

A photograph of the Golden Gate Bridge in San Francisco at dusk. The bridge's towers and suspension cables are illuminated with warm lights, and the sky is a deep blue. The bridge's reflection is visible in the water below. In the background, a hillside is lit with string lights.

Investors and Carbon Markets



March 19, 2024

Three sessions by the cCarbon team today

Role of investors and in
market outlook

9 am Imperial B

Interconnectedness of
different markets: Mosaic
of Cap and Trade and
Clean Fuels Markets

11.30 am Franciscan C

Interplay of Offsets and
Compliance Markets

4.00 pm Imperial A



Outline

Who are we

Demystifying investors and their role in carbon markets

Our outlook for North American markets

Unveiling the scenario simulator

CARBON
IS OUR
currency

Forecasting Environmental Markets



cCarbon

cCarbon (est. 2013)
is a specialized analysis platform for
**environmental
commodity**
markets and climate finance

Our data, insights and forecasts

enhance

decision-making

for environmental market
participants and investment firms



**OUR
WORKS
IMPACT**



US\$200

Billions of assets under
management in global that
are guided by cCarbon
forecasts



95%

of market-regulated global
emissions covered by
cCarbon products



1600 +

corporate entities guided
daily by our analysis

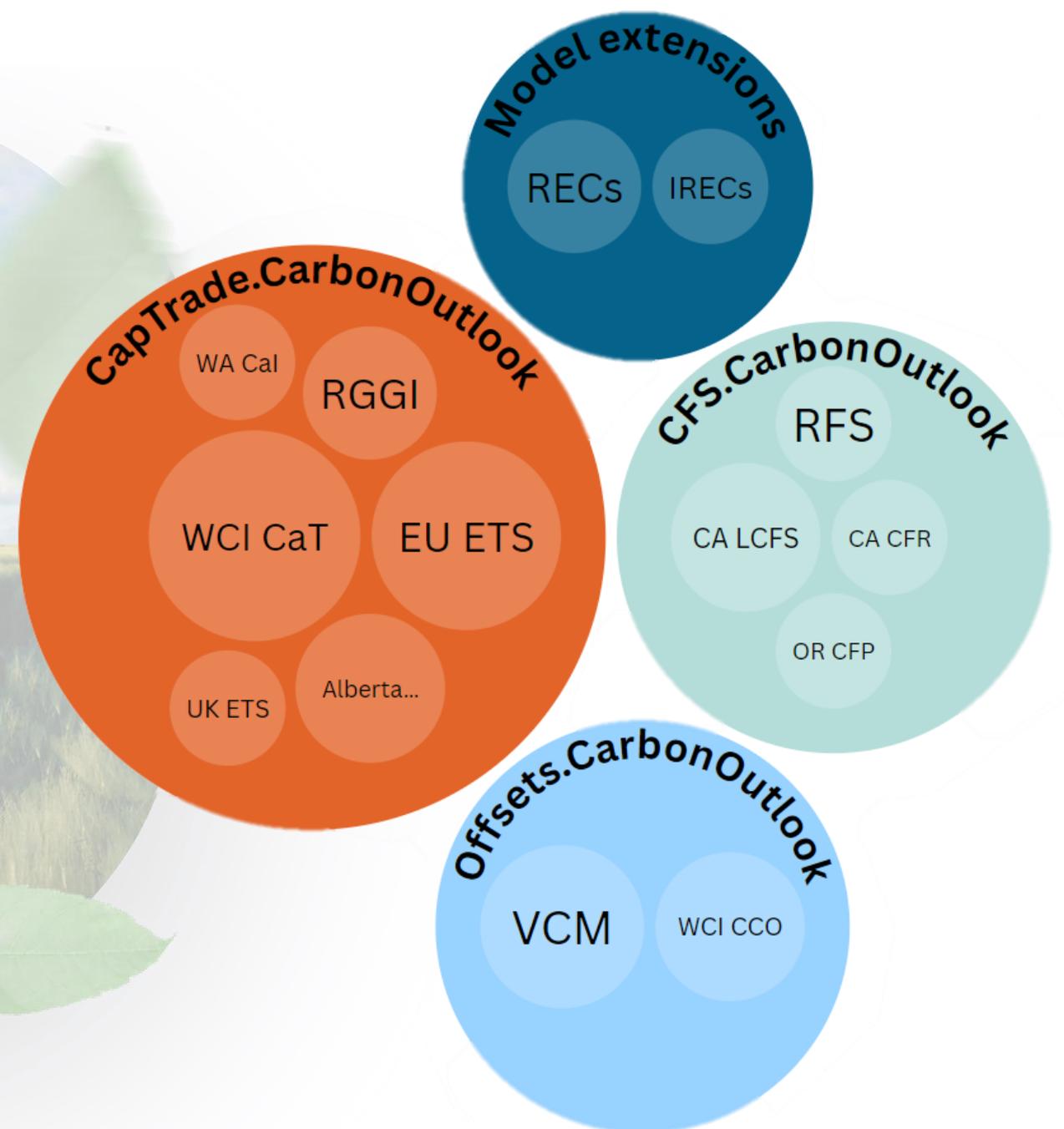
We have a wide range of coverage



For our analysis we use CarbonOutlook™: interconnected models for carbon markets

2 families of models:

- Near term trend analysis models (Trending.CarbonOutlook)
 - Econometrics
 - AI/ ML models
- Long term fundamental models (Fundamental.CarbonOutlook)
 - Linear programming

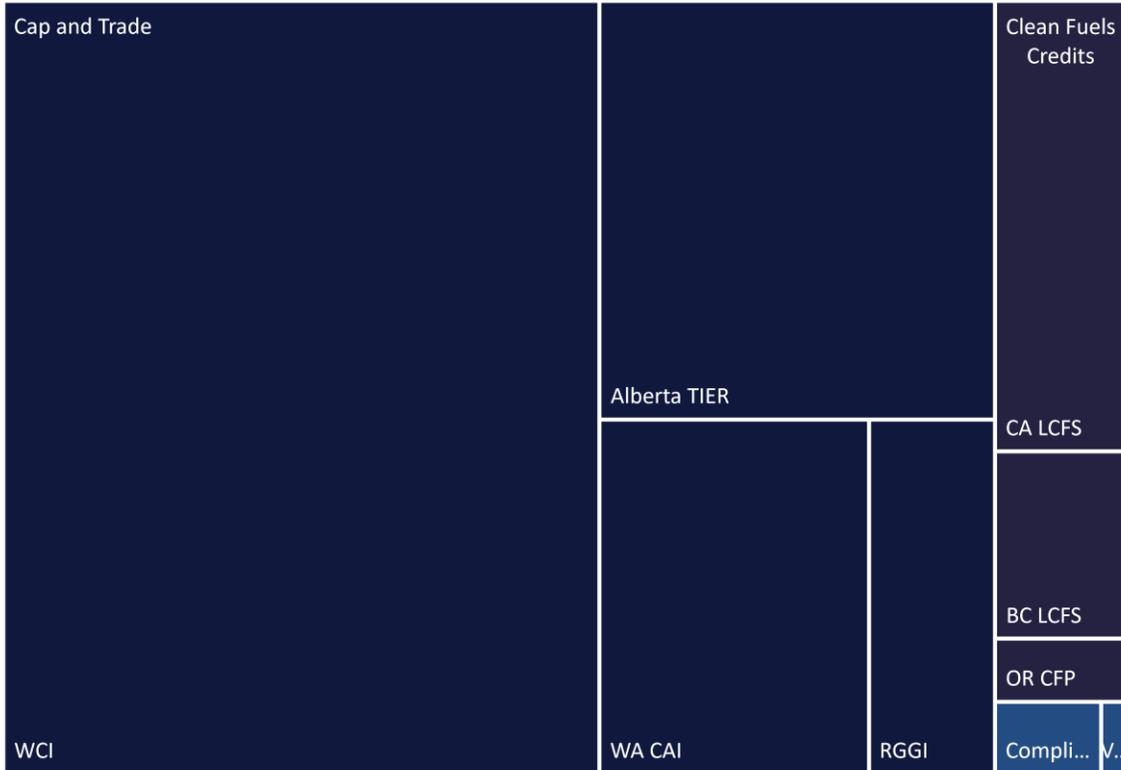




Demystifying investors and their role in carbon markets

North American carbon markets are presently 20% of global market, by value. Expected to double in 3 years by value and volume.

\$30 billion in annual issuances



Upcoming markets

New markets under development

- New York Cap and Trade
- New Mexico CFS

Markets that have come online and yet to trade in volumes

- Canada CFR
- WA CFS

Offsets

- WA compliance offsets

Annual issuance (2023)

Cap and Invest: \$22b (WCI is \$15b)

Clean Fuels credits: \$3.6b

Offsets (Compliance and voluntary): \$0.3b (WCI CCOs are \$0.2b)

Source: cCarbon Analytics

Demystifying who are investors in global carbon markets

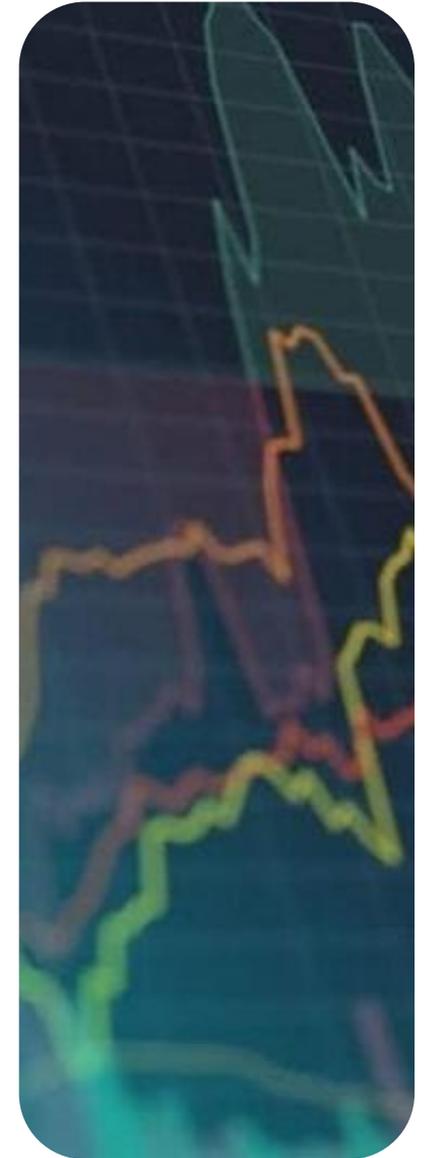
Private Capital (USD 20-25 billion)

- 175 Funds
- 97 Banks
- 245 Trading desks

Public Funds (USD 1 billion)

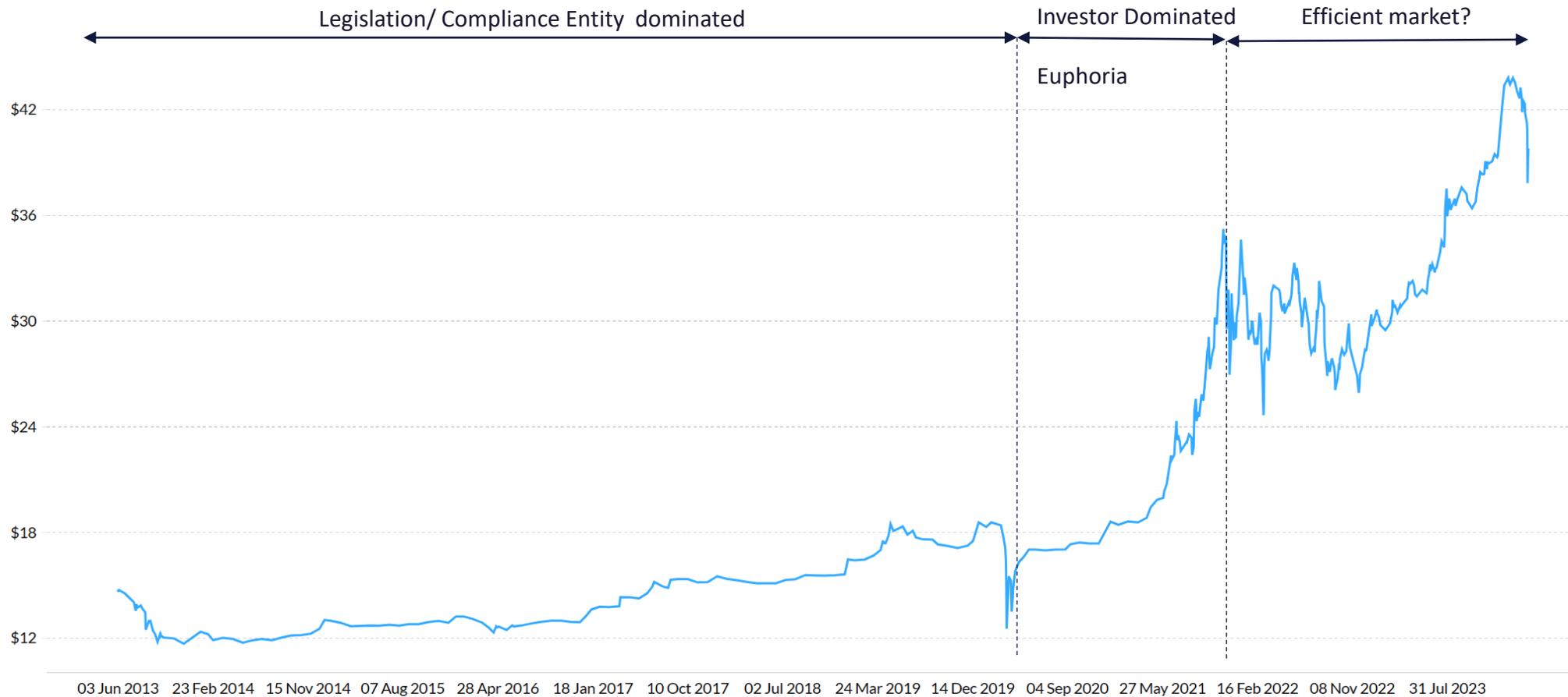
- ~15 ETFs

In North America, many of the investors entered post 2020
In the EU, investor participation increased in 2018



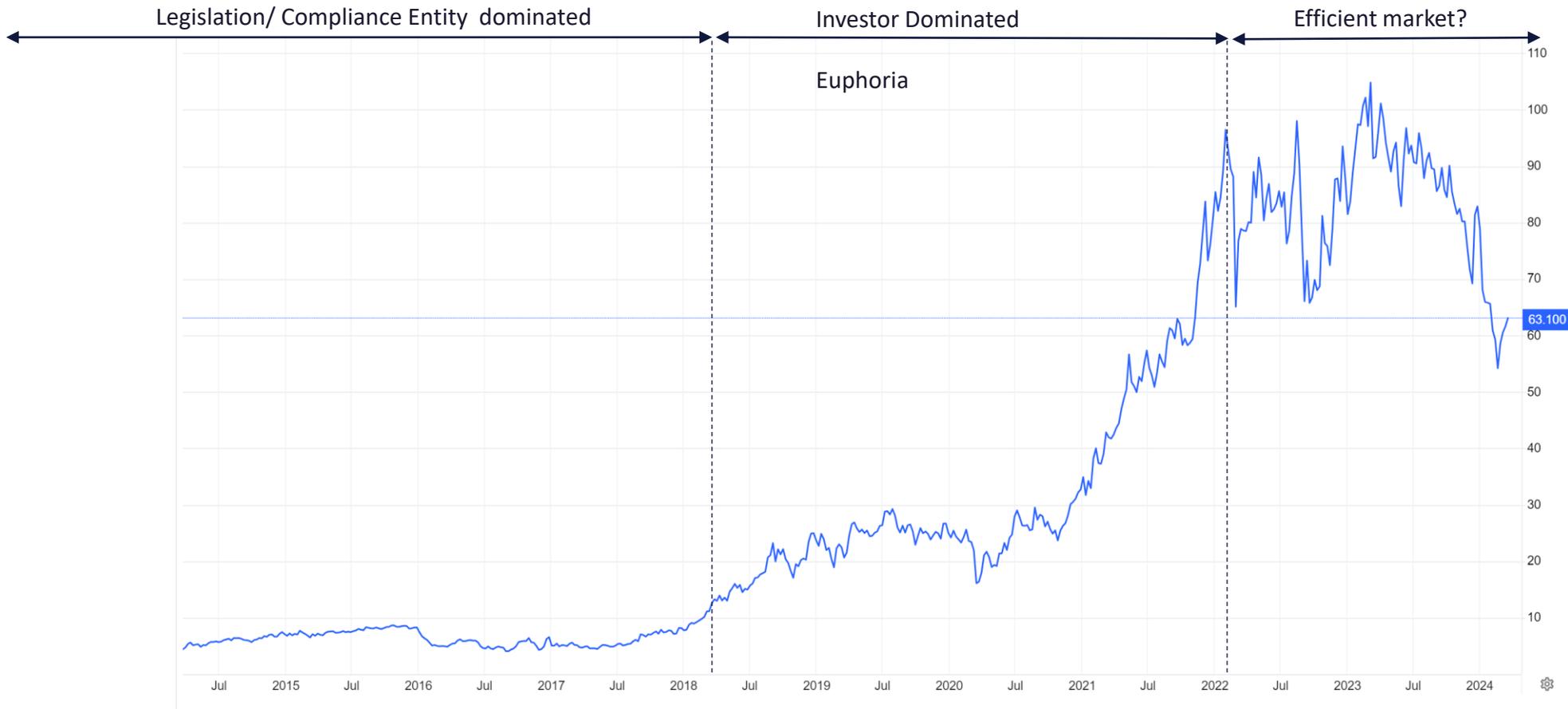
Source: cCarbon

Investors have arguably brought in price efficiency in the market: convergence between fundamental prices and traded values. A view on CCAs



Source: ICE

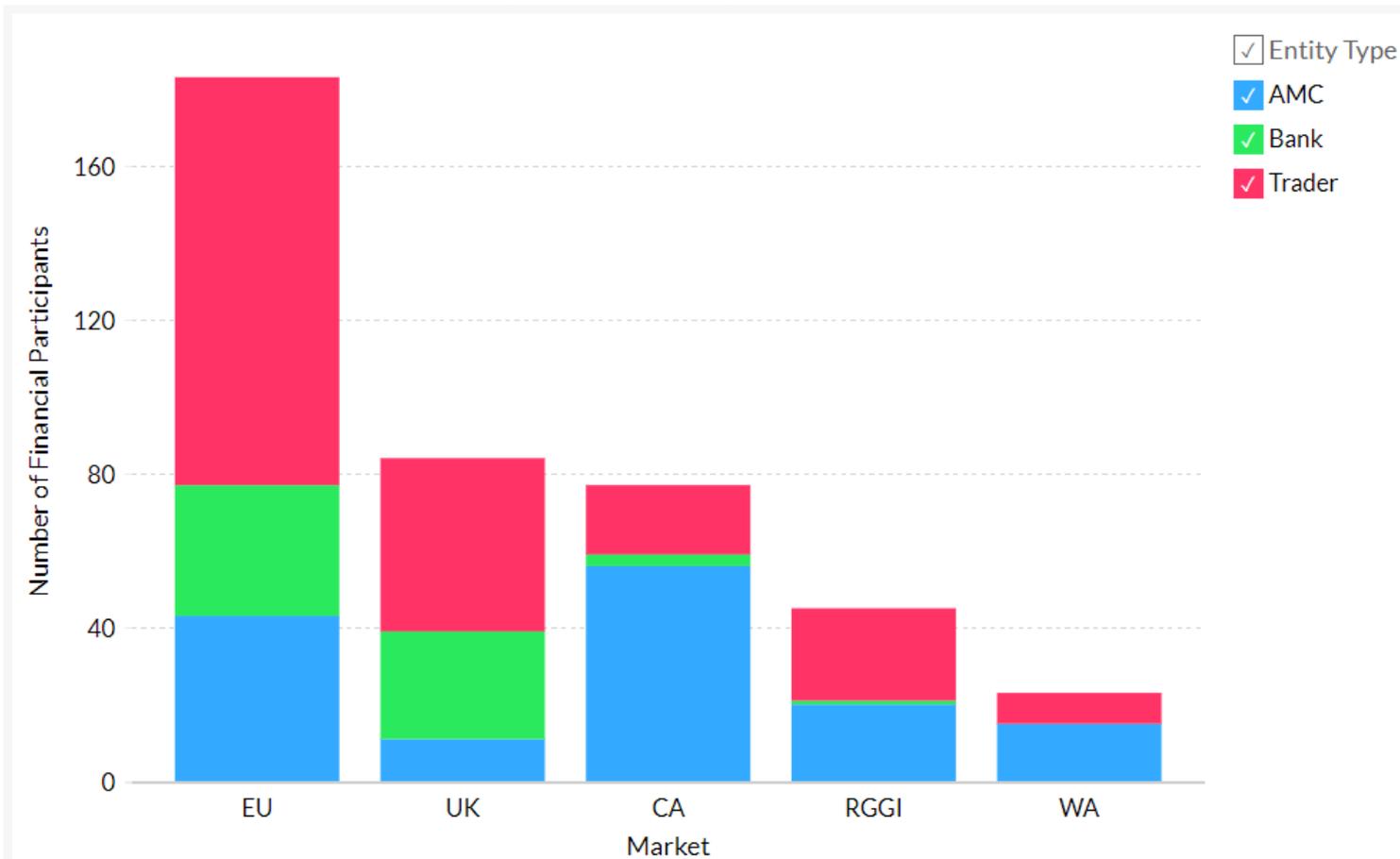
Investors have arguably brought in price efficiency in the market: convergence between fundamental prices and traded values. A view on EUAs



Source: CME

We have mapped 390 private capital players

By market of operation



By location of their HQ

	AMCs	Banks	Traders	
United States	23	47	88	158
United Kingdom	9	9	33	51
Germany	1	3	17	21
Netherlands	1	1	16	18
Italy		5	9	14
Denmark			12	12
Spain	1	2	8	11
Switzerland	2		8	10
Canada		7	2	9

Source: <https://commit.ckinetics.com/open-view/572220000060552076/a09920200a168972f74010a282>

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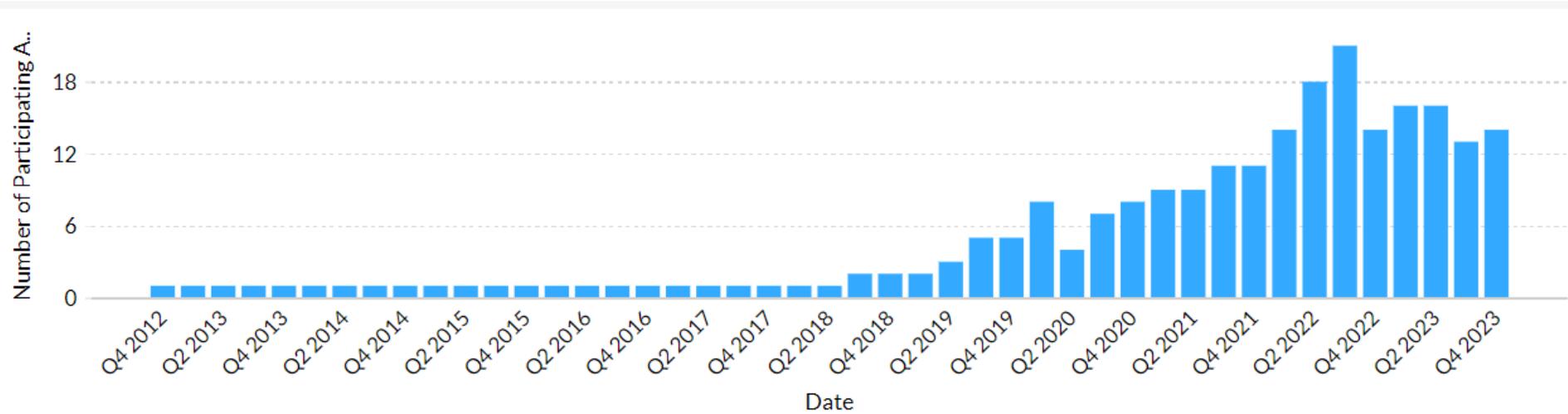
We have mapped 390 private capital players: reach

Entities in geographies mapped to Parent Company

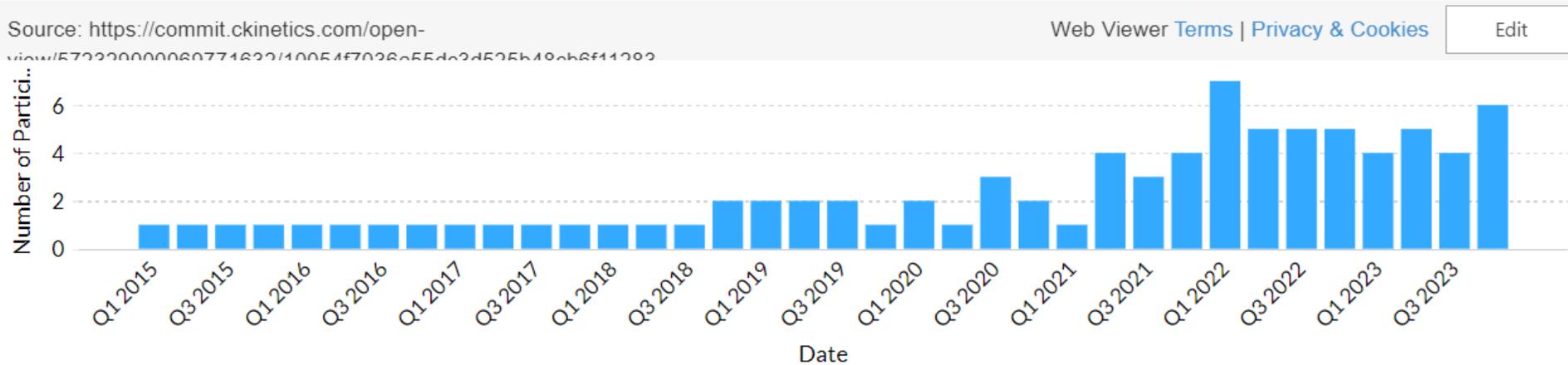
	Fund manager/ Parent Company	CA	EU	RGGI	UK	WA	
Bank	BNP PARIBAS	1	6		2		9
Bank	The Goldman Sachs Group, Inc.	2	4	1	1	1	9
Trader	Statkraft AS	1	4	2	1		8
Bank	JPMorgan Chase & Co.		5		3		8
Bank	Royal Bank of Canada	1	3	1	2		7
Trader	DRW Holdings, LLC	2	1	1	2	1	7
Trader	Trafigura Group Pte Ltd	1	3	1	1	1	7
Trader	Vertis Environmental Finance Ltd.		6		1		7
Bank	Bank of America		5		1		6
Bank	CITIGROUP INC.		5		1		6
Trader	Macquarie Group	1	2	1	1	1	6
Trader	Mercuria Energy Group Ltd	1	1	2	1	1	6
Bank	Macquarie Group		3		2		5
Bank	Morgan Stanley & Co LLC.		4		1		5

- Source: cCarbon

WCI and RGGI auction participation: another view on increasing investor engagement till 2022 and then steady values



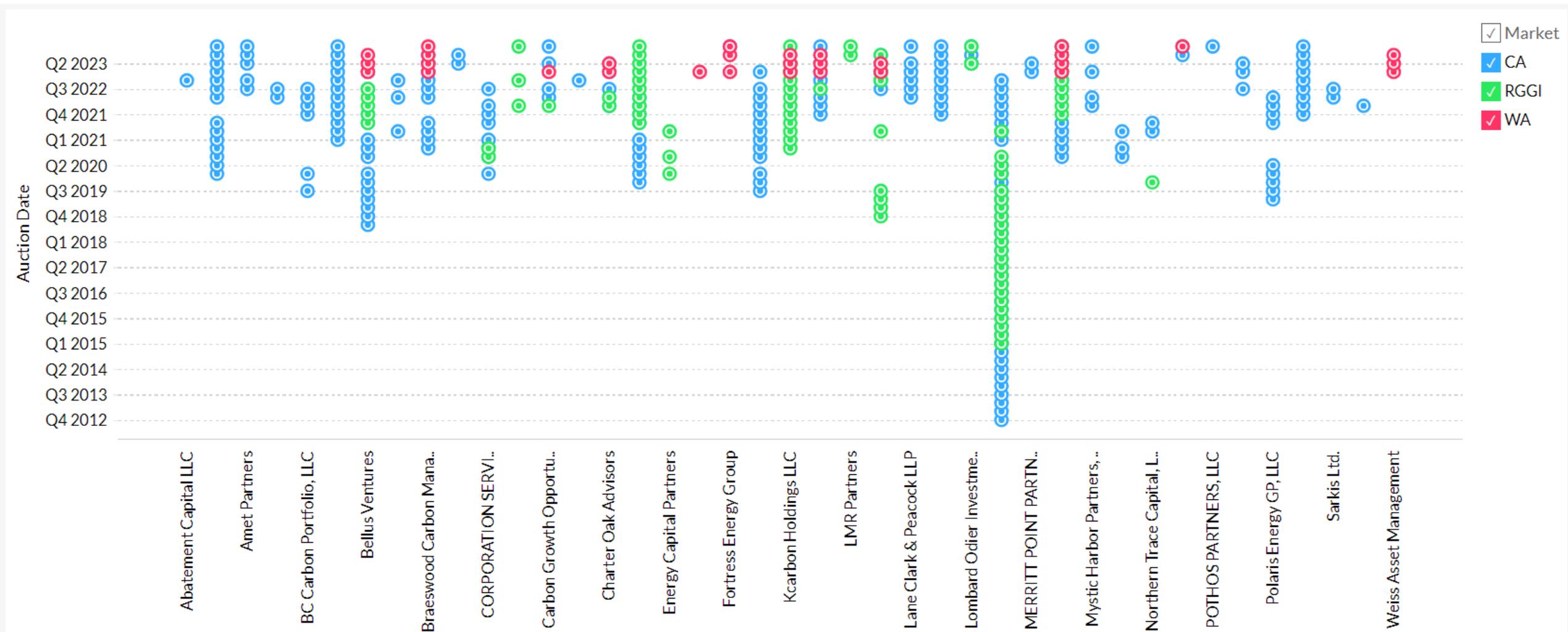
WCI investor participation



RGGI investor participation

Source: <https://commit.ckinetics.com/open-view/572220000060774622/140054f7026e554e2d4525b19eb6f41292> Web Viewer [Terms](#) | [Privacy & Cookies](#)

Interesting trends emerge when we look at engagement over time



Source: <https://commit.ckinetics.com/open-view/572220000074946800f05db0a7b522f0b20c6eb0a071a651dc2>

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15 funds have dominated public investment: all started during 2020-2022 and mainly covering EUAs and CCAs

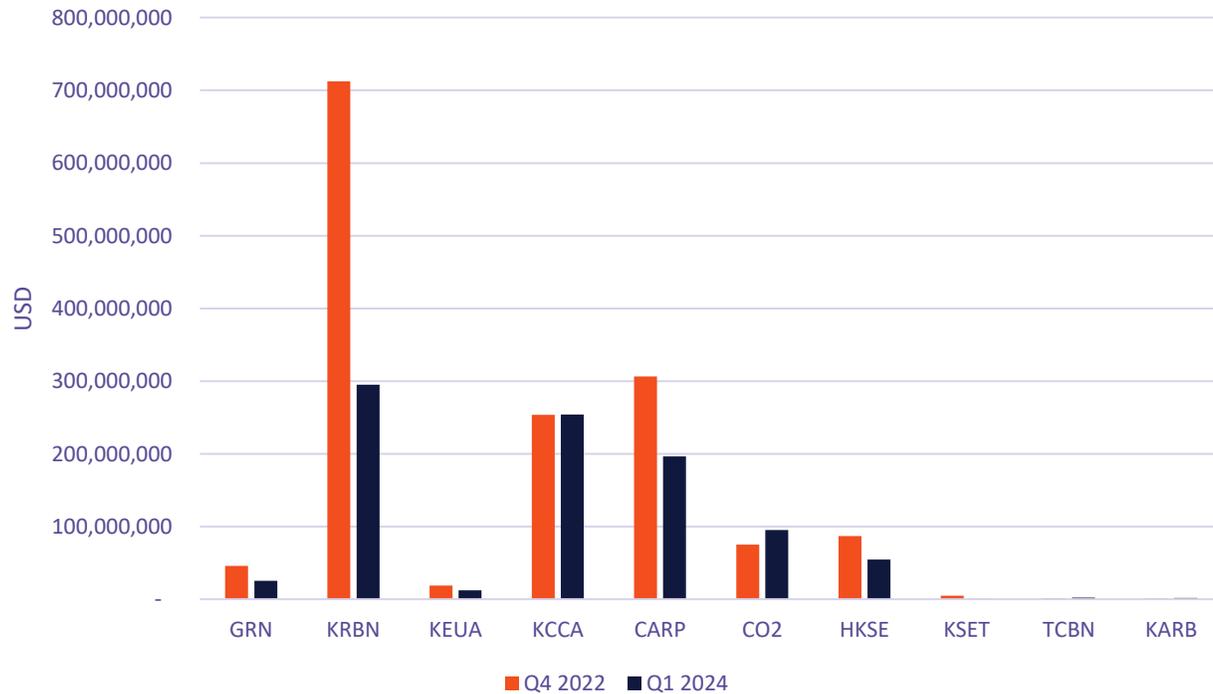
ETF Name, Ticker, and Exchange Traded	ETF Holdings	Date of Inception
Barclay's iPath Series B ETN (GRN) [NYSE ARCA]	99.9% EUA futures	9/10/2019
Kraneshares Global Carbon Strategy ETF (KRBN) [NYSE ARCA]	55% '22 EUAs, 23% '22 CCAs, 5% each of '22 RGGI, UK, CCA '23 Futures, EUA '23 Futures	7/30/2020
Wisdom Tree Carbon ETC (CARP) [LSE]	Tracks Solactive Carbon Emission Allowances Rolling Futures Index, Following ICE ECX CFI EUA Futures	8/20/21
KODEX (Samsung Asset Mng) EUA Futures ICE(H) ETF [XKRX]	62% Dec '22 ECX EUA Futures, 27% Dec '23 ECX EUA Futures, 11% KRBN Global Carbon ETF	9/30/21
Kraneshares European Union Allowance Strategy (KEUA)[NYSE ARCA]	100% '22 EUA futures	10/5/21
Kraneshares California Carbon Allowance Strategy (KCCA)[NYSE ARCA]	100% '22 CCA Futures	10/5/21
HanETF SparkChange Physical Carbon EUA ETC (CO2) [LSE]	ETC backed by physical EUAs	10/18/21

ETF Name, Ticker, and Exchange Traded	Holdings	Date of Inception
Horizons Carbon Credits ETF (CARB) [TSE]	99% EUAs '22, 1% Kraneshares Global ETF	2/9/22
Ninepoint Carbon Credit ETF (CBON) [NEO]	26% Dec '22 UKEA, 26% Dec '22 RGGI 22.5% Dec '22 ICE ECX EUAs, 22% Dec '22 CCAs, 3% Cash	2/16/22
CICC Carbon Futures ETF (9060) [HKSE]	100% EUA ICE Dec '22 Futures	3/23/22
Kraneshares Global Carbon Offset Strategy (KSET) [NYSE ARCA]	Offset Futures Traded on CME (GEO, N-GEO)	4/27/22
TD Global Carbon Credit Index (TCBN) [TSE]	100% EUAs	8/23/22
KARB Carbon Strategy ETF (KARB) [NYSE ARCA]	72% Dec '22 EUAs, 18.5% Dec '22 CCAs, 9.2% Dec '22 RGGI	9/13/22

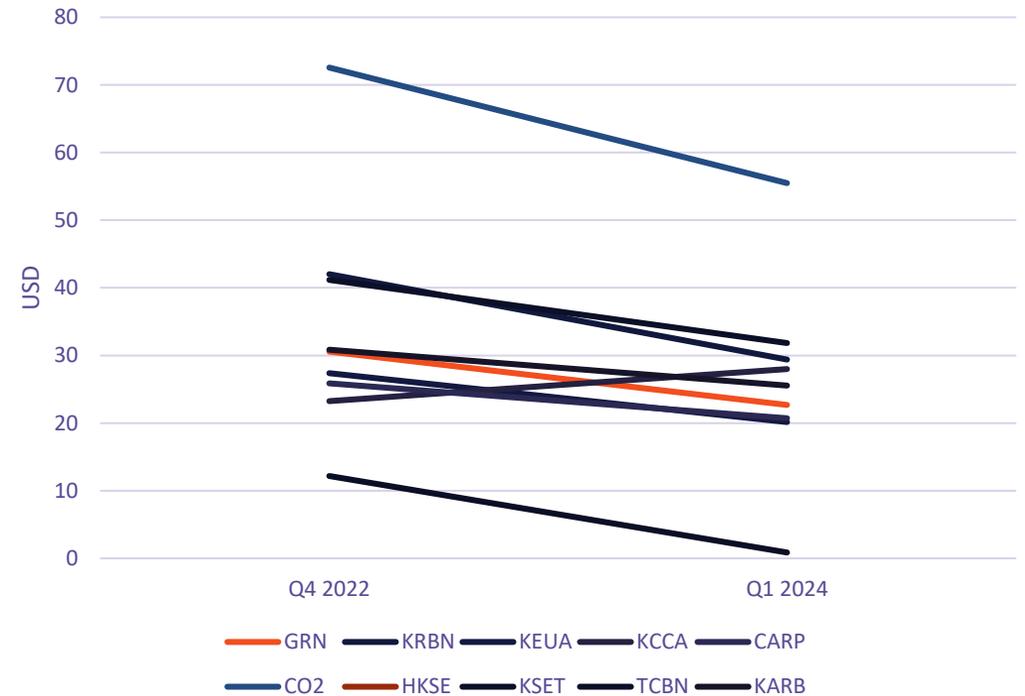
cCarbon research [ETFs: Building Momentum Amidst Uncertainty](#)

Collectively their capital under management has declined from USD 1.5 billion in Q4 2022 to USD 938 million (last week)

AUM of different ETFs



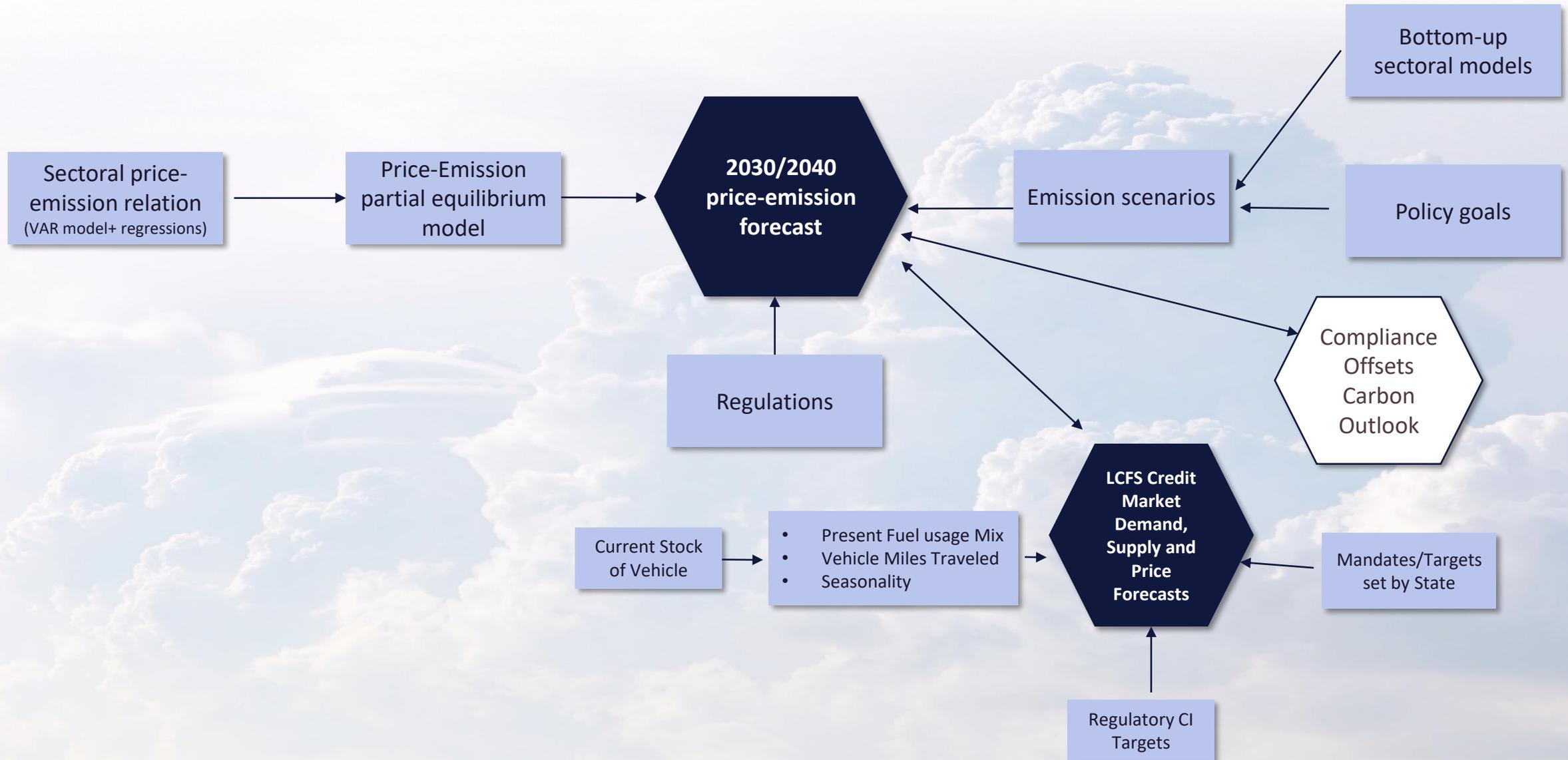
NAV of ETFs





Our outlook for North American markets

CarbonOutlook™ Model for WCI and Washington



CarbonOutlook™ Model for EU and UK ETS



In a nutshell

Market	Projection we made in Jan 2023	Closing price Dec 2023	What surprised us in 2023	Key drivers for 2024	Outlook on Price for Dec 2024	Long term drivers	2030 Price projection we made last year	Current 2030 price projection
WCI	\$33-\$53	\$40.11	ARB's using a revised 2020 reference point for setting its target	<ul style="list-style-type: none"> Timing of the new Cap roll-out and source of allowance reductions RD and RE pace 	\$47-\$73	<ul style="list-style-type: none"> Post 2030 detailing Transportation SB1440, SB 596 and building decarb Canadian elections and CFR 	\$60-\$118	Base case: \$94
EU ETS	€76-€83	€77.55	Significant rise in renewables	<ul style="list-style-type: none"> Inclusion of maritime Delay in compliance 	€74-€85	<ul style="list-style-type: none"> Falling fossil share EU ETS II EU 2040 	We just started LT forecast	Base case: €102 (€40-€120)
UK ETS	We started coverage mid-year	£43.67	Changing policy positions	<ul style="list-style-type: none"> Reduction in cap by 30% Unallocated allowances to be auctioned 		<ul style="list-style-type: none"> Pace of renewables in electricity sector Linkage 		
RGGI	\$11.7-\$12.9	\$15	Prices staying higher than CCR at times	<ul style="list-style-type: none"> Program update (NYCI with limited impact) 	\$14-\$16	<ul style="list-style-type: none"> Offshore wind and Interconnectors with Canada RPS 	\$11-\$13	\$11-\$13
WA CAI	\$48-\$52	\$51.85	Several changes in rules by Ecology	<ul style="list-style-type: none"> Ballot initiative 2117 GHG Inventory numbers 	\$56-\$63	<ul style="list-style-type: none"> WCI linkage EV and RD 	\$105-\$120 (no linkage scenario)	Same unless linked with WCI



Scenario simulators

Model: CarbonOutlook RGGI Demand-Supply Model
Version 202403y1

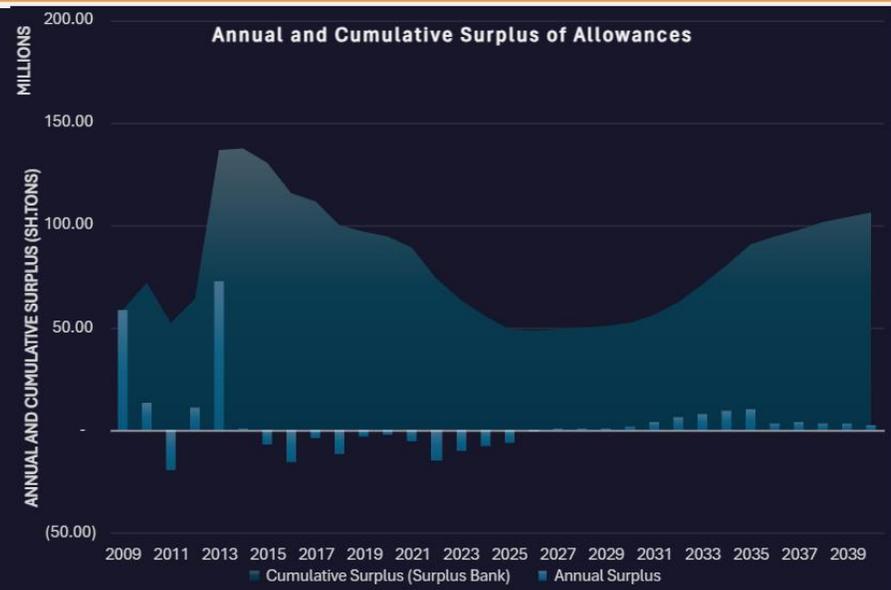
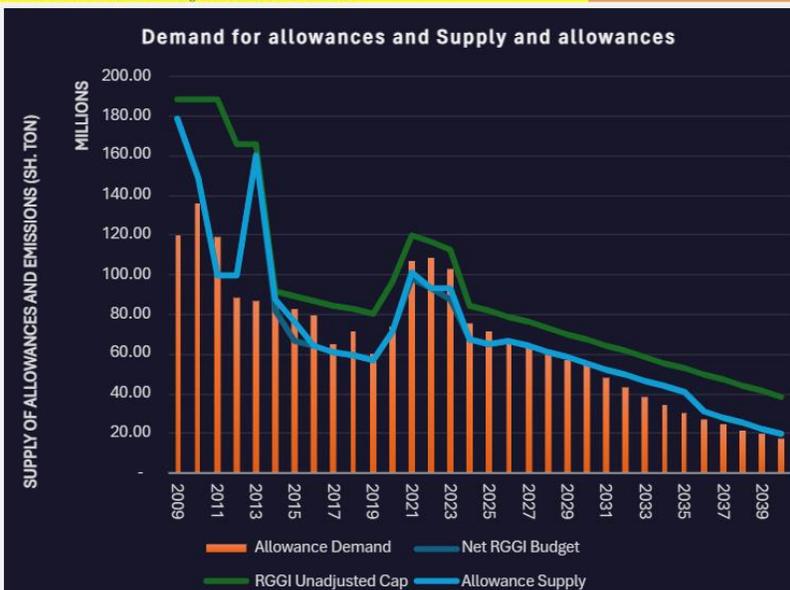
About this model: This is an extract of the Demand-Supply module of the CarbonOutlook RGGI forecasting model
Cells shaded with yellow in the sheets can be changed to construct scenarios

Pick your Supply Scenario

Scenario	2024-2040 CCR Release
Continuation	0%
Zero Cap by 2035	10%
Zero Cap by 2040	25%
	75%
	100%

Pick your Emission Scenario

EAI 2024-2030	EAI 2031-2040
EIA-10%	EIA-10%
EIA-7.5%	EIA-7.5%
EIA-5%	EIA-5%
EIA-3%	EIA-3%
EIA-2%	EIA-2%
EIA-1%	EIA-1%
EIA-0.5%	EIA-0.5%
EIA	EIA
EIA+0.5%	EIA+0.5%
EIA+1%	EIA+1%



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