

INVESTING TO PROTECT THE ENVIRONMENT
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Global Environmental Opportunities: transforming sustainable investment



Thanks to the emergence of a thriving environmental products industry, investing to safeguard the planet no longer means sacrificing returns.

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Overview

Danica May Camacho was born on October 30, 2011, to the sort of fanfare rarely seen in Manila's crowded public hospitals.

That's because she represented a global milestone – her birth brought the world's population to seven billion.

It was at once a joyful occasion and a reminder of the challenges posed by ever more people competing for finite resources.

In less than 30 years' time, the planet will be home to nine billion human beings, a larger proportion of which are likely to be part of the urban middle class.

This is certain to put even more pressure on the environment, testing it to breaking point. Investors are increasingly alert to these challenges.

Many now recognise that, as stewards of capital, they have a crucial role to play in placing the economy on a more sustainable footing. But for them to become part of the solution, investors need to resolve a paradox.

How can they become responsible guardians of the environment and simultaneously secure an attractive return on their investments?

We believe the solution to that conundrum has already begun to take shape. With governments and businesses responding to growing public pressure to reverse ecological degradation, a distinct and attractive group of environmental equity investments has emerged.

These are companies that combine strong environmental credentials with innovative products and services designed to safeguard the world's

natural resources. Such firms form the core of our Global Environmental Opportunities (GEO) portfolio.

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A burgeoning environmental products industry

Public shaping the agenda

Once a niche activity, environmental investing is now moving firmly into the mainstream. There are several reasons for that.

To begin with, society's attitudes towards protecting the planet have changed considerably in recent years.

That's partly because a growing proportion of the population has personal experience of the damage ecological degradation can cause. In 2015, pollution killed nine million people – three times more than AIDS, tuberculosis and malaria combined.¹ Floods and droughts have brought untold misery to millions more.

Social media has also helped shape world opinion. Thanks to platforms such as Twitter and Facebook, people can now voice and share their concerns about pollution and sustainability in a way they couldn't before.

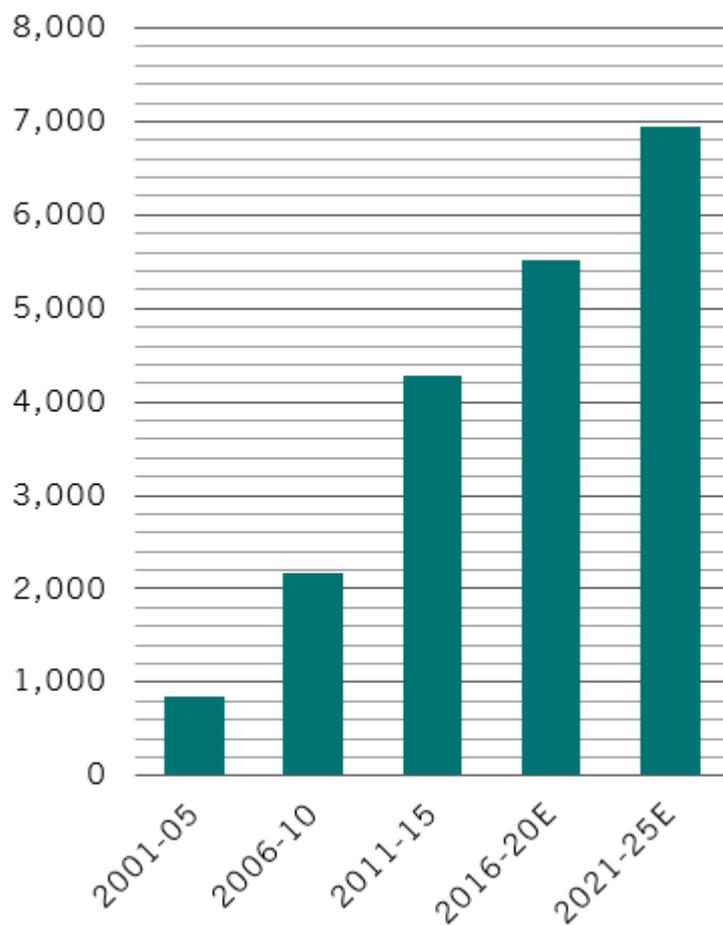
People power has, in turn, brought about a change in government priorities. China is a striking example of this trend.

In the run-up to the 2008 Olympics, the US embassy in Beijing started tweeting hourly air quality data from its roof-top monitor.

This was the first time the public had access to live data on airborne particles known as PM2.5, which kill more than 4 million people

Fig. 1 how to spend it

Growth in China's environmental spending (in RMB bln)



Source: National Bureau of Statistics of China, Pictet Asset Management

worldwide a year.

As a result, local residents began voicing their concerns about air quality, eventually taking to the streets to stage large public demonstrations.²

In response to growing social discontent, China's leadership unveiled a ground-breaking action plan in 2013 to tackle "Airpocalypse" with investments worth hundreds of billions of dollars and a slew of regulations.

China's Premier Xi Jinping has named environmental degradation as one of the three main battles the country has to fight along with political and financial

risks and poverty alleviation, adding that: "We will never again seek economic growth at the cost of the environment."

China's investment in the environment has in fact risen seven-fold since the early 2000s (see chart).

But this is unlikely to be the end of its spending boom. Beijing has promised to invest even more heavily in advanced environmental science and technology.

Also giving sustainable investing a shot in the arm is a sharp drop in the cost of technologies such as renewable energy, water recycling and agri-tech. In the US, wind power is now cheaper than any other form of energy, having seen a 40 per cent drop in production costs over the past decade. The costs of producing utility-scale solar power have declined by more than 60 per cent over the same period.

Stars aligned for environmental industry

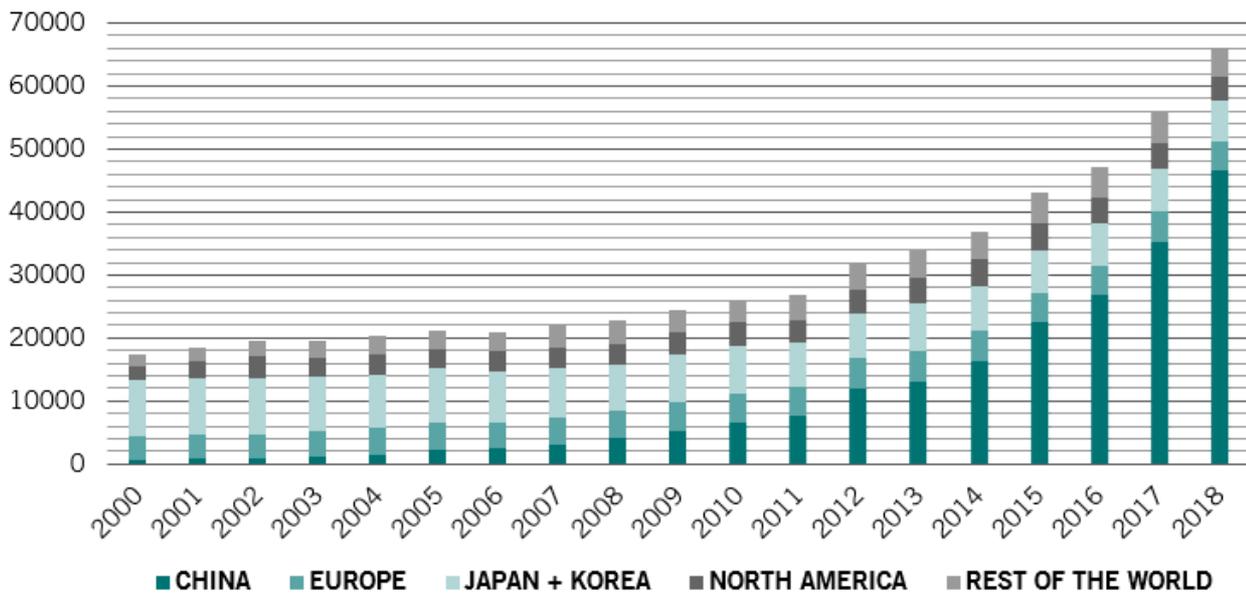
The combination of people power, government policies and economics has given rise to a thriving – and eminently investable – industry for environmental products and services.

China's generously-funded anti-pollution drive, for example, is likely to boost the prospects of firms that develop environmental technologies such as filters for engines and industrial applications for pollution control.

More broadly, as corporations worldwide embrace sustainable business practices, publicly-listed firms specialising in the development of a broad range of environmental technologies have mushroomed, while the number of patents filed for environmental products over the past decade has more than tripled.

Fig. 2 becoming innovative

Environmental technology patent publications by filing country



Source: WIPO Database, data as of 31.10.2019

The economic benefits – and investment potential – manifest themselves in several ways:

- Precision agriculture: A GPS guidance system can save a farm of 1,000 acres about USD13,000 in variable costs annually, paying for itself within one year. Even if only 10 per cent of US farmers use GPS for planting seeds, it could save 16 million gallons of fuel, four million pounds of insecticide, and two million quarts of herbicide per year.³
- Renewable energy: Renewable energy usage has been growing rapidly thanks to falling production costs. Being bid at less than USD0.02 per kilowatt hour, solar power will soon be cheaper than any form of fossil fuel-based power generation.⁴ The cost of electricity from offshore wind farms, once

one of the most expensive forms of green energy, is expected to drop by some 70 per cent over the next two decades.⁵

- **Smart cities:** Installing a suite of connected infrastructure such as water, electricity and waste, or upgrading ageing systems should cut bills and improve resource management. Barcelona, for example, saves USD58 million annually with smart water technology that uses connected sensors and cloud servers to monitor irrigation and water levels.⁶
- **Energy efficiency:** Investing in electric public transport, using more renewable energy and increasing efficiency in commercial buildings and municipal waste management could cut energy costs by about USD17 trillion worldwide by 2050.⁷
- **Pollution control:** Pollution mitigation and prevention can yield large net gains for the economy. In the US, an estimated USD30 in benefits has been returned to the economy for every dollar invested in air pollution control since 1970.⁸ More specifically, we see strong growth for companies developing technologies such as filters for engines and industrial applications for pollution control.

Critical mass

Fig. 3 environmental industry in numbers



Source: Pictet Asset Management

Overall, we estimate that the environmental products industry is already worth some USD2.5 trillion, and can grow by about 6-7 per cent per year.

That should matter to investors: sales growth of companies operating in this sector should outpace that of firms in the MSCI All-Country World equity index.

[1] The Lancet Commission on pollution and health, 19.10.2017

[2] According to the Chinese Academy of Social Sciences/South China Morning Post, as many as half of public protests in China involving at least 10,000 participants in 2000-2013 stemmed from concerns about pollution

[3] USDA, <https://link.springer.com/article/10.1186/2192-0567-2-22>

[4] Bloomberg

[5] Bloomberg New Energy Finance

[6] See **document**

[7] The Global Commission of the Economy and Climate

[8] Lancet Commission on pollution and health, 19.10.2017

03 A process to unlock the potential of environmental investments

When it comes to investing in rapidly-evolving area of environmental solutions, identifying the most promising opportunities isn't

straightforward.

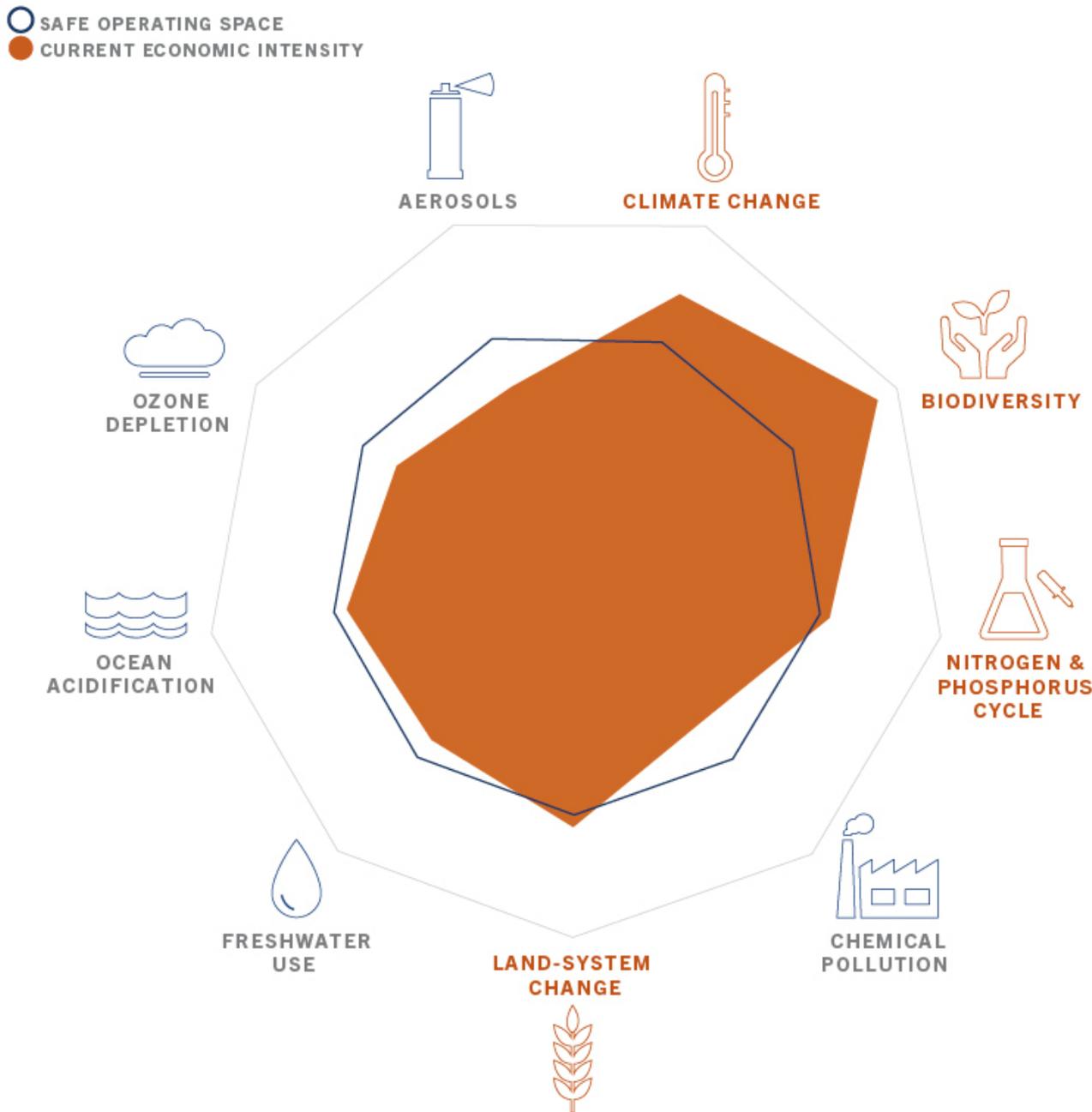
That is why investment managers of our GEO strategy have developed a process that deploys both a scientific, rule-based framework and traditional company-by-company research to build their portfolio. Central to the investment process is a ground-breaking scientific framework called Planetary Boundaries (PB).

This is a model developed in 2009 by a team of leading scientists at the Stockholm Resilience Centre and other leading organisations.

The PB framework identifies the nine most critical environmental dimensions - including carbon emissions (climate change), fresh water, land use and biodiversity - that are essential to maintain a stable biosphere required for human development and prosperity. It then quantifies the safe operating space within which human activities should take place.

Breach any of these thresholds, the model says, and the risk of triggering abrupt or irreversible damage to the Earth's biophysical systems increases significantly. Already, four of the nine boundaries have been transgressed (Fig. 4).

Fig. 4 planetary boundaries



Climate change
Ever increasing GHG emissions accelerate global warming that threatens to change global precipitation patterns, cause sea levels to rise and increase the severity of storms

Freshwater use
Water is overused and heavily polluted in many regions of this world with dire consequences on ecosystems, human health and economic production

Biodiversity
Loss of species several orders of magnitude higher than natural background rate; gravely endangering our natural "life support systems"

Ocean acidification
Deposition of acidic compounds into the oceans deplete their buffer capacity for CO₂, and impacts heavily on shell-forming organisms, and thus the entire marine food web

Nitrogen & phosphorus cycle
Human fixation of atmospheric N has reached an unprecedented scale with serious detrimental consequences (health impacts, eutrophication, global warming and ozone layer)

Ozone depletion
Ozone depleting substances destroy the stratospheric ozone layer, often after complex photochemical processes with heavy consequences for human health and other plant and animal organisms

Chemical pollution
Planetary boundary not yet quantifiable

Aerosols



Planetary boundary not yet quantified, but consensus that level of pollution is already too high and disruptive to health and ecosystems



Quantification not yet possible, but already heavy loading with airborne particles already impacting human health, climate and ecosystem



Land-system change

Conversion of forests & other natural habitats for intensive agricultural or industrial production releases GHG and degrades ecosystems

Source: Stockholm Resilience Centre, Pictet Asset Management, data as of 31.03.2020

In the decade since the ground-breaking model was published, the PB framework has transformed our approach to the environment.

Crucially, it highlights the threats humans pose to ecosystems, beyond the highly publicised aspect of climate change.

Partnering with the Stockholm Resilience Centre, we have developed a proprietary model that reveals how companies are operating with respect to the thresholds defined by the PB framework.

Specifically, the model defines resource use and emission limits for every industry in the global economy – expressed per USD1 million of annual revenue.¹

This model analyses every activity in the production of a good or service: the extraction of raw materials, manufacturing processes, distribution and transport, product use, and disposal and recycling.²

Take biodiversity as an example.

The loss of animal and plant species is as serious a threat as climate change. Our PB model quantifies that, for changes in biodiversity to remain at natural levels, the annual extinction rate must be less than 1.3 x 0.0000001 extinctions per million species for every USD1 million of annual revenue generated.

Applying this framework to the constituents of MSCI All-Country World Index, we can identify industries that make positive contribution to biodiversity.

Our analysis shows that the biodiversity footprint of industries such as environmental engineering and consulting, as well as water sewage networks, are negative -- meaning that products and services provided by these groups of companies help restore biodiversity.

Identifying environmental specialists

Using the proprietary screening tool based on the Planetary Boundaries, we define an opportunity set of around 3,500 companies.³

The second phase of the process involves taking a deeper look at the core business of each company that is identified in step one.

Here, our goal is to determine which firms are developing products and services that make a real difference in reversing environmental degradation.

What is more, we only choose companies whose products or services make a positive impact on at least one environmental dimension in the Planetary Boundaries model.

For each company we assign a proprietary “thematic purity” value, which indicates what proportion of a firm’s enterprise value (EV), revenue or EBITDA is derived from environmental products and services.

For a company to qualify for inclusion in the portfolio, its purity value must be at least 20 per cent.⁴

These filters narrow down our investment universe to about 400 companies.

In the next step, we conduct detailed company-by-company research to identify firms with the most attractive risk-return characteristics.

We use a proprietary scoring system, which takes into account the strength of the business model, management quality, valuation and operational momentum metrics. ESG analysis is systematically integrated in this stage as well.

The result is a concentrated portfolio of around 50 stocks - each investment combining an attractive risk-return profile with a small ecological footprint.

But our investment process does not end there.

Our aim is to be an active owner of the companies we invest in. For this, we exercise voting rights through a proxy voting platform and engage with the companies to ensure they have the best possible governance structure in place.

Fig. 5 actively engaging

Example of how we've engaged with a UK-based environmental utility company



Source: Pictet Asset Management

[1] Butz, C., Liechti, J., Bodin, J. et al. Towards defining an environmental investment universe within planetary boundaries. *Sustain Sci* 13, 1031–1044 (2018). <https://doi.org/10.1007/s11625->

018-0574-1

[2] We use Carnegie Mellon University's Economic Input-Output Life Cycle Assessment (EIO-LCA) database to quantify the environmental impact of 150-plus corporate sub-industries, defined by Bloomberg with its Global Industry Classification Standard methodology. For more, see <http://www.eiolca.net/> and <https://data.bloomberglp.com/professional/sites/10/Classification-Data-Fact-Sheet.pdf>

[3] We remove companies that are on our "black list" – consisting of companies commercialising controversial weapons, such as anti-personnel mines, chemical or cluster munitions from the investment universe

[4] The portfolio has an average purity score of at least 60 per cent

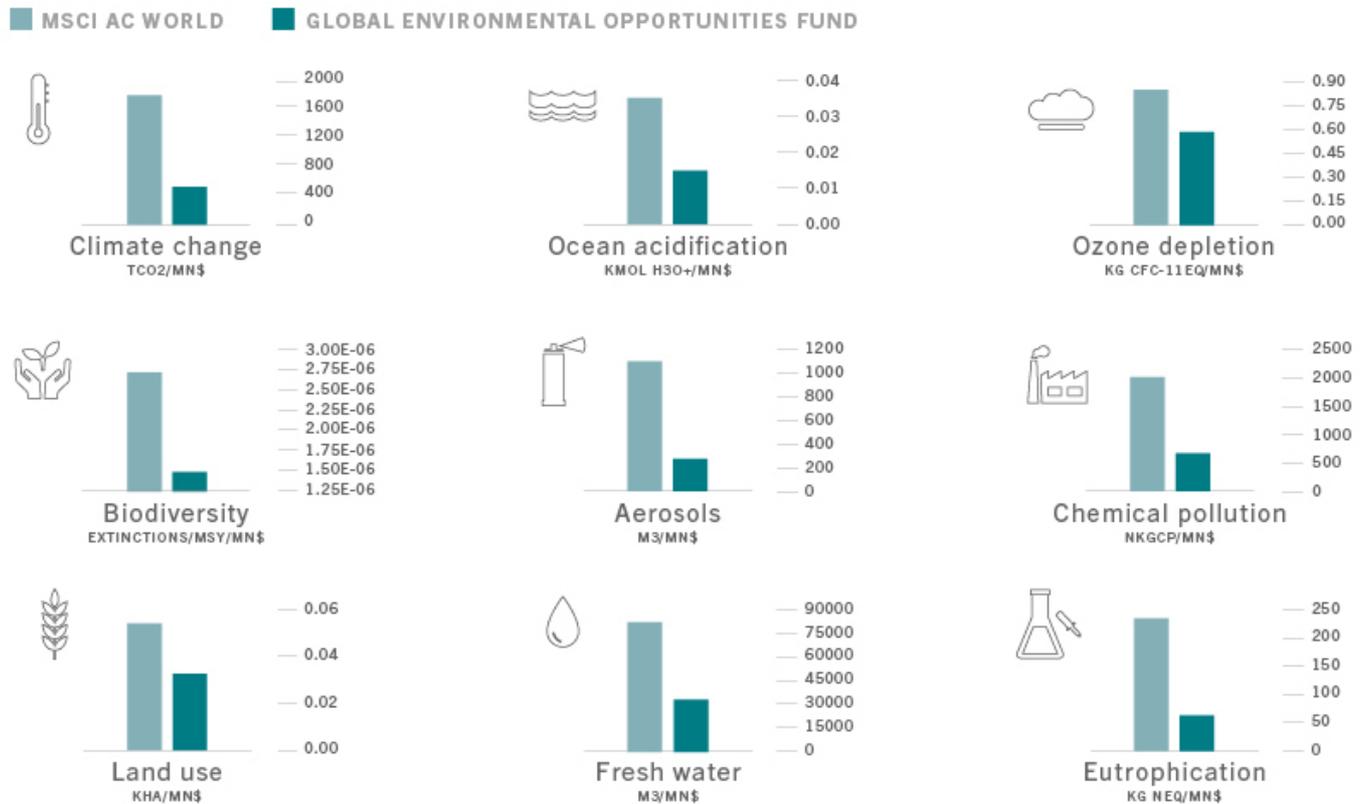
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Making a demonstrable impact

The Global Environmental Opportunities portfolio achieves a significantly more positive environmental impact than that of a typical global equity strategy across all nine dimensions, particularly in climate change (see Fig. 6).

Fig. 6 positive impact

Using the Planetary Boundaries framework to compare Pictet Global Environmental Opportunities strategy to MSCI ACWI



Source: Pictet Asset Management, NEOSIS, 31.03.2020

For example, carbon dioxide emissions of companies in our portfolio stand at 454 tonnes of CO2 equivalent per million dollar of annual revenue (tCO2 eq/mn\$), compared with 1,948 tonnes for the MSCI AC World index.

This is one of the many positive impacts investors can make with this strategy to protect the planet.

As stewards of global capital, investors matter. And in two ways.

On one hand, investors can provide vital funding to the companies developing products and services that can reverse ecological damage.

On the other, they alone have the power to withhold or withdraw capital from businesses that fail to take their environmental responsibilities seriously.

For investors, the opportunity to bring about change has never been greater.

Many investors have long appreciated the need to protect the planet. But they have not always been convinced sustainable investment was financially viable.

Thanks to the emergence of thriving environmental products industry, the calculus is now changing. Investing to safeguard the natural world does not mean sacrificing returns. It can enhance them.

05

Case study: analysing industries' impact on biodiversity

Our model, based on the Planetary Boundaries (PB) framework, shows that the threshold for biodiversity loss for any industry, across its entire production chain, is 1.3×0.0000001 extinctions per one million species per year (MSY) per USD1 million of annual revenue.

Environmental engineering and consulting

The PB model shows that business activity of companies which provide specialised consulting and technical services in environmental and resource management actually improves biodiversity.

The industry's biodiversity footprint stands at a negative 1.27×0.000001 extinctions/MSY per USD1 million of annual revenue. This means products and services provided by this group of companies help restore biodiversity.

In fact, the environmental engineering industry has a positive environmental footprint across all the nine PB dimensions, particularly in terms of promoting biodiversity and combatting global warming.

Water sewage networks

Companies operating in this industry provide specialised technologies and utility services on water sewage networks. The PB model shows the industry's biodiversity footprint stands at minus 1.11 x 0.000001 extinctions/MSY per USD1 million of annual revenue. The water sewage networks industry has positive PB scores across the nine boundaries, with the exception of global warming.

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