



WWF

REPORT

EU

2017

INVEST WELL BELOW

2°C

EUROPEAN ASSET OWNERS: 2°C ALIGNMENT AND MISALIGNMENT OF PUBLIC EQUITY PORTFOLIOS

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2° Investing Initiative performed the free and open-source 2°C benchmark and alignment assessments presented in this report on the investment portfolio data provided by WWF. It applied the tool developed as part of the Horizon 2020-funded Sustainable Energy Investing Metrics (SEIM) project. The assessment is based on third-party data, including Bloomberg, GlobalData and WardsAuto/ AutoForecast. 2° Investing Initiative is not responsible for any error associated with externally sourced data. contact@2degrees-investing.org or visit <http://2degrees-investing.org/>

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WWF has undertaken unprecedented research on whether asset owners' public equity investments in - amongst others - renewable energy are aligned with the Paris climate goals.

EXECUTIVE SUMMARY

The transition to a low carbon economy is underway. Renewable energy costs are falling, and coal is in structural decline. The Paris Agreement, approved internationally by 195 parties, has built a strong global consensus around climate goals and the need to make finance flows consistent with these goals. Nonetheless under current policies, CO₂ emissions will lead to global warming of up to 4.9°C. This will cause catastrophic consequences for natural systems and human societies, but also poses a significant material risk for investors.

Investors have started to play their part but will need to do much more if the Paris Agreement's climate target is to be achieved. How are they actually doing in contributing to the transition to a safe future for the climate? Are their investments aligned with the climate goals? How can we measure what needs to be done? Investors need to be supported – and also challenged – as they start to reallocate capital to align with a sustainable future and maximize their investment returns.

**WWF HAS ENGAGED WITH
80 OF THE 100 LARGEST
EUROPEAN ASSET OWNERS
IN 12 COUNTRIES: 30 HAVE
DISCLOSED DATA**

To contribute to investors' efforts on capital reallocation, WWF has undertaken this unprecedented piece of research, which is intended to inform and further stimulate the growing conversation about how asset owners' investment portfolios are aligned with the Paris climate goals. At the time of publication, WWF has engaged with 80 of the 100 largest European asset owners in 12 countries – defined in this study as pension funds, insurance companies and sovereign wealth funds. These 80 asset owners represent around \$13 trillion in total assets – more than half of all European institutional investors' assets.¹ So far 30 of these asset owners have provided data to be included in the study. As such, this research is part of the increasing demand that climate-related financial disclosures be made by all financial sector actors.

This report demonstrates how a forward-looking analysis can inform asset owners' investment decision-making in public equity holdings. It is focused on the sectors of coal mining and electric utilities (coal power and renewable power); in the future the same analysis could be done for other carbon-intensive sectors (oil & gas, automotive and more) and the corporate fixed income asset class. Going beyond carbon footprinting metrics by assessing *technology exposure* at portfolio level, this research helps market participants consider the future pathways their investments need to take.

The analysis is based on the 2°C benchmark and alignment analysis enabled by the Horizon 2020-funded Sustainable Energy Investing Metrics (SEIM) tool, and performed by the 2° Investing Initiative. This tool assesses how well the holdings in an investor's public equity portfolio are aligned with the 2°C scenario and technology roadmaps of the International Energy Agency (IEA) for the year 2020. In accordance with the recommendations from the Financial Stability Board (FSB)'s Task Force on Climate-related Financial Disclosures (TCFD), the tool generates a science-based, forward-looking scenario analysis of investment portfolios for a set of key technologies. It is using physical asset level data: actual capacity and production plans of each company (e.g. tonnes of coal mined per annum or coal/renewable power capacity).

¹ Estimate using data from European Commission; Willis Towers Watson (2016), World 500 largest asset managers in 2015; Willis Towers Watson (2016), 300 largest pension funds in 2015.

The research draws these first conclusions on the asset owners' equity portfolios:

Firstly, the lack of disclosure of holdings data from a majority of asset owners, in part due to a current lack of regulation, poses difficulties in assessing the alignment of equity portfolios with the 2°C objective. Given the TCFD recommendations, it is important to stress that the regulatory environment on climate-related financial disclosure might change in the near future.

Secondly, based on the data accessed for 30 asset owners,² results show major differences in terms of alignment according to technologies:

- On coal mining, almost all the asset owners surveyed are favourably positioned when compared with the IEA 2°C scenario for 2020: this means that they already underweight this technology in their portfolio in comparison to the IEA benchmark and related stock market average.
- On coal power, nearly half the asset owners fail to align with the IEA 2°C scenario.
- On renewable power, more than half the asset owners are favourably positioned relative to the IEA 2°C scenario, some by a significant amount, with the rest misaligned.
- Almost all the asset owners are aligned with the IEA 2°C benchmark for 2020, for at least one of the three technologies.³

While more results are expected over the coming months, the findings suggest that although some asset owners are showing leadership, there is still significant misalignment with the IEA 2°C scenario for 2020 for coal mining, coal power and renewable power. This requires urgent attention from asset owners to set investments on track for 2020.

WWF recommends that:

- Asset owners take action to assess and disclose the degree of alignment of their investment portfolios with the IEA 2°C scenario for key technologies.
- Asset owners contribute to the development of, and demand for, climate alignment assessment methodologies.
- Asset owners work towards full holdings' disclosure across asset classes: several best practice examples exist in five countries⁴.
- Financial policy makers and regulators swiftly transpose the recommendations of the FSB Task Force on Climate-related Financial Disclosures into European and/or national legislation and regulation.
- Climate alignment assessment disclosures by asset owners be viewed as best practice, and in due course become the market norm towards the Paris climate goals. As mentioned above, much fuller disclosure of holdings data by asset owners, either publicly or – as a first step – to the national regulator, is paramount to achieve this.

In a forthcoming publication expected in autumn 2017, WWF will issue detailed recommendations on how asset owners can meaningfully develop their investment strategies with a view to aligning their portfolios with the well below 2°C target from the Paris Agreement.

WWF will continue to expand the dialogue – both bilaterally and collectively – with asset owners, financial policy makers and regulators, and other market participants to stimulate the development and disclosure of climate alignment assessments in the market.

² Section 2 gives further details. It should be noted that DNB noticed an error in the data they provided and their results have therefore been removed temporarily.

³ It should be noted that the alignment with the IEA 2°C benchmark for 2020 for,

for example, coal mining does not mean that the given investment portfolio is coal-free. For more details see Section 2.

⁴ 23 asset owners in five countries make their public equity holdings public on their website: see Section 7-1.

INTRODUCTION AND RESEARCH FINDINGS

THE PARIS AGREEMENT CONTAINS A PROVISION TO 'MAKE FINANCE FLOWS CONSISTENT WITH A PATHWAY TOWARDS LOW GREENHOUSE GAS EMISSIONS AND CLIMATE RESILIENT DEVELOPMENT'⁵

In the **Paris Agreement on climate change**, 195 governments agreed to *'hold the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C'*. The Agreement moreover contains a provision to *'make finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development'*.⁵

Asset owners, financial regulators and other finance sector actors therefore have an imperative to address climate-related financial risks.

Under current policies, CO₂ emissions will lead to global warming of up to 4.9°C compared to the pre-industrial period.⁶ This will cause catastrophic consequences for natural systems and human societies, but also poses a significant material risk for investors. The Economist Intelligence Unit estimates that losses to manageable assets to 2100 could amount to \$7.2 trillion in a 5°C warming scenario – more than the total market capitalisation of the London Stock Exchange. Keeping global warming from climate change under 2°C can cut average projected losses in half, while extreme losses can be reduced by more than three-quarters.⁷

Asset owners have to safeguard the pensions and assets of future generations. Mercer, Cambridge University, the Economist Intelligence Unit and the London School of Economics find in modelling studies that 2°C pathways offer both the lowest risk and the maximum potential for maximising financial returns, in comparison to 3°C and 4°C pathways.⁸ Such analyses indicate that aligning investment portfolios with a 2°C compliant low-carbon transition is both technically feasible and advisable, because it will produce higher returns on a risk adjusted basis. It would further deliver the benefit of supporting the transition to a 2°C world and aligning with the Paris Agreement.

A growing number of asset owners recognise the benefits of an orderly low-carbon transition as a means to reduce climate-related financial risks and maximise low carbon investment opportunities. High-level policy initiatives (e.g. the FSB Task Force on Climate-related Financial Disclosures and the European Commission's High Level Expert Group on Sustainable Finance) have been set up to increase understanding and policy action in this area.

This research focuses on the public equity asset class as a starting point with the intention to inform and further stimulate the growing conversation about how the investment portfolios of the largest European asset owners are aligned with the internationally agreed climate goals of the Paris Agreement. In this research WWF focused on three key technologies: **coal mining, coal power, and renewable power**. Such technologies are a good way to start the journey on 2°C alignment of investment portfolios, as they likely present the most visible climate-related financial risks and opportunities to asset owners.⁹

⁵ UNFCCC, Paris Agreement.

⁶ Climate Action Tracker (Climate Analytics, Ecofys, NewClimate Institute, Potsdam Institute for Climate Impact Research).

⁷ Economist Intelligence Unit (2015), The cost of inaction.

⁸ Mercer (2015), Investing in a time of climate change; University of Cambridge - Cambridge Institute for Sustainable Leadership (2015), Unhedgeable risk; Economist Intelligence Unit (2015), The cost of inaction; London School of Economics (2016), Climate value at risk of global financial assets.

⁹ While immediate action to decarbonise industrial and economic sectors across economies is required, acting on coal and renewable energy technologies constitutes a first step in realising the energy transition: coal burning remains the single most important source of CO₂ emissions globally, and the implementation and deployment of sustainable renewable energy is crucial to accomplish carbon-neutral economies by 2050.

Limited disclosure narrows the scope of this research

This report presents a sample of the results of WWF's engagement with 80 of the 100 largest European asset owners.¹⁰

A majority of asset owners do not publicly disclose their holding lists, in part due to a current lack of regulation requiring to do so. This poses difficulties in assessing the alignment of equity portfolios with the 2°C limit. The table below shows that results for a sample of 30 asset owners were included in this research: these were chosen based on whether the investor publicly discloses equity holdings on their website, or whether the asset owner agreed to the publishing of results following engagement with WWF.

WWF focused on internally managed assets, for reasons of data accessibility and comparability. However, given the difficulty to access full holdings data it is difficult for WWF to assess what parts of the holdings have been circulated exactly so there may be involuntary differences in scope (e.g. autonomously managed holding lists versus companies owned through funds).

WWF will continue to engage with asset owners, and encourage them to voluntarily disclose the climate alignment of their portfolios. More results are therefore expected over the coming months following these bilateral discussions, and this will potentially lead to an updated publication next year.¹¹

TABLE 1. CATEGORISATION OF THE 80 ASSET OWNERS CONTACTED BY WWF ACCORDING TO DISCLOSURE AND DEGREE OF COOPERATION WITH WWF BY 31ST OF MAY 2017.

See Annex 1 for the full list of asset owners.

CLIMATE ALIGNMENT ASSESSMENT FINDINGS INCLUDED IN THE RESEARCH REPORT			CLIMATE ALIGNMENT ASSESSMENT NOT INCLUDED IN THE RESEARCH REPORT	
Disclosure of public equity holdings on a voluntary basis	Disclosure of public equity holdings due to domestic regulation	Undertook 2°C alignment assessment with WWF and agreed to publish findings	Accepted to do 2°C alignment assessment with WWF	Contacted and/or considering WWF request
15	9	6	7	43

¹⁰ WWF did not engage with 6 Swiss asset owners that are part of this 100 largest European group in order not to interfere with an ongoing climate alignment assessment initiative from the Swiss Federal Office for the Environment (FOEN) and the State Secretariat for International Financial Matters (SIF). It also did not engage with 14 UK pension funds,

given the large number of asset owners in the UK (27) in the 100 largest European group and WWF's need to prioritise its efforts.

¹¹ WWF does respect asset owners' decisions to have results published or not.

The Sustainable Energy Investment Metrics methodology (SEIM)

The SEIM tool used in this research links a climate scenario with the holdings in an investor's portfolio. More precisely it compares the technology exposure of an investment portfolio to the market production under an IEA 2°C scenario (for 2020) compatible transition, scaled to the portfolio size (called the benchmark exposure).¹² The analysis then generates indicators of under-exposure and over-exposure in terms of percentage points compared to the IEA 2°C scenario. For coal, under-exposure signifies alignment, over-exposure signifies misalignment – and vice versa for renewables.

MOVING TO A SCIENCE-BASED 2°C BENCHMARK

A benchmark is normally seen as a financial metric, i.e. an indication of financial return based on a market index, that is used as a reference indicator. But what if an investor's goals are not purely financial, and require appropriate non-financial metrics to measure progress towards those goals? In this research WWF is recommending that asset owners align their portfolio exposures to three technologies where the benchmark is a physical metric, not a financial one. The measurement of alignment with the benchmark remains a relative one. However the benchmark itself is in absolute terms, as it is based on the IEA 2°C scenario which is rooted in climate science.

Further details of the SEIM tool are as follows:

- SEIM is a scenario analysis model, not only a 2°C model. It is designed to allow investors and financial regulators to apply whatever scenario they prefer. In this research we have applied the model to the IEA 2°C scenario, due to limited availability of other scenarios with sufficient regional and technological granularity. The IEA 2°C scenario lays out an energy system deployment pathway and an emissions trajectory consistent with a 50% chance of limiting the average global temperature increase to 2°C, which is significantly less stringent than the objective to keep global warming below 1.5°C¹³. Concretely if a given portfolio is aligned with the IEA 2°C benchmark for 2020 for e.g. coal mining, this does not mean that it is coal-free: it means that the portfolio reaches the same coal mining exposure as the IEA 2°C benchmark for 2020 (which is not zero). In the IEA 2°C scenario coal mining exposure gradually decreases over time but does not yet reach zero in 2040, while a 1.5°C scenario would be much more stringent on coal. The findings should therefore be considered as representing a **minimum level of ambition in terms of 2°C alignment**, but they do indicate the desired direction of travel: **more ambitious scenarios (e.g. 1.5°C) will be tighter and will require a more rapid transition**. However, these changes will not be based on completely different technologies.
- SEIM is focused on the public equity asset class. The efforts of asset owners that have invested in **alternative asset classes (e.g. renewable energy infrastructure) are not reflected in the results** despite the high relevance of such investment strategies,¹⁴ nor are the report findings necessarily most relevant for asset owners whose strategic asset allocation is dominated by fixed income. In the course of 2017 SEIM will provide 2°C alignment assessment of the corporate fixed income asset class.

¹² The SEIM tool provides 2°C alignment assessment for more technologies than coal mining, coal power and renewable power: see Section 7-2.

¹³ The shortcomings of the IEA 2°C scenario are detailed in Section 7-4.

¹⁴ WWF forthcoming recommendations to asset owners on climate change will provide more analysis on alternative asset classes.

- Current results are focused on **companies listed in the MSCI World universe (which corresponds approximately with OECD countries)** and their production within OECD countries.¹⁵ In the course of 2017 SEIM will allow the assessment of a global universe of companies.
- Building on IEA-led milestones, the SEIM assessment generates a point in time portfolio alignment for the year 2020 based on currently available company plans. There is no guarantee for continued alignment beyond this point in time, unless further measures are taken by the investor to maintain the decarbonisation at a speed and scale that is consistent with science-based scenarios.
- The relevance of comparing different asset owners can be limited by the different geographic portfolio exposures (including, for example, any bias towards domestic investments).

SEIM provides a quantitative assessment of holdings data at portfolio level. Further qualitative research would be necessary to evaluate and assess the climate policies of asset owners.

Research findings for coal mining, coal power and renewable power

Results show major differences in terms of alignment according to technologies. For coal mining, almost all asset owners are aligned with the IEA 2°C benchmark for 2020, while the picture is more mixed for coal power and renewable power.

In the following exhibits, the X-axis represents the IEA 2°C benchmark for 2020: 0% is exact alignment. Misalignment with the 2°C benchmark is presented as a negative value (i.e. below the X-axis, in red), and alignment as a positive value (i.e. above the X-axis, in green). A positive percentage means that the given portfolio underweights the coal technology in their portfolio in comparison to the IEA benchmark – and vice versa for renewables.

¹⁵ The MSCI World Index is a broad global equity benchmark that represents large and mid-cap equity performance across 23 developed markets countries, with 1,648 constituents as of 28 April 2017. With approximately 85% of the free float-adjusted

market capitalization in each country, it covers most of the holdings of a typical public equity portfolio for a European asset owner.

COAL MINING

ALMOST ALL ASSET OWNERS ARE ALIGNED WITH THE IEA 2°C BENCHMARK

Almost all asset owners are aligned with the IEA 2°C benchmark exposure for 2020. Indeed, some leaders even have no coal mining companies at all in their public equity portfolio. While this is in line with the growing number of public coal divestment commitments due to climate considerations, it can also be partly explained by the general decline of the coal mining sector over the last few years, and the collapse of the coal miners' market value, in particular in the US. Experts increasingly consider that the coal mining sector is now in structural decline.¹⁶ It will be important to continue monitoring asset owners' investment strategy in this sector to ensure that the alignment with the IEA 2°C benchmark is part of a deliberate long-term strategy to gradually reduce exposure to coal mining and not just the result of short-term financial considerations.

FIGURE 1. COAL MINING: 2°C ALIGNMENT OF EQUITY PORTFOLIO

Asset owner alignment with the IEA 2°C benchmark (X-axis) for 2020 for coal mining in public equity portfolios. Alignment improves from left to right: asset owners misaligned with the 2°C benchmark are presented as a negative value (i.e. red), and aligned asset owners as a positive value (i.e. green). Five asset owners (right of the graph) have no coal mining.



¹⁶ See e.g. Moody's (2016), Coal industry struggles with structural decline; Goldman Sachs (2015), Thermal coal reaches retirement age; International Energy Agency (2015), Medium-term coal market report; WWF (2015), Global coal: the acceleration of market decline; Bernstein Research (2013), Asian coal and power: less, less, less... The beginning of the end of coal.

ALMOST HALF OF THE
ASSET OWNERS ARE
MISALIGNED WITH THE IEA
2°C BENCHMARK

COAL POWER

Almost half of the asset owners are misaligned with the IEA 2°C benchmark for coal power for 2020. This suggests that **asset owners willing to reduce their coal exposure across their full investment portfolio should widen their scope from coal mining to include coal power in the utilities sector.**¹⁷ On the other hand, several asset owners are already well aligned with the IEA 2°C benchmark.

FIGURE 2. COAL POWER: 2°C ALIGNMENT OF EQUITY PORTFOLIO

Asset owner alignment with the IEA 2°C benchmark (X-axis) for 2020 for coal power in public equity portfolios. Alignment improves from left to right: asset owners misaligned with the 2°C benchmark are presented as a negative value (i.e. red), and aligned asset owners as a positive value (i.e. green).



¹⁷ Beyond coal mining and coal power other sectors include companies playing a key role in the full coal value chain. For more information see WWF recommendations on coal (forthcoming).

MORE THAN HALF OF THE ASSET OWNERS ARE WELL ALIGNED WITH THE IEA 2°C BENCHMARK

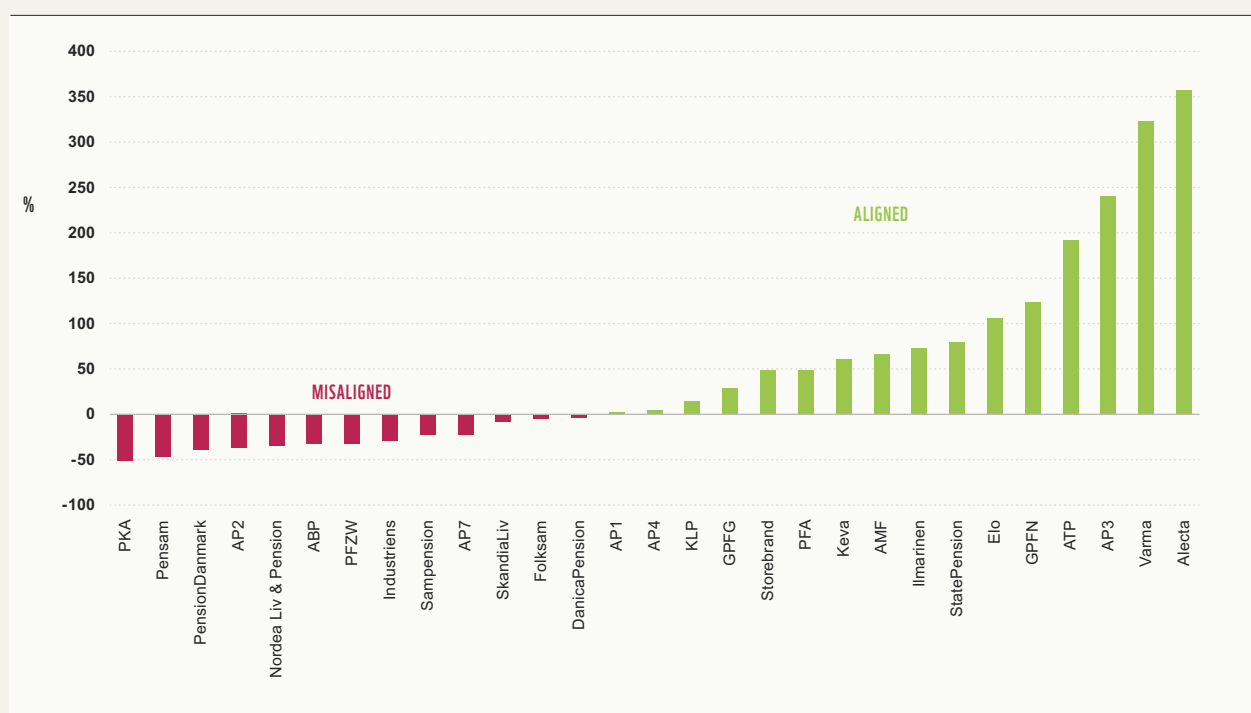
RENEWABLE POWER

More than half the asset owners are well aligned the IEA 2°C benchmark for 2020 for renewable power, which may well be the result of active strategies to support renewable energy technologies.

Given the focus of the research on public equity, the analysis does not reflect the efforts of several asset owners that have invested in renewable energy via alternative asset classes such as infrastructure, despite the high relevance of such investment strategies to the issue being researched.¹⁸ For instance, a large share of the unlisted infrastructure market (42% in 2015) is constituted by renewable energy projects,¹⁹ and exposure to this asset class is not captured in this report. However, the results of the research highlight that increasing exposure to renewable energy requires action across several asset classes – including public equity; and other asset classes should be assessed separately.

FIGURE 3. RENEWABLE POWER: 2°C ALIGNMENT OF EQUITY PORTFOLIO

Asset owner alignment with the IEA 2°C benchmark (X-axis) for 2020 for renewable power in public equity portfolios. Alignment improves from left to right: asset owners misaligned with the 2°C benchmark are presented as a negative value (i.e. red), and aligned asset owners as a positive value (i.e. green).



¹⁸ A concrete example is the asset owners that are pooling resources through the Copenhagen Infrastructure Partners initiative. WWF forthcoming recommendations to asset owners on climate change will provide more analysis on alternative asset classes.

¹⁹ IEEFA (2017), Making the case for the Norwegian Sovereign Wealth Fund investment in renewable energy infrastructure.

Research findings by asset owner

The following table provides an overview of the IEA 2°C alignment assessment results by asset owner:

- It makes a distinction between asset owners that align with the IEA 2°C benchmark above the median (dark green) and below or equal to the median (green).
- Misalignment with the IEA 2°C benchmark is indicated in red.

It is encouraging to note that almost all the 30 asset owners are aligned with the 2°C benchmark for 2020 for at least one technology. This suggests that it is feasible for asset owners to align their public equity portfolios with the 2°C target for coal mining, coal power and renewable power through appropriate investment strategies and their implementation.

At the time of publication, WWF could not yet share results of SEIM climate alignment assessments for 50 asset owners. **WWF considers asset owners whose SEIM climate alignment assessment results are included in the table as best practice examples in terms of disclosure.**

ALMOST ALL THE 30
ASSET OWNERS ARE
ALIGNED WITH THE
2 DEGREE BENCHMARK
FOR 2020 FOR AT LEAST
ONE TECHNOLOGY



TABLE 2. ASSESSMENT BY ASSET OWNER OF IEA 2°C ALIGNMENT FOR 2020 FOR COAL MINING, COAL POWER AND RENEWABLE POWER (PUBLIC EQUITY PORTFOLIOS).

INVESTOR NAME	COUNTRY	COAL MINING	COAL POWER	RENEWABLE POWER
ABP	Netherlands			
Alecta	Sweden			
AMF	Sweden			
AP1	Sweden			
AP2	Sweden			
AP3	Sweden			
AP4	Sweden			
AP7	Sweden			
ATP	Denmark			
DanicaPension	Denmark			
Elo	Finland			
Folksam	Sweden			
GPFG	Norway			
GPFN	Norway			
Ilmarinen	Finland			
Industriens	Denmark			
Keva	Finland			
KLP	Norway			
Nordea Liv & Pension	Sweden			
Pensam	Denmark			
PensionDanmark	Denmark			
PFA	Denmark			
PFZW	Netherlands			
PKA	Denmark			
Sampension	Denmark			
SkandiaLiv	Sweden			
StatePension	Finland			
Storebrand	Norway			
Varma	Finland			

LEGEND ALIGNMENT WITH THE IEA 2°C BENCHMARK ABOVE THE MEDIAN ALIGNMENT BELOW OR EQUAL TO THE MEDIAN MISALIGNMENT
See Annex 1 for more details on asset owners.



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More than half of the 30 asset owners surveyed in this study are favourably positioned in terms of public equity for renewable energy when compared with the IEA 2°C scenario for 2020.

RECOMMENDATIONS

FOR ASSET OWNERS

WWF RECOMMENDS ASSET OWNERS TO:

- **Assess and disclose the degree of alignment of their investment portfolios with the IEA 2°C scenario for key technologies.** Given the limitations of this scenario, alignment with it should be considered as a minimum level of ambition compared to the well below 2°C/1.5°C target of the Paris Agreement.
- **Contribute to the development of, and demand for, climate alignment assessment methodologies** to assess the alignment of investment portfolios against well below 2°C/1.5°C scenarios.²⁰
- **Work towards full holdings disclosure across asset classes:** best practice examples show the way forward.²¹

In a forthcoming publication expected in autumn 2017, WWF will also issue detailed recommendations on how asset owners can meaningfully develop their investment strategies with a view to aligning their portfolios with the well below 2°C target from the Paris Agreement.

FOR FINANCIAL POLICY MAKERS AND REGULATORS

WWF RECOMMENDS FINANCIAL POLICY MAKERS AND REGULATORS TO:

- **Swiftly transpose the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) into European and/or national legislation and regulation,** with an emphasis on climate scenario and forward-looking analysis as indicated by the TCFD. The TCFD recommendations are an unprecedented opportunity to improve disclosure and develop climate-related informed decision-making in financial markets.
- **Building on best practice, gradually ensure greater public disclosure of holdings data** across a broad range of asset classes, to the benefit of asset owners, their members and regulators. Climate alignment assessments can be carried out internally, by the regulator or by third parties. Publication of those assessments and the underlying holdings data increases confidence through the transparency of public scrutiny; it also builds momentum across the investor community. There is scope for voluntary requirements to become mandatory overtime.

WWF will continue to expand this dialogue with asset owners, financial policy makers and regulators, and other market participants to stimulate the development and disclosure of climate alignment assessments in the market.

²⁰ It should be noted that there may be relevant tools other than SEIM, and that other types of analysis are and will become available. The fact that WWF uses the SEI methodology in this report does not mean it is the only relevant one: WWF welcomes discussions on other methodologies and tools.

²¹ 23 asset owners in five countries make their public equity holdings public on their website: see Section 7-1.



On coal mining, almost all the 30 asset owners surveyed in this study are favourably positioned in terms of public equity when compared with the IEA 2°C scenario for 2020. On coal power, nearly half the asset owners fail to align with the IEA 2°C scenario.

WHY ASSET OWNERS SHOULD ALIGN WITH THE PARIS CLIMATE GOALS

THE ECONOMIST INTELLIGENCE UNIT ESTIMATES THAT CLIMATE-RELATED LOSSES TO 2100 COULD AMOUNT TO \$7.2 TRILLION IN A 5°C PATHWAY

There is a growing consensus amongst leading investors globally, though stronger in some countries than in others, that we are moving irreversibly towards a low carbon economy.²² **Under current policies, greenhouse gas emissions will lead to global warming of up to 4.9°C.**²³ This means we would be heading towards a world marked by extreme weather events, declining food stocks and loss of ecosystems and biodiversity. These climate change impacts will put millions of people at risk, and will come with a level of uncertainty that threatens our ability to anticipate and plan for future adaptation needs.²⁴ This would also pose a significant risk to investors and potentially to financial stability:

- **Studies find that the value at risk from climate change will run at least in USD trillions, and likely even in tens of USD trillions.**^{25,26}
- Climate-related losses could well accelerate, in a non-linear way, if insufficient action is taken to reduce emissions, leading to higher warming. The Economist Intelligence Unit estimates that losses to 2100 could amount to \$7.2 trillion in a 5°C pathway.²⁷
- The Cambridge Institute for Sustainable Leadership finds that substantial climate-related losses in financial portfolio value could already manifest themselves in timescales that are relevant to all investors – not only long-term investors.²⁸

In the Paris Agreement, the 195 parties that are part of the UN Climate Change Convention committed to curb the current emissions trajectory in accordance with climate science. This commitment translated into an objective to *hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C*. Limiting warming to 2°C by 2100 means that the net emissions of greenhouse gases need to be reduced by 40-70% by the time we reach 2050, and brought to zero by the end of the century.²⁹ Respecting the more stringent limit of 1.5°C would require reducing emissions of greenhouse gases even more rapidly in the coming years and decades, and bring them to zero around mid-century.³⁰

While immediate action across all sectors is required to decarbonise the economy, it is particularly important to replace coal by sustainable renewable energy:

- Oxford University finds that for a 50% probability of limiting warming to 2°C, assuming other sectors play their part, no new investments in fossil electricity infrastructure are feasible from 2017 at the latest.³¹ This conclusion is particularly pressing for coal-fired power plants, by far the most polluting fossil fuel.

²² See for example Global Investor Coalition, 280+ global investors urge G7 to stand by Paris Agreement and drive its swift implementation, 7 May 2017.

²³ Climate Action Tracker (Climate Analytics, Ecofys, NewClimate Institute, Potsdam Institute for Climate Impact Research).

²⁴ World Bank (2014), Turn down the heat.

²⁵ See e.g. Bank of England (2014; 2015), Kepler-Chevreaux (2014), Citigroup (2014), The Economist Intelligence Unit (2015), London School of Economics-Grantham Institute (2016). Estimates about the value at risk from climate change vary depending on the timeframe of the analysis, the asset class covered, assumptions on future emission pathways and types of risk.

²⁶ The FSB Task Force on Climate-related Financial Disclosures (TCFD) has presented a

taxonomy of climate-related risk in its draft recommendations, dividing it between transition risk (policy and legal, technology, market, reputation) and physical risks (acute, chronic).

²⁷ Economist Intelligence Unit (2015), The cost of inaction.

²⁸ Cambridge Institute for Sustainable Leadership (2015), Unhedgeable Risk.

²⁹ IPCC (2014), AR5.

³⁰ Climate Action Tracker (Climate Analytics, Ecofys, NewClimate Institute, Potsdam Institute for Climate Impact Research).

³¹ Pfeiffer, Millar, Hepburn, Beinhöcker (2016), The '2C capital stock' for electricity generation: Committed cumulative carbon emissions from the electricity generation sector and the transition to a green economy, in Nature.

MERCER FINDS THAT AT THE PORTFOLIO LEVEL, 2°C PATHWAYS OFFER BOTH THE LOWEST RISK AND THE MAXIMUM POTENTIAL FOR MAXIMISING FINANCIAL RETURNS

- Climate Action Tracker (Climate Analytics, Ecofys, NewClimate Institute, Potsdam Institute for Climate Impact Research) finds that even with no new coal plant constructions, emissions from coal-fired power generation in 2030 would still be 150% higher than what is consistent with scenarios limiting warming to below 2°C. This implies that a substantial part of existing coal infrastructure will have to undergo early closure.³²

The Paris Agreement also contains a commitment to ‘*make finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development*’.³³ Different analyses indicate that long-term diversified investors have an interest in aligning their investment portfolios with the objectives of the Paris Agreement on climate change:

- **Mercer finds that at the portfolio level, 2°C pathways offer both the lowest risk and the maximum potential for maximising financial returns.**³⁴ The London School of Economics confirms that limiting warming to no more than 2°C makes financial sense to risk-neutral investors — and even more so to the risk-averse.³⁵ The University of Cambridge finds that over a longer time horizon a 2°C scenario is shown to outperform other climate scenarios.³⁶ The Economist Intelligence Unit indicates that keeping global warming under 2°C can cut the average projected losses in half, while the extreme losses, identified as tail risks, can be reduced by more than three-quarters.³⁷
- **Keeping global warming below 2°C will reduce the risk of stranded assets that result from environment-related risks**, including the effects of physical climate change and societal and regulatory responses to climate change. Coal infrastructure is already a stranded asset in certain markets: the four largest US coal miners have lost 99% of their market value, and Europe’s twenty largest utilities lost half of their market value over the period 2008-2015.³⁸ These risks will further increase in the near future (with, for example, a potential \$500 billion capital misallocation in Chinese coal-fired power plants).³⁹ **Mercer estimates that over a ten-year period the average annual returns from the coal sub-sector could be reduced by a quarter, or even turn out to be negative in absolute terms, while renewable energy could see average annual returns increase modestly, or nearly double, depending on the climate scenario.**⁴⁰

Asset owners – pension funds, insurance companies and sovereign wealth funds – have to safeguard the pensions and assets of future generations. Aligning investment portfolios in accordance with the objectives of the Paris Agreement offers both the lowest risk and the highest potential for maximising financial returns, acting in the best interest of their beneficiaries. Asset owners should in particular reduce exposure to fossil fuels, notably coal, and seize the opportunities provided by renewable energy as a first step toward aligning their entire portfolio with the Paris Agreement.

³² Climate Action Tracker (2015), The Coal Gap: planned coal-fired power plants inconsistent with 2°C and threaten achievement of INDCs.

³³ UNFCCC, Paris Agreement, Article 2c.

³⁴ Mercer (2015), Investing in a time of climate change. It should be noted that this study looks primarily at Strategic Asset Allocation.

³⁵ London School of Economics (2016), Climate value at risk of global financial assets.

³⁶ University of Cambridge (2015), Unhedgeable risk.

³⁷ Economist Intelligence Unit (2015), The cost of inaction.

³⁸ Carney Mark (2016), Resolving the climate paradox, Speech at the Arthur Burns Memorial Lecture, Berlin.

³⁹ Carbon Tracker Initiative (2016), Chasing the Dragon? China’s coal overcapacity crisis and what it means for investors; Carney (2016), Breaking the tragedy of the horizon – climate change and financial stability.

⁴⁰ Mercer (2015), Investing in a time of climate change. The study covers four climate scenarios: transformation (2°C scenario), coordination (3°C scenario), fragmentation with lower damages (4°C scenario), fragmentation with higher damages (4°C scenario with higher economic damages). Specifically, the study finds that the average annual returns from the coal sub-sector could be eroded by between 26% and 138%, while renewable energy could see average annual returns increase by 4% to 97% depending on the climate scenario.

INVESTORS AND FINANCIAL REGULATORS RESPOND TO CLIMATE CHANGE

AT LEAST 20 ASSET OWNERS HAVE PUBLICLY COMMITTED TO DIVEST OR REDUCE EXPOSURE TO THE COAL SECTOR, AND OFTEN COMMITTED TO INCREASE INVESTMENTS IN RENEWABLE ENERGY

A growing number of asset owners recognise the potential of climate-related financial risk, and have started to act accordingly. At least 20 asset owners have, for instance, publicly committed to divest or reduce exposure to the coal sector⁴¹ – in many cases combined with commitments to increase investments in renewable energy.⁴²

The mounting evidence of potential climate-related financial risks has also sparked a number of high-level policy initiatives:

- **At the international level, in 2015 the G20 established the FSB Task Force on Climate-related Financial Disclosures (TCFD).** Its 2016 draft recommendations aim at harmonising industry-wide, consistent climate-related financial information from, and for, actors across the investment chain. This indicates a growing consensus that forward-looking investors should carefully assess the climate-related risks and opportunities in their portfolio. In turn, this requires a growing understanding about which asset classes (public equity, fixed income, real estate, etc.), sectors and companies are most at risk from climate change, analysing the risks and opportunities that the transition to the low carbon economy provide, and adapting investment strategies accordingly.
- **At the European level, a High-Level Expert Group on sustainable finance** has been set up by the European Commission and is mandated to propose an EU sustainable finance strategy; climate change is one of the most prominent issues on its agenda.⁴³ This expert group will publish an interim report in July 2017 and provide final recommendations in December 2017.
- **Also in Europe, several EU regulations** (Institutions for Occupational Retirement Provisions Directive, Non-Financial Reporting Directive, Shareholder Rights Directive, Accounting Directive) already or will, once transposed, require investors to disclose material environmental, social and governance (ESG) information covering their impacts and their engagement policy.
- **At country level, Article 173 of the French energy transition law** for example requires institutional investors to report on the risks induced by climate change, their contribution to the international goal of limiting climate change, and their contribution to the realisation of the ecological and energy transition. A similar piece of legislation is being considered by California for public pension funds.

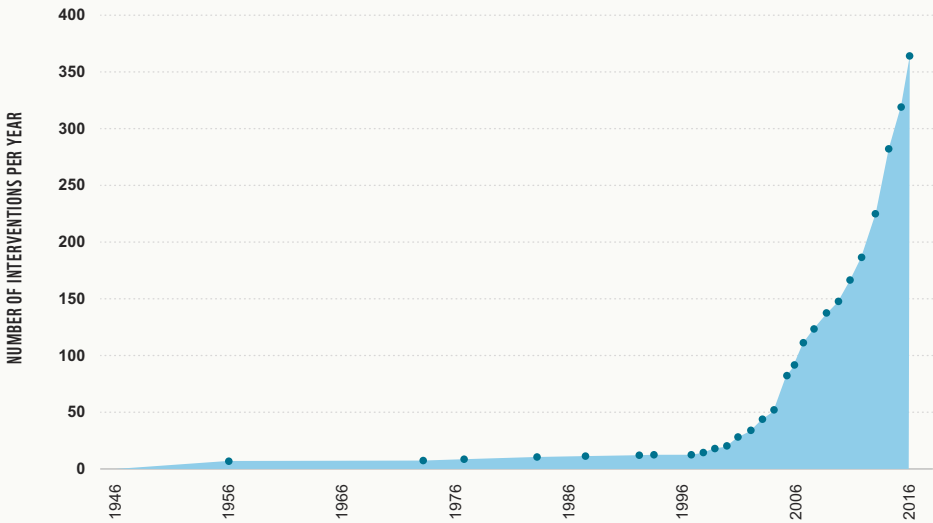
⁴¹ By alphabetical order: Allianz, Aviva, AP2, AP4, Axa, Caisse des Depots, CalPERS, CalSTRS, CNP Assurances, Government Pension Fund Global, HESTA, Imarinen, KLP Bank, Local Government Super, P+ (JOP/DIP), Pensam, PGGM/PFZW, PKA, Skandia Liv, Storebrand, SWIP, etc.

⁴² By alphabetical order: Axa, Aviva, Allianz, CNP, Ilmarinen, KLP, Local Government Super, P+ (JOP/DIP), PKA, PGGM/PFZW, etc.

⁴³ Pascal Canfin, CEO of WWF France, is a member of the EU High Level Expert Group.

Figure 4 below indicates that the initiatives presented above are part of a more general increase in responsible investment policy interventions, as tracked by PRI, the organisation that supports the UN Principles for Responsible Investment. WWF expects that more policy and regulatory initiatives and/or requirements are to come on climate-related financial issues.

FIGURE 4. NUMBER OF RESPONSIBLE INVESTMENT POLICY INTERVENTIONS PER YEAR
PRI responsible investment regulation database



WWF'S OBJECTIVE: AIM FOR WELL BELOW 2°C ALIGNMENT

The increasing commitments by financial regulators and asset owners are praiseworthy, but do not yet reflect the pace and scale of effort needed to decrease the pressure that human activities pose on the planet: all the major environmental indicators, including those related to climate change, reflect a progressive decline and deterioration.⁴⁴

To contribute to investors' efforts on capital reallocation, WWF intends to inform and further stimulate the growing conversation about how the largest European asset owners' investment portfolios are aligned with the Paris climate goals. WWF intends to promote this research widely and extend its coverage to more sectors and asset classes.

WWF is committed to drive the conversation between asset owners and financial regulators, and other market participants, towards the investment strategies and financial policies that will deliver a well below 2°C / 1.5°C transition.

⁴⁴ WWF (2016), Living Planet Report.



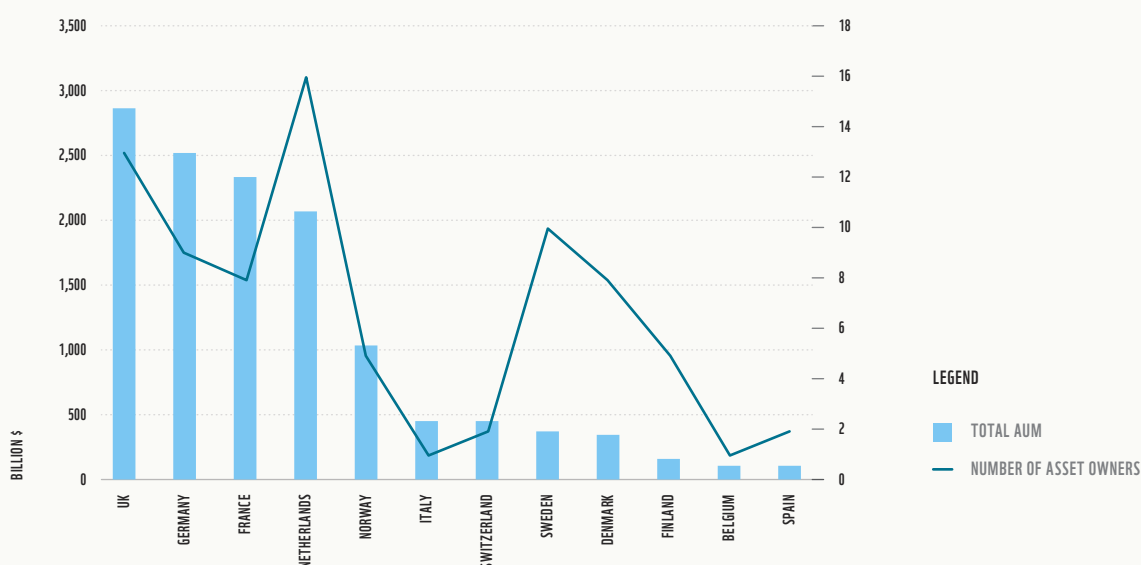
Over a ten year period the average annual return from the coal sub-sector could be reduced by a quarter, or even turn out to be negative in absolute terms (Mercer).

RESEARCH STEPS: EQUITY HOLDINGS

IDENTIFICATION AND METHODOLOGY

WWF has engaged with 80 of the 100 largest European asset owners in 12 countries – defined in this study as pension funds, insurance companies and sovereign wealth funds.

FIGURE 5. DISTRIBUTION BY COUNTRY OF ASSET OWNERS THAT WWF HAS ENGAGED WITH IN THIS RESEARCH
by number and by aggregated Asset Under Management - AUM



Collecting equity holdings data: the barrier of lack of disclosure

Assessing the alignment of asset owners' equity portfolios against the objectives of the Paris Agreement, which are rooted in climate science, requires the collection of the relevant equity holdings data and employing a methodology to analyse that data.

Having access to robust holdings data is crucial to assess the alignment of the equity portfolios with a 2°C target. The availability of equity holdings data is limited, however, due to generally sparse disclosure from the majority of asset owners covered in this research. The approach taken for the collection of equity holdings data was informed by the level of disclosure by the asset owners.⁴⁵

WWF has identified 23 asset owners in 5 countries (Denmark, Finland, Netherlands, Norway, Sweden) that make their public equity holdings public on their website.⁴⁶ WWF took the most recent reporting available at the time of the research as the starting point.⁴⁷ Asset owners were provided an opportunity to correct and update the holdings data, in order to obtain the best possible data and therefore most meaningful research findings.⁴⁸

For the asset owners that do not make equity holdings public on their website, WWF relied on bilateral contacts to obtain the relevant data.⁴⁹ Research results obtained on the basis of this outreach were only included in the study if authorized by the asset owners.

The lack of disclosure has restricted the extent to which WWF has been able to present full research findings in this report. There were many asset owners for which WWF could not publish assessment findings due to the unavailability of accurate equity holdings data, or because of the asset owners' preference to not make assessment findings public.

The SEIM tool and IEA scenarios: current status and planned developments

The characteristics of the SEIM assessment tool are set out in Section 2. The tool generates a science-based, forward-looking scenario analysis of public equity portfolios, based on actual capacity and production plans by company (e.g. tonnes of coal mined per annum and megawatts of coal/renewable power capacity), using physical asset level data (e.g. the Globaldata database for the power sector).

The key elements of the SEIM methodology that enable the assessment of the alignment of public equity portfolios with the IEA 2°C benchmark are as follows:⁵⁰

- **Roadmap translation:** the framework starts with the quantitative targets set in the 2°C scenario and energy technology roadmaps of the IEA. These targets are adapted to stock markets to reflect the role of listed companies in the deployment of technologies and the production of energy in different geographies.
- **Energy technology exposure:** the future exposure of listed companies to energy technologies is assessed on the basis of asset level data, i.e. granular (e.g. on plant level for the power sector) and forward looking (i.e. including capacity addition plans) data from industry-specific databases.

⁴⁵ See Annex 2 for a detailed description of the equity holdings research.

⁴⁶ ABP/APG, Alecta, AP Fonden 1, AP Fonden 2, AP Fonden 3, AP Fonden 4, AP Fonden 7, ATP, Danica Pension, Elo Mutual Pension Insurance, Government Pension Fund Global (GPF), Government Pension Fund Norway (GPFN), Ilmarinen, Industriens Pension, Keva, PensionDanmark, PFA Pension, PEZW/PGGM, PKA, Sampension, State Pension, Varma. In addition, Greater Manchester pension fund discloses its holdings but includes a disclaimer that reproduction or use is not permitted without the express prior written consent of the copyright holder. The disclosure focuses essentially on internally managed portfolios, which is the focus of this research.

⁴⁷ In order to get the holdings in the necessary format to perform the 2°C alignment assessment, WWF has in many cases attempted to retrieve unique identifiers for every security (ISIN codes); this additional step in the research adds a margin of error to the results.

⁴⁸ More details on the holdings that were included in the data can be found in Annex 2.

⁴⁹ WWF contracted expert support (Cary Krosinsky: Yale University teacher, lead consultant to PRI's Climate Change Asset Owner Project and to the UNEP Inquiry, co-founder of Carbon Tracker Initiative) to undertake in-depth research of the available equity holdings data through public sources for each of these asset owners. This data served to support outreach and facilitate the asset owner dialogue: due to the complex nature of institutional ownership it was not possible to collect robust data for all asset owners, and the results of this research could therefore not be used for several asset owners.

⁵⁰ See Annex 2 for further details on the SEIM methodology.

- **Gap analysis:** the exposure of a given portfolio to these technologies is compared to the exposure of the IEA 2°C scenario for 2020 benchmark portfolio, generating indicators of under-exposure and over-exposure in terms of percentage points. For coal, under-exposure signifies alignment, over-exposure signifies misalignment and vice versa for renewables.

The SEIM methodology is currently available for technologies in the power sector (coal, gas, nuclear, hydro, renewables), fossil fuel extraction sector (oil and gas, coal mining) and automotive sector (ICE, electric, hybrid) and will be expanded to cement, steel, aviation and shipping in the course of 2017. This report only presents findings for coal mining, coal power and renewable power, perceived as the first key areas for aligning investment portfolios with climate targets.

**Climate alignment
assessment: calculation
details and results**

The SEIM tool currently compares the exposure of a public equity portfolio to its share of the IEA 2°C scenario for a given technology, generating indicators of alignment and misalignment with this scenario in terms of percentage points (see Section 2 as well). For example:

- Technology exposure for 2020 for coal power is expressed as the power capacity (in megawatt) that is held in the investment portfolio. It is then compared with the IEA 2°C benchmark, that reflects the production of a portfolio with the same size (in terms of total power capacity) that does its 'fair share'. Fair share means:
 - For declining technologies (coal): reduce the technology capacity at the same rate as required by the 2°C scenario.
 - For expanding technologies (renewables): build out the same percentage of total power capacity as required by the 2°C scenario.
- The alignment percentage figures use the benchmark as denominator, i.e. if an asset owner is projected to have ownership in companies operating or planning 1100 megawatt of coal-power capacity in its portfolio in 2020, while it should only hold 1000 megawatt of coal-power capacity under a 2°C decarbonisation pathway, it is considered to be 10% misaligned with the 2°C benchmark. Conversely, if an asset owner is projected to have ownership in companies operating or planning 800 megawatt of coal-power capacity in its portfolio in 2020, it is considered to align with the 2°C benchmark and have 20% better results.

**What the SEIM
methodology does and
does not do**

As with any tool, the SEIM methodology is developed for a specific purpose and scope, and explores a new field of analysis. When considering the research findings in this report, this needs to be borne in mind.

The SEIM methodology does not cover all asset classes

The SEIM climate alignment assessment is currently limited to **public equity**. The efforts of asset owners that have invested in alternative asset classes (e.g. renewable energy infrastructure) are therefore not reflected in the results. Also, the report's findings may be less relevant for asset owners whose strategic asset allocation is dominated by fixed income. In the course of 2017 SEIM will enable 2°C alignment assessment of **corporate fixed income** as well.

The geographic scope of the SEIM methodology is limited to OECD companies

Current results are focused on **companies listed in the MSCI World universe (which reflects approximately the OECD countries) and their production within the OECD countries only**. Expansion is planned in the course of 2017 to cover companies across the globe. This will enable future analysis to include important companies based in non-OECD countries and regions (e.g. China, India, South-East Asia, South Africa).

The time horizon of the SEIM assessment is limited to 2020

While the IEA 2°C scenario provides decarbonisation pathways with a 25 year time horizon (to 2040), the quality of data provided by companies for their future investments **does not allow meaningful projections beyond 5 years**. For that reason, the SEIM assessment is currently assessing companies' planned alignment with the IEA 2°C benchmark to 2020.

It is important to note that in the IEA 2°C scenario, CO₂ emissions will need to be reduced at a faster rate beyond 2020 than before, and that a portfolio's alignment with the IEA 2°C benchmark for 2020 does not guarantee that the alignment will persist beyond 2020.

The IEA 2°C scenario can be challenged

The IEA 450 scenario⁵¹ (2°C scenario), which the SEIM methodology translates to listed companies, is built as follows: it adopts a specified outcome (necessary action in the energy sector to limit the rise in long-term average global temperature to 2°C) and offers steps by which that goal might be achieved. It focuses on key technologies, including stronger deployment of energy efficiency and renewable energies, significant additional nuclear capacity and rapid carbon capture and storage (CCS) expansion after 2025. The pace of development of each technology is measured in physical units (gigawatt of power capacity, number of electric vehicles, etc) and organised by milestone (every 5 year) and by key geography (EU, US, China, etc). The time horizon is 2040.

This IEA scenario shows shortcomings in three respects:

- **It only provides a 50% probability of limiting global warming to 2°C** – while the IPCC 2°C scenario provides a 66% probability – and is not a 'well below 2°C' or 1.5°C scenario.
- **Its forecasts on the deployment of nuclear energy and of CCS for fossil fuel fired power and high-carbon industries are quite bullish compared to existing developments.**⁵² Moreover, the IEA has been criticised for having systematically underestimated the growth rate of renewable energy and energy efficiency technologies.⁵³
- **It does not ensure that renewable energy technologies of biomass, biofuels and hydropower are conditioned to sustainability criteria that in WWF's view are necessary to avoid counter-productive impacts**, and for which further expansion should be considered with great care.

⁵¹ IEA (2016), World Energy Outlook 2016.

⁵² See for example Grattan Institute (2017), The challenges for CCS.

⁵³ Bloomberg (2015), IEA to lift solar wind outlook after decade of underestimates.

The SEIM methodology is designed to be scenario independent: it is flexible and allows the use of any other climate scenarios, for example either 2°C or 1.5°C benchmarks. At the moment, however, there are no other scenarios which present the required level of granularity in terms of data points. The IEA and IPCC are developing a 1.5°C scenario that will become available in 2017 and 2018 respectively: these could be integrated into the SEIM model once they become available. WWF will encourage asset owners to test their investment portfolios in accordance with the best science available at the time, as stated in the Paris Agreement.

The geographic scope of asset owners' portfolios varies

WWF is using the SEIM to compare the alignment of the 100 largest European asset owners, whose portfolios can have different geographic allocations – for example some asset owners may be more heavily invested in their domestic markets than others. This can limit the immediate relevance of comparing different asset owners. However, WWF believes that whatever the geographic mix of an asset owner, assessing the level of alignment of its portfolio and aligning the portfolio with the 2°C target – remains appropriate.

WWF assessment

Results from the SEIM climate alignment assessments should be considered as a first attempt to give an indication of how companies and sectors in an equity portfolio perform compared to a specific 2°C scenario.

The SEIM climate alignment assessments should be interpreted with care:

- Alignment with the IEA 2°C benchmark for coal mining, coal power and renewable power technologies does not imply that asset owners' public equity portfolios are aligned for other key technologies. For example, results for the oil & gas or the automotive sectors – covered by the SEIM tool but not included in this report – typically show a much weaker alignment of portfolios with the IEA 2°C scenario, and asset owners that are leading in one technology may be lagging behind in other areas.
- The IEA 2°C benchmark should, due to inherent limitations explained in Section 7-3, be considered to reflect a minimum level of ambition in terms of 2°C alignment. It is not a 'well below 2°C' / 1.5°C benchmark as per the Paris Agreement.
- An alignment by 2020 is no guarantee for continued alignment beyond that date, unless further measures are taken to maintain the decarbonisation at a speed and scale which is consistent with science-based scenarios.

In light of the above, whilst alignment with the IEA 2°C benchmark is creditable, it does not mean that the job is done. Even with a portfolio well-aligned to a 2020 scenario, an asset owner should continue to consider how to maintain that alignment beyond 2020, in a continuous transition towards 2050. **WWF encourages asset owners to accelerate the development of their investment policies** so that they become gradually aligned with the 2°C climate scenario, ultimately aiming for 1.5°C alignment. In many cases, especially beyond the asset owners who engaged in this research, that may mean the start of such a journey. **Recent scientific analyses clearly indicate that, to reach the objectives of the Paris Agreement, asset owners will need to do significantly better than aligning with the IEA 2°C benchmark⁵⁴.**

⁵⁴ For example on coal: ClimateAnalytics (2016), Implication of the Paris Agreement for coal use in the power sector. The key finding of this research is that to reach the objectives of the Paris Agreement under a least-cost strategy, the EU and the OECD would need to phase out coal by 2030, China by 2040 and the rest of the world by 2050 – which is far more stringent than the coal pathway factored into the IEA 2°C scenario.

WWF believes that the SEIM methodology is a highly relevant and valuable tool to drive a discussion on what investment strategies and policies will actually deliver a well below 2°C transition. It responds to the need identified by the TCFD to use climate scenario analysis and forward-looking methodologies that are based on current and future plans for every company. WWF encourages and welcomes the development of additional tools that can complement or offer alternative ways to reach the same goal, which is alignment with science-based targets.

Also, the decision to focus on climate alignment based on the evolving mix of technologies does not imply a disregard for financial risk assessments on climate-related value at risk, identified by the TCFD as another key feature of climate change assessments. Such approaches are crucial to understand the magnitude of risks (and opportunities) embedded in investment portfolios under different emission trajectories, and are fully complementary to climate alignment assessments.



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ANNEX 1: LIST OF 80 EUROPEAN ASSET OWNERS CONTACTED BY WWF

As made clear, WWF wishes to drive the conversation between asset owners, regulators and others towards the investment strategies and policies that will actually deliver a well below 2°C transition.

At the time of publication, WWF has engaged with 80 of the 100 largest asset owners in 12 European countries.⁵⁵ It has not engaged with:

- 6 Swiss asset owners that are part of the 100 largest European ones, in order not to interfere with the ongoing work of the Swiss Federal Office for the Environment (FOEN) and the State Secretariat for International Financial Matters (SIF). All Swiss pension funds and insurances are encouraged and provided the opportunity to assess the alignment of their portfolio with the 2°C objective. The aggregated results will be published in autumn 2017.
- 14 UK pension funds, given the large number of asset owners in the UK (27) in the 100 largest European group, and WWF's need to prioritise our efforts.

The names of asset owners for which SEIM assessments were published in this study are indicated in black. WWF encourages other asset owners to get in touch in case they are interested to undertake the SEIM assessment.

ANNEX TABLE 1. LIST OF 80 EUROPEAN ASSET OWNERS CONTACTED BY WWF

INVESTOR NAME	COUNTRY	TYPE
ABN AMRO	Netherlands	Pension Fund (of a bank)
ABP / APG	Netherlands	Pension Fund
Aegon Group	Netherlands	Insurance
Ageas	Belgium	Insurance
Alecta	Sweden	Pension Fund
Allianz Group	Germany	Insurance
AMF Pension	Sweden	Pension Fund
AP Fonden 1	Sweden	Pension Fund (sovereign)
AP Fonden 2	Sweden	Pension Fund (sovereign)
AP Fonden 3	Sweden	Pension Fund (sovereign)
AP Fonden 4	Sweden	Pension Fund (sovereign)
AP Fonden 7	Sweden	Pension Fund (sovereign)
ATP	Denmark	Pension Fund
Aviva	UK	Insurance
AXA Group	France	Insurance
BASF	Germany	Pension Fund (corporate)
Bayerische Versorgungskammer	Germany	Pension Fund (sovereign)
BT Group	UK	Pension Fund (corporate)
BVV	Germany	Pension Fund (corporate)
Caisse des dépôts	France	Sovereign Wealth Fund
CNP Assurances	France	Insurance
Covea Group	France	Insurance
DanicaPension	Denmark	Pension Fund (of a bank)
Delta Lloyd	Netherlands	Insurance

⁵⁵ Sources: Willis Towers Watson (2016), World 500 largest asset managers in 2015; Willis Towers Watson (2016), 300 largest pension funds in 2015.

INVESTOR NAME	COUNTRY	TYPE
DNB	Norway	Pension Fund (of a bank)
Elo Mutual Pension Insurance	Finland	Pension Fund
ERAFP	France	Pension Fund (sovereign)
Folksam	Sweden	Insurance
Fondo de Reserva Seguridad Social	Spain	Pension Fund (sovereign)
FRR	France	Pension Fund (sovereign)
Generali Group	Italy	Insurance
Government Pension Fund Global (GPFG)	Norway	Sovereign Wealth Fund
Government Pension Fund Norway (GPFN)	Norway	Sovereign Wealth Fund
Greater Manchester (GMPF)	UK	Pension Fund (sovereign)
Groupama France	France	Insurance
HSBC Bank	UK	Pension Fund (of a bank)
Ilmarinen	Finland	Pension Fund
Industriens Pension	Denmark	Pension Fund
ING Pensioenfonds	Netherlands	Pension Fund (of a bank)
Keva	Finland	Pension Fund
Kommunal Landspensjonskasse (KLP)	Norway	Insurance
Legal & General Group	UK	Insurance
Mapfre	Spain	Insurance
Munich RE	Germany	Insurance
Natixis Insurance	France	Insurance (of a bank)
NN Group	Netherlands	Insurance
Nordea Liv & Pension	Sweden	Pension Fund (of a bank)
Nürnbergger	Germany	Insurance
Old Mutual	UK	Insurance
Pearl Group	UK	Insurance
Pensam	Denmark	Pension Fund
Pensioenfonds Metaal en Techniek (PMT)	Netherlands	Pension Fund
Pensioenfonds PGB	Netherlands	Pension Fund
Pensioenfonds Vervoer	Netherlands	Pension Fund
Pensioenfonds voor de Bouw (bpfBOUW)	Netherlands	Pension Fund
Pension Protection Fund	UK	Pension Fund
PensionDanmark	Denmark	Pension Fund
PFA Pension	Denmark	Pension Fund
PFZW / PGGM	Netherlands	Pension Fund
Philips	Netherlands	Pension Fund (corporate)
PKA	Denmark	Pension Fund
PME	Netherlands	Pension Fund
Rabobank	Netherlands	Pension Fund (of a bank)
Railway Pensions	UK	Pension Fund (corporate)
Royal Dutch Shell	Netherlands	Pension Fund (corporate)
Royal London Group	UK	Insurance
Sampension	Denmark	Pension Fund
SkandiaLiv	Sweden	Insurance
Standard Life	UK	Insurance
State Pension	Finland	Pension Fund (sovereign)
Storebrand	Norway	Insurance
Swiss Re	Switzerland	Insurance
Syntrus Achmea	Netherlands	Insurance
Talanx Group	Germany	Insurance
Unilever	UK	Pension Fund (corporate)
Universities Superannuation	UK	Pension Fund
Varma	Finland	Pension Fund
VBL (Versorgungsanstalt des Bundes und der Länder)	Germany	Pension Fund (sovereign)
Versicherungskammer Bayern	Germany	Insurance
Zurich Insurance Group	Switzerland	Insurance

ANNEX 2: RESEARCH METHODOLOGY

The research aims to identify how the public equity holdings of the selected largest European asset owners are aligned with the internationally agreed target to keep global warming below 2°C for three key high carbon and low carbon technologies: coal mining, coal power and renewable power.

The following steps were undertaken in order to reach the overarching objective:

- Identification and selection of asset owners.
- Choice and use of methodology: 2°C assessment using the Sustainable Energy Investment Metrics (SEIM) tool.
- Research on asset owners that make equity holdings public on their websites.
- Research on asset owners that do not make equity holdings public on their websites.
- Presentation of results.

Identification and selection of asset owners	<p>A first step in the research consisted in identifying the largest European asset owners:</p> <ul style="list-style-type: none"> • Asset owners were defined as pension funds, insurance companies and sovereign wealth funds. • European pension funds and sovereign wealth funds were selected from the Willis Towers Watson World 300 largest pension funds in 2015. European insurance companies were added from the Willis Towers Watson World 500 largest asset managers in 2015. This list was consolidated by using the list of the 500 largest asset owners compiled by the Asset Owner Disclosure Project (AODP). • WWF selected the 100 largest asset owners across the 12 main European countries asset-wise: Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and UK. • WWF finally entered into a dialogue with a total of 80 asset owners (see the full list Annex 1). • A column ‘country’ was created to indicate the headquarters of the asset owner. • A column ‘type’ was created to divide asset owners into 7 categories: foundation, insurance, pension fund, pension fund (of company), pension fund (of bank), pension fund (sovereign), sovereign wealth fund.
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**Methodology:
2°C assessment using
the SEIM tool**

The Sustainable Energy Investment Metrics partners

WWF used the methodology developed by the Sustainable Energy Investment Metrics (SEIM) research consortium⁵⁶. The SEIM consortium comprises eight organisations: 2° Investing Initiative (think tank, lead organisation of the consortium), Frankfurt School of Finance & Management (university), Zurich University, CIRED (research centre), Kepler Cheuvreux (broker), CDP (formerly Carbon Disclosure Project,) Climate Bonds Initiative (think tank) and WWF.

The SEIM methodology delivers a science-based, forward-looking assessment of the ‘climate alignment’ of investment portfolios for key high carbon and low carbon technologies. The SEIM methodology is currently available for technologies in the power sector (coal, oil, gas, nuclear and renewables), fossil fuel extraction sectors (oil and gas; coal mining) and the automotive sector (ICE, electric, and hybrid). For these technologies, asset level data from industry databases has been aggregated to the level of listed parent companies and linked to identifiers (i.e. ISIN codes): this, in turn, allows identifying the energy technology exposure of an equity portfolio to the 2°C benchmark. The SEIM methodology will ultimately apply as well to cement, steel, aviation and shipping. These eight sectors represent more than 80% of emissions in an investment portfolio.

Use of the SEIM methodology

WWF used the SEIM methodology for research focusing on three technologies: coal power, coal mining and renewable energy power.

As the figure above indicates, the software set up to run the SEIM climate alignment assessment requires equity holdings data for all the relevant listed companies as an input. WWF employed a differentiated approach depending on the equity holdings data that it could obtain from the target group of asset owners:

- Asset owners that make their equity holdings public on their websites.
- Asset owners that do not do this.

⁵⁶ See SEIMmetrics.org.

Asset owners that make equity holdings public on their websites

Equity holdings collection

WWF identified 23 asset owners that make their holdings public on their websites, headquartered in five countries (Denmark, Finland, Netherlands, Norway, Sweden): ABP / APG, Alecta, AP Fonden 1, AP Fonden 2, AP Fonden 3, AP Fonden 4, AP Fonden 7, ATP, Danica Pension, Elo Mutual Pension Insurance, Government Pension Fund Global (GPFNG Norway), Government Pension Fund Norway (GPFN), Ilmarinen, Industriens Pension, Keva, Pensam, PFZW / PGGM, PensionDanmark, PFA Pension, PKA, Sampension, State Pension and Varma. In addition, Greater Manchester pension fund discloses its holdings but includes a disclaimer that reproduction or use is not permitted without the express prior written consent of the copyright holder: such consent was not provided upon request by WWF

WWF collected the most recent available data from the websites of these asset owners, and transferred the full equity portfolios to an excel file. From that list, the equity holdings for which the asset owner directly reported information at company level were retained.

The equity portfolios were put into the format allowing benchmarking against the 2°C benchmark using the SEIM methodology. This format required the following information:

- ISIN code;
- Company name;
- Number of shares held in company;
- Portfolio name;
- Investor name;
- Portfolio date;
- Total portfolio size in the base currency;
- Base currency.

The company name, investor/portfolio name, portfolio date, and base currency were provided in the reporting of all these asset owners. One or more of the remaining elements required further research, an explanation for which is provided below.

ISIN codes

- The names of the companies in the asset owners' equity portfolio were compared to the company names of the 62,612 listed companies included the Industry Classification Benchmark⁵⁷ (ICB, as of 19 October 2016), of which a large number (12,708) was already matched to ISIN codes.
- The data software Iugum was used to perform the matching on the basis of company names. This software allows comparing company names by applying a percentage of similarity between the names: in this case a 50% similarity threshold was applied. Perfect fits (i.e. 100% similarity) were matched directly, while equity portfolio companies whose names showed a 50% to 99% similarity to companies from the ICB sector classifications were double-checked individually through the programme.

⁵⁷ ICB, ICB benchmark.

- For some companies in the asset owners' equity portfolios the research above did not result in a matching ISIN code to the company name in question. This occurred in three instances: (1) the name of the equity portfolio company did not show a 50% or more similarity with a company name from the ICB sector classification; (2) the company name of the equity portfolio company showed a 50% to 99% similarity with one or more company names from the ICB sector classification, but turned out to not be the same company after double-checking through the Iugum software; (3) the name of the equity portfolio company corresponded to a company name from the ICB sector classification, but it was not yet matched to an ISIN code in that database. For each company in one of the three cases above, a manual research for the ISIN code was undertaken in the Bloomberg Financial Terminal.
- This research allowed obtaining ISIN codes for the vast majority ($\geq 90\%$) of the companies in the asset owners' equity portfolios.

Number of shares held:

- If asset owners did not report number of shares held in companies, they generally did report the value of the equity held in that company at a certain point in time.
- If this case, WWF recovered the share value for all companies in the equity portfolio at the relevant point-in-time through the Bloomberg Financial Terminal – either by extracting it to Excel from the terminal on the basis of the company's ISIN code, or by importing the equity portfolio into the terminal and applying the PORT function.
- For each of the companies in the asset owner's equity portfolio, WWF divided the total value of the shares held at the relevant point-in-time by the share value at the same point-in-time in order to obtain the number of shares held by the asset owner.
- For example: if an asset owner owned equity in company X for a total value \$100 on 31 December 2016, and the value of one share in that company at that point-in-time (i.e. 31 December 2016) was \$10, the asset owner can be considered to have held 10 shares in that companies at that point-in-time (i.e. $100/10 = 10$).
- This research meant that the number of shares held could be determined for the vast majority ($\geq 90\%$) of the companies in the asset owners' equity portfolios.

Total portfolio size in the base currency:

- The total portfolio size was obtained by adding up the value of shares held by the asset owner in each of the companies in its equity portfolio.
- The total portfolio size used may differ from the total portfolio size in the asset owners' own reporting for two reasons. Firstly, it was not always possible to obtain the required information (ISIN codes and/or number of shares) for all of the companies in the equity portfolio through the research steps explained above: variations between total portfolio size were generally no larger than 10%. Secondly, in some cases asset owners also reported equity holdings held through funds. For consistency, these funds holdings (which could be significant compared to the direct holdings included) were not included.

Outreach to asset owners for verification of equity holdings data

WWF shared the equity holdings data with the asset owners, who were given an opportunity to provide their most recent data.

Assessments were undertaken on the basis of the original or (if provided) updated data with the support of 2° Investing Initiative. The results of the SEIM climate alignment assessments for each portfolio were shared with the given asset owners.

It should be noted that the approach of taking the most recent available data, and allowing asset owners to provide updates, results in equity holdings from different points in time.

Asset owners that do not make equity holdings public on their websites

Outreach to asset owners

The lack of disclosure on the equity holdings by this group of asset owners means it was not possible to obtain the full equity portfolios of these institutions by means of our own research.

WWF therefore contacted these asset owners to obtain the relevant data. Two different approaches were used:

- Asset owners were asked to provide their full equity holdings in confidence to WWF or 2° Investing Initiative (with a Non-Disclosure Agreement if required). This approach enabled the full SEIM climate alignment assessment to be run.
- Provide the equity holdings of their portfolio in the SEIM company universe for coal power, coal mining and renewable power (see point 4.2 below). This approach allowed running the SEIM climate alignment assessment for these three sectors.

Equity holding research on basis of an SEIM company universe for coal power, coal mining and renewable power

Company universe delimitation

WWF decided to focus on identifying the asset owners' equity holdings in the companies relevant to the scope of the research: coal mining, coal power and renewable power.

WWF isolated the relevant listed parent companies for the relevant technologies, in close cooperation with 2° Investing Initiative:

- Listed companies that have power production capacity: the asset level data are sourced from the Globaldata database. The IEA roadmaps used for the SEIM methodology cover power production across the globe, and the translation of these roadmaps therefore needs to cover all listed companies that have power production assets globally: this resulted in a large number of companies (approx. 1500), and also explains the fact that the universe contains companies that are not traditional power utilities in industry classifications (e.g. electric utilities in the Industry Classification Benchmark or Global Industry Classification Standard) but that do own power production assets.

- Listed companies that are active in coal mining: the number of listed companies (approx. 100) in this sector is much smaller than for power production. The companies were identified using a combination of sources (Carbon Underground, Bloomberg financial terminal, Oxford Smith School Programme on Stranded Assets, Profundo).

The result of the above research was a universe of approximately 1600 companies, constituting the 'SEIM company universe' for coal mining, coal power and renewable power.

Equity holding collection

The SEIM company universe for coal mining, coal power and renewable power was used as the basis for the equity holdings research. This research was undertaken by Cary Krosinsky (Investor Watch).

The research provided those holdings that are directly attributable to the decision making centres of the targeted asset owners, and ensured quality control on these holdings.

Factset was the primary source, but Thomson Reuters and Bloomberg financial terminals were used as alternative sources. Data sources also include UK Share Registers, Mutual Funds and their equivalent portfolio vehicles across Europe (such as SICAV and FCP in France, UK Unit and Investment Trusts, ETFs, etc.). The ultimate source was Investor Watch, with all of the holdings going through a quality control, multiple source process, meaning that no one source can be considered the only source of this information.

Given the nature of institutional ownership, regional decision making, points in time nature of disclosure and varying disclosure regimes, snapshots in time are the best available view of institutional holdings that could be obtained.

The data that were gathered from multiple sources were rolled up into a single institutional perspective. Quality control steps were taken to ensure that the holdings are as accurate as can be ascertained in such a snapshot, but it is important to recognize that such disclosures are made on a delayed basis, and buy/sell decisions mean that actual real-time holdings will have partly changed.

However, it is important to note that historical perspectives are available, which helped validate the consistency of institutional decisions and positions held over time and further validate the authenticity of the holdings.

The collected holdings represent best efforts using all possible techniques across public sourcing and quality checks, but global institutional ownership is complex given the lack of consistency in disclosure regime transparency and rules, as well as the point in time nature of the information by definition. Hence, the information is considered indicative.

Presentation of results

WWF chose to publish SEIM climate alignment assessment results that were considered to provide a meaningful reflection of the asset owners' exposures against the 2°C benchmark for coal mining, coal power and renewable power, provided that the asset owner agreed to publish the findings if equity holdings data were shared on a bilateral basis. This was considered the case for the asset owners that make equity holdings public on their website and the asset owners that agreed to make findings from the SEIM climate alignment assessment public after bilateral engagement with WWF.



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Over a ten year period renewable energy could see average annual returns increase modestly, or nearly double, depending on the climate scenario (Mercer).

100%
RECYCLED

EUROPEAN ASSET OWNERS: 2°C ALIGNMENT AND MISALIGNMENT OF PUBLIC EQUITY PORTFOLIOS

30 ASSET OWNERS

30 European asset owners
out of 80 have been assessed.

DISCLOSURE

Lack of disclosure poses
difficulties in assessing 2°C
alignment of portfolios.



ALIGNMENT

Almost all asset owners
surveyed are aligned with
IEA 2°C benchmark for
coal mining.

MISALIGNMENT

Almost half of equity portfolios
are misaligned with IEA 2°C
benchmark for coal power and
renewable power.



Why we are here

To stop the degradation of the planet's natural environment and
to build a future in which humans live in harmony with nature.

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