

Essays

Artificial Intelligence and the Future of Climate Accountability Through Sports

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Climate change and its effects continue to intensify despite decades of international agreements and corporate sustainability pledges. One barrier to progress is the difficulty of understanding where emissions actually occur within complex and interconnected systems such as transportation networks, infrastructure operations, and global supply chains. At the same time, the rapid rise of artificial intelligence in system analysis has introduced a paradox: while it contributes to rising energy demand and environmental impact, it also offers opportunities to analyze and manage these same systems. This essay proposes that private-sector businesses could develop an AI-powered carbon intelligence platform for the global sports industry, capable of tracking, predicting, and reducing emissions in real time. By using data from transportation networks, energy systems, stadium operations, and event supply chains, this platform would allow leagues, teams, and event organizers to transition from basic reporting to actively managing their environmental impact as it occurs. The sports industry presents an especially ideal environment for this innovation due to its global reach, cultural influence, and diverse scale. Sporting events frequently bring together millions of participants, creating conditions where new technologies can be deployed, tested, and refined on diverse audiences. By transforming emissions measurement within sport into a real-time and transparent system, these platforms could reposition the sports industry as a leader in climate innovation and an example to be modeled in other industries.

Introduction

Climate change is widely recognized as one of the defining global challenges of the modern era (United Nations, n.d.). Governments, corporations, and international organizations have responded with ambitious climate commitments, including pledges to achieve net-zero emissions within the coming decades. Yet despite these commitments, global emissions continue to increase, and corporate companies continue to make empty promises to fend off climate activism.

The gap between climate ambition and climate progress highlights the greater issue: that the modern global economy remains extremely difficult to measure and manage in environmental terms. Specifically, measuring Scope 2 and Scope 3 emissions proves consistently challenging for nearly every organization. Most economic systems operate through interconnected networks of transportation, infrastructure, digital services, and global supply chains. Emissions occur at multiple stages of these networks, often across different countries and industries when examining multinational firms. As a result, organizations frequently struggle to identify where emissions originate and how they can be effectively reduced.

Traditional sustainability reporting methods are often poorly equipped to address this complexity. Carbon level reports are typically produced annually using static models and historical estimates, which rarely capture the real-time fluctuations of modern economic systems and struggle to account for short-term spikes in emissions generated by large gatherings and events (Devera Team, n.d.; Vujic et al., 2025). Advances in artificial intelligence offer an opportunity to fundamentally change this dynamic. AI systems can analyze enormous datasets, identify patterns, and generate predictive insight (Burnham, 2024, 2025). When applied to sustainability challenges, these tools offer the ability to measure environmental impact in real time and ultimately guide organizations toward more sustainable decisions in the short term.

This essay argues that artificial intelligence could allow businesses to develop a novel market-based solution to climate accountability through the creation of AI-driven carbon intelligence platforms tailored to the global sports industry. Major sporting events bring together millions of travelers, large infrastructure systems, and intricate supply chains, making them uniquely suited to testing new sustainability technologies. Additionally, major sporting events are high visibility settings, as successful events are viewed by hundreds of millions of viewers worldwide. By

analyzing emissions across transportation networks, stadium infrastructure, and event logistics in real time, these platforms could transform sport into a laboratory for climate innovation while creating examples for emissions accountability that can later be applied across scale.

The Measurement Problem in Global Climate Action

One of the most persistent challenges in climate policy is the problem of measurement. Reducing emissions requires accurate information about where emissions occur and how they change over time. Without reliable measurement systems, organizations cannot effectively design or evaluate climate strategies. Current emissions accounting systems rely heavily on estimation, as firms calculate emissions by applying their activity to standardized emission factors, though these estimates are subject to significant uncertainty, especially in complex supply chains (Greenhouse Gas Protocol, 2013; Intergovernmental Panel on Climate Change, 2023).

Large-scale sporting events highlight these challenges particularly well. Major international tournaments require large amounts of coordination among transportation providers, venue operators, hospitality services, broadcasters, vendors, and more. In many cases annually, millions of fans travel between cities while consuming energy and resources across different infrastructure systems and often across multiple countries or regions of the world. One example is the Summer 2024 Paris Olympic Games, where transportation accounted for 53% of the event's global carbon footprint (Mandard, 2024).

Global soccer tournaments also provide one of the most interesting and observable examples of the complexity of global sporting events, especially in the modern age. While World Cup events used to be restricted to one host city, events today involve dozens of host cities, massive international travel flows and fluctuations, and sophisticated logistics that must be coordinated years in advance. These events also generate enormous economic activity in their respective host cities but also produce significant environmental impacts (Allmers & Maennig, 2009; New Weather Institute, 2025). As the scale of these events continues to grow, they illustrate both the difficulty of measuring emissions and the opportunity to develop new technological solutions for doing so.

Generative AI as the Foundation of Emissions Tracking in Sports

Recent advances in artificial intelligence have significantly expanded the ability of both individuals and organizations to analyze many inputs. In the context of sustainability challenges within the sports industry, these sources would include satellite imagery of host cities, transportation data from fan travel patterns, stadium energy usage, financial transactions tied to event operations, and supply chain processes related to merchandise and concessions. AI's ability to take these inputs and optimize them allows for the possibility of systems that continuously monitor

and analyze emissions in sports settings and ultimately work to reduce them.

One potential example is a business platform known as Nil Impact, a digital infrastructure system designed to provide real-time carbon analysis across large-scale sporting events. Nil Impact would function as an openly accessible platform that combines multiple environmental data streams specific to sports ecosystems. Transportation networks would provide travel and logistics data for teams and spectators, energy grids would contribute electricity consumption patterns from stadiums and broadcasting operations, and supply chain systems would supply vendor and production information related to event logistics, merchandise, and food services. AI algorithms would then analyze these inputs to generate dynamic emissions models reflecting the real-time environmental impact of sporting events. Unlike traditional carbon accounting systems, which rely on historical estimates, Nil Impact would constantly be updating as new data become available throughout the lifecycle of an event. This would allow event organizers, leagues, and host cities to monitor emissions as they occur and respond quickly to any emerging issues during events.

For example, AI models could detect transportation bottlenecks caused by dramatic spikes in fan movement between venues that increase emissions or identify stadium infrastructures that are operating inefficiently during busy games. The platform could then generate targeted recommendations for reducing emissions, such as optimizing match scheduling to accommodate the travel demand, adjusting public transit routing for fans, or improving stadium energy systems. By integrating environmental intelligence directly into real-time operational decision-making, sports organizations could actively manage the environmental footprint of their events rather than simply reporting emissions after they occur. Similarly, sports teams themselves could use these carbon performance metrics to their advantage by publicly showcasing strong sustainability performance as part of their brand identity, positioning themselves as leaders in environmental responsibility.

Sports as a Facilitator for Climate Innovation

The global sports industry provides a uniquely powerful environment for testing and scaling sustainability technologies. Major sporting events concentrate millions of participants, spectators, and infrastructure systems within a highly visible and coordinated setting. Because these events require extensive logistical planning and involve many community and corporate partners, they offer opportunities to deploy new technologies across large populations.

Sport also holds significant cultural and social influence across all walks of life and throughout all regions of the world. Throughout history and ever-presently today, sports players, teams, and organizations have played visible roles in shaping public conversations around social issues, including racial equality, public health, and international cooperation. As a result, sustainability initiatives implemented within sport can reach global audiences and influence behavior far beyond stadiums or practice fields.

The sport industry can therefore serve as a powerful catalyst for climate innovation and should be considered an industry open to new and exciting climate innovation.

Broader Applications Across the Global Economy

Although large-scale sporting events provide an ideal testing ground, the applications of carbon intelligence platforms have the potential to extend far beyond the sports industry. The same systems that support global sporting events (transportation networks, energy systems, and supply chains) also support many modern cities and industries. AI-driven carbon intelligence platforms could therefore be deployed across scale in the global economy. Cities could use similar systems to monitor transportation emissions and optimize public transit networks. Corporations could use AI-driven emissions tracking to manage supply chain sustainability and improve environmental reporting. Governments could integrate carbon intelligence systems into climate policy frameworks to better monitor national emissions trends. Innovations first developed within the sports ecosystem could expand into other industries, ultimately helping to close the gap between climate commitments and measurable progress.

Conclusion

The challenge of climate change is no longer defined solely by a lack of ambition but by the lack of systems capable of translating that ambition into real-time, measurable action. Traditional approaches to sustainability report-

ing fail to capture the dynamics and fluctuations of modern economies, particularly in environments as large and as intricate as global sporting events. As emissions continue to rise despite increasing climate-forward commitments, today's modern tools must be utilized to combat this growing issue.

Through the development of carbon intelligence platforms such as Nil Impact, emissions tracking can shift from an after-the-fact exercise into a continuous, real-time system that changes how businesses manage their emissions. Within the sports industry, these platforms create opportunities for organizations to integrate sustainability directly into their operations, decision-making, and even fan engagement. Turning climate awareness into a team-to-team competition with league incentives tied to success would incorporate environmental action into the core of each league.

The global sports ecosystem provides a particularly intriguing environment for this transformation. Its visibility and cultural influence make it an ideal testing ground for climate innovation. By integrating carbon performance into competition, branding, and even fan engagement, sport can help frame sustainability as both a priority and a shared responsibility to the greater global population.

As these technologies grow, the systems and models developed within sport also have the potential to extend rapidly and eventually serve as successful examples of climate action through carbon intelligence and sports.

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