



Business and the environment

**Climate accounting your
stakeholders want to see**



Corporations increasingly

need to understand and manage the growing link between environmental and financial performance with appropriate carbon management strategies.



Fortunately, we now have the technology we need to make meaningful business sense of the massive amounts of environmental data available to us from the exponential growth in the instrumentation of the physical world and alternate data from purpose built drones and high resolution satellites.

– Sal Ternullo,
Director, US Blockchain, KPMG



Across corporate America, economic and environmental agendas are increasingly intertwined. Spurred by regulators and environmentally conscious consumers and shareholders—and eager to better manage their own operating costs—companies see a growing economic interest in moving to a low-carbon economy. Smart leadership teams also see it as a way to protect and improve their company’s reputation, get ahead of future regulatory requirements, and uncover emerging environmental opportunities and risks.

None of this will be possible, however, if companies aren’t able to calculate their carbon footprint and document the impact of their carbon management strategies in a manner that investors, customers and corporate leadership teams can trust to inform decision-making. And that’s not yet hard science. Companies face a patchwork of local, state, and federal climate-regulatory requirements. To meet these requirements, they need to calculate emissions with standardized and emerging scientific methodologies. Currently, this requires companies to augment their internal climate data with external datasources which are both public and private. Additionally, to meet investor needs, companies are expected to publish emissions reports and climate disclosures using generally accepted climate-related standards and frameworks for comparative climate exposure assessment and investment returns.

Considering the diversity of products in the market, there are significant variations in the methodologies followed by companies to estimate and report the impact of their products and services. The World Resources Institute documented a wide variation in how companies measure and report avoided emissions for their products and concluded that their claims are often unverifiable or inaccurate.¹

However, there is a smart way forward. Drawing on technologies many companies are already deploying as part of their digital transformation initiatives, such as blockchain, cloud computing, data analytics, artificial intelligence and the Internet of Things, companies now have the ability to create a climate accounting infrastructure that can help them meet their reporting challenges, identify areas where they need to do better, and capitalize on opportunities they might otherwise miss.

“Just a few years ago, this wasn’t really possible. Fortunately, we now have the technology we need to make meaningful business sense of the massive amounts of environmental data available to us from the exponential growth in the instrumentation of the physical world and alternate data from purpose built drones and high resolution satellites. We can more accurately measure carbon footprints, capture those measurements in a trusted way on a blockchain, and use machine learning and other AI strategies to derive insights from the collected data. And we can work to automate many of the necessary processes along the way while effectively managing climate risks,” says Sal Ternullo, Blockchain based Climate Services lead for KPMG US.



Behind the growing imperative for a strong climate accounting infrastructure

Concern for the health of the planet, and the important role of the business community in protecting it, are hardly new. What is new is the rigor businesses are now expected to document, with high fidelity trusted data, their progress towards the commitments made to transition to a low-carbon economy. Both to demonstrate alignment with public sentiment, as translated into the Environmental, Social, and Governance (ESG) demands of investors, and to assure compliance with a growing array of regulatory regimes.

“In capital markets around the world, the investment thesis is expanding from one focused solely on financial factors to one that includes non-financial factors,” says Arun Ghosh, Principal, KPMG US Blockchain Leader. “We are proposing a climate accounting system for those non-financial factors, starting with carbon, that’s designed around emerging technology to create trusted data that is auditable from the ground up. Now, instead of having to look backward via audits to verify reporting, like we do today, companies and their stakeholders will be able to verify cryptographically, in real time, everything coming out of these new accounting systems. These systems will be critical to aligning with the changes taking place in the capital markets and evolving regulatory regimes.”



Up to \$1,500,000,000,000

For a long time, climate-related regulatory efforts were focused primarily on the energy industry, which directly or indirectly accounts for more than half the world's greenhouse gas emissions.² In response, companies have been making significant investments in their renewables portfolios, carbon capture technologies and diversified carbon intensive assets. Additionally, a number of supermajors have established consortiums aimed at accelerating the industry's response to climate change, such as the Oil and Gas Climate Initiative, and are now encouraging the U.S. government to maintain or strengthen regulations for monitoring emissions and creating a level playing field for all industry participants. To meet self-imposed goals, O&G companies are changing practices on flaring, upgrading equipment to reduce leaks, investing in advanced technology such as unmanned aerial vehicles and are now looking to prove their efforts have had impact.

Now, regulators are increasingly targeting other industries, too, including, notably, real estate. According to a 2019 report by the United Nations Environment Program, buildings and construction account for 39% of all energy-related carbon emissions.³ This has prompted some cities and states to adopt aggressive targets for reducing building emissions, incentivize real-time energy management project implementation and impose fines on building owners who exceed emission targets. For example, New York City passed a bill last year that seeks to reduce carbon emissions 40% by 2030 when compared with 2005 levels.

The consequences of failure can be substantial. Starting in 2024, some building owners in New York City could be facing fines totaling millions of dollars a year if they fail to meet the city's new emission caps.⁴ In 2020 KPMG estimates U.S. property owners could face fines collectively totaling as much as \$1 trillion to \$1.5 trillion annually resulting from enforcement of climate standards for emissions reduction by 2050.

Microsoft announced in January that it plans to become carbon negative by 2030 and vowed that by 2050 it will remove from the environment all the carbon the company has emitted, either directly or by electrical consumption, since its founding in 1975.⁵ Apple, which is already carbon neutral for corporate emissions worldwide, announced in July that it plans to become carbon neutral across its entire business, its manufacturing supply chain and its product life cycle by 2030. That would mean every Apple device sold would have a net zero climate impact.⁶ And in 2016, Walmart became the first retailer to set an emissions-reduction plan approved by the Science Based Targets initiative, in alignment with the Paris Climate Accord.⁷

Total amount KPMG estimates that U.S. property owners could collectively face in fines resulting from enforcement of climate standards for emissions reduction by 2050.



The amount of all energy-related carbon emissions that buildings and construction account for.³



Challenges to measurement and accounting

With so much at stake, it's not surprising that corporations are scrambling to do a better job of understanding and reducing their carbon footprint and reliably reporting on their progress on climate actions to shareholders. But the challenges are numerous.

They often rely on information from their utility providers or landlords, who may not own all the underlying data needed for calculating and accounting emissions. In the energy industry, the use of ground-based sensors, continuous monitoring systems, laser detection, manned and unmanned aerial vehicles and both public (Tropomi) and private (GHGSat) satellites, oil and gas companies now have access to a wealth of data that can help in calculating emissions. Yet energy producers struggle to produce emission estimates that are credible with climate scientists, policy makers and the public as a whole. Part of this is related to technologies needed to accurately capture and analyze complex structured and unstructured data from a variety of sources for emissions accounting.



“The sustainability reports that O&G companies are publishing today represent a positive step. However, companies and stakeholders are looking for increased rigor and credibility” says Pravin Chandran, Director Blockchain KPMG US. “It’s self-reported data predominately from ground based instruments. They often take emission measurements from small samples at a point in time and extrapolate them across the company’s portfolio, or use outright estimates where no data exists at all for a class of assets; both approaches are dependent on static emission factors. These models assume everything is normal—that all wells are the same, that all terrain is the same, that climate patterns are unvarying. Existing methodologies essentially treat all emitters the same and risk underestimating total emissions.”⁸”

Leading organizations are looking to become much more precise. As research and technology progress, there is a growing interest among energy producers in calculating and triangulating ‘top-down’ emissions⁹ with models built on ground-based measurements, while providing transparency into emissions calculations, including traceability to the original source of data. Elsewhere, companies with significant real estate holdings are moving to measure energy consumptions at the building level, using instrumentation and IoT sensors to accurately calculate emissions with the climate accounting infrastructure. They are working with energy suppliers and others in their value chain to help those organizations develop the same capabilities. These companies are seeking to document that their energy consumption and offsets calculations are accurate—to verify, for example, the provenance of renewable energy certificates (RECs) purchased for offsets are directly generated from active windfarm and that there is no double spending of the RECs. This requires a wide range of data inputs, not just from IoT sensors and other direct measurement devices, but also from external sources, along with protocols for aggregating and analyzing them.

All these transactions need to be recorded on an immutable blockchain that can give all stakeholders, internal and external, the confidence they need to trust the data used for calculating a company’s emissions, and reporting and deriving insights for decision making.

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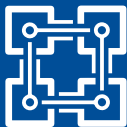


A robust climate accounting infrastructure: Six core components

Because the information demands of different industries can vary dramatically—even within broad industries—climate accounting challenges will vary from one company to the next. Solving for climate accounting requires a converged technology approach that allows the integration of disparate data source to create a comprehensive, high fidelity, data foundation needed to accurately calculate emissions for reliable and transparent reporting and for enhancing value realization through improved intervention planning and execution.

Regardless of the industry involved, KPMG believes a robust climate accounting infrastructure must consist of six core components that, in concert, will enable climate reporting that wins the confidence of internal and external stakeholders, auditors and regulators. These core components include:

1



Device integration

The foundational requirement for a strong climate accounting infrastructure is the collection of data from a diverse portfolio of devices with industrial protocols and communications technologies, ideally delivered in a cloud computing environment that promotes speed and flexibility.

2



Digital trust infrastructure

Using a blockchain ledger system, the company will be able to record and maintain the integrity of device data and digital assets with provenance, auditability and immutability.

3



Data storage

Using both data warehouses and data lakes, companies can process and store structured and unstructured data for ready access.



4



Applications interface

APIs and microservices, configured to integrate information technology and operational technology applications, will improve data fidelity and integrity. Operating technology in this instance refers to technology used to monitor and control the devices and processes that track things like energy use and carbon emissions.

5



Cognitive intelligence marketplace

With reliable data collected and readily available, companies can use machine learning and other artificial intelligence techniques to analyze that data and generate insights that let them take advantage of cost-saving or revenue-enhancing opportunities related to their use of energy and other natural resources.

6



Reporting

Building on the five core components listed above, companies can create, with a high degree of confidence and transparency, a range of standardized climate accounting reports for a diverse array of stakeholder groups, each tailored to the individual group's compliance requirements or expectations.



Learn more

KPMG believes corporations that build sustainable operating models and robust climate accounting infrastructures will have the insights to accelerate their transition to a low-carbon economy and become more resilient to environmental risks.

Building on its wealth of industry-specific experience and its expertise in digital transformation, KPMG is already working with corporate clients in a range of industries to develop their climate accounting infrastructures and integrate their ESG and operational strategies. To learn more about how KPMG could help with your climate accounting needs, please contact us.



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References

- 1 "Estimating and Reporting the Comparative Emissions Impacts of Products," by Stephen Russell, World Resources Institute, March 2019 - <https://www.wri.org/publication/estimating-and-reporting-comparative-emissions-impacts-products>
- 2 "Decarbonization: The Race to Zero Emissions," Morgan Stanley, November 25, 2019 - <https://www.morganstanley.com/ideas/investing-in-decarbonization#:~:text=The%20Race%20to%20Net%20Zero&text=Simply%20put%2C%20net%20zero%20is, balance%20between%20emissions%20and%20decarbonization.>
- 3 "2019 Global Status Report for Buildings and Construction," United Nations Environment Programme, 2019 - <http://wedocs.unep.org/bitstream/handle/20.500.11822/30950/2019GSR.pdf?sequence=1&isAllowed=y>
- 4 "Why COVID-19 Makes It Harder for Cities to Fight Climate Change," by Konrad Putzier, The Wall Street Journal, July 22, 2020 - <https://www.wsj.com/articles/why-covid-19-makes-it-harder-for-cities-to-fight-climate-change-11595332800?mod=searchresults&page=1&pos=1>
- 5 "Microsoft Will Be Carbon Negative by 2030," by Brad Smith, president, Microsoft, January 16, 2020 - <https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/>
- 6 "Apple Commits to be 100 Percent Carbon Neutral for its Supply Chain and Products by 2030," Apple press release, July 21, 2020 - <https://www.apple.com/newsroom/2020/07/apple-commits-to-be-100-percent-carbon-neutral-for-its-supply-chain-and-products-by-2030/>
- 7 "Reducing Greenhouse Gas Emissions," Walmart website, viewed July 22, 2020 - <https://corporate.walmart.com/global-responsibility/sustainability/sustainability-in-our-operations/reducing-greenhouse-gas-emissions>
- 8 "Assessment of methane emissions from the U.S. oil and gas supply chain," by Alvarez et al., July 13th, 2018 - <https://science.sciencemag.org/content/361/6398/186.full?ijkey=42lcrJvdyZA&keytype=ref&siteid=sci>
- 9 "Temporal variability largely explains top-down/bottom-up difference in methane emission estimates from a natural gas production region," by Vaughn et al., October 29th, 2018 - <https://www.pnas.org/content/115/46/11712>

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