

Product Category Climate Impact Factsheet

About 2° Investing Initiatives

The 2° Investing Initiative (2DII) is an independent, non-profit think tank working to align financial markets and regulations with the Paris Agreement goals.

Globally focused with offices in Paris, New York, Berlin, London, and Brussels, 2DII coordinates some of the world's largest research projects on sustainable finance. Its team of finance, climate, and risk experts develop research, tools, and policy insights to help financial institutions and regulators hasten and adapt to the energy transition.

In order to ensure its independence and the intellectual integrity of its work, 2DII has a multi-stakeholder governance and funding structure, with representatives from a diverse array of financial institutions, governments, and NGOs.

Authors of this report: Mickaël Mangot

Date: January 2022

About the funder:

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 894345 as part of the [LEVEL EEI project](#).

Horizon 2020 is the funding instrument for implementing the Innovation Union, an initiative to secure Europe's global competitiveness.

Through H2020, nearly €80 billion in funding is available over a 7-year period (2014 to 2020) - in addition to the private investment it aims to attract. The EU Commission expects more breakthroughs, discoveries and world firsts by bringing great ideas from the lab to the market.

Presentation of the factsheet

The factsheet proposes 2-pagers that gather important information about climate impact potential of “green” product categories available for retail investors.¹

The factsheet is built upon six sections (description of the strategy, theory of change, impact mechanisms, important moderators, observed outcomes and evidence of additionality) followed by an overall assessment.

In the absence of existing research on the outcomes and additionality for most of the studied financial products, the overall assessment has been thought as a qualitative evaluation mostly based on the intensity of exploitation of the four impact mechanisms presented in the factsheet and documented by research to be (more or less) effective in delivering impact².

We nevertheless decided to display metrics about the (lack of) empirical evidence supporting the effectiveness of most products to deliver a clear positive climate outcome. To us, the lack of significant evidence is a major information to be disclosed to retail investors. It forces us to analyze products based on the logical soundness of the applied strategies without any empirical validation regarding their effects on carbon emissions.

We still hope that research on impact of green financial products will soon densify. Therefore, the assessment will be updated frequently to integrate changes in market practices and advances in the research on observed climate outcomes.

The factsheet is expected to be used by individual investors prior to choosing between various “green” financial products that might actively contribute to the energy transition and mitigation of climate change.

In the following sections, we exemplify the use of the factsheet by considering 9 cases studies of product categories already available for European retail investors:

1. Low carbon equity funds
2. Green thematic equity funds
3. Green bond funds
4. Green private equity funds
5. Green private debt funds
6. Green infrastructure funds
7. Green equity crowdfunding
8. Green peer-to-peer lending
9. Green deposits

¹ See further information on the derivation of the methodology and the list of products in the Annex

² 2DII (2021), I got the power! Really? Assessing the impact potential of financial products supporting the energy transition

Summary of assessments

SIGNIFICANT IMPACT POTENTIAL

- Green equity crowdfunding
- Green peer-to-peer lending
- Green private equity funds
- Green private debt funds
- Green infrastructure funds



High-level explanation: products obtaining the rating are products that most probably provide additional funding of green activities in underserved markets

INTERMEDIATE IMPACT POTENTIAL

- Green bond funds
- Green deposits



High-level explanation: products obtaining the rating are products for which there is an uncertainty about the additionality of the funding of green activities while no other effective impact mechanism is intensively exploited

LIMITED IMPACT POTENTIAL

- Green thematic equity funds
- Green low-carbon equity funds



High-level explanation: products obtaining the rating are products for which there is no additionality in funding of green activities while no other effective impact mechanism is intensively exploited

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

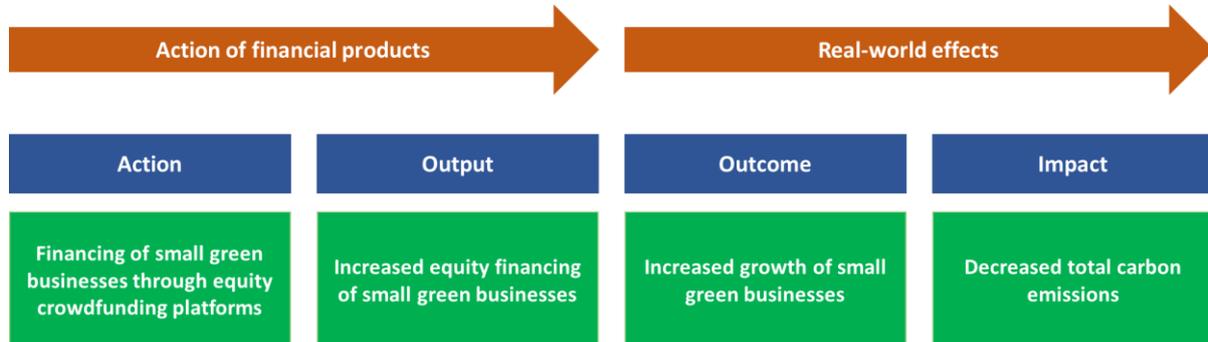
PRODUCT CATEGORY: GREEN EQUITY CROWDFUNDING

DESCRIPTION OF THE STRATEGY

Green equity crowdfunding is a way to provide equity capital to small green businesses through the gathering of small-ticket investors through digital platforms, either of general purpose or specifically focusing on green projects. For start-ups, it is an alternative to seed money raised from friends and family or from angel investors.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The fees required by platforms:** the impact is enhanced when fees are lower because it leaves more capital for green businesses to finance their activities
- **The quality of the anti-greenwashing tools applied by platforms:** as communicating green features has been identified by researchers to be a key determinant of crowdfunding campaigns' success, it is important for platforms to develop and apply anti-greenwashing tools (anti-greenwashing charter, greenwashing risk score, climate due diligence, etc.)

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics (see list in the next page)	1
% analyses that obtain a positive effect (at KPI level)	50%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees' climate metrics would have not taken

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	NO (as there is no effect on prices in capital markets)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	YES (as crowdfunding is used to finance companies which face critical issues in raising capital)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	NO (as platforms' commissions, due diligence fees and additional pre-investment and post-investment costs may increase the cost of capital for issuers compared to getting funded by business angels)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (as companies are already considered as providers of "green" solutions and therefore aligned)

place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT

- We conclude that investments in small green businesses through equity crowdfunding platforms most probably have **a significant impact potential**
- On the positive side, unlike investments in secondary markets equity crowdfunding investments are a source of (intermediated) financing for green businesses. Therefore, the impact on economic agents' decisions is more direct.
- They are especially useful for firms that have significant issues raising equity capital through more conventional means (venture capital, private equity or business angels) because of their early-stage, small size or lack of connection. They consequently complement other funding channels.
- Still, empirical evidence needs to be gathered to assess how funding conditions on platforms fare compared with financing by business angels. If conditions appeared to be better for businesses, the impact potential would be even clearer.
- And platforms have yet to develop efficient tools to mitigate greenwashing risk in communications by entrepreneurs in demand for capital.



LIST OF RESEARCH PAPERS

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green crowdfunding	Adhami et al. (2017)	Europe	Renewable energy	Econometric modelling	Environmental Performance Index (regional district)	Positive (money raised)
						Null (# of campaigns)

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

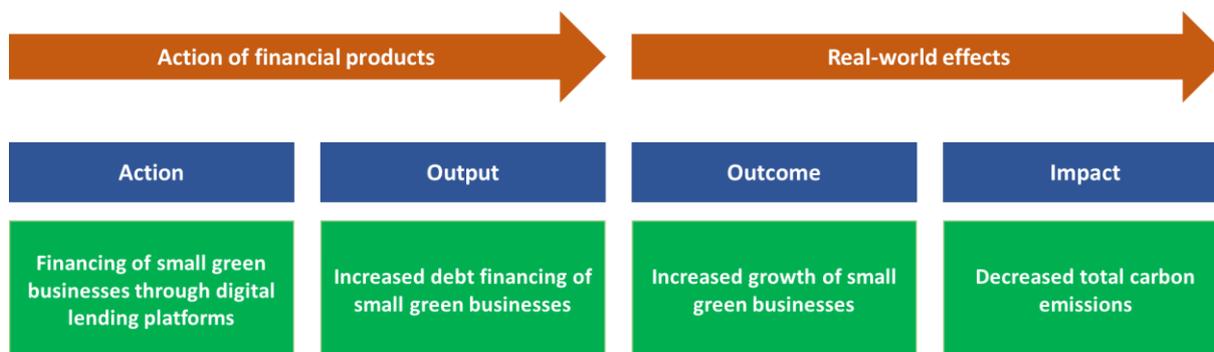
PRODUCT CATEGORY: GREEN PEER-TO-PEER LENDING

DESCRIPTION OF THE STRATEGY

Green peer-to-peer lending is a way to provide loans to small green businesses through the gathering of small-ticket investors through digital platforms, either of general purpose or specifically focusing on green projects. For start-ups or growth companies that lack positive cash-flows to get loans from commercial banks, it is an alternative to venture debt.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	NO (as there is no effect on prices in capital markets)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	YES (as P2P lending is used to finance companies which face critical issues in raising capital)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	NO (as platforms' commissions, due diligence fees and additional pre-investment and post-investment costs may increase the cost of debt for issuers)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (as companies are already considered as providers of "green" solutions and therefore aligned)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The fees required by platforms:** the impact is enhanced when fees are lower because it leaves more capital for green businesses to finance their activities
- **The quality of the anti-greenwashing tools applied by platforms:** as communicating green features has been identified by researchers to be a key determinant of crowdfunding campaigns' success, it is important for platforms to develop and apply anti-greenwashing tools (anti-greenwashing charter, environmental impact score, climate due diligence, etc.)

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics (see list in the next page)	1
% analyses that obtain a positive effect (at KPI level)	50%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees' climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT

- We conclude that investments in small green businesses through peer-to-peer lending platforms most probably have **a significant impact potential**
- On the positive side, unlike investments in secondary markets P2P lending investments are a source of (intermediated) financing for green businesses. Therefore, the impact on economic agents' decisions is more direct.
- They are especially useful for firms that have significant issues raising debt capital through more conventional means (venture debt or business angels) because of their early-stage, small size or lack of connection. They consequently complement other funding channels.
- Still, empirical evidence needs to be gathered to assess how funding conditions on platforms fare compared with other channels (especially venture debt). If conditions appeared to be better for businesses, the impact potential would be even clearer.
- And platforms have yet to develop efficient tools to mitigate greenwashing risk in communications by entrepreneurs in demand for debt capital.



LIST OF RESEARCH PAPERS

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green peer-to-peer lending	Adhami et al. (2017)	Europe	Renewable energy	Econometric modelling	Environmental Performance Index (regional district)	Positive (money raised)
						Null (# of campaigns)

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

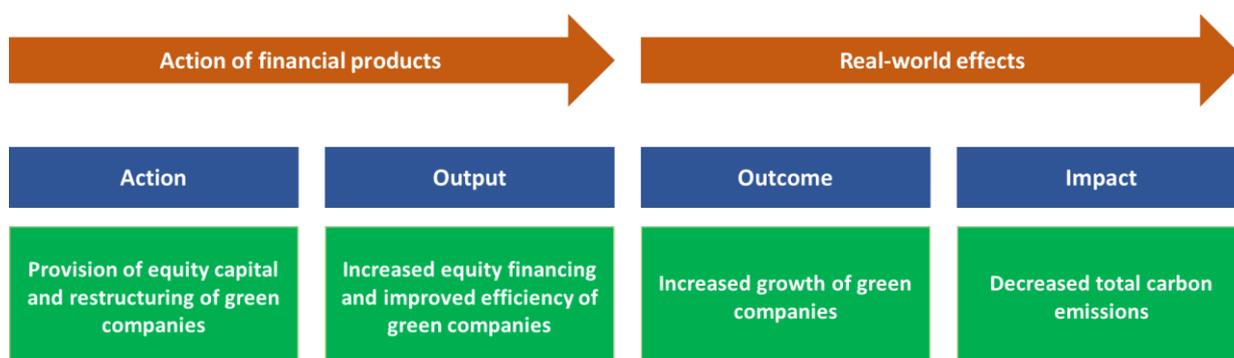
PRODUCT CATEGORY: GREEN PRIVATE EQUITY FUNDS

DESCRIPTION OF THE STRATEGY

Green private equity funds are an alternative form of private financing, away from public markets, in which investors through funds buy stakes in the capital of companies providing solutions to environmental issues or engage in buyouts of such companies. A private equity fund has Limited Partners (LP), who have limited liability, and General Partners (GP), who have full liability and are also responsible for executing and operating the investment. To offer high returns to their investors, private equity funds engage with and/or restructure invested companies in the prospect of exiting them at higher valuations.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	NO (as there is no effect on prices in capital markets)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	YES (they provide equity capital to growth companies that is necessary for them to secure debt financing)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	NO (there is no evidence that green PE funds provide capital at favorable conditions for issuers)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (as invested companies are already considered as providers of "green" solutions and therefore aligned)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The valuation ratios supporting the deals:** do green PE funds make deals with green issuers based on higher valuations compared to conventional PE funds?
- **The compensation of General Partners:** is the compensation of GPs significantly conditional to the success or failure in meeting targets on climate KPIs?
- **The non-financial support and engagement with management:** as PE funds often have seats at the Board of Directors of invested companies, a key point is whether they use their privileged position to offer non-financial support and engage actively with the management

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics <i>(see list in the next page)</i>	0
% analyses that obtain a positive effect (at KPI level)	0%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees’ climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT

- We conclude that investments in green private equity funds most probably have a **significant impact potential**
- The impact potential of green PE funds is mostly quantitative. They are appealing products that may attract new types of investors to private equity and, consequently, provide additional equity capital to green companies that are not eligible to venture capital (e.g., due to insufficient growth) and not yet ready to enter the stock market.
- The positive impact of green PE funds could be enhanced by displaying qualitative features that would distinguish them from conventional PE funds (e.g., higher risk-taking in the selection of projects, more favorable valuations, non-financial support, active engagement, KPI-linked compensation).



LIST OF RESEARCH PAPERS

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green private equity funds	None	NS	NS	NS	NS	NS

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

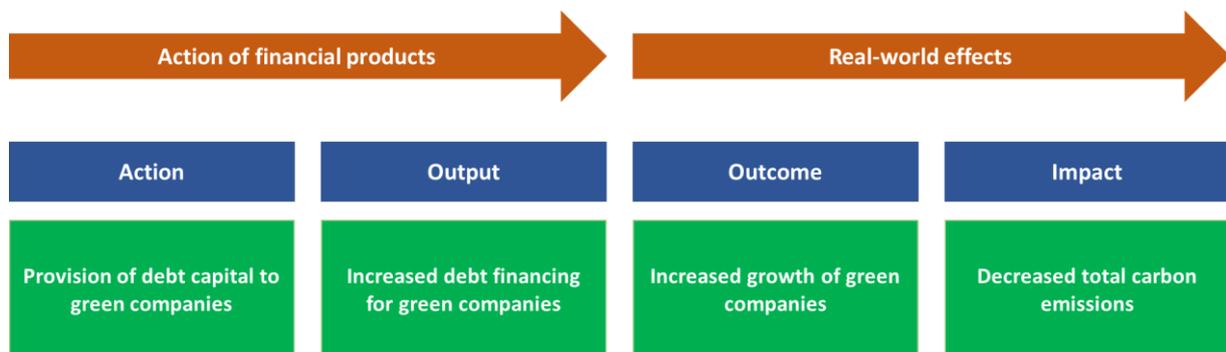
PRODUCT CATEGORY: **GREEN PRIVATE DEBT FUNDS**

DESCRIPTION OF THE STRATEGY

Green private debt funds are an alternative form of private financing, away from public markets, in which investors through funds buy debt assets from companies providing solutions to environmental issues.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	NO (as there is no effect on prices in capital markets)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	YES (they provide debt capital to young growth companies that may have a difficult access to bank loans)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	NO (there is no evidence that green private debt funds provide capital at favorable conditions for issuers)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (as invested companies are already considered as providers of "green" solutions and therefore aligned)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The selection of projects:** do the funds finance projects that tend to lack financial support by conventional private debt funds?
- **The funding conditions:** do the funds offer more favorable funding conditions compared with those proposed by conventional private debt funds?
- **The use of impact covenants:** do the funds use specific clauses that condition the financing terms to the success or failure of invested companies in meeting targets regarding climate KPIs?
- **The non-financial support:** do the funds offer non-financial support to invested companies?

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics <i>(see list in the next page)</i>	0
% analyses that obtain a positive effect (at KPI level)	0%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees’ climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT

- We conclude that investments in green private debt funds most probably have a **significant impact potential**
- The impact potential of green private debt funds is mostly quantitative. They are appealing products that may attract new types of investors to private debt and, consequently, provide additional debt capital to green companies that may otherwise have difficulties to get bank loans (e.g., if they don’t have assets to back loans)
- The positive impact of green private debt funds could be enhanced by displaying qualitative features that would distinguish them from conventional private debt funds (e.g., more favorable financing conditions, non-financial support).



LIST OF RESEARCH PAPERS

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green private debt funds	None	NS	NS	NS	NS	NS

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

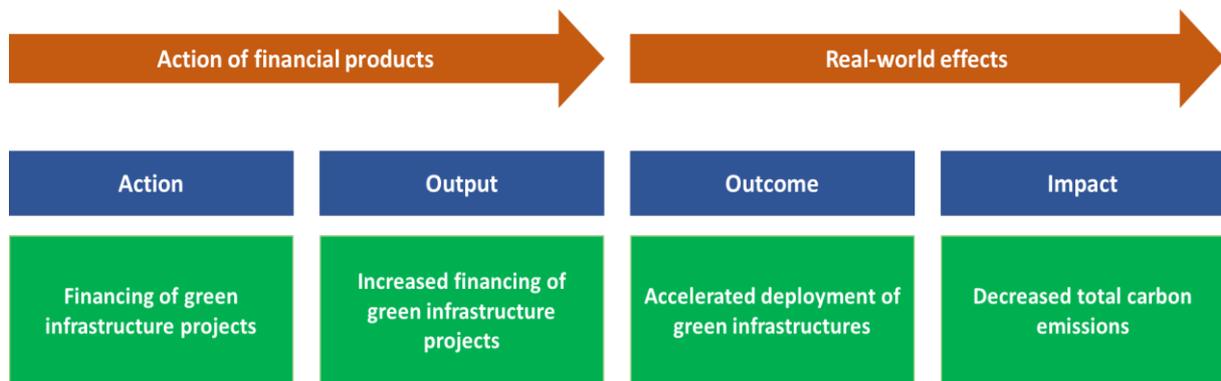
PRODUCT CATEGORY: **GREEN INFRASTRUCTURE FUNDS**

DESCRIPTION OF THE STRATEGY

Green infrastructure funds are Alternative Investment Funds which invest primarily in unlisted (debt or equity) securities of investee companies engaged in or formed for the purpose of operating, developing or holding green infrastructure projects (e.g., wind farms, energy storage facilities, photovoltaic power stations, etc.). Investments can be made in greenfield (new projects), brownfield (young existing projects that need improvements, maintenance or extension) or secondary-stage (refinancing of mature, viable projects).

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	NO (as there is no effect on prices in capital markets)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	YES (as there is currently a massive green infrastructure funding gap)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	NO (there is no evidence that green infrastructure projects benefit from more favorable funding conditions from green infrastructure funds compared with other infrastructure projects)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (as financed projects are already considered as providers of “green” solutions and therefore aligned)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The selection of projects:** do the funds finance projects that tend to lack financial support by conventional infrastructure funds?
- **The funding conditions:** do the funds offer more favorable funding conditions compared with those proposed by conventional infrastructure funds?
- **The use of impact covenants:** do the funds use specific clauses that condition the financing terms to the success or failure in meeting targets regarding climate KPIs?
- **The non-financial support:** as infrastructure funds often have seats at the Board of Directors of invested companies, they are in a privileged position to offer support that help companies to grow.

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics (see list in the next page)	0
% analyses that obtain a positive effect (at KPI level)	0%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees’ climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT

- We conclude that investments in green infrastructure funds most probably have a **significant impact potential**
- The impact potential of green infrastructure funds is mostly quantitative. They are appealing products that may attract new types of investors (institutional or individual) and, consequently, provide additional capital necessary to bridge the massive green infrastructure funding gap.
- The positive impact of green infrastructure funds could be enhanced by displaying qualitative features that would distinguish them from conventional infrastructure funds (e.g., higher risk-taking in the selection of projects, more favorable financing conditions, non-financial support, active engagement).



LIST OF RESEARCH PAPERS

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green infrastructure funds	None	NS	NS	NS	NS	NS

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

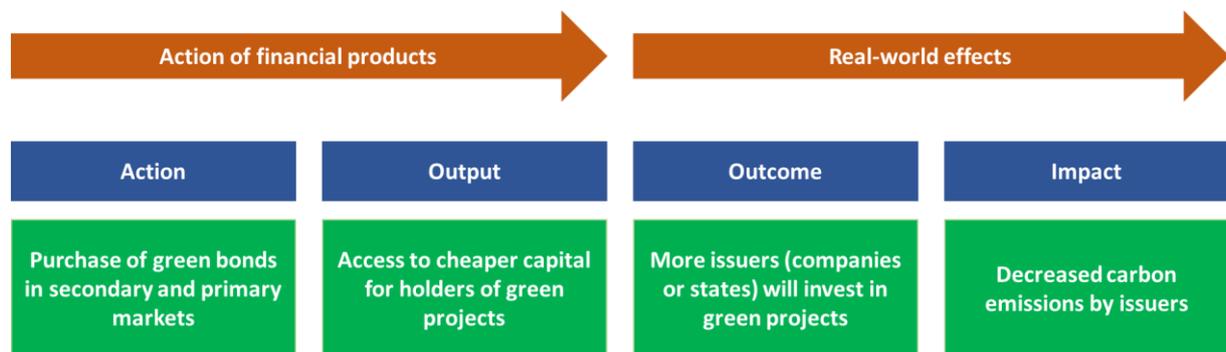
PRODUCT CATEGORY: GREEN BOND FUNDS

DESCRIPTION OF THE STRATEGY

Green bond funds are fixed-income instruments that raise money specifically earmarked for new or already existing (i.e. finance and refinance) climate and environmental projects. They can be issued by private firms, banks or public entities to support environmental and climate-related activities.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Price signaling	Do investments in the product send clear price signals that may positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	YES (green bonds currently trade at a "greenium", i.e. a decreased yield compared to conventional bonds from the same issuer)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	NO (they de facto target large companies with no difficulty to access funding)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	UNCLEAR (there is currently a "greenium" in bond markets at the issuance but it seems too small to influence issuers)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C?	CONDITIONAL (to the standards the purchased bonds follow)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The size of the “greenium”:** it must be enough to significantly affect the decisions of issuers to start new green projects. So far, the greenium (i.e., a few basis points) appears to be too small to influence issuers’ decisions on its own.
- **The acceptance of lower yields by green bond investors:** can the greenium grow even more and stay large enough in the long run to influence issuers’ decisions? In the short run, green bond investors can enjoy a superior return due to the progressive widening of the greenium (in relation with the increasing demand for green bonds). But in the long run, when the greenium stabilizes, green bond investors could withdraw from the green bond market when they realize that they get lower returns on a consistent basis.
- **The (discretionary) standards the purchased green bonds follow:** the EU Green Bond Standards and the Certified Climate Bonds set the highest levels of constraint for the issuers regarding the necessity to align with the EU taxonomy or the Paris Agreement scenario.

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics (as of 2021/12/31, see list in page 4)	8
% analyses that obtain a positive effect (at climate KPI level)	68%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees’ climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT:

- We conclude that green bond funds most probably have **a moderate impact potential**.
- Regarding impact mechanisms, green bond funds rely on market signals (affecting bond prices) and non-market signals (by issuing green bonds, issuers show a kind of commitment to the green transition that could influence other issuers to follow suit). So far, research shows little evidence proving the effectiveness of such mechanisms
- Regarding effects on companies, the product category benefits from a pronounced interest of researchers in evaluating the climate behavior of green bond issuers. And most studies have found a positive correlation between issuing green bonds and carbon outcomes.
- But, in absence of evidence of additionality, the positive outcomes observed in research papers are consistent to both an interpretation of green bonds having a positive impact and to issuers committed to the green transition using green bonds as signaling devices only (i.e., in the absence of green bonds, they would have implemented their green projects anyway by relying on other sources of funding).



LIST OF RESEARCH PAPERS

Remark: the papers in the table below address the climate outcomes of green bonds (and not green bond funds).

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green Bonds	Flammer (2021)	World	All	Quantitative comparison (change)	Carbon emission	Positive
					Environmental rating	Positive
	Maltais & Nykvist (2020)	Sweden	All	Interview	Ratio of green-to-brown investments	Null
					Climate targets	Positive
	Gibon et al. (2020)	Europe	Renewable energy	Quantitative comparison (level)	Carbon emissions	Positive
	Fatica and Panzica (2020)	World	All	Quantitative comparison (change)	Carbon intensity (book value)	Positive
	Fatica et al. (2021)	Europe	Banks	Econometric modelling	Lending to carbon-intensive sectors (as lead bank)	Positive
					Lending to carbon-intensive sectors (as participant bank)	Null
	Ehlers et al. (2020)	World	All	Quantitative comparison (level)	Carbon intensity (revenues)	Null
			Industry / real estate	Quantitative comparison (change)		Positive
			Utilities	Quantitative comparison (change)		Negative
	2DII (2018)	World	Power	Quantitative comparison (level)	Share of renewables	Null
					Share of hydro	Positive
				Quantitative comparison (change)	Share of renewables	Null
					Share of hydro	Positive
	Schmittmann and Chua (2021)	World	All	Quantitative comparison (level)	Carbon intensity (revenues)	Positive
Quantitative comparison (level)				Carbon intensity (assets)	Positive	
Quantitative comparison (change)				Carbon intensity (revenues)	Positive	
Quantitative comparison (change)				Carbon intensity (assets)	Positive	

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

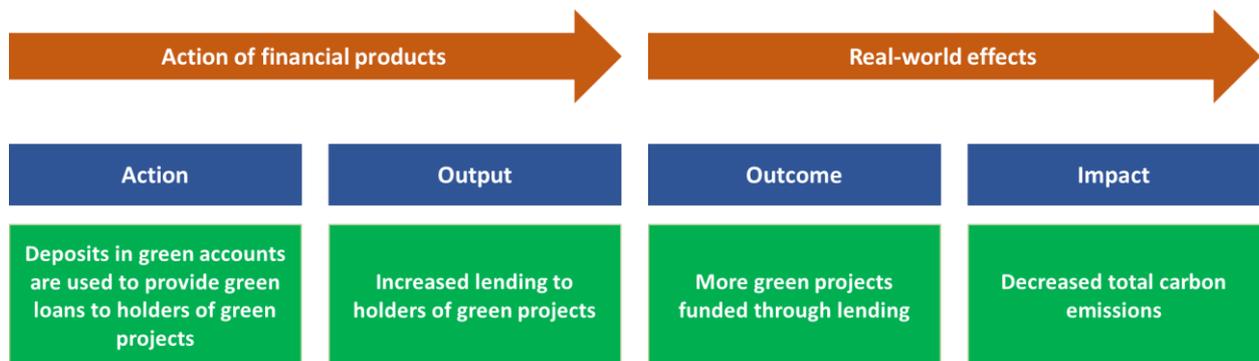
PRODUCT CATEGORY: GREEN DEPOSITS

DESCRIPTION OF THE STRATEGY

Green deposits are savers' deposits held at a (commercial or cooperative) bank or other financial institutions and specifically used to fund projects (through "green loans") from different types of economic agents (households, companies, administrations, etc.) that are considered to generate a positive and long-lasting impact on the environment.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	NO (as there is no effect on prices in capital markets)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	UNCERTAIN (it's uncertain whether green deposits increase the overall volumes of green loans granted by banks and whether the access to green loans is easier for SMEs or households compared with conventional loans)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	UNCERTAIN (there is so far no clear evidence that interest rates are lower for green loans than for conventional loans)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (there is no obligation for companies that sign green loans to commit to align to a B2DS)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The interest rates on green loans compared with conventional loans:** the impact is enhanced when interest rates are lower for green loans than for conventional loans
- **The easiness for holders of green projects to access green loans:** the impact is enhanced if the access to green loans is easier for borrowers compared with conventional loans (i.e., lowest standards in terms of borrower’s credit profile and history)
- **The reporting requirements for borrowers:** the reporting of the use of proceeds and the outcomes may act as powerful deterrents for SMEs and households

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics <i>(see list in the next page)</i>	1
% analyses that obtain a positive effect (at KPI level)	50%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees’ climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT

- We conclude that green deposits most probably have **a moderate impact potential**
- On the positive side, unlike investments in secondary markets green deposits are a source of (intermediated) financing for holders of green projects. Therefore the impact on economic agents’ decisions is more direct.
- We can expect that massive inflows of capital in green current and saving accounts would contribute to loosen bank’s credit allocation rules for holders of green projects and/or lower interest rates on green loans, increasing the overall volume of green investments in the economy.
- But this still needs to be backed by empirical evidence.



LIST OF RESEARCH PAPERS

Remark: the papers in the table below address the climate outcomes of green loans (and not green deposits serving to fund green loans).

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green loans	Schmittmann and Chua (2021)	World	All	Quantitative comparison (level)	Carbon intensity (revenues)	Null
				Quantitative comparison (level)	Carbon intensity (assets)	Null
				Quantitative comparison (change)	Carbon intensity (revenues)	Positive
				Quantitative comparison (change)	Carbon intensity (assets)	Positive

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

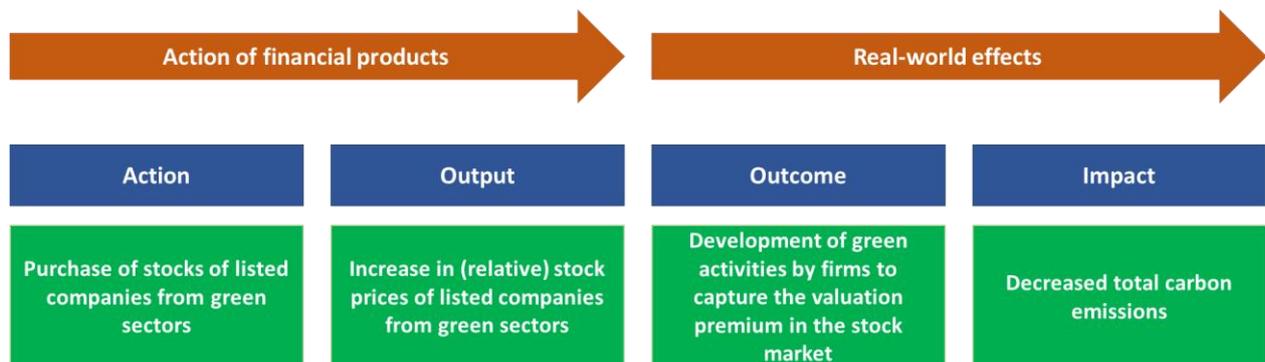
PRODUCT CATEGORY: GREEN THEMATIC EQUITY FUNDS

DESCRIPTION OF THE STRATEGY

Green thematic equity funds exclusively invest in stocks from companies that produce goods or services that provide solutions to an environmental issue. Therefore, they build portfolios concentrated on one or a few industry sectors, unlike sector-diversified non-thematic funds.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	YES (purchases might boost stock prices of companies from green sectors compared to others)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	NO (the funds de facto invest in stocks of large listed companies with no difficulty to access funding)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	NO (the funds do not directly finance companies, buying stocks in the secondary market)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (through their products, investees are already aligned with a B2DS and no incentive is provided to align even more)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The combined size of the funds in the category:** the total effect of green thematic screening approaches on asset prices, as well as the marginal effect per additional euro, increases with the fraction of wealth commanded by investors that apply the same screening approach
- **The homogeneity of the screening approach:** the more funds in the category apply the same methodology for selecting and weighting assets, the more effect on prices they can have. In that sense, coordinated actions by passive funds via the replication of the same thematic index is a plus
- **The cost of developing green activities for companies:** the green thematic screening approach is more likely to cause companies to launch or grow green activities if the costs for them to do so are low
- **The interest in green listed companies by standard investors:** if there is already a strong demand for green stocks by standard investors, then the valuation of listed companies operating in green sectors is already stretched and the incentive for companies to launch/grow green activities is already present.

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics (see list in the next page)	1
% analyses that obtain a positive effect (at KPI level)	100%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees' climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality (at KPI level)	0%

OVERALL ASSESSMENT

- We conclude that green thematic equity funds most probably have **a limited impact potential**, due to a combination of several factors:
 - the exposure to large, listed companies mostly (as they often rely on a market-cap weighting process within the green sector)
 - the operation through secondary markets (i.e., funds buy stocks from other investors and not directly from companies)
 - the heterogeneity of scope (e.g., new energy in general or just hydrogen or wind) of green thematic funds
 - the current strong interest in green listed companies by standard investors that may prove investments in thematic funds to be redundant
- Consequently, the main impact channel used appears to be the non-market signaling channel: the existence of thematic funds and their adoption by investors signal to companies that the financial community is interested into being exposed to green activities. But, so far, research shows little evidence proving the effectiveness of such a mechanism to change companies' behavior.
- The scarcity of evidence showing positive outcomes or proving additionality confirm us in our negative view.



LIST OF RESEARCH PAPERS

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green mutual funds (including thematic and low carbon)	De Angelis et al. (2021)	US	All	Econometric modelling	Carbon intensity (revenues)	Positive

PRODUCT CATEGORY CLIMATE IMPACT FACTSHEET

PRODUCT CATEGORY: **LOW CARBON EQUITY FUNDS**

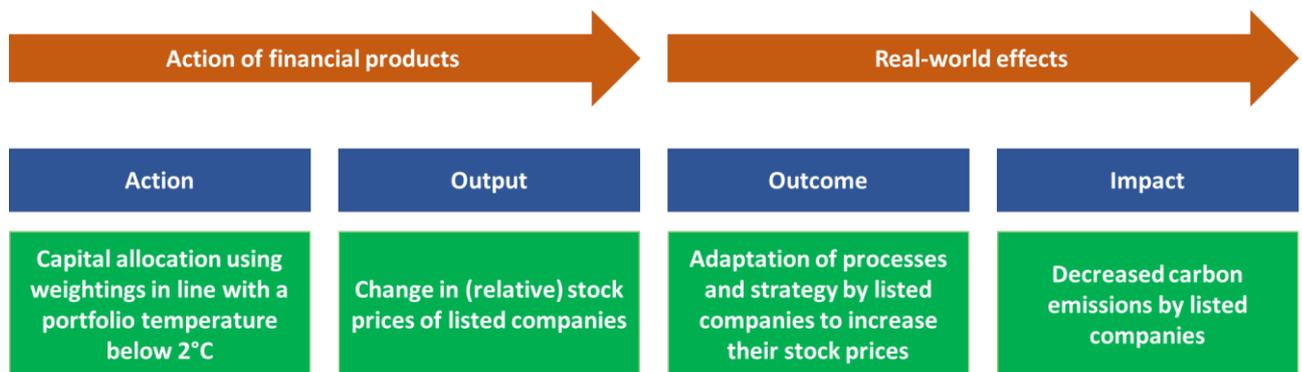
DESCRIPTION OF THE STRATEGY

Low carbon equity funds build equity portfolios aligned with a below 2°C scenario or to the Paris Agreement. They adapt asset allocations compared to standard portfolios, using some or all of the following techniques:

- The exclusion of the most carbon-intensive sectors (especially fossil fuel producers),
- A best-in-class approach to select companies that are the least carbon-intensive within their sectors,
- An overweighting of companies that generate products and services that enable to decrease collective carbon emissions (avoided emissions), mostly companies producing renewable energies or energy efficiency solutions.

THEORY OF CHANGE

What is the causal chain that could enable investments in products from this category to lead to decreased carbon emissions in the real economy?



IMPACT MECHANISMS

Which well-known impact mechanisms are commonly deployed by products from the category?

	Description of the mechanism	Deployment by products from the category
Market signaling	Do investments in the product send market signals that might positively influence the behavior of economic agents (i.e., issuers or investors) regarding their climate policy?	YES (climate-related weightings might boost stock prices of low-carbon companies compared to their high-carbon peers)
Underserved markets	Do investments in the product finance holders of green projects with difficult access to financing?	NO (funds de facto invest in stocks of large listed companies with no difficulty to access funding)
Flexible capital	Do investments in the product provide capital to holders of green projects at flexible conditions (e.g., at lower cost or with a risk transfer compared to market terms)?	NO (they do not directly finance companies, buying stocks from other investors)
Commitment to a B2DS	Do investments in the product create a strong incentive for project holders to align with a scenario well below 2°C (through active engagement or any other mechanism)?	NO (investees are already the most-aligned companies and no incentive is provided to align even more)

IMPORTANT MODERATORS

Which specific (external and internal) factors importantly affect the climate impact of products in the category?

- **The combined size of the funds in the category:** the total effect of screening approaches on asset prices, as well as the marginal effect per additional euro involved, increases with the fraction of wealth commanded by investors that apply the same screening approach
- **The homogeneity of the screening approach:** the more funds in the category apply the same methodology for selecting and weighting assets, the more effect on prices they can have. In that sense, coordinated actions by passive funds via the replication of the same low-carbon index is a plus
- **The capability to diverge from conventional benchmarks:** the more funds are allowed to diverge, the more emission metrics will play a role in the weighting process (compared to market capitalization)
- **The engagement policy of funds:** funds of the category can add to their low-carbon strategy an active engagement policy to incent invested companies to implement reforms in line with the Paris Agreement.
- **The cost of reforms for companies:** the low carbon screening approach is more likely to cause companies to improve their carbon practices if the costs for them to implement the necessary reforms are low

OBSERVED EFFECTS ON CLIMATE

Does research observe that investees by products from the category improve their climate metrics faster than others?

Number of research papers investigating the effect of the product category on climate metrics <i>(as of 2021/12/31, see list in page 4)</i>	1
% analyses that obtain a positive effect <i>(at KPI level)</i>	100%

EVIDENCE OF ADDITIONALITY

Does research prove that observed positive effects on investees' climate metrics would have not taken place without the investments made by the category products?

Number of research papers investigating the additionality of the product category on climate metrics	0
% analyses that obtain a positive additionality <i>(at KPI level)</i>	0%

OVERALL ASSESSMENT

- We conclude that low carbon equity funds most probably have **a limited impact potential**,
- The strategy does not sufficiently exploit well-known impact mechanisms, due to a combination of several factors:
 - the exposure to large companies mostly (as low-carbon funds try to remain as close to their conventional benchmark as possible under the temperature constraint)
 - the operation through secondary markets (i.e., funds buy stocks from other investors and not directly from companies)
 - the multidimensionality of the screening approach (involving positive, negative and thematic types) that dilutes any potential effect on asset prices
 - the motivation to stick to conventional benchmarks, which limits the influence of carbon performance on portfolio weightings
- Consequently, the main impact channel used is a non-market signaling channel: the existence of low-carbon funds and the choice of them by investors signal to companies that their carbon profile is important to the financial community. But, so far, there is too little evidence proving the effectiveness of such a mechanism to change companies' behavior.
- The scarcity of evidence showing positive outcomes or proving additionality reinforces even more our negative view.



LIST OF RESEARCH PAPERS

Product category	Study	Zone	Sector	Evaluation method	KPI	Effect on KPIs
Green mutual funds (including thematic and low carbon)	De Angelis et al. (2021)	US	All	Econometric modelling	Carbon intensity (revenues)	Positive

ANNEX

We developed several product factsheets which will in the next two years be presented to and discussed with the industry. The product factsheet will be very likely in continuous development over this time and affected by the engagement with the industry and our work on impact marketing claim principles.

We started developing a database of environmental investment products which comprised around 700 products available on public or private markets. This database helped us to understand the fragmentation and characteristics, such as marketing claims and financial structures, of different categories of environmental investment products. In a next step we derived relevant product categories for institutional and private investors (see product categories discussed in the paper). Insights about misleading practices in the communication about environmental impact influenced our work on the first version of the product factsheets (i.e. providing evidence on the impact potential of financial products based on scientific evidences).

As shown in the current version of the fact sheets, there are few sources which have analyzed the impact potential of specific financial products available for retail investors. However, this doesn't mean that the impact potential can't be assessed since there is enough evidence on fundamental impact mechanisms of financial products. Therefore, to arrive at the best possible conclusion we combined scientific evidence on specific products and broader impact mechanisms of financial products (see comprehensive information about the impact grid and product analysis in our complementary paper *I've got the power! Really?* (2021)).

The fact sheets were so far consulted with stakeholders within our Advisory Committee consisting of experts from industry, science, politics and civil society and other individual stakeholders such as La Banque Postale Asset Management, Mirova and Inco Ventures. While discussions about the impact potential of individual product categories and products maintain, the selection of the impact frameworks on which we built on the impact grid as well as the product selection were confirmed by the experts. The next step is to consult further stakeholders (in particular product manufacturers) to adapt these fact sheets and to inform our work on impact marketing claims and a comprehensive methodological impact framework.