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# Climate Transition Whitepaper

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## **Welcome to CAMRADATA's Climate Transition Whitepaper**

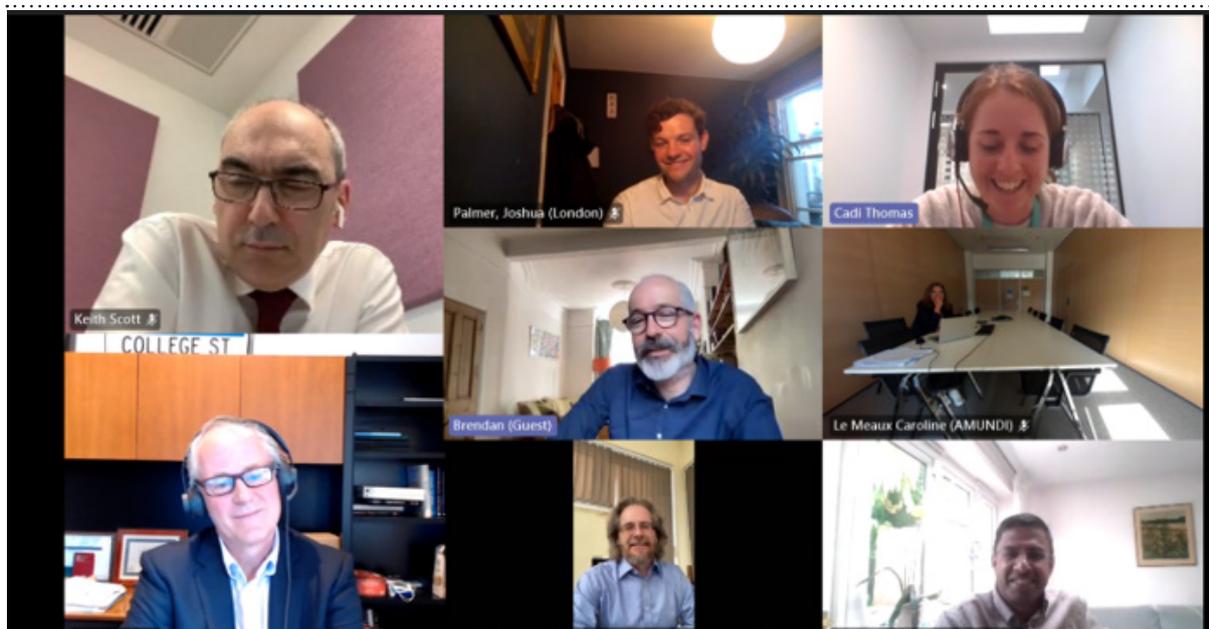
One arresting feature of climate change is that it is non-linear. This means that gradual decarbonisation will not necessarily have a gradual change on temperature, ocean acidification, glacier shrinkage etc. Instead, new conditions will arise that may be unstable while the environment adapts after a tipping-point. Such volatility and uncertainty can get lost in the constant references to a 1.5 degree or 2 degree rise in average global temperatures. This CAMRADATA whitepaper will look at the complications of climate transition and ask investors how their portfolios are designed to meet the challenges ahead. If climate change really is going to require the greatest revolution in human behaviour ever, then where are the revolutionary entrepreneurs and financiers to back them? Where are the opportunities should unstable environments become common and humanity has to adapt to further hostile conditions?

Such doubts have previously been masked or ignored by other conditions. The last decade was a honeymoon for responsible investing in which pension funds and insurers could earn handsome returns from carbon-light tech stocks. Meanwhile, Oil & Gas as a sector was a lousy performer since the Global Financial Crisis: underweighting these companies did not hurt until recently. Now they have come back with a vengeance post-Covid, at a time when the manufacturing costs of renewables – like so many industrial processes – has risen on the back of supply bottlenecks and greater labour costs.

Much of the responsibility for steering humanity rests with political leaders. They play a vital role in transitioning society as is from unsustainable to sustainable ways of living. But companies and their shareholders also have plenty of cash to deploy on the right technologies. The coming decade will see whether government and capitalism work well together to minimise climate change.

# Climate Transition Roundtable

The CAMRADATA Climate Transition Roundtable took place virtually in London on 19th May 2022.



The resurgence of fossil fuel prices and the value of companies that produce them is a reminder that decarbonisation will not be a straight path. In the first quarter of this year alone, Oil & Gas as a sector of the S&P500 appreciated 39%. A very different story to the sector's weak performance over the previous decade, which spurred the development and implementation of Low-Carbon investment products.

Given the recent turnaround in the value of fossil-fuel companies, the CAMRADATA Climate Transition roundtable 2022 began by asking panellists whether they had raised or reviewed their exposure, or those of their clients, to the energy sector over the past 18 months.

Caroline LeMeaux, global head of ESG research, voting and engagement at Amundi, said that every portfolio manager was free to allocate as they saw fit within the firmwide ESG policy. This includes a commitment by Amundi last year to avoid the worst hydrocarbon producers [it will divest from those firms deriving more than 30% of revenue from unconventional methods such as tar sands]. LeMeaux said that commitment was being realised

***“Fanatical Low-Carbon tilts won’t get us where we need to go. They actually drive capital away from solutions.”***

this year regardless of market movements.

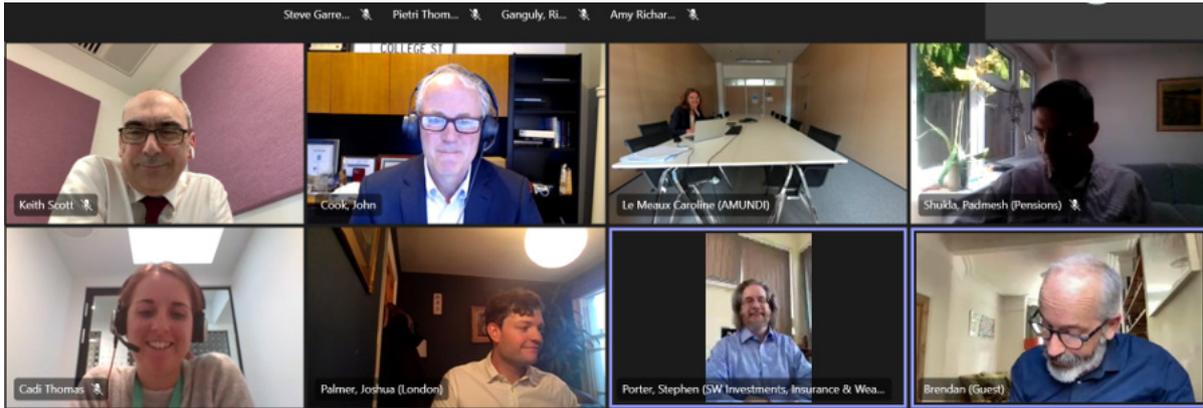
Keith Scott, an independent trustee to five UK pension plans, said that several had already opted for Low-Carbon-tilted strategies. Their exposure to energy had fallen in terms of allocation but due to market price increases in the energy sector overall, exposure had not changed dramatically. Stephen Porter, Responsible Investment Lead at Scottish Widows, gave a similar report. He said that as a universal owner, with a mixture of passive and active equity exposure, change to oil and gas was probably neutral in aggregate.

John Cook, portfolio manager of the Mackenzie Environmental Equities Strategy, said it doesn't invest in fossil fuel producers. However, he warned that there had to be greater capex not just in renewables but in fossil fuel companies too in order to achieve decarbonisation. “We believe the world needs some amount of oil and gas to transition smoothly,” he

said. “Fanatical Low-Carbon tilts won't get us where we need to go. They actually drive capital away from solutions.”

Padmesh Shukla, chief investment officer for the £14bn TFL Pension Fund, said that its exposure to fossil fuels, like many other pension funds, may have gone up marginally because of exceptional performance of the oil, gas and materials sector over the last 12 months and not because of any new allocation. The war in Ukraine has further exacerbated this trend. On the positive side, however, exposure continues to fall versus the Fund's benchmark, but commodities in general have been hugely diversifying and supportive in this inflationary period. “We have a Net-Zero commitment with a strong focus on engagement, and divestment as a last-resort strategy, with the exception of coal,” said Shukla.

Cadi Thomas, head of ESG at pension fund consultancy, Isio, made a similar point. “Our clients



*“We still have to figure out how to measure physical stress as business risk”*

don't typically take sector bets. The asset managers they appoint will usually focus on picking companies with good transition plans rather than complete disinvestment.”

Josh Palmer, head of sustainable credit research at WTW, a global investor consultancy and fiduciary manager, agreed that the focus was on issuers with credible transition plans. He noted that emissions in monitored portfolios had risen as the world economy reopened after Covid-19.

This had led to interesting conversations with credit managers. Palmer gave the example of one credit manager's portfolio in which 85% of emissions were created by just four companies. “What would happen if those four were excluded? The irony is that both quality and yield would have risen,” claimed Palmer. That is not the whole story, however. Assessing transition risk is complex and much depends on timescales. Palmer explained that one of the four was a transition play, a geothermic smelter in Iceland, supplying aluminium. So cheap energy and carbon-free energy but with extra shipping costs (the essential materials for aluminium such as bauxite are not found on Iceland).

**Missing Information**

The CAMRADATA panel was then asked which one set of data would most improve their working lives. LeMeaux said that so few issuers are transparent about their capex for green solutions and their location. “We need that to model their transition; we don't have that granularity on green,” she said.

Cook agreed that capex was at the heart of climate transition. He noted one irony: that the sell-side doesn't like capex discussions. “I remember one analyst covering the solar manufacturer, Jinko, accusing the company management of criminality for having spent more capex than budgeted. This is solar, an energy for a sustainable future.” Cook said that over the last decade, there has been an abhorrence of high capex as market pressure has been all about attracting shareholders with dividends and via buybacks.

He said that Mackenzie has data on green revenues and it can be useful to asset owners and advisers in trying to rate the firm's investment impact. He reckoned third-party data on green revenues were not so consistent. The remedy, according to Cook, would be the adoption of a common taxonomy.

Palmer's desired set of data regarded physical risk. “We know the climate transition is going to be expensive,” he said. “We need a baseline incorporating destructive weather patterns. It's hard to quantify these.” Palmer said that his team sees reports that are good on the likes of flood risk to property. “But these are based on historical information,” he qualified.

When challenged that there are plenty of scientific papers modelling climate change, Palmer responded that there is not yet enough cross-over into financial risk. “We still have to figure out how to measure physical stress as business risk,” he replied.

Porter reckoned that there plenty of organisations doing good work in this endeavour to link academia to finance. He named the Grantham Institute at LSE and the Oxford Sustainable Finance Group.

But Porter admitted that what is lacking is granularity going down to the asset level. He advocated more funding by the industry of academia to effect the cross-over. “What is our level of comfort on how robust these data modelling extreme events are?” he asked. “We don't know the circumstances around the data.”

He nevertheless retained optimism. “There have to be



assumptions and each asset manager will have their view based on those assumptions. As long as they are directionally right – and I don't mean within one to three years, the normal timeframe for assessing investment performance – we are going to effect change.”

Thomas explained a temperature-aligned mandate co-designed by Isio with an asset manager. She said that such mandates often target an annual decarbonisation rate. Thomas said that an annualised rate was not necessarily practical for a buy-and-maintain bond portfolio, with low turnover. So, instead, Isio focused on agreeing less frequent milestones: to take the current temperature alignment of c.2.4 C to 2 C by 2025 and 1.5 C by 2030.

Shukla agreed that data will improve over time. “You have to do this exercise on an annual basis, at least” he said. “Our Net-Zero commitment applies to all assets. Some areas have better quality than others.” He praised the work by LSE and the Transition Pathway Initiative as fantastic.

“The challenge now is the private side,” said Shukla. The TfL pension fund has c.40% target asset allocation to alternatives. “We have proxied the private companies’ emissions,” he said. “Some are not resourced to go on the journey. We can get to quite a reasonable level but the more we can move from proxy to real data, the better.”

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***“We are open in time to re-engineer our baseline as better data becomes available, particularly around Scope 3.”***

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Harking back to Palmer’s example, Shukla said that 20% of assets contribute 80%-90% of emissions. He stressed that the Tfl pension fund wants to be in those companies, including miners and fossil fuels, with a clear path to net-zero and playing an important role in the transition journey.

“We are open in time to re-engineer our baseline as better data becomes available, particularly around Scope 3. At the moment it is carbon emissions per dollar of revenues covering Scope 1 and 2,” said Shukla. “There is increasing pressure to see improvements in these data.”

#### **Double - Edged Transparency**

Having better data is one thing and it is very helpful in pushing us all in the right direction. Having to publish it is another. Large pension schemes in the UK are now obliged to publish data but Scott questioned the use of those metrics.

He said that the pressure to be seen to be green wasn't coming so much from members as environmental campaigning groups.

“They are naming and shaming pension funds. I think it's a bit unfair. One of my schemes was on one of these lists but we are actively working on targets and just don't want to commit to something until we have the measurements and a plan in place to get there.”

Scott said that these disclosed numbers on portfolio emissions will make league-table data easier to construct. He warned that was not necessarily a good thing if used to focus on some narrow metrics rather than wider engagement goals.

Thomas said that trustees are considering how the climate-related financial disclosures are going to be used. She said that,

ideally, trustees want to set targets that are ambitious but achievable. Concerns around data quality, however, mean trustees have to apply caution in setting targets. This results in a focus on data quality improvement targets, where those targets could be misinterpreted as too conservative.

Shukla said that TCFD was a great guide here. “You start with governance, then strategy. Then risk management. Then targets. Tfl Pension Fund is a very visible public entity. We are in the spotlight.”

His observation therefore was that trustees of any scheme would need to own this issue. “There will be pressure groups and they are to be welcomed. There will be a plurality of views among stakeholders and even the board members, but the boards have to understand what is driving their commitments, as embedded in their investment beliefs.”

If trustees understand the issues, Shukla said they would be more active and less reactive. “Because you will be challenged. Communications will be an important part of any ESG strategy. You will still get criticized in this

era of social media where trust is generally missing. So you have to open up to stakeholders to build that.”

His experience was that the biggest detractors became the strongest supporters when you got them ‘inside the tent’ to understand the issues in more depth. Shukla said that honest communications have helped the TFL pension fund.

LeMeaux said that the discussion thus far had focused on investing. She altered the debate to what the influence of an asset manager on a company can be. She said it was not enough to be in alignment; a sustainable asset manager should also have an influence on its emissions. This is where engagement can push corporates.

Thomas said that Isio was grappling with quantifying the effectiveness of asset manager engagements. She said that no one has yet developed an effective methodology to attribute or quantify stewardship.

LeMeaux admitted this task was difficult because there are a lot of asset owners and managers engaging. “At Amundi, this is a work in progress year on year,” she said. “For each engagement, we recognise if and when the issue starts to improve. We are trying to give more transparency.” In practice this information means some quantitative and some qualitative data.

The CAMRADATA panel were challenged that with diversification of capital into thousands of different securities and real assets per asset owner, stewardship was stretched.

LeMeaux replied that Amundi’s size was an advantage. “It makes it easier for us to meet executive management and put our point of view across,” she said. “We can be useful to them. We can show them best practice; it is like consulting. We bring them knowledge of what shareholders want. We have been expressing why investors are pushing on the energy transition. Some of the biggest companies don’t understand: they think we are doing this for political reasons.”



Cook said that engagement has never been part of Mackenzie Environmental Equities strategy. He did, however, want to focus on the big picture. “Measuring your carbon footprint is all around the edges,” he said. “This is getting us away from what really matters – the \$30 trillion needed to effect the move to a sustainable way of living globally. For 2022 alone, the prediction is an \$800bn spend. It needs to be \$2.5trn. We need more copper, more lithium, more steel, more polysilicon and in the short-run more oil.”

On the pressure groups Scott mentioned, Cook said that Mackenzie had received publicity about investments in Daqo, a major producer of polysilicon and the only Chinese producer listed in the US. Polysilicon is a vital ingredient in solar panels and hence decarbonisation. The controversy, however, surrounds allegations of the firm’s use of forced labour [Daqo denies this]. “It’s possible there is forced labour in their supply chain,” said Cook. “We have not been able to conduct a labour audit. But there is no other supplier of polysilicon. Another holding, Wacker-Chemie in Germany also produces poly but the CEO has said that he won’t increase volumes no matter what the price.”

Cook said that such external pressure has the potential to

misdirect capital away from the spending gap. “We don’t have enough food to feed eight billion people sustainably. Nowhere near enough materials. Not even enough investment in fossil fuels.”

Cook said that the challenge was communicating the magnitude of the underspend to clients and asset owners generally.

LeMeaux agreed there was a need for incredible investment in lots of different channels. She said asset owners can have an impact on real emissions by pushing their companies with deep money to invest.

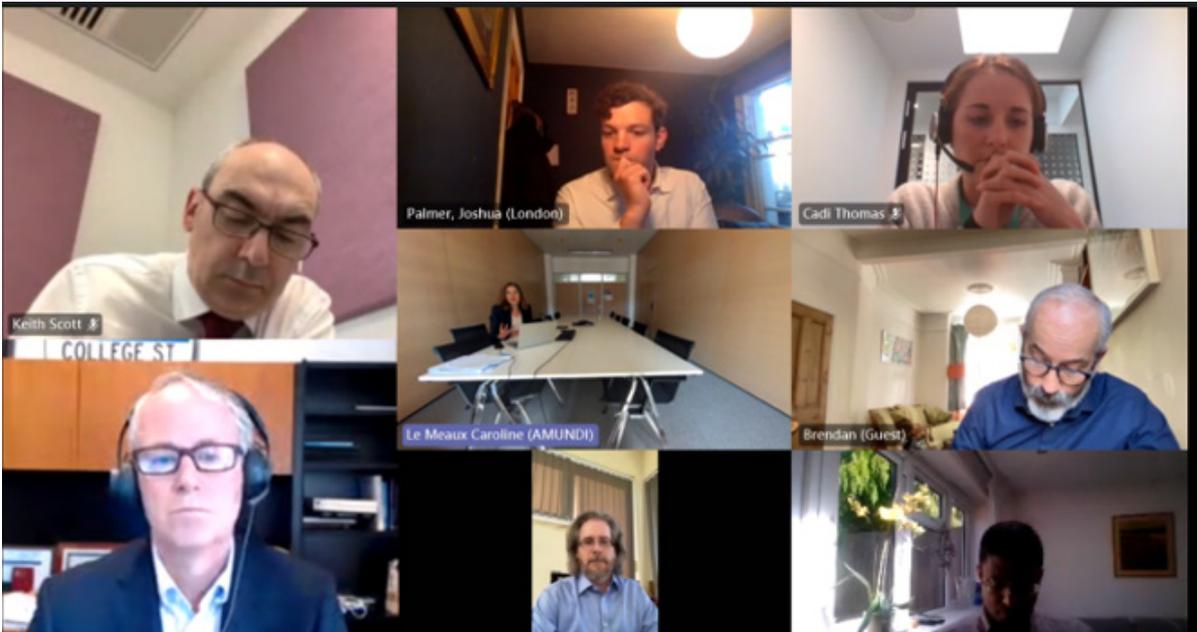
### World Leaders

The CAMRADATA panel were then asked if they were prime minister or president for just one day, which policy they would implement.

LeMeaux said she would enact a campaign to educate people to recognise externalities. Palmer said he would subsidise more energy transition projects, blending private and state capital but with the public-sector taking the final piece. This would promote long-termism, including possibly in nuclear energy.

Porter said it was challenging currently for defined contribution pension providers to make direct investments in long-term illiquid assets so he would move the

***“For each engagement, we recognise if and when the issue starts to improve. We are trying to give more transparency.”***



industry to look beyond pricing, to value. “We manage £190bn from pension schemes, of which 90% is in default funds, ie the lowest cost possible,” he said. “And there is the charge cap to consider.”

He said the regulation that directs most of this capital into daily-dealt funds was restrictive.

Shukla said his focus would be on the demand side: “I would open the public coffers to retrofit the UK’s housing stock with decent insulation and other energy efficient retrofits that pay for themselves and are good for local jobs,” he said. “There is a growing section of the UK population choosing between heating and eating. That’s not right, creating a real social justice issue, which, if not managed well from a transition perspective, can create real roadblocks to climate change goals.”

Thomas, as first minister of Wales, said she would finance enhanced weathering technologies and natural carbon capture. All off the back of airplane taxes.

As first minister of Scotland, Scott said he would focus on reducing the use of oil-based plastics.

Cook said he would progress the revenue-neutral carbon tax pioneered in a number of Canadian provinces. This system adds the cost of carbon to everyday activities for individuals, organisations and businesses. And then every Canadian gets a cheque back at the end of the year with an equal share of the total carbon taxes collected.

***“ Porter said it was challenging currently for defined contribution pension providers to make direct investments in long-term illiquid assets so he would move the industry to look beyond pricing, to value.”***

Cook warned that realising the policy was politically challenging yet singular action would be to hasten the price on emissions. The national ‘floor’ was CAD40 per ton of CO2 in 2021. The current plan will see it rise to CAD170 by 2030, but Cook wants to get there faster.



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# Roundtable Participants



**Caroline Le Meaux**  
*Head of Engagement and Voting*



## Amundi Asset Management

### *Personal Profile*

Caroline Le Meaux joined Amundi in 2019 and is responsible for the ESG Research, Engagement and Voting team within the ESG Business Line. She was previously head of the long-term investment department at the pension division of Caisse des Dépôts et Consignations (CDC) which is the fiduciary manager of several French pension funds, in charge of the SRI strategy, ESG and climate policy.

Before that, she was director of investment at FRR Fonds de Réserves des Retraites from 2011 to 2014. She was formerly fund manager at BNPPAM, managing Small and Mid-Caps European equities and has been head of quantitative analysis for European equities.

Caroline Le Meaux began her career at Paribas Asset Management. She is a CFA (Chartered Financial Analyst) and is a graduate of Paris IX Dauphine University.

### *Company Profile*

Amundi, the leading European asset manager, ranking among the top 10 global players<sup>1</sup>, offers its 100 million clients – institutional, corporate and retail – a complete range of savings and investment solutions in active and passive management, in traditional or real assets. With its six international investment hubs<sup>2</sup>, financial and extra-financial research capabilities and longstanding commitment to responsible investment, Amundi is a key player in the asset management landscape. Amundi clients benefit from the expertise and advice of 4,800 employees in more than 35 countries. A subsidiary of the Crédit Agricole group and listed on the stock exchange, Amundi currently manages nearly £1.7 trillion of assets<sup>3</sup>.

<sup>1</sup> Source: IPE “Top 500 Asset Managers” published in June 2021, based on assets under management as at 31/12/2020

<sup>2</sup> Boston, Dublin, London, Milan, Paris and Tokyo

<sup>3</sup> Amundi figures including Lyxor as of December 31, 2021



## **John Cook**

*Senior Vice President*

### *Personal Profile*

John Cook, Senior Vice President, is a Portfolio Manager, responsible for Investor Engagement and Team Co-Lead with the Mackenzie Greenchip Team.

John's career in the investment industry began in 1991. He was President of Greenchip Financial Corp. since it was founded in 2007 and became part of Mackenzie Investments in 2021. Prior to Greenchip, John led corporate development at one of Canada's largest innovation hubs. He has also held a number of executive positions at Canadian mutual fund companies.

John holds a BA from Queen's University and the Chartered Investment Manager (CIM) designation.



**MACKENZIE**  
Investments

## **Mackenzie Investments**

### *Company Profile*

Mackenzie Investments, founded in 1967, is a leading Canadian global asset manager, headquartered in Toronto with international investment teams in Boston, Dublin and Hong Kong. As part of IGM Financial Inc., a subsidiary of Power Corporation with a history dating back to 1925, Mackenzie benefits from the financial stability of a deep corporate structure while maintaining a boutique investment management profile.

Our distinct and experienced investment teams offer both fundamental and quantitative approaches with expertise across traditional and non-traditional asset classes, including equities, alternatives, currency and multi-asset strategies.

We provide investment management services to pension plans, consultants, foundations and other institutions, building trusting relationships that seek to understand client perspectives. We are committed to delivering strong investment performance and offering innovative, relevant solutions to our clients by drawing on the experience gained through over 50 years in the investment management business.

# Roundtable Participants



**Cadi Thomas**

## *Head of ESG Research*

Cadi leads Isio's ESG research team and is responsible for supporting Isio's clients through their ESG journeys. She works with Isio's client base to integrate ESG centric strategies and works to identify market-leading innovative products and sustainable investment solutions.

She is actively involved with various stakeholders in the UK pensions industry and has helped develop thought leadership on ESG topics.

Cadi has a degree in Mathematics from the University of Bath and is a Fellow of the Institute of Actuaries.



**Keith Scott**

## *Director*

Keith currently acts as trustee director on five DB schemes and one DC scheme ranging from £150m to £3.5bn and is chair of numerous investment committees.

Keith joined LawDeb in 2019 as a professional trustee and brings with him a wealth of experience in risk, investment and pension management and trusteeship.

Prior to LawDeb, Keith served as the Client Director of BMO Global Asset Management and as the European Pensions Director of IBM, managing an inhouse pension team responsible for assisting the IBM DB and DC schemes with all aspects of investment and pensions management. He was company nominated trustee on the IBM Ireland schemes and also spent a number of years in the US as an investment strategist for the IBM US DB plan.

Keith is a specialist in designing risk management and control frameworks for pension plans and has led a number of projects for schemes ranging from investment (asset allocation and investment manager selection), custody and administrator review and selection and set up of new DB and DC plans.





## **Dr Stephen Porter** **CFA, PhD**

### *Responsible Investment Lead*

Dr Stephen Porter is the Responsible Investment Lead at Scottish Widows. He is a CFA charterholder and has over twenty years experience in investment management as well as a decade within academia.

Stephen earned an MSc and PhD related to carbon and sustainable business at the University of Edinburgh, where he continues to guest lecture and supervise research on these topics as an Honorary Fellow.

Stephen is also a trustee of the Plan Vivo Foundation, a Scottish-registered charity that seeks to aid communities vulnerable to climate change build their resiliency through local, nature-based carbon projects.



## **Padmesh Shukla** **CFA**

### *Chief Investment Officer*

He is CIO of £14 billion Transport for London Pension Fund where he has delivered major changes from diversifying the Fund's bond and equities portfolio to building its over £5 billion alternatives programme, with non-UK assets making up close to 80% of the Fund. He has also led the Fund's sustainability and engagement strategy, which led to the Fund announcing a very ambitious Net Zero and "ESG tilted" investment target last year.

Emerging markets and climate change are of particular interest to him, having previously worked at the World Bank and the Centre for International Development. He went to Harvard University on a full scholarship for his Masters in International Economics and Development (major in Finance) and has a Bachelors in Civil Engineering. He sits on the UK CFA Asset Owner Council and several boards and is involved in multiple research and policy initiatives.

# Moderator



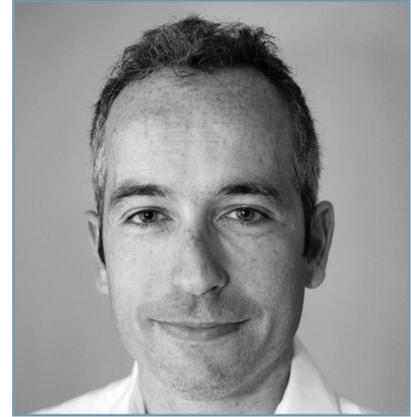
**Josh Palmer**

*Head of Sustainable Credit Research*

Josh Palmer joined Willis Towers Watson in August 2013 as a Manager Researcher focusing on hedge fund and fixed income strategies. He currently leads the Sustainability research efforts in fixed income.

He has led the Emerging Market Debt research team, the Discretionary Macro research team and the Volatility Arbitrage team.

He is also a member of the Manager Research Sustainable Investment Working Group, the London Investments Inclusion Network Steer-Co and the WTW Climate and Resilience Hub.



**Brendan Maton**

*Freelance Journalist*

A highly experienced financial journalist with an expansive network of contacts in the UK and across Europe. Brendan has written about pension schemes and national welfare systems from Finland to Greece for 18 years and understands the retirement savings industry in each European country. Brendan has interviewed EU commissioners and national ministers; central bankers; pension scheme heads; insurance chief executives; chief investment officers; actuaries; union officials; professional and lay trustees. He worked at Financial Times Business for eight years, finally as editor-in-chief of all international pensions titles.

Brendan has spent the last ten years as a freelancer for a number of publications, including Financial Times, Responsible Investor, Nordic region pensions news and IPE. He is also Chief webcast host for IPE. Brendan has acted as conference chair for Financial News, the UK National Association of Pension Funds, Dutch Investment Professionals Association (VBA), Corestone, Insight Investment, Marcus Evans, Robeco Asset Management, Sustainable Asset Management (SAM), Towers Watson.

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(1) Source IPE "Top 500 asset managers" published in June 2021 and based on AUM as of end December 2020. (2) Amundi data including Lyxor as at 31/12/2021. In the UK, this promotion is issued by Amundi (UK) Limited, registered office: 77 Coleman Street, London, EC2R 5BJ, United Kingdom. Amundi (UK) Limited is authorised and regulated by the Financial Conduct Authority under number 114503. This document is not intended for any citizens or residents of the United States of America or any "U.S. Person" as defined by "Regulation S" of under the US Securities Act of 1933. The content of this advertisement is for information purposes only and does not constitute a recommendation to buy or sell. [amundi.com](https://www.amundi.com). March 2022. | 

# New Carbon Emission Metrics on the Road to Net Zero

*“Institutional investors are regrouping into the UN-convened Net Zero Asset Owner Alliance with the objective to transition their portfolios to net zero GHG emissions by 2050 ”*

Climate risk is the biggest challenge humanity has to face in the 21st century, affecting both the biosphere and the economic paradigm that currently underpins it. The latest reports released by the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA) emphasize the urgency to act quickly. The former provides new estimates of the chances of crossing the global warming level of 1.5°C in the next decades, and finds that unless there are immediate and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be out of reach. IEA's report underlines that to achieve Net Zero Emissions, the annual clean energy investment will need to reach \$4 trillion by 2030, with a 40% reduction of carbon emissions by 2030 and 62% by 2035.

**Since the 2015 Paris Agreement and the emergence of net zero emission policies, climate change is now the top priority on the agenda of financial institutions, supervisors and policymakers.** Consequently, the asset management industry also has a key role to play. Terms such as “portfolio decarbonisation”, “temperature alignment”, “net zero carbon investment” and “Paris-aligned benchmark (PAB)<sup>1</sup>” have become the everyday reality of asset owners and managers. These will significantly alter portfolio allocation and investment frameworks.

Institutional investors are regrouping into the UN-convened Net Zero Asset Owner Alliance with the objective to “transition their portfolios to net zero GHG emissions by 2050”. Additionally, asset managers have formed the Net Zero Asset Managers initiative, which currently boasts 220 international asset managers and \$57 trillion of assets under management. Governments have also implemented additional regulations to promote the efforts of companies and financial market participants around the disclosure and the transparency of carbon emissions data, such as the Sustainable Finance Disclosure Regulation (SFDR) and the EU Taxonomy.

**The key challenge of these regulations is therefore the supply of relevant data in terms of frequency, quality and coverage.** If these metrics are not self-reported by companies, data providers estimate their carbon emissions. However, the quality of these estimates is usually poor: academics find no evidence that these scores predict future changes in emissions. **As we are at an early stage for the race to Net Zero, climate risk assessment methodologies have not yet reached maturity<sup>2</sup>.** Numerous initiatives have put forward new climate risk measures that differ from traditional scope 1 + scope 2 carbon emissions<sup>3, 4</sup>.

Amundi has published two working papers that study climate risk measures:

- **Portfolio Construction with climate risk measures**, conducting a survey of the current climate risk measures in the asset management industry and how portfolio construction practices use these “traditional” metrics;
- **Net Zero Carbon Metrics**, defining the metrics needed to enhance disclosure and debate on corporates' emissions in the context of portfolio alignment, engagement and net zero emissions policies.

In essence, introducing constraints or adding extra-financial objectives to portfolio construction makes the exercise more complex. Indeed, by construction, the addition of constraints reduces the universe and therefore the possible diversification of optimized portfolios. In this context, it is important to prioritize the objectives in a coherent transition logic. These papers have tried to provide answers to two main issues. In the first one, we proposed asset-level metrics that allow the performance of an issuer towards the NZE scenario to be assessed. The objective of these metrics is to promote transparent and comparable information that will support communication between investors and corporates and a unified framework that will help asset owners and managers to define their engagement policies and their NZE investment strategies.

We have seen that the decarbonisation path is more difficult and can involve a high degree of tracking error if we include scope 3 emissions. Asset owners and managers should keep this mind as they are increasingly encouraged by regulators and other stakeholders to go beyond scope 1 + 2. Additionally, portfolio alignment requires new metrics that are more difficult to estimate, implying more uncertainties about the optimal portfolio solution. As a result, these two combined factors will have significant impact on investors in the coming years and we can without any doubt anticipate large portfolio rebalancing in the future.

In conclusion, asset owners and managers must accelerate their engagement policies if they do not want to let the gap widen between both the economic and financially effective decarbonisation required and the effective emissions pathway pursued by individual companies. Too much mismatch between the two decarbonisation pathways could become a significant issue for the asset management industry.

Read the full article here: <https://research-center.amundi.com/article/shift-carbon-emissions-net-zero-carbon-metrics-portfolio-construction>

<sup>1</sup> PAB: The label requires a year-on-year self-decarbonisation of 7% on average per annum, based on scope 1,2 and 3 emissions, a minimum carbon intensity reduction of 50% and a minimum exposure to sectors highly exposed to climate change. Other constraints are also imposed such as issuer exclusions (controversial weapons and societal norms violators), a minimum green share revenue, or some activity exclusions.

<sup>2</sup> Portfolio Construction with Climate Risk Measures, Roncalli et. al, 2022

<sup>3</sup> Scope 1: direct GHG emissions occurring from sources that are owned or controlled by the company.

<sup>4</sup> Scope 2: indirect greenhouse gas emissions from consumption of purchased electricity, heat or steam. These emissions can be computed using the energy mix of the country (location-based) or the energy mix of the utility company supplying the electricity.

# IN FOCUS

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# Mackenzie Greenchip's quarterly update



In May, Prime Minister Boris Johnson convened nuclear industry bosses, pension managers, and insurance executives. He told them his government wanted to increase nuclear electricity output to one-quarter of the country's total production using a new generation of reactors – at “warp speed”. The world desperately needs this kind of energy urgency, but also transition realism. While Britain currently has six reactors supplying 16% of its electricity, five of these are scheduled to close by 2028. With only one new reactor coming online in the next decade, Johnson's target is entirely based on the success of an unproven technology: small modular reactors (SMRs), which carry unknown costs, uncertain safety, and are at least a decade away from a meaningful generation.

This renewed nuclear excitement is shared by many as concerns over energy security, energy inflation, climate change, and the limitations of current renewable technologies converge – an old technology has suddenly become new again.

*“This renewed nuclear excitement is shared by many as concerns over energy security, energy inflation, climate change, and the limitations of current renewable technologies converge.”*

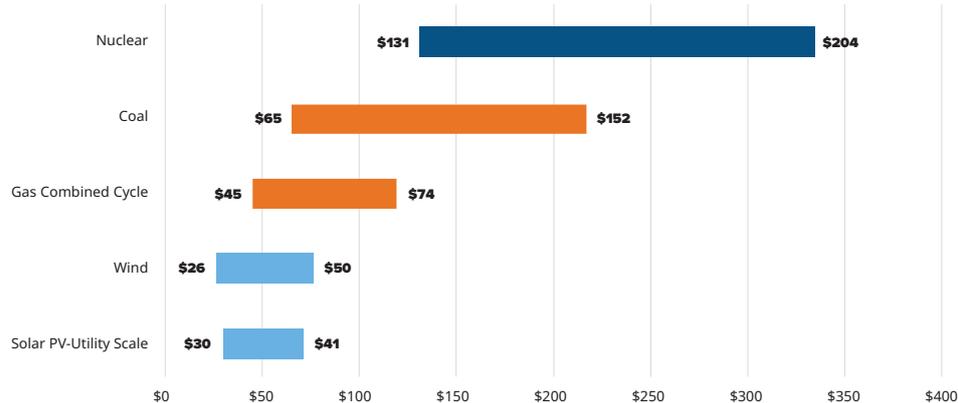
**It's hard to overstate how quickly our existing reactor fleet is aging.** The halcyon days for nuclear were in the 1970s and 80s. Today there are 440 nuclear reactors operating around the world, which is only 20 more than were operating in 1987. Twenty-first century large-scale reactors are generally safer and designed to last longer, but the technology has not changed much over the past 50 years. What has changed is electricity consumption and a lot less of it comes from nuclear. In the late 1980s, nuclear accounted for 16.5% of global generation – today it's barely 10%. Given that it's one of few “emissions-free” technologies, this is a problem.

According to the US Energy Information Agency, there are 94 reactors still operating in the US, accounting for 20% of generation. On average they're 39 years old – somewhat concerning when their designed operating lifespan was originally in the 30-40-year range. Still, there are only two new US plants under construction, which were supposed to start generating in 2016 but their opening has been delayed until 2023.

France has a much greater nuclear challenge with 56 reactors providing 70% of the country's electricity. In 2015 the government introduced a policy to reduce the country's reliance on nuclear to 50%. A robust replacement policy seems logical; however, the country has only one reactor under construction and only three others under consideration. The only other reactor currently being built in Western Europe is at Hinkley Point in Somerset.

**Nuclear development is still active in emerging markets.** About 50 new large-scale reactors will be commissioned in the next five years, primarily in China, Russia, South Korea, and India. Annual electricity demand has been soaring in most emerging markets. For example, Chinese consumption grew 6.5% per annum from 2010-2020. While wind and solar are the fastest growing technologies by capacity, new nuclear was required as “base load power” to help balance transmission systems. The alternative in most emerging markets would be to burn more coal. While GHG emissions are a concern, air particulate emissions create social stability issues, particularly in China and India. You can see the nuclear appeal.

**Nuclear resurgence benefits from fossil inflation.** The energy industry compares economics using “levelized cost of energy” (LCOE), which calculates the present value of the total cost of building and operating a power plant over an assumed lifetime amount of energy production. Until recently, the average LCOE for nuclear was about double that of new coal or natural gas plants, and quadruple that of wind and solar.



Source: Lazard 2021 LCOE Report.

But LCOE doesn't differentiate between baseload power and intermittent power. As such, the graphic above overstates the economic advantages of wind and solar and underestimates the real value of nuclear in the electrical system. Further, the chart does not account for recent inflation. In the past 12 months, natural gas prices have doubled in North America and tripled in Europe. The cost of a ton of coal has also tripled, and many operators now face rising emissions taxes. The cost of renewable equipment is also on the rise. Input costs like polysilicon for solar (up 500% in the past 18 months!), and steel and concrete for wind towers are soaring. Material costs have increased for nuclear too, but these have far less impact on nuclear LCOE. Commodity inflation has narrowed the economic gap between nuclear and alternatives.

Author:

**The economics of extending reactor lifetimes is also looking more attractive.** Operators have been finding ways to extend generating lifespans beyond original decommissioning dates. In some cases, it's becoming technically and economically feasible to add 30 years to plant lifetimes.

Ontario, Canada, provides a useful case study of how thoughtful energy planning combined with careful engineering can buy time to manage difficult regional energy transitions. We believe the province's 2012 decision to refurbish 10 aging reactors looks a very good one in hindsight.

If delivered on time and on budget, Ontario will have 10 refurbished reactors operating by 2033. Combined, they will provide 10GW of base load power into the late 2060s at an estimated refurbishment cost of \$26 billion CAD. Considering nuclear currently provides about 60% of the province's power, transitioning to an alternative technology was going to be very disruptive, less predictable, require new land allocations, and be more expensive.

The economics look good, but the real value of nuclear refurbishment is that it may provide enough time for the world to develop economic grid level storage for renewables and other low carbon technologies.



John Cook  
Senior Vice President

	Ontario Nuclear Refurbishment	Combined Cycle Natural Gas	Wind	Solar
				
<b>Capacity</b>	10 GW	12.5 GW	26 GW	45 GW
<b>Annual Generation</b>	79 TWh	79 TWh	79 TWh	79 TWh
<b>Land Area Required</b>	5.8 km <sup>2</sup>	2.6 km <sup>2</sup>	8,200 km <sup>2</sup>	1,200 km <sup>2</sup>
<b>LCOE</b>	\$74 MWh	\$87 MWh	\$56 MWh	\$58 MWh

1. Assumptions mostly based on Lazard 2021 LCOE report
2. Utilization rates: Nuclear 90%, Gas 70%, Wind 35%, Solar 18%
3. Capital cost for nuclear refurbishment: \$26B CAD
4. Carbon price for natural gas: \$50 CAD/ton
5. Assumed annual inflation of 2%
6. Cost of capital 6%

**Adding long-term storage would increase LCOE well above other alternatives**

**Small modular reactors offer some hope for a nuclear future but it's far from certain.** In addition to its refurbishment program, Ontario has granted a 10-year licence to a GE/Hitachi consortium to develop a 300MW SMR. There were many they could have chosen from. According to a recent Economist article, there are over 50 SMR designs being developed globally. The promises of SMRs, generally defined as reactors designed to produce under 300MW, are many but let's highlight two: They're potentially cheaper, due to simpler modular construction; and they're potentially safer, due to smaller reactors, different vessel shapes, and even different cooling materials. Some promise to also sell heat, while others promise to use existing spent fuel. The problem with these promises is that they haven't been proven yet. We remain hopeful, but believe meaningful SMR generating contributions are at least a decade away.

**Nuclear investment opportunities do exist.** Over the past 15 years, Greenchip has rarely backed unproven technologies. We are more likely to invest in large-diversified industrials or even engineering firms that have emerging clean technologies as a part of their overall business. Given the risks related to SMR developments, it's unlikely that we would back an SMR start-up. Thankfully, other investors have. Just last week, New Brunswick Power invested \$30 million in ARC Clean Energy which is developing Canada's first commercial SMR. If the promises of SMR pan out, the returns could be enormous. That said, the large industrials and engineering firms will benefit too.

Our exposure has not been limited to diversified industrials though, the **Mackenzie Greenchip Global Environmental Balanced Fund** participated in \$500 million of green bonds issued last November to help finance the Ontario's refurbishment. Whether it be reactor refurbishment or backing SMR technologies, there will be no shortage of capital required to develop whatever form the nuclear future takes.

# Meet the Team!



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