



AI-Driven

Net Zero

**Panel takeaways from the
Elevandi Insights Forum**



About PwC

At PwC, our purpose is to build trust in society and solve important problems - this is at the core of everything we do, from the value we provide to our clients and society, to the decisions we make as a firm.

Our services started with audit and assurance over a century ago. As times change and the issues faced by businesses and individuals evolve, we have developed specialised capabilities in advisory, consulting and tax to help you address emerging new challenges across focus areas like ESG, sustainability and climate change, digital transformation, cyber security and privacy, data, mergers and acquisitions, and more.

In Singapore, we have more than 3,500 partners and staff to help resolve complex issues and identify opportunities for public, private and government organisations to progress. As part of the PwC network of nearly 328,000 people in 152 countries, we are among the leading professional services networks in the world focusing on helping organisations and individuals create the value they are looking for.

About Elevandi

Elevandi is set up by the Monetary Authority of Singapore (MAS) to foster an open dialogue between the public and private sectors to advance FinTech in the digital economy. Elevandi works closely with governments, founders, investors, and corporate leaders to drive collaboration, education, and new sources of value at the industry and national levels. Elevandi's initiatives have convened over 300,000 people to drive the growth of FinTech through events, closed-door roundtables, investor programmes, educational initiatives, and research. Its flagship product is the Singapore FinTech Festival alongside fast-rising platforms, including the World FinTech Festival, Point Zero Forum, and the recently launched Elevandi Insights Forum.





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1. Introduction

The urgency to accelerate the transition to a net zero economy and remain within the critical threshold of 1.5°C cannot be overstated. In 2022, the global annual decarbonisation rate reached 2.5%, falling significantly short of the required decarbonisation rate of 17.2% per annum to meet Paris Agreement targets.¹ This stark gap calls for immediate and concerted action to increase the pace of decarbonisation and safeguard our planet's future.

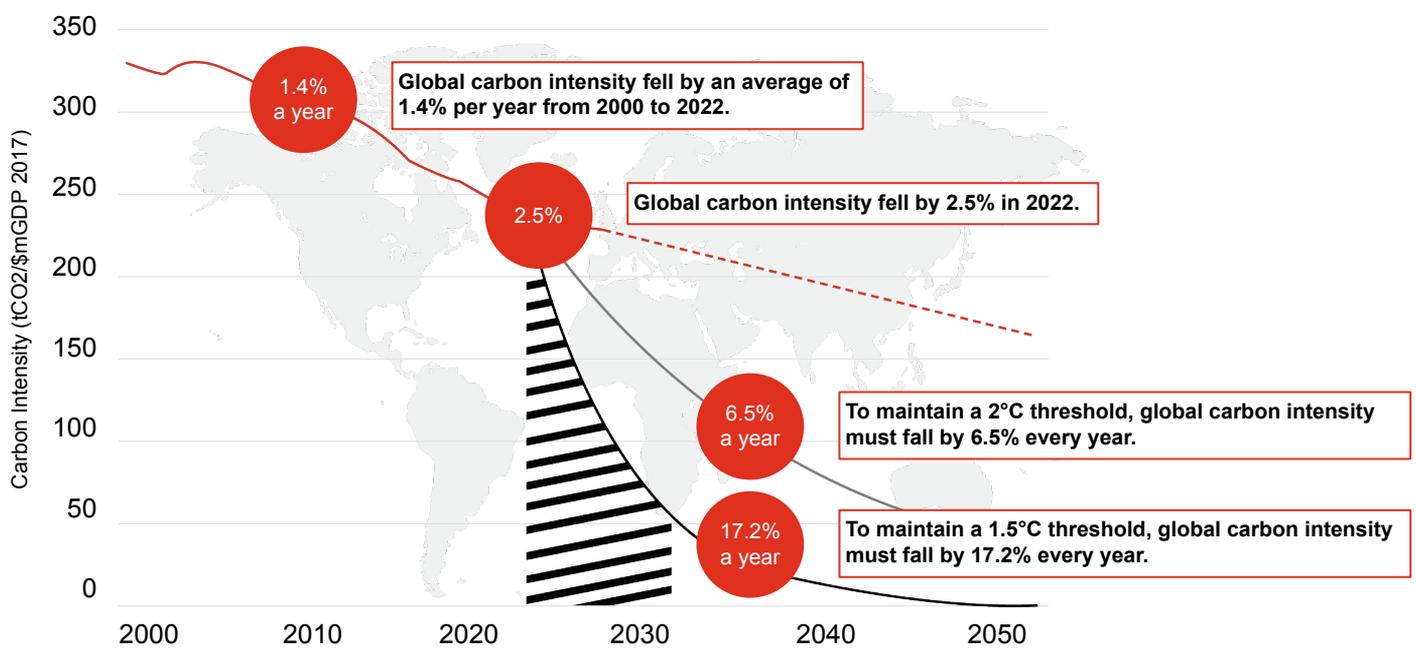
Against this backdrop, the Artificial Intelligence (AI) revolution stands out as a pivotal opportunity, offering unprecedented technological capabilities that can be leveraged to accelerate this transition.

To explore AI's transformative potential, the Elevandi Insights Forum - which serves as the prelude to the Singapore FinTech Festival - held a roundtable on 14 November 2023, titled **"AI-driven net zero: A case-based approach for decarbonisation and climate risk mitigation"**.

The roundtable brought together 14 global leaders and experts from financial institutions (FIs), technology companies, academia, and the real economy to foster ecosystem-wide collaboration and innovation. The plenary session was chaired by Professor Mohan Kankanhalli, Provost's Chair Professor of Computer Science at the National University of Singapore (NUS), and moderated by Karan Dhanwani, Director of Sustainability at PwC South East Asia Consulting (SEAC).

This report aims to communicate key ideas discussed during the panel, and provides a clearer understanding of how AI can be used to speed up efforts towards achieving the net zero agenda. To begin, this report demonstrates a range of AI use cases across sectors to measure, model and reduce carbon emissions. Following that, Chapters 3 to 5 highlight critical factors to consider when deploying AI to further the sustainability agenda, such as vertical integration to address data quality barriers, the importance of governance and standardisation, and the need for collaboration. The report rounds off in Chapter 6 with a case study of Project NovAI - an AI-powered system developed by a consortium led by MAS.

Figure 1: Global annual decarbonisation rates



Source: [PwC Net Zero Economy Index 2023](#)



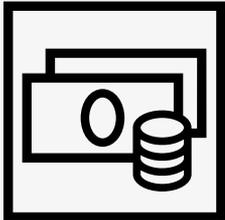
2. Harnessing AI to accelerate decarbonisation

AI technology holds immense potential in reducing global emissions and accelerating the decarbonisation process. A modelling study conducted by PwC found that the implementation of AI technology could reduce greenhouse gas emissions by around 4.0% by 2030, relative to projected emissions under Business as Usual scenarios (Figure 2).²

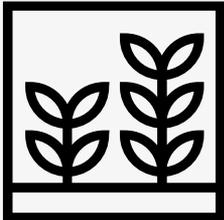
This section explores how AI can be applied to achieve sustainability goals across various industries, in particular by addressing common challenges such as data gaps and inaccurate measurements, while also aiding in decision making.

Figure 2: AI for the environment headline results

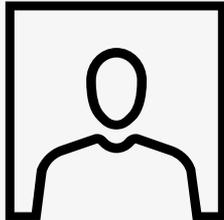
By 2030, sustainability-driven applications of AI in agriculture, energy, transport, and water have the potential to...



+4.4% GDP
(**\$5.2Tr**)

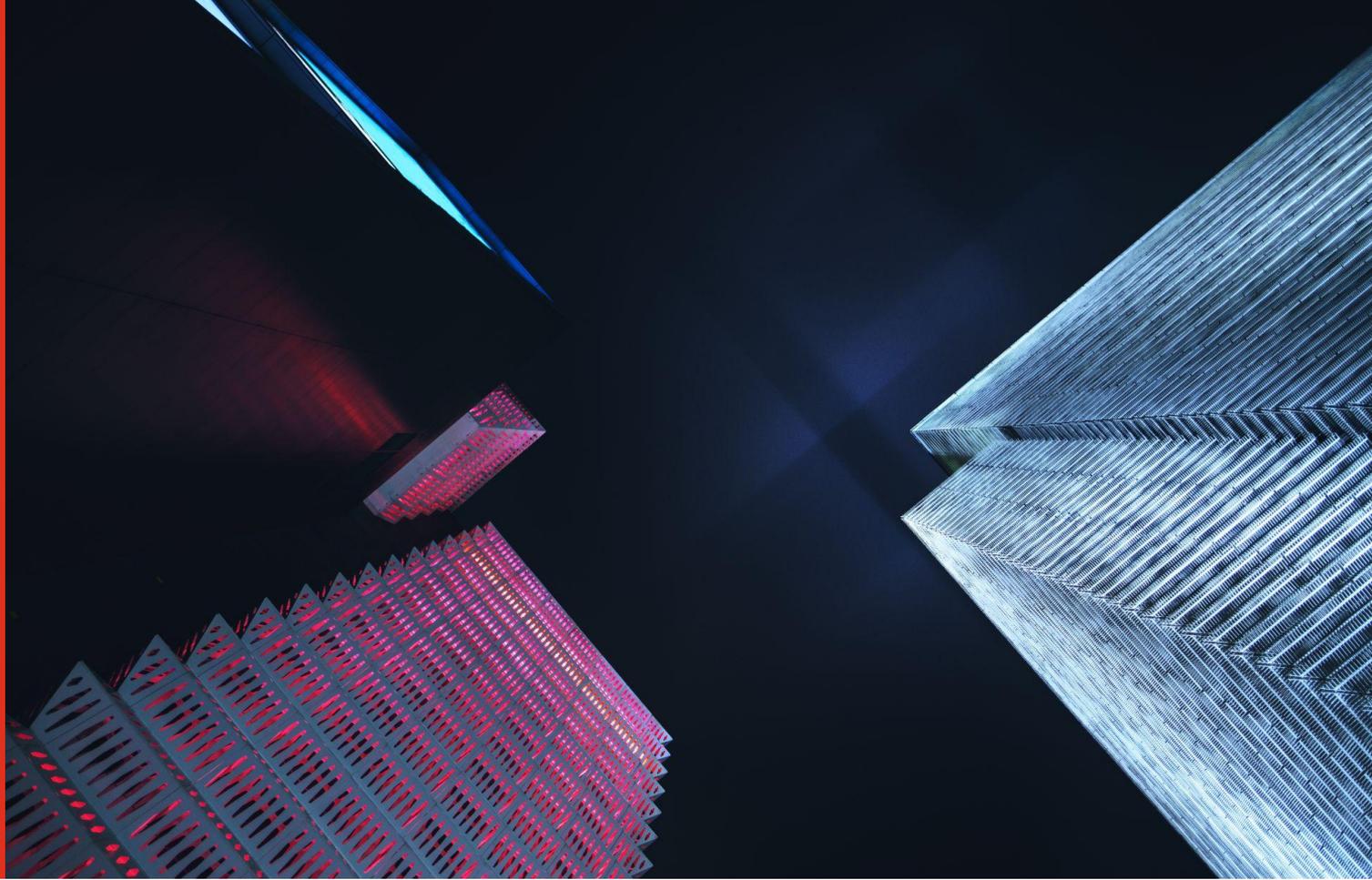


-4.0% GHGs
(**-2.4Gt**)



+1.0% net jobs
(**+38.2 million**)

Source: PwC analysis - [How AI can enable a Sustainable Future Report](#)



Real estate

Responsible for nearly 40% of global carbon emissions, the real estate sector presents a key avenue for decarbonisation in both operational energy and embodied emissions.³

Central to the issue of operational emissions is the problem of building operational inefficiency, as highlighted by a speaker during the roundtable. The energy consumption inefficiency in many buildings in the region leads to excessively cold temperatures and unnecessarily high operational emissions.⁴

Hence, a growing number of building owners have started integrating smart technologies that monitor and optimise operations in the pursuit of enhanced energy efficiency and decarbonisation. These AI-powered systems utilise real-time occupancy sensors and building management systems to provide recommendations for optimising Heating, Ventilation, and Air Conditioning (HVAC) settings, ultimately reducing operational emissions in the real estate sector.⁵

Besides operational emissions, embodied emissions, particularly that associated with materials like steel, concrete, aluminium, and glass, were raised during the discussion as a growing concern in the real estate sector's decarbonisation agenda. The upstream extraction of raw materials, manufacturing and transportation processes involved in producing these materials contribute to substantial amounts of greenhouse gases, yet are faced with limited emissions data coverage from supply chain manufacturers.

AI plays a crucial role in reducing embodied emissions, minimising waste, and promoting circularity by identifying alternative materials with lower carbon footprints and facilitating the selection of sustainable materials. Through data analysis and predictive models, AI can also enable better decision-making, resource allocation and supply chain management, minimising embodied emissions in the real estate industry.

“To size up the embodied carbon footprint of a building, you can put in some parameters, generate and identify [design] options to reduce carbon footprint and cost. This offers huge potential from the generative design perspective.”

For instance, Podium for Development (P4D), a digital platform established by Lendlease, empowers building designers by enabling them to input specific parameters that generate options with minimised carbon footprints and costs.⁶ Through the utilisation of computational algorithms and AI, P4D's sustainability-driven recommendations empower the real estate industry to overcome its perennial data challenges and make more sustainable decisions in building design and construction.

Agriculture

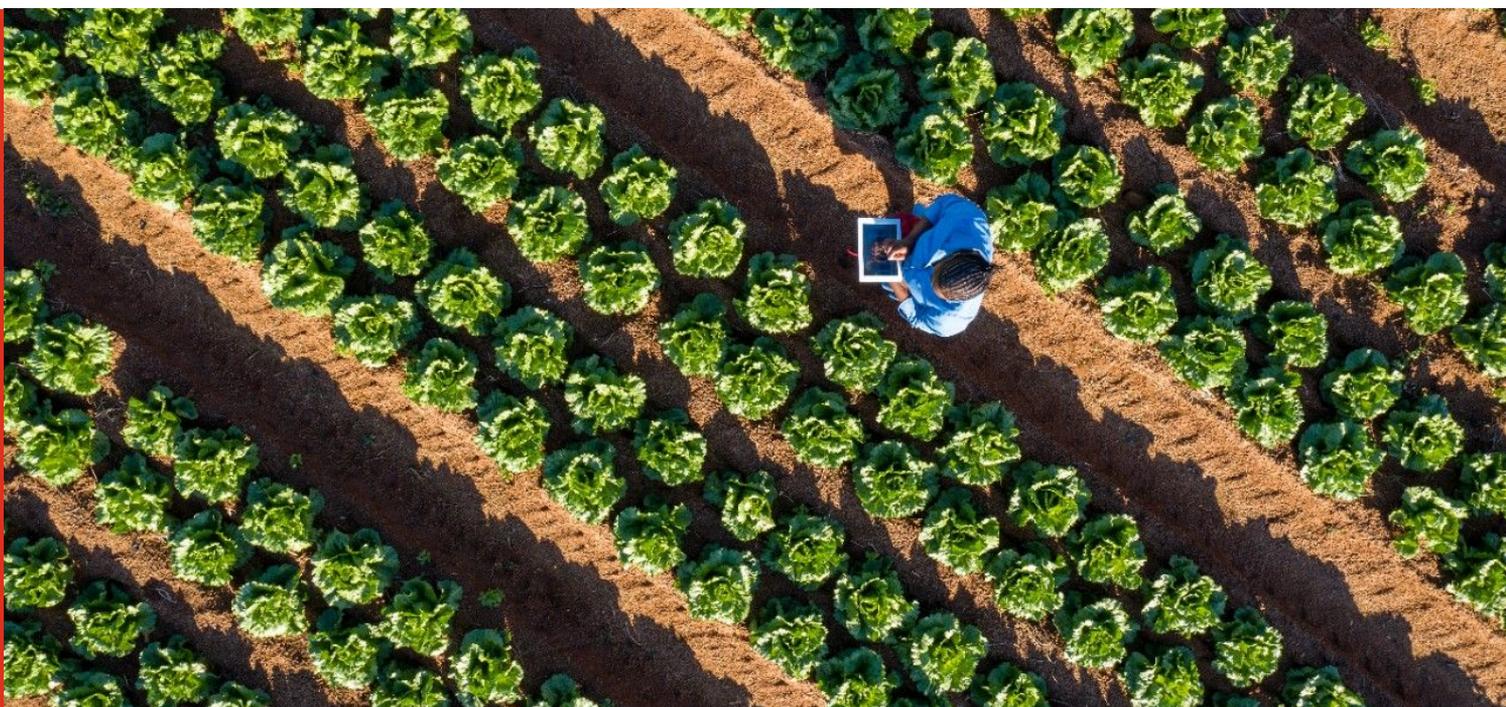
The agricultural sector is a significant contributor to global emissions and faces numerous challenges from climate change. In the third edition of the [Asia Food Challenge report](#) co-published by PwC, Rabobank, Temasek, and Terrascope, it was revealed that the agri-food sector accounts for approximately 34% of global emissions, with activities like rice cultivation, fertiliser use, livestock rearing, food waste, and deforestation making up half of the sector's carbon emissions.⁷ Yet, many agriculture enterprises lack the necessary measurement capabilities for managing and reducing its carbon footprint. In light of this, AI offers a promising solution to decarbonise the agricultural industry by facilitating emissions measurement, and therefore improving resource management and agricultural productivity.

A roundtable speaker highlighted that AI could firstly assist farmers with identifying value chain emission hotspots through efficient emission measurements. Utilising machine learning (ML) algorithms, AI not only automates the collection and analysis of Scope 3 emissions data, but also fills data gaps, thereby enhancing benchmarking capabilities. This process reduces the need for manual effort and time, while improving the speed, precision and consistency of emission measurements. Additionally, AI techniques enable the processing of large volumes of data to allow for more comprehensive and detailed measurements. This helps agriculture enterprises focus their decarbonisation efforts on key value chain hotspots.

The application of AI towards decarbonising the agriculture industry is exemplified by Terrascope's carbon measurement and management platform, which helps the forest, land and agriculture (FLAG) sector understand and mitigate their emissions from hotspots across agricultural commodities, dairy and livestock, and palm oil. The platform leverages ML to speed up data ingestion and improve data granularity, and uses AI techniques to incorporate relevant emissions factors to fill in data gaps. This provides more complete and accurate measurement of emissions compared to traditional means.⁸

Secondly, the integration of AI into agriculture has led to the emergence of precision agriculture, where AI plays a more prescriptive role in emission reduction. Also known as "smart farming", precision agriculture seeks to enhance productivity, improve agricultural yields, and reduce resource consumption with the guidance of AI. For example, precision fertiliser applications utilise sensors, softwares and application hardware to monitor and analyse real-time conditions of crops, soil and other indicators of crop growth. Automated systems, built upon AI techniques, then adjust the rate of applications of fertilisers to optimal levels, decreasing waste and environmental footprint of fertiliser use.⁹

One such application raised in the discussion was in Alternate Wetting and Drying (AWD), a method of optimised irrigation to minimise water-intensive overflooding of rice fields. Aided by Terrascope's AI-enabled carbon management platform, a programme that implemented AWD for 700 rice farms in Northern India reported 48% reduction in methane emissions, 20% reduction in costs and 12% jump in harvest.¹⁰ AI levers can thus help to guide decisions and actions around decarbonisation more effectively.



Financial services

Within the financial services industry, AI has the ability to empower risk assessment and management by incorporating climate and environmental risk analysis. In the face of increasing physical, transition, and adaptation risks, the roundtable acknowledged the growing urgency of building robust risk mitigation practices. AI-powered predictive models can support FIs in evaluating climate scenarios, regulatory changes, market trends, and company disclosures to assess the vulnerability of portfolios and companies to climate-related risks. This enables proactive identification of risks like stranded assets or physical risks from extreme weather events, and empowers institutions to take necessary measures for risk mitigation.

To guard the financial sector against greenwashing, the World Wildlife Fund (WWF), the University of Zurich, and the University of Oxford collaborated to develop an AI tool that assists FIs in assessing investee companies' net zero transition plans. Utilising natural language processing (NLP) to automate the extraction and assessment of transition plans, this tool helps FIs effectively evaluate transition plans for climate risks and flag out companies suspected of greenwashing.¹¹ By promoting transparency in reports and mitigating climate risk, AI can support FIs in making more informed decisions around their sustainable investing commitments.

“The role of AI is extending beyond mitigating risks and decarbonising businesses. It is about reinventing revenues and simulating what green opportunities lie ahead.”

By leveraging AI algorithms to analyse wide streams of data including ESG metrics, climate data, climate scenarios, and company disclosures, banks and asset managers can also identify investment opportunities that align with sustainability goals. This strategic allocation of capital to areas such as renewable energy projects or low carbon footprint companies holds the key to unlocking future green investing opportunities.

An example of this AI use case in real life is Climate Alpha - an AI-powered platform that enables investors to effectively allocate capital to climate-resilient assets. By harnessing the power of climate models, advanced data analysis techniques, spatial finance and ML, Climate Alpha provides valuable guidance to investors, ensuring their investments are not only climate resilient, but tap into growing opportunities in the green economy.¹²

Carbon credits

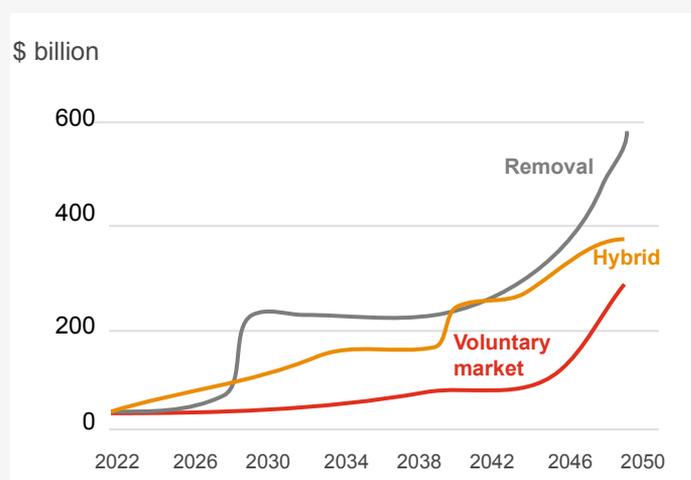
As institutions strive to meet their net zero commitments, carbon credits are picking up in popularity as a way to address their hard-to-abate emissions (Figure 3).¹³ However, many still hold reservations around carbon credits as a lack of reliable data has commonly resulted in inaccurate calculations and an overestimation of emissions offset. A speaker remarked that confidence in, and the simplification of carbon credit systems was important to the participation of FIs.

“The construction and governance of methodologies is fundamental to the simplification process [of carbon credits].”

AI offers a solution to this central concern by raising the accuracy of carbon credit projects. Solutions integrating AI with satellite imagery and remote sensing technologies facilitate the collection of more precise measurements, thereby strengthening the credibility and integrity of carbon credits.

To support more reliable carbon credit issuance processes, Verra, a global certifier of voluntary carbon credits, has incorporated AI and other technologies to enhance the accuracy of their Reducing Emissions from Deforestation and Forest Degradation (REDD+) methodology.¹⁴ Using AI to provide jurisdiction-level deforestation data, the solution would create more consistency around the industry's largely project-specific measurement processes of emissions reduction. While still in development, such AI solutions could greatly improve the trustworthiness of the carbon credits market.

Figure 3: Projections of voluntary carbon market value, by scenario



Source: BloombergNEF

3. Overcoming data quality barriers through vertical integration

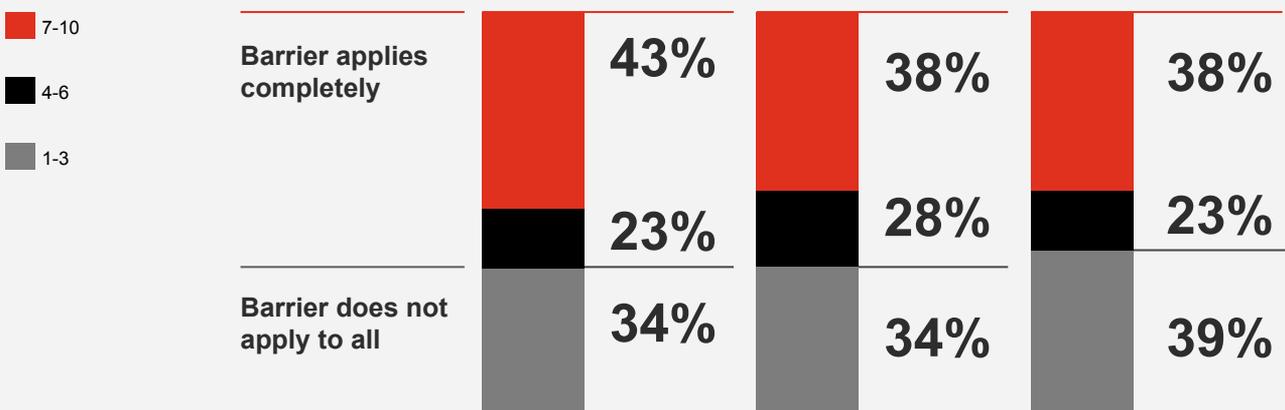
Garbage in, garbage out: the problem of data quality

During the roundtable discussion, an issue highlighted unanimously by speakers was poor data quality. Refinitiv's Artificial Intelligence / Machine Learning Global Study supports this sentiment in the realm of AI, revealing that inadequate data quality is the primary obstacle to adopting and implementing ML (Figure 4).¹⁵ This challenge becomes particularly pronounced when considering the application of AI within sustainability, as AI models heavily rely on data for training and validation. Given that ESG factors, sustainability metrics, and ESG reporting are relatively new concepts, there is limited data to train and refine AI models in this specific context.

“There are two types of garbage: wrong information, and redundant information - both are totally useless. We are very good at accumulating useless information.”

To effectively deploy AI solutions for net zero, ensuring good data quality will be essential. The concept of “garbage in, garbage out” (GIGO) is a fundamental principle in computer science emphasising the importance of high-quality input data to produce accurate outputs. This principle holds particular significance in the realm of AI, as AI models rely heavily on data for training and validation.¹⁶

Figure 4: Barriers to adopting and deploying machine learning



Source: Refinitiv AI/ML Survey

Q: To what extent do you agree these are barriers to adopting new ML technologies / techniques in the organisation, where 1 means 'does not apply at all' and 10 means 'completely applies'

Base: All respondents (447n)

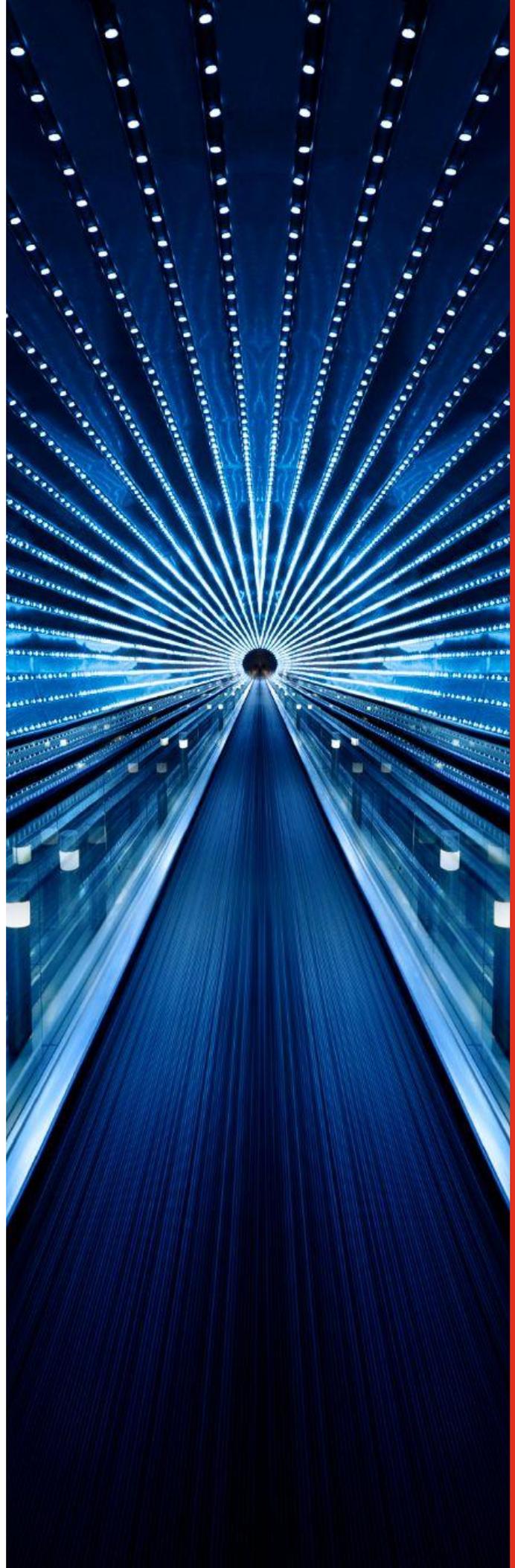
AI vertical integration for stronger data foundations

To address the challenge of data quality, one speaker proposed the concept of vertically integrated AI as a solution. Vertical integration involves the consideration of all aspects of a product's development at conception, assembling teams with diverse expertise, and recognising the limitation of building models in isolation.¹⁷

Diverging from the traditional model-centric approach, vertically integrated AI acknowledges the value of diverse subject matter expertise and limitations of isolated model building. By considering the entire supply chain and allowing businesses greater control over their data collection and application, vertical integration promotes a more comprehensive and effective AI solution.

Going beyond software development, this approach involves building effective on-the-ground systems and infrastructure needed to overcome data quality barriers. Within the real estate sector, one speaker highlighted how operational technologies such as Supervisory Control and Data Acquisition (SCADA) systems could support such an approach to AI and data. SCADA systems that monitor and control the HVAC, lighting, and security systems of building infrastructure could be customised and integrated into AI solutions to collect more robust data. The creation of reliable data foundations can therefore aid organisations in collecting data that is not only accurate, but also valid and relevant to their needs.

In the context of AI for net-zero, a vertically integrated approach becomes particularly crucial in gathering the specialised knowledge needed to deliver precise and industry-specific insights for decarbonisation.¹⁸ By establishing a strong data infrastructure, organisations can capture and maintain high quality data for AI solutions to provide more reliable and meaningful outputs. This flow of industry-specific knowledge and expertise ultimately enhances decision making around emissions reduction.





4. Building trust through unifying governance and standards

The need for governance: inconsistent methodologies and systems

Clear governance and regulatory frameworks are also a key factor to ensuring the adoption and scaling of AI-driven net zero. Roundtable speakers agreed that creating transparent and auditable environments of AI solutions were vital to building trust in their capabilities and reliability.

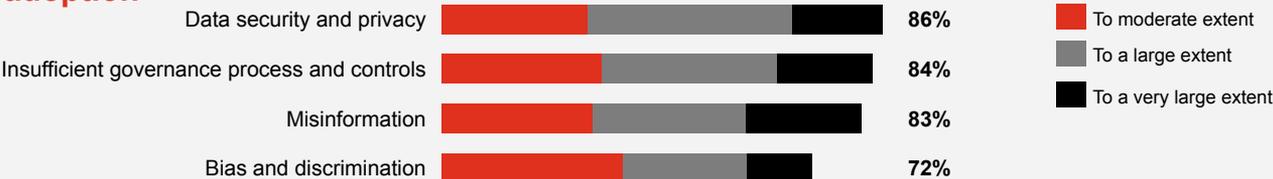
Roundtable speakers voiced out the need to guide ESG reporting methodologies in today's fragmented landscape of sustainability reporting. Of 800 SMEs within APAC polled in 2022, 75% felt that sustainability reporting standards lacked standardised measurement.¹⁹ This lack of consistency in ESG methodologies and metrics consequently undermines organisations' abilities to engage in meaningful peer benchmarking and sustainability decision-making.²⁰

Speakers also raised concerns over the inconsistency of standards around new AI modelling innovations. Many industry stakeholders have also expressed uncertainty over the reliability of AI models, which without clear guidelines for transparency and disclosure, remain opaque and difficult to audit or deploy in a consistent manner. In 2023, 84% of investors surveyed saw insufficient governance as a moderate to very large risk (Figure 5).²¹ With the advent of AI reporting innovations, the issue of inconsistent ESG reporting methodology is only compounded.

“We have to make sure that AI models are applied and deployed in a consistent way”

The conflation of inconsistent methodologies from both AI and ESG frameworks presents a growing need for unifying governance and guidelines around sustainability reporting, AI methodologies, and their intersection.

Figure 5: Investors see considerable risk in AI adoption



Source: [PwC's Global Investor Survey 2023](#)

Q: To what extent do you think the following are a risk for companies as they adopt AI?

Note: Showing only 'To moderate extent,' 'To a large extent' and 'To a very large extent' responses. Percentages shown may not total 100 due to rounding.

Establishing consistency with unifying governance and standards

For AI solutions towards net zero to become more integrated across current systems and practices, their methodologies must be easily understood, adopted and verified to provide transparency and auditability.

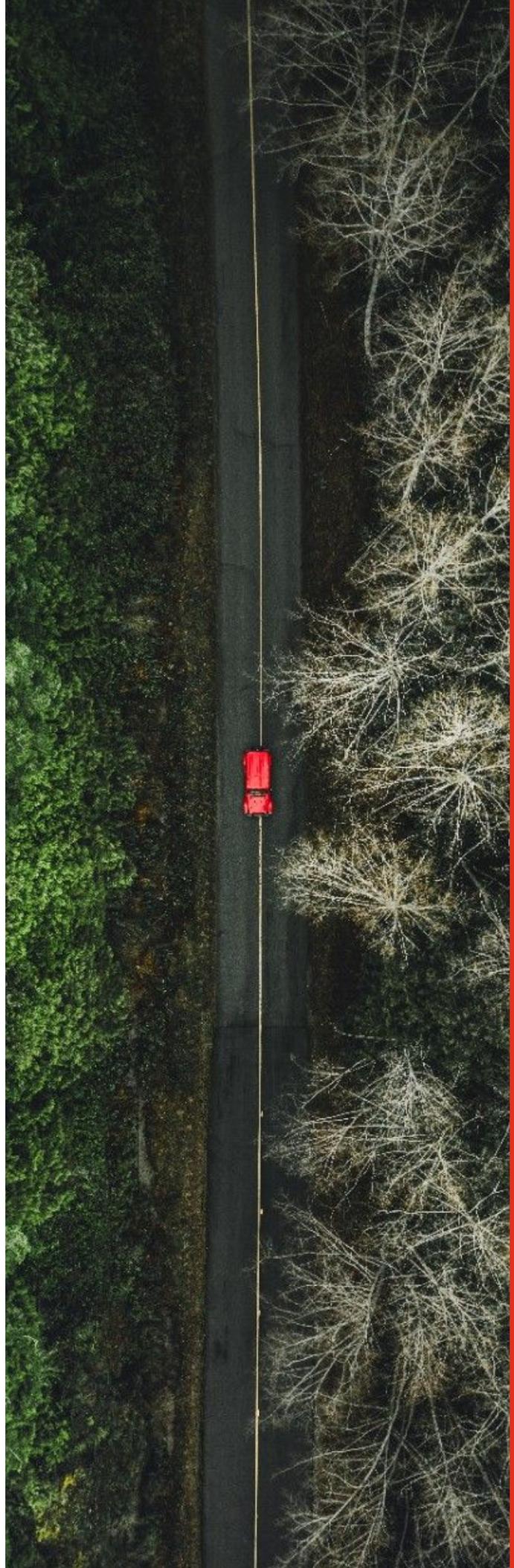
Regulatory bodies must align stakeholders on frameworks and guidelines for consistent methodologies, including simplified ESG measurement requirements and regulated model training procedures and disclosures.

“Organising actionable data sets which then a governance structure can come in and audit - that is powerful”

Speakers agreed that human direction and judgement over the materiality of AI input and parameters was important, and that governance was a key way to building confidence in the application of AI.

One such governing structure is Singapore’s AI Verify testing tool. Currently in its development phase, the tool verifies AI systems for compliance with global governance structures around principles such as transparency, explainability, fairness, and human agency and oversight.²²

More guidance and best practices, particularly addressing the use of AI for carbon accounting, will be critical to building societal confidence in the application of AI for net zero.





5. It takes a village: collaborative approach to accelerate AI for sustainability

Implementing a decarbonisation strategy calls for all hands on deck

To move the decarbonisation needle, collaboration among stakeholders across the value chain is key. While 'stick' approaches of regulation and penalties may push stakeholders to cooperate, a roundtable speaker emphasised that it is a mindset shift that lies at the heart of impactful net zero efforts. It will take a village to carry out decarbonisation, and all stakeholders across supply chains, industries and economies have a part to play (Figure 6).²³

To support the move of business operations towards net zero, organisations and their supply chain stakeholders will need to actively work together. Yet, a speaker commented that many efforts were hindered by supplier reluctance to disclose carbon footprints or commit to potentially cost-inflating decarbonisation measures.

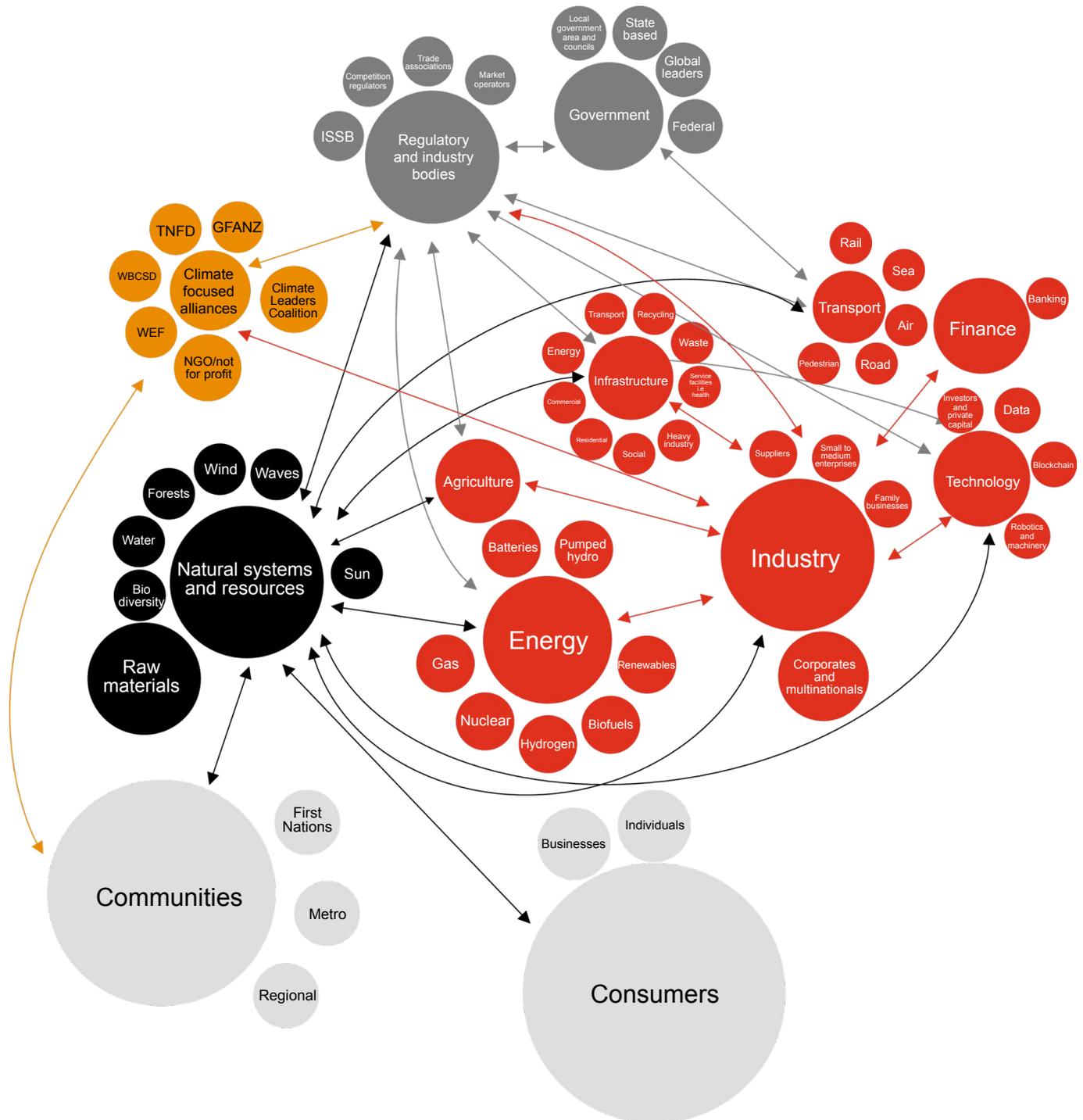
Organisations could attempt to overcome this by identifying opportunities across their value chain to co-create decarbonisation strategies with their key suppliers. Lion, an Australian brewery business, is one such organisation that is working on value chain decarbonisation with their suppliers. Communicating one-on-one to their highest emission suppliers on their intent to develop a carbon-neutral beer product, Lion discovered a similar thinking among suppliers, and subsequently formed a new working group to explore the proof of concept.²⁴

“If you have certain carbon emission hotspots in your value chain, ... it becomes commercially unviable to absorb all of the capital expenditure around making [decarbonisation] happen if it’s just on you.”

Putting aside competition, the solution of forming industry coalitions around decarbonisation was suggested for improved commercial viability.

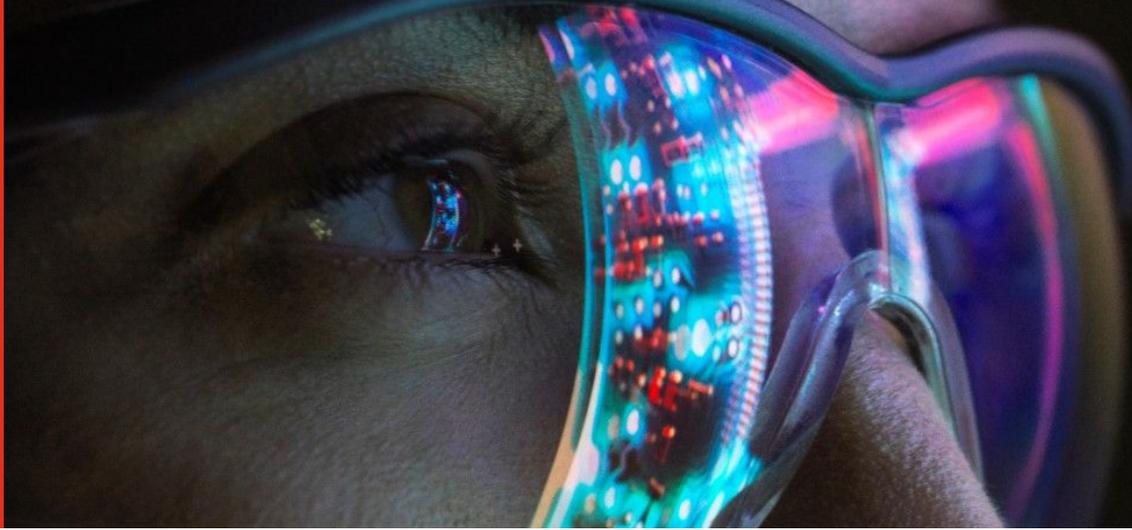
The Australian Climate Leaders Coalition is one such working group that demonstrates this. Bringing together CEOs from beef, beer, aviation, gas, and property industries to share knowledge around initiatives and steps for greening their business operations, the group released [Scope 3 Roadmap](#), a report with recommended actions for firms to reduce emissions.²⁵ Other collaborative industry efforts around knowledge and cost sharing can likewise further AI-led decarbonisation initiatives.

Figure 6: The ecological business and value system



Source: [Climate Leaders Coalition Scope 3 Roadmap](#)

At a more macro level, cross-territory governance and regulation will act as a key lever in propelling AI-driven net zero further. Regulatory bodies can take the lead in encouraging and removing barriers to collaboration, including laying out cohesive reporting standards and paving corridors for fluid data exchange. One example of multilateral governance is the UN-hosted Climate Technology Centre and Network (CTCN), which has already been working to support cross-country technology transfers and development in developing countries.²⁶ AI-driven net zero would benefit from more geopolitical and regulatory collaboration.



6. Case study of NovA!²⁷

Introduced in 2021 as a key component of Singapore’s National AI Programme in Finance, NovA! is a global utility platform that utilises AI and data analytics to accelerate sustainability within the financial sector. Spearheaded by MAS and the Smart Nation and Digital Government Office (SNDGO), NovA! demonstrates the effectiveness of vertical integration to address data quality issues, the importance of standardising metrics when setting sustainability performance targets (SPTs), and the power of ecosystem-wide collaboration.

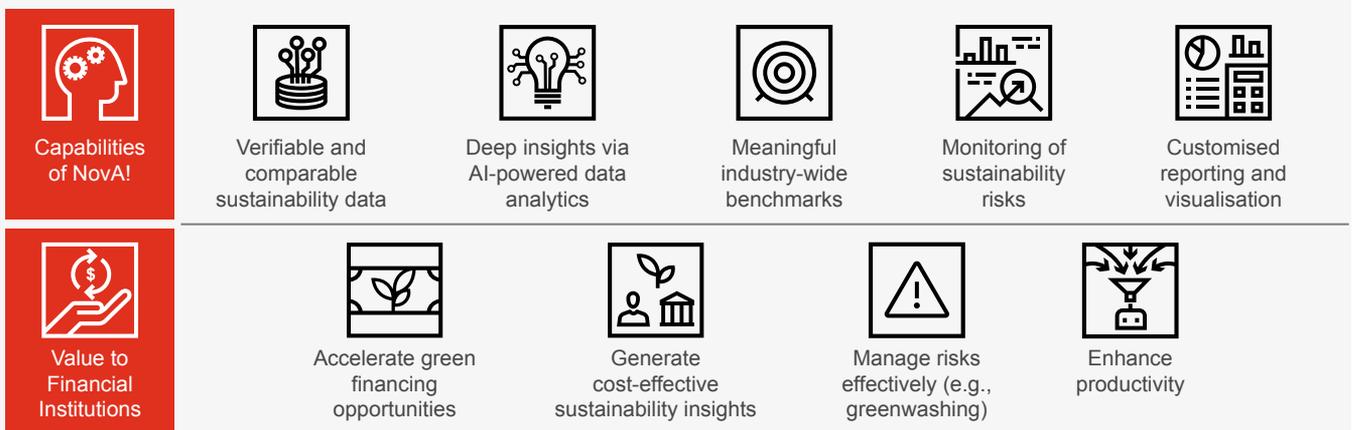
Firstly, through collaboration with the Building and Construction Authority (BCA) of Singapore, NovA! will tap into near real-time nation-wide environmental performance data within the real estate sector. Tracking data by meters and IoT-enabled devices and sensors, this collaboration helps NovA! to retrieve at-source country-wide data provided by government utilities. The collection of data in this manner allows for greater data reliability, relevance and accuracy to make decisions within the financial sector.

Secondly, NovA! establishes a peer benchmarking feature to address challenges faced by banks in assessing and proposing SPTs. This feature will define property characteristics that support fair comparison and consistent evaluation of building performances. For instance, NovA! aims to cluster industry groups based on sector and asset function type, and peer groups on building information such as occupancy rates and age. Real-time sustainability performance data is then pulled and exported to calculate industry benchmarks, helping banks set SPTs for clients in a consistent and reliable manner.

Furthermore, NovA! recognises the importance of an ecosystem approach in ensuring that their solution meets the needs of stakeholders. NovA! has established partnerships with leading industry experts in financial services, real estate, technology, and academia. Since its inception, the initiative has also attracted significant interest, with 23 organisations joining the NovA! Consortium - underscoring the importance of inclusion and co-creation in advancement of AI-driven net zero solutions.

Figure 7: Overview of NovA!

NovA! is an industry-wide platform using data intelligence and AI analytics to support FIs and companies on their sustainability journey.



Source: [NovA! A whitepaper on accelerating sustainability with AI](#)

Final thoughts

Up and coming AI for net zero use cases shared by speakers from diverse backgrounds showcase AI's vast potential in powering decarbonisation efforts. From collecting emissions data to optimising processes for carbon emission reduction, the future for AI in the sustainability space is promising.

Nevertheless, roundtable speakers also acknowledged the challenges and factors to consider when deploying AI for sustainability to ensure successful adoption. Clean data is critical - vertically integrating AI solutions to ensure the flow of accurate and relevant data will ensure AI models for sustainability can provide useful and actionable insights. Consistent methodology for both sustainability and AI performance tracking will also need to be established for meaningful participation across the economy. Finally, to adopt AI for net zero across the business ecosystem, organisations will need to collaborate to move the needle.

At the same time, speakers also agreed on the critical need to be aware of the environmental footprint of advancing AI. A University of Massachusetts study found that training one AI model alone emitted over 626,000 pounds of carbon dioxide, or around five times the total emissions associated with an average American car.²⁸ Considering AI's own carbon footprint, there needs to be a balanced approach to maximising the benefit of AI while minimising its risks.

To do so, the panel agreed on the importance of human-led governance and strategic opportunity creation. Given the nascency of AI solutions for climate change, rather than letting AI be in charge with minimal human interference ("human in the loop"), a roundtable speaker voiced that humans should actively guide and direct AI's application as a tool ("AI in the loop").²⁹ This approach will go a long way in shaping the responsible deployment of AI technologies in tackling climate change.

“AI is not a silver bullet, it is not a magic solution, but at the same time, we must explore every lever at our disposal.”





Endnotes

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Additional insights from PwC to delve deeper into the sustainability agenda



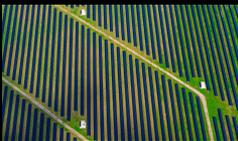
1. The new sustainability mandate

Companies face intense pressure to act on sustainability issues. So, why is so little being achieved? This strategy+business issue focuses on four steps to bridge the gap between intentions and reality.



2. State of Climate Tech 2023

The need for climate tech continues to rise, but the amount of investment into startups has declined for a second year amid tough market conditions. How can the world reverse the fall in climate tech investment?



3. The hidden cost of carbon

Carbon pricing mechanisms impose costs that are deeply and subtly embedded in supply chains, affecting companies' profitability and competitiveness. We look at how these costs can add up, and what leaders can do to manage them.



4. How climate adaptation can both protect and grow your business

Preparing for physical climate risks can be a catalyst for companies' innovation and growth. But first they must form a clear picture of their vulnerabilities and make a plan to manage them.



5. Bridging the gaps: Setting the stage for an orderly energy-system transition

The world has made significant progress on the energy transition. But to attain the end goal, there are key gaps to address.



6. Managing nature risks: From understanding to action

Business relies heavily on nature to supply much-needed goods and services. Recognising those dependencies is the first step toward managing the risks and opportunities they create.



7. CSRD is resetting the value-creation agenda

How will your company create value in a world focused on sustainability? Four strategic shifts and a few next steps for each C-suite role.



8. How CFOs further value creation by leading on sustainability

Climate change, nature loss, and social inequality are reshaping the CFO's role. They may require a new way of thinking about value.



9. Climate leadership wanted: How CEOs can better meet investor expectations

PwC research suggests that CEOs are less concerned about climate change and less effective at confronting its risks and opportunities than investors would like.



10. Net Zero Economy Index 2023

Our Net Zero Economy Index 2023 reveals that the world must achieve a daunting year-on-year decarbonisation rate of 17.2% from now until 2050, if we are to limit global warming to 1.5°C above pre-industrial levels. But there is positive news too.



Contact us



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