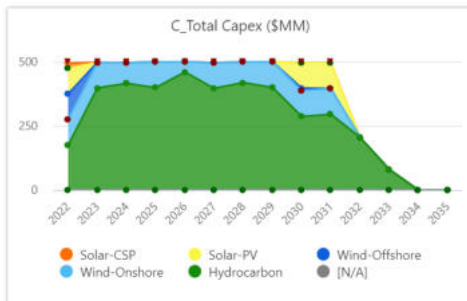
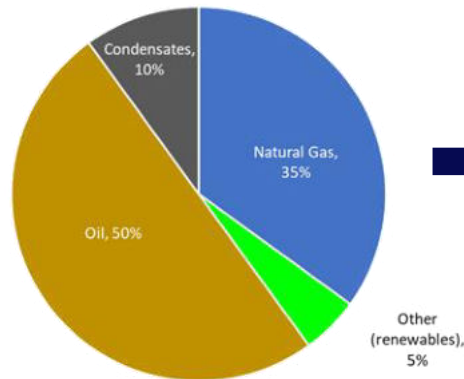
A Need to **BALANCE** Competing Demands  
(under uncertainty...)



# Strategic Energy Transition

Fully Leverage Existing Assets and Migrate to a New Asset Mix

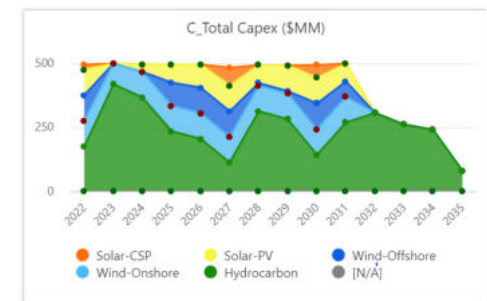
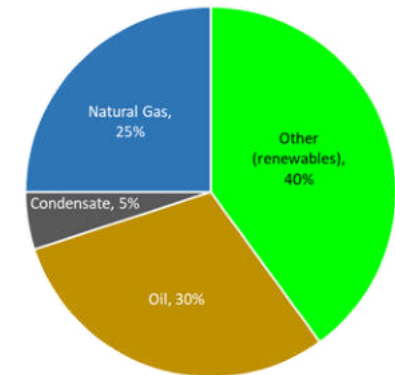
## Existing Organization



## Portfolio Rationalization

New Business Investments and Selected Divestitures

## Aspired Portfolio



# Strategic Energy Transition

How to Assess the **Value** of Investments in Renewables, CCS - **Holistic Portfolio Management**

Which investments deliver **material carbon reduction**?

Which investments best align with objectives and **legacy assets**?



What are the impacts of **uncertainties** in pricing, electricity markets, or technologies?

How to efficiently value **disparate investment options**?

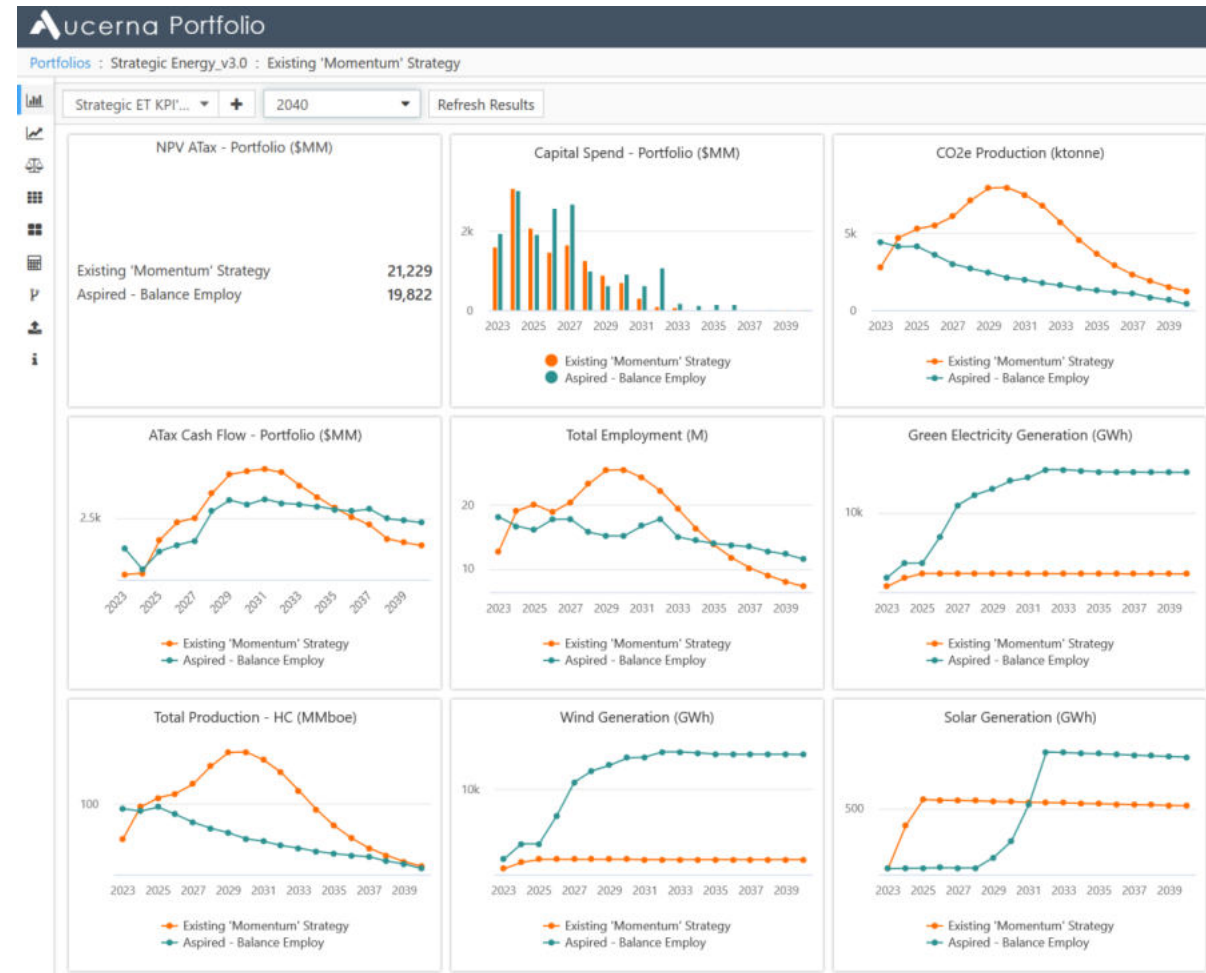
**Quantify Objectives, Options, and Potential 'Aggregate' Performance Delivery**

# Strategic Energy Transition

Need to adapt **business models** to position for these changes (**costs**)



**CHALLENGE**  
A Need to ADAPT Business Models



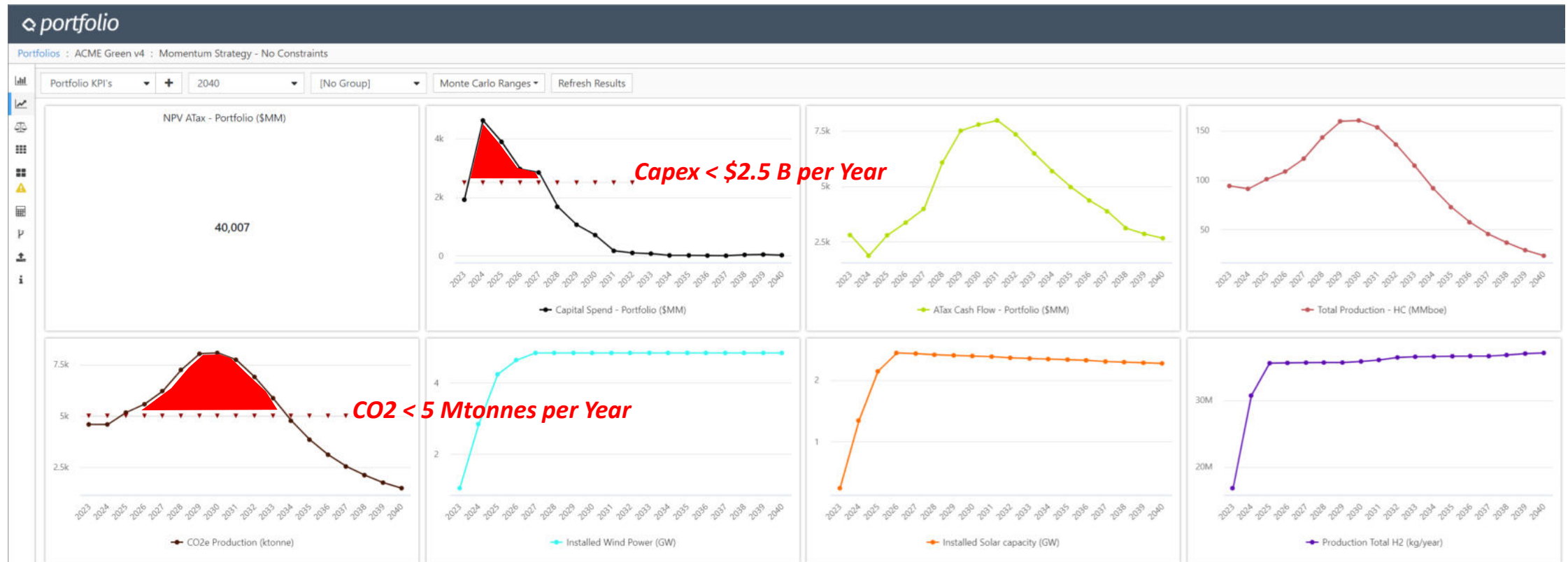
# Strategic Energy Transition: Portfolio Modelling

## General Methodology

1) Quantify the specific (aggregate) objectives for the company

**Momentum Strategy:**

**Violates CO2 Objective and Capital limits**

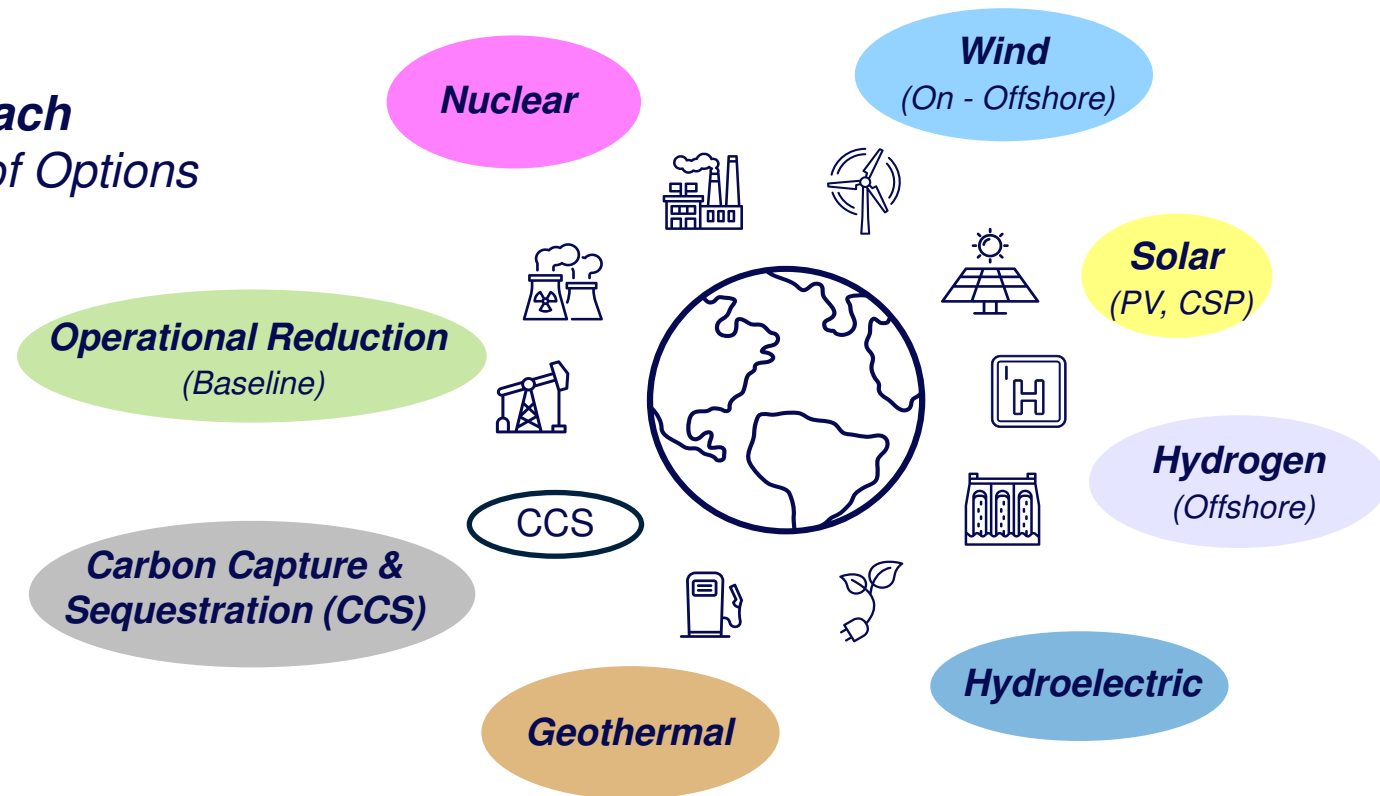


# Strategic Energy Transition: Portfolio Modelling

## General Methodology

2) Characterize the inventory of investment options (opportunities)

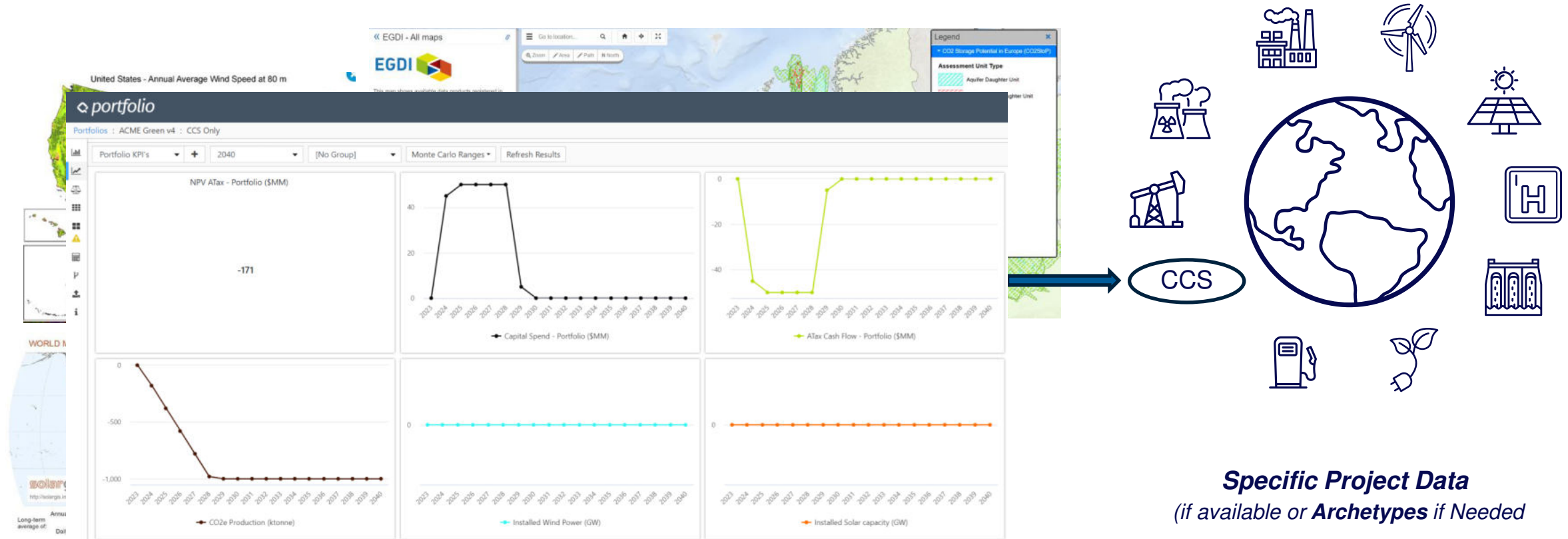
**Greatest Value in this approach**  
*Consideration of wider range of Options*



# Strategic Energy Transition: Portfolio Modelling

## General Methodology

2) Characterize the inventory of investment options (opportunities)



**Detailed Operational Data Compiled: Cash Flows and Performance Characteristics**



# Strategic Energy Transition: Portfolio Modelling

## General Methodology

3) Specify the optionality (availability, timing) and dependencies for the opportunities

**Aucerna Portfolio**  
Portfolios : AI-ET Model v8.6 : Momentum Strategy

Selection Constraints | Selection Dependencies | Selection Groups | Outcome Dependencies

Search Opportunities  Show Namespaces Show Attributes ▾

Opportunity	Energy Type ▼	Integer	Min	Total		Total Instances		2022		2023		2024	
				Min	Max	Min	Max	Min	Max	Min	Max		
Offshore Wind - Class 1	Wind-Offshore	<input checked="" type="checkbox"/>	-	100.00	-	-	10.00	-	10.00	-	10.00	-	10.00
Offshore Wind - Class 2	Wind-Offshore	<input checked="" type="checkbox"/>	-	100.00	-	-	10.00	-	10.00	-	10.00	-	10.00
Offshore Wind - Class 3	Wind-Offshore	<input checked="" type="checkbox"/>	-	100.00	-	-	10.00	-	10.00	-	10.00	-	10.00
Offshore Wind - Class 4	Wind-Offshore	<input checked="" type="checkbox"/>	-	100.00	-	-	10.00	-	10.00	-	10.00	-	10.00
Offshore Wind - Class 5	Wind-Offshore	<input checked="" type="checkbox"/>	-	100.00	-	-	10.00	-	10.00	-	10.00	-	10.00
Offshore Wind - Class 6	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 7	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 8	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 9	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 10	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 11	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 12	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 13	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-
Offshore Wind - Class 14	Wind-Offshore	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-	-	-	-	-

### Specific Projects or Archetypes

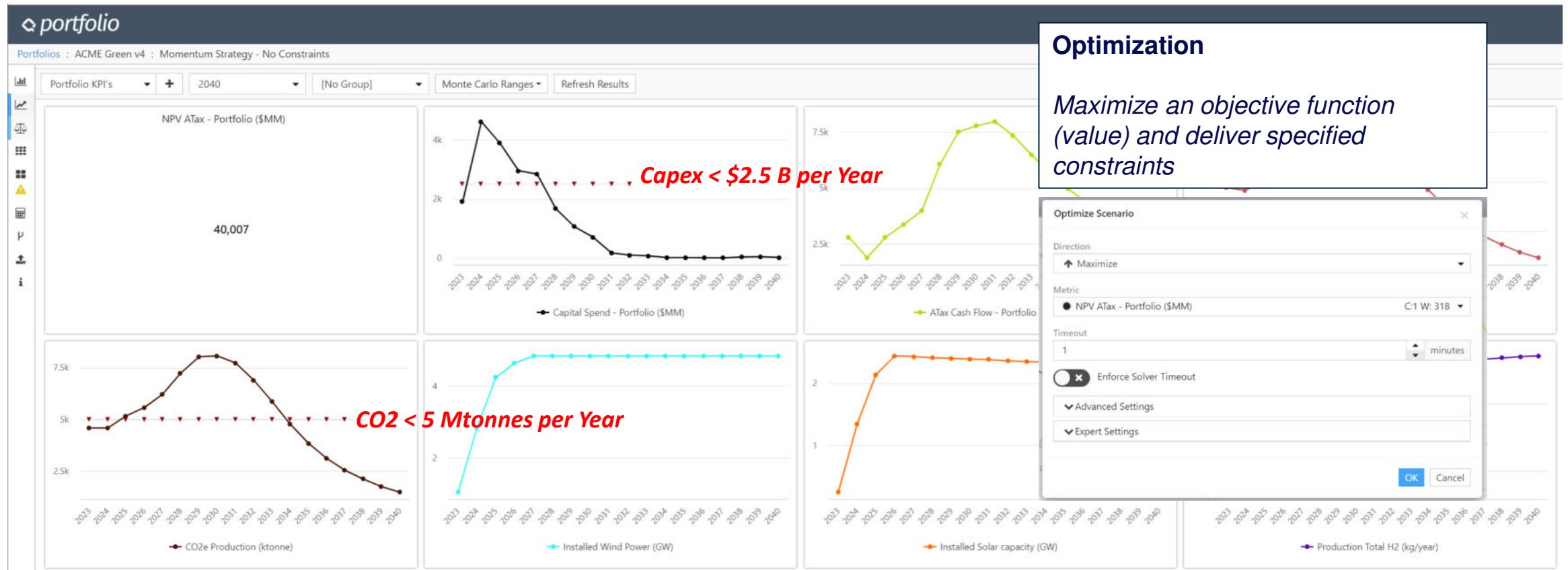
*How many projects in total?  
How many per year?*

Opportunity Name	Wind Technology	Average Wind Speed (m/s)	Wind Speed Range (m/s)	Average Water Depth (m)	Average Distance Site to Cable Landfall (km)
Offshore Wind - Class 1	Fixed Bottom	8.7	8.7	23	35
Offshore Wind - Class 2	Fixed Bottom	8.6	8.6	24	38
Offshore Wind - Class 3	Fixed Bottom	8.6	8.6	28	40
Offshore Wind - Class 4	Fixed Bottom	8.6	8.6	32	45
Offshore Wind - Class 5	Fixed Bottom	8.6	8.6	32	65
Offshore Wind - Class 6	Fixed Bottom	7.8	7.8	33	74
Offshore Wind - Class 7	Fixed Bottom	6.8	6.8	36	77
Offshore Wind - Class 8	Floating	9.6	9.6	159	45
Offshore Wind - Class 9	Floating	9.4	9.4	177	54
Offshore Wind - Class 10	Floating	9.3	9.3	167	56
Offshore Wind - Class 11	Floating	9.3	9.3	128	90
Offshore Wind - Class 12	Floating	9.1	9.1	193	122
Offshore Wind - Class 13	Floating	8.0	8.0	608	137
Offshore Wind - Class 14	Floating	7.0	7.0	635	161

# Strategic Energy Transition: Portfolio Modelling

## General Methodology

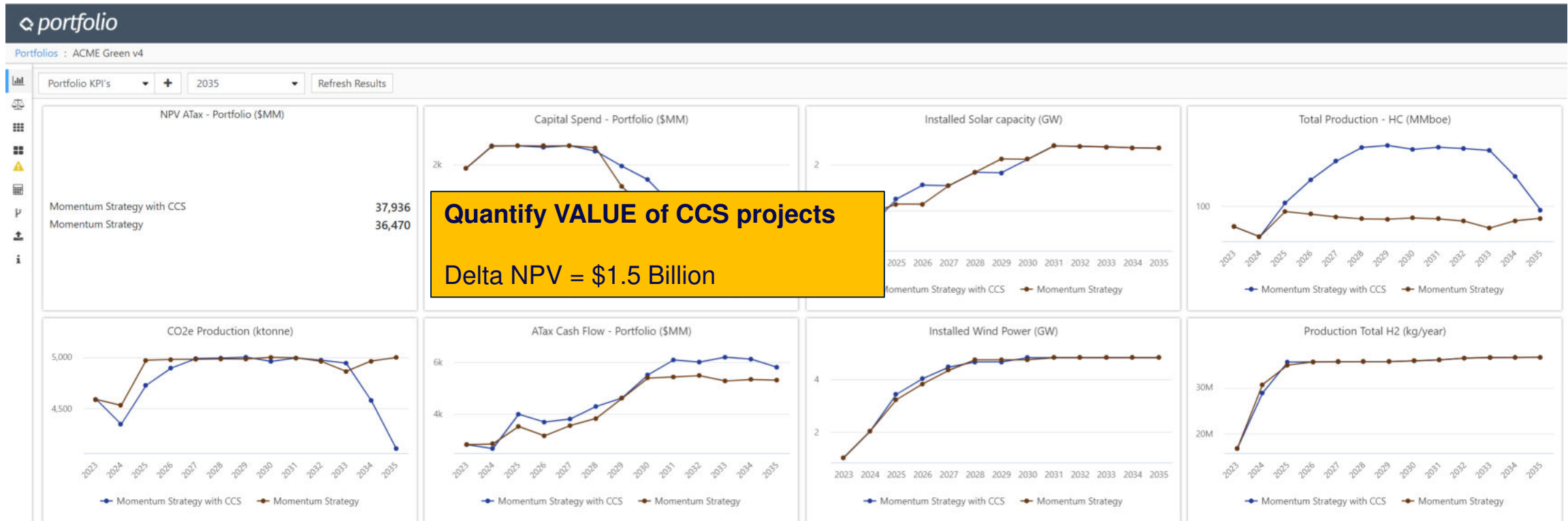
### 4) Optimize the portfolio composition for alternative scenarios



# Strategic Energy Transition: Portfolio Modelling

## General Methodology

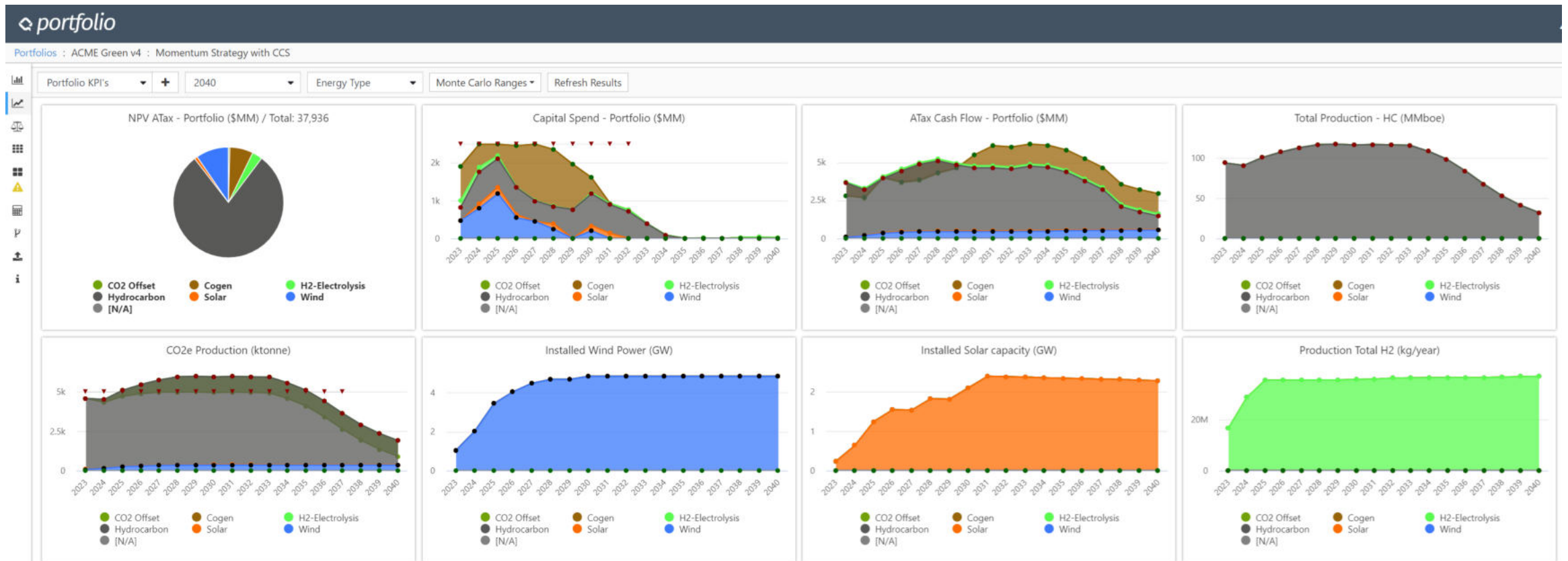
### 5) Compare / Contrast multiple scenarios under alternative constraints



# Strategic Energy Transition: Portfolio Modelling

## General Methodology

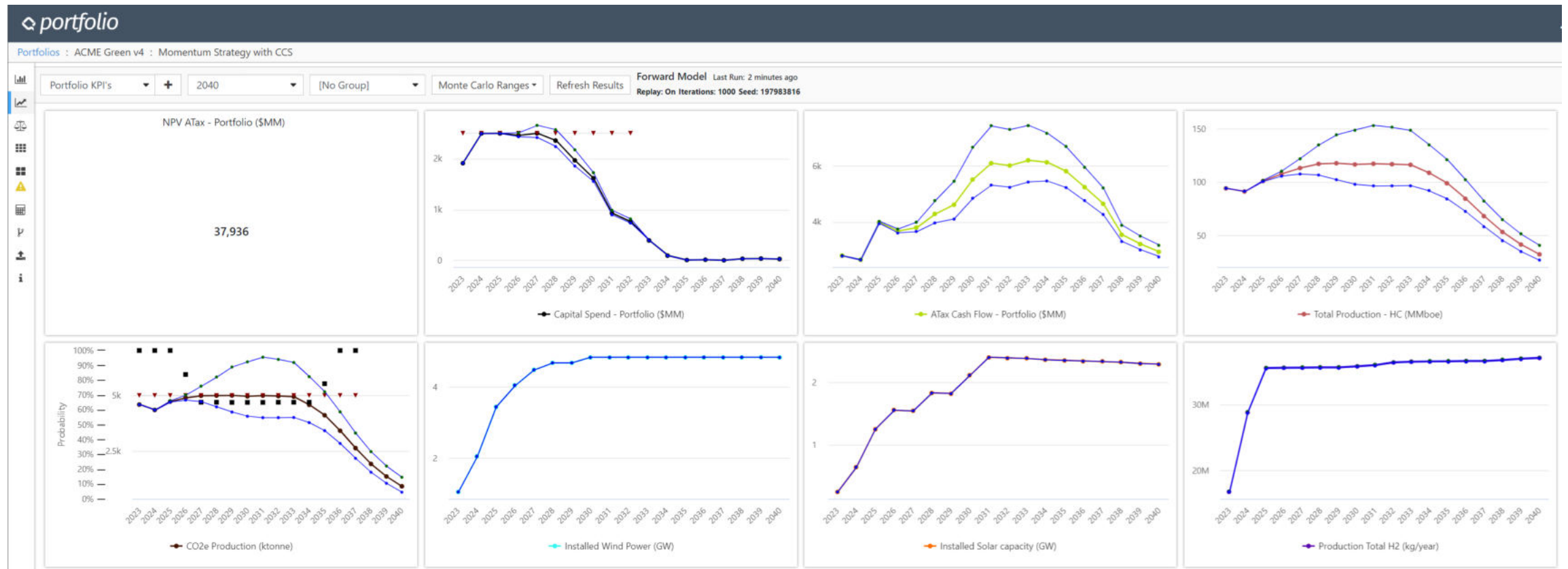
### 6) Distill scenario results to gain further insights



# Strategic Energy Transition: Portfolio Modelling

## General Methodology

### 7) Monte Carlo simulations to assess ranges of uncertainty and probability of achieving objectives



# Strategic Energy Transition: Portfolio Modelling

*Fully Leverage Existing Assets and Migrate to a New Asset Mix*

## Insights from **Portfolio Modelling**

Value of asset(s) as contributors to **Total Portfolio Value**

Trade-offs in performance between various paths towards lower carbon generation

Value Accretion or Dilution from alternative investment types (cost of carbon reduction)

Consideration of Uncertainties – Alternatives for mitigating risks

## ***Broader Perspectives on Performance***



[quorumsoftware.com](http://quorumsoftware.com)

