

Fixed Income Optimisation for Net zero Alignment

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Anthropocene Fixed Income Institute

On this call from AFII

SPEAKERS



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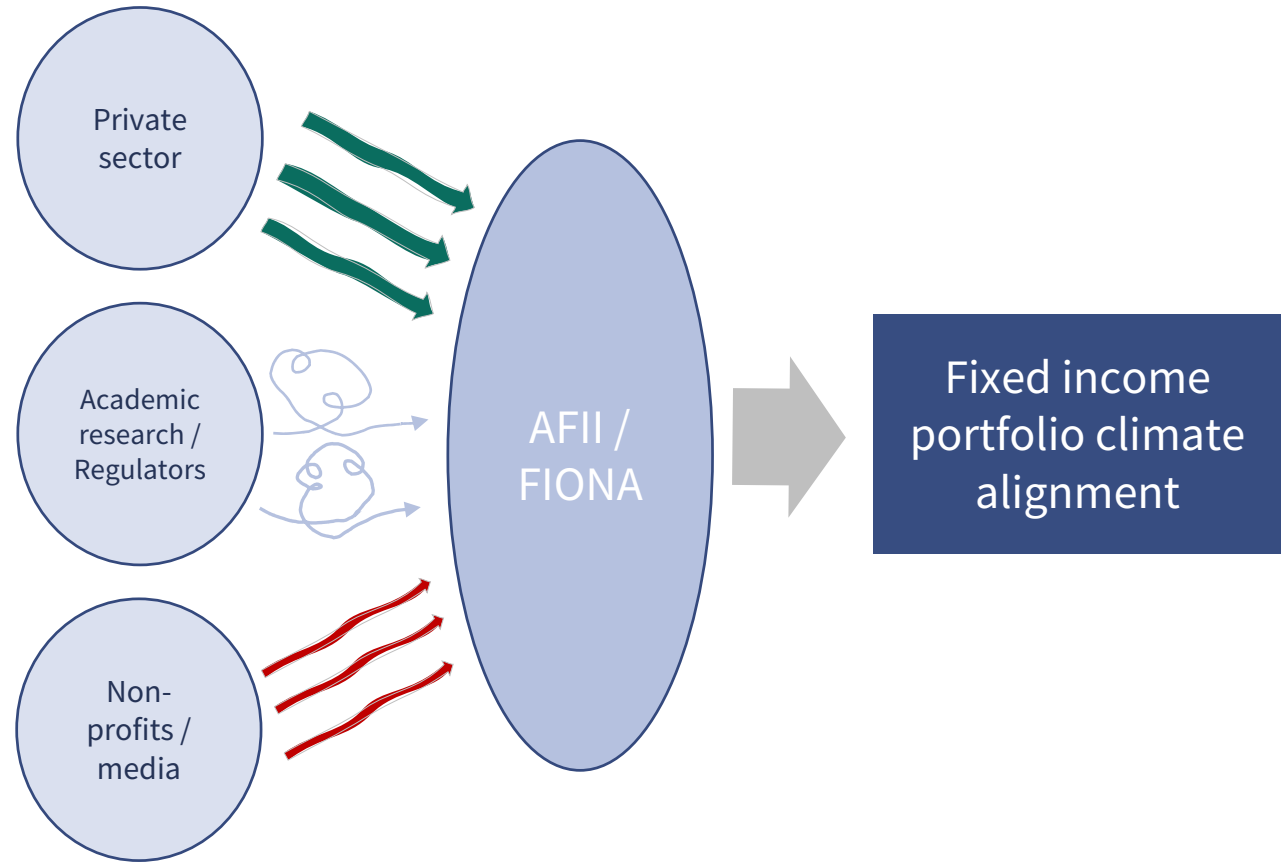
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Introduction and call objectives

Addressing the gap for the fixed income market

DISTILLING PARTIAL SOLUTIONS INTO A FIXED INCOME PORTFOLIO, ACTIONABLE CONTEXT

- Banks and sell-side – security/markets focused but biased to selling “good” cases, lacking portfolio overviews.
- Data providers – technical but often incomplete, silo-effects, expensive, equity focused.
- Asset managers/buy-side – bespoke, opaque, black box methodologies.
- Academia – robust methodologies but lacking market experience, slow.
- Regulators – receiver rather than producer of robust solutions, slow.
- Non-profits/NGOs/Media – challenging market views, providing downside information, offering what “to sell” but few portfolio solutions.



FIONA Fixed Income Optimisation for Net zero Alignment

Fixed Income Optimisation for Net zero Alignment

Universe

- AFII inclusion criteria
 - › Comprehensive universe of liquid issuers
- Issuer level data
 - › Completed with AFII extrapolation methods
- AFII sector ranking
 - › Data and AFII judgement used
- AFII intra-sector ranking
 - › Data and AFII threshold framework



Portfolio analytics and optimisation

- Apply universe rankings to portfolio using ECOBAR analytics
- Portfolio optimisation framework by adjusting weights of rankings subject to constraints
 - › Retain / adjust sector weights
 - › Minimise transaction costs
 - › Minimise tracking error



Dashboard

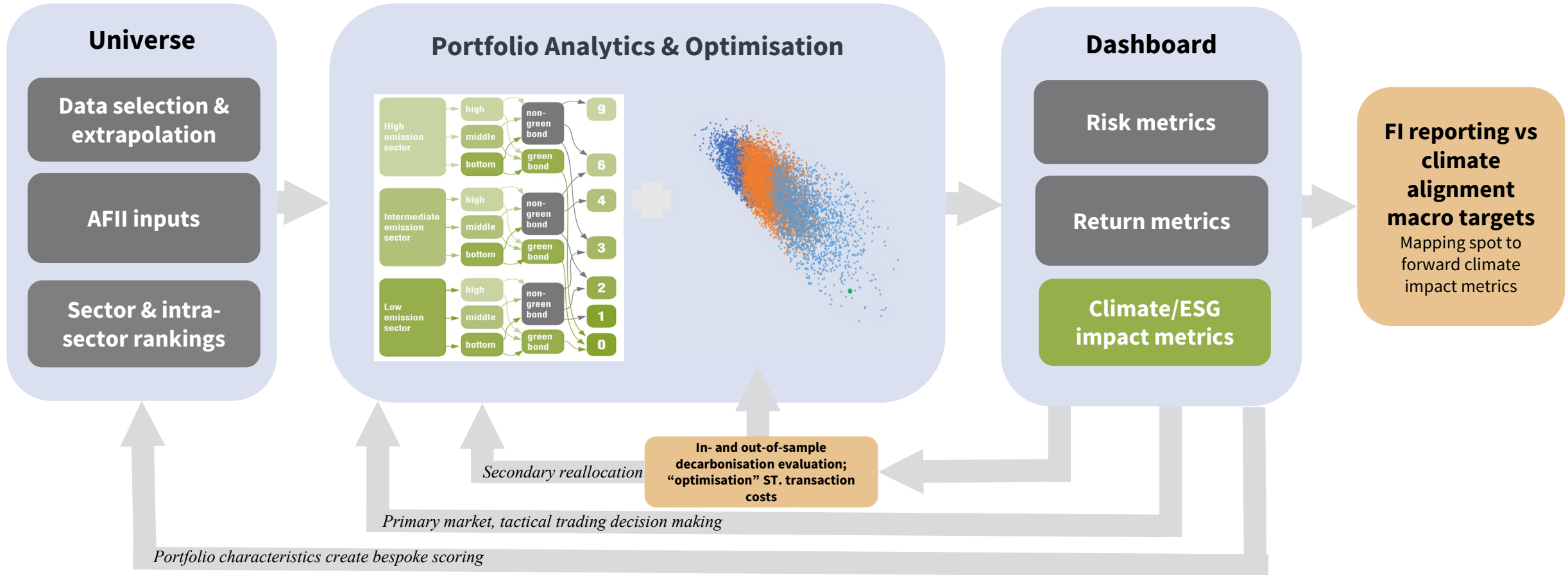
- Portfolio snapshot view, with metrics on risk, return & impact
 - › Detailed understanding on portfolio changes
- Traditional risk metrics
- Robust historic return comparisons
- Forward looking return scenarios
- Spot carbon impact footprints
- Forward impact measures

Handbook

- Why decarbonise a fixed income portfolio - quantification of impact and theory of change
- How to decarbonise – detailed write-up of data and analytics used
- Optimisation - feedback loop for ongoing development and improvements

FIONA portfolio analysis & optimisation framework

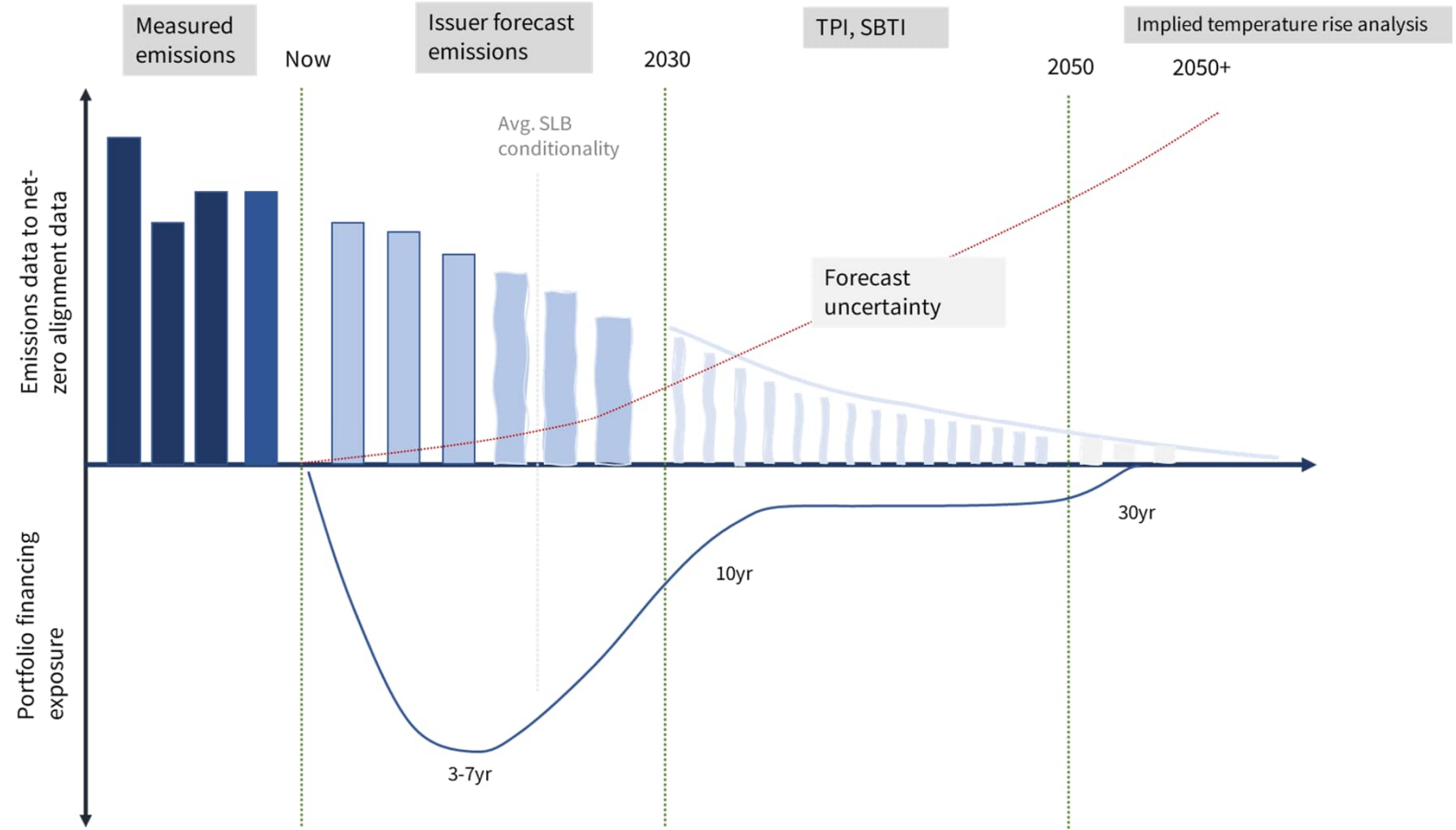
FIXED INCOME OPTIMISATION FOR NET ZERO ALIGNMENT



Challenge 1: Data and net zero alignment targets

PERPETUAL/LONG-DATED FINANCING PLOTS THE COURSE, SHORT/INTERMEDIATE STEERS IT

- **Portfolio impact/alignment should have a connection to the horizon of the financing of the portfolio.**
- **“Plot the course”:** A long-horizon financier (perpetual/ equity) arguably should focus on long-term targets, engagement to get those right.
- **“Steer along the course”:** A short-term financier should focus on the borrower effectively steering toward such targets.
- *Implication 1:* usage of spot versus forward data when building scoring systems should be flexible depending on the underlying portfolio’s maturity.
- *Implication 2:* how to then balance a fixed income portfolio for alignment should depend on its maturity profile.
- *Implication 3:* reporting on alignment with long-term targets should depend on the underlying portfolio’s maturity profile.



Challenge 2: Practicalities in implementation

Challenges in portfolio design and implementation	Portfolio manager questions	FIONA design
Quality and coverage of "spot" carbon emissions/sustainability indicators	"All these metrics seems to be mapped on the equity issuing entities: how do we sew together the complex structures for many corporate bond issuers?"	Comprehensive data mapping
Lack of comparability between various natural segments of fixed income portfolios	"We use govies to adjust total risk-level in the portfolio: if they are not accounted for, the system we are supposed to just incentivises a biased risk taking." "Transition investment in Emerging markets needs different metrics to Developed markets"	Fixed income specific
Trade-offs between portfolio decarbonisation/reallocation vs return potential, risk metrics, and transaction costs	"What should be the trade-off between leader/laggard and sector tilting? Can this be 'optimised'?" "How do I minimise transaction costs?" "How has this worked historically? Is it robust or just data-mining?"	Practical and intuitive
Complexity and speed of decision-making	"I am trying to decide what bond(s) to sell to decide on either of the ten new bond issues today (where two are actually new issuers), and need to understand how that affects my portfolio climate alignment?" "How does the usage of credit hedges apply to my alignment, both on a single name as well as CDS index level?" "Can I run it vs my benchmark?" "Does it work with ETFs?"	Easy to understand impact of single trading decision
Labelled bonds	"How does my score change if buy green bonds or SLBs? Does it matter if they are credible or not?" "How do we differentiate between an ambitious SLB versus a greenwashed green bond?"	Security and issuer level impact for labelled debt Overlay of ESG analysis
Mapping of "spot" indicators to forward indicators	"I am reducing the carbon footprint of my portfolio by 50%, but what does that mean if I am supposed to report on 'net zero alignment'"	Transparency on impact across metrics; flexible optimisation

Challenge 3: Do scoring systems inhibit returns?

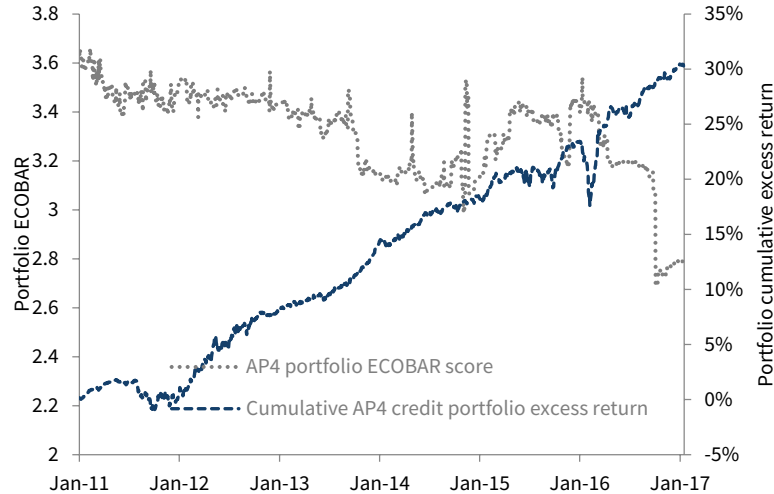
EARLIER RESULTS SUPPORT LITTLE TO NO COST FOR SCORING APPROACH

Active management: alpha opportunity not significantly impeded by tilting of portfolio

Passive management: duration neutral outperformance since 2015, with some draw-downs the past year.

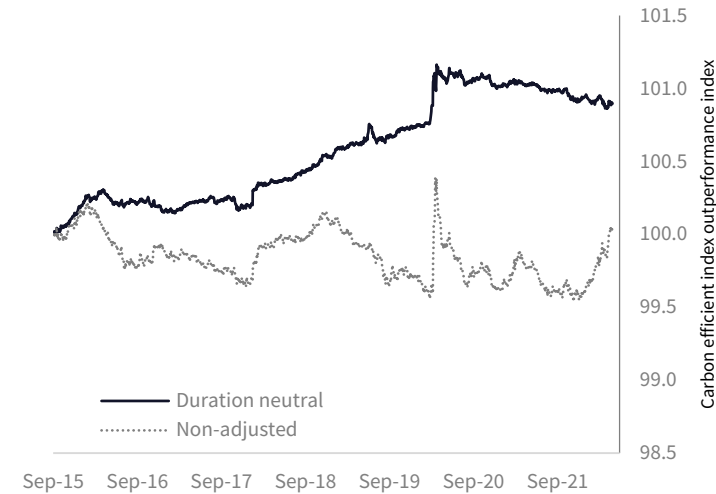
Policy portfolios: central bank buying/ selling could have been decarbonised (more below)

Excess return on AP4 portfolio with decarbonisation score



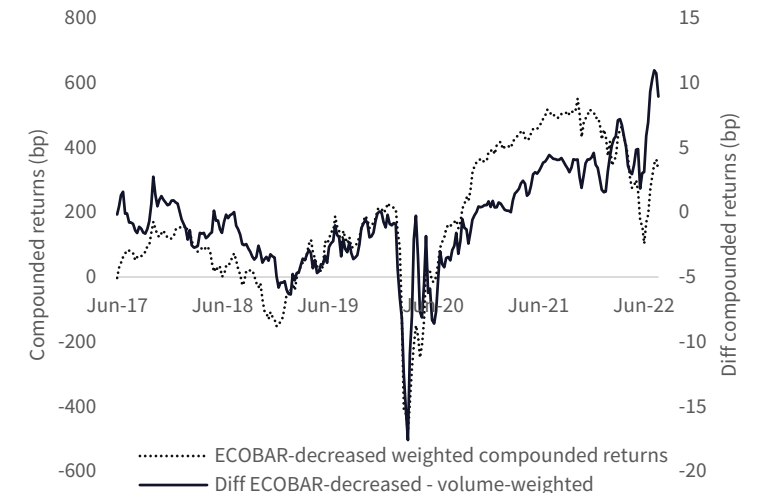
[Credit alpha and CO2 reduction: A portfolio manager approach](#)

Cumulative relative perf. S&P IG carbon efficient index



[Low carbon credit performance 2015-2020](#)

Decarbonised central bank portfolio relative excess return



[What if...the ECB had decarbonised its portfolio from the start? P&L and de-carbonisation implication](#)

FIONA

Defining a global issuer universe

Global issuer universe

DESIGNING A LIQUID GLOBAL UNIVERSE FOR FIXED INCOME INVESTORS

- We begin with a universe of liquid debt issuers, enhanced by AFII analysis
- We need complete data sets for optimisation
- When considering portfolio level decisions, we prioritise statistical rigour
 - › Extrapolate based on median with a penalty
 - › Median of similar companies grouped by sector, industry and region
 - › Granularity dependent on number of data points
 - › Penalty chosen to balance estimate of bias coming from companies who do not report data with sensible data set
- We complete 5 data sets
 - › Emissions / Emissions intensity / Emissions per unit of investment / MSCI implied temperature rise / ESG rating

Global issuer universe

WE NEED A RANKING SYSTEM WHICH IS INTUITIVE AND ROBUST

- The scoring needs to be quick to analyse and understand so that it can factor into daily and immediate decisions of portfolio managers
- We propose a ranking system of 1(H)/2(M)/3(L)
 - › Applied to sectors and again to issuers intra-sector
 - › Final score is the product of the two rankings

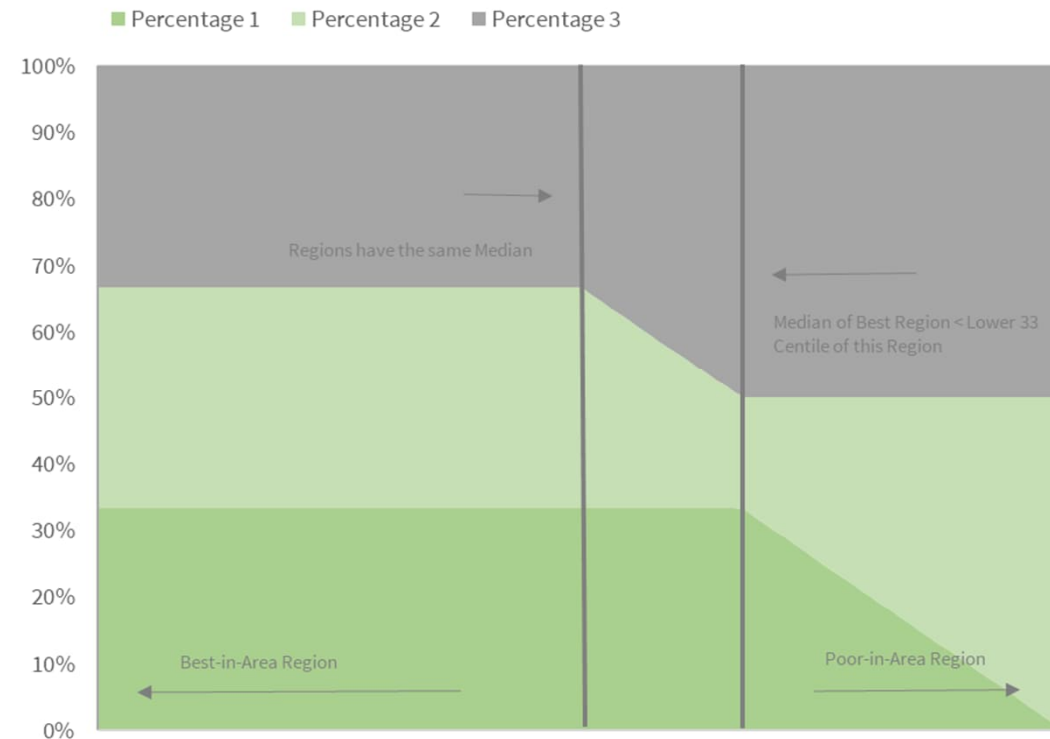
- For sector rankings we look at emissions, temperature and rating, but overlay judgement
 - › Rank Financials at 2 due to impact of lending books
 - › Rank Industrials at 3 due to wide dispersion of emissions in sector

Sector	Count of Issuers	Emissions Intensity		ESG Rating		Implied Temperature Rise		AFII Sector Rank
		Average	Median	Average	Median	Average	Median	
Technology	151	36	13	19	19	1.9	1.7	1
Communications	186	47	35	24	26	1.8	1.6	1
Health Care	173	29	24	28	31	2.1	2.1	1
Financials	644	30	8	27	27	2.1	2.1	2
Consumer Staples	162	110	70	29	31	2.7	2.6	2
Consumer Discretionary	320	99	48	25	25	3.0	3.0	2
Real Estate	189	217	83	18	18	2.0	1.9	2
Government	221	61	63	14	14	3.9	3.9	2
Industrials	342	331	79	27	28	2.7	2.4	3
Materials	231	820	510	31	30	4.4	3.8	3
Energy	240	837	819	45	51	8.9	10.0	3
Utilities	329	1,712	1,038	36	39	4.1	3.5	3

Global issuer universe

WE DESIGN A RANKING SYSTEM WITHIN SECTORS WHICH PRIORITISES IMPACT

- Data-driven based on emissions intensity
- Dynamic thresholds based on medians of the region
 - › When region is best-in-class we set thresholds for even split between rankings
 - › When region is far poorer than an equivalent DM/EM region, we split 50:50 between 2/3
 - › We interpolate between those scenarios for continuity of framework



FIONA

Portfolio scoring and optimisation

Fixed income portfolio scoring

WE APPLY OUR ISSUER SCORES TO A FIXED INCOME PORTFOLIO

Data is sourced for securities from issuers not in our universe

- Consistent data sourcing and extrapolation methods are used

We leverage methods from an academic model ECOBAR¹ to apply security level scores to a portfolio

- Duration-weighted
- Green bond adjustments
 - › Zero-weight for FIONA score
 - › Discount on Carbon Footprint
 - › Reduction in Implied Temperature and ESG Rating

¹ For full details please see [“Credit alpha and CO2 reduction: A portfolio manager approach”](#), Ulf Erlandsson, 19 Apr 2017

Fixed income portfolio optimisation

A FLEXIBLE OPTIMISATION FRAMEWORK ADAPTABLE TO INVESTOR CONSTRAINTS AND OBJECTIVES

Subject to constraints, we randomise changes in portfolio weights, observe results, and identify the best solutions.

- Best impact for smallest tracking error
 - › We randomise reducing weights for poor FIONA scores, and increase weights for better FIONA scores in each sector, and observe return and tracking error
- Best impact for accepted level of portfolio reallocation
 - › We set different levels of portfolio reallocation, and repeat the above to improve FIONA score for limited tracking error
- Best impact for accepted increase in concentration
 - › We allow sector weights to be non-maintained, but monitor increase in maximum positions and maximum sector weights

FIONA

Dashboard for risk, return and impact metrics

Portfolio dashboard

PORTFOLIO METRICS CATEGORISED INTO RISK, RETURN & IMPACT

Metrics can feed back to enhanced optimisation to further improve portfolio

Risk metrics

- Traditional credit metrics
 - › Average Rating*
 - › Average Spread*
 - › DV01
 - › 10% CSW*
- Concentration metrics
 - › Sector weights*
 - › Max Issuer Position
 - › Max Security Position
- Value-at-Risk / cVaR*
- Climate scenario risk*

Return metrics

- Historic 5y financial return
- Tracking error vs unadjusted portfolio
- Tracking error vs Benchmark*

Impact metrics

- FIONA portfolio score
- Carbon footprint
- ESG rating
- TPI coverage and alignment
- MSCI implied temperature rise

* Metrics under development

FIONA case study Decarbonising/aligning the CSPP

Case study – applying FIONA to CSPP

EUROPEAN CENTRAL BANK’S CORPORATE PURCHASE PROGRAMME

- High-level criteria are set which determine list of eligible securities
 - › Maturity (not too long or short)
 - › Rating (investment grade)
 - › Non-bank issuer (corporates only, insurance included)
 - › Issuer incorporated in the EURO area (can be European subsidiaries)

- Portfolio is published weekly with securities held, but not sizes. It is believed investments are proportional to size of issue

- It is well reported that the portfolio has a high carbon footprint due to a) low financial weighting and b) risk being proportional to issuance, i.e. high weights on capital intensive sectors.

- We apply FIONA to improve the portfolio

Sector	Count of Issuers	Median Emissions Intensity CSPP	Median Emissions Intensity AFII Universe	Median Emissions Intensity AFII Universe (DM Europe)	Sector ranking
Technology	14	7	13	8	1
Communications	24	28	35	45	1
Health Care	19	29	24	39	1
Financials	24	1	8	9	2
Consumer Discretionary	23	33	48	77	2
Consumer Staples	34	55	70	69	2
Real Estate	50	61	83	123	2
Industrials	81	46	79	58	3
Energy	16	251	819	266	3
Utilities	61	598	1,038	501	3
Materials	34	366	510	510	3

Case 1 – Can we improve alignment with low tracking error?

CONCLUSION: MODESTLY ENHANCING THE PORTFOLIO COMES AT NO COST TO RETURNS

We have created a multi-path simulator to test different strategies for re-weighting the CSPP portfolio.

It has the following constraints:

- Keeping sector weights constant.
- Allowing the portfolio to be re-weighted with a maximum of 4x change in individual weights.
- Applying relative re-weighting values for each FIONA score (so (1,3) treated same as (3,1)).

We observe that for modest enhancements tracking error is low, cumulative return is equivalent, and FIONA score can be reduced.

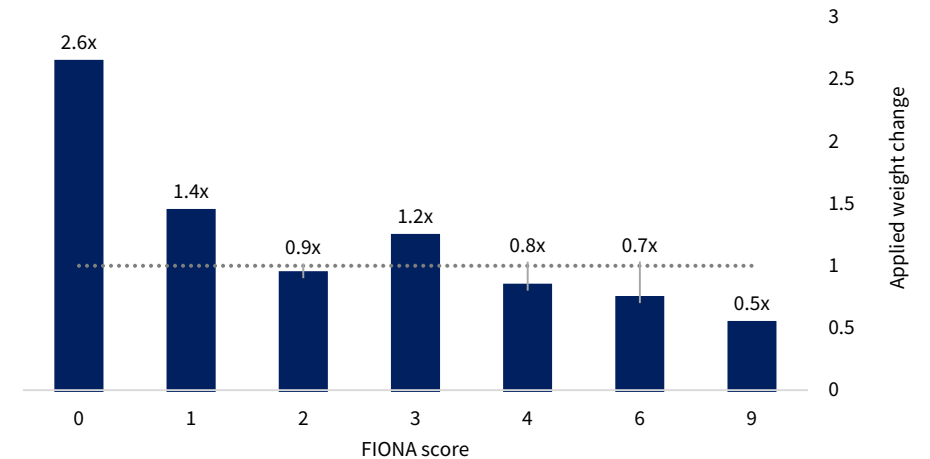
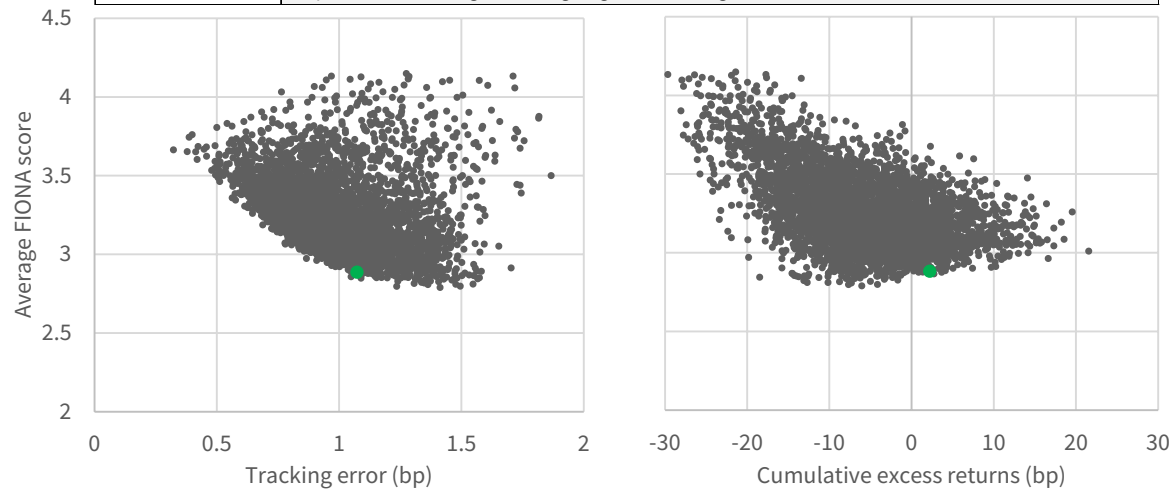
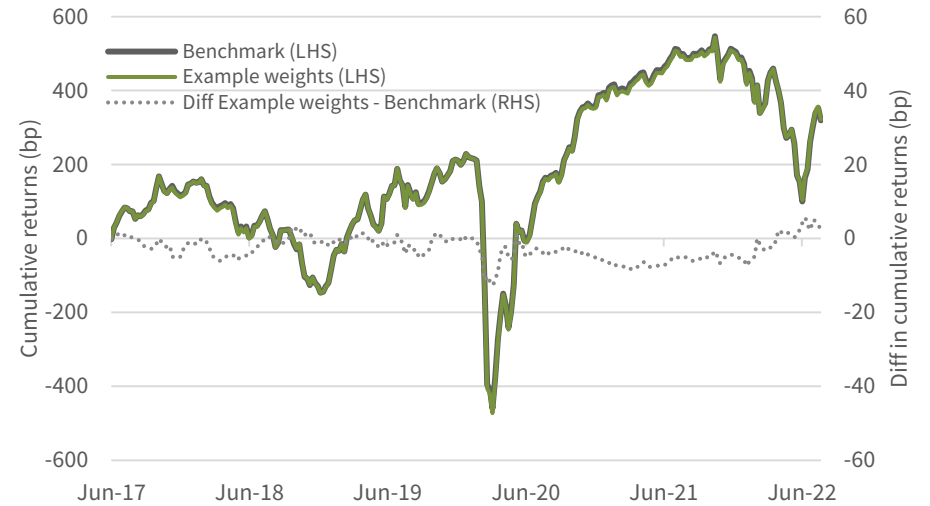
We also observe that Implied Temperature Rise (ITR) falls short of Paris alignment, even though carbon footprint is meaningfully reduced.

Case 1 – Can we improve alignment with low tracking error?

CONCLUSION: MODESTLY ENHANCING THE PORTFOLIO COMES AT NO COST TO RETURNS

Case 1 optimal portfolio metrics

		FIONA-weighted Portfolio	Original Portfolio
Risk	Average duration	5.9	5.9
	Historical 1y VaR 95% (bp)	-69.8	-69.2
	Maximum individual bond weight	0.007	0.006
	Maximum individual issuer weight	0.046	0.038
Return	Cumulative returns (bp)	322	319
	Tracking error (bp)	1.1	0.0
	Reallocation volume (% of original portfolio)	22%	
Impact (Average)	FIONA score	2.9	4.0
	MSCI Implied Temperature Rise	2.3	2.4
	ESG Risk SCR	19.1	19.3
	Emissions (kton) per mm EUR investment	0.16	0.31
	TPI portfolio share Aligned or Aligning (16% coverage)	13%	14%



Case 2 – How far can we align fixing sector weights?

CONCLUSION: INTRA-SECTOR ALIGNMENT REQUIRES SUBSTANTIAL PORTFOLIO CHANGES

We now target a more meaningful temperature reduction, and explore what is possible

- We define transaction costs as the percentage of the portfolio which must be sold to re-align; we have not considered security specific costs.

It has the following constraints

- Keeping sector weights constant.
- Allowing the full portfolio to be re-weighted, within a larger range.
- Applying relative re-weighting values for each FIONA score (so (1,3) treated same as (3,1)).

We observe further temperature reduction is possible by trading more of the portfolio. Encouragingly, tracking error is only slightly higher

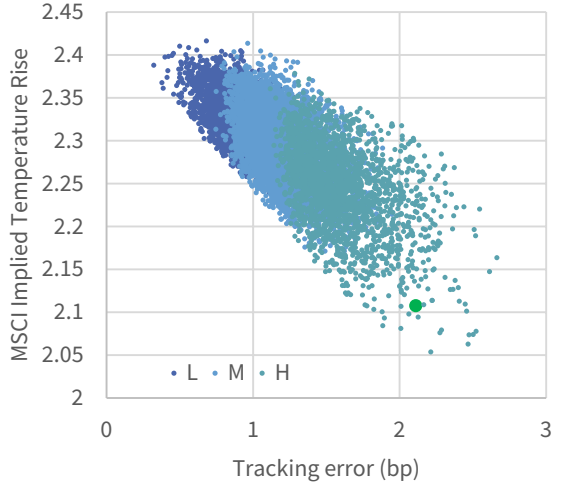
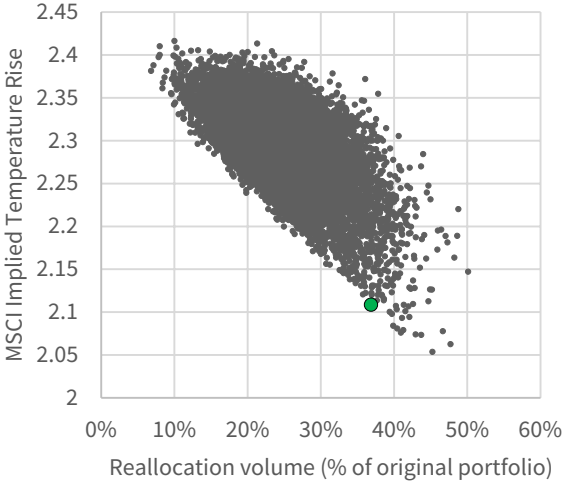
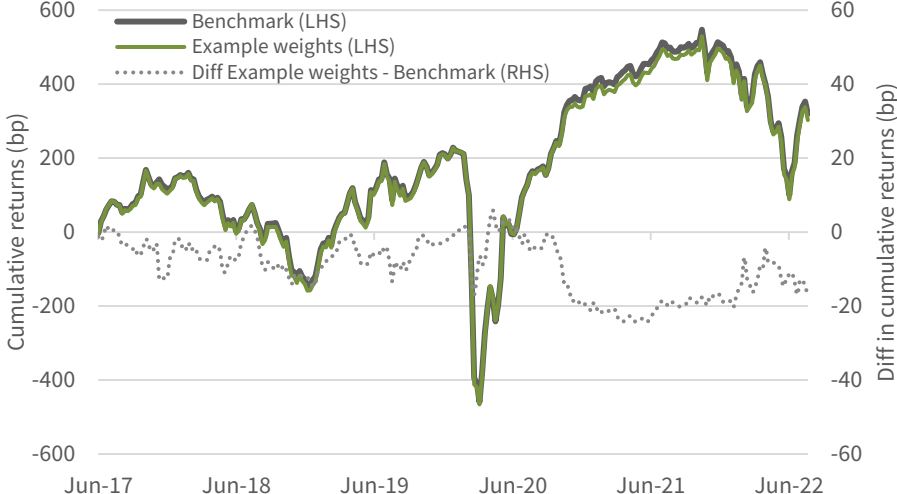
We believe costs can be kept low with opportunistic execution.

Case 2 – How far can we align fixing sector weights?

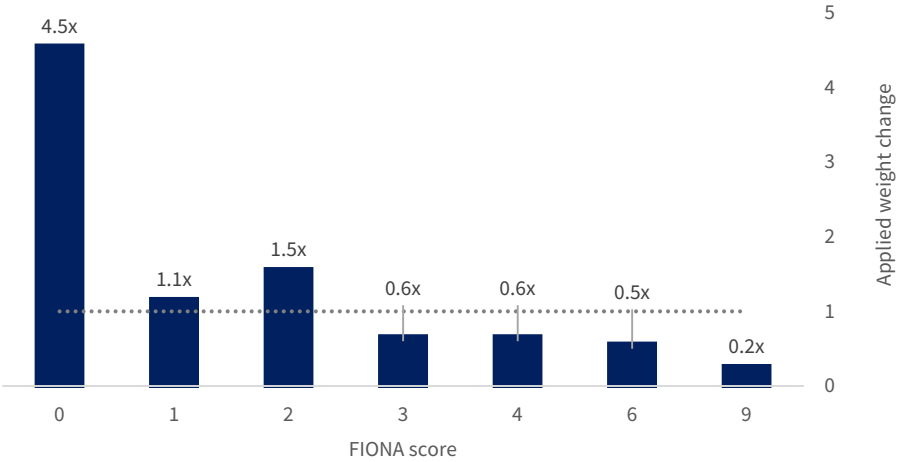
CONCLUSION: INTRA-SECTOR ALIGNMENT REQUIRES SUBSTANTIAL PORTFOLIO CHANGES

Case 2 optimal portfolio metrics

		FIONA-weighted Portfolio	Original Portfolio
Risk	Average duration	6.1	5.9
	Historical 1y VaR 95% (bp)	-69.8	-69.2
	Maximum individual bond weight	0.020	0.006
	Maximum individual issuer weight	0.061	0.038
Return	Cumulative returns (bp)	303	319
	Tracking error (bp)	2.1	0.0
	Reallocation volume (% of original portfolio)	37%	
Impact (Average)	FIONA score	2.1	4.0
	MSCI Implied Temperature Rise	2.1	2.4
	ESG Risk SCR	17.8	19.3
	Emissions (kton) per mm EUR investment	0.16	0.31
	TPI portfolio share Aligned or Aligning (16% coverage)	17%	14%



(L = 0% - 20%, M = 20% - 30%, H = 30% - 50% Portfolio Reallocation)



Case 3 – How far can we align moving between sectors?

CONCLUSION: MORE NET ZERO ALIGNMENT IS POSSIBLE WITH HIGHER CONCENTRATION

We now want to be more selective about where to change weights, and explore whether increasing concentration can give similar results with a lower notional needing to be traded

It has the following constraints:

- Sector weights allowed to move with relative percentage.
- Allowing the full portfolio to be re-weighted, within a larger range.
- Applying relative re-weighting values for each FIONA score (so (1,3) treated same as (3,1)).

We observe that similar temperature reductions can be achieved with lower transaction costs. It is also possible to achieve better results, allowing weights of sectors to move. These paths do involve reducing weights in high-emitting sectors e.g. energy.

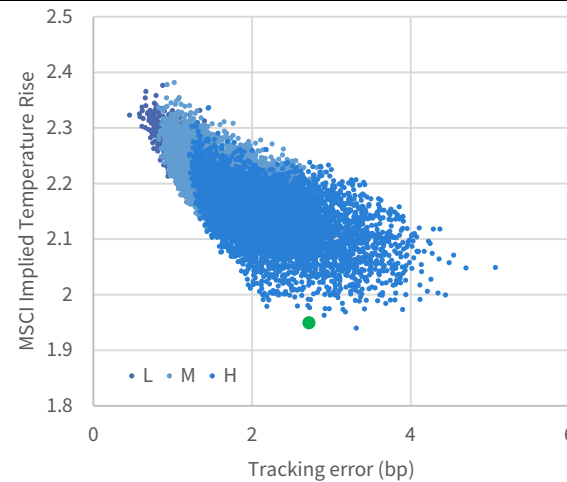
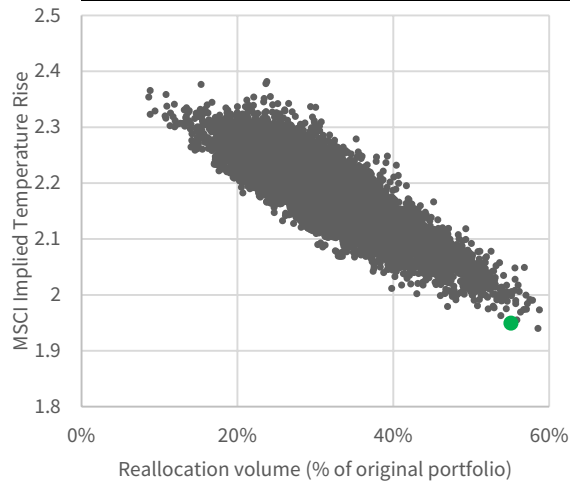
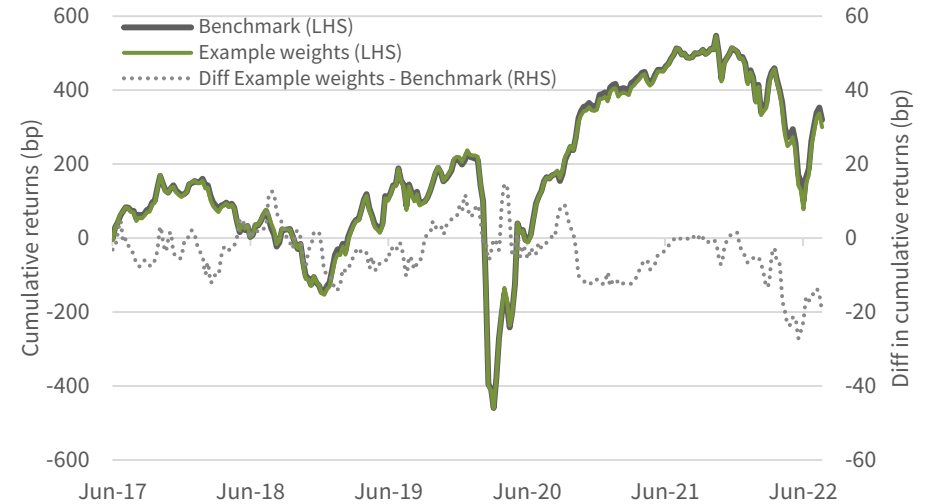
FIONA is effective in aligning to short-term indicators of decarbonisation. What we see here is an illustration of the challenges of some long-term forward looking indicators. We want transparency to see and understand both, and consider a fixed income portfolio over a time horizon which reflects the underlying maturity of financing.

Case 3 – How far can we align moving between sectors?

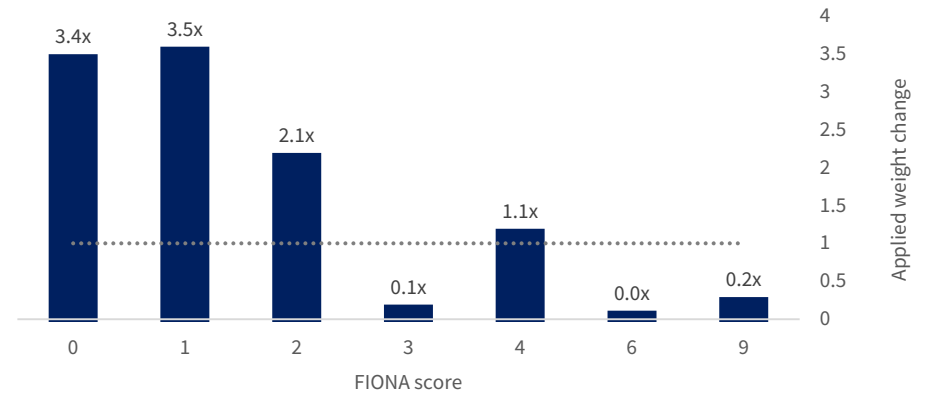
CONCLUSION: MORE NET ZERO ALIGNMENT IS POSSIBLE WITH HIGHER CONCENTRATION

Case 3 optimal portfolio metrics

		FIONA-weighted Portfolio	Original Portfolio
Risk	Average duration	6.0	5.9
	Historical 1y VaR 95% (bp)	-71.9	-69.2
	Maximum individual bond weight	0.011	0.006
	Maximum individual issuer weight	0.087	0.038
Return	Cumulative returns (bp)	300	319
	Tracking error (bp)	2.7	0.0
	Reallocation volume (% of original portfolio)	55%	
Impact (Average)	FIONA score	1.6	4.0
	MSCI Implied Temperature Rise	1.9	2.4
	ESG Risk SCR	16.5	19.3
	Emissions (kton) per mm EUR investment	0.07	0.31
	TPI portfolio share Aligned or Aligning (16% coverage)	15%	14%



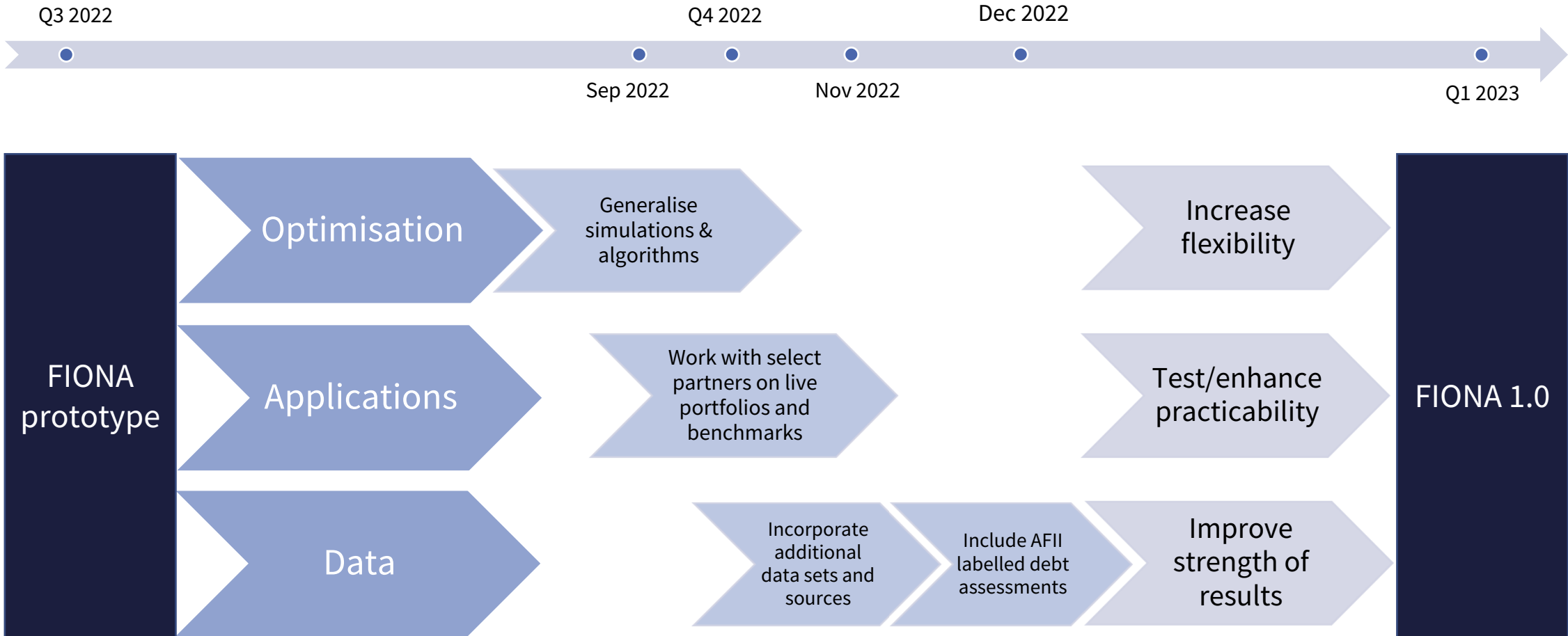
(L = 0% - 20%, M = 20% - 30%, H = 30% - 60% Portfolio Reallocation)



Next Steps

Next steps

BUILD FIONA PROTOTYPE INTO IMPACTFUL TOOL



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[The Reformed SSA Trader: Kreditanstalt Fossil Wiederaufbau?](#)

[Wind-down \(of CSPP\) is coming](#)

[SFDR subsidiary ESG disclosures: ESMA clarifications](#)

[ESG Bond ETFs: Passive aggressive investing?](#)

[Low carbon credit performance: Mayday or opportunity?](#)

[SSA carbon exposures: JBIC New Year's announcement](#)

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[Notable fixed income fossil funding deals 2021](#)

Green bonds/SLBs:

[Auto bonds: Any colour so long as it is green](#)

[MHI: The wrong kind of transition](#)

[JBS: A meaty SLB impact proposal](#)

[Enel: A case study in transition finance using SLBs](#)

[SLB bond radar: Eni \(potentially\) coming to market](#)

[Swedish RE Bond Blowup: Not a green issue](#)

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